

**Barriers and facilitators to linkage, adherence and retention in care among HIV positive patients: An overview of qualitative systematic reviews using mega-aggregation framework synthesis.**

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in the Faculty of Medicine and Health Sciences at Stellenbosch University.



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## **Declaration**

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## Submission Format

As per the research assignment guidelines, this assignment is “submitted in the format of a completed manuscript for a (preferably subsidy-bearing) peer-reviewed scientific journal (i.e. that appears on the list of the approved scientific journals of the Department of Education) with the candidate as first author”. The selected peer-reviewed journal to which the format of this article is aligned is **BMC Systematic Reviews** and is presented, as it will be submitted to the journal in Part A of this document. Journal submission guidelines are available online at: <https://systematicreviewsjournal.biomedcentral.com/submission-guidelines> and in Part B of this document, which contains appendixes relevant to the academic submission of this paper.

## Abstract

**Background:** People living with Human Immunodeficiency Virus (PLHIV) continue to struggle with the complexities related to having a chronic disease and integrating antiretroviral treatment (ART) and care into their daily lives. This overview aimed to assess existing evidence related to self-reported barriers and facilitators to linkage to ART, adherence to ART and retention in care for PLHIV and to identify gaps in the evidence.

**Methods:** The novel pragmatic approach of mega-aggregation framework synthesis was developed, described and applied in this overview using Kaufman's interpretation of the socio-ecological framework. We included qualitative systematic reviews, up to July 2018, and used a systematic and rigorous approach to select reviews and extract data. We assessed methodological quality using an amended version of the Joanna Briggs Institute Critical Appraisal Checklist for Systematic Reviews.

**Results:** We included 33 systematic reviews, from low, middle and high income countries and included 1 111 964 HIV positive children and adults. Methodological quality varied considerably across reviews. Using the mega-aggregative framework approach, we found 544 unique third order concepts, from the included systematic reviews, and reclassified the third order concepts into 45 fourth order themes within the individual, interpersonal, community, institutional and structural levels of the Kaufman HIV Behaviour Change model. Our overview found that the main barriers and facilitators to linkage, adherence and retention such as psychosocial personal characteristics of perceptions of ART, desires, fears, experiences of HIV and ART, coping strategies and mental health, were interwoven with other factors on the interpersonal, community, institutional and structural level.

**Conclusions:** High quality qualitative review level evidence on self-reported barriers and facilitators of linkage, adherence and retention in care is lacking for adults and even more so for children. Overviews are useful in the identification of evidence gaps to inform new review questions and researchers are encouraged to build on the method of mega-aggregative framework synthesis as the place

of overviews become more prominent with the growing body of qualitative reviews.

**Systematic review registration:** The protocol of this overview was registered on PROSPERO (CRD42017078155) on 17 December 2017.

## **Keywords**

Overview, Mega-aggregation, Qualitative, Barriers, Facilitators, Human Immunodeficiency Virus, Linkage, Adherence, Retention

## Abstrakte

**Agtergrond:** Mense wat met 'n Menslike Immuniteitsgebrevsvirus (HIV) leef, sukkel steeds met die kompleksiteit wat verband hou met 'n chroniese siekte en die integrasie van antiretrovirale behandeling (ART) en sorg vir hul daaglikse lewens. Hierdie oorsig was daarop gemik om bestaande bewyse wat verband hou met self-gerapporteerde hindernisse en fasiliteerders te evalueer om aan ART te koppel, aan te pas by ART en behoud in die sorg vir PLHIV en om gapings in die getuienis te identifiseer. **Metodes:** Die nuwe pragmatiese benadering van mega-aggregasie raamwerk sintese is ontwikkel, beskryf en toegepas in hierdie oorsig deur Kaufman se interpretasie van die sosio-ekologiese raamwerk te gebruik. Ons het tot en met Julie 2018 kwalitatiewe sistematiese oorsigte ingesluit, en gebruik 'n sistematiese en streng benadering om resensies te kies en data te onttrek. Ons het metodologiese kwaliteit geassesseer met 'n gewysigde weergawe van die Joanna Briggs Instituut se kritiese beoordelingskontrolelys vir sistematiese resensies. **Resultate:** Ons het 33 sistematiese resensies ingesluit, van lae-, middel- en hoëinkomste-lande en 1 111 964 HIV-positiewe kinders en volwassenes ingesluit. Metodologiese kwaliteit het aansienlik gewissel oor resensies. Deur die mega-aggregatiewe raamwerkbenadering te gebruik, het ons 544 unieke derde orde konsepte, uit die ingesluit sistematiese oorsigte, gekry en die derde orde konsepte in 45 vierde orde temas binne die individuele, interpersoonlike, gemeenskaps-, institusionele en strukturele vlakke van die Kaufman HIV Behaviour Change Model herklassifiseer. Ons oorsig het bevind dat die vernaamste struikelblokke en fasiliteerders van koppeling, aanhouding en behoud, soos psigososiale persoonlike eienskappe van persepsies van kuns, begeertes, vrese, ervarings van MIV en KUNS, hanteringstrategieë en geestesgesondheid, met ander faktore op die interpersoonlike, gemeenskaps-, institusionele en strukturele vlak. **Gevolgtrekkings:** Hoë gehalte kwalitatiewe hersieningsvlakbewyse op selfversorgde struikelblokke en fasiliteerders van skakeling, handhawing en behoud in sorg, ontbreek aan volwassenes en

selfs meer vir kinders. Oorsig is nuttig in die identifisering van getuienisgapings om nuwe hersieningsvrae in te lig. Navorsers word aangemoedig om voort te bou op die metode van mega-aggregatiewe raamwerk sintese, aangesien die plek van oorsigte meer prominent word met die groeiende liggaam van kwalitatiewe oorsigte. **Sistematiese oorsigregistrasie:** Die protokol van hierdie oorsig is op 17 Desember 2017 geregistreer op PROSPERO (CRD42017078155).

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## **PART A**

**Title:**

Barriers and facilitators to linkage, adherence and retention in care among HIV positive patients: An overview of qualitative systematic reviews using mega-aggregation framework synthesis.

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## **Background**

### **The burden of HIV/AIDS**

Human Immunodeficiency Virus (HIV) represents the largest global public health challenge in history and since the beginning of the epidemic approximately 78 million people worldwide have been infected with HIV and 35 million people have died<sup>(1)</sup>. The Joint United Nations Programme on HIV/acquired immunodeficiency syndrome (AIDS) (UNAIDS) set the global 90-90-90-target to combat HIV infection by 2020<sup>(2)</sup>. The goal aims for 90% of all people to know their HIV status, of those who test positive, 90% should be linked to care, and of those being adherent to care, 90% will have achieved viral suppression. The latest statistics released estimates that in 2017, nearly 37 million people were estimated to be living with HIV (PLHIV) worldwide, however, only 60% were aware that they have HIV and only 49% of those who knew their status were accessing treatment<sup>(3)</sup>. The HIV burden continues to vary considerably between countries, with regions in Africa having the highest HIV prevalence with HIV being the leading cause of death in South Africa<sup>(1)</sup>. To date there is no known cure for AIDS and improved patient outcomes, prevention of transmission and long-term morbidities are affected by the timing of linkage to care, adherence to treatment and retention in care.

### **Linkage to ART, adherence to ART and retention in care**

The expansion of access to HIV testing has led thousands of people to learning about their HIV status, however only a small percentage of people are enrolling in HIV care and treatment programmes at time of diagnosis<sup>(4)</sup>. Enrolment in ART care following a positive HIV test is referred to as linkage to care in this overview. While no specific criterion exists with regards to linkage to care, it has been previously defined as one visit or more during the first six months of receiving a positive diagnosis and the initiation of antiretroviral treatment<sup>(5)</sup>. Adherence to ART refers to the extent to which a patient who is HIV positive

follows their prescribed regimen of care and takes their medication as they should<sup>(6,7)</sup>. Since the introduction of Antiretroviral Therapy (ART) there has been a decline in AIDS related deaths and life expectancy for those infected with HIV has increased<sup>(8)</sup>. Viral suppression is optimal when PLHIV have an adherence rate of 95% or more<sup>(9)</sup>. Retention in HIV care is described as constant attainment of the suitable medical care that includes attending follow-up appointments, medical tests or any other activity that was suggested by a healthcare practitioner to be maintained<sup>(10)</sup>.

### **HIV Behaviour Change Model**

Although access to HIV care has improved significantly over the past few years, PLHIV still face numerous challenges when it comes to initiating care and staying on treatment. The complexities and interrelatedness of the factors influencing behaviour of PLHIV, including barriers and facilitators, can be found on multiple dimensions for linkage to ART<sup>(5)</sup>, adherence to ART<sup>(6,7,11)</sup> and retention in care<sup>(10,12)</sup>. The dimensions within which barriers and facilitators are understood in this overview are based on the Kaufman et al<sup>(13)</sup> interpretation of the socio-ecological framework, which he refers to as the “HIV Behaviour Change Model”. The model includes five broad domains, namely: 1. Individual factors (includes factors such as knowledge, emotions, motivation, mental health, adverse drug reactions and comorbidities), 2. Interpersonal and network factors (includes factors such as relationships, social networks and interpersonal violence, 3. Community factors (includes factors such as stigma, peer pressure and cultural norms), 4. Institutional and health system factors, (includes factors such as provision of services, service integration and relationships with health care workers), and 5. Structural factors (includes factors such as poverty, political context and gender equity). This framework is useful in understanding the multilevel barriers and facilitators that PLHIV experience when they decide to link to ART, adhere to ART and engage in care consistently.

## **Why it is important to do this overview**

PLHIV continue to struggle with the complexities related to being HIV positive and integrating ART treatment and care into their daily lives. Unsuccessful interventions and the target driven 90-90-90 goals have increased researchers' commitment to understanding the human experience of living with HIV and engaging in the HIV treatment cascade. A quick search of published articles in November 2016 elicited over 25 systematic reviews in this area of study. To date there is no coherent sense of what is known across populations and settings; and there is uncertainty about the quality of the existing evidence. This study aimed to provide an overview of available evidence on self-reported barriers and facilitators to linkage to care, adherence to treatment, and retention in care, for child and adult HIV populations across contexts, using a systematic approach. The primary objective was to gather, appraise and synthesize the systematic review-level evidence on the barriers and facilitators on linkage to ART, adherence to ART and retention in care in HIV positive patients. The secondary objective was to identify evidence gaps for self-reported barriers and facilitators to linkage to ART, adherence to ART and retention in care among persons living with HIV using the socio-ecological framework to make recommendations for future research and support the reduction of research waste.

## **Methods**

### **Protocol and Guidelines**

This overview used guidance from the Johanna Briggs Institute Methodology for Umbrella Reviews<sup>(14)</sup> and the PRISMA Extension for Scoping Reviews Checklist (PRISMA-ScR)<sup>(15)</sup> (Additional file 1) guided reporting of the overview, a mega-aggregation of qualitative systematic reviews within the Kaufman et al.<sup>(13)</sup> framework for HIV Behaviour Change. The protocol<sup>(16)</sup> pertaining to this overview was registered on PROSPERO (CRD42017078155)

on 17 December 2017. Differences between the protocol and the manuscript are reported in Additional file 2.

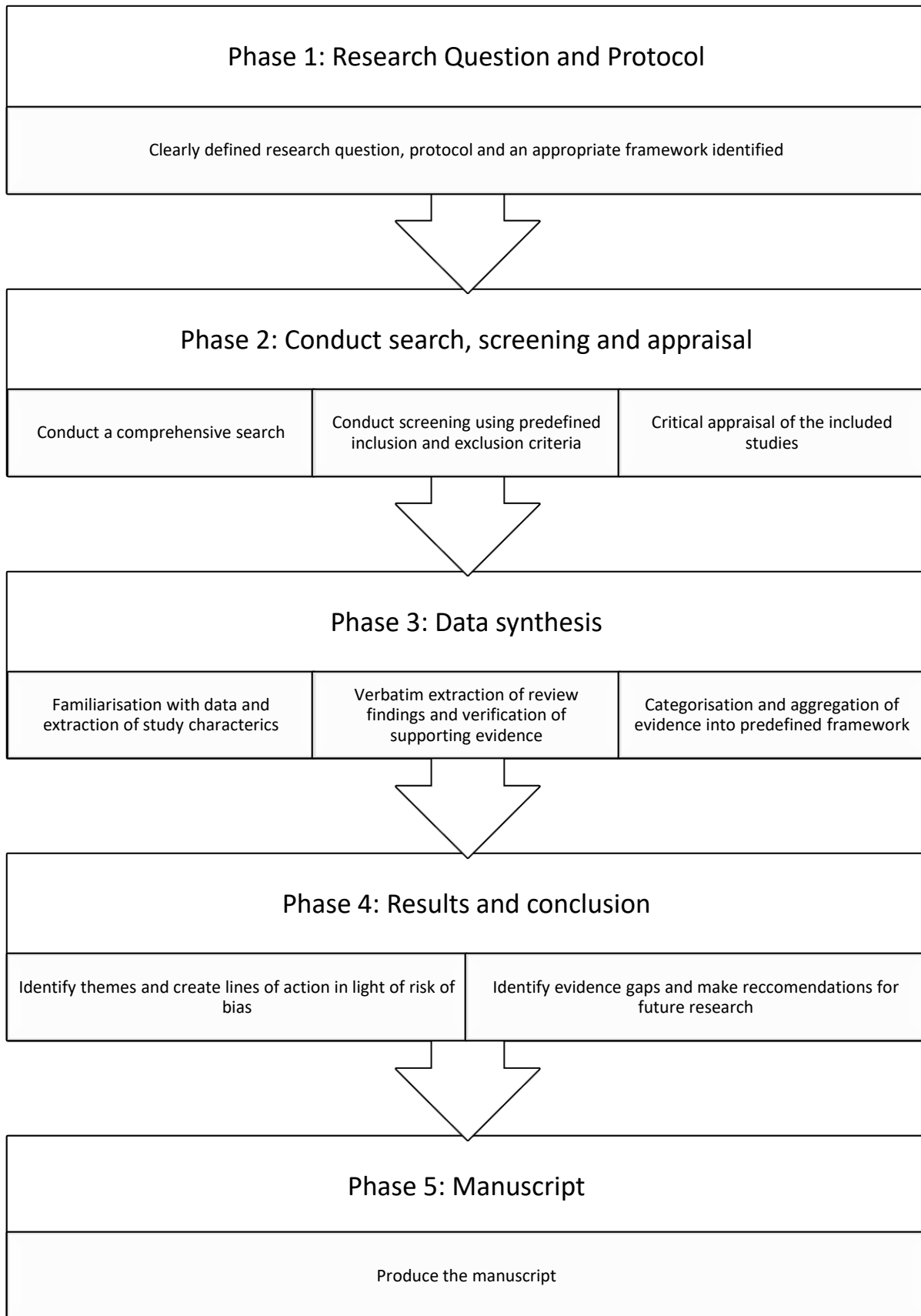
## **Paradigmatic Stance**

Overviews of reviews aim to provide a single synthesis or summary from multiple systematic reviews<sup>(17)</sup>. Qualitative systematic reviews often have a theoretical underpinning to understand findings and interpret meaning. Qualitative research is usually positioned in the interpretive or critical-realist paradigm. Another approach to qualitative evidence synthesis is meta-aggregation, which is based on the philosophy of pragmatism<sup>(18,19)</sup> and users of this method aim for immediate usability of the review findings. Mega-aggregation adopts a pragmatic approach and does not focus on the generation of new theory but rather on providing an overview of the existing evidence, identifying evidence gaps and making recommendations for future research.

## **Overview Design**

In the context of the pragmatic stance and the large number of existing systematic reviews, a predetermined framework<sup>(13)</sup> with broad categories was selected to guide the aggregation and synthesis within this overview, which built on the steps in methods development for, conducting overviews<sup>(20)</sup>, qualitative evidence synthesis<sup>(21,22)</sup>, systematic review synthesis<sup>(17,23,24)</sup>, meta-aggregation<sup>(18,19,25)</sup> and framework synthesis<sup>(26,27)</sup>. The novel approach of *mega-aggregation framework synthesis* was developed and utilised to identify evidence gaps and to inform future research from the evidence collated within included systematic reviews. The mega-aggregative approach includes 5 phases containing 10 steps, as proposed in Figure 1.

Figure 1: Steps of the overview using mega-aggregation framework synthesis of qualitative systematic reviews



## Criteria for Considering Systematic Reviews for Inclusion

### *Types of reviews*

Systematic reviews were defined as those reviews that had predetermined objectives, predetermined criteria for eligibility, searched at least two data sources, of which one needed to be an electronic database, and performed standardised data extraction<sup>(28)</sup>.

Systematic reviews were considered eligible if they included only qualitative studies. Reviews containing qualitative and quantitative studies were still considered eligible if outcomes were self-reported and a narrative description was used to summarise review findings. Systematic reviews only synthesising quantitative studies or only examining adherence pre- or post-exposure prophylaxis were excluded. No reviews were excluded based on whether quality assessments were conducted or not.

### *Types of participants*

Eligible participants included children and adults living with HIV. Reviews were excluded if the primary sample of interest included more than 50% of the population who were not HIV positive. Although people living with HIV were the target participants in this review, information obtained from health professionals and primary caregivers were considered if it pertained to perceptions of barriers and facilitators to linkage, adherence and retention in care for HIV positive patients.

### *Types of Issues*

Eligible reviews addressed linkage to ART, adherence to treatment and retention in care of persons testing positive for HIV. The enrolment in ART care following a positive HIV test is referred to as linkage to care. Adherence refers to the extent to which a patient follows a prescribed regimen of care<sup>(6,7)</sup>. Retention in care is described as constant attainment of the suitable medical care that includes attending follow-up appointments, medical tests or any other activity that was suggested by a healthcare practitioner to be maintained<sup>(10)</sup>. Reviews

addressing the issues related to prevention including Pre-Exposure Prophylaxis (PREP) and pre-ART were excluded from this review.

#### *Types of contexts*

Reviews synthesising information from high-, middle- and low- -income countries were included in this overview. The geographic settings included rural and urban across all global regions.

#### *Types of outcomes*

The review level outcomes of interest were self-reported barriers and facilitators to linkage to ART, adherence to ART and retention in care. Outcomes that were measured and reported using statistical associations between various factors and linkage, adherence and retention in care were not included.

### **Systematic Reviews Search and Selection**

A comprehensive search for systematic reviews up to 25 July 2018 was conducted in the Cochrane Library (specifically the CDSR and DARE), The Campbell Library, MEDLINE via PubMed, SCOPUS, and CINAHL EBSCHOhost. PROSPERO was also checked for ongoing systematic reviews. Experts in the field were contacted and reference lists of included reviews were checked to identify further potential reviews for inclusion. An additional search on GOOGLE was conducted to search for reviews not contained within the databases. Key terms included in the search strategy were 'HIV', 'linkage', 'adherence', 'retention in care', 'ART', 'qualitative' and 'systematic reviews'. Search terms were modified appropriately for the various databases. Detailed search strategies for all databases are reported in Additional file 3. No language, geographic or time restrictions were used in the search. Two authors (LH and AR), using Covidence<sup>(29)</sup>, independently and in duplicate screened titles and abstracts of the records retrieved by the electronic searches for relevance; based on the participant characteristics, issues addressed, study design and outcomes. Full-texts were

retrieved for all potentially eligible reviews and were screened independently and in duplicate by two authors (LH and AR). Disagreements were recorded in Covidence<sup>(29)</sup> and these were resolved by consensus or through discussion with a third author (IEW). Reviews were categorised as included, ongoing, awaiting assessment or excluded with reasons.

## **Data Extraction**

The data extraction took place in two phases, 1) data extraction of characteristics of included studies and 2) data extraction of barriers and facilitators for data synthesis.

### *Data extraction of characteristics of included reviews and their primary studies*

Data was extracted by the first author (LH) and checked by a second author (AR) using a pre-specified piloted data extraction form in Microsoft EXCEL (Additional file 4). The extracted data in Phase 1 included information on databases searched, date of the last search, what the reviews authors searched for and what they found in terms of types of studies, types of participants, the issue of interest, the setting or context, barriers and facilitators related to issues of interest. Details of critical appraisal tools, theoretical frameworks or models, methods of synthesis and limitations were also extracted. Information about the primary studies in the included systematic reviews were extracted, and these included the author names, year of publication, countries included and types of participants from primary source studies relevant to the overview, in order to describe the overlap of primary studies in systematic reviews included in the overview. Review authors were contacted for missing information. Discrepancies in data extraction were discussed and once consensus was reached, the second phase commenced.

### *Data extraction of barriers and facilitators for data synthesis*



The first author (LH) read the systematic reviews a number of times to become more familiar with the findings and recommendations made by the review authors. Following this, LH extracted barriers and facilitators verbatim into EXCEL for each review and categorised them according to the pre-specified Kaufman framework<sup>(13)</sup>. A second author (AR) checked the extracted barriers and facilitators in the EXCEL spreadsheet, and where discrepancies were raised, consensus was reached through discussion.

### **Quality Assessment**

All included systematic reviews were subjected to rigorous quality appraisal by the first author (LH) and checked by a second author (AR). Discrepancies were resolved through discussion. Risk of bias was assessed using an amended version of the Joanna Briggs Institute Critical Appraisal Checklist for Systematic Reviews<sup>(14)</sup> (JBI-SR-Checklist) (Table 1). The JBI-SR-Checklist contains 11 guidance questions for the appraisal of systematic reviews. As this tool can be used for quantitative or qualitative reviews, we only considered those guidance questions that were appropriate for the assessment of qualitative reviews. Therefore, we omitted the question ‘Was the likelihood of publication bias assessed?’, as this was not applicable to this overview. Furthermore, we added a question that we thought was important to consider, namely ‘Was the screening and study selection appropriate?’. Each question was answered as “yes”, “no”, or “unclear”. The critical appraisal guide<sup>(14)</sup> provides key considerations for review authors when conducting appraisal. For the purpose of this overview specific decision rules from the original JBI-SR-Checklist manual<sup>(14)</sup> were revised (Additional file 5) and clarified for making judgements about risk of bias, in order to ensure consistency between reviewers and across included reviews. No study was excluded based on the results of the quality assessment but rather it was used to identify weaknesses in study methodologies and to strengthen and inform the interpretation of the results of the systematic reviews.

Table 1: Revised JBI 11-item checklist for systematic reviews

Revised JBI Systematic Review Checklist Item <sup>(14)</sup>
1. Is the review question clearly and explicitly stated?*
2. Were the inclusion criteria appropriate for the review question?*
3. Was the search strategy appropriate?*
4. Were the sources and resources used to search for studies adequate?*
5. Was the screening and study selection appropriate?*
6. Were the criteria for appraising studies appropriate?*
7. Was critical appraisal conducted by two or more reviewers independently?
8. Were there methods to minimize errors in data extraction?*
9. Were the methods used to combine studies appropriate?*
10. Were recommendations for policy and/or practice supported by the reported data?
11. Were the specific directives for new research appropriate?

\*Items used in the calculation of quality assessment score

We assessed the overall quality of systematic reviews as either low, medium or high, by considering items 1-5, 8 and 9. We excluded items 6 and 7, as the area of quality assessment in qualitative review is still being debated in the field and the philosophical underpinning and epistemological reasoning behind conducting or not conducting quality assessment are unique to the rationale and question of the review authors<sup>(21)</sup>.

Table 2: Decision rules for low, medium and high risk of bias in the conduct of the included systematic reviews

Rule	Decision on the quality of the conduct of the systematic review
Two or more 'No'	Low quality
One 'No' and 3 or more 'Unclear'	Low quality
One 'No' and 0-2 'Unclear'	Medium quality
Zero 'No' and 3 or more 'Unclear'	Medium quality
Zero 'No' and 1-2 'Unclear'	High quality
Zero 'No' and zero 'Unclear'	High quality

We excluded items 10 and 11, as these questions do not relate to risk of bias, but rather to the validity of the findings, as stated in the JBI-SR-Checklist manual.<sup>(14)</sup> Table 2 explains how we made decisions about the overall quality of included reviews.

## **Data synthesis**

The principles of meta-aggregation and framework synthesis were merged together to design the novel approach coined '*mega-aggregative framework synthesis*' for this overview. Meta-aggregation is a method of data synthesis used in qualitative evidence synthesis and focuses on aggregating primary level findings into categories and then further aggregating those categories into synthetic statements that may be used for policy and practice without losing the critical interpretive value of the qualitative findings<sup>(19)</sup>. Mega-aggregation is a method of qualitative synthesis and aims to aggregate third order review level data into higher order themes, called fourth order themes with the purpose of identifying the scope of the available review level evidence and make recommendations for research and practice.

In keeping with recent guidelines in selection of approaches for meta-synthesis and the large number of existing reviews available on the topic of this overview, a framework was applied to the mega-aggregative approach. Using a broad framework in mega-aggregation is useful for categorising the themes and findings of systematic review papers which, although may have included various qualitative designs, consider the same objective or issue and outcomes.

The mega-aggregative framework synthesis approach comprises of five distinct phases (Figure 1). The *first phase* is the identification of a clearly defined review question, the identification of an appropriate framework, and to develop a rigorous protocol that can be ratified and registered online or published. The *second phase* it to conduct a comprehensive search followed by conducting in duplicate and independent screening using a predefined

inclusion and exclusion criteria. This phase also includes the critical appraisal of studies using a reliable tool with two or more appraisers. The *third phase* includes the data synthesis of the review level data and this is initiated by the familiarisation with data through careful reading and discussion with the review team. Using a predefined data extraction tool, the review level findings are extracted verbatim and considered third order concepts. The third order concepts are verified in the review by checking for supporting evidence, which can include a reference to the primary studies, direct quotes, visual or text evidence from the primary study, visual representations such as tables and figures with references to the primary studies that the finding was based on. Only findings with supporting evidence is included in the overview synthesis. We did not include primary level quotations or supporting evidence of review level findings as the aim of this review was to provide an overview of existing review level evidence and to thematically categorise the review level barriers and facilitators of linkage, adherence and retention. Additionally, we were not privy to all the primary data and did not want to risk using quotes out of context. The third order concepts were coded into fourth order concepts further categorised into the appropriate framework dimensions. The *fourth phase* focuses on the thematic analysis of the fourth order concepts within each framework dimension and the creation of synthetic statements, and the identification of evidence gaps to inform future research. This synthetic statements and evidence gaps can form part of the discussion or within the text of the results. The *fifth phase* is the production of a manuscript that is transparent and contains evidence of the synthesis process that was followed.

For this overview we conceptualised a protocol and identified the Kaufman framework<sup>(13)</sup>, we conducted a comprehensive search and two authors did screening, data extraction and critical appraisal. For the data synthesis, we extracted the review levels findings verbatim; we reclassified the third order concepts into fourth order concepts, then fourth order themes. The overall number of findings contributing to each of the fourth order themes of the

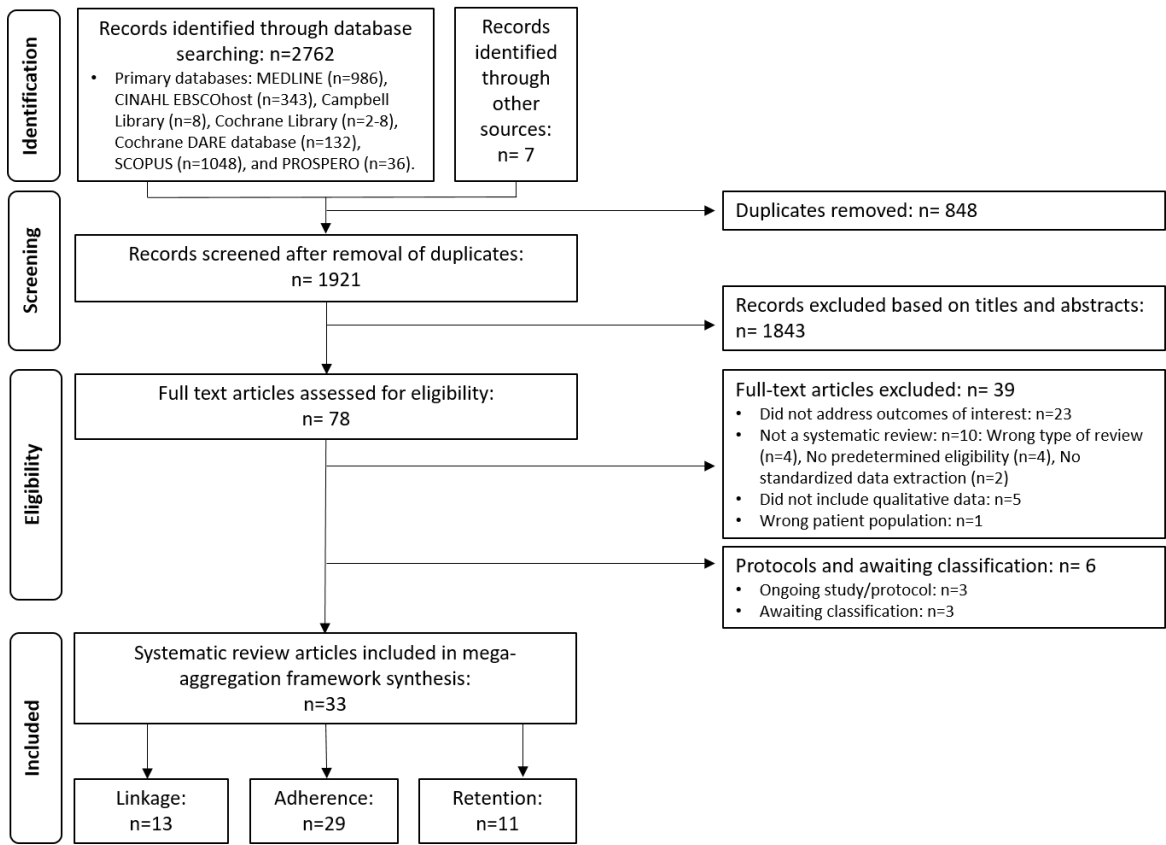
overview were examined, and the most emergent (meaning the fourth order themes with the most findings) barriers and facilitators, across included systematic reviews were discussed in the manuscript. Evidence of all findings are presented in tables in-text and within the additional files of the manuscript. Additionally, we identified the evidence gaps and explored the gaps by country income classification, population group, and fourth order themes. Further detail on the application of mega-aggregation framework synthesis to this overview is provided in Additional file 6.

## Results

### Overview of the search results

The database search resulted in 2762 article citations and an additional seven reviews were identified through other sources (two within the reference lists of included reviews and five through other readings). After the removal of duplicates, 1921 citations were imported into Covidence and the title and abstracts were screened, resulting in 78 retrieved for full text review. Thirty-nine reviews were excluded, most reviews did not fit the criteria of a systematic review (n=10), did not contain qualitative primary studies or data (n=4) or did not include the target population group (n=1) (Additional file 7). Despite numerous efforts, we were unable to obtain the full texts for two reviews and are waiting on information that determines full text inclusion from one author and have classified these three reviews as 'awaiting assessment'. Three ongoing reviews or protocols were found in our search (Additional file 7). We included 33<sup>(30,31,40–49,32,50–59,33,60–62,34–39)</sup> systematic reviews in this overview. Figure 2 describes the flow of reviews through the different stages of this overview using the PRISMA flow diagram<sup>(63)</sup>.

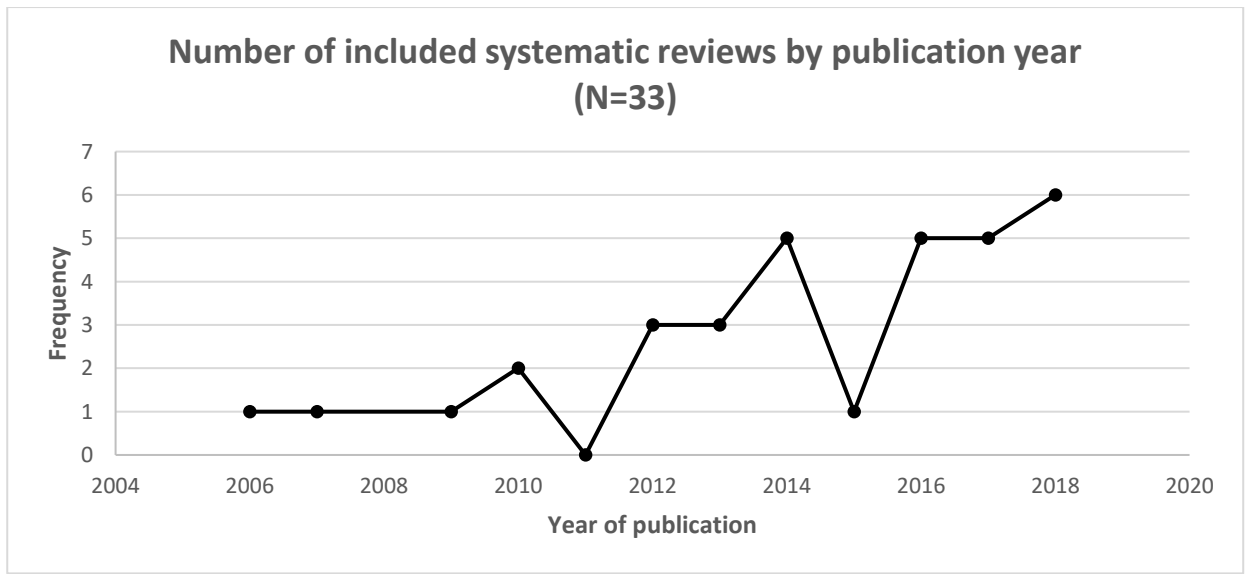
Figure 2: PRISMA Flowchart



**Description of the systematic reviews included in the overview**

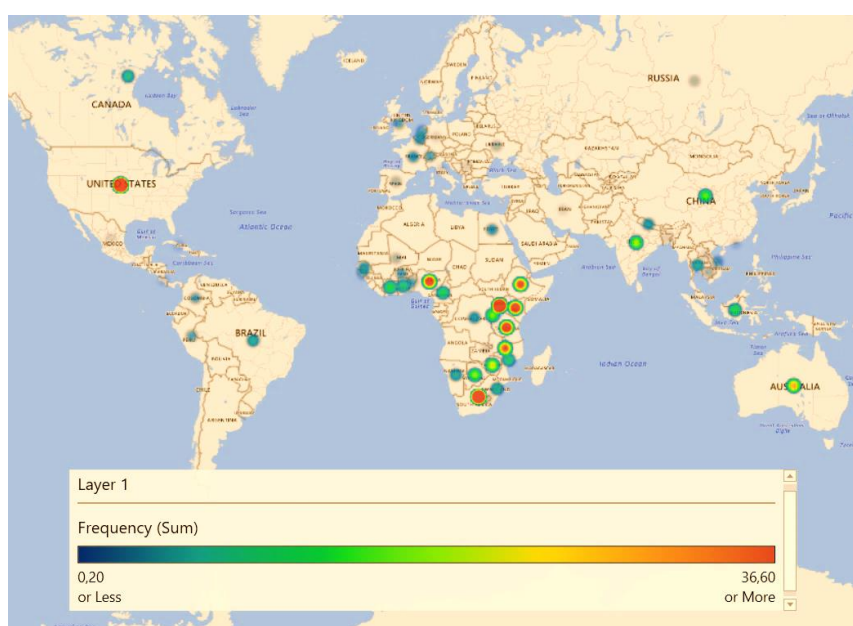
Included systematic reviews were published between 2006 to June 2018, peaking at 6 publications in 2018 (Figure 3).

Figure 3: Number of included systematic reviews by publication year



The included reviews (N=33) synthesised primary studies that were conducted in both high-income countries and low-and-middle-income countries with a large concentration of included primary studies being conducted in sub-Saharan Africa (Figure 4). The self-reported barriers and facilitators of 1 156 540 children and adults living with a positive diagnosis of HIV are included in this overview. Some reviews included high-risk populations, such as pregnant and post-partum women, youth and adolescents, commercial sex workers, men who have sex with men, transgender persons, prisoners, intravenous drug users and foreign nationals. Two reviews on children and adolescents included data from caregivers.

Figure 4: Distribution of countries included in the included systematic reviews (N=33)



We applied the conceptual definitions of the outcomes as per the overview protocol and we found that 13 reviews addressed the outcome of linkage to ART, 29 addressed the outcome of adherence to ART and 11 addressed the outcome of retention in care. The method of synthesis of the reviews varied and included thematic analysis, thematic content analysis, content analysis, narrative synthesis, meta-synthesis and meta-aggregation.

Table 3: Table of included studies (N=33)

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
<b>Ammon, 2018 [30]</b>	3 June 2016 to 15 August 2016	N=3145 participants: 2937 adolescents aged 10-19; 191 caregivers (parents, non-parental caregiver, biological relative, non-relative, or foster-carer) and 17 healthcare providers. Some ALHIV did not know about their HIV positive status.	Adherence	Sub-Saharan Africa: n=1 study each from Congo DRC, Ghana, Kenya, Rwanda, South Africa, Zambia, Zimbabwe and n=2 studies from Uganda.	None	11 studies: Qualitative (7), Quantitative (1) and Mixed Methods (3)	Thematic synthesis	Low
<b>Barroso, 2017 [31]</b>	2008 to 2013	N=6189 participants: n=4830 PLHIV (2197 female and 1850 male, 783 unspecified) and n=1359 included provider participants (caregivers, health care providers, traditional healers, local community leaders, pharmacists, policymakers, stakeholders, peer counsellors, facility managers, volunteers, and clinical trial coordinators).	Linkage Adherence	China (5), Nigeria (5), South Africa (19), Tanzania (8), Uganda (16), and Zambia (9). All other locations for data collection contributed to fewer than five reports (Countries not reported)	Europe (9), United States (28)	127 studies: Qualitative (127)	Thematic synthesis	Medium



First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
<b>Bolsewicz, 2015 [32]</b>	2003 to 2013	PLHIV, excluding drug users, mothers, adolescents, prisoners, sex workers in Canada, UK and Australia	Linkage Adherence	None	Canada (8), UK (3) and Australia (6), reports (US)		Thematic synthesis	High
<b>Bravo, 2010 [33]</b>	1990 to November 2009	N=4215 PLHIV including drug users and women caring for children <18 years; n= 4022 in Quantitative and n=193 Qualitative studies.	Linkage Adherence	Botswana (1)	USA (7), UK (1), France (1)	10 studies: Qualitative (5) and Quantitative (5)	Thematic meta-analysis	Low
<b>Chop, 2017 [34]</b>	Up to 18 February 2018	Women living with HIV	Adherence	Zambia (1), Swaziland (1) and Democratic Republic of Congo (1)	France (1)	4 studies: Qualitative (3) and Quantitative (1)	Thematic analysis	Low
<b>Colvin, 2014 [35]</b>	1 January 2008 to 26 March 2013	N=875 308 participants: HIV-infected pregnant and/or postpartum women and/or health care providers delivering antenatal care, ART and/or PMTCT. A few studies included partners and/or family members.	Linkage Adherence Retention	LMIC: Sub-Saharan Africa (38) and Latin America (2) and Asia (2)	None	42 studies: Qualitative (14), Quantitative studies (25) and Mixed Methods (3)	Narrative meta-synthesis	High

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
<b>Croome, 2017 [36]</b>	2005 to 24 May 2016	N=37175 Adult HIV positive participants	Adherence	Benin, Cote d'Ivoire and Mali (1), Botswana (3) Burkina Faso (1), Cameroon (4) Cote d'Ivoire (1), DRC (2), Ethiopia (20), Ethiopia and Uganda (1), Ghana (4), Guinea-Bissau (1), Kenya (16), Kenya and Malawi (1), Kenya and Uganda (1), Lesotho (1), Malawi (2), Mali (1), Mozambique (3), Namibia (4), Nigeria (13), Nigeria, Tanzania and Uganda (1), Rwanda (3), Senegal (1), South Africa (30), Tanzania (10), Tanzania, Uganda and Zambia (1), Togo (1), Uganda (19), Zambia (6), Zimbabwe (2)	None	154 studies: 83 Qualitative (83), Quantitative (67) and Mixed methods (4)	Thematic content analysis	Medium
<b>Engler, 2018 [37]</b>	1996 to 10 March 2016	N=1482 adult HIV positive participants	Adherence	None	United States (n =35), Europe (n=3)	40 studies: Qualitative (40)	Thematic analysis	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
		(including Men, Women, MSM, IDU)			(Switzerland, the Netherlands and Belgium) and Canada (n=2).			
<b>Ferguson, 2012 [38]</b>	1st January 2000 to 31st December 2010	N=819 Pregnant women with HIV. Not all studies included reported sample size.	Retention	Kenya (1), South Africa (1), Tanzania (1), Zimbabwe (1), Malawi (2), Uganda (1)	None	7 studies: Qualitative (3) and Quantitative (4)	Thematic content analysis	Low
<b>Flores, 2018 [39]</b>	2008 to 2013	N=3257 participants: 2263 patients or HIV-positive participants from the community (740 men, 1008 women, 78 transgender individuals and 437 people with unspecified gender). 994 other people were included in the studies such as family members, friends, physicians, nurses, treatment advocates, caregivers, clinic staff, program directors, social	Linkage Retention	followed by South Africa (9), Uganda (6), Nigeria (4), Zimbabwe (4) and China (4); 20=unspecified	United States (22 reports)	69 studies: Qualitative (69)	Thematic meta-synthesis	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
		workers and other key stakeholders.						
<b>Gaston, 2013 [40]</b>	1 January 2001 to 31 May 2012	African Americans LHIV Total n=2846	Adherence	None	USA (16)	16 Studies: Qualitative (6) and Quantitative (10)	Thematic analysis	Low
<b>Geter, 2018 [41]</b>	January 2005 to December 2016	African American females living with HIV Total n=830	Adherence Retention	None	US (14)	14 studies: Qualitative (10) and Quantitative (4)	Thematic content analysis	Low
<b>Govindasamy, 2012 [42]</b>	01 January 2000 to 31 May 2011	PLHIV in sub-Saharan Africa and health care workers.	Linkage	South Africa (6), Uganda (6), Kenya (2), Tanzania (2), Zambia (2), and 1 study each from Ethiopia, Swaziland, Mozambique, and South Africa and Zimbabwe.	None	21 Studies: Qualitative (11), Quantitative (7) and Mixed Methods (3)	Thematic content analysis	Medium
<b>Heestermans, 2016 [43]</b>	January 2002 to 27 October 2014.	161 922 Adult PLHIV	Adherence	Sub-Saharan Africa		146 studies: Qualitative (37), Quantitative (112) and	Narrative synthesis	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
						Mixed methods (3)		
<b>Hodgson, 2014 [44]</b>	1st January 2008 to 26 March 2013	Pregnant women and postpartum women infected with HIV	Linkage Adherence Retention	Ghana (1), Nigeria (1), Malawi (5), South Africa (6), Zimbabwe (2), Tanzania (2), Kenya (5), Uganda (3), Brazil (1), Rwanda (1), Zambia (1), Latin America (1)	Australia (1), USA (3), France (1),	34 studies included in the review: Qualitative (12), Quantitative (16) and Mixed Methods (6)	Thematic analysis	Medium
<b>Katz, 2013 [45]</b>	Up until February 2013	PLHIV between 18-30 years old, providers of HIV care, single persons and those in intimate partnerships and persons with and without children. High risk groups including men who have sex with men, injecting drug users and commercial sex workers.	Adherence	Uganda (9), South Africa (5), India (2), and 1 study each from DRC, Brazil, Botswana, Tanzania, Thailand, Egypt, Ethiopia, Vietnam, Nepal, Nigeria, Asia, Zambia and China. Four countries were not reported.	US, (1)	75 Studies: Quantitative (41) and Qualitative (34)	Meta-ethnography	Low
<b>Knettel, 2018 [46]</b>	January 2012 to June 2017	736 Pregnant and postpartum women on option B+.	Retention	Malawi (13 studies), Uganda (4), Zimbabwe (3), Mozambique (2), and 1 each from Cameroon, Ethiopia,	None	13 Studies: Qualitative (13)	Thematic analysis	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
				Rwanda, South Africa, and Tanzania				
<b>Lancaster, 2016 [47]</b>	Up to 22 November 2013 and a second search up to 30 July 2015	N=2721 Female sex workers living with HIV	Linkage Adherence	Rwanda (n = 1), Zimbabwe (n = 2), Benin (n = 2), Burkina Faso (n = 1), Nigeria (n = 1), Swaziland (n = 1), Kenya (n = 1), and Uganda (n = 1).	None	10 studies: Qualitative (3), Quantitative (6) and Mixed Methods (3)	Thematic analysis	Medium
<b>Lankowski, 2014 [48]</b>	Databases up until August 2011 and abstracts from 2002-2004 and from 2006-2011.	N=69 506 Adults and children LHIV, HIV infected HCW, HC Providers, HIV infected rape victims, pregnant and postpartum women with HIV.	Linkage Adherence Retention	Uganda (10), Kenya (3), Zambia (2), Malawi (4), Nigeria (3), Cote d'Ivoire (1), Botswana (4), Tanzania (4), Togo (1), Ethiopia (1), South Africa (2), The Gambia (1), Namibia (1)	None	34 studies: Qualitative (16) and Quantitative (18)	Content analysis	Low
<b>Lazuardi, 2018 [49]</b>	1990 to 2016	PLHIV: including injecting drug users, pregnant women, MSM, transgendered people, women, men and sero-discordant couples. Found information related to service providers,	Linkage Adherence Retention	Indonesia (11)	None	11 studies: Qualitative (11)	Thematic analysis	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
		community members, TB patients, caregivers and community organisers.						
<b>Li, 2016 [50]</b>	1 January 2000 to 21 February 2015	Total: N=192434 HIV-infected individuals including adults, children, adolescents, pregnant and post partum women and caregivers.	Adherence	Botswana, Tanzania and Uganda (1), Peru (1), Ukraine (1), Zambia (1), Rwanda (1), Ethiopia (1), Uganda (1), Nepal (2), Cuba (1), Southern Malawi (1), Uganda and Zimbabwe (1), China (2), Tanzania (3), South Africa (3)	USA (14), Netherlands (1), Canada (1), Australia (1), Belgium and Netherlands (1), Switzerland (1)	39 studies: Qualitative (39)	Thematic analysis	Medium
<b>Lytvyn, 2017 [51]</b>	1 January 2000 to 11 February 2017	N=1165: Women considering pregnancy (140), pregnant women (408), and post partum women (602). Couples desiring and/or intending to have children (15) also included.	Adherence	Puerto Rico (1), Nigeria (1), Kenya (2), Swaziland (2), Malawi (2), India (1), South Africa (1), Zimbabwe (1), and	Australia (1), USA (3)	15 Studies: Qualitative (15)	Meta-ethnography	High
<b>Merten, 2010 [52]</b>	2000 to 2008	N=2044+ Community members, policy makers, HIV+ patients,	Adherence	Uganda (6), Zambia (5), South Africa (6), Burkina Faso (1),	None	32 studies: Qualitative (32)	Meta-ethnography	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
		health workers, female HIV+ patients, healthcare actors, In-school and out-of-school youth, patients who attended the ARV clinic, counsellors, HIV+ patients on ART for 6 months, care givers, family care givers, key informants, HIV+ patients from IDP camps, treatment partners		Malawi (2), Tanzania (5), Botswana (2), Kenya (1), Nigeria (1), Ethiopia and Uganda (1), Burkina Faso, Cote d'Ivoire and Mali (1), Nigeria, Tanzania and Uganda (1)				
<b>Mey, 2016 [53]</b>	January 2000 to 15 December 2015	PLHIV, Men, women, MSM, caregivers of children who are HIV positive, CAM workers (traditional healers/alternative medicines)	Linkage Adherence Retention	None	Australia (21)	35 Studies: Qualitative (14), Quantitative (14), Mixed Methods (6), and Case Report (1)	Narrative synthesis	Low
<b>Mills, 2006 [54]</b>	Up to June 2005	People living with HIV and caregiver Total: N=12902	Adherence	12 studies were conducted in developing countries included four from Brazil and one each from Uganda, Cote	Fifty-six were from the US, Canada (3), UK (3), Italy (2), France (2), The	84 studies: Qualitative (37) and Quantitative (47)	Content analysis	High



First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
				d'Ivoire, South Africa, Malawi, Botswana, Costa Rica, Romania and China.	Netherlands (2), Australia (1), Belgium (1) and Switzerland (1). The studies conducted in developing countries included Brazil (1) and Botswana (1) Two studies were multi-national: (countries not reported).			
<b>Morales-Aleman, 2014 [55]</b>	Jan 2002 to April 2013	N=121 Hispanic and Latino PLHIV	Linkage Adherence Retention	None	USA (4)	3 studies: Qualitative (3) and Quantitative (1)	Thematic analysis	Low
<b>Omonaiye, 2018 [56]</b>	Up to December 2017	HIV positive pregnant women (include number)	Adherence	Kenya (3), Swaziland (1), Uganda (2), South Africa (1), Cote d'Ivoire (2), Tanzania (1), Malawi (4), Mozambique (1)	None	15 Studies: Qualitative (9) and Mixed Methods (6)	Thematic content analysis	Medium

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
<b>Reisner, 2009 [57]</b>	1999 to 2008	N=5179 HIV positive youth and adolescents and pregnant adolescents.	Adherence	None	United States (14)	14 Studies: Qualitative (4), Quantitative (7) and Mixed Methods (3)	Thematic content analysis	Low
<b>Santer, 2014 [58]</b>	1996 to 2011	N=96 Caregivers of children aged 0 -18 years	Adherence	None	Belgium (1) and US (2)	3 Studies: Qualitative (3)	Thematic analysis	Low
<b>Vervoort, 2007 [59]</b>	1996 to 2005	N=1053 Adult PLHIV	Adherence	Not specified	Not specified	24 studies containing qualitative data.	Thematic content analysis	Low
<b>Vitalis, 2013 [60]</b>	Up to July 2011	HIV positive pregnant and post partum women between the ages of 12 to 58 years receiving ART.	Adherence	Africa (7), Brazil (2) and Puerto Rico (1)	USA (8), and Australia (1)	18 studies: Quantitative (15) and Qualitative (3)	Content analysis	Low
<b>Wasti, 2012 [61]</b>	1996 to 2010	N=4782 Adult PLHIV who have been prescribed ART. Quantitative Studies n=4372; qualitative studies n=152 and mixed methods studies n=258	Adherence	India (10), China (4), Thailand (3), Cambodia (1).	None	18 studies: Quantitative (12), Qualitative (4) and Mixed Methods (2)	Thematic analysis	Low

First Author, year of publication [reference]	Search Dates	Participants	Issue	Context		Types of Studies	Method of Synthesis	Overall quality of review
				Low to Middle Income Country	High Income Country			
<b>Williams, 2018 [62]</b>	January 2005 to March 2016	Adolescent ages 9-20 years LHIV	Linkage Adherence Retention	Zimbabwe (2), South Africa (3), Kenya (3), Botswana (1), Zambia (3), Tanzania (1), Uganda (1), Uganda and Zimbabwe (1), Tanzania (2), and Botswana and Tanzania (1)	None	18 studies: Qualitative (18)	Meta- ethnography	Low

We explored whether there was overlap in the search dates between the included reviews and found that most reviews searched between 2000-2013 with an average search period covering 13 years (Figure 5). Seven studies<sup>(33,34,45,47,49,54,56,60)</sup> conducted comprehensive searches up to a year before publication. One review<sup>(30)</sup>, conducted as part of an online postgraduate degree programme, had very short search period of six months. We found considerable overlap in the search dates of included systematic reviews.

Figure 5: Overlap between search dates of the search dates of included systematic reviews (N=33)

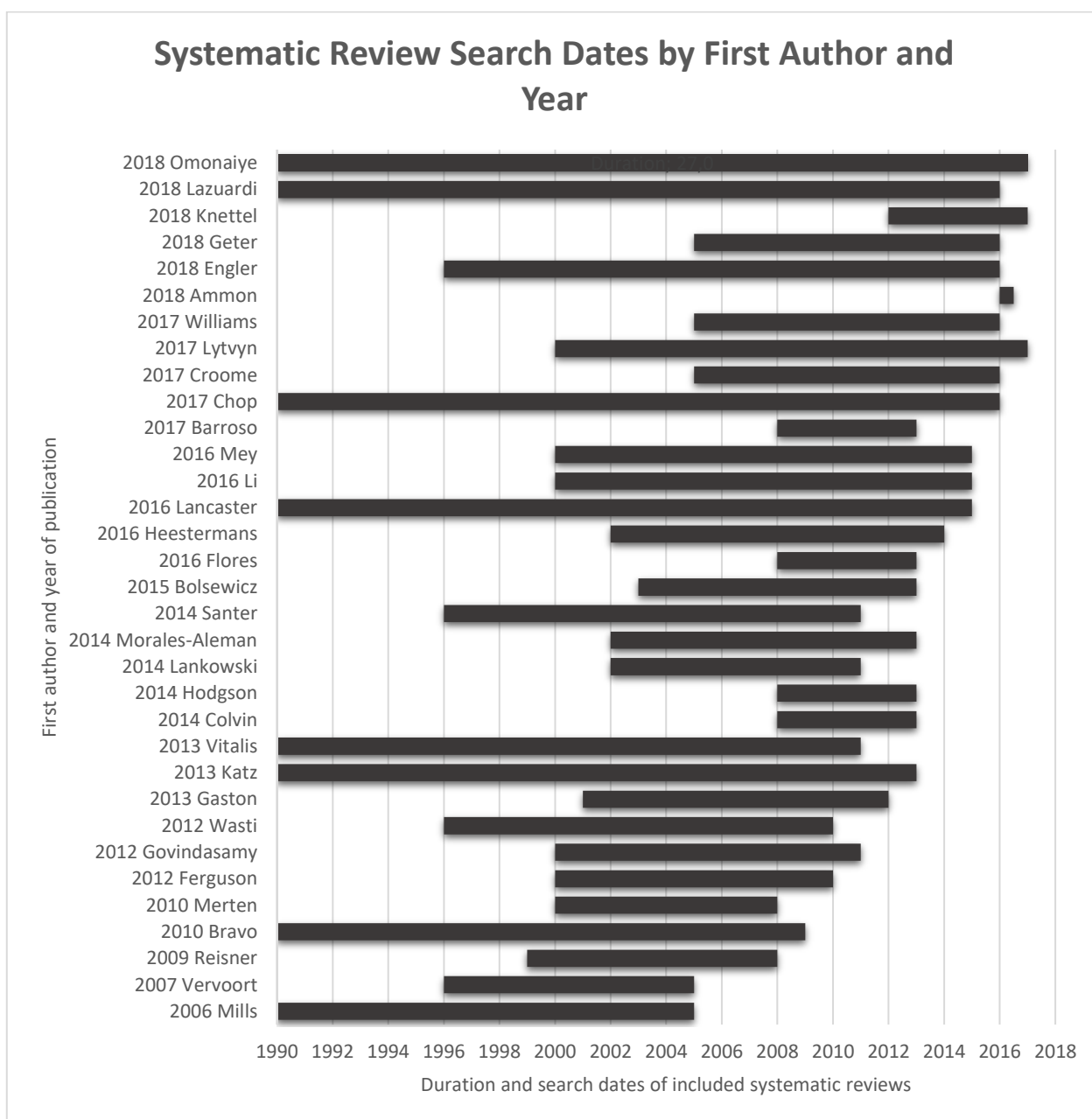


Table 4: Critical appraisal

Included Reviews: First Author and Year	JBI Critical Appraisal Questions											Overall Quality
	1. Review question clear	2. Inclusion criteria appropriate	3. Search strategy comprehensive	4. Sources and resources	5. Selection of studies	6. Appraisal criteria	7. Critical appraisal conducted in duplicate	8. Methods to minimise error in data extraction	9. Methods to combine studies	10. Recommendations for practice	11. Directives for research	
Ammon 2018	+	+	+	?	?	?	?	+	+	-	Low	
Barroso 2017	+	+	+	-	?	-	-	+	+	?	Medium	
Bolsewicz 2015	+	+	+	+	?	?	?	+	+	+	High	
Bravo 2010	+	+	-	-	?	?	?	+	+	+	Low	
Chop 2017	+	+	?	-	-	-	?	+	?	+	Low	
Colvin 2014	+	+	+	+	?	?	?	+	+	+	High	
Croome 2017	+	+	+	+	-	+	-	?	+	+	Medium	
Engler 2018	+	-	+	-	-	-	-	+	+	+	Low	
Ferguson 2012	+	+	-	+	+	?	?	-	?	+	Low	
Flores 2016	+	-	+	-	?	-	-	?	+	+	Low	
Gaston 2013	+	+	?	-	-	?	?	?	+	+	Low	
Geter 2018	+	+	?	-	?	?	?	+	+	+	Low	
Govindasamy 2012	+	+	-	+	+	-	-	?	?	?	Medium	
Heestermans 2016	+	?	+	-	?	+	?	-	?	+	Low	
Hodgson 2014	+	+	-	+	+	?	?	+	+	+	Medium	
Katz 2013	-	-	?	+	?	+	?	?	+	+	Low	
Knettel 2018	+	-	+	-	+	?	?	+	+	+	Low	
Lancaster 2016	+	+	?	-	+	?	?	+	?	+	Medium	
Lankowski 2014	+	+	-	-	-	-	?	-	-	+	Low	
Lazuardi 2018	+	+	?	+	?	?	?	-	?	+	Low	
Li 2017	+	+	-	+	+	+	+	?	+	+	Medium	
Lytvyn 2017	+	+	+	+	+	+	?	?	+	+	High	
Merten 2010	-	?	-	+	-	?	?	?	+	?	Low	
Mey 2017	+	-	+	-	-	+	?	-	+	?	Low	
Mills 2006	+	+	?	+	?	+	+	+	+	+	High	
Morales-Aleman 2014	-	-	?	-	?	?	?	?	+	+	Low	
Omonaiye 2018	+	+	?	-	+	+	+	+	?	?	Medium	
Reisner 2009	?	-	?	-	?	?	?	?	+	+	Low	
Santer 2014	+	-	?	+	?	+	+	?	+	-	Low	
Vervoort 2007	-	+	+	-	?	?	?	+	+	+	Low	
Vitalis 2013	+	+	?	-	?	+	?	?	?	-	Low	
Wasti 2012	-	-	+	-	?	?	?	+	-	-	Low	
Williams 2017	+	+	?	-	?	+	+	?	+	+	Low	

### **Quality Assessment of Systematic Reviews Included in the review**

The methodological quality of the included systematic reviews varied considerably across reviews (Table 4). Details of the justifications for quality judgements are reported in Additional file 8. All but five reviews had clear research questions. Key methodological aspects that were appraised as good quality were the relevance of recommendations for policy, having a clear research question and relevant directives for future research. The key aspects that were assessed as poor for the included reviews were the sources used to search and the inclusion criteria of the reviews. Some reviews did not clearly report items and as we were thus unable to make a judgement, we assessed them as 'unclear'. Items concerning if the 'process of data extraction was appropriate' and if the 'critical appraisal was conducted by two or more authors' were mostly identified as 'unclear' across included reviews. We identified 109 (30%) items out a possible 363 as 'unclear', 71 (20%) items as 'no' and 182 (50%) of items as 'yes'. Four reviews<sup>(32,35,51,54)</sup> were rated as high quality seven reviews<sup>(31,36,42,44,47,50,56)</sup> were rated as medium quality and 22 reviews<sup>(30,33-34,37-41,43,45-46,48-49,52-53,55,57-62)</sup> were rated as low quality.

### **Mega-aggregative framework synthesis findings**

We found 544 unique third order concepts from the included systematic reviews and to retain the essence of the review authors' interpretations, we extracted most concepts verbatim. We reclassified the third order concepts into 45 fourth order themes (Additional file 10) within the five levels of the Kaufman<sup>(13)</sup> HIV behaviour change model. For the individual level, we found 19 themes, for the interpersonal level, five themes, the community level, six themes, the institutional level, eight themes and for the structural level we found six themes (Figure 6). Within each of the framework themes, we aggregated the number of findings, and identified the most emergent themes (Table 5).

Figure 6: Summary of 4th order themes by levels of the HIV Behaviour Change model

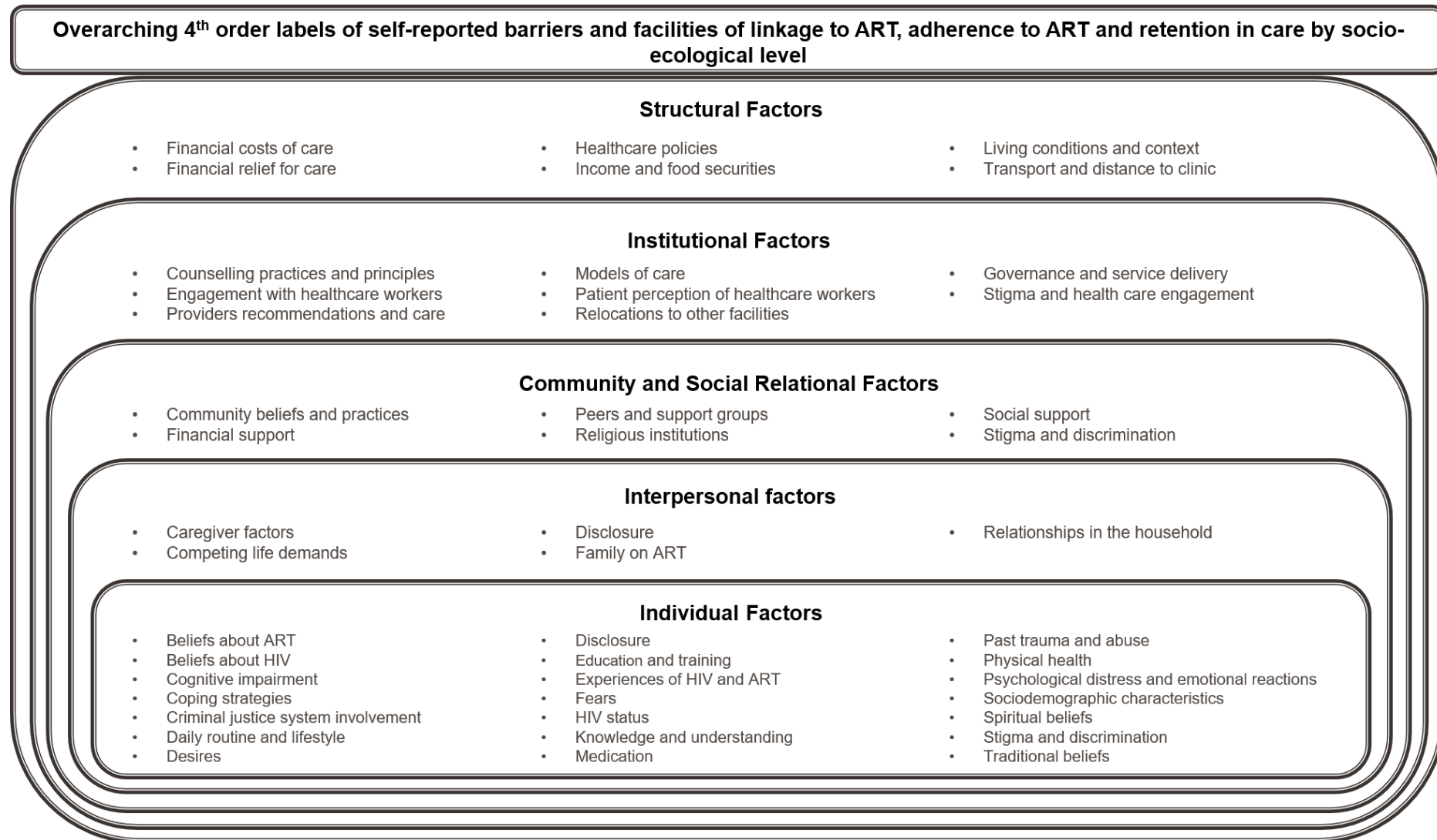


Table 5: Summary of number of findings contributing to the fourth order themes

HIV Model	Overview fourth order themes	Number of findings extracted from the included systematic reviews					
		Linkage		Adherence		Retention	
		Barriers	Facilitators	Barriers	Facilitators	Barriers	Facilitators
Individual	Beliefs about ART	6		7	4	1	2
	Beliefs and HIV	2		3			
	Cognitive impairment			1	1		
	Coping strategies	1		2	12		
	Criminal justice involvement			1		1	
	Daily routine and lifestyle	1	2	5	1		
	Desires	2	4	4	7	1	6
	Disclosure		1	1			
	Education and training skills	1	1		6		3
	Experiences of HIV and ART	1		3	5	1	
	Fears	10		12	1	4	3
	HIV status	1		1	1	1	1
	Knowledge and understanding	2	2	6	7	2	3
	Medication	5	1	19	4	3	2
	Past trauma and abuse	1		2	1	3	
	Physical Health	4	4	5	6	3	1
	Psychological distress and emotional reactions	9		15		7	
	Sociodemographic	10	1	18	7	5	
	Spiritual beliefs			4	4	1	
	Stigma and discrimination			1			
Traditional beliefs	3	2	2	1	1		
Interpersonal	Caregiver factors	2		5	3		
	Competing life demands	2		1		2	
	Disclosure	6	2	7	3	5	3
	Family on ART			4	2		
	Relationships in household	8	5	15	7	6	6
Community	Community beliefs and practices	3		6	3	1	3
	Financial support				1		
	Peers and support groups	2	6	2	7	1	6



HIV Model	Overview fourth order themes	Number of findings extracted from the included systematic reviews					
		Linkage		Adherence		Retention	
		Barriers	Facilitators	Barriers	Facilitators	Barriers	Facilitators
	Religious institutions		1		1		1
	Social support		1		1		1
	Stigma and discrimination	4		3			
Institutional	Counselling practices and principles	3	6	4	10	3	9
	Engagement with health care workers	2	3	4	5	6	3
	Providers recommendations and care	3	1	2			2
	Models of care	8	14	7	15	17	9
	Perception of health care workers	1	1	6	2	2	6
	Relocation to other facility	2		2			
	Service delivery	12	2	27	5	20	5
	Stigma and health care engagement	12		5		7	0
		Financial costs of care	2		3		2
Structural	Financial relief for care		2		5		
	Healthcare policies	2		3		4	
	Income and food security	2	1	3	2	1	1
	Living conditions and context	1		1		1	
	Transport and distance to clinic	2	1	2		2	2

### What is available review level evidence on the barriers and facilitators to linkage, adherence and retention in care?

#### *Barriers and facilitators to linkage to ART*

Barriers and facilitators to linkage to ART were found on all levels of the Kaufman framework (Table 6) contributed to the synthesis of the barriers and facilitators to linkage to ART. One low quality review<sup>(62)</sup> contributed to the findings on linkage for children. For adults, findings for linkage, were aggregated from three high quality reviews<sup>(32,35,54)</sup>, four medium quality reviews<sup>(31,42,44,47)</sup>, and eight low quality reviews<sup>(33-34,38-39,43,49,53,55)</sup>.

On the *individual level*, participants reported barriers linked to sociodemographic factors (10 findings), such as being younger, whether the participant's occupation was considered socially acceptable, gender, and not having identification documents in order to enrol in care services. Barriers related to patient fears (10 findings) were the emergent themes. Participants expressed fears of the consequences of disclosure, such as job loss, stigma and social isolation, fears of being on lifelong treatment and the negative side effects of ART. Participants reported experiencing psychological distress and emotional reactions (9 findings) and some were shocked at the news of their positive status, unsure about how they had contracted the disease, and the possibility of infidelity in their relationships. Feelings of hopelessness and depression was a recurring theme, with women questioning their self-esteem as wives and mothers.

Participants doubted their ability to adhere and commit to lifelong treatment and care. Emergent themes for the facilitators of linkage to ART on the individual level included physical health (4 findings) and desires (4 findings). In the context of participants' psychological distress, some reviews found that participants could no longer ignore the physical symptoms of the disease or their declining health, while others found, that although testing positive for HIV, patients were asymptomatic and therefore delayed care. The desire to care for family, protect unborn children from the transmission of HIV as well as the desire for future marriage and children facilitated participants' linkage.

On the *interpersonal level*, relationships in the household emerged as an important theme, both as barriers (8 findings) and facilitators (5 findings). Participants reported conflicts in the household, threats of domestic violence and abandonment, and the lack of autonomy for women, as barriers to linkage to ART. In contrast, supportive partners and families with mutuality-fostering relationships involving empathy facilitated linkage.

Table 6: Summary of review level evidence: Linkage to ART

HIV model levels	Themes	Sub-themes	Children		Adults		
			Barriers	Facilitators	Barriers	Facilitators	
Individual	Beliefs about ART	Beliefs about the right to decide			[53] <sup>L**</sup>		
		Negative beliefs about ART			[32] <sup>H**</sup> , [42] <sup>M</sup> , [49] <sup>L</sup>		
	Coping strategies	Poor coping strategies			[32] <sup>H**</sup>		
	Daily routine and lifestyle	Daily routine and lifestyle				[43] <sup>L</sup>	
	Daily routine and lifestyle	Substance Use			[32] <sup>H**</sup>		
	Desires	Care for family and children				[53] <sup>L**</sup>	
		Marriage and children	[62] <sup>L</sup>	[62] <sup>L</sup>			
		Normalisation to life before ART	[62] <sup>L</sup>	[62] <sup>L</sup>			
	Disclosure	Disclosure		[62] <sup>L</sup>			
	Education and training Skills	Education and training Skills	[62] <sup>L</sup>			[31] <sup>M*</sup>	
	Experiences of HIV and ART	Experiences of HIV and ART					
	Fears	Fear of economic loss related to treatment				[44] <sup>M**</sup>	
		Fear of reason for positive HIV diagnosis					
		Fear of the future					
		Fears of stigma	[62] <sup>L</sup>			[32] <sup>H**</sup> , [38] <sup>L</sup> , [39] <sup>L*</sup> , [42] <sup>M</sup>	
		Fears related to the effects of ART				[42] <sup>M</sup> , [49] <sup>L</sup> , [53] <sup>L**</sup>	
	HIV Status	Non-acceptance of HIV status				[39] <sup>L*</sup> , [42] <sup>M</sup>	
	Knowledge and understanding	Knowledge of HIV, ART and HAART		[62] <sup>L</sup>		[32] <sup>H**</sup> , [38] <sup>L</sup> , [39] <sup>L*</sup> , [42] <sup>M</sup>	[55] <sup>L**</sup>
		Uncertainty and conflicting messages				[42] <sup>M</sup>	
	Medication	Forgetting and misplacing medication				[44] <sup>M**</sup>	
		Negative side effects of medication				[34] <sup>L</sup> , [53] <sup>L**</sup>	
		Pill burden and regimen				[53] <sup>L**</sup>	

HIV model levels	Themes	Sub-themes	Children		Adults	
			Barriers	Facilitators	Barriers	Facilitators
		Reminder of status			[32] <sup>H**</sup>	[54] <sup>H**</sup>
	<b>Past trauma and abuse</b>	Experienced past trauma or abuse	[62] <sup>L</sup>			
	<b>Physical health</b>	Comorbidities			[32] <sup>H**</sup> , [42] <sup>M</sup>	[32] <sup>H**</sup> [43] <sup>L</sup> ,
		Feeling better and healthier			[39] <sup>L*</sup> , [42] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M**</sup>	
		Feeling ill and disease progression			[53] <sup>L**</sup>	[39] <sup>L*</sup> , [42] <sup>M</sup> , [43] <sup>L</sup> , [53] <sup>L**</sup>
	<b>Psychological distress and emotional reactions</b>	Demotivated			[32] <sup>H**</sup> , [38] <sup>L</sup> , [42] <sup>M</sup>	
		Negative emotion	[62] <sup>L</sup>		[32] <sup>H**</sup> , [39] <sup>L*</sup>	
		Perception of self	[62] <sup>L</sup>		[39] <sup>L**</sup> , [49] <sup>L</sup>	
		Psychological distress and emotional impact			[39] <sup>L*</sup> , [53] <sup>L**</sup>	
	<b>Socio-demographic</b>	Age			[32] <sup>H**</sup>	[53] <sup>L**</sup>
		Employment			[32] <sup>H**</sup>	
		Gender			[49] <sup>L</sup> , [53] <sup>L**</sup>	
		Identification document			[55] <sup>L**</sup>	
<b>Interpersonal</b>	<b>Competing life demands</b>	Competing life demands			[42] <sup>M</sup> , [39] <sup>L*</sup> , [49] <sup>L</sup> , [55] <sup>L**</sup>	
	<b>Disclosure</b>	Disclosure	[62] <sup>L</sup>	[62] <sup>L</sup>	[39] <sup>L*</sup>	[39] <sup>L*</sup>
		Non-disclosure	[62] <sup>L</sup>		[38] <sup>L</sup> , [39] <sup>L*</sup> , [42] <sup>M</sup> , [44] <sup>M**</sup> , [49] <sup>L</sup>	
	<b>Relationships in household</b>	Conflict and tension in family relationships			[32] <sup>H**</sup>	
		Gender and power in household			[42] <sup>M</sup> , [39] <sup>L*</sup> , [44] <sup>M</sup>	
		Supportive family relationships		[62] <sup>L</sup>		[33] <sup>L**</sup> , [39] <sup>L*</sup>
		Supportive partner				[47] <sup>M</sup>
		Unsupportive family relationships	[62] <sup>L</sup>		[32] <sup>H**</sup> , [39] <sup>L*</sup>	
Unsupportive partner				[44] <sup>M**</sup>		
<b>Community</b>		Beliefs about HIV and ART			[39] <sup>L*</sup>	

HIV model levels	Themes	Sub-themes	Children		Adults	
			Barriers	Facilitators	Barriers	Facilitators
HIV model levels	Community beliefs and practices	Gender norms			[39] <sup>L*</sup>	
		Preference for traditional healers and medicines			[39] <sup>L*</sup>	
	Peers and support groups	Medication companion		[62] <sup>L</sup>		[31] <sup>M*</sup> , [42] <sup>M</sup>
		Peer support				[31] <sup>M*</sup>
		Support groups		[62] <sup>L</sup>		
		Supportive supervisors and teachers		[62] <sup>L</sup>		
		Unsupportive supervisors and teachers	[62] <sup>L</sup>			
	Religious institutions	Religious institutions		[62] <sup>L</sup>		[39] <sup>L*</sup>
	Social support	Social support				[33] <sup>L**</sup> , [42] <sup>M</sup>
	Stigma and discrimination	Experiences of stigma	[62] <sup>L</sup>		[32] <sup>H**</sup> , [33] <sup>L*</sup> [42] <sup>M</sup> ,	
Institutional	Counselling practices and principles	Awareness of literacy and language barriers			[39] <sup>L*</sup> , [55] <sup>L**</sup>	
		Awareness of who is providing the counselling				[39] <sup>L*</sup>
		In depth pre and post counselling when testing		[62] <sup>L</sup>	[39] <sup>L*</sup>	[31] <sup>M*</sup> , [39] <sup>L*</sup> , [42] <sup>M</sup> , [53] <sup>L**</sup>
		Including patients beliefs and respecting cultural practices				[39] <sup>L*</sup>
		Poor counselling	[62] <sup>L</sup>		[42] <sup>M</sup>	
	Engagement with health care workers	Disengaged and unsupportive relationships	[62] <sup>L</sup>		[42] <sup>M</sup>	
		Frequency and duration of engagements			[39] <sup>L*</sup>	[35] <sup>H***</sup>
		Supportive and collaborative relationships				[39] <sup>L*</sup> , [42] <sup>M</sup>
	Health care worker recommendations and care	Health care worker does not do timely tests or referrals			[38] <sup>L</sup>	
		Health care worker does not provide holistic care			[38] <sup>L</sup>	

HIV model levels	Themes	Sub-themes	Children		Adults	
			Barriers	Facilitators	Barriers	Facilitators
			Provider input			[32] <sup>H**</sup>
<b>Models of Care</b>	Adolescent services		[62] <sup>L</sup>			
	Gaps in referrals			[38] <sup>L</sup>		
	Hospital admission				[42] <sup>M</sup>	
	Integrated care				[39] <sup>L*</sup>	
	Integrated mental health care		[62] <sup>L</sup>		[53] <sup>L**</sup>	
	Involving patients as peer facilitators		[62] <sup>L</sup>			
	Lack of integrated care			[38] <sup>L</sup>		
	Mobile and home visits			[42] <sup>M</sup>		
	PMTCT, ANC and HIV Integration			[35] <sup>H***</sup>	[38] <sup>L</sup> , [53] <sup>L**</sup>	
<b>Perception of health care workers</b>	Negative perceptions of health care workers			[32] <sup>H**</sup> , [42] <sup>M</sup>		
	Positive perceptions of health care workers				[39] <sup>L*</sup>	
<b>Relocation to other facility</b>	Transfers and Relocation			[42] <sup>M</sup>		
<b>Service delivery</b>	Clinic times			[39] <sup>L*</sup> , [42] <sup>M</sup>		
	Drug and test resources			[42] <sup>M</sup>		
	Lack of privacy	[62] <sup>L</sup>		[39] <sup>L*</sup> , [42] <sup>M</sup> , [44] <sup>M**</sup> , [49] <sup>L</sup>		
	Experiences at the clinic	[62] <sup>L</sup>		[38] <sup>L</sup> , [39] <sup>L*</sup> , [42] <sup>M</sup> , [47] <sup>M</sup> , [49] <sup>L</sup>	[39] <sup>L*</sup>	
	Physical clinic environment	[62] <sup>L</sup>		[38] <sup>L</sup> , [42] <sup>M</sup>	[42] <sup>M</sup>	
	Scheduled appointments			[39] <sup>L*</sup> , [44] <sup>M**</sup>		
	Staff turnover	[62] <sup>L</sup>		[38] <sup>L</sup> , [39] <sup>L*</sup> , [42] <sup>M</sup> , [49] <sup>L</sup>		
<b>Stigma and health care engagement</b>	Favouritism					
	Gender and sexuality bias			[49] <sup>L</sup> , [53] <sup>L**</sup>		
	Gender bias			[39] <sup>L*</sup>		

HIV model levels	Themes	Sub-themes	Children		Adults		
			Barriers	Facilitators	Barriers	Facilitators	
		HIV related stigma			[39] <sup>L*</sup> , [42] <sup>M</sup>		
		Patient anticipates stigma	[62] <sup>L</sup>		[39] <sup>L*</sup> , [42] <sup>M</sup> , [47] <sup>M</sup>		
Structural	Financial costs for care	Free ART still has costs	[62] <sup>L</sup>		[32] <sup>H**</sup> , [38] <sup>L</sup>		
	Financial relief for care	Grants				[34] <sup>L</sup> , [42] <sup>M</sup>	
	Healthcare policies	Access and eligibility policies				[39] <sup>L*</sup> , [47] <sup>M</sup>	
		Health insurance				[39] <sup>L*</sup>	
	Income and food security	Income and financial status	[62] <sup>L</sup>		[32] <sup>H**</sup> , [34] <sup>L</sup> , [42] <sup>M</sup> , [47] <sup>M</sup>	[33] <sup>L**</sup>	
	Living conditions and context	Housing				[32] <sup>H**</sup>	
	Transport and distance to clinic	Transport and distance to clinic	[62] <sup>L</sup>		[42] <sup>M</sup> , [44] <sup>M**</sup> , [47] <sup>M</sup> , [48] <sup>L</sup>	[42] <sup>M</sup> , [55] <sup>L**</sup>	

. Low and middle income countries; \*High income countries; \*\*Not able to discern economic category of countries in review; \*\*\*Both high income countries and low and middle income countries. <sup>L</sup> indicates a low quality review, <sup>M</sup> indicates a medium quality review, <sup>H</sup> indicates a high quality review.

On the *community level*, the main barrier expressed was stigma and discrimination (4 findings), which is linked to community narratives around masculinity, HIV as witchcraft, and hospitals as places of death. Facilitators reported included peer support and support groups (6 findings) which served as a proxy for family support when it was lacking.

At *Institutional level*, barriers such as stigma experienced at health care facilities (12 findings), service delivery (12 findings), which includes overcrowding, long queues, high staff turnovers, inconvenient client times, poor resources and participants' experiences with limited medication availability as well as their experiences of HIV testing were reported. Eight findings were related to barriers of institutional models of care. Participants identified gaps in the ART cascade referral process, particularly for women who test positive during their antenatal care (ANC) and are not followed-up postpartum, as well as lack of integrated services. Participants

perceived health care models such as home visiting, as a barrier, as it might contribute to involuntary disclosure. There were fourteen findings for facilitators in the theme models of care, including offering population specific services for adolescents, the integration of HIV care within ANC, offering mental health assessments, and providing multi-level, multi-pronged approaches to care. The facilitators for the theme service delivery (2 findings) included patients' positive experiences of HIV testing and having a staff member welcome patients into the clinic. Counselling practices and principles (6 findings) that respected the place of traditional medicine and incorporated the traditional beliefs of patients, and that provided in-depth counselling before and after HIV testing were reported as facilitators on the institutional level.

On the *structural level*, reported barriers included the financial cost of care (2 findings), healthcare policies (2 findings), income and food security (2 findings), transport and distance to the clinic (2 findings), and one finding for living conditions and context. Facilitators included income and food security (1 findings), and transport and distance to clinic (1 finding), which includes having an escort to the clinic, was reported as facilitators of linkage.

Three high quality reviews<sup>(32,35,54)</sup> were found that addressed linkage to care for HIV positive adults. Themes from the high quality reviews included individual level barriers such as negative beliefs about ART, poor coping strategies, substance use, fear of stigma, knowledge of HIV and ART, reminder of status, comorbidities, demotivation and negative emotions, age and employment status; interpersonal level barriers such as conflict and tension in family relationships, community level barriers such as experiences of stigma; institutional level barriers such as provider input, integrated models of care and perception of health care workers; and structural level barriers such as financial costs of ART, income insecurity and unstable housing. Findings of facilitators for linkage in adults from high quality reviews included



being reminded of their HIV status when being linked, physical comorbidities and the frequency and duration of engagements with health care providers.

#### *Barriers and facilitators to adherence to ART*

Findings on barriers and facilitators to adherence to ART, and reviews reporting on these are summarised in Table 7. For children, one high quality review<sup>(54)</sup> and three low quality reviews<sup>(30, 57, 62)</sup> contributed to the aggregation of findings. For adults, three high quality reviews<sup>(32,51,54)</sup>, seven medium quality reviews<sup>(31,36,42,44,47,50,56)</sup>, and thirteen low quality reviews<sup>(33,37,39-41,43,45,52-53,55,59-61)</sup> contributed to the findings for adherence to ART.

On the *individual level*, emerging themes related to barriers to adherence were linked to medication (19 findings) socio-demographic factors (18 findings) and fears (12 findings). Reviews reported medication characteristics, negative side effects, pill burden and regimen, travelling away from home and lack of privacy as barriers; and the use of reminders, simpler medication regimens as facilitators, within the medication theme. A number of reviews synthesised findings on the self-reported sociodemographic characteristics such as levels of education, age and gender. In some cases a woman's positive HIV status was considered a result of her husband's infidelity and reducing the risk of stigmatisation when disclosing her status or been seen taking medication and in other contexts women were stigmatised as hypersexual and being discriminated against. Other reported barriers were grouped under the themes psychological distress and emotions (15 findings) and fears (12 findings). Fears were related to the medication toxicities, side effects, unintentional disclosure, that the treatment would harm a pregnant woman's unborn child and the fears that ART leads to impotency, infertility and the impossibility of sexual activity.

The theme of coping strategies (12 findings) and desires (7 findings) were identified as facilitators to mitigate fears, anticipated stigma and negative side effects of ART. Coping

strategies included being aware of personal strengths and weakness, learning to manage the HIV diagnosis and interpreting physical signs of the body, drinking liquids, resting and adopting a resilient and positive attitude. Participants desired to be healthy to care for their families and to maintain their appearance in order to keep their status a secret. Knowledge and understanding was identified both as a barrier (6 findings), such as receiving conflicting messages from community members, providers, peers and the media; and as a facilitator (7 findings) such as, understanding the need for compliance.

On the *interpersonal level*, participants' relationships within the household emerged as a barrier (15 findings) and facilitator (7 findings). Family involvement and emotional, material and social support were important factors to participants. Other barriers such as punishment for lack of adherence for children, negative family reactions to disclosure, enacted stigma by family members and lack of autonomy in relationships made it difficult for patients to adhere.

*Community level* barriers were related to community beliefs and practices (6 findings) such as strong negative community beliefs about HIV and bypassing of clinics and hospitals for traditional healers. Peers and support groups (6 findings) played a mitigating role and helped participants adjust to their new daily routine. Financial and emotional support also facilitated adherence.

The two emergent themes identified at the *institutional level* of the framework were service delivery (27 findings), which was reported as a barrier; and models of care (15 findings), which was reported as a facilitator. Participants who may have had the intention of adhering to ART were discouraged by the difficulties of making a scheduled appointment and the long waiting times at the clinic when they did seek care. Negative experiences at the clinic when collecting the refills of medication included the lack of privacy, overcrowding and stigma experienced within the clinic by other patients, community members and staff. Patients reported spending

up to a day waiting to see a health care worker and were presented with additional barriers such as drug stock-outs or limits on the amount of medication that could be dispensed at a time. Models of care, such as integrated mental health care, integrated ANC and HIV care, and specialised services for adolescents, with highly skilled and trained healthcare workers, were reported as facilitators to adherence to ART.

Table 7: Summary of review level evidence: Adherence to ART

HIV Model levels	Themes	Sub-themes	Children and Youth (0-24 years)		Adults	
			Barriers	Facilitators	Barriers	Facilitators
Individual	Beliefs about ART	Negative beliefs about ART	[30] <sup>L*</sup> , [62] <sup>L</sup>		[32] <sup>H*</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [40] <sup>L*</sup> , [43] <sup>L</sup> , [45] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup>	
		Positive beliefs about ART		[30] <sup>L</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [45] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>
	Beliefs about HIV	Negative beliefs about HIV			[43] <sup>L</sup> , [52] <sup>L</sup>	
	Cognitive impairment	Cognitive impairment			[43] <sup>L</sup>	[43] <sup>L</sup>
	Coping strategies	Coping strategies for emotional regulation and self-management		[30] <sup>L</sup> , [57] <sup>L*</sup>		[31] <sup>M**</sup> , [33] <sup>L***</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [41] <sup>L*</sup> , [43] <sup>L</sup> , [45] <sup>L</sup> , [52] <sup>L***</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [55] <sup>L*</sup> , [56] <sup>M</sup> , [60] <sup>L*</sup> , [61] <sup>L</sup>
		Poor coping strategies	[57] <sup>L*</sup>	[62] <sup>L</sup>	[32] <sup>H*</sup> , [59] <sup>L***</sup>	
	Criminal justice system involvement	Criminal justice system involvement			[37] <sup>L*</sup>	
	Daily routine and lifestyle	Daily routine and lifestyle	[54] <sup>H*</sup>	[30] <sup>L</sup>	[33] <sup>L*</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [52] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	[33] <sup>L***</sup> , [43] <sup>L</sup> , [59] <sup>L***</sup>

	<b>Lifestyle</b>			[43] <sup>L</sup>	
	<b>Sleeping</b>			[36] <sup>M</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	
	<b>Substance Use</b>	[57] <sup>L*</sup>		[32] <sup>H*</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [42] <sup>M</sup> , [44] <sup>M</sup> , [45] <sup>L</sup> , [50] <sup>M*</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup> , [61] <sup>L</sup>	
<b>Desires</b>	<b>Care for family and children</b>		[62] <sup>L</sup>	[33] <sup>L*</sup> , [60] <sup>L***</sup>	[36] <sup>M</sup> , [40] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [51] <sup>H***</sup> , [52] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H*</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup> , [61] <sup>L</sup>
	<b>Look and feel healthy</b>			[59] <sup>L***</sup>	[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> [45] <sup>L</sup> , [51] <sup>H</sup>
	<b>Marriage and children</b>		[62] <sup>L</sup>		[52] <sup>L</sup>
	<b>Normalisation to life before ART</b>	[54] <sup>H*</sup> , [62] <sup>L</sup>	[62] <sup>L</sup>	[54] <sup>H*</sup> , [61] <sup>L</sup>	[36] <sup>M</sup>
<b>Disclosure</b>	<b>Disclosure</b>		[30] <sup>L</sup> , [62] <sup>L</sup>		[44] <sup>M*</sup> , [59] <sup>L***</sup>
<b>Education and Training Skills</b>	<b>Education and Training Skills</b>		[62] <sup>L</sup>		[31] <sup>M**</sup>
	<b>Experiences of HIV and ART</b>				[44] <sup>M</sup> , [52] <sup>L</sup>
<b>Experiences of HIV and ART</b>	<b>Experiences of HIV and ART</b>				[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [50] <sup>M</sup> , [52] <sup>L</sup> , [56] <sup>M</sup> , [59] <sup>L</sup>
<b>Fears</b>	<b>Fear of declining physical health</b>				[43] <sup>L</sup>
	<b>Fear of reason for positive HIV diagnosis</b>			[36] <sup>M</sup>	
	<b>Fear of the future</b>			[52] <sup>L</sup>	

		<b>Fears of stigma</b>	[30] <sup>L</sup> , [54] <sup>H***</sup> , [57] <sup>L*</sup> , [62] <sup>L***</sup>	[30] <sup>L*</sup>	[32] <sup>H*</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [39] <sup>L**</sup> , [41] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M***</sup> , [45] <sup>L</sup> , [52] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup> , [61] <sup>L</sup>	
		<b>Fears related to the effects of ART</b>	[54] <sup>H*</sup>		[44] <sup>M*</sup> , [51] <sup>H***</sup> , [52] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup> , [60] <sup>L*</sup> , [61] <sup>L</sup>	
<b>HIV Status</b>		<b>Acceptance of HIV status</b>				[33] <sup>L</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [52] <sup>L</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup>
		<b>Non-acceptance of HIV status</b>	[30] <sup>L</sup> , [54] <sup>H*</sup>		[33] <sup>L</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [45] <sup>L</sup> , [54] <sup>H*</sup>	
<b>Knowledge and understanding</b>		<b>Knowledge of HIV Status</b>	[30] <sup>L</sup> , [62] <sup>L</sup>	[30] <sup>L</sup> , [62] <sup>L</sup>	[50] <sup>M</sup> , [54] <sup>H***</sup>	
		<b>Knowledge of HIV, ART and HAART</b>		[30] <sup>L</sup> , [62] <sup>L</sup>	[32] <sup>H</sup> , [33] <sup>L</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup> , [61] <sup>L</sup>	[31] <sup>M**</sup> , [36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [53] <sup>L*</sup> , [54] <sup>H*</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup>
		<b>Uncertainty and conflicting messages</b>	[30] <sup>L</sup> , [54] <sup>H***</sup> , [62] <sup>L</sup>	[30] <sup>L</sup>	[43] <sup>L</sup> , [52] <sup>L</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup>	[44] <sup>M</sup> , [52] <sup>L</sup> , [56] <sup>M</sup>
<b>Medication</b>		<b>Being away from home</b>	[30] <sup>L</sup> , [62] <sup>L</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	[36] <sup>M</sup>
		<b>Forgetting and misplacing medication</b>	[30] <sup>L</sup> , [54] <sup>H*</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [47] <sup>M</sup> , [53] <sup>L*</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	

		<b>Medication characteristics</b>	[30] <sup>L</sup> , [54] <sup>H***</sup> , [29] <sup>*</sup> , [62] <sup>L</sup>		[36] <sup>M</sup> , [37] <sup>L*</sup> , [45] <sup>L</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup>	
		<b>Medication reminders</b>		[30] <sup>L</sup> , [62] <sup>L</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>
		<b>Negative side effects of medication</b>	[30] <sup>L</sup> , [54] <sup>H*</sup> , [57] <sup>L*</sup> , [29] <sup>*</sup> , [62] <sup>L</sup>		[30] <sup>L</sup> , [32] <sup>H*</sup> , [33] <sup>L*</sup> , [37] <sup>L*</sup> , [50] <sup>M*</sup> , [51] <sup>H*</sup> , [53] <sup>L*</sup> , [54] <sup>H*</sup> , [55] <sup>L*</sup> , [59] <sup>L*</sup> , [62] <sup>L</sup>	
		<b>No privacy when taking pills</b>	[30] <sup>L</sup>		[31] <sup>M**</sup> , [36] <sup>M</sup> , [59] <sup>L***</sup>	
		<b>Pill burden and regimen</b>	[30] <sup>L</sup> , [54] <sup>H***</sup> , [57] <sup>L*</sup> , [29] <sup>*</sup> , [62] <sup>L</sup>	[57] <sup>L*</sup>	[32] <sup>H*</sup> , [33] <sup>L*</sup> , [36] <sup>M</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [45] <sup>L</sup> , [51] <sup>H</sup> , [53] <sup>L*</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	[31] <sup>M**</sup> , [33] <sup>L*</sup> , [54] <sup>H***</sup> , [60] <sup>L***</sup>
		<b>Reminder of status</b>			[32] <sup>H*</sup> , [59] <sup>L***</sup>	
		<b>Skipping medication</b>		[30] <sup>L</sup>	[59] <sup>L***</sup>	
	<b>Past trauma and abuse</b>	<b>Experienced past trauma or abuse</b>	[57] <sup>L*</sup> , [62] <sup>L</sup>		[43] <sup>L</sup>	[43] <sup>L</sup>
	<b>Physical health</b>	<b>Comorbidities</b>			[32] <sup>H*</sup> , [37] <sup>L*</sup> , [54] <sup>H***</sup>	[44] <sup>M*</sup>
		<b>Feeling better and healthier</b>	[30] <sup>L</sup> , [54] <sup>H***</sup> , [62] <sup>L</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [54] <sup>H***</sup> , [61] <sup>L</sup>	[32] <sup>H</sup> , [36] <sup>M</sup> , [43] <sup>L</sup> , [50] <sup>M</sup> , [52] <sup>L</sup> , [54] <sup>H*</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>
		<b>Feeling ill and disease progression</b>	[57] <sup>L*</sup> , [62] <sup>L</sup>		[36] <sup>M</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup>	[43] <sup>L</sup> , [52] <sup>L*</sup> , [53] <sup>L*</sup>
	<b>Psychological distress and emotional reactions</b>	<b>Demotivated</b>			[36] <sup>M</sup> , [37] <sup>L*</sup> , [52] <sup>L</sup> , [59] <sup>L*</sup> , [60] <sup>L</sup> , [61] <sup>L</sup>	

		<b>Negative emotion</b>	[30] <sup>L</sup> , [57] <sup>L*</sup> , [62] <sup>L</sup>	[62] <sup>L</sup>	[32] <sup>H*</sup> , [33] <sup>L*</sup> , [36] <sup>M</sup> , [43] <sup>L</sup> , [52] <sup>L</sup> , [53] <sup>L*</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup> , [61] <sup>L</sup>	[43] <sup>L</sup>
		<b>Perception of self</b>	[30] <sup>L</sup> , [50] <sup>M*</sup> , [62] <sup>L</sup>	[62] <sup>L</sup>	[36] <sup>M</sup> , [43] <sup>L</sup> , [54] <sup>H*</sup> , [60] <sup>L***</sup>	
		<b>Psychological distress and emotional impact</b>	[30] <sup>L</sup> , [50] <sup>M*</sup> , [62] <sup>L</sup>		[33] <sup>L*</sup> , [43] <sup>L</sup> , [50] <sup>M***</sup> , [52] <sup>L</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup>	[43] <sup>L</sup>
	<b>Sociodemographic</b>	<b>Age</b>	[30] <sup>L</sup> , [57] <sup>L*</sup>	[57] <sup>L*</sup>	[32] <sup>H*</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [60] <sup>L***</sup>	[60] <sup>L</sup>
		<b>Education</b>	[57] <sup>L*</sup>	[57] <sup>L</sup>	[43] <sup>L</sup> , [44] <sup>M*</sup>	[43] <sup>L</sup> , [44] <sup>M</sup>
		<b>Employment</b>			[32] <sup>H*</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup>	[43] <sup>L</sup> , [47] <sup>M</sup> , [55] <sup>L</sup>
		<b>Gender</b>	[30] <sup>L</sup> , [57] <sup>L*</sup>	[57] <sup>L*</sup>	[32] <sup>H*</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [52] <sup>L*</sup> , [53] <sup>L*</sup>	[43] <sup>L</sup>
		<b>Marital status</b>			[43] <sup>L</sup>	
		<b>Race/nationality</b>			[37] <sup>L*</sup> , [44] <sup>M</sup>	
		<b>Sexual partners</b>			[43] <sup>L</sup>	
		<b>Identification</b>			[55] <sup>L*</sup>	
	<b>Spiritual beliefs</b>	<b>Beliefs: Spiritual</b>	[30] <sup>L</sup>	[30] <sup>L</sup>	[36] <sup>M</sup> , [43] <sup>L</sup> , [56] <sup>M</sup>	[36] <sup>M</sup> , [43] <sup>L</sup> , [45] <sup>L</sup> , [52] <sup>L</sup> , [60] <sup>L***</sup>
	<b>Stigma and discrimination</b>	<b>Experiences of stigma</b>			[45] <sup>L</sup>	
	<b>Traditional Beliefs</b>	<b>Beliefs: Traditional</b>				
<b>Interpersonal</b>	<b>Caregiver Factors</b>	<b>Access to caregivers</b>			[30] <sup>L</sup>	
		<b>Caregiver beliefs</b>	[30] <sup>L</sup> , [29] <sup>*</sup>		[56] <sup>M</sup>	
		<b>Caregiver Disclosure</b>	[30] <sup>L</sup>	[30] <sup>L</sup>		

		<b>Caregiver education</b>	[57] <sup>L*</sup>	[57] <sup>L*</sup>	[44] <sup>M*</sup>	
		<b>Caregiver reminders</b>		[30] <sup>L-</sup>		[54] <sup>H***</sup>
		<b>Relation to caregiver</b>		[57] <sup>L*</sup>		
	<b>Competing life demands</b>	<b>Competing life demands</b>			[41] <sup>L-</sup> , [44] <sup>M*</sup> , [52] <sup>L-</sup> , [54] <sup>H*</sup> , [60] <sup>L***</sup>	
	<b>Disclosure</b>	<b>Disclosure</b>				
		<b>Non-disclosure</b>	[30] <sup>L-</sup> , [62] <sup>L-</sup>		[36] <sup>M</sup> , [45] <sup>L-</sup> , [52] <sup>L-</sup> , [53] <sup>L-</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup>	
	<b>Family on ART</b>	<b>Family on ART</b>		[30] <sup>L-</sup>	[36] <sup>M</sup> , [43] <sup>L-</sup> , [44] <sup>M*</sup> , [56] <sup>M</sup>	[43] <sup>L-</sup>
	<b>Medication</b>	<b>Negative side effects of medication</b>			[37] <sup>L*</sup> , [45] <sup>L-</sup>	
	<b>Relationships in household</b>	<b>Conflict and tension in family relationships</b>			[32] <sup>H*</sup> , [41] <sup>L*</sup> , [52] <sup>L-</sup> , [54] <sup>H</sup> , [61] <sup>L-</sup>	[43] <sup>L-</sup>
		<b>Gender and power in household</b>			[36] <sup>M</sup> , [44] <sup>M</sup> , [45] <sup>L-</sup> , [52] <sup>L-</sup> , [56] <sup>M</sup> , [60] <sup>L-</sup>	
		<b>Supportive family relationships</b>		[62] <sup>L-</sup>		[40] <sup>L*</sup> , [41] <sup>L*</sup> , [44] <sup>M*</sup> , [45] <sup>L-</sup> , [52] <sup>L-</sup> , [54] <sup>H*</sup> , [59] <sup>L*</sup> , [60] <sup>L*</sup> , [61] <sup>L-</sup>
		<b>Supportive partner</b>				[47] <sup>M</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup>
		<b>Unsupportive family relationships</b>	[30] <sup>L-</sup> , [54] <sup>H*</sup> , [57] <sup>L*</sup> , [62] <sup>L-</sup>		[32] <sup>H*</sup> , [44] <sup>M***</sup> , [45] <sup>L-</sup> , [54] <sup>H*</sup> , [59] <sup>L*</sup> , [61] <sup>L-</sup>	
		<b>Unsupportive partner</b>			[59] <sup>L***</sup>	
		<b>Community beliefs and practices</b>	<b>Beliefs about HIV and ART</b>			[52] <sup>L-</sup> , [56] <sup>M</sup>
<b>Community</b>		<b>Gender norms</b>			[43] <sup>L-</sup> , [52] <sup>L-</sup>	[43] <sup>L-</sup>
		<b>Patient lacks autonomy</b>			[44] <sup>M</sup> , [56] <sup>M</sup>	



		<b>Preference for traditional healers and medicines</b>			[52] <sup>-</sup>		
		<b>Supportive traditions</b>				[40] <sup>L*</sup>	
	<b>Financial support</b>	<b>Financial support</b>				[52] <sup>L</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	
	<b>Peers and support groups</b>	<b>Medication companion</b>	[62] <sup>-</sup>	[62] <sup>-</sup>		[33] <sup>L</sup> , [43] <sup>L</sup> , [51] <sup>H**</sup> , [52] <sup>L</sup>	
		<b>Peer support</b>		[30] <sup>-</sup>		[51] <sup>H**</sup>	
		<b>Social isolation</b>	[54] <sup>H*</sup>			[33] <sup>L*</sup> , [54] <sup>H*</sup>	
		<b>Support groups</b>		[62] <sup>-</sup>		[36] <sup>M</sup>	
		<b>Supportive supervisors and teachers</b>		[62] <sup>-</sup>		[51] <sup>H**</sup>	
		<b>Unsupportive supervisors and teachers</b>	[62] <sup>-</sup>				
	<b>Religious institutions</b>	<b>Religious institutions</b>		[62] <sup>-</sup>		[53] <sup>L*</sup>	
	<b>Social support</b>	<b>Social support</b>				[36] <sup>M</sup> , [41] <sup>L*</sup> , [43] <sup>L</sup> , [45] <sup>L</sup> , [52] <sup>L</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup>	
	<b>Stigma and discrimination</b>	<b>Experiences of stigma</b>	[62] <sup>-</sup>		[32] <sup>H*</sup> , [43] <sup>L</sup> , [53] <sup>L*</sup> , [61] <sup>-</sup>		
<b>Institutional</b>	<b>Counselling practices and principles</b>	<b>Addressing shared community uncertainties</b>				[33] <sup>L*</sup>	
		<b>Awareness of literacy and language barriers</b>				[43] <sup>L</sup> , [55] <sup>L*</sup>	
		<b>In depth pre and post counselling when testing</b>		[30] <sup>-</sup> , [62] <sup>-</sup>			[36] <sup>M</sup> , [51] <sup>H**</sup> , [52] <sup>L</sup>
		<b>Including patients beliefs and respecting cultural practices</b>				[52] <sup>-</sup>	[41] <sup>L*</sup> , [51] <sup>H**</sup>
		<b>Poor counselling</b>	[62] <sup>-</sup>			[36] <sup>M</sup> , [52] <sup>L</sup> , [59] <sup>L***</sup> , [61] <sup>-</sup>	

		<b>Types of narrative used by health care workers</b>		[62] <sup>L-</sup>		
<b>Engagement with health care workers</b>		<b>Disengaged and unsupportive relationships</b>		[62] <sup>L-</sup>	[36] <sup>M</sup> , [37] <sup>L*</sup> , [43] <sup>L-</sup> , [52] <sup>L-</sup> , [54] <sup>H*</sup> , [59] <sup>L***</sup>	
		<b>Frequency and duration of engagements</b>		[57] <sup>L*</sup>		
		<b>Supportive and collaborative relationships</b>				[33] <sup>L*</sup> , [36] <sup>M</sup> , [40] <sup>L*</sup> , [45] <sup>L-</sup> , [54] <sup>H*</sup> , [59] <sup>L*</sup> , [61] <sup>L-</sup>
<b>Health care worker recommendations and care</b>		<b>Provider input</b>	[57] <sup>L*</sup>		[32] <sup>H*</sup>	
<b>Models of Care</b>		<b>Adolescent services</b>		[62] <sup>L-</sup>		
		<b>Family driven care</b>				[45] <sup>L-</sup>
		<b>Integrated mental health care</b>		[62] <sup>L-</sup>	[43] <sup>L-</sup>	[41] <sup>L-</sup> , [43] <sup>L-</sup> , [45] <sup>L-</sup>
		<b>Involving patients as peer facilitators</b>		[62] <sup>L-</sup>		
		<b>Male services</b>			[51] <sup>H**</sup> , [52] <sup>L-</sup>	
		<b>Mobile and home visits</b>			[52] <sup>L-</sup>	
		<b>PMTCT, ANC and HIV Integration</b>			[35] <sup>H***</sup>	[44] <sup>M***</sup> , [56] <sup>M</sup>
		<b>PMTCT, ANC and HIV Integration</b>			[35] <sup>H***</sup>	
<b>Perception of health care workers</b>		<b>Expectations of providers</b>			[40] <sup>L*</sup> , [51] <sup>H**</sup>	
		<b>Negative perceptions of health care workers</b>			[3] <sup>*</sup> , [35] <sup>H***</sup> , [36] <sup>M</sup>	
		<b>Positive perceptions of health care workers</b>		[30] <sup>L-</sup>	[52] <sup>L-</sup>	
<b>Relocation to other facility</b>		<b>Transfers and relocation</b>			[53] <sup>L*</sup> , [55] <sup>L*</sup>	

	<b>Service delivery</b>	<b>Clinic times</b>	[30] <sup>L</sup>		[36] <sup>M</sup> , [41] <sup>L*</sup> , [43] <sup>L</sup> , [54] <sup>H***</sup>	[59] <sup>L***</sup>
		<b>Drug and test resources</b>			[35] <sup>H***</sup> , [36] <sup>M</sup> , [37] <sup>L</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [50] <sup>M</sup> , [51] <sup>H**</sup> , [54] <sup>H***</sup>	[45] <sup>L</sup>
		<b>Lack of privacy</b>	[30] <sup>L</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [44] <sup>M***</sup> , [51] <sup>H**</sup> , [52] <sup>L</sup> , [60] <sup>L***</sup>	
		<b>Negative experiences at the clinic</b>	[62] <sup>L</sup>	[62] <sup>L</sup>	[36] <sup>M</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [54] <sup>H*</sup> , 55	
		<b>Physical clinic environment</b>	[30] <sup>L</sup>		[43] <sup>L</sup> , [52] <sup>L</sup>	
		<b>Scheduled appointments</b>	[30] <sup>L</sup>	[30] <sup>L</sup>	[35] <sup>H*</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [52] <sup>L</sup> , [56] <sup>M</sup>	
		<b>Staff turnover</b>	[62] <sup>L</sup>		[35] <sup>H*</sup> , [52] <sup>L</sup>	
		<b>Weak systems and protocols</b>			[35] <sup>H***</sup>	
	<b>Stigma and health care engagement</b>	<b>Gender and sexuality bias</b>			[45] <sup>L</sup>	
		<b>HIV related stigma</b>			[41] <sup>L</sup> , [45] <sup>L</sup> , [52] <sup>L</sup> , [56] <sup>M</sup> , [61] <sup>L</sup>	
<b>Patient anticipates stigma</b>				[40] <sup>L*</sup>		
<b>Structural</b>	<b>Financial costs for care</b>	<b>Free ART still has costs</b>	[62] <sup>L</sup>	[62] <sup>L</sup>	[32] <sup>H*</sup> , [36] <sup>M</sup> , [41] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M*</sup> , [45] <sup>L</sup> , [49] <sup>L</sup> , [51] <sup>H**</sup> , [52] <sup>L</sup> , [53] <sup>L*</sup>	[30] <sup>L**</sup> , [36] <sup>M</sup>
	<b>Financial relief for care</b>	<b>Grants</b>		[30] <sup>L</sup>		[36] <sup>M</sup> , [43] <sup>L</sup> , [51] <sup>H**</sup>
	<b>Healthcare policies</b>	<b>Access and eligibility policies</b>			[51] <sup>H</sup>	
		<b>Health insurance</b>			[37] <sup>L</sup>	

		<b>Policies are hard to understand</b>			[51] <sup>H</sup>	
	<b>Income and food security</b>	<b>Income and financial status</b>			[36] <sup>M</sup> , [37] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [47] <sup>M</sup> , [52] <sup>L</sup> , [54] <sup>H*</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [61] <sup>L</sup>	[36] <sup>M</sup>
	<b>Income and food security</b>	<b>Income and financial status</b>	[30] <sup>L</sup> , [62] <sup>L</sup>		[37] <sup>L*</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [45] <sup>L</sup> , [51] <sup>H**</sup> , [54] <sup>H***</sup> , [56] <sup>M</sup> , [59] <sup>L***</sup> , [60] <sup>L***</sup> , [61] <sup>L</sup>	[44] <sup>M</sup> , [61] <sup>L</sup>
	<b>Living conditions and context</b>	<b>Housing</b>	[57] <sup>L*</sup>		[32] <sup>H*</sup> , [37] <sup>L*</sup> , [41] <sup>L</sup> , [43] <sup>L</sup> , [54] <sup>H***</sup> , [59] <sup>L***</sup>	
	<b>Transport and distance to clinic</b>	<b>Transport and distance to clinic</b>	[30] <sup>L</sup> , [62] <sup>L</sup>	[30] <sup>L</sup>	[32] <sup>H</sup> , [43] <sup>L</sup> , [44] <sup>M</sup> , [48] <sup>L</sup> , [49] <sup>L</sup> , [50] <sup>M</sup> , [51] <sup>H***</sup> , [52] <sup>L</sup> , [54] <sup>H</sup> , [56] <sup>M</sup> , [60] <sup>L</sup> , [61] <sup>L</sup>	

. Low and middle income countries; \*High income countries; \*\*Not able to discern economic category of countries in review; \*\*\*Both high income countries and low and middle income countries. <sup>L</sup> indicates a low quality review, <sup>M</sup> indicates a medium quality review, <sup>H</sup> indicates a high quality review.

The *structural level* themes identified for barriers to ART adherence included the financial cost of ART, healthcare policies, and income and food security, each of which had three findings. Participants reported that food insecurity and no access to something to liquids prevented them from taking their medication. Participants felt discouraged by their lack of understanding of healthcare policies and some reported the barrier of access laws at health care facilities that sent patients to their birthplace to seek care. Policies directed at specific populations with criminalising threats for transgender persons, commercial sex workers, drug users and deportation threats for immigrants were reported as barriers. Even with the advent of free ART, the indirect cost of ART is still high in low income settings with participants expressing

the challenge of travelling to clinics in rural areas, the affordability of safe, reliable transport and the indirect cost of childcare when visiting the clinic in order to collect medications. Facilitators at the structural level included financial relief for care (5 findings) and income and food security (2 findings), which included the provision of grants for food supplementation and travel reimbursement.

One high quality review<sup>(54)</sup> found that children reported their daily routines and lifestyle, desires to have their lives pre-ART normalised, fears of stigma, fears of the related effects of ART as well as actual negative effects experienced, non-acceptance of HIV status, conflicting messages regarding ART, forgetting or misplacing medication, medication characteristics, pill burden, feeling better, unsupportive family relationships, and social isolation as barrier to their medication adherence. No facilitators of adherence to ART for children were reported in the high quality review. Review findings from high quality reviews found that adults reported their beliefs about ART, coping strategies, daily routines, desires, fears, HIV acceptance and non-acceptance, knowledge and understanding of ART, medication factors, physical health, psychological distress, age, competing life interests on the individual level. Relationships in the household on the interpersonal level of the framework; peer and social support groups on the community level; perceptions and engagements of health care workers, integrated models of care, male only services, health care workers' recommendations, service delivery, financial costs and health care policies on the institutional level; and food insecurity, housing and income as structural factors were self-reported by patients as barriers and facilitators of adherence to ART.

#### *Barriers and facilitators to retention in care*

Ten reviews contributed to the findings for retention in care and the barriers and facilitators as reported in the reviews, by country income level and quality rating are presented in Table 8. Four low quality reviews<sup>(39,41,55,62)</sup> and one medium quality review<sup>(47)</sup> reported on the barriers

and facilitators for children. Findings for adults were found in five low quality reviews<sup>(39,41,45,46,55)</sup>, three medium quality reviews<sup>(31,44,47)</sup> and one high quality review<sup>(35)</sup>. No high quality reviews were found for children's self-reported barriers and facilitators of retention.

The prominent themes on the *individual level* were the barriers of sociodemographic factors (5 findings), such as issues around gender, and concerns about not have registered identification documents to access care due to either immigrant status or being transgender; the themes of fears (4 findings); and psychological distress and emotional reactions (7 findings). Participants reported experiencing mental fatigue from being retained in care and experiencing psychological suffering as an adult with HIV, which included feeling angry, feeling like they have lost control of their lives and feelings of depression and hopelessness.

On the *interpersonal level*, emergent themes included the barriers (5 findings) and facilitators (3 findings) of disclosure. Disclosure was reported as a barrier either in cases when participants chose not to disclose and this resulted in sporadic care within health care systems or due to post-disclosure stigma. Family members who were supportive and relationships in the household (6 findings) were reported as facilitators of in care. Partners who were emotionally supportive and encouraged healthy living were considered facilitators of retention. In other instances, partners who were not involved in care, were considered barriers, with reviews reporting that women did not have decision-making power in some contexts and this denied them the opportunity to seek care.

The *community level* had two emergent themes with one finding each. These included the theme of community beliefs and practices and the theme of peers and support groups, which was also reported as facilitators with six key findings. Facilitator findings included having a treatment companion, identifying a confidante, attending support groups and enlisting the help of supervisors and teachers to facilitate retention in care.

For retention in care, many themes that related to the *institutional level* were reported. These included service delivery (20 findings) and models of care (17 findings), followed by stigma in health care and engagement (7 findings) and engagement with health care workers (6 findings). Service delivery barriers included long waiting times and subsequent short consultations with health care workers, drug and test stock outs, lack of privacy, laboratory challenges, negative experiences of testing for HIV, the physical clinic environment, and the failure of the health care facility to keep up with rapidly changing treatment protocols. Participants reported same day appointments between services offerings at the clinic, their experiences of HIV testing and the provision of disability accommodations to be facilitators of service delivery (5 findings). The facilitators of models of care (9 findings) included integrated care to reduce patient burden, the treatment of depression and anxiety related to diagnosis, offering male-friendly services without needing to access care through partners' ANC services and home visiting or mobile care units.

*Structural level* barriers were emergent for health care policies (4 findings), financial costs of care (2 findings), transport and distance to clinic (2 findings), and one finding each for income and food security, and living condition and context. Participants reported the cost of attending care even while ART was universally free and accessible as a barrier to engaging in care. Indirect costs included the loss of wages when attending the clinic, transportation costs, childcare costs, and the possible loss of grants due to their HIV positive diagnosis. Only one facilitator of having a higher income was reported at the structural level.

No high quality reviews were found for self-reported barriers and facilitators of retention in care for children, whereas one high quality review<sup>(35)</sup> was found for adults. This review reported integrated models of care, negative perceptions of health care workers, limited drug and test resources, scheduling difficulties, high staff turnover and weak protocol systems as barriers to

retention in care. Frequency and duration of engagement between HIV positive adults and health care workers was the only self-reported facilitator of retention in the high quality review.

Table 8: Summary of review level evidence: Retention in care

HIV Model level	Themes	Sub-themes	Children and Youth (0-24 years)		Adults	
			Barriers	Facilitators	Barriers	Facilitators
Individual	Beliefs about ART	Negative beliefs about ART	[62] <sup>L</sup>		[46] <sup>L</sup>	
	Criminal justice system involvement	Criminal justice system involvement			[31] <sup>M**</sup>	
	Daily routine and lifestyle	Substance Use			[41] <sup>L*</sup>	
	Desires	Care for family and children		[62] <sup>L</sup>		[46] <sup>L</sup>
	Desires	Look and feel healthy				[46] <sup>L</sup>
	Desires	Marriage and children		[62] <sup>L</sup>		
	Desires	Normalisation to life before ART	[62] <sup>L</sup>	[62] <sup>L</sup>		
	Disclosure	Disclosure		[62] <sup>L</sup>		
	Education and Training Skills	Education and Training Skills		[62] <sup>L</sup>		[31] <sup>M**</sup>
	Experiences of HIV and ART	Experiences of HIV and ART			[39] <sup>L**</sup>	
	Fears	Fears of stigma	[62] <sup>L</sup>		[39] <sup>L**</sup> , [44] <sup>M*</sup> , [46] <sup>L</sup> , [55] <sup>L*</sup>	
		Fears related to the effects of ART			[46] <sup>L</sup>	
	HIV Status	Non-acceptance of HIV status			[44] <sup>M*</sup> , [46] <sup>L</sup>	
	Knowledge and understanding	Knowledge of HIV, ART and HAART		[62] <sup>L</sup>		[44] <sup>M*</sup> , [55] <sup>L*</sup>
		Uncertainty and conflicting messages	[62] <sup>L</sup>		[44] <sup>M</sup> , [46] <sup>L</sup>	[44] <sup>M</sup>
Medication	Negative side effects of medication	[62] <sup>L</sup>		[46] <sup>L</sup>		



		<b>Pill burden and regimen</b>			[46] <sup>L</sup>		
	<b>Past trauma and abuse</b>	<b>Experienced past trauma or abuse</b>	[62] <sup>L</sup>		[41] <sup>L*</sup>		
	<b>Physical health</b>	<b>Feeling better and healthier</b>			[39] <sup>L**</sup> , [46] <sup>L</sup>		
		<b>Feeling ill and disease progression</b>			[46] <sup>L</sup>	[39] <sup>L**</sup>	
	<b>Psychological distress and emotional reactions</b>	<b>Demotivated</b>			[46] <sup>L</sup>		
		<b>Negative emotion</b>	[62] <sup>L</sup>		[41] <sup>L*</sup> , [46] <sup>L</sup>		
		<b>Perception of self</b>	[62] <sup>L</sup>	[62] <sup>L</sup>			
		<b>Psychological distress and emotional impact</b>			[39] <sup>L**</sup>		
	<b>Sociodemographic</b>	<b>Employment</b>	[41] <sup>L*</sup> , [47] <sup>M</sup>		[47] <sup>M</sup>		
		<b>Identification</b>	[55] <sup>L*</sup>				
	<b>Spiritual beliefs</b>	<b>Beliefs: Spiritual</b>			[44] <sup>M</sup> , [46] <sup>L</sup>		
	<b>Traditional Beliefs</b>	<b>Beliefs: Traditional</b>	[62] <sup>L</sup>				
<b>Interpersonal</b>	<b>Competing life demands</b>	<b>Competing life demands</b>			[41] <sup>L*</sup> , [39] <sup>L**</sup> , [55] <sup>L*</sup>		
	<b>Disclosure</b>	<b>Disclosure</b>	[62] <sup>L</sup>	[62] <sup>L</sup>		[39] <sup>L**</sup> , [44] <sup>M*</sup>	
		<b>Non-disclosure</b>	[62] <sup>L</sup>			[39] <sup>L</sup>	
	<b>Relationships in household</b>	<b>Gender and power in household</b>				[39] <sup>L**</sup> , [45] <sup>L</sup> , [46] <sup>L</sup>	
		<b>Supportive family relationships</b>				[39] <sup>L**</sup>	[39] <sup>L**</sup> , [41] <sup>L*</sup>
		<b>Supportive partner</b>					[47] <sup>M</sup>
		<b>Unsupportive family relationships</b>	[62] <sup>L</sup>			[39] <sup>L**</sup> , [46] <sup>L</sup>	
		<b>Unsupportive partner</b>				[44] <sup>M</sup> , [46] <sup>L</sup>	[44] <sup>M</sup>

Community	Community beliefs and practices	Beliefs about HIV and ART			[39] <sup>L**</sup>	
		Gender norms			[39] <sup>L**</sup>	
		Preference for traditional healers and medicines			[39] <sup>L**</sup> , [62] <sup>L</sup>	
	Peers and support groups	Medication companion			[62] <sup>L</sup>	
		Peer support				[31] <sup>M**</sup>
		Support groups		[62] <sup>L</sup>		[46] <sup>L</sup>
		Supportive supervisors and teachers		[62] <sup>L</sup>		
		Unsupportive supervisors and teachers			[62] <sup>L</sup>	
	Religious institutions	Religious institutions		[62] <sup>L</sup>		[39] <sup>L**</sup>
Social support	Social support				[41] <sup>L*</sup>	
Stigma and discrimination	Experiences of stigma	[62] <sup>L</sup>		[39] <sup>L**</sup> , [41] <sup>L*</sup> , [46] <sup>L</sup> , [55] <sup>L*</sup>		
Institutional	Counselling practices and principles	Awareness of literacy and language barriers			[39] <sup>L**</sup> , [55] <sup>L*</sup>	[31] <sup>M**</sup>
		Awareness of who is providing the counselling				[39] <sup>L**</sup>
		In depth pre and post counselling when testing		[62] <sup>L</sup>	[39] <sup>L**</sup>	[31] <sup>M**</sup>
		Including patients beliefs and respecting cultural practices				[31] <sup>M**</sup> , [39] <sup>L**</sup>
		Poor counselling	[62] <sup>L</sup>		[46] <sup>L</sup>	
		Types of narrative used by health care workers		[62] <sup>L</sup>		[31] <sup>M**</sup>

<b>Engagement with health care workers</b>	<b>Disengaged and unsupportive relationships</b>		[62] <sup>L</sup>	[31] <sup>M**</sup> , [41] <sup>L*</sup> , [49] <sup>L</sup>	
	<b>Frequency and duration of engagements</b>			[39] <sup>L**</sup>	[35] <sup>H</sup> , [39] <sup>L**</sup>
	<b>Supportive and collaborative relationships</b>				[31] <sup>M**</sup> , [39] <sup>L**</sup>
<b>Health care worker recommendations and care</b>	<b>Health care worker provides holistic care</b>				[31] <sup>M**</sup>
	<b>Provider input</b>				[39] <sup>L**</sup>
<b>Models of Care</b>	<b>Adolescent services</b>		[62] <sup>L</sup>		
	<b>Integrated care</b>	[39] <sup>L**</sup>			[39] <sup>L**</sup>
	<b>Integrated mental health care</b>	[62] <sup>L</sup>			[41] <sup>L*</sup>
	<b>Involving patients as peer facilitators</b>	[62] <sup>L</sup>			
	<b>Male services</b>				[31] <sup>M**</sup>
	<b>Mobile and home visits</b>				[31] <sup>M**</sup>
	<b>PMTCT, ANC and HIV Integration</b>				[35] <sup>H***</sup> , [44] <sup>M***</sup>
<b>Perception of health care workers</b>	<b>Expectations of providers</b>				[31] <sup>M**</sup>
	<b>Negative perceptions of health care workers</b>			[35] <sup>H***</sup>	[31] <sup>M**</sup>
	<b>Perception of health care workers</b>			[31] <sup>M**</sup>	[31] <sup>M**</sup>
	<b>Positive perceptions of health care workers</b>				[31] <sup>M**</sup> , [39] <sup>L**</sup> , [44] <sup>M*</sup>
<b>Service delivery</b>	<b>Clinic times</b>			[31] <sup>M**</sup> , [39] <sup>L**</sup> , [41] <sup>L*</sup> , [46] <sup>L</sup>	
	<b>Drug and test resources</b>			[31] <sup>M**</sup> , [35] <sup>H***</sup>	[31] <sup>M**</sup>

		<b>Lack of privacy</b>			[31] <sup>M**</sup> , [39] <sup>L**</sup> , [41] <sup>L*</sup> , [44] <sup>M</sup> , [46] <sup>L</sup>	
		<b>Negative experiences at the clinic</b>	[62] <sup>L</sup>	[62] <sup>L</sup>	[41] <sup>L*</sup> , [39] <sup>L**</sup> , [44] <sup>M</sup> , [46] <sup>L</sup> , [49] <sup>L</sup> , [55] <sup>L*</sup>	[39] <sup>L**</sup>
		<b>Physical clinic environment</b>		[62] <sup>L</sup>	[46] <sup>L</sup>	[31] <sup>M**</sup>
		<b>Scheduled appointments</b>			[31] <sup>M**</sup> , [35] <sup>H***</sup> , [39] <sup>L**</sup> , [41] <sup>L*</sup> , [44] <sup>*</sup>	[31] <sup>M**</sup>
		<b>Staff turnover</b>	[62] <sup>L</sup>		[35] <sup>H***</sup> , [39] <sup>L**</sup>	
		<b>Weak systems and protocols</b>			[31] <sup>M**</sup> , [35] <sup>H***</sup>	
	<b>Stigma and health care engagement</b>	<b>Gender bias</b>			[39] <sup>L**</sup>	
		<b>HIV related stigma</b>			[39] <sup>L**</sup> , [41] <sup>L*</sup> , [46] <sup>L</sup>	
		<b>Patient anticipates stigma</b>	[62] <sup>L</sup>		[39] <sup>L**</sup> , [46] <sup>L</sup>	
<b>Structural</b>	<b>Financial costs for care</b>	<b>Free ART still has costs</b>	[62] <sup>L</sup>		[31] <sup>M**</sup> , [41] <sup>L*</sup> , [47] <sup>M</sup> , [49] <sup>L</sup>	
	<b>Healthcare policies</b>	<b>Access and eligibility policies</b>			[31] <sup>M</sup> , [39] <sup>L**</sup> , [47] <sup>M</sup>	
		<b>Health insurance</b>			[39] <sup>L**</sup>	
		<b>Policies are hard to understand</b>			[31] <sup>M</sup>	
	<b>Income and food security</b>	<b>Income and financial status</b>	[62] <sup>L</sup>		[41] <sup>L*</sup> , [44] <sup>M</sup> , [46] <sup>L</sup> , [49] <sup>L</sup>	[44] <sup>M</sup>
	<b>Living conditions and context</b>	<b>Housing</b>				
	<b>Transport and distance to clinic</b>	<b>Transport and distance to clinic</b>	[62] <sup>L</sup>		[41] <sup>L***</sup> , [44] <sup>M</sup> , [46] <sup>L</sup> , [48] <sup>L</sup> , [49] <sup>L</sup>	[48] <sup>L</sup> , [55] <sup>L*</sup>
	<b>Financial relief for care</b>	<b>Grants</b>		[62] <sup>L</sup>		

. Low and middle income countries; \*High income countries; \*\*Not able to discern economic category of countries in review; \*\*\*Both high income countries and low and middle income countries. <sup>L</sup> indicates a low quality review, <sup>M</sup> indicates a medium quality review, <sup>H</sup> indicates a high quality review.

## **What are the knowledge gaps in the available review level evidence?**

We found the following gaps in the existing evidence related to linkage, adherence and retention in care.

### *Linkage to HIV care*

Review level evidence (Table 6) on the barriers and facilitators for children and linkage to ART is sparse, with a single review reporting on children and adolescents in low and middle-income countries and no reviews reporting on children in high income countries. A low quality review identified the main barriers for children in both low to middle-income countries were categorised into the interpersonal and institutional level of the HIV behaviour change model. Review level evidence is lacking of the psychological distress and emotional reactions experienced by children and adults when learning about their positive status and possible mode of transmission, whether through unprotected sex or vertical transmission. Review level evidence of the facilitators of linkage are under-reported and children's perceptions of and engagement with health care workers. No high quality reviews reporting on children's self-reported barriers and facilitators to linkage was found. For adults, much of the review-level evidence has synthesised the barriers of linkage to ART rather than the facilitators. There is a lack of high quality reviews for the facilitating effect of community beliefs and practices, internal beliefs and the role of peers and support groups for linkage to treatment for ART. Additionally, there is lack of evidence on the coping strategies employed by children and adults to facilitate linkage.

### *Adherence to ART*

There is minimal review level evidence for children when compared to the existing evidence of adherence to ART in adult populations (Table 7). We found only one high quality review for children and three high quality reviews for adults. However, when comparing the

methodological quality of reviews, there is a large body of medium and low quality reviews, with most reviews being conducted on populations from low income countries. Individual beliefs, desires, coping strategies, and fears are addressed in the literature for adults but not adequately for children. No review-level evidence was available on the relationships in the household in low and middle-income countries for children. There is a large quantity of evidence on the barriers of the characteristics of the medication, the side effects, the psychological distress and emotional reactions and the effects of service delivery but a gap exists in the evidence of the facilitators that can mitigate these barriers in adults. Evidence in adults is lacking on the role of personal beliefs, cultural practices and traditional community beliefs on adherence to ART. Further exploration on the self-reported experiences of psychological distress and engagement with peers in the context of stigma is needed.

#### *Retention in care*

The existing evidence on review level for retention is sparse (Table 8). The focus of synthesis from the included studies have primarily been conducted in adult populations in low and middle-income countries. Four low quality reviews and one medium quality review addressed the outcome of retention in care among young people and no high quality reviews were found. In children, caregivers are seen as the primary caregivers and gatekeepers for management of a positive HIV diagnosis but this is not displayed in the existing evidence, as there is a lack of research that is available. Additionally, the role of caregivers in adult populations was not available in the included reviews. In low and middle-income countries to complexities regarding the co-existence of traditional medicine and scientific based medicine is briefly mentioned, but not explored, in review-level evidence. Adult populations self-reports of family and social relationships are synthesised in low and middle-income countries as well as high income countries, however there is no review level evidence for children. Only one high quality review was found for HIV positive adults reporting barriers and facilitators to retention in care.

## **Overlap between included systematic reviews**

We found overlap in the qualitative, quantitative and mixed methods primary studies included within the 33 systematic reviews (Additional file 10). The primary studies within the systematic reviews were published between and 1995 and 2017. Of the 1153 primary studies in the systematic reviews, 826 were unique studies, of which 616 were included in only one review. We found that 139 of the studies were included in two reviews, forty-seven in three reviews, fourteen in four reviews, three in five, four in six, and one study was included in seven reviews and another across eight reviews.

We found inconsistency in the review authors inclusion criteria to synthesis the outcomes of linkage to ART, adherence to ART and retention in care. One author may have used a primary study to synthesise evidence on linkage to ART and another author may have used the same study to synthesis evidence on adherence to ART. This may be due to the varying definitions ascribed by authors when referring to various stages within the HIV continuum of care.

## **Discussion**

This overview identified 33 systematic reviews from high-income countries and low and middle-income countries and reported on scope, quality and gaps in evidence of the available review-level literature for youth and adults population groups who are infected with HIV for the outcomes of linkage to ART, adherence to ART and retention in care. We conducted a qualitative evidence synthesis to explore self-reported barriers and facilitators of participants. For the outcome of linkage, adherence, and retention in care, individual level factors such as participants' fears, psychological distress, and beliefs about ART were emergent with little to no emphasis on the facilitators to mitigate these barriers in youth or adult populations. Interpersonal factors such as the dynamics of relationships within the household, and the fears, anxieties and experiences of disclosure, were reported as barriers. The influence of

peers and support groups on participants decisions to progress through the HIV care cascade were reported as both barriers and facilitators. Models of care and the service delivery practices adopted by health care centres were considered as prominent themes when exploring review level evidence for barriers and facilitators. Participants reported long waiting times, the risk of unintentional disclosure when visiting an overcrowded facility, the negative treatment by health care workers and the challenges of travelling to clinic as barriers. The facilitators of having skilled health care workers and targeted services for men and youth as well as integration of care were reported by participants. Structural level themes included transportation to the clinic, poverty and low income levels linked to the lack of food. Looking at the themes and self-reported barriers provides a complex, rich overview of the interwoven complexities of the lives that people who are HIV positive lead.

We found very few high quality reviews examining self-reported barriers and facilitators to linkage, adherence to ART and retention in care for children and adults. This does not imply that the primary studies included in the reviews are of low quality, as we only assessed the methodological quality of the systematic reviews. There is a current debate<sup>(64-65)</sup> about when, within which paradigmatic stance and whether to conduct critical appraisal within a qualitative systematic review. The area for methods development in appraisals for qualitative systematic reviews and qualitative overviews are understudied. The appraisal of the reviews challenged us as authors to think reflexively about the domains that influenced the quality of the reviews and the items on the appraisal tool that explored these domains. We used guidance from recent methodological papers<sup>(21,22,64-66)</sup> in the field on critical appraisal to revise the JBI-SR Checklist<sup>(66)</sup> for our overview and to determine our decision rules for overall quality of the reviews. To facilitate understanding of the human experience the production of qualitative evidence synthesis is increasing and the risk of sampling and re-interpretation of the same primary studies for different outcomes and objectives through different paradigmatic lenses



can become challenging for research synthesis. The use of overviews to provide a synthesis of the existing review level evidence is expected to increase as the pool of systematic reviews continue to grow. Before embarking on new systematic reviews it is important for authors and review teams to take stock of existing evidence and minimise the risk of creating research waste.

### **Strengths and limitations of the overview**

The strengths of this overview is in the robust and transparent way in which it was conducted and reported. All evidence, data extraction, critical appraisal, justifications for decisions, clear decision guides and data is presented alongside the manuscript. The search was comprehensive, and data extraction, screening and critical appraisal was conducted by two authors. At the time of the protocol of this overview protocol was developed there was no existing example of the synthesis of review-level qualitative data. The method of synthesis was developed and refined with testing its application multiple times with the data.

We had envisioned to explore the data by sub groups for children 0-13 years, young people and adolescents, perinatally infected adolescents, and adult sub-group populations. Due to the different reporting methods and study designs that review authors chose to include we were unable to provide a detailed synthesis of themes by types of participants for children and adults. We were unable to group specific themes to specific participants in specific contexts. However, what we were able to do is provide an overview of the existing reviews, the quality of the reporting of the review, an overview of the review searches, types of studies samples, the types of participants included, and the barriers and facilitators reported by the review authors.

The aim of this paper was to present an overview of existing systematic reviews, and therefore, we included the primary studies as per the review authors' description and assessed it for

inclusion in our mega-aggregation against our inclusion criteria. Where we could not discern which findings came from which types of study designs we included the reviewers conclusions and findings as is. It can be argued that the authors base their conclusions on the knowledge of all the findings in their study. However, it cannot be assumed that all the evidence was used in their summations. Therefore, this overview only included review level evidence of the self-reported by the participants that were evidenced in the synthesis of the review authors.

This overview is the first review to synthesise the available qualitative review-level evidence on HIV linkage to ART, adherence to ART and retention in care, for all populations, across all settings, from 1990 up to July 2018. It is also the first application of a new proposed method of qualitative synthesis called mega-aggregation framework synthesis.

## **Conclusion**

Our overview found that the main barriers and facilitators to linkage, adherence and retention such as psychosocial personal characteristics of perceptions of ART, desires, fears, experiences of HIV and ART, coping strategies and mental health, were interwoven with other factors on the interpersonal, community, institutional and structural level. Persons living with HIV identified stigma and lack of social support, alongside health care services that was not sensitive to their individual needs as barriers to adherence and retention in care. In low income countries structural, community and institutional factors were more self-reported than in high income countries who reported more individual level barriers such as fear of medication side effects. High quality qualitative review level evidence on self-reported barriers and facilitators of linkage, adherence and retention in care is lacking for adults and even more so for children.

## **Implications for Practice**

Factors associated with linkage, adherence and retention in care do not occur in isolation but are in fact complex and tightly interwoven<sup>(32)</sup>. To understand the experiences of persons

testing positive for HIV when considering committing to lifelong treatment, the potential post-disclosure life changes, and the side effects, juxtaposed with their beliefs about medication and diseases, it is important to consider all the factors on the individual, interpersonal, community, institutional and structural factors that influence their decision making and actions. Practitioners working in health care cannot treat patients only for their diagnosis of HIV but must provide holistic care and be aware of the barriers and facilitators that these patients may be experiencing. The experiences of one patient may not be the experience of another and should be dealt with a case-by case manner within the contextual circumstance of the patient. Healthcare policies have been reported as not easily understood and methods of dissemination and education need to be considered for information uptake in communities. Community engagement workers can use their platforms to create open dialogues about HIV, the negative beliefs and stigmas, the dissemination of information on services that are provided in the communities and to promote the positive effects of staying adherent to ART for people infected with HIV.

### **Implications for Research**

The variables linkage, adherence and retention in care has been used broadly in this to encompass the range of reviews available. Accurate measurement of HIV linkage to medication, adherence to ART and retention in care are inconsistent in the available evidence. This study did not analyse the breadth of definitions across reviews and it is recommended that future research interrogate the conceptual definitions of linkage, adherence and retention in care for HIV positive populations.

Most included reviews were assessed as having low quality. Future qualitative systematic reviews in the field of HIV linkage, adherence and retention in care, should follow a rigorous approach to minimise the risk of bias. The findings of this overview provide researchers and

practitioners with a broad overview of the existing evidence and is useful in the development of new research questions to respond to evidence gaps identified.

This overview applies the first attempt at a newly developed method of analysis for overviews that include qualitative systematic reviews. Researchers are encouraged to build on the proposed synthesis method of mega-aggregative framework synthesis as the place of overviews become more prominent with the growing body of qualitative systematic reviews.

## List of Abbreviations

**AIDS:** Acquired immuno-deficiency syndrome

**ANC:** Antenatal care

**ART:** Antiretroviral therapy

**CD4 count:** Cluster of differentiation 4 count

**HAART:** Highly Active Antiretroviral Therapies

**HIV:** Human immunodeficiency virus

**JBI:** Johanna Briggs Institute

**JBI-SR Checklist:** Johanna Briggs Systematic Review Checklist

**MSM:** Men who have sex with men

**PLHIV:** People living with HIV

**PRISMA-ScR:** PRISMA Extension for Scoping Reviews Checklist

**QES:** Qualitative Evidence Synthesis

**STI:** Sexually transmitted infection

## **Declarations**

### **Ethics approval and consent to participate**

Not applicable

### **Consent for publication**

Not applicable

### **Availability of data and material**

All data generated or analysed during this study are included in this published article and its supplementary information files.

### **Competing interests**

LH, AR and IEW are authors on a qualitative systematic review on factors influencing linkage, adherence to ART and retention in care among PLWHIV in Sub-Saharan Africa, with IEW being the lead author. We have identified this review as an ongoing study, as it was not completed when we conducted the search (25 July 2018 ). Authors note that their involvement in both projects was beneficial to understanding the existing evidence and were reflexive of any potentials for biases in their conversations and dialogues that may have arose. The outcomes of either paper was not dependent on the other.

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## **Author Contributions**

LH, AR and EIW conceptualised the research question and LH wrote the protocol. AR and EIW reviewed and approved the protocol. LH and AR screened the titles and abstracts of studies resulting from the search as well as the full text included studies. LH and AR extracted data and critically appraised all included studies. LH conducted the mega-aggregation and AR reviewed the analysis. LH wrote the final manuscript. AR read, reviewed and approved the final manuscript. EIW provided reviewer comments through the review process.

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## **Authors' information**

LH is a practising research psychologist and a proposed graduate in Masters in Clinical Epidemiology. She used her expertise in qualitative research to lead the conceptualisation of the protocol, the qualitative analysis of extracted data and the write up of this paper. IEW is an HIV specialist who assisted with the selection of relevant reviews and conceptualisation of the protocol and overview design. AR and IEW are experienced researchers in systematic reviews and provided expert guidance in the design, implementation and write up of the paper.

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**Additional file 1: PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist**

Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	10
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable) background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	11
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	15
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	15
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	15
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	18-19
Information sources	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	19-20
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	94
Study selection	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review	19-20

Data collection process	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	20-21
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made. Critical appraisal of individual sources of evidence	20-21
Risk of bias in individual studies	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	21-23
Summary measures	13	Not applicable for scoping reviews.	NA
Synthesis of results	14	Describe the methods of handling and summarizing the data that were charted.	23-25
Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Not applicable for scoping reviews.	N/A
Additional analyses	16	Not applicable for scoping reviews.	N/A
<b>RESULTS</b>			
Selection of sources of evidence.	17	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	26
Characteristics of sources of evidence	18	For each source of evidence, present characteristics for which data were charted and provide the citations.	26-39
Critical appraisal of sources of evidence	19	If done, present data on critical appraisal of included sources of evidence (see item 12).	41-42
Results of individual sources of evidence	20	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	42-74 and 111-195

Synthesis of results	21	Summarize and/or present the charting results as they relate to the review questions and objectives.	42-74
Risk of bias across studies	22	Not applicable for scoping reviews.	NA
Additional analysis	23	Not applicable for scoping reviews.	N/A
<b>DISCUSSION</b>			
Summary of evidence	24	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	75-77
Limitations	25	Discuss the limitations of the scoping review process.	78
Conclusions	26	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	78-79
<b>FUNDING</b>			
Funding	27	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	82

*From:* Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med* [Internet]. 2018 Sep 4 [cited 2018 Sep 4]; Available from: <http://annals.org/article.aspx?doi=10.7326/M18-0850>



## **Additional file 2: Differences between protocol and manuscript**

We amended the inclusion criteria for types of systematic reviews to include reviews that “included qualitative and mixed methods studies containing qualitative data. Reviews that included both qualitative and quantitative studies were included but only qualitative primary studies were used for analysis. Reviews that included only quantitative studies were excluded”.

The protocol specified:

*“Qualitative systematic reviews that include self-report data, quantitative studies (specifically cross sectional or survey studies that contain open ended questions), or mixed methods studies that make reference to the perceived barriers and facilitators to linkage, adherence and retention in care of HIV positive persons will be included in this overview.”*

We made this amendment during the screening phase as including only ‘qualitative systematic reviews’ was too specific for our inclusion and it resulted in us excluding studies containing relevant qualitative data. By amending the type of systematic reviews to ‘systematic reviews containing qualitative data’ we conducted a more comprehensive review.

Due to the complexity and amount of data in this overview, we made a decision after the protocol was submitted for publication, to create decision rules for quality appraisal cut off scores in order to rate reviews as low quality, medium quality and high quality. Reviews were not excluded based on their quality but the ratings were used in the interpretation of the review findings and to explore the gaps in evidence.

**Additional file 3: Search Strategies for electronic databases****Campbell Library:**

<https://www.campbellcollaboration.org/library.html>

HIV or AIDS

**Cinahl EbscoHost**

S23	S12 and S17 and S22
S22	S18 or S19 or S20 or S21
S21	TI ("integrative research" OR "integrative review*" OR "integrative overview*" OR "research integration*" OR "research overview*" OR "collaborative review*" OR "collaborative overview*" OR "systematic review*" OR "systematic overview*" OR "methodological overview*" OR "methodologic overview*" OR "methodological review*" OR "methodologic review*" OR "quantitative review*" OR "quantitative overview*" OR "quantitative syntheses*" OR "data syntheses*" OR "qualitative overview*" OR "qualitative syntheses*" OR "data extraction" OR "data abstraction*") OR AB ( "integrative research" OR "integrative review*" OR "integrative overview*" OR "research integration*" OR "research overview*" OR "collaborative review*" OR "collaborative overview*" OR "systematic review*" OR "systematic overview*" OR "methodological overview*" OR "methodologic overview*" OR "methodological review*" OR "methodologic review*" OR "quantitative review*" OR "quantitative overview*" OR "quantitative syntheses*" OR "data syntheses*" OR "qualitative overview*" OR "qualitative syntheses*" OR "data extraction" OR "data abstraction*" )
S20	TI ( (meta analysis or meta-analysis or metaanalysis) ) OR AB ( (meta analysis or meta-analysis or metaanalysis) )
S19	MH systematic review
S18	PT systematic review
S17	S13 OR S14 OR S15 OR S16
S16	MH medication adherence
S15	TI ( (Adherence OR adher* OR compliance OR complian* OR comply OR complied OR noncompliant* OR non-compliant* OR non-adher* OR nonadher*) ) OR AB ( (Adherence OR adher* OR compliance OR complian* OR comply OR complied OR noncompliant* OR non-compliant* OR non-adher* OR nonadher*) )
S14	TI ( (Retention OR retain* OR "lost to follow-up" OR ("loss*" AND "follow up") OR LTFU OR "loss-to-follow-up" OR attrition OR "loss to care" OR "loss to program*" OR default* OR engage* OR disengage* OR "retention in care" OR "lost to retention") ) OR AB ( (Retention OR retain* OR "lost to follow-up" OR ("loss*" AND "follow up") OR LTFU OR "loss-to-follow-up" OR attrition OR "loss to care" OR "loss to program*" OR default* OR engage* OR disengage* OR "retention in care" OR "lost to retention") )
S13	TI ( ("treatment initiation" OR link* OR "link to care" OR "link to treatment" OR "linkage to treatment" OR "link into care" OR "linkage into treatment") ) OR AB ( ("treatment

	initiation" OR link* OR "link to care" OR "link to treatment" OR "linkage to treatment" OR "link into care" OR "linkage into treatment" )
S12	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11
S11	AB hiv/aids
S10	AB (acquired immun*) AND (deficiency syndrome)
S9	AB "acquired immunodeficiency syndromes" OR "acquired immune deficiency syndrome" OR "acquired immuno-deficiency syndrome" OR "acquired immune-deficiency syndrome"
S8	AB (human immun*) AND (deficiency virus)
S7	AB (HIV OR hiv-1 OR hiv-2* OR hiv1 OR hiv2 OR "hiv infect*" OR "human immunodeficiency virus" OR "human immune deficiency virus" OR "human immuno-deficiency virus" OR "human immune-deficiency virus")
S6	TI hiv/aids
S5	TI (acquired immun*) AND (deficiency syndrome)
S4	TI "acquired immunodeficiency syndromes" OR "acquired immune deficiency syndrome" OR "acquired immuno-deficiency syndrome" OR "acquired immune-deficiency syndrome"
S3	TI (human immun*) AND (deficiency virus)
S2	TI (HIV OR hiv-1 OR hiv-2* OR hiv1 OR hiv2 OR "hiv infect*" OR "human immunodeficiency virus" OR "human immune deficiency virus" OR "human immuno-deficiency virus" OR "human immune-deficiency virus")
S1	MW hiv OR MW hiv infection

### Cochrane Library and Cochrane Library DARE:

#1	MeSH descriptor: [HIV] explode all trees
#2	MeSH descriptor: [HIV Infections] explode all trees
#3	"human immunodeficiency virus"
#4	"human immuno-deficiency virus"
#5	"acquired immunodeficiency syndrome"
#6	acquired immuno-deficiency syndromes
#7	"acquired immunodeficiency syndromes"
#8	acquired immuno-deficiency syndrome
#9	AIDS
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9
#11	"treatment initiation" or link* or "link to care" or "link to treatment" or "linkage to treatment" or "link into care" or "linkage into treatment"
#12	Retention or retain* or "lost to follow-up" or ("loss*" and "follow up") or LTFU or "loss-to-follow-up" or attrition or "loss to care" or "loss to program*" or "loss to programme*" or default* or engage* or disengage* or "retention in care" or "lost to retention"
#13	Adherence or adher* or compliance or complian* or comply or complied or noncomplan* or non-complian* or non-adher* or nonadher*
#14	MeSH descriptor: [Medication Adherence] explode all trees

#15	#15 #11 or #12 or #13 or #14
#16	#10 and #15

**Medline (PubMed)**

#1	Search "HIV"[Majr]
#2	Search "HIV Infections"[Majr]
#3	Search HIV[Title/Abstract]
#4	Search hiv-1[Title/Abstract]
#5	Search hiv-2*[Title/Abstract]
#6	Search hiv1[Title/Abstract]
#7	Search hiv2[Title/Abstract]
#8	Search hiv infect*[Title/Abstract]
#9	Search "human immunodeficiency virus"[Title/Abstract]
#10	Search "human immune deficiency virus"[Title/Abstract]
#11	Search "human immuno-deficiency virus"[Title/Abstract]
#12	Search "human immune-deficiency virus"[Title/Abstract]
#13	Search (((human immun*) AND (deficiency virus)))
#14	Search "acquired immunodeficiency syndromes"[Title/Abstract]
#15	Search "acquired immune deficiency syndrome"[Title/Abstract]
#16	Search "acquired immuno-deficiency syndrome"[Title/Abstract]
#17	Search "acquired immune-deficiency syndrome"[Title/Abstract]
#18	Search HIV/AIDS[Title/Abstract]
#19	Search (((acquired immun*) AND (deficiency syndrome)))
#20	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19
#21	Search "Medication Adherence"[Majr]

#22	Search (((((((((adherence[Title/Abstract]) OR adher*[Title/Abstract]) OR compliance[Title/Abstract]) OR complian*[Title/Abstract]) OR comply[Title/Abstract]) OR complied[Title/Abstract]) OR noncomplian*[Title/Abstract]) OR non-complian*[Title/Abstract]) OR non-adher*[Title/Abstract]) OR nonadher*[Title/Abstract]
#23	Search (((((((((((((((retention[Title/Abstract]) OR retain*[Title/Abstract]) OR "lost to follow-up"[Title/Abstract]) OR ("loss*[Title/Abstract] AND "follow up")[Title/Abstract])) OR LTFU[Title/Abstract]) OR "loss-to-follow-up"[Title/Abstract]) OR attrition[Title/Abstract]) OR "loss to care"[Title/Abstract]) OR "loss to program"[Title/Abstract]) OR "loss to programme"[Title/Abstract]) OR default*[Title/Abstract]) OR engage*[Title/Abstract]) OR disengage*[Title/Abstract]) OR "retention in care"[Title/Abstract]) OR "lost to retention"[Title/Abstract]
#24	Search (("treatment initiation"[Title/Abstract]) OR link[Title/Abstract]) OR linkage[Title/Abstract]
#25	Search (#21 OR #22 OR #23 OR #24)
#26	Search "Meta-Analysis" [Publication Type]
#27	Search "Meta-Analysis as Topic"[Mesh]
#28	Search (Search "integrative research" OR "integrative review*" OR "integrative overview*" OR "research integration*" OR "research overview*" OR "collaborative review*" OR "collaborative overview*" OR "systematic review*" OR "systematic overview*" OR "methodological overview*" OR "methodologic overview*" OR "methodological review*" OR "methodologic review*" OR "quantitative review*" OR "quantitative overview*" OR "quantitative syntheses*" OR "data syntheses*" OR "qualitative overview*" OR "qualitative syntheses*" OR "data extraction" OR "data abstraction*")
#29	#26 OR #27 OR #28
#30	#20 AND #25 AND #29

**PROSPERO:** (limit to ongoing reviews)

HIV adherence OR HIV linkage OR (HIV AND retention)

**SCOPUS**

TITLE-ABS-KEY ( ( meta-analysis OR "systematic review" ) AND ( hiv OR aids ) AND ( "treatment initiation" OR link\* OR adherence OR adher\* OR compliance OR complian\* OR noncomplian\* OR non-complian\* OR non-adher\* OR nonadher\* OR "lost to follow-up" OR attrition ) ) AND PUBYEAR > 2015

**Additional file 4: Data extraction form**

<b>Characteristics of included systematic review</b>		
<b>Citation</b>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>		
<b>Search Dates</b>		<b>Date of last search:</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>		(N) Studies: Qualitative (n=), Quantitative (n=) and Mixed Methods (n=)
		<b>Studies relevant to this overview:</b> (N) Studies: Qualitative (n=), Quantitative (n=) and Mixed Methods (n=)
<b>Participants</b>		
<b>Issue</b>		
<b>Setting</b>		
<b>Outcome: Barriers and Facilitators</b>		<b>Overview Frameworks</b>
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>		
<b>Data extraction method</b>		
<b>Appraisal tool used</b>		
<b>Data synthesis method</b>		
<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>		
<b>3. Was the search strategy appropriate?</b>		
<b>4. Were the sources and resources used to search for studies adequate?</b>		
<b>5. Was selection of studies done adequately?</b>		
<b>6. Were the criteria for appraising studies appropriate?</b>		

<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>		
<b>8. Were there methods to minimize errors in the data extraction?</b>		
<b>9. Were the methods used to combine studies appropriate?</b>		
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>		
<b>11. Were the specific directives for new research appropriate?</b>		



## **Additional file 5: Revised decision rules for JBI-SR-Checklist**

### *1. Is the review question clearly and explicitly stated?*

The review questions are useful in guiding the search strategy, study design and how the review was conducted. Reviews with evidence of the main objective or question clearly stated that contains the PICO elements of Population, Issue, Context and Outcomes will be graded as a “yes”. As this overview is not inclusive of intervention studies the PICO elements have been redefined to incorporate qualitative systematic reviews. If the review contains many questions or aims that may not be clearly defined then the review will be graded as “unclear”. Reviews without review questions will be graded as a “no”.

### *2. Were the inclusion criteria appropriate for the review question?*

Included studies should be appropriate to the review question. The inclusion criteria but be clearly stated before an assessment can be made or this appraisal question will be marked as “unclear”. If study designs are aligned to review questions, the review will be graded as a “yes”, otherwise if no alignment is established the review will be graded as a “no”.

### *3. Was the search strategy appropriate?*

Systematic reviews use specific search strategies relevant to databases to locate evidence in the literature. The systematic reviews should provide evidence of a comprehensive search strategy and may be available in the methods sections of the review or available in the supplementary material of the publication. The search strategy will be deemed appropriate if it contains the PICO components of the research question or the review authors provided a description of the approach with key words and how the terms were derived. A systematic review should present a clear search strategy that addresses each of the identifiable PICO components of the review question.

Some reviews, due to word limit may only provide a description of the approach to searching, the relevant key words and terms, how the terms that were ultimately used were derived, and Subject Headings or Index terms. Search limiters such as search date or language may impact the results of the search and these will be considered for each review. If reviewers state a pre-specified search strategy was used but do not provide detail of the strategy, the reviews will be considered “unclear”. If no information on the search strategy or languages included is provided then the appraisal result for this question will be “no”.

### *4. Were the sources and resources used to search for studies adequate?*

Databases searched should be relevant to the review with at least two or more databases being searched, such reviews will result in a “yes” appraisal. Resources may include grey literature, conference abstracts or thesis repositories. Lack of evidence of these will result in a downgrade for this overview. If search sources are not specified the review question will be appraised as a “no” and if too little information is available to make a decision then the review question will be appraised as “unclear”.

5. *Was the screening and study selection appropriate?*

Study title, abstract and full text screening should be conducted by two reviewers independently and in duplicate to be graded as a “yes”. If studies were selected and screened by one reviewer and a proportion or all are checked by a second reviewer the study will be appraised as a “yes”. If studies did title and abstract screening in duplicate and full text screening was only conducted by one reviewer, or vice versa, the review will be graded as a “no”. Studies reporting screening and selection to be conducted by one author will be graded as a “no”. When no information or too little information is available the review will be graded as “unclear”.

6. *Were the criteria for appraising studies appropriate?*

To be appraised as “yes” reviews need to include a clear statement that a critical appraisal tool was used and provide details of the items used to assess the included studies. Additionally, the critical appraisal tool used should be relevant to the objective and scope of the review. If either these criteria are not met, or there is no mention of the process of critical appraisal, the review will be downgraded to a “no”. If the review authors state that an appraisal was used but do not provide details of the appraisal, the review will be graded as “unclear”.

7. *Was critical appraisal conducted by two or more reviewers independently?*

In some instances all appraisals may have been conducted by one author and checked by another, however discrepancies must be resolved by consensus or with a third person to be graded as a “yes”. Not meeting these requirements will result in a “no”. Where no critical appraisal was used in the review, the review will be graded as a “no”. Where too little information is available to make a decision, the review will be graded as “unclear”.

8. *Were there methods to minimize errors in data extraction?*

Reviews will be graded as a “yes” if efforts to minimize errors in data extraction include extracting data in duplicate and independently, using specific tools to guide the extraction or piloting of extraction tools. If it is clear that none of these strategies are used, the review will be graded as a “no”. If no information is provided, the review will be graded as “unclear”.

9. *Were the methods used to combine studies appropriate?*

If the method of synthesis the review used is aligned to the review question, the type of review and the type of evidence included in the review will be graded as a “yes”. The appraisal will also include whether the descriptive and explanatory information support the final synthesized findings from the original research. If the data synthesis method is not aligned to the review question and method, the review will be graded as a “no”. Where too little information is available to make a decision, the review will be graded as “unclear”.

10. *Were recommendations for policy and/or practice supported by the reported data?*

This question assesses the review validity rather than quality and appraises whether the recommendations made are aligned clearly to the results of the review, evidence of which will

result in a “yes” grade for the review question. If recommendations are provided but are not aligned to the research data, the review question will be graded as a “no”. If no recommendations are provided, the review question will be graded as an “unclear”.

*11. Were the specific directives for new research appropriate?*

The purpose of reviews are to identify gaps in the literature and areas where further research is identified. If review authors present recommendations for future research, relevant to findings and methods of the review, the review will be graded as “yes” for this review question. If the directives for future research are not appropriate to the review, the question will be graded as a “no”. If no directives for future research are provided, the review question will be graded as “unclear”.

## Additional file 6: Description and application of mega-aggregation framework synthesis

Phases of mega-aggregative framework synthesis	Description of phase	Application in this overview
1. Develop a rigorous protocol and identify an appropriate framework or conceptual model.	<ul style="list-style-type: none"> <li>❖ Identify a framework that can be used to understand and interpret review findings.</li> <li>❖ Broader frameworks are useful for overviews to synthesize existing qualitative systematic review findings.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Kaufman et al.<sup>(13)</sup> framework for HIV Behaviour Change was identified and the categories of individual, interpersonal, community, health system, and structural factors were used.</li> </ul>
2. Conduct a comprehensive search of the evidence.	<ul style="list-style-type: none"> <li>❖ A comprehensive search includes all relevant literature.</li> </ul>	<ul style="list-style-type: none"> <li>❖ A comprehensive search was conducted up to July 2018 with no limits on language, geographic, time period or type of publication</li> </ul>
3. Conduct screening using predefined inclusion and exclusion criteria	<ul style="list-style-type: none"> <li>❖ Screening and selection of studies should be conducted in duplicate and independently by two authors or more.</li> </ul>	<ul style="list-style-type: none"> <li>❖ See PRISMA flowchart</li> </ul>
4. Conduct critical appraisal of included reviews	<ul style="list-style-type: none"> <li>❖ A reliable and appropriate tool must be used to conduct appraisal.</li> <li>❖ If appraisal is not conducted, reasons should be provided.</li> <li>❖ Critical appraisal of studies should be conducted in duplicate and independently by two authors or more.</li> <li>❖ Full description of judgements and the reasons for judgments should be evidenced.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Critical appraisal was conducted using the JBI Checklist for Systematic Reviews and Meta analysis</li> </ul>
5. Familiarization with the data and extraction of study characteristics.	<ul style="list-style-type: none"> <li>❖ Repeated reading of the systematic reviews with special attention to the characteristics of included studies, conceptual framework, method of synthesis, findings, discussion, recommendations for policy, practice and research, and evidence for recommendations made.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The first and second author read the 33 included reviews repeatedly to familiarize themselves with the available evidence.</li> <li>❖ Detailed individual review summaries of data extraction, appraisals and discussions were recorded in a shared database that authors could refer back to.</li> <li>❖ See Additional File 4</li> </ul>
6. Verbatim extraction of review findings and search for supporting evidence or data for the extracted findings.	<ul style="list-style-type: none"> <li>❖ Qualitative software packages can be used to extract relevant review findings verbatim or findings can be extracted manually and captured into another processing programme like EXCEL.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The outcomes of interest in this overview were the barriers and facilitators to linkage, adherence and retention in care.</li> <li>❖ The barriers and facilitators reported by the review authors were identified</li> </ul>

	<ul style="list-style-type: none"> <li>❖ The extractions are considered third order concepts.</li> <li>❖ Extracted findings are checked for supporting data or evidence.</li> <li>❖ Evidence can include a reference to the primary study/ies, direct quote, visual or text evidence from the primary study, visual representations such as tables and figures with reference to the primary study/ies that the finding was based on.</li> <li>❖ Only findings with supporting evidence is included in the overview synthesis.</li> </ul>	<p>within the reviews, extracted verbatim and recorded into EXCEL as third order concepts.</p> <ul style="list-style-type: none"> <li>❖ Each code was checked for supporting data or evidence.</li> <li>❖ All codes had supporting evidence and were included in the synthesis.</li> <li>❖ Evidence was found in the review authors tables of included studies, within the text of the review or within other supplementary material provided by the review authors.</li> <li>❖ See Additional file 6</li> </ul>
7. Categorize codes and aggregate evidence into predefined framework	<ul style="list-style-type: none"> <li>❖ Categorize codes into the predefined framework. This may also include sub-population disaggregation.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Each code was categorized into the predefined framework categories: individual, interpersonal, community, health system, and structural factors by outcome and population group into the EXCEL database.</li> <li>❖ See Additional File 6</li> </ul>
8. Identify themes and create lines of action	<ul style="list-style-type: none"> <li>❖ Codes may be grouped into themes (considered 4<sup>th</sup> order concepts) within the framework categories.</li> <li>❖ Provide a description of the themes within the categories of the framework.</li> <li>❖ Visual diagrams can enhance the transparency of this process.</li> <li>❖</li> </ul>	<ul style="list-style-type: none"> <li>❖ The extracted codes were grouped into themes and considered fourth order concepts/themes.</li> <li>❖ 544 third order concepts were reclassified into 45 fourth order themes and categorized into the 5 categories of the SEM framework.</li> <li>❖ See Figure 6 for framework with themes and descriptions.</li> <li>❖ See Additional File 6</li> </ul>
9. Identify evidence gaps and make recommendations for future research	<ul style="list-style-type: none"> <li>❖ Describe the scope, quality and gaps in evidence within each category. Sub-group description will be beneficial for thick description.</li> <li>❖ Describe implications for future research.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Full description provided within the manuscript in the conclusion.</li> </ul>
10. Produce the manuscript.	<ul style="list-style-type: none"> <li>❖ Generate the report containing visual and text descriptions of the process of synthesis.</li> </ul>	<ul style="list-style-type: none"> <li>❖ This manuscript provides details of the synthesis approach with supporting Additional Files and Figures to enhance the transparency and thick description within the report.</li> </ul>

## Additional file 7: Tables of excluded studies, ongoing studies and protocols (N=45)

### Full-text articles excluded: n= 39

- Did not address outcomes of interest: n=23
- Did not meet systematic review criteria: n=10
- Did not include qualitative data: n=5
- Wrong patient population: n=1

Excluded studies references	Reason for exclusion
Abuogi LL, Smith C, McFarland EJ. Retention of HIV-infected children in the first 12 months of anti-retroviral therapy and predictors of attrition in resource limited settings: A systematic review. PLoS One [Internet]. 2016;11(6 PG-). Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84976333390&amp;partnerID=40&amp;md5=4f5ec054984db581641fba637e283b24">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84976333390&amp;partnerID=40&amp;md5=4f5ec054984db581641fba637e283b24</a> NS -	Wrong Outcomes
Aidala AA, Wilson MG, Shubert V, Gogolishvili D, Globerman J, Rueda S, et al. Housing Status, Medical Care, and Health Outcomes Among People Living With HIV/AIDS: A Systematic Review. Am J Public Heal [Internet]. 2016;106(1 PG-e1-e23):e1–23. Available from: NS -	Wrong Outcomes
Al-Dakkak I, Patel S, McCann E, Gadkari A, Prajapati G, Maiese EM. The impact of specific HIV treatment-related adverse events on adherence to antiretroviral therapy: a systematic review and meta-analysis. AIDS Care [Internet]. 2013;25(4 PG-400-14):400–14. Available from: NS -	Wrong Outcomes
Assawasuwannakit P, Braund R, Duffull SB. A model-based meta-analysis of the influence of factors that impact adherence to medications. J Clin Pharm Ther [Internet]. 2015;40(1 PG-24-31):24–31. Available from: <a href="http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=103869560&amp;site=ehost-live">http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=103869560&amp;site=ehost-live</a> NS-	Not a systematic review
Atkinson MJ, Petrozzino JJ. An evidence-based review of treatment-related determinants of patients' nonadherence to HIV medications. AIDS Patient Care STDS [Internet]. 2009;23(11 PG-903-14):903–14. Available from: NS -	Not a systematic review
Azar MM, Springer SA, Meyer JP, Altice FL. A systematic review of the impact of alcohol use disorders on HIV treatment outcomes, adherence to antiretroviral therapy and health care utilization. Drug Alcohol Depend [Internet]. 2010;112(3 PG-178-93):178–93. Available from: NS -	Wrong Outcomes
Bangalore S, Kamalakkannan G, Parkar S, Messerli FH. Fixed-dose combinations improve medication compliance: a meta-analysis (Structured abstract) [Internet]. Vol. 120, American Journal of Medicine. 2007. p. 713–9. Available from: <a href="http://onlinelibrary.wiley.com/o/cochrane/cldare/articles/DARE-12007005994/frame.html">http://onlinelibrary.wiley.com/o/cochrane/cldare/articles/DARE-12007005994/frame.html</a> NS -	Wrong patient population

Bharat S. A systematic review of HIV/AIDS-related stigma and discrimination in India: Current understanding and future needs. <i>Sahara j</i> [Internet]. 2011;8(3 PG-138-149):138–49. Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84866171091&amp;partnerID=40&amp;md5=973d85823d67e08e3b6e38ad987e76ab">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84866171091&amp;partnerID=40&amp;md5=973d85823d67e08e3b6e38ad987e76ab</a> NS -	Wrong Outcomes
Chambers LA, Rueda S, Baker DN, Wilson MG, Deutsch R, Raeifar E, et al. Stigma, HIV and health: a qualitative synthesis. <i>BMC Public Health</i> [Internet]. 2015;15(PG-848):848. Available from: NS -	Wrong Outcomes
Claborn KR, Meier E, Miller MB, Leffingwell TR. A systematic review of treatment fatigue among HIV-infected patients prescribed antiretroviral therapy. <i>Psychol Heal Med</i> [Internet]. 2015;20(3 PG-255-65):255–65. Available from: NS -	No pre-determined eligibility criteria
Colombini M, Stöckl H, Watts C, Zimmerman C, Agamasu E, Mayhew SH. Factors affecting adherence to short-course ARV prophylaxis for preventing mother-to-child transmission of HIV in sub-Saharan Africa: a review and lessons for future elimination. <i>AIDS Care</i> [Internet]. 2014;26(7 PG-914-926):914–26. Available from: <a href="http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=103936501&amp;site=ehost-live">http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=103936501&amp;site=ehost-live</a> NS -	Wrong Outcomes
Costa JM, Torres TS, Coelho LE, Luz PM. Adherence to antiretroviral therapy for HIV/AIDS in Latin America and the Caribbean: Systematic review and meta-analysis. <i>J Int AIDS Soc</i> [Internet]. 2018;21(1 PG-). Available from: NS -	Did not include qualitative studies
Darak S, Panditrao M, Parchure R, Kulkarni V, Kulkarni S, Janssen F. Systematic review of public health research on prevention of mother-to-child transmission of HIV in India with focus on provision and utilization of cascade of PMTCT services. <i>BMC Public Health</i> [Internet]. 2012;12(1 PG-). Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84860340493&amp;partnerID=40&amp;md5=3834500b0067d07a7e842d55ea7b6ef5">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84860340493&amp;partnerID=40&amp;md5=3834500b0067d07a7e842d55ea7b6ef5</a> NS -	Wrong Outcomes
Falagas ME, Zarkadoulia EA, Pliatsika PA, Panos G. Socioeconomic status (SES) as a determinant of adherence to treatment in HIV infected patients: a systematic review of the literature. <i>Retrovirology</i> [Internet]. 2008;5(PG-13):13. Available from: NS -	Wrong Outcomes
Gari S, Doig-Acuna C, Smail T, Malungo JR, Martin-Hilber A, Merten S. Access to HIV/AIDS care: a systematic review of socio-cultural determinants in low and high income countries. <i>BMC Heal Serv Res</i> [Internet]. 2013;13(PG-198):198. Available from: NS -	Did not include qualitative studies
Gemeda DH, Gebretsadik LA, Dejene T, Wolde M, Sudhakar M. Determinants of non-compliance with Antiretroviral Therapy among adults living with HIV/AIDS: A Systematic Review. <i>JB Libr Syst Rev</i> [Internet]. 2012;10(56 PG-3596-3648):3596–648. Available from: NS -	Did not include qualitative studies
Gourlay A, Birdthistle I, Mburu G, Iorpenda K, Wringe A. Barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa: a systematic review. <i>J Int AIDS Soc</i> [Internet]. 2013;16(PG-18588):18588. Available from: NS -	Wrong Outcomes
Hall B, Sou K-L, Beanland R, Lacky M, Tso L, Ma Q, et al. Barriers and Facilitators to Interventions Improving Retention in HIV Care: A Qualitative Evidence Meta-Synthesis. <i>AIDS Behav</i> [Internet]. 2017;21(6 PG-1755-1767):1755–67. Available from: <a href="http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=122919454&amp;site=ehost-live&amp;scope=site">http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=122919454&amp;site=ehost-live&amp;scope=site</a> NS -	Wrong Outcomes

Hiko D, Jemal A, Sudhakar M, Kerie MW, Degene T. Determinants of non-compliance to Antiretroviral Therapy among adults living with HIV/AIDS: A Systematic Review. <i>JBI Libr Syst Rev</i> [Internet]. 2012;10(14 Suppl PG-1-14):1–14. Available from: NS -	Wrong Outcomes
Hudelson C, Cluver L. Factors associated with adherence to antiretroviral therapy among adolescents living with HIV/AIDS in low- and middle-income countries: a systematic review. <i>AIDS Care</i> [Internet]. 2015;27(7 PG-805-16):805–16. Available from: NS -	Wrong Outcomes
Iwelunmor J, Ezeanolue EE, Airhihenbuwa CO, Obiefune MC, Ezeanolue CO, Ogedegbe GG. Socio-cultural factors influencing the prevention of mother-to-child transmission of HIV in Nigeria: a synthesis of the literature. <i>BMC Public Health</i> [Internet]. 2014;14(PG-771):771. Available from: NS -	Wrong Outcomes
Lall P, Lim SH, Khairuddin N, Kamarulzaman A. Review: an urgent need for research on factors impacting adherence to and retention in care among HIV-positive youth and adolescents from key populations. <i>J Int AIDS Soc</i> [Internet]. 2015;18(2 Suppl 1 PG-19393):19393. Available from: NS -	No data extraction in systematic review
Ma Q, Tso LS, Rich ZC, Hall BJ, Beanland R, Li H, et al. Barriers and facilitators of interventions for improving antiretroviral therapy adherence: A systematic review of global qualitative evidence: A. <i>J Int AIDS Soc</i> [Internet]. 2016;19(1 PG-). Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-85015788116&amp;doi=10.7448%2FJIAS.19.1.21166&amp;partnerID=40&amp;md5=1bc81e9ec66cd80d2e41deec63ddacd2">https://www.scopus.com/inward/record.uri?eid=2-s2.0-85015788116&amp;doi=10.7448%2FJIAS.19.1.21166&amp;partnerID=40&amp;md5=1bc81e9ec66cd80d2e41deec63ddacd2</a> NS -	Wrong Outcomes
Malta M, Magnanini MM, Strathdee SA, Bastos FI. Adherence to antiretroviral therapy among HIV-infected drug users: a meta-analysis. <i>AIDS Behav</i> [Internet]. 2010;14(4 PG-731-47):731–47. Available from: NS -	Wrong Outcomes
Malta M, Strathdee SA, Magnanini MM, Bastos FI. Adherence to antiretroviral therapy for human immunodeficiency virus/acquired immune deficiency syndrome among drug users: a systematic review. <i>Addiction</i> [Internet]. 2008;103(8 PG-1242-57):1242–57. Available from: NS -	Wrong Outcomes
Mbuagbaw L, Thabane L, Ongolo-Zogo P, Yondo D, Noorduyn S, Smieja M, et al. Trends and determining factors associated with adherence to antiretroviral therapy (ART) in Cameroon: a systematic review and analysis of the CAMPS trial. <i>AIDS Res Ther</i> [Internet]. 2012;9(1 PG-37):37. Available from: NS -	Wrong Outcomes
Medved Kendrick H. Are religion and spirituality barriers or facilitators to treatment for HIV: a systematic review of the literature. <i>AIDS Care - Psychol Socio-Medical Asp AIDS/HIV</i> [Internet]. 2016;(PG-1-13):1–13. Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84978515022&amp;partnerID=40&amp;md5=e60550155ae06001a987f9d97f8a8b48">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84978515022&amp;partnerID=40&amp;md5=e60550155ae06001a987f9d97f8a8b48</a> NS -	Did not include qualitative studies
Mhaskar R, Alandikar V, Emmanuel P, Djulbegovic B, Patel S, Patel A, et al. Adherence to antiretroviral therapy in India: a systematic review and meta-analysis. <i>Indian J Community Med</i> [Internet]. 2013;38(2 PG-74-82):74–82. Available from: NS -	Wrong Outcomes
Mugglin C, Estill J, Wandeler G, Bender N, Egger M, Gsponer T, et al. Loss to programme between HIV diagnosis and initiation of antiretroviral therapy in sub-Saharan Africa: systematic review and meta-analysis. <i>Trop Med Int Heal</i> [Internet]. 2012;17(12 PG-1509-20):1509–20. Available from: NS -	Wrong Outcomes



Nichols J, Paintsil E, Steinmetz A. Impact of HIV-Status Disclosure on Adherence to Antiretroviral Therapy Among HIV-Infected Children in Resource-Limited Settings: A Systematic Review. <i>AIDS Behav</i> [Internet]. 2017;21(1 PG-59-69):59–69. Available from: <a href="http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=120570158&amp;site=ehost-live&amp;scope=site">http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=120570158&amp;site=ehost-live&amp;scope=site</a> NS -	Wrong Outcomes
Parsons SK, Cruise PL, Davenport WM, Jones V. Religious beliefs, practices and treatment adherence among individuals with HIV in the southern United States. <i>AIDS Patient Care STDS</i> [Internet]. 2006;20(2 PG-97-111):97–111. Available from: NS -	Not a systematic review
Posse M, Meheus F, Van Asten H, Van Der Ven A, Baltussen R. Barriers to access to antiretroviral treatment in developing countries: A review. <i>Trop Med Int Heal</i> . 2008;13(7):904–13.	No data extraction in systematic review
Shubber Z, Mills EJ, Nachega JB, Vreeman R, Freitas M, Bock P, et al. Patient-Reported Barriers to Adherence to Antiretroviral Therapy: A Systematic Review and Meta-Analysis. <i>PLoS Med</i> [Internet]. 2016;13(11 PG-e1002183):e1002183. Available from: NS -	Did not include qualitative studies
Tso LS, Best J, Beanland R, Doherty M, Lackey M, Ma Q, et al. Facilitators and barriers in HIV linkage to care interventions: A qualitative evidence review. <i>AIDS</i> [Internet]. 2016;30(10 PG-1639-1653):1639–53. Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84964089361&amp;doi=10.1097%2FQAD.0000000000001101&amp;partnerID=40&amp;md5=1e0fdf13e20e18bcdebfd1d634c17821">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84964089361&amp;doi=10.1097%2FQAD.0000000000001101&amp;partnerID=40&amp;md5=1e0fdf13e20e18bcdebfd1d634c17821</a> NS -	Wrong Outcomes
Tucker JD, Tso LS, Hall B, Ma Q, Beanland R, Best J, et al. Enhancing Public Health HIV Interventions: A Qualitative Meta-Synthesis and Systematic Review of Studies to Improve Linkage to Care, Adherence, and Retention. <i>EBioMedicine</i> [Internet]. 2017;17(PG-163-171):163–71. Available from: NS -	Wrong Outcomes
Varela Arévalo MT, Salazar Torres IC, Correa Sánchez D. Adherence to treatment in HIV/AIDS infection. Theoretical and methodological considerations for dealing with this problem. <i>Acta Colomb Psicol</i> [Internet]. 2009;11(2 PG-101-113):101–13. Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-74549209029&amp;partnerID=40&amp;md5=9ec8c6f26fd1a5cbbea815e932b8910b">https://www.scopus.com/inward/record.uri?eid=2-s2.0-74549209029&amp;partnerID=40&amp;md5=9ec8c6f26fd1a5cbbea815e932b8910b</a> NS -	Not a systematic review
Weinstein TL, Li X. The relationship between stress and clinical outcomes for persons living with HIV/AIDS: a systematic review of the global literature. <i>AIDS Care</i> [Internet]. 2016;28(2 PG-160-9):160–9. Available from: NS -	No pre-determined eligibility criteria
Wood E, Kerr T, Tyndall MW, Montaner JSG. A review of barriers and facilitators of HIV treatment among injection drug users. <i>Aids</i> [Internet]. 2008;22(PG-1247-56):1247–56. Available from: NS -	No pre-determined eligibility criteria
Young S, Wheeler AC, McCoy SI, Weiser SD. A review of the role of food insecurity in adherence to care and treatment among adult and pediatric populations living with HIV and AIDS. <i>AIDS Behav</i> [Internet]. 2014;18 Suppl 5(PG-S505-15):S505-15. Available from: NS -	No pre-determined eligibility criteria

**Ongoing studies/protocol: n= 3**

<b>Ongoing studies/protocol references</b>	<b>Reason for exclusion</b>
Eshaun-Wilson I, Rohwer A, Hendricks L, Oliver S, Garner P. Adherence, linkage and retention-in-care in antiretroviral treatment programmes in low and middle income countries: systematic review and synthesis of qualitative research. 2017;(PG-). Available from: <a href="http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42017057335">http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42017057335</a> NS -	Ongoing Study/ Protocol
Norberg A, Nelson J, Holly C, Jewell ST, Salmond S. Experiences of HIV-infected adults and healthcare providers with healthcare delivery practices influencing engagement in primary healthcare settings: a qualitative systematic review protocol. JBI database Syst Rev Implement reports [Internet]. 2017;15(11 PG-2645-2650):2645–50. Available from: NS -	Ongoing Study/ Protocol
Protti S, Evans C, Nalubega S. The experience of patients living with human-immunodeficiency virus/tuberculosis co-infection: a systematic review of qualitative evidence protocol. JBI Database Syst Rev Implement Rep [Internet]. 2015;13(7 PG-72-82):72–82. Available from: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84973412396&amp;partnerID=40&amp;md5=d1a03c50cd5a46095635e7ef86e853fa">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84973412396&amp;partnerID=40&amp;md5=d1a03c50cd5a46095635e7ef86e853fa</a> NS -	Ongoing Study/ Protocol

**Studies awaiting classification: n= 3**

Costa ASRG, Pessoa IF V, Lopes SPO, Melo RCCP. What are the factors that affect HIV-positive patient adherence to therapeutic regimen: systematic review of the literature. Nurs Rev Form Contin em Enferm [Internet]. 2012;24(281 PG-18-24):18–24. Available from: <a href="http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=108133139&amp;site=ehost-live">http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=108133139&amp;site=ehost-live</a> NS -	Awaiting appraisal
Detsis M, Tsioutis C, Karageorgos SA, Sideroglou T, Hatzakis A, Mylonakis E. Factors Associated with HIV Testing and HIV Treatment Adherence: A Systematic Review. Curr Pharm Des [Internet]. 2017;23(18 PG-2568-2578):2568–78. Available from: NS -	Awaiting appraisal
Fogarty L, Roter D, Larson S, Burke J, Gillespie J, Levy R. Patient adherence to HIV medication regimens: a review of published and abstract reports. Patient Educ Couns [Internet]. 2002;46(2 PG-93-108):93–108. Available from: NS -	Awaiting appraisal

**Additional file 8: Individual summaries and critical appraisal reasons**

Ammon

<b>Characteristics of included systematic review Ammon et al. 2018</b>		
<b>Citation</b>		
Ammon, N., Mason, S. and Corkery, J. M. (2018) 'Factors impacting antiretroviral therapy adherence among human immunodeficiency virus-positive adolescents in Sub-Saharan Africa: a systematic review', Public Health. Elsevier Ltd, 157(0), pp. 20–31. doi: 10.1016/j.puhe.2017.12.010.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Peer reviewed databases: Cochrane, PubMed, CINAHL Plus, Scopus, Web of Knowledge, TRIP, Science Direct, Google Scholar; Databases of ongoing research were included, and Open Grey was searched. Relevant publications from reference lists of five articles were retrieved.	
<b>Search Dates</b>	3 June 2016 - 15 August 2016	<b>Date of last search: 15 August 2016</b>
<b>Search Criteria</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found:</b>
<b>Studies</b>	Peer-reviewed, quantitative, qualitative and mixed methods studies conducted after ART induction in 2004, that displayed good quality, with ethical approval and informed participant consent	11 studies: 7 qualitative studies and 3 mixed methods studies.
		<b>Studies relevant to this overview:</b> 11 studies: 7 qualitative studies, 1 quantitative cross-sectional study and 3 mixed methods studies.
<b>Participants</b>	HIV positive adolescents - vertical and horizontal infection	N=3145 participants: 2937 adolescents aged 10-19; 191 caregivers (parents, non-parental caregiver, biological relative, non-relative, or foster-carer) and 17 healthcare providers. Some ALHIV did not know about their HIV positive status.
<b>Issue</b>	Adherence	Adherence (n=11)
<b>Setting</b>	Sub-Saharan Africa	Sub-Saharan Africa: n=1 study each from Congo DRC, Ghana, Kenya, Rwanda, South Africa, Zambia, Zimbabwe and n=2 studies from Uganda.
<b>Outcomes: Barriers and Facilitators</b>	Patient-related, medication-related, caregiver-related and health system-related factors impacting ART adherence	<b>Overview Framework:</b> Individual, Interpersonal, Health System and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	No specific framework. Categories developed for study: Patient-related, medication-related, caregiver-related and health system-related factors	
<b>Data extraction method:</b>	The authors state that a standard template was used but do not report who extracted the data and whether this was done in duplicate.	
<b>Appraisal tool used</b>	National Heart, Lung and Blood Institute - Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies: <a href="https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools">https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools</a>	
<b>Data synthesis method:</b>	Thematic Synthesis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	This systematic review aims to identify factors that enable and impede ART adherence among ALHIV in SSA. Question clearly stated.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Quantitative (cross sectional), qualitative and mixed methods studies that addressed factors impacting ART adherence in SSA ALHIV of all languages were included. Studies with populations of children <10 years and adults were excluded. Potentially eligible studies met the following criteria: (1) used a qualitative, quantitative or mixed methods design; (2) were peer-reviewed original studies; (3) were studies conducted after ART induction in SSA in 2004; (4) discussed and evaluated an association between ART adherence among ALHIV in SSA and at least one patient-related, medication-related, caregiver-related or health system related factor; and (5) displayed good quality, with ethical approval and informed participant consent. Only English studies were included. The review has been judged as a Yes as inclusion criteria 1-4 are appropriate. We do not agree that inclusion criteria 5 "displaying good quality" was appropriate as this is part of the review process after inclusion.
<b>3. Was the search strategy appropriate?</b>	Yes	The supplementary material provided evidence of search strategy, MESH terms, key terms and search filters from 3 June 2016 - 15 August 2016. Only included English studies.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Unclear	Review searched 8 electronic databases. Cochrane, PubMed, CINAHL Plus, Scopus, Web of Knowledge, TRIP, Science Direct, Google Scholar. Databases of ongoing research were included, and Open Grey was searched. Relevant publications from reference lists of five articles were retrieved and screened for duplications. Judgement is unsure as the authors report that papers had to be peer-reviewed, but they also indicate that they searched Opengrey, which is a database of grey literature (i.e. unpublished and not peer-reviewed). Have contacted author for clarity and await response.
<b>5. Was selection of studies done adequately?</b>	Unclear	After removal of duplicates, one investigator, using predefined inclusion and exclusion criteria, reviewed all titles, abstracts and full-text articles. A second reviewer screened and assessed the studies independently. It is unclear whether title and abstract screening was done in duplicate. Have contacted author for clarity and await their response.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Before inclusion, cross-sectional studies were appraised for quality of evidence, using the appraisal tool from the National Institutes of Health. For qualitative studies, the Critical Appraisal Skills Programme was used. Criteria or specific domains and results of appraisal not reported
<b>7. Was the critical appraisal conducted by two or more</b>	Unclear	Not reported

<b>JBI Quality Appraisal</b>		
<b>reviewers independently?</b>		
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	The authors state that a standard template was used but do not report who extracted the data and whether this was done in duplicate.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Thematic synthesis was used. Data from qualitative studies were extracted using thematic analysis with results sorted into four main categories: patient-related, medication-related, caregiver related and health system-related factors. These categories were further divided into facilitators and barriers. Quantitative data results were listed under the same headings. Finally, findings were recorded according to frequency of topics occurring across studies.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The evidence of this review strongly suggests that culturally appropriate, large-scale campaigns, also aimed at schools, including religious authorities, could change attitudes in the wider society and create greater acceptance of ALHIV. A film produced by Picturing Health will highlight the findings of this review and aid in guiding researchers, policy-makers and healthcare workers involved with ALHIV.
<b>11. Were the specific directives for new research appropriate?</b>	No	General recommendations for interventions were provided. However, no specific research directives provided.

Barasso

<b>Characteristics of included systematic review Barasso et al. 2017</b>		
<b>Citation</b>		
Barroso, J., Leblanc, N. M. and Flores, D. (2017) 'It's Not Just the Pills: A Qualitative Meta-Synthesis of HIV Antiretroviral Adherence Research', Journal of the Association of Nurses in AIDS Care. Elsevier Inc, 28(4), pp. 462–478. doi: 10.1016/j.jana.2017.02.007.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Peer reviewed databases search included: PubMed, PsychINFO and CINAHL were searched. No fugitive or grey literature was searched+B20.	
<b>Search Dates</b>	2008-2013	<b>Date of last search: 2013</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found:</b>
<b>Studies</b>	Searched for peer-reviewed English only qualitative studies including mixed methods studies which contained qualitative data.	127 studies: Qualitative Studies (127)
		<b>Studies relevant to this overview:</b> 127 studies: Qualitative Studies (127)
<b>Participants</b>	HIV positive people age 13 years and older.	N=6189 participants: n=4830 PLHIV (2197 female and 1850 male, 783 unspecified) and n=1359 included provider participants (caregivers, health care providers, traditional healers, local community leaders, pharmacists, policymakers, stakeholders, peer counselors, facility managers, volunteers, and clinical trial coordinators).
<b>Issue</b>	Linkage to ART and Adherence	Linkage to ART (127) and Adherence (127).
<b>Setting</b>	Anywhere in the world	The most frequent places of data collection were the United States (28 reports), South Africa (19 reports), Uganda (16 reports), Europe (9 reports), Zambia (9 reports), Tanzania (8 reports), Nigeria (5 reports), and China (5 reports). All other locations for data collection contributed to fewer than five reports.
<b>Outcomes: Barriers and Facilitators</b>	Patient reported barriers to adherence	<b>Overview Framework:</b> Individual, Interpersonal, Community, Health System and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	Maslow's theory of human motivation	
<b>Data extraction method:</b>	Data extracted into EXCEL and checked between authors	
<b>Appraisal tool used</b>	No appraisal was conducted	
<b>Data synthesis method:</b>	Thematic Synthesis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Synthesising the qualitative findings published between 2008-2013 related to starting ART and remaining of ART until viral suppression is achieved. Question clearly stated.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Reviewed qualitative research from anywhere in the world, published in English from 2008-2013 that (a) were conducted with people ages 13 years and older (we used this age cut-off as we were interested in those who could take their own medications, as opposed to children who were reliant on a caregiver to do so); and (b) involved some aspect of the HIV treatment cascade. Inclusion criteria was deliberately broad as one search was conducted for three different reviews.
<b>3. Was the search strategy appropriate?</b>	Yes	Review searched 3 electronic databases. Review provides list of key terms used to search between 2008-2013. Information regarding search strategy string available in connected publication (Flores 2016). Strategy is adequate. English only studies.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed, PsychINFO and CINAHL were searched. No fugitive or grey literature was searched.
<b>5. Was selection of studies done adequately?</b>	Unclear	No information provided on the screening and selection of studies.
<b>6. Were the criteria for appraising studies appropriate?</b>	No	No appraisal was conducted on included articles.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	No	No appraisal was conducted on included articles.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Data was captured into EXCEL including authors, demographic characteristics of the study sample, and findings that related to starting on or remaining adherent to ART. They conducted quality checks on one another; one person would extract the findings and another would conduct random validations, both of the articles that were excluded (to ensure that they were correctly categorized as excluded) and of those that were included (to ensure that the data were extracted correctly).

<b>JBI Quality Appraisal</b>		
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Thematic synthesis was used by initially creating 150 statements of findings followed by the aggregation of similar findings into more abstract, encompassing themes, maintaining careful and close adherence to the original meaning. Statements that captured the findings in the studies were developed. Spreadsheet of the findings for reports that contained that finding were scanned and all studies that contained that finding listed. Similar statements were linked together, under more encompassing themes, to develop cogent statements about ART adherence. At all analysis points, authors worked together, sending work electronically back and forth for validation of themes, refinement of findings, discussions of potential theoretical frameworks to elaborate on the findings, and the development of manuscripts.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Policies and strategies that reduce the burden associated with care is recommended. The review provides recommendations to move away from individual centred care to community and social networks. Recommendations are further explored through citing a previous study Ellman (2015) and drawing correlations to the review findings. This was considered adequate.
<b>11. Were the specific directives for new research appropriate?</b>	No	No research recommendations provided.



Bolszewicz

<b>Characteristics of included systematic review Bolszewicz et al. 2015</b>		
<b>Citation</b>		
Bolszewicz, K. et al. (2015) 'Factors associated with antiretroviral treatment uptake and adherence: A review. Perspectives from Australia, Canada, and the United Kingdom', <i>AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV</i> , 27(12), pp. 1429–1438. doi: 10.1080/09540121.2015.1114992.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Scopus, OVID-EMBASE, CSAillumina, CINAHL, PROQuest, Web of Science, Informit and unpublished reports and grey literature selected based on recommendations and implications for the national and regional policies	
<b>Search Dates</b>	2003 - 2013	<b>Date of last search:</b> Not specified
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Searched for primary studies and reviews published in English, that included search terms in the title, keywords and abstracts. All study designs included	17 Studies and 11 reports
		<b>Studies relevant to this overview:</b> 17 studies and 2 reports
<b>Participants</b>	People living with HIV, excluding drug users, mothers, adolescents, prisoners, sex workers in Canada, UK and Australia	People living with HIV, excluding drug users, mothers, adolescents, prisoners, sex workers in Canada, UK and Australia
<b>Issue</b>	Linkage to ART and adherence	Linkage to ART (19) and Adherence (19)
<b>Setting</b>	High income countries: Canada, Australia and the UK	3 High income countries: Studies were from Canada (8), UK (3) and Australia (6) (HIC), reports not reported. All from the North American region
<b>Outcomes: Barriers and Facilitators</b>	Factors associated with initiating treatment (linkage) and staying on treatment (adherence)	<b>Overview framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	Categorization of barriers by Begley and colleagues (2008) into intrapersonal, interpersonal and extrapersonal	
<b>Data extraction method:</b>	None reported	
<b>Appraisal tool used</b>	None reported	
<b>Data synthesis method:</b>	Thematic Synthesis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Reviewed the literature on factors associated with initiating and staying on treatment in the general adult population in Australia, Canada and the UK using an established framework of intrapersonal, interpersonal and extrapersonal. Question clearly stated.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	included studies only from Canada, UK and Australia. Primary studies and reviews published in English. Articles restricted to those that include the review search terms. Studies focusing on specific populations were excluded.
<b>3. Was the search strategy appropriate?</b>	Yes	Search strategy available and keywords clearly indicated. All PICO elements contained within the search strategy. English only.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Peer-reviewed and grey literature which informed two reviews. Medical, allied health, and social sciences online libraries: Scopus, OVID-EMBASE, CSAillumina, CINAHL, PROQuest, Web of Science, Informit and unpublished reports selected based on recommendations and implications for the national and regional policies
<b>5. Was selection of studies done adequately?</b>	Unclear	Study selection and screening not reported.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Appraisal not reported.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Appraisal not reported.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Evidence of tools used to minimise error in data extraction not reported.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Used Begley (2008) categories to synthesis the data. broadly categorized into intrapersonal (cognitive or psychological processes experienced by the individual, including person's attitudes, perception, and beliefs); interpersonal (relationship variables including relationship with health providers, community, and family; and social support); and extrapersonal (external variables including systemic, structural and demographic issues, experiences of illness, lifestyle, and treatment factors). Factors identified fit into the prescribed categories.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	ART not universal: enhance scope for people with HIV and for doctors to initiate ART; remove financial barriers to treatment uptake arising from dispensing fees, establish programmes to provide ART to people not eligible for Medicare cover. ART universal: improve accessibility to low barrier housing to homeless, expand adherence support programmes, provide services locally, "one stop shop" model of care, stable housing and support from family (especially in aboriginal youth). Recommendations are supported by the data.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Qualitative social research within HIV-positive communities is urgently needed to capture people's lived experiences and may address some of this deficit in understanding. Supported by the study finding gaps in evidence.

Bravo

<b>Characteristics of included systematic review Bravo et al. 2010</b>		
<b>Citation</b>		
Bravo P, Edwards A, Rollnick S, and Elwyn E. 2010. Tough decisions faced by people living with HIV: a literature review of psychosocial problems. <i>AIDS Rev</i> , 12(2 PG-76-88), pp.76–88.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Peer reviewed (Web of Science, Scopus, ProQuest and PubMed and reference lists of literature reviews not included).	
<b>Search Dates</b>	1990-2009	<b>Date of last search:</b> November 2009
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Primary studies and reviews published in any language, that included search terms in the title, keywords and abstracts. All study designs included. Literature reviews excluded.	46 studies: 21 qualitative studies, 21 quantitative cross-sectional studies and 4 mixed methods studies.
		<b>Studies relevant to this overview:</b> 10 studies, 5 qualitative and 5 quantitative cross sectional studies
<b>Participants</b>	People living with HIV	N=4215 PLHIV including drug users and women caring for children <18 years; n= 4022 in Quantitative and n=193 Qualitative studies.
<b>Issue</b>	Decision support needs testing, linkage and adherence	Linkage to ART (10) and Adherence (10)
<b>Setting</b>	All countries	3 High income countries: USA (7), UK (1), France (1) and 1 Low to middle income country: Botswana (1). Across the North American and African region
<b>Outcomes: Barriers and Facilitators</b>	Barriers: Decision making dilemmas and Facilitators: Psychosocial needs for decision making	<b>Overview framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	Paper aimed to build model based on findings - Meta synthesis	
<b>Data extraction method:</b>	Details of studies extracted but whether it was done in duplicate is not reported.	
<b>Appraisal tool used</b>	No appraisal was reported	
<b>Data synthesis method:</b>	Thematic Analysis: Meta-synthesis to develop model	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	To determine whether or not PLHIV have decision support needs, and if they do, to describe these needs in more detail in order to consider to what extent they could be met by the development of new services or interventions. Question clearly stated.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Articles were included if they described psychosocial needs or concerns of PLHV from 1990 to 2009. All research methods were eligible. Literature review articles were excluded, but their references assessed.
<b>3. Was the search strategy appropriate?</b>	No	Full search strategy not available but the search strategy included the following terms: (HIV) AND (decision making; OR decision need; OR decision) AND (psychosocial; OR psychological; OR social). All languages were included.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Electronic searches of the following sources from 1990-2009: Web of Science, Scopus, ProQuest, and PubMed. We also specifically searched the following journals (AIDS and Behavior, AIDS Care, and Social Science and Medicine). Web of science, Scopus, ProQuest and PubMed databases. No grey literature searched. Reference list of excluded literature reviews were assessed.
<b>5. Was selection of studies done adequately?</b>	Unclear	Studies were assessed for relevance but not in duplicate or independently by two reviewers.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Appraisal not reported.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Appraisal not reported.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data was extracted for research identification and research methods. Not reported whether data extraction was done in duplicate
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	The study used thematic analysis.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Provide rapid support around the time of diagnosis, helping people with disclosure issues and providing guidance for all other behavioural descisions. Interventions should incirporate elements to reduce stigma and discrimination against PLHIV, incoporating them in all the development process in order to empower them and provide a sensitive and effective psychosocial intervention.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Valuable to examine the influence on undertaking or not undertaking HIV tests and the decisions around this.

Chop

<b>Characteristics of included systematic review Chop et al. 2017</b>		
<b>Citation</b>		
Chop, E. et al. (2017) 'Food insecurity, sexual risk behavior, and adherence to antiretroviral therapy among women living with HIV: A systematic review', <i>Health Care for Women International</i> . Taylor & Francis, 38(9), pp. 927–944. doi: 10.1080/07399332.2017.1337774.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), PsycINFO, and Sociological Abstracts. A secondary reference search was conducted on all studies included in the review, as well as articles included in two previous reviews of food insecurity and ART adherence among people living with HIV (Singer et al., 2015; Young et al., 2014).	
<b>Search Dates</b>	Up to 18 February 2018	<b>Date of last search: 18 February 2016</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found:</b>
<b>Studies</b>	Any study with primary data, either quantitative or qualitative, published in a peer-reviewed journal	N=7 studies: n=5 qualitative studies, and n=1 quantitative prospective cohort study.
		<b>Studies relevant to this overview:</b> 4 studies: 3 qualitative studies and n=1 quantitative cross-sectional study
<b>Participants</b>	Women living with HIV	Women living with HIV
<b>Issue</b>	Association between food insecurity and risky sexual behaviour and adherence	Adherence (4)
<b>Setting</b>	All countries	3 LMIC: Zambia (1), Swaziland (1) and Democratic Republic of Congo (1) and 1 HIC: France (1)
<b>Outcomes: Barriers and Facilitators</b>	Food insecurity	<b>Overview Framework:</b> Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	None reported	
<b>Data extraction method:</b>	Done in duplicate by two authors.	
<b>Appraisal tool used</b>	Qualitative studies not appraised.	
<b>Data synthesis method:</b>	Thematic analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The review aimed to review the impact of food insecurity on sexual risk behaviour and ART adherence among women living with HIV. Question clearly stated.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Studies had to contain primary data from qualitative or quantitative study designs, collected from women living with HIV, describe relationships between food insecurity and ART adherence, safer sex or sexual risk behaviours, and be published in a peer-reviewed journal prior to February 18, 2016. No restriction was placed on location. The inclusion criteria fits the scope of the review question.
<b>3. Was the search strategy appropriate?</b>	Unclear	Evidence of the search strategy is provided as well as key terms. The search did not include the concept of 'adherence' in order to broaden to the search and not miss any studies. Did not include a MeSH term for HIV and did not use HIV on its own. Also not sure whether including terms for women would narrow down the search too much as more studies could have been found in the search that contain men and women.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), PsycINFO, and Sociological Abstracts. A secondary reference search was conducted on all studies included in the review, as well as articles included in two previous reviews of food insecurity and ART adherence among people living with HIV (Singer et al., 2015; Young et al., 2014). Judgement is no as no grey literature searched or sourced.
<b>5. Was selection of studies done adequately?</b>	No	Titles, abstracts, citation information, and descriptor terms of citations identified through the search strategy were screened by only one study staff member. Full text screening was done in duplicate by two authors.
<b>6. Were the criteria for appraising studies appropriate?</b>	No	Qualitative studies were not appraised. Quantitative studies were appraised with the approach designed by the Evidence Project (Denison, O'Reilly, Schmid, Kennedy, & Sweat, 2008; Medley, Kennedy, O'Reilly, & Sweat, 2009).
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Appraisal procedure not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Data extraction with differences in interpretation between reviewers was done in duplicate by two authors and resolved through discussion.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	Process of synthesis not reported.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The HIV response must create an enabling environment for women living with HIV by implementing programs that reduce hunger and food insecurity, especially for women. Programs should address the political, social, and economic contexts in which women experience food insecurity. Evidence supports this recommendation.

JBI Quality Appraisal		
<b>11. Were the specific directives for new research appropriate?</b>	Yes	The review suggests that more research is needed that specifically addresses food security, sexual risk behavior, and ART adherence among women living with HIV. Furthermore, disaggregation of results by sex would allow future researchers to better understand gender dynamics of HIV and food insecurity. This is adequate.

Colvin

<b>Characteristics of included systematic review Colvin et al. 2014</b>		
<b>Citation</b>		
Colvin, C.J. et al., 2014. A systematic review of health system barriers and enablers for antiretroviral therapy (ART) for HIV-infected pregnant and postpartum women. PLoS One, 9(10 PG-e108150), p.e108150.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Peer reviewed (PubMed and Social Science Citation Index) and Websites searched include: United Nations Joint Program on HIV/AIDS (UNAIDS), World Health Organization (WHO), United States Agency for International Development (USAID) – Development Experience Clearinghouse (DEC), ICAP, Columbia University, Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), Pathfinder International, International AIDS Society (IAS), Conference on Retroviruses and Opportunistic Infections (CROI), International Society For Sexually Transmitted Diseases Research (ISSTD), International Conferences on Improving Use of Medicines (ICIUM).	
<b>Search Dates</b>	1 January 2008-26 March 2013	<b>Date of last search:</b> March 2013
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	All study designs relevant to the research question. Literature reviews excluded. Only English language included.	42 studies: 14 qualitative studies, 25 quantitative studies and 3 mixed methods studies.
		<b>Studies relevant to this overview:</b>
		42 studies: 14 qualitative studies, 25 quantitative studies and 3 mixed methods studies.
<b>Participants</b>	Pregnant and post partum women with HIV	HIV-infected pregnant and/or postpartum women and/or health care providers delivering antenatal care, ART and/or PMTCT. A few studies included partners and/or family members of HIV-infected pregnant or postpartum women. Participants: n=875 308
<b>Issue</b>	Linkage, Adherence and Retention	Linkage to ART (30), Adherence (9) and Retention (10) from 42 studies
<b>Setting</b>	HIC and LMIC	LMIC: Sub-Saharan Africa (38) and Latin America (2) and Asia (2)
<b>Outcomes: Barriers and Facilitators</b>	Health system barriers and enablers of ART	<b>Overview Framework:</b> Political and Health System Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	Grounded theory approach	
<b>Data extraction method:</b>	Used a standardised form independently and in duplicate.	
<b>Appraisal tool used</b>	Appraisal tool not reported.	
<b>Data synthesis method:</b>	4 stage narrative synthesis - Meta synthesis	



<b>JBI Quality Appraisal</b>		
<b>Appraisal tool used</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Health system barriers and enablers for ART for HIV infected pregnant and postpartum women. Question clearly stated.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Any empirical qualitative or quantitative findings relevant to the review was included. All countries. Studies on community, primary care or tertiary care settings. Only English language included.
<b>3. Was the search strategy appropriate?</b>	Yes	For the database searches, used variations of search terms for 1) the population of interest (pregnant or postpartum women with HIV, 2) the intervention of interest (antiretroviral therapy) and 3) the outcomes of interest (initiation, adherence, retention). A full search strategy for one of the database searches can be found in the Supporting Information. Search was specific to maternal ART and could have included search on adult ART and PMTCT
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	To identify eligible studies, first searched for peer-reviewed publications through the PubMed and Social Science Citation Index databases. Additional studies were identified through a gray literature search of conference abstracts, program reports, and government documentation related to ART for HIV-infected pregnant or postpartum women. A list of websites searched for gray literature available in Supporting Information. Websites searched include: United Nations Joint Program on HIV/AIDS (UNAIDS), World Health Organization (WHO), United States Agency for International Development (USAID) – Development Experience Clearinghouse (DEC), ICAP, Columbia University, Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), Pathfinder International, International AIDS Society (IAS), Conference on Retroviruses and Opportunistic Infections (CROI), International Society For Sexually Transmitted Diseases Research (ISSTD), International Conferences on Improving Use of Medicines (ICIUM). Only English articles were included. Searched studies available in published literature and grey literature through website search.
<b>5. Was selection of studies done adequately?</b>	Unclear	The first 100 citations were checked in duplicate but there is no description of the method of agreement was or how they checked the other citations.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Ranked each included study as low, medium or high with respect to overall risk of bias, based on its sample size, selection criteria, sampling procedure and data analysis method. Appraisal not reported.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not described whether critical appraisal was done by 2 authors independently

<b>JBI Quality Appraisal</b>		
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	One author extracted data regarding study characteristics and key findings using a standard template, another author reviewed the studies and extracted data related to program outcomes and key health system factors. Extracted findings from both were compared and discrepancies resolved.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	A four-stage narrative synthesis design was used: 1. Developing a theoretical model of how the interventions work, why and for whom using the WHO Building Blocks Model, SURE Framework, and Review Scoping Discussion among team members 2. Developing a preliminary synthesis using Thematic analysis 3. Exploring relationships in the data using Comparative case analysis 4. Assessing the robustness of the synthesis product using Narrative assessment guided by 4 questions about strength and 2 questions about generalizability.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Findings are supportive of the health systems recommendations made. Recommendations are detailed and show clear links to the data and themes.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Critical gaps in evidence regarding maternal ART including adherence outcomes, factors affecting adherence, the role of timeliness and timing as discrete variables, barriers and enablers for those who never make it to health services and those who drop out, and maternal ART outcomes along the full cascade and using a variety of denominators for different comparative evaluation. *Programme evaluations using strong, prospective research designs in pragmatic settings should be prioritised in order to better characterise likely maternal ART outcomes and challenges in settings outside small pilot interventions. Measures of adherence should be standardised to enable comparison across programs and studies. Specific directives for research provided.

Croome

<b>Characteristics of included systematic review Croome et al. 2017</b>		
<b>Citation</b>		
Croome, N. et al. (2017) 'Patient-reported barriers and facilitators to antiretroviral adherence in sub-Saharan Africa', <i>Aids</i> , 31(7), pp. 995–1007. doi: 10.1097/QAD.0000000000001416.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Peer reviewed databases: 10 databases: Cochrane Library, MEDLINE (OVID), PsycINFO (OVID), PsycARTICLES (OVID), EMBASE (OVID), Global Health (OVID), CINAHL (EBSCO), International Bibliography of the Social Science (IBSS; Proquest), Applied Social Sciences Index and Abstracts (AIDIA; Proquest). Hand-searching, web-searching and forward citation searching were conducted to find other relevant published and unpublished studies. Abstracts from the following international conferences were searched: International AIDS Society (IAS; 2005–2015), Conference on Retroviruses and Opportunistic Infections (CROI; 2014, 2016), AIDS Impact (2009–2015) and International AIDS Conference (2006–2014). For all potentially relevant abstracts, if no published article was found, the authors were contacted for more details if possible. Reference lists of included articles and systematic reviews were searched. Searches in Google Scholar were conducted using search terms such as 'adherence', 'HIV' and 'Sub-Saharan Africa'. Forward tracking was also performed in the Web of Science database.	
<b>Search Dates</b>	2005 to 24 May 2016	<b>Date of last search: 24 May 2016</b>
<b>Search Criteria</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found:</b>
<b>Studies</b>	Searched for peer-reviewed and reference list all-language quantitative surveys and qualitative studies	154 studies: 83 qualitative studies, 67 quantitative cross-sectional studies and 4 mixed methods studies.
		<b>Studies relevant to this overview:</b> 154 studies: 83 qualitative studies, 67 quantitative cross-sectional studies and 4 mixed methods studies
<b>Participants</b>	Adult HIV positive patient	N=37175 Adult HIV positive participants
<b>Issue</b>	Adherence	Adherence (154)
<b>Setting</b>	Sub-Saharan Africa	Benin, Cote d'Ivoire and Mali (1), Botswana (3) Burkina Faso (1), Cameroon (4) Cote d'Ivoire (1), DRC (2), Ethiopia (20), Ethiopia and Uganda (1), Ghana (4), Guinea-Bissau (1), Kenya (16), Kenya and Malawi (1), Kenya and Uganda (1), Lesotho (1), Malawi (2), Mali (1), Mozambique (3), Namibia (4), Nigeria (13), Nigeria, Tanzania and Uganda (1), Rwanda (3), Senegal (1), South Africa (30), Tanzania (10), Tanzania, Uganda and Zambia (1), Togo (1), Uganda (19), Zambia (6), Zimbabwe (2)
<b>Outcomes: Barriers and Facilitators</b>	Patient reported barriers to ART adherence	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		

<b>Conceptual framework:</b>	No framework reported
<b>Data extraction method:</b>	Extracted into pre-defined EXCEL spreadsheet
<b>Appraisal tool used</b>	Relevance, Appropriateness, Transparency, Soundness (RATS) measure used to appraise qualitative studies and Hawker et al (2016) measure used to assess quantitative studies.
<b>Data synthesis method:</b>	Content analysis

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The review identifies adult patient-reported barriers and facilitators to ART adherence in SSA from 2005 to 2016 in studies with qualitative and quantitative methodology.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Eligible studies met the following criteria: based in SSA, original research, any language, qualitative study or quantitative survey and included an adult patient-reported barrier or facilitator to ART adherence. Studies were excluded if they only focused on initiation to ART in treatment-naïve participants, only utilized a single dose of ART treatment, for example prophylaxis, only focused on Africans living in a non-SSA country or were only reviews.
<b>3. Was the search strategy appropriate?</b>	Yes	Review searched 10 electronic databases. Provided evidence of search strategy, MESH terms, key terms and search filters from 2005 to 24 May 2016. All languages were included.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Peer reviewed databases: 10 databases: Cochrane Library, MEDLINE (OVID), PsycINFO (OVID), PsycARTICLES (OVID), EMBASE (OVID), Global Health (OVID), CINAHL (EBSCO), International Bibliography of the Social Science (IBSS; Proquest), Applied Social Sciences Index and Abstracts (AIDIA; Proquest). Hand searching, web searching and forward citation searching were conducted to find other relevant published and unpublished studies. Abstracts from the following international conferences were searched: International AIDS Society (IAS; 2005–2015), Conference on Retroviruses and Opportunistic Infections (CROI; 2014, 2016), AIDS Impact (2009–2015) and International AIDS Conference (2006–2014). For all potentially relevant abstracts, if no published article was found, the authors were contacted for more details if possible. Reference lists of included articles and systematic reviews were searched. Searches in Google Scholar were conducted using search terms such as ‘adherence’, ‘HIV’ and ‘Sub-Saharan Africa’. Forward tracking was also performed in the Web of Science database. The authors searched a number of sources for published and unpublished papers.
<b>5. Was selection of studies done adequately?</b>	No	One author reviewed all the titles and abstracts of each record to assess potential relevance, a second author examined a random sample (10%), and a concordance rate was measured. Acceptable concordance was predefined as

<b>JBI Quality Appraisal</b>		
		agreement on at least 90%. The full text screening was only conducted by one author.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	Relevance, Appropriateness, Transparency, Soundness (RATS) measure used to appraise qualitative studies and Hawker et al (2016) measure used to assess quantitative studies.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	No	Appraisal conducted by a single author
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	One author extracted all the data into a predesigned Excel spreadsheet that was double-checked for accuracy. This was not adequate for a 'Yes'. We are unsure whether the author double checked their own work or if the data extracted was checked by someone else. Author has been contacted and we await their response.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	After an initial read of all qualitative papers, a list of all key barriers and facilitators were identified and were combined into themes by three authors who discussed the themes and any disputes were resolved
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Factors including traditional medicines, religious beliefs or treatments, lack of access to food and sharing medication need to be acknowledged when working with people living with HIV in SSA and need particular consideration when designing interventions to improve ART adherence.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Frequency across studies does not necessarily equate with importance for individuals; therefore, the most reported factors may not have the greatest impact upon adherence. Future studies should include these to allow researchers to ascertain not only the range of factors that affect adherence but also the impact of each.

Engler

<b>Characteristics of included systematic review Engler et al. 2018</b>		
<b>Citation</b>		
Engler K, Lènart A, Lessard D, Toupin I, Lebouché B. Barriers to antiretroviral therapy adherence in developed countries: a qualitative synthesis to develop a conceptual framework for a new patient-reported outcome measure. <i>AIDS Care - Psychol Socio-Medical Asp AIDS/HIV</i> . 2018;30(May):17–28.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Peer reviewed databases: 3 databases: Medline, Psych INFO and Embase	
<b>Search Dates</b>	1996 to 10 March 2016	<b>Date of last search: 10 March 2016</b>
<b>Search Criteria</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found:</b>
<b>Studies</b>	Searched for English or French peer-reviewed qualitative and mixed methods studies containing qualitative data.	41 studies: 40 qualitative studies, and 1 systematic review
		<b>Studies relevant to this overview:</b> 40 studies: 40 qualitative studies
<b>Participants</b>	Adult HIV positive patients	N=1482 adult HIV positive participants (including Men, Women, MSM, IDU)
<b>Issue</b>	Adherence	Adherence (40)
<b>Setting</b>	Developed Countries	United States (n =35), Europe (n=3) (Switzerland, the Netherlands and Belgium) and Canada (n=2).
<b>Outcomes: Barriers and Facilitators</b>	Patient reported barriers to ART adherence	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	No predetermined framework. Review aimed to develop an electronically administered patient-reported outcome measure (PRO) and then generate a conceptual framework.	
<b>Data extraction method:</b>	One author extracted all the data into a predesigned Excel spreadsheet that was double-checked for accuracy.	
<b>Appraisal tool used</b>	No appraisal was conducted	
<b>Data synthesis method:</b>	Thematic Synthesis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Based on findings derived from qualitative methods of studies conducted in developed countries with HIV positive adults, what factors are identified as barriers to taking ART as prescribed and how are they interrelated?
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	The sought articles published original qualitative studies from 1996 to 2016, written in English or French, reporting studies conducted with PLHIV in a developed country. Conference abstracts and studies only concerned with barriers to adherence in correctional environments or in youth under 18 years old were excluded. Because of the global, inclusion for countries the English inclusion criteria is not appropriate.
<b>3. Was the search strategy appropriate?</b>	Yes	Author was contacted for search strategy as paper suggests it is available upon request and the search strategies were appropriate. Provided evidence of key terms and search filters for search conducted from 1996 to 10 March 2016. The university librarian designed search queries.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Review searched 3 electronic databases: Medline, Psych INFO and Embase. Downgraded as no grey literature was searched.
<b>5. Was selection of studies done adequately?</b>	No	Twenty percent of both the de-duplicated records and the records marked for full-text examination were evaluated by another co-author to test interrater reliability with Cohen's Kappa. Not all included studies were checked in duplicate and independently.
<b>6. Were the criteria for appraising studies appropriate?</b>	No	No appraisal was conducted with reason
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	No	No appraisal was conducted with reason
<b>8. Were there methods to minimize errors in the data extraction?</b>	No	One author extracted all the data into a predesigned Excel spreadsheet that was double-checked for accuracy. This was not adequate for a 'Y'. It does not specifically say that another author checked it.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Steps of the thematic analysis are operationalised in the paper and described using the Braun & Clarke (2006) method of synthesis.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	No single intervention can ensure the maintenance of high ART adherence. Given the patient diversity, the clinical management of ART adherence barriers should be tailored to the individual patient. Supported by the data. Detailed description for implications for practice.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Findings of the review supported the conceptual framework for the development of the Patient Reported Outcome (PRO) measure.

Ferguson

<b>Characteristics of included systematic review Ferguson et al. 2012</b>		
<b>Citation</b>		
Ferguson, L. et al., 2012. Linking women who test HIV-positive in pregnancy-related services to long-term HIV care and treatment services: a systematic review. <i>Trop Med Int Health</i> , 17(5 PG-564-80), pp.564–580. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Medline, EMBASE, Global Health and the International Bibliography of the Social Sciences and in the reference lists of included articles. Experts were consulted and 1 thesis was included.	
<b>Search Dates</b>	1st January 2000 - 31st December 2010	<b>Date of last search:</b> Not specified
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Studies could be observational or descriptive. No publications were excluded on the basis of study design	20 studies: 3 Qualitative studies, 12 Quantitative: 3 Cross-sectional, 5 Retrospective Cohort, 1 Prospective Cohort; 1 Mix Methods, 6 Programme Reviews/Evaluations/Policy Analysis/Commentaries and 1 Case Study
		<b>Studies relevant to this overview:</b>
		7 studies: 3 Qualitative studies and 4 Quantitative studies
<b>Participants</b>	HIV positive women in pregnancy-related services	Pregnant women with HIV. Total reported N=819 reported for qualitative studies. Number not reported for quantitative studies.
<b>Issue</b>	Linkage	Linkage to ART (7)
<b>Setting</b>	Low or middle-income countries	LMIC: Kenya (1), South Africa (1), Tanzania (1), Zimbabwe (1), Malawi (2), Uganda (1)
<b>Outcomes: Barriers and Facilitators</b>	To quantify attrition between women testing HIV-positive in pregnancy-related services and accessing long-term HIV care and treatment services in low- or middle-income countries and to explore the reasons underlying client drop-out	<b>Overview Framework:</b> Individual, Interpersonal, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	No framework reported.	
<b>Data extraction method:</b>	A single researcher reviewed eligible articles after consensus regarding which articles to include.	
<b>Appraisal tool used</b>	No appraisal reported	
<b>Data synthesis method:</b>	Thematic content analysis	



<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	This study aimed to quantify attrition along the pathway between women testing HIV-positive in pregnancy-related services and accessing long-term HIV care and treatment services in low- or middle -income countries (LMIC) and to explore the reasons underlying client dropout by synthesising current literature. Review question is clear.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Articles were included in the review if the studies were carried out in a LMIC and contained information specific to access to long-term HIV care and treatment services among women who test HIV-positive in the context of pregnancy. Studies could be observational or descriptive. No publications were excluded based on study design. Only studies meeting predefined quality were included. Inclusion criteria is appropriate.
<b>3. Was the search strategy appropriate?</b>	No	Search strategy for the literature search provided. Searched for articles published in English, Portuguese, French or Spanish between 1st January 2000 and 31st December 2010. Few key words contained.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Medline; EMBASE; Global Health and the International Bibliography of the Social Sciences and in the reference lists of included articles. Experts in the field were consulted and 1 PhD thesis was included.
<b>5. Was selection of studies done adequately?</b>	Yes	Search and screening were done in duplicate. Ten percent of the titles and abstracts were screened in duplicate and an agreement calculated. Following this, one author continued independently.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Appraisal not reported.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Appraisal not reported.
<b>8. Were there methods to minimize errors in the data extraction?</b>	No	Eligible articles were reviewed by a single researcher after consensus regarding which articles to include.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	Quantitative data was pooled and extrapolations made. Qualitative data synthesis method was not specified.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Providing family focused care and integrating CD4 testing and HAART provision into prevention of mother-to-child HIV transmission services appear promising for increasing women's uptake of HIV-related services. Individual level factors that need to be addressed include financial constraints and fear of stigma.

<b>11. Were the specific directives for new research appropriate?</b>	Yes	Additional work is needed to better understand the effectiveness and sustainability of Health facility-level interventions to improve linkage between HIV testing in pregnancy-related services and long-term HIV care and treatment services. It is critical that the strengths and weakness of existing and new interventions be documented so that lessons learnt can be translated into concrete benefits in terms of access to HIV-related services for pregnant women who require them.
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Flores

<b>Characteristics of included systematic review Flores et al. 2016</b>		
<b>Citation</b>		
Flores D, Leblanc N, Barroso J. Enrolling an retaining patients with Human Immunodeficiency Virus (HIV) in their care: A Metasynthesis of qualitative studies. Int J Nurs Stud. 2016;62(2):126–36.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Comprehensive automated searches of the literature found in three electronic databases (Cumulative Index to Nursing and Allied Health Literature [CINAHL], MEDLINE [PubMed] and PsycINFO).	
<b>Search Dates</b>	2008 - 2013	<b>Date of last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Searched for qualitative studies that had data on linkage and retention	69 qualitative studies <b>Studies relevant to this overview:</b> 69 qualitative studies
<b>Participants</b>	PLHIV	N=3257 people included in these studies; 2263 patients or HIV-positive participants from the community (740 men, 1008 women, 78 transgender individuals and 437 people with unspecified gender). 994 other people were included in the studies such as family members, friends, physicians, nurses, treatment advocates, caregivers, clinic staff, program directors, social workers and other key stakeholders.
<b>Issue</b>	Linkage and Retention	Linkage to ART (69) and retention in care (n=69)
<b>Setting</b>	No geographic restrictions used.	United States (22 reports) followed by South Africa (9), Uganda (6), Nigeria (4), Zimbabwe (4) and China (4); 20=unspecified
<b>Outcomes: Barriers and Facilitators</b>	Individual perspectives on barriers	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	Theory of Triadic Influence	
<b>Data extraction method:</b>	Data extracted into EXCEL sheet and the headings described. No information about who conducted it.	
<b>Appraisal tool used</b>	No appraisal used with reason	
<b>Data synthesis method:</b>	Metasynthesis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The first aim of this report was to determine factors that influence linkage and retention in care with which people diagnosed with HIV infection must contend. The second aim was to determine what healthcare providers could do to enhance linkage and retention in care for people with HIV infection.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	Qualitative research studies or the qualitative findings from mixed methods studies, b) published in English and in peer-reviewed journals, and c) published from 2008 to 2013. Did not specify eligibility for participants. Did not specify inclusion or exclusion criteria for the outcomes.
<b>3. Was the search strategy appropriate?</b>	Yes	Key terms including 'Human Immunodeficiency Viruses', 'Acquired Immune Deficiency Syndrome', 'qualitative', and 'themes'. The combination of Boolean terms (and, or, not) were also added. Evidence of CINAHL search strategy available and appears appropriate.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Comprehensive automated searches of the literature found in three electronic databases (Cumulative Index to Nursing and Allied Health Literature [CINAHL], MEDLINE [PubMed] and PsycINFO). Grey literature, conference abstracts and literature reviews were excluded.
<b>5. Was selection of studies done adequately?</b>	Unclear	No information on study selection process.
<b>6. Were the criteria for appraising studies appropriate?</b>	No	No appraisal used with reason
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	No	No appraisal used with reason
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Information about who conducted the data extraction not reported. The data was summarized into Excel spreadsheets using the Matrix method (Garrard, 2013). Column headings about pertinent study details (i.e., design, sample and findings) were used in these evidence tables, along with identifying which components of the Treatment Cascade they addressed (whether testing and notification of results, linkage and retention to HIV care, or antiretroviral initiation and viral suppression). Many articles had several unique findings applicable to multiple components of the HIV Treatment Cascade and therefore cited more than once. Data extraction was performed by DF and NL independently with discrepancies addressed and resolved during team discussions.

<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Steps to meta-synthesis are outlined and detailed. Authors used the three steps of extraction, aggregation and synthesis.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Authors provide system level recommendations that has implications for practice such logistical reinforcement of staff, structural support, multidisciplinary services, alternative care sites and the use of information technology.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Because multifactorial ecological factors synergistically affect individual-level outcomes, research on the macro-level impediments to system changes similar to the recommendations in this study must be a priority. Research into the experiences of providers and key stakeholders who undertake process improvement projects around HIV surveillance and care delivery can identify persistent macro-level linkage and retention barriers.

Gaston

<b>Characteristics of included systematic review Gaston et al. 2015</b>		
<b>Citation</b>		
Gaston, G.B. & Alleyne-Green, B., 2013. The impact of African Americans' beliefs about HIV medical care on treatment adherence: a systematic review and recommendations for interventions. <i>AIDS Behav</i> , 17(1 PG-31-40), pp.31–40. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Medline, PsychInfo, Academic search complete and PubMed.	
<b>Search Dates</b>	1 January 2001-31 May 2012	<b>Date of last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Both quantitative and qualitative published studies.	16 Studies: Qualitative (6) and Quantitative (10)
		<b>Studies relevant to this overview:</b> 16 Studies: Qualitative (6) and Quantitative (10)
<b>Participants</b>	African Americans LHIV	African Americans LHIV Total n=2846
<b>Issue</b>	Adherence	Adherence (16)
<b>Setting</b>	HIC USA	HIC: USA (16)
<b>Outcomes: Barriers and Facilitators</b>	African Americans patients perceptions of HIV medical care, specifically as it relates to adherence to medical self-care and ART medication regimens.	<b>Overview Framework:</b> Interpersonal, Community and Social, Political and Health System,
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	No framework reported.	
<b>Data extraction method:</b>	Data extraction process not reported.	
<b>Appraisal tool used</b>	Appraisal not reported.	
<b>Data synthesis method:</b>	Thematic analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Explores African American patients' perceptions of HIV medical care, specifically as it relates to adherence to medical self-care and antiretroviral medication regimens.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Only include peer-reviewed journals published from January 1, 2001 through May 31, 2012. The review included both quantitative and qualitative studies that described the perceptions of HIV-related medical care and its relationship with self-care and anti-retroviral drug adherence among adult African American patients. Studies included in the review had to meet at least one of two search criteria: the perceptions of HIV medical care in relation to its impact on medical self-

		care and/or the perceptions of HIV medical care in relation to its impact on medical adherence to ART
<b>3. Was the search strategy appropriate?</b>	Unclear	Keywords have been indicated. Searches completed between January 1, 2001 to May 31, 2012. No full search strategy available.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Medline, PsychInfo, Academic Search Complete and PubMed. No grey literature was searched.
<b>5. Was selection of studies done adequately?</b>	No	Studies were selected if they were published in peer review journals and focused of ART or medical self-care and recruited African American men. Study selection and screening was not reported to be done independently and in duplicate.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Appraisal not reported.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Appraisal not reported.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data extraction process not described.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	The authors made use of a thematic analysis to identify three key themes in the 16 descriptive studies examined: (1) perceived racism and discrimination within health care settings, (2) conspiracy beliefs, and (3) perceived quality of health care provider relationships.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Healthcare providers need to be aware of African Americans' historical relationship with the health care system. Health care providers should also engage African Americans in the health care process inclusive of using good communication, exploring patient beliefs about HIV care, and getting to know patients personally in order to understand what motivates them to adhere to HIV treatment regimens. Health care providers should use more open ended questions, less medical jargon and explore patient beliefs and concerns about their prescribed HIV treatment regimens. Appropriate recommendations.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Interventions to reduce discriminatory practices in provider judgment, behaviour, and decision-making should promote the cognitive strategy of individuation. Interventions aimed to examine patient experiences and narratives is critical. Directives are appropriate.

Geter

<b>Characteristics of included systematic review Geter et al. 2018</b>		
<b>Citation</b>		
Geter A, Sutton MY, Hubbard McCree D. Social and structural determinants of HIV treatment and care among black women living with HIV infection: a systematic review: 2005–2016. <i>AIDS Care</i> [Internet]. 2018;30(4):409–16. Available from: <a href="https://www.tandfonline.com/doi/full/10.1080/09540121.2018.1426827">https://www.tandfonline.com/doi/full/10.1080/09540121.2018.1426827</a>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PubMed, PsycINFO, Scopus, Embase, Global Health, OVID/Medline and Google Scholar.	
<b>Search Dates</b>	January 2015 and December 2016	<b>Date of last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Published quantitative and qualitative research meeting the inclusion criteria.	16 Studies: Qualitative studies (11 studies) and Quantitative (5 studies) <b>Studies relevant to this overview:</b> 14 studies: Qualitative studies (10 studies) and Quantitative Cross sectional studies (3 studies), Self-reported baseline in RCT (1)
<b>Participants</b>	Black women living with HIV	African American females living with HIV Total n=830
<b>Issue</b>	Adherence and Retention in Care	Adherence (6 studies); Retention in Care (8 studies)
<b>Setting</b>	US	HIC: US (14 studies)
<b>Outcomes: Barriers and Facilitators</b>	Common themes for barriers to HIV Care	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	No framework reported	
<b>Data extraction method:</b>	Authors do not specify who conducted the data extraction. Description of the types of data extracted is provided.	
<b>Appraisal tool used</b>	No appraisal reported.	
<b>Data synthesis method:</b>	Thematic content analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The purpose of this literature review is to identify possible social and structural factors related to the disparities in treatment and care among black women living with diagnosed HIV infection (BWLH). Review question clearly stated
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Studies with population of >60% black and 100% female. Qualitative and quantitative studies. Specified outcomes to biomedical, structural, social and psychosocial determinants.



<b>3. Was the search strategy appropriate?</b>	Unclear	Search was conducted but no key terms and phrases, MESH terms and evidence of the search not reported. Details of the search not reported.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed, PsycINFO, Scopus, Embase, Global Health, OVID/Medline and Google Scholar. Did not search abstracts, unpublished dissertations, editorials, commentaries and studies that were conducted outside of the U.S. No grey literature included.
<b>5. Was selection of studies done adequately?</b>	Unclear	Study selection not reported
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Appraisal not reported
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Appraisal not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Authors do not specify who conducted the data extraction. Description of the types of data extracted is provided.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Authors used content analysis to categorise and create themes and reported on the themes.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Based on study findings with the specific sample of BWLHIV authors recommend the development of social and structural interventions that increase accessibility and acceptability to services. They also recommend that prevention evidence-based HIV interventions be developed specifically for BWLHIV. Supported by the data.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Future studies, with larger samples of BWLH, are needed to increase the number of culturally appropriate interventions and evidence-based practices for addressing social and structural factors that impede treatment and care for BWLH. Based on findings.

Govindasamy

<b>Characteristics of included systematic review Govindasamy et al. 2012</b>		
<b>Citation</b>		
Govindasamy, D., Ford, N. & Kranzer, K., 2012. Risk factors, barriers and facilitators for linkage to antiretroviral therapy care: a systematic review. <i>Aids</i> , 26(16 PG-2059-67), pp.2059–2067. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Databases include: Medline, Global Health, Web Search on: Africa-Wide Information and Google Scholar and Conference abstracts from: Conference on HIV Pathogenesis and Treatment of the International AIDS Society, the Conference on retroviruses and Opportunistic Infections, the International AIDS Conference and the AIDS Educational Global Information System. Experts in the field were contacted for recommended literature.	
<b>Search Dates</b>	01 January 2000-31 May 2011	<b>Date of last search:</b> Not specified
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Quantitative and qualitative studies. Published in English. Conference abstracts.	42 Studies: 6 Qualitative 17 Quantitative, 19 Mixed Methods
		<b>Studies relevant to this overview:</b> 21 Studies: 11 Qualitative, 7 Quantitative and 3 Mixed methods
<b>Participants</b>	PLHIV in sub-Saharan Africa	PLHIV in sub-Saharan Africa and health care workers.
<b>Issue</b>	Linkage	Linkage (n=21)
<b>Setting</b>	Studies in sub-Saharan Africa	South Africa (6); the remainder were conducted in Uganda (6), Kenya (2), Tanzania (2), Zambia (2), and 1 study each from Ethiopia, Swaziland, Mozambique, and South Africa and Zimbabwe.
<b>Outcomes: Barriers and Facilitators</b>	Risk factors and barriers and facilitators	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework:</b>	No framework reported	
<b>Data extraction method:</b>	Data extraction form was used but method and who conducted it not reported.	
<b>Appraisal tool used</b>	The quality assessment form was adapted from the STROBE statement checklist.	
<b>Data synthesis method:</b>	Thematic content analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	This review summarises the characteristics of patient and programme level factors associated with retention in care during the pre-ART period and linkage to ART care in sub-Saharan Africa
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	The search was limited to quantitative and qualitative studies conducted within sub-Saharan Africa, published in English between 01 January 2000 (the time when ART first became available in this region) and 31 May 2011 and within conference abstracts.
<b>3. Was the search strategy appropriate?</b>	No	Search strategy available in supplementary material. Sufficient use of keywords and terms. Only searched for English studies.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Databases include: Medline, Global Health, Web Search on: Africa-Wide Information and Google Scholar and Conference abstracts from: Conference on HIV Pathogenesis and Treatment of the International AIDS Society, the Conference on retroviruses and Opportunistic Infections, the International AIDS Conference and the AIDS Educational Global Information System. Experts in the field were contacted for recommended literature.
<b>5. Was selection of studies done adequately?</b>	Yes	Screening of articles taken through to full review was performed in duplicate.
<b>6. Were the criteria for appraising studies appropriate?</b>	No	The quality assessment form was adapted from the STROBE statement checklist. This tool is not adequate.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	No	Process of critical appraisal not described.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data extraction process not described. Data extraction form adapted from STROBE tool. No description of what was extracted or who conducted it.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	Not specified. Table of included studies does not correlate with referencing system. Web appendixes available do not correlate with included studies available in Table 1. Author responded and said to add the studies in Table 1 and Web Appendix together to get to 42 included studies but this amounts to over 50 studies. Synthesis of findings in text do not relate to the Tables provided in text.

<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Unclear	The results of this review indicate the need for task-shifting, decentralisation of care and integration of services to alleviate current health system barriers. Urgent interventions such as support groups and intense post-test counselling are warranted. Uncertain about the findings that were synthesised and how these support the recommendations for practice made.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Direction for piloting of interventions that could improve linkage to HIV and ART care. Future studies should examine interventions that could potentially reduce out-of-pocket payment for transport and minimise the travel to clinics for patients.

Heestermans

<b>Characteristics of included systematic review Heestermans et al. 2016</b>		
<b>Citation</b>		
Heestermans T, Browne JL, Aitken SC, Vervoort SC, Klipstein-Grobusch K. Determinants of adherence to antiretroviral therapy among HIV-positive adults in sub-Saharan Africa: a systematic review. <i>BMJ Glob Heal</i> [Internet]. 2016;1(4):e000125. Available from: <a href="http://gh.bmj.com/lookup/doi/10.1136/bmjgh-2016-000125">http://gh.bmj.com/lookup/doi/10.1136/bmjgh-2016-000125</a>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	6 databases: PubMed, Cochrane Library, EMBASE, Web of Science, Popline and Global Health Library	
<b>Search Dates</b>	January 2002 to 27 October 2014.	<b>Date of last search: None specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Qualitative, quantitative or mixed methods study designs and languages included.	146 studies: Qualitative (37), Quantitative (112) and Mixed methods (3)
		<b>Studies relevant to this overview:</b> 146 studies: Qualitative (37), Quantitative (112) and Mixed methods (3)
<b>Participants</b>	Adult PLHIV older than 15 years and receiving ART	161 922 Adult PLHIV
<b>Issue</b>	Adherence	Adherence (146)
<b>Setting</b>	Sub Saharan Africa	Sub-Saharan Africa
<b>Outcome: Barriers and Facilitators</b>	Determinants of Adherence	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	None reported.	
<b>Data extraction method</b>	Used a standardised extraction form and carried out by a single author with a second author available if clarification was needed.	
<b>Appraisal tool used</b>	For qualitative studies used tool by Vervoort et al. In addition, an adapted version of the Cochrane Collaboration tool for quantitative studies. Mixed methods studies were scored by both measures.	
<b>Data synthesis method</b>	Narrative descriptions of qualitative data.	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The aim of this review was to identify and summarise determinants of adherence to ART among HIV-positive adults. Clear aim identified.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Unclear	The authors say that all languages are eligible when searching and then state that in selection studies not in English or Dutch were excluded.

<b>3. Was the search strategy appropriate?</b>	Yes	Search terms composed of MeSH and combined text for domain. The terms and search strategy are appropriate and provided in the supplementary material.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed/ MEDLINE, The Cochrane Library, EMBASE, Web of Science, POPLINE, and the Global Health Library for all publications up to 27 October 2014. No grey literature searched.
<b>5. Was selection of studies done adequately?</b>	Unclear	Selection was done independently and in duplicate. However, authors only report this for titles and abstracts and do not report on the screening of full texts.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	For qualitative studies used tool by Vervoort et al. And an adapted version of the Cochrane Collaboration tool for quantitative studies. Mixed methods studies were scored by both measures. Measures are appropriate.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported.
<b>8. Were there methods to minimize errors in the data extraction?</b>	No	Used a standardised extraction form and carried out by a single author with a second author available if clarification was needed. 10% of qualitative studies extraction was conducted by another second reviewer. Rules regarding reporting of duplicate studies. Downgraded to no as extraction was done by a single author.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	Meta-analysis and pooled estimates using odds ratio for quantitative data. Qualitative data was described narratively. No further description is provided.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The recommendations are supported by the reported data.
<b>11. Were the specific directives for new research appropriate?</b>	Unclear	Not reported.

Hodgson

<b>Characteristics of included systematic review Hodgson et al. 2014</b>		
<b>Citation</b>		
Hodgson, I. et al., 2014. A systematic review of individual and contextual factors affecting ART initiation, adherence, and retention for HIV-infected pregnant and postpartum women. PLoS One, 9(11 PG-e111421), p.e111421. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PubMed and SSCI (also grey literature through conference databases, multilateral and bilateral agency websites, NGO's)	
<b>Search Dates</b>	1st January 2008 - 26 March 2013	<b>Date of last search:</b> Not specified
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Any study that reported empirical qualitative or quantitative findings relevant to the review question. English language.	34 studies included in the review: Qualitative (12), Quantitative (16) and Mixed methods (6),
		<b>Studies relevant to this overview:</b> 34 studies included in the review: Qualitative (12), Quantitative (16) and Mixed methods (6),
<b>Participants</b>	Pregnant women and postpartum women infected with HIV	Pregnant women and postpartum women infected with HIV
<b>Issue</b>	Initiation, adherence and retention	Linkage to ART (14) and Adherence (24)
<b>Setting</b>	LMIC and HIC	Ghana (1), Nigeria (1), Malawi (5), South Africa (6), Zimbabwe (2), Tanzania (2), Kenya (5), Uganda (3), Brazil (1), Australia (1), USA (3), Rawanda (1), France (1), Zambia (1), Latin America (1)
<b>Outcomes: Barriers and Facilitators</b>	Individual and contextual factors	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	WHO health systems framework and the Supporting the Use of Research Framework (SURE)	
<b>Data extraction method</b>	Independently and in duplicate	
<b>Appraisal tool used</b>	Appraisal and quality assessment was conducted but the tools and who conducted the appraisal are unclear and not reported.	
<b>Data synthesis method</b>	Thematic Analysis	
<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
1. Is the review questions clearly and explicitly stated?	Yes	What are the individual and contextual risk factors affecting the initiation, adherence, and retention to ART among HIV-infected pregnant women during and following pregnancy?

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Studies from low and middle-income countries (LMICs), as well as high-income countries, were included, as were studies conducted in community or health system settings. Included studies that described health systems-related factors if these were described from the women's perspectives or experiences
<b>3. Was the search strategy appropriate?</b>	No	Adequate search strategy available in supporting information and keywords available in text. Did not include grey literature and only included English studies.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Both peer-reviewed journal articles were searched systematically in the PubMed and Social Sciences Citation Index. English language only studies. Key words were indicated. Grey literature was searched through conference abstract databases, multilateral and bilateral agency websites, and websites of non-governmental organisations. Studies published between January 1, 2008 and March 26, 2013
<b>5. Was selection of studies done adequately?</b>	Yes	Studies were selected in two stages: First three review authors independently assessed the first 100 abstracts from PubMed and then each reviewers list compared, and discrepancies discussed and resolved. From this, the inclusion and exclusion criteria were refined and clarified. Second, one review author reviewed the remaining studies to include or exclude.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Ranked each included study as low, medium or high with respect to overall risk of bias, based on its sample size, selection criteria, sampling procedure and data analysis method. Appraisal tool used was not reported.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Once the study selection process was concluded, one review author extracted data from the studies using a standard template. Initial data extraction captured both the study characteristics as well as key findings related to factors associated with initiation, adherence, and retention of ART. A second author also reviewed the studies and extracted data relating to key individual and contextual barriers and enablers associated with initiation, adherence, and retention. Extracted findings from both authors were compared and discrepancies resolved.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Study findings were analysed thematically. The barriers and enablers identified were arranged thematically within a framework of individual, interpersonal, community, and structural categories. These categories were further divided into enabling factors and barriers to ART adherence, e.g., knowledge about HIV or ART or wanting to protect one's child (individual-level enablers); domestic violence or spousal dependence (interpersonal-level barriers); stigma (community-level barrier); or health



<b>JBI Quality Appraisal</b>		
		worker attitude or support group participation (structural-level enablers). This method was adequate.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Recommendations supported by data and findings.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Identified evidence gaps and methodological gaps based on the data and synthesis.

Katz

<b>Characteristics of included systematic review Katz et al. 2013</b>		
<b>Citation</b>		
Katz IT, Ryu AE, Onuegbu AG, Psaros C, Weiser SD, Bangsberg DR, et al. Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. J Int AIDS Soc. 2013;16(3 Suppl 2).		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Published and grey literature in BIOSIS previews, CINAHL, Embase, ERIC, Medline, ProQuest Dissertations and Theses, PsychInfo, Web of Science and the WHO African Index Medicus. Grey literature searched.	
<b>Search Dates</b>	Up until February 2013	<b>Date of last search:</b> February 2013 for PubMed and 2011 for all other databases
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Published and grey literature. Qualitative and quantitative. No languages excluded	75 Studies: 41 Quantitative, 34 Qualitative (published between 1999-2013)
		<b>Studies relevant to this overview:</b> 34 Qualitative studies
<b>Participants</b>	PLHIV	PLHIV between 18-30 years old, providers of HIV care, single persons and those in intimate partnerships and persons with and without children. High risk groups including men who have sex with men, injection drug users and commercial sex workers.
<b>Issue</b>	The relationship between HIV-related stigma and ART adherence	Adherence (34)
<b>Setting</b>	LMIC and HIC	Uganda (9), South Africa (5), India (2), and 1 study each from DRC, US, Brazil, Botswana, Tanzania, Thailand, Egypt, Ethiopia, Vietnam, Nepal, Nigeria, Asia, Zambia and China. Four countries were not reported.
<b>Outcomes: Barriers and Facilitators</b>	Stigma, disclosure and ART adherence	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual Framework:</b>	Not specified but methods of synthesis reported resembles grounded theory to generate new conceptual model.	
<b>Data extraction method</b>	Not reported	
<b>Appraisal tool used</b>	CASP Tool	
<b>Data synthesis method</b>	Meta-ethnography	
<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
1. Is the review questions clearly and explicitly stated?	No	We undertook this review to systematically assess the relationship between HIV-related stigma and ART adherence

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	Inclusion criteria not explicitly stated.
<b>3. Was the search strategy appropriate?</b>	Unclear	Authors report that the search strategy is available in the supplementary material and we followed the links. No material could be found. Author has been contacted and we are waiting for a response.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Published and grey literature in BIOSIS Previews, CINAHL, EMBASE, ERIC, MEDLINE, ProQuest Dissertations and Theses, PsycINFO, Web of Science, and the WHO African Index Medicus. Searches were done in May 2011. ProQuest search completed in June 2011. In February 2013 one author updated Medline search. Consulted experts in the field.
<b>5. Was selection of studies done adequately?</b>	Unclear	Removed duplicates. Screened studies that appeared to be potentially related to ART adherence. Not specified whether this was done in duplicate.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	Critical appraisal skills programme quality assessment tool for qualitative studies was adapted into conceptual domains being clearly described and these include the role of the researcher, sampling method, data collection and method of analysis. Quantitative studies were assessed through the domains of sample probability, validated self-report scale to measure stigma, validated self-report scale to measure ART adherence, statistical analysis accounts for missing numbers, study adjusts for confounding in analysis, and computing interests declared.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	They do not report whether one or more than one person assessed risk of bias
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	No evidence provided of tools used to minimise error in data extraction
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Iterative process of Meta synthesis (also described as meta-ethnography) to identify themes. This method was considered appropriate.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Interventions aimed at enhancing social support. Structural interventions that strengthen the livelihoods of HIV-positive persons may also be a promising avenue for subverting HIV-related stigma. Results support the recommendation.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	More research is needed to understand the conditions under which HIV-related outcomes are better than expected despite the experiences of HIV- and stigma-related adversity (which can be thought of as being related to the concept of resilience). Results support the recommendation.

Knettel

<b>Characteristics of included systematic review Knettel et al. 2018</b>		
<b>Citation</b>		
Knettel BA, Cichowitz C, Ngocho JS, Knippler ET, Chumba LN, Mmbaga BT, et al. Retention in HIV Care During Pregnancy and the Postpartum Period in the Option B+ Era. JAIDS J Acquir Immune Defic Syndr [Internet]. 2017;77(5):1. Available from: <a href="http://insights.ovid.com/crossref?an=00126334-900000000-96776">http://insights.ovid.com/crossref?an=00126334-900000000-96776</a>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Used 3 databases: PubMed, EMBASE, and the African Index Medicus (AIM). Screened abstracts from the International AIDS Society Conference and the Conference on Retroviruses and Opportunistic Infection during the study period of 2012– 2017.	
<b>Search Dates</b>	January 2012 to June 2017	<b>Date of last search: June 15, 2017</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Qualitative and quantitative studies reported self-reported data. Studies published after January 2012	35 Studies: 13 Qualitative and 22 Quantitative
		<b>Studies relevant to this overview:</b>
		13 Studies: 13 Qualitative
<b>Participants</b>	Pregnant and post-partum women on option B+. Special key populations were excluded (IDU, prisoners, sex workers and cohorts with low CD4 counts)	736 Pregnant and post-partum women on option B+.
<b>Issue</b>	Linkage and Retention in Care.	Retention in Care (13)
<b>Setting</b>	Africa	Malawi (13 studies), Uganda (4), Zimbabwe (3), Mozambique (2), and 1 each from Cameroon, Ethiopia, Rwanda, South Africa, and Tanzania
<b>Outcome: Barriers and Facilitators</b>	Factors associated with retention in care	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	Not reported	
<b>Data extraction method</b>	Independently and in duplicate using pre-specified form.	
<b>Appraisal tool used</b>	None reported.	
<b>Data synthesis method</b>	Qualitative data was analysed using thematic analysis.	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The goal of this systematic review was to identify and summarize the existing data on initiation and retention in care after starting lifelong ART (option B+) for pregnant and postpartum women in Africa. Aim and objectives are provided.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	Studies were included if they reported patient-level data on retention in care among pregnant or postpartum women who received care under the clinical conditions of option B+ (i.e., lifetime initiation of ART during pregnancy or breastfeeding) in an African country. Studies using modelling estimates as opposed to actual patient data were excluded. For aim 2, studies were included if they explored factors associated with retention under the clinical conditions of option B+, including both quantitative and qualitative study designs. Special populations were excluded without reason.
<b>3. Was the search strategy appropriate?</b>	Yes	Designed in consultation with information specialist from Duke University Library. Used standardized search terms and key words related to the constructs of (1) HIV or AIDS, (2) option B+, universal “test and treat,” or lifelong ART, (3) pregnancy or the postpartum period, and (4) Africa or any African nation. When available, controlled vocabulary was used to capture broader categories related to the search terms, indexed by the databases (e.g., PubMed Medical Subject Headings, or MeSH). The specific search terms used for the PubMed database are detailed in supplementary material.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Used 3 databases: PubMed, EMBASE, and the African Index Medicus (AIM). Screened abstracts from the international AIDS Society Conference and the Conference on Retroviruses and Opportunistic Infection during the study period of 2012– 2017. Conference abstracts related to retention in option B+ were compared with results from the database searches to ensure that relevant published articles derived from the abstracts had been captured. Did not search grey literature.
<b>5. Was selection of studies done adequately?</b>	Yes	Title and abstract and full text screened independently by two authors using Covidence. Disagreements resolved by discussion with a third author.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Not reported
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Data extraction was performed using a standardized form and was performed independently and in duplicate by two authors. List of information extracted available in manuscript.

<b>JBI Quality Appraisal</b>		
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Abstracted variables that were found to significantly predict retention or loss to follow-up in HIV care. For qualitative results, we abstracted themes related to risk or protective factors for retention in care. Using the abstracted results of all studies that examined factors associated with retention, we used thematic analysis to synthesize the data and identify common themes in the findings. Presented a narrative review of both the quantitative and qualitative data. Adequate.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Authors describe the findings and recommendations disaggregated by study design. These are considered appropriate.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Practical directives for research are clearly and directly provided.

Lancaster

<b>Characteristics of included systematic review Lancaster et al 2016</b>		
<b>Citation</b>		
Lancaster KE, Cernigliaro D, Zulliger R, Fleming PF, Hill C, Carolina N, et al. living with HIV in sub-Saharan Africa : A systematic review. 2017;15(4):377–86.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PubMed, Embase, Web of Science, SCOPUS, CINAHL, Global Health, Psycinfo, Sociological Abstracts, and Popline	
<b>Search Dates</b>	Up to 22 November 2013 and a second search up to 30 July 2015	<b>Date of last search: 30 July 2015</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Original and empirical qualitative and quantitative data collected after 2000 and published in English.	10 studies: Qualitative (3), Quantitative (6) and Mixed Methods (3)
		<b>Studies relevant to this overview:</b> 10 studies: Qualitative (3), Quantitative (6) and Mixed Methods (3)
<b>Participants</b>	Female sex workers living with HIV	N=2721 Female sex workers living with HIV
<b>Issue</b>	Linkage to and retention in HIV Care Pre-ART, treatment initiation, ART adherence and viral suppression.	Linkage to ART (6) and Adherence (6) from 10 studies
<b>Setting</b>	Sub Saharan Africa	Rwanda (n = 1), Zimbabwe (n = 2), Benin (n = 2), Burkina Faso (n = 1), Nigeria (n = 1), Swaziland (n = 1), Kenya (n = 1), and Uganda (n = 1).
<b>Outcome: Barriers and Facilitators</b>	Care experiences and factors associated.	<b>Overview Framework:</b> Individual, interpersonal and structural factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	Conceptual model was developed as part of this review.	
<b>Data extraction method</b>	Used a standardised data abstraction sheet. Two reviewers independently and in duplicate extracted data.	
<b>Appraisal tool used</b>	Not reported.	
<b>Data synthesis method</b>	Thematic analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	To examine and synthesise the findings in the quantitative and qualitative literature regarding the care experiences and factors associated with linkage to and retention in HIV care, treatment initiation, and ART adherence and viral suppression among FSW living with HIV in sub-Saharan Africa.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	The inclusion criteria is described in detail and appropriate. Studies had to include female sex workers living with HIV, include original empirical quantitative or qualitative data, have data collected after 2000 and be published in English. Had to address determinants related to linkage, adherence or retention in sub-Saharan Africa.
<b>3. Was the search strategy appropriate?</b>	Unclear	Key terms provided. Search strategy for at least one database not reported.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed, Embase, Web of Science, SCOPUS, CINAHL, Global Health, Psycinfo, Sociological Abstracts, and Popline. Search was conducted on 22 November 2013 and updated on 30 July 2015. Did not include grey literature.
<b>5. Was selection of studies done adequately?</b>	Yes	Each review step included two independent reviewers who evaluated whether or not the article should be included, based on the following a priori inclusion criteria. Discrepancies were discussed with all four authors until a decision was reached.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	None reported
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	None reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Used a standardised data abstraction sheet. Two reviewers independently and in duplicate extracted data.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	First organised results by the care and treatment steps of the HIV care cascade: linkage and retention to care, ART initiation, and ART adherence and viral suppression. Given the focus on the care experiences and determinants of care among FSW living with HIV, the HIV testing step of the HIV care cascade was not included as part of our results. Also developed a conceptual framework to organise results using a multilevel framework that includes individual, interpersonal, and structural levels. Unclear as method of synthesis or more detail to process reported.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The recommendations of integrating substance use treatment with HIV care and treatment programmes is supported by the data. The review highlights stigma and discrimination as prominent themes in the data and recommends interventions to reduce these such as sex work sensitization training.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	The review was able to identify gaps in evidence on FSW and engagement in the cascade of care.



Lankowski

<b>Characteristics of included systematic review Lankowski et al. 2014</b>		
<b>Citation</b>		
Lankowski AJ, Siedner MJ, Bangsberg DR, Tsai AC. Impact of geographic and transportation-related barriers on HIV outcomes in sub-Saharan Africa: A systematic review. <i>AIDS Behav.</i> 2014;18(7):1199–223.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PubMed and Web of Science. Searched all abstracts from the International Conference on HIV treatment and Prevention Adherence of the International Association of Physicians in AIDS care. Included a limited number of manuscripts and abstracts recommended by experts in the field but not identified in the systematic search. PubMed and Google Scholar was searched again to identify IAPAC abstracts that had been subsequently published as full-length manuscripts.	
<b>Search Dates</b>	Databases up until August 2011 and abstracts from 2002-2004 and from 2006-2011.	<b>Date of last search:</b> Not specified.
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Descriptive, quantitative and qualitative studies, no language exclusion	66 studies: Quantitative (29) Quantitative Descriptive (17) Qualitative (15) and Mixed Methods (5)
		<b>Studies relevant to this overview:</b>
		34 studies included: Qualitative (16) Quantitative descriptive (18)
<b>Participants</b>	Either predominantly HIV-infected or prescribed ART for other reasons	N=69 506 Adults and children LHIV, HIV infected HCW, HC Providers, HIV infected rape victims, pregnant and postpartum women with HIV.
<b>Issue</b>	Voluntary counselling and testing, pre-ART linkage, loss to follow up/mortality and ART adherence or viral suppression.	Linkage (6), Adherence (23) and Retention (5)
<b>Setting</b>	Sub-Saharan Africa	Uganda (7), Malawi (4), Nigeria (3), Kenya (3), Zambia (2), Corte d'Ivoire (1), Botswana (3), Tanzania (2), Togo (1), Ethiopia (1), South Africa (2), The Gambia (1), Namibia (1), Zimbabwe (1), Uganda, Tanzania and Nigeria (1), Uganda, Tanzania and Botswana (1).
<b>Outcomes: Barriers and Facilitators</b>	Geographic and Transportation-related barriers	<b>Overview Framework:</b> Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	No framework reported	

<b>Data extraction method</b>	Used a standardised data extraction tool. Was conducted by a single author
<b>Appraisal tool used</b>	No appraisal was conducted for qualitative studies. Only studies reporting a statistical association for transportation and geographic related barriers were assessed using a designed assessment tool.
<b>Data synthesis method</b>	Odds ratio was calculated for quantitative studies. No data analysis method described for qualitative studies.

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	This review aimed to systematically assess the extent to which—and in what manner—geographic and transportation-related barriers affect HIV outcomes in SSA.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Studies that examined associations between geographic or transportation-related barriers and HIV outcomes in SSA: Voluntary counselling and testing, pre-ART linkage, loss to follow up/mortality and ART adherence or viral suppression.
<b>3. Was the search strategy appropriate?</b>	No	Full search strategy with search terms available as an appendix. Search terms for Africa setting not included. Search strategy is not comprehensive.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed and Web of Science. Searched all abstracts from the International Conference on HIV treatment and Prevention Adherence of the International Association of Physicians in AIDS care. Included a limited number of manuscripts and abstracts recommended by experts in the field but not identified in the systematic search. PubMed and Google Scholar was searched again to identify IAPAC abstracts that had been subsequently published as full-length manuscripts. There was no inclusion of databases relevant to Africa. Judged as N as authors should have included all manuscripts and abstracts recommended by experts in the field.
<b>5. Was selection of studies done adequately?</b>	No	Two reviewers screened the first 150 studies independently and in duplicate, agreement on the selection of studies for full text review reported as $k=0.74$ , thereafter a single investigator completed the remainder of the screening. Full text screening was not conducted in duplicate.
<b>6. Were the criteria for appraising studies appropriate?</b>	No	For studies reporting a statistical association between a geographic or transportation-related barrier and an HIV outcome, we designed an assessment tool that accounted for seven parameters within the following four domains: (1) study design and population, (2) exposure measurement, (3) outcome measurement, and (4) data analysis. No appraisal conducted for qualitative studies.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported

<b>JBI Quality Appraisal</b>		
<b>8. Were there methods to minimize errors in the data extraction?</b>	No	Using a standardized extraction form, data from all eligible studies were extracted by a single investigator. This should have been done in duplicate.
<b>9. Were the methods used to combine studies appropriate?</b>	No	The identification of transport and distance as barriers and the reporting thereof is available in the review for qualitative and descriptive studies. There was not a synthesis of findings or reporting of how qualitative data was synthesised.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	We found that geographic and transportation-related barriers impede access to care at all points in the HIV care continuum. this systematic review has important implications for HIV policy and programming in SSA. Policy-makers are urged to aggressively pursue service decentralization, and to prioritize investment in the necessary rural health care infrastructure. The recommendations were supported by the data.
<b>11. Were the specific directives for new research appropriate?</b>	Unclear	No research recommendations were made.

Lazuardi

<b>Characteristics of included systematic review Lazuardi et al. 2018</b>		
<b>Citation</b>		
Lazuardi E, Bell S, Newman CE. A “scoping review” of qualitative literature about engagement with HIV care in Indonesia. Sex Health. 2018;		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Scopus, Medline, ProQuest and Web of Science was searched. Further searches were conducted using reference lists of relevant papers, the UNSW Sydney library and Google Scholar between July and December 2016. An additional search of a journal called Indonesia was performed using the same search terms used to search electronic databases.	
<b>Search Dates</b>	1990 - 2016	<b>Date of last search: 22 July 2016</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Qualitative studies	17 Studies: Qualitative (17): 13 peer-reviewed articles and 4 book chapters
		<b>Studies relevant to this overview:</b>
		11 Qualitative studies
<b>Participants</b>	PLHIV	PLHIV: including injecting drug users, pregnant women, MSM, transgendered people, women, men and sero-discordant couples. Also found information related to service providers, community members, TB patients, caregivers and community organisers.
<b>Issue</b>	Engagement in HIV Care: Linkage to care and Treatment Uptake and Adherence.	Linkage (2) and Adherence (2) Retention in Care (10) in 11 studies.
<b>Setting</b>	Indonesia	Indonesia (11)
<b>Outcome: Barriers and Facilitators</b>	Factors influencing engagement in the HIV cascade of care.	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	Not reported.	
<b>Data extraction method</b>	Information extracted is described but the process is not reported.	
<b>Appraisal tool used</b>	Not reported	
<b>Data synthesis method</b>	Thematic synthesis.	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Paper aimed to conduct a comprehensive scoping review of published qualitative research about engagement with HIV care in Indonesia. Research question: What does qualitative research contribute to what is known about the HIV care cascade in Indonesia?

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Excluded other languages, countries, also excluded quantitative, and non-peer reviewed studies.
<b>3. Was the search strategy appropriate?</b>	Unclear	The following search terms were used: ('HIV' OR 'HIV infection') AND ('qualitative' OR 'qualitative research' OR 'ethnography') AND ('Indonesia'). The publication period included all years between 1990 and 2016. English only. Full search strategy not provided.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Scopus, Medline, ProQuest and Web of Science was searched. Further searches were conducted using reference lists of relevant papers, the UNSW Sydney library and Google Scholar between July and December 2016. An additional search of a journal called Indonesia was performed using the same search terms used to search electronic databases. Although the did not include grey literature and should be judged an N, the aim of the paper was to review published literature, therefore judged as adequate.
<b>5. Was selection of studies done adequately?</b>	Unclear	Method of selection not reported
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Critical appraisal not reported
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Critical appraisal not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	No	Information that was extracted was described but not by whom and if it was done independently or in duplicate.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	Authors used thematic synthesis but do not describe how it was implemented and by whom.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The study conclusions regarding the usefulness of qualitative data to support programme initiatives and government policies are evidenced in the data that they provided.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	The study recommends more qualitative research within key populations and identifies the gaps in evidence in the Indonesian setting.

Li

<b>Characteristics of included systematic review Li et al. 2016</b>		
<b>Citation</b>		
Li, H. et al., 2016. The Role of ARV Associated Adverse Drug Reactions in Influencing Adherence Among HIV-Infected Individuals: A Systematic Review and Qualitative Meta-Synthesis. <i>AIDS Behav</i> , (PG-1-11), pp.1–11. Available at: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84986243900&amp;partnerID=40&amp;md5=eaf19d18950931a8483f9b5583fc7e08">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84986243900&amp;partnerID=40&amp;md5=eaf19d18950931a8483f9b5583fc7e08</a> NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	CENTRAL, EMBASE, LILACS, PsychINFO, PubMed (MEDLINE), Web of Science/Web of Social Science, CINAHL, British Nursing Index and Archive, Social Science citation Index, AMED, DAI, EPPI-Centre, ESRC, Global Health (EBSCO), Anthrosource, JSTOR, conference proceedings include the conferences on Retroviruses and Opportunistic Infections (CROI), International AIDS conference (IAC), and alternating year International AIDS Society (IAS). Reference mining of included studies were conducted.	
<b>Search Dates</b>	1st January 2000 until 21st February 2015	<b>Date of last search: 21 Feb 2015</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	All studies in English, studies were selected that used qualitative research designs, including but not limited to ethnographic research, case studies, process evaluations, and mixed methods research using a framework analysis approach	39 Qualitative Studies
		<b>Studies relevant to this overview:</b> 39 Qualitative Studies
<b>Participants</b>	HIV-infected individuals	Total: N=192434 HIV- infected individuals including adults, children, adolescents, pregnant and post-partum women and caregivers.
<b>Issue</b>	Adherence	Adherence (n=39)
<b>Setting</b>	HIC and LMIC	HIC (19): USA (14), Netherlands (1), Canada (1), Australia (1), Belgium and Netherlands (1), Switzerland (1) and LMIC (20): Botswana, Tanzania and Uganda (1), Peru (1), Ukraine (1), Zambia (1), Rwanda (1), Ethiopia (1), Uganda (1), Nepal (2), Cuba (1), Southern Malawi (1), Uganda and Zimbabwe (1), China (2), Tanzania (3), South Africa (3)
<b>Outcomes: Barriers and Facilitators</b>	Perception and experience of ARV adverse drug reactions	<b>Overview Framework:</b> Individual Factors
<b>Systematic Review Methods</b>		
<b>Conceptual Framework:</b>	None Specified	

<b>Data extraction method</b>	Pre-specified data extraction form
<b>Appraisal tool used</b>	CASP tool
<b>Methods of data synthesis:</b>	Thematic Synthesis

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The aim of this qualitative synthesis was to systematically review and synthesize the qualitative literature examining how perception and experience of ARV adverse drug reactions influence drug adherence among HIV-infected individuals
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Studies were selected that used qualitative research designs, including but not limited to ethnographic research, case studies, process evaluations, and mixed methods research. Studies also had to include qualitative data collection techniques (e.g., participant observation, in-depth interview, or focus group) and a qualitative data analysis approach (e.g., framework analysis, or thematic analysis). The review included studies that provided description and interpretation of the impact of adverse drug reactions on adherence for all HIV-infected individuals. We excluded studies that only used quantitative methods to investigate the same phenomenon.
<b>3. Was the search strategy appropriate?</b>	No	In accordance with guidance from PRISMA checklist, ENTREQ, and meta-synthesis guidance from the Cochrane group, we used a comprehensive search strategy to identify all relevant studies in English. Search strategy available in supplementary material. Only included English studies.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	The following electronic journal and dissertation/thesis databases were searched from January 1st, 2000 until February 21st 2015 (to limit to recent ARV drug regimens): CENTRAL (Cochrane Central Register of Controlled Trials), EMBASE, LILACS, PsycINFO, PubMed (MEDLINE), Web of Science/Web of Social Science, CINAHL, British Nursing Index and Archive, Social science citation index, AMED (Allied and Complementary Medicine Database), DAI (Dissertation Abstracts International), EPPI-Centre (Evidence for Policy and Practice Information and Coordinating Centre), ESRC (Economic and Social Research Council), Global Health (EBSCO), Anthrosource, and JSTOR. Conference proceedings including the Conferences on Retroviruses and Opportunistic Infections (CROI), International AIDS Conference (IAC), and alternating year International AIDS Society (IAS) clinical meetings were searched from their inception dates (1993, 1985 and 2001, respectively). References of included studies were checked and authors were contacted to provide additional information as required

<b>JBI Quality Appraisal</b>		
<b>5. Was selection of studies done adequately?</b>	Yes	Two authors independently reviewed abstracts and made a list of categories for exclusion, and then independently reviewed full text manuscripts and notes reasons for exclusion. Discordance between the two authors was resolved by discussion with a third author.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	The seven scale CASP quality assessment tool was used, however they do not describe the domains of the CASP
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Yes	Prior to conducting the synthesis, each paper's quality was assessed by two authors and using a seven scale criteria tool adapted from the critical appraisal skills programme (CASP), which has been used in other reviews
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Pre-specified data extraction form. Data extracted authors, year published, study design, location, key populations/subgroups. Not reported whether data extraction was done by two authors
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Thematic synthesis was adopted in the data analysis. Two authors conducted a line-by-line coding of the findings of primary studies prior to organizing into related areas to construct descriptive themes. Analytical themes were developed based on the descriptive themes. Pre-defined subgroup analyses were conducted among specific groups of adults, children and adolescents, and pregnant women. CERQUAL was also used to appraise confidence in the findings.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	This synthesis identified 39 qualitative studies from diverse countries and data supported the recommendations for a structured informing approach about the adverse reactions of the medication. All recommendations supported.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	This qualitative synthesis found very limited studies considering perspectives of children, adolescent, and pregnant women, and the findings were in moderate and low confidence levels respectively. Future qualitative studies should focus on exploring subjective experiences and perceptions of ARV adverse drug reactions from their perspectives. Results support the conclusion.



Lytvyn

<b>Characteristics of included systematic review Lytvyn et al 2017</b>		
<b>Citation</b>		
Lytvyn L, Siemieniuk RA, Dilmitis S, Ion A, Chang Y, Bala MM, et al. Values and preferences of women living with HIV who are pregnant, postpartum or considering pregnancy on choice of antiretroviral therapy during pregnancy. <i>BMJ Open</i> . 2017;7(9):1–9.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	MEDLINE, EMBASE and PsycINFO. Included grey literature and performed an additional search on GOOGLE.	
<b>Search Dates</b>	1 January 2000 to 11 February 2017	<b>Date of last search:</b> 12 February 2017
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Quantitative and qualitative studies from any setting and location.	15 Studies: Qualitative (15) <b>Studies relevant to this overview:</b> 15 Studies: Qualitative (15)
<b>Participants</b>	Women living with HIV of childbearing age (15-50 years), who were diagnosed at any time, that evaluated the initiation, adherence or change in ART regimen during pregnancy	N=1165: Women considering pregnancy (140), pregnant women (408), and post-partum women (602). Couples desiring and/or intending to have children (15) also included.
<b>Issue</b>	Linkage and adherence	Adherence (15)
<b>Setting</b>	Any setting	Puerto Rico (1), Nigeria (1), Kenya (2), Swaziland (2), Malawi (2), India (1), Australia (1), South Africa (1), Zimbabwe (1), and USA (3)
<b>Outcome: Barriers and Facilitators</b>	Values and preferences of women considering or discussing ART during pregnancy	<b>Overview Framework:</b> Individual and intrapersonal factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	Not reported	
<b>Data extraction method</b>	Two reviewers independently and in duplicate extracted data using a standardised spreadsheet in EXCEL	
<b>Appraisal tool used</b>	CASP Tool	
<b>Data synthesis method</b>	Meta-ethnography	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	To inform the BMJ Rapid Recommendation on cART regimens in pregnancy, we performed this systematic review to explore how women living with HIV value possible benefits and harms of ART.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Considered eligible both quantitative and qualitative studies from any setting and location, enrolling women living with HIV of childbearing age (15–50 years), who were diagnosed at any time, that evaluated the initiation, adherence or change in ART regimen during pregnancy. This inclusion criterion is appropriate for the review question.
<b>3. Was the search strategy appropriate?</b>	Yes	Used a combination of keywords and MeSH/EMTREE terms for 'HIV' AND 'pregnancy' AND 'antiretroviral therapy'. Search strategy was available in supplementary material and is appropriate. All languages were included in the search.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	MEDLINE, EMBASE and PsycINFO. Included grey literature and performed an additional search on GOOGLE.
<b>5. Was selection of studies done adequately?</b>	Yes	Title and abstract as well as full-text screening was done independently and in duplicate by reviewer pairs (LL, MMB, YC). Disagreements were resolved by consensus.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	All eligible studies reported qualitative outcomes. We used the Critical Appraisal Skills Programme checklist to assess methodological quality of individual qualitative studies.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Two reviewers independently and in duplicate extracted data using a standardised spreadsheet in EXCEL. Detailed description of data was extracted is provided.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Authors used thematic synthesis and explain the steps that they followed. First extracted all quotes and author identified themes relevant to taking ART and these were coded and categorised to identify common themes.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Based on the findings in this specific population recommendations are made for practice. These are supported by the data.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	The authors make several directives for research including no studies have addressed women being given the choice of ART alternatives or about the priorities of outcomes related to taking ART. Methodological recommendations for research are provided such as reflexivity and transparency. These are supported and appropriate.

Merten

<b>Characteristics of included systematic review Mertern et al. 2010</b>		
<b>Citation</b>		
Merten, S. et al., 2010. Patient-reported barriers and drivers of adherence to antiretrovirals in sub-Saharan Africa: a meta-ethnography. Trop Med Int Health, 15 Suppl 1(PG-16-33), pp.16–33. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Medline, AIO, SSCI, CINAHL, IBSS, EMBASE and JSTOR and additional hand searches	
<b>Search Dates</b>	2000-2008	<b>Date of last search: 5 January 2010</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Qualitative studies with qualitative design and analysis method	32 Qualitative studies
		<b>Studies relevant to this overview:</b> 32 Qualitative studies
<b>Participants</b>	PLHIV	N=2044+ Community members, policy makers, HIV+ patients, health workers, female HIV+ patients, healthcare actors, In-school and out-of-school youth, patients who attended the ARV clinic, counsellors, HIV+ patients on ART for 6 months, care givers, family care givers, key informants, HIV+ patients from IDP camps, treatment partners
<b>Issue</b>	ART access and adherence in cultural settings	Adherence in cultural settings (32)
<b>Setting</b>	Sub-Saharan Africa	Uganda (6), Zambia (5), South Africa (6), Burkina Faso (1), Malawi (2), Tanzania (5), Botswana (2), Kenya (1), Nigeria (1), Ethiopia and Uganda (1), Burkina Faso, Cote d'Ivoire and Mali (1), Nigeria, Tanzania and Uganda (1) (LMIC)
<b>Outcomes: Barriers and Facilitators</b>	Patient reported barriers and drivers of adherence in cultural settings	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	None reported.	
<b>Data extraction method</b>	Data extraction was conducted in duplicate; however, there is no mention of a standard data extraction form.	
<b>Appraisal tool used</b>	Appraisal conducted but no procedure or process reported.	
<b>Data synthesis method</b>	Meta-ethnography	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	No	This article presents an update and systematic review of findings from qualitative studies on ART adherence

<b>JBI Quality Appraisal</b>		
		in SSA and discusses how these factors interact. The question is not clearly formulated.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Unclear	Studies using a qualitative design and analysis method were included. Appropriate for use with meta-ethnography. Participants not clearly identified in the inclusion criteria.
<b>3. Was the search strategy appropriate?</b>	No	Indicated keywords. Articles reported findings from 2000-2008. No search strategy reported. No language criteria.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Medline, AIO, SSCI, CINAHL, IBSS, EMBASE and JSTOR and additional hand searches. No grey literature included. Authors report hand searches but not how, where or by whom it was conducted.
<b>5. Was selection of studies done adequately?</b>	No	Titles and abstracts were reviewed in duplicate by three researchers. Removed duplicates. No information regarding full text screening.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Articles were appraised but there is no mention of the tool that was used or the procedure that was followed.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data extraction was conducted in duplicate; however, there is no mention of a standard data extraction form. Additionally, data extracted into Table 1 is for 32 studies but authors report 31 studies in PRISMA chart and search strategy and outcomes.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	The method of meta-ethnography has proven to be an effective tool to synthesize qualitative studies to attain deeper understanding of complex health-related topics, such as adherence to medication for chronic conditions. While a literature review summarizes the main findings of qualitative studies on a single theme, meta-ethnography aims at synthesis, which 'involves the juxtaposition of studies and the connections between them, to develop a more sophisticated understanding. Key themes and concepts were extracted and peer reviewed for inclusiveness. Key themes found were consolidated into a line of argument (third-order analysis), which is presented in the synthesis/discussion section.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Unclear	The review does not provide information regarding the way forward for policy and practice
<b>11. Were the specific directives for new research appropriate?</b>	Unclear	Recommendations for further research has not been provided

Mey

<b>Characteristics of included systematic review Mey et al. 2017</b>		
<b>Citation</b>		
Mey, A. et al., 2016. Motivations and Barriers to Treatment Uptake and Adherence Among People Living with HIV in Australia: A Mixed-Methods Systematic Review. <i>AIDS Behav</i> , (PG-1-34), pp.1–34. Available at: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84994388389&amp;partnerID=40&amp;md5=fa7d78974dfe5881731fabdbc91d2be3">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84994388389&amp;partnerID=40&amp;md5=fa7d78974dfe5881731fabdbc91d2be3</a> NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Ovid Medline, CINAHL, Scopus, Health and Society Database and Sociological Abstracts	
<b>Search Dates</b>	January 2000-15 December 2015	<b>Date of last search:</b> Between November and December 2015
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Qualitative, quantitative and mixed methods studies found in published literature.	72 studies: Qualitative (30) Quantitative (34), Mixed methods (6), Case Report (1) and Short Communication Article (1).
		<b>Studies relevant to this overview:</b> 35 Studies: Qualitative (7), Quantitative (21), Mixed Methods (6), and 1 Case report.
<b>Participants</b>	People living with HIV	PLHIV, Men, women, MSM, caregivers of children who are HIV positive, CAM workers (traditional healers/alternative medicines)
<b>Issue</b>	Treatment uptake (linkage) and Treatment Adherence	Linkage to ART (13) and Adherence (26) and Retention (7) from 21 studies.
<b>Setting</b>	Australia	Australia (21)
<b>Outcomes: Barriers and Facilitators</b>	Identify motivations and barriers to treatment uptake and adherence	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	No framework reported	
<b>Data extraction method</b>	Only a second author independently reviewed a random selection of articles.	
<b>Appraisal tool used</b>	Quality appraisal utilised the Mixed Methods Appraisal Tool (MMAT) Version 2011	
<b>Data synthesis method</b>	Narrative synthesis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The purpose of this research is to provide a greater understanding of the perspectives of PLHIV and to identify motivations and barriers to treatment uptake and adherence.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	Studies were included if they referred to i) living with HIV, ii) treatment uptake and iii) treatment adherence. Qualitative, quantitative and mixed methods studies were reviewed. Articles were considered for analysis if they described the experiences, knowledge, attitudes and beliefs of people living with HIV in the Australian context. Included studies from 2000, which may include data reported on that, may not refer to aspects of medication and care in practice after 2000.
<b>3. Was the search strategy appropriate?</b>	Yes	Articles published post 2000 until December 15 2015. Full search strategy available in text and is adequate.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Ovid Medline, CINAHL, Scopus, Health and Society Database and Sociological Abstracts were accessed between November and December 2015. Review articles and grey literature were excluded from analysis but their reference lists were scrutinised and in some cases, yielded new articles to include in the analysis. Keywords were indicated as well
<b>5. Was selection of studies done adequately?</b>	No	Authors report that one author screened titles and abstracts, and a second author to check that none was missed for inclusion reviewed abstracts. One author did full text screening and another author checked a random sample of excluded studies. Full text should have been conducted in duplicate and independently.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	Quality appraisal utilised the Mixed Methods Appraisal Tool (MMAT) Version 2011. Mixed methods studies were assessed according to: i) appropriateness of the research design, ii) appropriateness of triangulation, and iii) appropriate acknowledgement of limitations. For qualitative studies, methodological quality was assessed according to the relevance/appropriateness of four domains relative to the research question: i) the data source ii) the analytical process, iii) the findings and iv) reflexivity
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	It was reported that the search strategy, data table and study quality assessment were reviewed by SD and disagreement resolved by consensus" but there is no mention of a second author that did critical appraisal, therefore judged as unclear.
<b>8. Were there methods to minimize errors in the data extraction?</b>	No	Only a random selection of articles were independently reviewed by a second author.

<b>JBI Quality Appraisal</b>		
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Data was synthesised using thematic analysis. Independent reviewers analysed a random selection of studies and developed a codebook then discussed their views and agreed on a coding framework. One author coded the remaining articles. The remaining authors each reviewed 5 articles that were coded in relation to the framework for discussion. Final themes were based on the outcomes of discussion. This was found adequate.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Unclear	The review does not provide information regarding the way forward for policy and practice
<b>11. Were the specific directives for new research appropriate?</b>	Yes	While the study provides clues, more research is needed to understand how these meanings are generated and how they give rise to rationales regarding HIV management. In addition, a review of studies focused on testing and risk-taking behaviour is required to provide a holistic overview of the barriers and facilitators to the effective management of HIV in the Australian context.

Mill

<b>Characteristics of included systematic review Mill et al. 2006</b>		
<b>Citation</b>		
Mills, E.J. et al., 2006. Adherence to HAART: a systematic review of developed and developing nation patient-reported barriers and facilitators. PLoS Med, 3(11 PG-e438), p.e438. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	AMED, Campbell Collaboration, CINAHL, Cochrane Library, Embase, ERIC, MedLine, NHS EED. The UK national research register and conference abstracts were sourced from international conference web sites. Searched bibliographies of key papers.	
<b>Search Dates</b>	Up to June 2005	<b>Date of last search:</b> Not specified
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Qualitative and quantitative studies. No language exclusions. Published literature and conference abstracts.	85 studies: 38 qualitative studies and 47 quantitative survey studies
		<b>Studies relevant to this overview:</b> 85 studies: 38 qualitative studies and 47 quantitative survey studies
<b>Participants</b>	PLHIV	People living with HIV and caregiver N=12902
<b>Issue</b>	Barriers and facilitators to antiretroviral adherence	Barriers and facilitators to antiretroviral adherence
<b>Setting</b>	Representative of developed and developing nations according to the United Nations Development Index	72 studies conducted in developed countries: Fifty-six were from the US, Canada (3), UK (3), Italy (2), France (2), The Netherlands (2), Australia (1), Belgium (1) and Switzerland (1). The studies conducted in developing countries included Brazil (1) and Botswana (1) Two studies were multi-national: (countries not reported). 12 studies were conducted in developing countries included four from Brazil and one each from Uganda, Cote d'Ivoire, South Africa, Malawi, Botswana, Costa Rica, Romania and China.
<b>Outcomes: Barriers and Facilitators</b>	Patient reported barriers and facilitators	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	No framework reported	
<b>Data extraction method</b>	Qualitative data was analysed using content analysis and quantitative data was pooled together.	
<b>Appraisal tool used</b>	Authors used their pre-specified appraisal tool specific for qualitative studies and another for quantitative studies.	
<b>Data synthesis method</b>	Content analysis	



<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Review question is not clearly stated with the PICO elements clearly identified in the introduction. In the search strategy, the aim of the study is identified.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Eligible studies met the following criteria: (1) reported an original research study, (2) contained content addressing barriers or facilitators to antiretroviral adherence, and (3) were either a qualitative study or quantitative survey. All languages were included. Criteria was appropriate.
<b>3. Was the search strategy appropriate?</b>	Unclear	Keywords have been indicated. Author has been contacted for full search strategy. Awaiting response.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Databases searched included: AMED, Campbell Collaboration, CINAHL, Cochrane Library, Embase, ERIC, MedLine, NHS EED. Grey literature was searched (unpublished studies) in the UK national research register and conference abstracts were sourced from international conference web sites. Reference mining was also conducted. Published and unpublished studies were sourced.
<b>5. Was selection of studies done adequately?</b>	Unclear	Two authors independently reviewed abstracts. Nevertheless, they do not describe how they selected full texts.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	We extracted data on the quality of both qualitative and quantitative studies using pre-determined criteria for quality. We previously reported our rationale for assessing the quality of qualitative studies and in this study have extended our quality assessment to examine quantitative surveys. Authors describe the domains used for appraisal in detail for both quantitative and qualitative studies.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Yes	Two reviewer independently extracted data and appraised the quality and content of the studies.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	A coding template was iteratively developed through initial extraction that was then used for a second review of the papers to identify barriers and facilitators. Data extraction was done independently and in duplicate.

<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Qualitative data was analysed using content analysis and quantitative data was pooled together. These were adequate.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The review identified a broad range of barriers and facilitators to adherence. These barriers should be inferred as guides for interventional research to improve adherence rates. Given the many factors tabulated in this review, clinicians should use this information to engage in open discussion with patients to promote adherence and identify barriers and facilitators within their own populations. Recommendations were supported by data.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Further research on HAART adherence in developing countries that incorporates both qualitative and quantitative elements as a priority. Directives provided were appropriate.

Morales-Aleman

<b>Characteristics of included systematic review Morales-Aleman et al. 2014</b>		
<b>Citation</b>		
Morales-Aleman, M.M. & Sutton, M.Y., 2014. Hispanics/Latinos and the HIV continuum of care in the Southern USA: a qualitative review of the literature, 2002–2013. <i>AIDS Care</i> , 26(12 PG-1592-1604), pp.1592–1604. Available at: <a href="http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=103905221&amp;site=ehost-live">http://search.ebscohost.com/login.aspx?direct=true&amp;db=cin20&amp;AN=103905221&amp;site=ehost-live</a> NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PsychInfo, PubMed, Medline, and Google Scholar	
<b>Search Dates</b>	Jan 2002 - April 2013	<b>Date of last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Empirical studies published in peer review journals	13 studies: 10 quantitative studies, 3 qualitative studies
		<b>Studies relevant to this overview:</b> 3 qualitative studies and 1 quantitative study.
<b>Participants</b>	Studies reporting sample of >50% Hispanics and Latinos LHIV	N=121 Hispanic and Latino PLHIV
<b>Issue</b>	Factors associated with the HIV continuum of care at various stages: diagnosis/testing, Linkage/Retention in Care; and Adherence.	Linkage to Care (3), Adherence (1), Retention in Care (3) from 4 studies.
<b>Setting</b>	Southern USA	Southern USA 4)
<b>Outcomes: Barriers and Facilitators</b>	Barriers, facilitators and gaps in HIV testing and Care	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Framework</b>	HIV Continuum of care	
<b>Data extraction method</b>	Summarised into tables. No indication who conducted it.	
<b>Appraisal tool used</b>	Not reported	
<b>Data synthesis method</b>	Thematic Analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	No	Review states: We conducted a systematic review of the literature to examine each step of the HIV continuum of care, a framework that has recently gained nationwide attention and utilization, for Hispanics/Latinos in the southern USA

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	We included empirical articles that (1) were published in peer-reviewed journals between January 2002 and April 2013; (2) included samples of ≥50% Hispanics/Latinos; (3) were conducted exclusively in one or more Southern US states; and (4) identified or examined at least one of the five aspects of the continuum of care. We extracted and summarized these data in table form. Articles were analysed based on the HIV continuum of care stages, utilizing directed content analysis. We identified significant variables, barriers, facilitators, and gaps in HIV testing and care for Hispanics/Latinos in the South
<b>3. Was the search strategy appropriate?</b>	Unclear	Searches were limited to peer-reviewed, original research articles and abstracts published between 1 January 2002 and 1 April 2013. Keywords have been indicated. Full search strategy is not reported.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PsychInfo, PubMed, Medline, and Google Scholar. No grey literature included or attempts to find unpublished studies.
<b>5. Was selection of studies done adequately?</b>	Unclear	Removed duplicates. Screened studies that appeared to be potentially related to ART adherence. Selection process is not described adequately.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Not reported
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data was extracted and summarised in table form. Who conducted it and methods to minimise errors not reported.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Articles were analysed based on the HIV continuum of care stages using direct content analysis to identify significant variables, barriers, facilitators, and gaps in HIV testing and care. Adequate.

<b>JBI Quality Appraisal</b>		
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Increased implementation of effective provider strategies at the individual-, clinician-, and organizational-level may be effective in increasing access to HIV care for Hispanics/Latinos in the South. Open dialog among stakeholders (e.g., Hispanic/Latino immigrants, health-care policy-makers, and health-care providers) about HIV care access will be a vital step in reducing HIV-related health disparities as part of domestic HIV prevention efforts. These are some findings such as local media coverage that is not addressed in the recommendations. However, recommendations made are supported by the data.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Future studies should consider country of origin, geographic location, level of acculturation unique roles in the context of barriers and facilitators. Authors make relevant suggestions on future research methods to use participatory approaches.

Omonaiye

<b>Characteristics of included systematic review</b>		
<b>Citation</b>		
Omonaiye O, Kusljic S, Nicholson P, Manias E. Medication adherence in pregnant women with human immunodeficiency virus receiving antiretroviral therapy in sub-Saharan Africa: a systematic review. 2018;1–20. Available from: <a href="https://doi.org/10.1186/s12889-018-5651-y">https://doi.org/10.1186/s12889-018-5651-y</a>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	MEDLINE Complete (1916-Dec 2017), Embase (1947-Dec 2017), Global Health (1910-Dec 2017) and CINAHL Complete (1937-Dec 2017). Included papers were searched for additional papers.	
<b>Search Dates</b>	Up to December 2017	<b>Date of last search: Not reported</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Qualitative and quantitative studies. No language and publication restrictions.	51 Studies: Qualitative (9), Quantitative (36) and Mixed Methods (6)
		<b>Studies relevant to this overview:</b> 15 Studies: Qualitative (9) and Mixed Methods (6)
<b>Participants</b>	HIV positive pregnant women	HIV positive pregnant women (include number)
<b>Issue</b>	Adherence to ART	Adherence (15)
<b>Setting</b>	sub-Saharan Africa	Kenya (3), Swaziland (1), Uganda (2), South Africa (1), Cote d'voire (2), Tanzania (1), Malawi (4), Mozambique (1)
<b>Outcome: Barriers and Facilitators</b>	Patient related factors, condition, therapy related factors, and health care team and health system factors.	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	WHO Multidimensional adherence model	
<b>Data extraction method</b>	The data was extracted by one author and then reviewed by the other authors and discrepancies resolved via discussion	
<b>Appraisal tool used</b>	Used the Mixed Methods Appraisal Tool version 2011	
<b>Data synthesis method</b>	Thematic Analysis	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	The aim of this review is to examine barriers and enablers of medication adherence to ART among HIV positive pregnant women in sub-Saharan Africa.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Inclusion criteria was specific to the question.

<b>JBI Quality Appraisal</b>		
<b>3. Was the search strategy appropriate?</b>	Unclear	HIV AND (Pregnancy OR Pregnant*) AND (PMTCT OR "PMTCT Cascade" OR "Vertical Transmission" OR "Mother-to-Child") AND (Prevent OR Prevention) AND (HAART OR "Antiretroviral Therapy" OR "Triple Therapy") AND (Retention OR Concordance OR adherence OR Compliance). Example specific to database not provided.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	MEDLINE Complete (1916-Dec 2017), Embase (1947-Dec 2017), Global Health (1910-Dec 2017) and CINAHL Complete (1937-Dec 2017). Included papers were searched for additional papers. No grey literature included.
<b>5. Was selection of studies done adequately?</b>	Yes	One researcher (O.O.) initiated and screened all titles and abstracts to identify potentially relevant studies. A second researcher independently screened all titles and abstracts to identify potentially relevant studies (E.M.). Three researchers (O.O., E.M. and S.K.) to determine whether they met the inclusion criteria independently examined the full texts of potentially relevant studies.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	Used the Mixed Methods Appraisal Tool version 2011, which provides criteria to evaluate the methodological quality of studies. 19 items assessing quality and possible risk of bias. Tool may be used with different study designs. This was judged Y
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Yes	Two researchers conducted assessment independently and in duplicate.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Although a standard template was used. One author only did data extraction. The extraction was reviewed by the other authors and discrepancies resolved via discussion.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	WHO Multidimensional adherence model was used to categorize findings. The presentation of results and narrative synthesis provided is adequate. However, the method of synthesis is not reported.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The recommendations are well linked to the data and themes. Authors also provide feedback on the limitations of the data.
<b>11. Were the specific directives for new research appropriate?</b>	Unclear	No directives provided.

Reisner

<b>Characteristics of included systematic review Reisner et al. 2009</b>		
<b>Citation</b>		
Reisner, S.L. et al., 2009. A review of HIV antiretroviral adherence and intervention studies among HIV-infected youth. <i>Top HIV Med</i> , 17(1 PG-14-25), pp.14–25. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Medline, PubMed, PsychInfo. In addition, bibliographies of relevant articles were reviewed for additional studies.	
<b>Search Dates</b>	1999-2008	<b>Date last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Qualitative and quantitative published studies.	21 Studies: Qualitative (4), Quantitative (7), Mixed Methods (3) and 7 Intervention Studies.
		<b>Studies relevant to this overview:</b>
		14 Studies: Qualitative (4), Quantitative (7) and Mixed Methods (3)
<b>Participants</b>	HIV positive adolescents and youth ages 13 to 24 years	N=5179 HIV positive youth and adolescents and pregnant adolescents.
<b>Issue</b>	Medication adherence and exercising an intervention technique to enhance antiretroviral adherence.	Adherence (14)
<b>Setting</b>	United States	United States (14)
<b>Outcomes: Barriers and Facilitators</b>	Demographic, psychosocial, HIV disease, treatment regimen and practitioner factors	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual Framework</b>	Not specified	
<b>Data extraction method</b>	Not specified	
<b>Appraisal tool used</b>	Not specified	
<b>Data synthesis method:</b>	Thematic content analysis	
<b>Limitations:</b>	All studies included regardless of methodological rigour, no search strategy provided. No duplicate screening.	



<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Unclear	This article states that the reviews published adherence studies on HIV-infected youth (ages 13 to 24 years), focusing on rates of adherence to antiretroviral regimens and interventions designed to enhance adherence. However, data collated summarises factors influencing adherence as well as interventions that enhance adherence.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	Included were quantitative and qualitative studies reporting original data on medication adherence among HIV-infected youth (ages 13 to 24 years) and on exercising an intervention technique to enhance antiretroviral adherence among this population. Studies that included children as well as adolescents and young adults were incorporated for review as long as the mean age of participants fell within the 13- to 24-year-old age range. All relevant studies were included in the review, regardless of methodologic rigor. Authors did not specify country as part of the inclusion criteria.
<b>3. Was the search strategy appropriate?</b>	Unclear	Using combinations of the keywords HIV/AIDS, youth, adolescents, young adults, adherence (or compliance), non-adherence (or noncompliance), medical treatments, highly active antiretroviral therapy (HAART), anti-retroviral, resistance, and intervention (also keywords associated with specific types of interventions, such as education, telephone, and peer). However, the search does not seem comprehensive and there is no evidence of a search strategy for at least one database.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Medline, PubMed, PsychInfo. In addition, bibliographies of relevant articles were reviewed for additional studies. They did not include grey literature.
<b>5. Was selection of studies done adequately?</b>	Unclear	Not reported
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Not reported
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported

<b>JBI Quality Appraisal</b>		
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	A coding manual was developed to extract descriptive information on setting, study design, population and sample characteristics, definition of adherence used, adherence measurement method, key study variables, and reported findings. The authors do not report on who conducted the extraction and whether this was conducted in duplicate.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	For the qualitative papers, a combination of content analysis and an iterative process of variable sorting and concept formation common in qualitative research was employed to identify 9 categories in which all the variables could be classified. The analysis of quantitative studies is not reported.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Detailed descriptions of the included studies are provided and support the recommendations made.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	Not many research directives were provided but the directives reported are appropriate.

Santer

<b>Characteristics of included systematic review Santer et al. 2014</b>		
<b>Citation</b>		
Santer, M. et al., 2014. Treatment non-adherence in paediatric long-term medical conditions: Systematic review and synthesis of qualitative studies of caregivers' views. BMC Paediatrics, 14(1 PG-). Available at: <a href="https://www.scopus.com/inward/record.uri?eid=2-s2.0-84899486142&amp;partnerID=40&amp;md5=16144f05b226c744b60274a03e977597">https://www.scopus.com/inward/record.uri?eid=2-s2.0-84899486142&amp;partnerID=40&amp;md5=16144f05b226c744b60274a03e977597</a> NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Medline, EMBASE, Cinahl, Psychinfo. Additional papers were sought by writing to authors and examining reference lists of included studies.	
<b>Search Dates</b>	1996 to 2011	<b>Date of last search: December 2011</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Qualitative studies in English and German	17 qualitative studies (19 papers)
		<b>Studies relevant to this overview:</b> 3 Studies: Qualitative studies (3)
<b>Participants</b>	Parents and caregivers of children aged 12 or younger with long term conditions such as asthma, diabetes	N=96 Caregivers of children aged 0 -18 years
<b>Issue</b>	Treatment adherence and Non adherence	Adherence (3)
<b>Setting</b>	Developed countries	Belgium (1) and US (2)
<b>Outcomes: Barriers and Facilitators</b>	Barriers to treatment adherence.	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social; and Political and Health System.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	Not reported	
<b>Data extraction method</b>	Standard data extraction form to capture study design and participants. Study findings and discussion were separately captured into Nvivo 9	
<b>Appraisal tool used</b>	CASP Tool	
<b>Data synthesis method</b>	Thematic Synthesis by coding text, developing descriptive and general analytical themes.	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	We therefore conducted a systematic review and synthesis of the qualitative literature to investigate parents and caregivers' accounts of their reasons for adherence and non-adherence to prescribed treatments in paediatric long-term medical conditions

<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	Included qualitative studies from the perspectives of parents and other caregivers of children with long-term conditions. Focused on caregiver adherence. Studies had to include data on parents or caregivers of children 12 years or younger. Studies only reporting on children older than 12 were excluded. Focused on clinical conditions with long-term outcomes for children and studies where caregivers were given specific treatment advice and instructions. The authors excluded studies from developing countries, as they believed barriers to treatment adherence would differ substantially in their context. Only German and English included, as these were the languages spoken by the authors. The study would have benefitted from including studies from developing countries and be more language inclusive.
<b>3. Was the search strategy appropriate?</b>	Unclear	Searches took place in December 2011 and included studies from 1996. Keywords have been indicated as well. The search strategy key terms are not comprehensive. Marked as unclear as the author mention that this is just one example but do not evidence others.
<b>4. Were the sources and resources used to search for studies adequate?</b>	Yes	Medline, EMBASE, Cinahl, Psychinfo. Additional papers were sought by writing to authors and examining reference lists of included papers. Titles and abstracts were initially screened and if these indicated that the paper might meet the inclusion criteria, the full text paper was retrieved and examined against the inclusion criteria.
<b>5. Was selection of studies done adequately?</b>	Unclear	Selection is reported but the method was not reported. Authors mention that if there was uncertainty it was discussed with the research team.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	CASP quality assessment tool was used and reported within Tables of the paper. This was considered adequate.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Yes	Assessing potential papers against inclusion criteria and assessing quality was completed independently by two researchers and then collaboratively to compare findings. Any differences were resolved through discussion.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data was extracted in two phases. First, information about the study design and participants were extracted into a previously adapted template. Second, findings and discussion from included papers relating to treatment adherence were captured into Nvivo9. Who conducted the extraction is not reported.

<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Used the principles of thematic synthesis, an established approach previously used in public health. In order to develop descriptive themes, three reviewers independently coded this text in 10 original papers – these were chosen as they covered different conditions and provided a breadth of findings – to identify provisional themes according to meaning and content. These three reviewers then discussed their independently derived themes and agreed a preliminary coding frame of main themes. This coding frame was then applied to data in all papers. Two reviewers with any differences between coders resolved through discussion and the coding frame refined where necessary coded data independently. This process involved extensive team discussion and reflection to refine descriptive themes and develop overarching analytical themes derived from all included studies.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Such findings can inform everyday consultations in paediatric long-term conditions. The additional complexity in the paediatric encounter of the ‘therapeutic triad’ rather than a ‘therapeutic dyad’ represents a challenge to health professionals to develop sophisticated communication strategies. For instance, health professionals may be able to assist parents and caregivers by helping the child view their treatment as enabling health and a ‘normal life’, rather than representing illness and interference. Participants in these studies wished for more support from health professionals in devising simpler treatment regimens that take account of family life, seeking solutions to barriers to adherence and communicating with their child about adherence. Providing opportunities to discuss barriers to adherence before repetitive resistance develops could be a great help to caregivers. This is appropriate.
<b>11. Were the specific directives for new research appropriate?</b>	No	Authors suggest that a synthesis of qualitative studies focusing on the views of children and young people with long-term conditions would be therefore valuable in future. Directives are not very specific. Authors did not mention directives such as including developing countries, differences between the diseases.

## Vervoort

Characteristics of included systematic review Vervoort et al. 2007		
<b>Citation</b>		
Vervoort, S.C.J.M. et al., 2007. Adherence in antiretroviral therapy: A review of qualitative studies. <i>Aids</i> , 21(PG-271-281), pp.271–281. Available at: NS -.		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	CINAHL, PUBMED and Web of Science	
<b>Search Dates</b>	1996 to 2005	<b>Date of last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Qualitative and quantitative studies but only qualitative data was used. English language.	24 Studies: All studies contained qualitative data was extracted (methods of larger studies not reported)
		<b>Studies relevant to this overview:</b> <i>24 Studies containing qualitative data.</i>
<b>Participants</b>	Patients living with HIV	<i>Author has been contacted for supporting information: N=1053 Adult PLHIV</i>
<b>Issue</b>	Patient perspectives, barriers, facilitators and the process of adherence to HAART	Adherence (24)
<b>Setting</b>	Western (unclear)	<i>Author has been contacted for supporting information: Not specified</i>
<b>Outcomes: Barriers and Facilitators</b>	Therapy related, condition related, patient related, health care team and system related and socioeconomic factors	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	WHO guide on factors affecting adherence	
<b>Data extraction method</b>	Extraction was done by one author and checked by another author. This was adequate.	
<b>Appraisal tool used</b>	Identified and used specific criteria for review of methodological quality	
<b>Data synthesis method</b>	Thematic content analysis	

JBI Quality Appraisal		
Question	Judgement	Justification
<b>1. Is the review questions clearly and explicitly stated?</b>	No	The PICO elements are identified in the methods section of the paper, however there is no clearly stated question or aim.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Qualitative studies published from 1996 through April of 2005 were selected for this review if they focused on the patients' perspectives, barriers, facilitators and the process of adherence to HAART. The search was restricted to articles written in English. According to Table 1 and reasons for exclusions were quantitative

<b>JBI Quality Appraisal</b>		
		only studies, children and adolescents, non-English, non-Western and non-antiretroviral adherence.
<b>3. Was the search strategy appropriate?</b>	Yes	Search terms provided. 1996 through April 2005. Articles restricted to English. Table 1 provides summary of search strategies per database, number of hits, reasons for exclusions and references for included studies.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	CINAHL, PUBMED and Web of Science. No grey literature included.
<b>5. Was selection of studies done adequately?</b>	Unclear	Not reported.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	Appraisal considered the nature of the sample, recruitment strategy, the population and the sample size. The quality of data collection was appraised for measures taken to assure validity, quality of the data collector (interviewer), interview type, data triangulation and the likely thickness of the data (i.e., whether enough data had been collected to support the conclusions, as can be inferred from the interview guide and the number and duration of the interviews).
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Two reviewers for methodological quality evaluated studies meeting the inclusion criteria. Not reported whether this was done independently or in duplicate.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Extraction was done by one author and checked by another author. This was adequate.
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	The included publications were read several times. Findings were coded inductively and interpreted after which articles were organised into thematic groups and compared within these groups. The process is reported to be done by the first author and controlled by the second author. Discrepancies were discussed by consensus. A grounded theory approach was used.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	Specific practice recommendations are made within each of the categories of analysis including therapy-related factors, condition-related factors, patient-related factors, healthcare team and system-related factors and socioeconomic factors.
<b>11. Were the specific directives for new research appropriate?</b>	Unclear	Further qualitative studies can make an important contribution in this field, particularly when the research approaches deal with the respondents' own perspective. Such methods are essential given the complexity of adherence. This is very vague.

## Vitalis

Characteristics of included systematic review Vitalis et al. 2013		
<b>Citation</b>		
Vitalis. Factors affecting antiretroviral therapy adherence among HIV-positive pregnant and postpartum women: An adapted systematic review. Int J STD AIDS [Internet]. 2013;24(6):427–32. Available from: <a href="http://www.embase.com/search/results?subaction=viewrecord&amp;from=export&amp;id=L370229543%5Cn">http://www.embase.com/search/results?subaction=viewrecord&amp;from=export&amp;id=L370229543%5Cn</a> <a href="http://dx.doi.org/10.1177/0956462412472807%5Cn">http://dx.doi.org/10.1177/0956462412472807%5Cn</a> <a href="http://sfx.library.uu.nl/utrecht?sid=EMBASE&amp;issn=09564624&amp;id=doi:10.1177/0956462412472807&amp;atitle=Factors+affecting+antiret">http://sfx.library.uu.nl/utrecht?sid=EMBASE&amp;issn=09564624&amp;id=doi:10.1177/0956462412472807&amp;atitle=Factors+affecting+antiret</a>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Ovid Medline, Ovid Embase, Ovid PsycInfo, Ebsco Cinahl Plus, JSTOR, ISI Web of Science and the Cochrane Library	
<b>Search Dates</b>	Up to July 2011	<b>Date of last search: 7 July 2011</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Quantitative and qualitative studies. English only studies. No date limits.	18 studies: 15 Quantitative and 3 Qualitative
		<b>Studies relevant to this overview:</b> <i>Author has been contacted for supporting information: 18 studies: 15 Quantitative and 3 Qualitative</i>
<b>Participants</b>	Hiv positive pregnant and post partum women receiving ART	HIV positive pregnant and post-partum women between the ages of 12 to 58 years receiving ART.
<b>Issue</b>	Factors affecting antiretroviral therapy	Adherence (18)
<b>Setting</b>	Resource rich and resource constrained countries, with a focus on the latter	USA (8), Africa (7), Australia (1), Brazil (2) and Puerto Rico (1)
<b>Outcomes: Barriers and Facilitators</b>	Individual factors, relationship and social factors, stigma, interpersonal violence, health system factors	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	No conceptual framework specified	
<b>Data extraction method</b>	Used a modified data collection form designed using items from Table 7.3.an of the Cochrane Handbook Version 5.1.0.33	
<b>Appraisal tool used</b>	CASP	
<b>Data synthesis method</b>	Content Analysis	



<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	To conduct a systematic review of the literature to determine the studies that address the risk factors and determinants of Adherence in seropositive pregnant and postpartum women in international settings.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	A systematic literature search was conducted for both qualitative and quantitative studies in both resource-rich and resource constrained countries, with a focus on the latter settings. All designs (qualitative and quantitative), Pregnant and postpartum women with HIV, and the barriers and facilitators to adherence to ART.
<b>3. Was the search strategy appropriate?</b>	Unclear	Keywords provided. Searches from 1806-2011. There were no date limits on the searches, but studies were limited to those written in English which included the study population
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Ovid Medline, Ovid Embase, Ovid PsycInfo, EBSCO CINHAL Plus, JSTOR, ISI Web of Science and the Cochrane Library. Reference list of selected studies were hand searched. Grey literature was not included.
<b>5. Was selection of studies done adequately?</b>	Unclear	Abstracts identified from the PICO was reviewed but the authors do not indicate whether this was done independently or in duplicate.
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	The qualitative studies were assessed using the Critical Appraisal Skills Program (CASP), a 10-item tool for qualitative research and the Effective Public Health Practice Project for quantitative studies.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported.
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Data were extracted using a modified data collection form designed using items from Table 7.3.a of the Cochrane Handbook Version 5.1.0.33. Key information (author, year, participants, methods, interventions, outcomes and results) from each study was summarized on this form. Predetermined but whether this was independently or in duplicate is not reported.
<b>9. Were the methods used to combine studies appropriate?</b>	Unclear	Not reported.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	No	Although interventions to improve adherence in pregnant and postpartum women are non-existent at this time, strategies undertaken in the general HIV/AIDS population can be modified or use in this population. Broad recommendations.

JBI Quality Appraisal		
<b>11. Were the specific directives for new research appropriate?</b>	Yes	The paucity of information on adherence among pregnant and postpartum women, particularly in resource-constrained countries, warrants urgent attention. As major funding sources such as the Global Fund, World Bank and USAID scale back on financial resources for this epidemic, targeted research is needed on the facilitators and barriers to adherence among this group that not only measures adherence, but also research that can provide insight on the myriad reasons why women fail to adhere. Based on the thin description of the evidence the broad recommendations are sufficient for research directives.

Wasti

<b>Characteristics of included systematic review Wasti et al. 2012</b>		
<b>Citation</b>		
Wasti, S.P. et al., 2012. Factors influencing adherence to antiretroviral treatment in Asian developing countries: a systematic review. <i>Trop Med Int Health</i> , 17(1 PG-71-81), pp.71–81. Available at: NS		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	Medline/Ovid, Cochrane library, CINAHL, Scopus, Psych INFO, English articles	
<b>Search Dates</b>	1996-2010	<b>Date of last search: Not specified</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found</b>
<b>Studies</b>	Quantitative, qualitative and mixed methods studies. English only. Published studies.	18 studies: 12 Quantitative, 4 Qualitative and 2 Mixed Methods
		<b>Studies relevant to this overview:</b> 18 Studies: 12 Quantitative, 4 Qualitative and 2 Mixed Methods
<b>Participants</b>	Adult PLHIV who have been prescribed ART.	N=4782 Adult PLHIV who have been prescribed ART. Quantitative Studies n=4372; qualitative studies n=152 and mixed methods studies n=258
<b>Issue</b>	Adherence to ART	Positive and negative factors affecting adherence
<b>Setting</b>	24 Asian developing countries as defined by the World Bank (2010)	India (10), China (4), Thailand (3), Cambodia (1).
<b>Outcomes: Barriers</b>	Factors influencing adherence to ART	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	No conceptual framework specified	
<b>Data extraction method</b>	Used a standardised form. Data extraction was double-checked and if necessary amendments were made.	
<b>Appraisal tool used</b>	Tool by Hawker et al (2002) which is validated for assessing methodological quality of quantitative and qualitative studies.	
<b>Data synthesis method</b>	Thematic synthesis was performed.	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	No	Reviewed published articles on factors affecting adherence to ART in Asia. The population is later specified in the inclusion/exclusion criteria but the question is not clearly defined.

<b>JBI Quality Appraisal</b>		
<b>2. Were the inclusion criteria appropriate for the review question?</b>	No	The population consisted of participants >18 years who had been prescribed ART. Data describing ART service providers were included to provide the staff's perspective. The included studies considered populations from 24 Asian developing countries as defined by the World Bank (2010). Papers not written in English, published before 1996, review articles, policy documents and adherence training manuals were excluded. The inclusion is specific to Asia, therefore non-English papers should have been included.
<b>3. Was the search strategy appropriate?</b>	Yes	Articles sourced from 1996 through to December 2010. Keywords have been indicated. Reference mining has also been completed. English only studies. Keywords are not comprehensive and no evidence of the search strategy is available.
<b>4. Were the sources and resources used to search for studies adequate?</b>	No	Medline/Ovid, Cochrane library, CINAHL, Scopus, PsychInfo. Did not include grey literature. Screened the reference list of included studies.
<b>5. Was selection of studies done adequately?</b>	Unclear	Two authors independently reviewed and retrieved studies at abstract and title level. No information reported on who conducted full text screening.
<b>6. Were the criteria for appraising studies appropriate?</b>	Unclear	The appraisal tool used was developed by Hawker et al. (2002) whose tool is validated for both quantitative and qualitative systematic reviews in health care settings. The tool is indicated to have 9 questions and the scoring system is provided but the domains of the tool are not available.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Unclear	Not reported
<b>8. Were there methods to minimize errors in the data extraction?</b>	Yes	Used a standardised form. Data extraction was double-checked and if necessary amendments were made.
<b>9. Were the methods used to combine studies appropriate?</b>	No	Owing to the heterogeneity of the data (quantitative and qualitative), meta-analysis was not appropriate and a thematic synthesis was performed instead and results are presented in table form. The analysis used resembles content analysis however, the authors report it as thematic, therefore No

<b>JBI Quality Appraisal</b>		
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	No	Recommendations are broad and only partially supported by data as the findings were not analysed for depth and little application to theory has been made. Authors report that drawing coherent conclusions was hampered by the scarce data and methodological limitations of included studies. Recommendations were too broad and not supported by data.
<b>11. Were the specific directives for new research appropriate?</b>	Unclear	Not reported

Williams

<b>Characteristics of included systematic review Williams et al. 2017</b>		
<b>Citation</b>		
Williams S, Renju J, Ghilardi L, Wringe A. Scaling a waterfall: A meta-ethnography of adolescent progression through the stages of HIV care in sub-Saharan Africa. J Int AIDS Soc [Internet]. 2017;20(1):1–17. Available from: <a href="https://doi.org/10.7448/IAS.20.1.21922">https://doi.org/10.7448/IAS.20.1.21922</a>		
<b>Search Summary Details</b>		
<b>Literature Searched</b>	PubMed, Web of Science, Scopus, Global Health and ADOLEC.	
<b>Search Dates</b>	January 2005 to March 2016	<b>Date of last search: Not specified.</b>
<b>Search Criteria and Outcomes</b>		
	<b>What the review authors searched for</b>	<b>What the review authors found relevant to this overview</b>
<b>Studies</b>	Qualitative studies published in English.	24 Studies: Qualitative (24)
		<b>Studies relevant to this overview:</b>
		18 Studies: Qualitative (18)
<b>Participants</b>	Adolescents LHIV (ages 10-19 year)	Adolescent ages 9-20 LHIV
<b>Issue</b>	Testing, Linkage, adherence to ART and retention	Linkage (8), Adherence (15) and Retention (10) from 18 studies.
<b>Setting</b>	sub-Saharan Africa	Zimbabwe (2), South Africa (3), Kenya (3), Botswana (1), Zambia (3), Tanzania (1), Uganda (1), Uganda and Zimbabwe (1), Tanzania (2), and Botswana and Tanzania (1)
<b>Outcome: Barriers and Facilitators</b>	Factors influencing engagement with cascade of care.	<b>Overview Framework:</b> Individual, Interpersonal, Community and Social, Political and Health System, and Structural Factors.
<b>Systematic Review Methods</b>		
<b>Conceptual framework</b>	Socio-ecological model (Individual, Family/Peer, Community and Structural)	
<b>Data extraction method</b>	Not reported.	
<b>Appraisal tool used</b>	Oxford CASP	
<b>Data synthesis method</b>	Meta-ethnography	

<b>JBI Quality Appraisal</b>		
<b>Question</b>	<b>Judgement</b>	<b>Justification</b>
<b>1. Is the review questions clearly and explicitly stated?</b>	Yes	Meta-ethnography includes qualitative studies undertaken across the region, in order to understand the most influential issues affecting adolescent initiation of, and retention in, HIV care in SSA.
<b>2. Were the inclusion criteria appropriate for the review question?</b>	Yes	Studies were limited to adolescent's age 10-19 years, qualitative studies and in sub-Saharan Africa. Published in English.
<b>3. Was the search strategy appropriate?</b>	Unclear	The key terms are provided but there is no evidence of the search strategy. Only English studies

<b>4. Were the sources and resources used to search for studies adequate?</b>	No	PubMed, Web of Science, Scopus, Global Health and ADOLEC. Did not include grey literature.
<b>5. Was selection of studies done adequately?</b>	Unclear	Not reported how studies were selected and who was involved
<b>6. Were the criteria for appraising studies appropriate?</b>	Yes	Oxford CASP was used and is appropriate. Description of the scoring is provided.
<b>7. Was the critical appraisal conducted by two or more reviewers independently?</b>	Yes	Appraisal was conducted independently and in duplicate
<b>8. Were there methods to minimize errors in the data extraction?</b>	Unclear	Not reported how data was extracted and who was involved
<b>9. Were the methods used to combine studies appropriate?</b>	Yes	Meta-ethnographic analysis was reported to be used to synthesise the results. Method is described and how it was conducted. Did not state who conducted the analysis. Quotes are used to support the themes that emerged.
<b>10. Were recommendations for policy and/or practice supported by the reported data?</b>	Yes	The recommendations are based on findings. Reference is made to the data and conclusions are appropriate.
<b>11. Were the specific directives for new research appropriate?</b>	Yes	The authors identified the gaps of gender specific experiences for adolescents and the lack of research on risk perceptions, knowledge of HIV transmission, sources of SRH education and experiences of adolescent females with HIV services. All of these are discussed in the data included in the paper.

**Additional file 9: Summary of themes and included reviews linked to outcomes**

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Beliefs about ART	Beliefs about right to decide	Participants perceived right to decide	Participants believed it is their right to consider taking treatment over the good of the public in preventing transmission	[24]					
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Strong beliefs in HIV and a conspiracy			[40]			
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Perception that ART initiation was an acceptance of impending death	[53]		[53]			
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Belief ART is a sexual stimulant			[43]			
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Suspicious about medication: ART is harmful, toxic and will not work	[42]		[36], [43], [45], [53], [54], [59], [60], [62]		[17], [33]	
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Pregnant women perceived the likelihood of their baby suffering from taking Art was greater than their baby acquiring HIV infection.			[60]			



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Belief that drugs increased appetite	[13]					
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Negative beliefs about benefits of taking ART and resistance	[32], [49]		[32], [37], [43], [53], [54], [58], [59], [60]	[1]	[17]	
Individual	Beliefs about ART	Negative beliefs about ART	Negative beliefs about ART	Should not mix ART with other treatments	[42]		[36]			
Individual	Beliefs about ART	Positive beliefs about ART	Positive beliefs about ART	ART helps you look healthy to others				[7]		
Individual	Beliefs about ART	Positive beliefs about ART	Positive beliefs about ART	Belief in ART benefit and that medication works				[1], [7], [14], [44], [16], 24], [25]		
Individual	Beliefs about ART	Positive beliefs about ART	Positive beliefs about ART	Increased confidence in ART with use				[14]		
Individual	Beliefs about ART	Positive beliefs about ART	Positive beliefs about ART	Medication takes priority over substance abuse			[53], [54]			
Individual	Beliefs about ART	Positive beliefs about ART	Positive beliefs about ART	Belief that ART will keep them alive and help them live longer				[30], [32]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Beliefs about HIV	Negative beliefs about HIV	Negative beliefs about HIV	Belief that ART and national health policies are used to exploit low income countries by wealthier nations			[52]			
Individual	Beliefs about HIV	Negative beliefs about HIV	Negative beliefs about HIV	Doubtful of tests reliability	[13]					
Individual	Beliefs about HIV	Negative beliefs about HIV	Negative beliefs about HIV	Lack of belief in the existence of HIV	[13]		[43]			
Individual	Beliefs about HIV	Negative beliefs about HIV	Negative beliefs about HIV	HIV is witchcraft and magic can protect communities			[52]			
Individual	Cognitive impairment	Cognitive impairment	Cognitive impairment	Cognitive impairment			[43]	[14]		
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Being hopeful	Being hopeful			[36]	[12]		
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Coping strategies for emotional regulation and self-management	Prisoners keep own prescription			[31]	[2]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Coping strategies for emotional regulation and self-management	Self-efficacy-active coping, self-motivations, self-advocacy and using resources/ Strong belief in adherence self-efficacy			[30], [33], [36], [41], [43], [30], [52], [53], [54], [56], [60], [61]			
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Perceived behavioural control	Perceived behavioural control			[55]	[24], [26], [28]		
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Positive attitude and life satisfaction	Positive attitude and life satisfaction			[53], [55], [57]	[7]		
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Resilience	Resilience			[41]	[1], [4], [7], [12], [14], [1], [23], [24], [25], [27], [31], [32]		
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Self-awareness	High levels of self-awareness (personal strengths and weaknesses and multiple factors contributing to life			[36], [41], [52], [53]	[7], [8], [23], [26]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
				choices and trajectories)						
<b>Individual</b>	<b>Coping strategies</b>	Coping strategies for emotional regulation and self-management	Want to take control of their health	Want to take control of their health			[36], [37], [52], [55]	[26]		
<b>Individual</b>	<b>Coping strategies</b>	Coping strategies to recede side effects	Coping strategies to reduce side effects	Learned to manage HIV diagnosis and treatment/ Interpreting body and adjusting needs accordingly			[37], [56]	[27]		
<b>Individual</b>	<b>Coping strategies</b>	Coping strategies to reduce side effects	Coping strategies to reduce side effects	Coping strategies to cope with adverse side effects such as drinking lots of fluids, resting to reduce dizziness and eating a snack before swallowing pills.			[50], [52]	[21], [23]		
<b>Individual</b>	<b>Coping strategies</b>	Poor coping strategies	Poor coping strategies	Poor coping skills (such as using substances, lying about diagnosis, ascribing reasons for medications to other diseases, not	[32]		[32], [57], [59], [62]	[33]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
				taking medications to avoid disclosure)						
<b>Individual</b>	<b>Criminal justice system involvement</b>	Criminal justice system involvement	Involvement in the criminal justice system	Involvement in the criminal justice system			[37]			
<b>Individual</b>	<b>Criminal justice system involvement</b>	Criminal justice system involvement	Repeated incarcerations	Repeated incarcerations					[2]	
<b>Individual</b>	<b>Daily routine and lifestyle</b>	Daily routine and lifestyle	Change daily routine to integrate ART	Change daily routine to integrate ART		[43]	[30], [33], [36], [43], [52], [56], [59]	[1], [14], [30]		
<b>Individual</b>	<b>Daily routine and lifestyle</b>	Daily routine and lifestyle	Life demands and organisational issues is disrupted by ART	Life demands and organisational issues is disrupted by ART/ not having time to attend the clinic due to busy lifestyle/ busy and distracted		[43]	[33], [36], [37], [52], [53], [54], [56], [59], [61]			
<b>Individual</b>	<b>Daily routine and lifestyle</b>	Lifestyle	Unable to maintain healthy lifestyle	Unable to maintain healthy lifestyle			[43]			
<b>Individual</b>	<b>Daily routine and lifestyle</b>	Sleeping	Sleeping	Sleeping			[36], [54], [59], [61]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Daily routine and lifestyle	Substance Use	Substance Use	Substance Abuse/IDU (aspects of illicit drug use and alcohol consumption. Regular use of more than one type of recreational drug significantly increases likelihood of non-adherence.	[32]		[32], [36], [37], [42], [44], [45], [46], [50], [53], [54], [57], [59], [60], [61]		[12]	
Individual	Desires	Care for family and children	Being a parent and having children	Patient relying on child-rearing responsibilities can mitigate experiences of racism.			[40]	[11]		
Individual	Desires	Care for family and children	Care for family and be healthy for children	Be healthy to care for and protect ones children (and prevent transmission for pregnant women)			[33]	[7], [14], [44], [23], [25], [30], [31], [32], [33]		[17], [33]
Individual	Desires	Care for family and children	Child Health	Desire for child to be healthy		[53]	[51], [53], [60]	[22], [24], [31]		[17]
Individual	Desires	Care for family and children	Child Health	Being pregnant and desire to reduce transmission to child		[53]	[51], [53], [56]	[22], [24], [27]		[17]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Desires	Look and feel healthy	Desire to be healthy and choosing 'life' over 'death'	Desire to be healthy and choosing 'life' over 'death'			[43], [44], [45], [51]	[14], [44], [16], [22]		
Individual	Desires	Look and feel healthy	Desire to maintain appearance, stay healthy and keep status hidden	Desire to maintain appearance, stay healthy and keep status hidden (want to look healthy to others and prevent visible signs of the disease)			[36], [59]	[7]		[17]
Individual	Desires	Marriage and children	Desire for marriage and children	Desire for marriage and children		[62]	[52], [62]	[23]	[33]	
Individual	Desires	Normalisation to life before ART	Normalisation to life before ART	Normalisation (feeling the same as others or same as before HIV)	[62]		[36], [54], [61], [62]	[7], [33]	[33]	[33]
Individual	Disclosure	Disclosure	Disclosure without stigma	Disclosure without stigma	[62]			[1], [44], [30], [33]		[33]
Individual	Education and Training Skills	Education and Training Skills	Goal setting and coping skills	Goal setting and coping skills				[2]		
Individual	Education and Training Skills	Education and Training Skills	Nutrition education to help them optimise ART regimens and minimise side effects	Nutrition education to help them optimise ART regimens and minimise side effects				[2]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Education and Training Skills	Education and Training Skills	Private storage of medication	Devising ways of storing ART in obvious locations but in nondescript or containers				[2]		
Individual	Education and Training Skills	Education and Training Skills	Stigma management and disclosure support education	Stigma management and disclosure support education	[62]			[2], [33]		[33]
Individual	Education and Training Skills	Education and Training Skills	Vocational training to promote livelihoods for those financially dependent on other family	Vocational training to promote livelihoods		[31]		[2]		[2]
Individual	Education and Training Skills	Education and Training Skills	Want to be kept abreast of new formulations of ART, new formulations and how to deal with missed doses and how to manage side effects	Want to be kept abreast of new formulations of ART, new formulations and how to deal with missed doses and how to manage side effects				[2]		[2]
Individual	Education and Training Skills	Experiences of HIV and ART	Healthy children responding to ART of HIV positive mother establishes role of mother in the family	Healthy children responding to ART of HIV positive mother establishes role of mother in the family				[44], [23]		



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Experienced an HIV-related illness and do not want to be ill again	Experienced an HIV-related illness and do not want to be ill again				[7]		
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Experiencing health benefits	Experiencing health benefits of taking ART				[21], [23], [30]		
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Having a child before the introduction of HAART	Having children before the introduction of HAART			[53]			
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Knowing others with HIV accessing care	Knowing others who have HIV and on ART and felt healthier				[14], [23], [27]		
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Knowing others with HIV who died	Knowing others who had HIV and died, want to be healthier and live because of their experiences				[14]		
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Low perception of need for treatment/insignificance of experienced HIV illness	Low perception of need for treatment/insignificance of experienced HIV illness/ No instant consequences for non-adherence	[39], [42]			[14]	[10]	
Individual	Experiences of HIV and ART	Experiences of HIV and ART	Negative experiences with ART	Makes patient feel different to peers			[30]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Fears	Fear of declining physical health	Becoming ill again	Fear of returning to pre ART health state				[14]		
Individual	Fears	Fear of economic loss related to treatment	Fear of job loss	Fear of job loss	[44]					
Individual	Fears	Fear of reason for positive HIV diagnosis	Cause of HIV	Fear of cause of HIV	[42]		[36]			
Individual	Fears	Fear of the future	Fear of the unknown and future	Fear of the unknown and inability to formulate expectations	[39]		[52]			
Individual	Fears	Fears of stigma	Consequences of disclosure	Fear of disclosure will lead to stigma and discrimination	[32], [38], [39], [42], [53], [62]		[30], [32], [44], [45], [52], [53], [54], [56], [59], [62]		[17], [33]	
Individual	Fears	Fears of stigma	Isolation	Fear of isolation	[42], [44], [62]		[44], [62]		[44], [33]	
Individual	Fears	Fears of stigma	Marginalisation	Marginalisation of IDU intensified for HIV positive patients			[45]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Fears	Fears of stigma	Perceived or actual stigma	Anticipated HIV stigma and concealment (not wanting others to know about status, may see taking medication)	[39], [42], [53], [55], [62]		[30], [36], [37], [39], [41], [43], [44], [53], [57], [59], [60], [61], [62]		[10], [44], [17], [26], [33]	
Individual	Fears	Fears of stigma	Perceived or actual stigma	Unwanted stigma and disclosure when taking medication	[32]		[32], [56], [57], [59], [61], [62]	[1]	[33]	
Individual	Fears	Fears related to the effects of ART	ART is harmful to unborn babies	Fear that treatment would have a negative impact on children or harm children	[49], [53]		[44], [51], [53], [60]			
Individual	Fears	Fears related to the effects of ART	Being on ARVs	Fear of being on ARVS	[42]					
Individual	Fears	Fears related to the effects of ART	Drug resistance	Fear of drug resistance			[61]			
Individual	Fears	Fears related to the effects of ART	Fear that ART leads to impotency, infertility and impossibility of sexual activity	Fear that ART leads to impotency, infertility and impossibility of sexual activity			[52]			
Individual	Fears	Fears related to the effects of ART	Negative beliefs about benefits of taking ART and resistance	Fear of drug toxicities	[42], [53]		[53], [54], [59]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Fears	Fears related to the effects of ART	Side effects	Fear of side effects	[42]		[49], [54], [59]		[17]	
Individual	HIV Status	Acceptance of HIV status	Acceptance of HIV status	Acceptance of HIV status				[4], [7], [8], [14], [23], [25], [30]		
Individual	HIV Status	Non-acceptance of HIV status	Non-acceptance of HIV status	Non-acceptance (Avoidance, denial of ones HIV status, diagnosis and what it entails)	[39], [42]		[30], [36], [37], [43], [44], [45], [54]		[44], [17]	
Individual	Knowledge and understanding	Knowledge of HIV Status	Knowledge of HIV status	Knowledge of HIV status				[1], [33]		
Individual	Knowledge and understanding	Knowledge of HIV Status	Not knowing HIV status is reason for medication	Not knowing reasons for taking drugs (Lack of prior knowledge of status before being given ART made children resistant)			[30], [50], [54], [62]			
Individual	Knowledge and understanding	Knowledge of HIV, ART and HAART	Experiences with ART improves knowledge	Long term experience with ART leads to more knowledge and strategies to incorporate ART into lifestyle				[7], [14], [30]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Knowledge and understanding	Knowledge of HIV, ART and HAART	High knowledge of HIV, HAART, PMTCT and referral processes	High knowledge of HIV, HAART, PMTCT and referral processes				[44], [27]		[44]
Individual	Knowledge and understanding	Knowledge of HIV, ART and HAART	Knowledge of ART benefits	Understanding of the benefits of taking ART, drug reactions and how to manage side effects				[1], [2], [21], [24]		
Individual	Knowledge and understanding	Knowledge of HIV, ART and HAART	Low knowledge of HIV and HAART	Lack of Knowledge (pertains to having insufficient or incorrect knowledge of ART and adherence, including having unanswered questions, being faced with conflicting information and difficulty understanding	[32], [38], [39], [42], [53]	[43]	[32], [36], [54], [56], [61]			
Individual	Knowledge and understanding	Knowledge of HIV, ART and HAART	More sources of information about HIV services	Media channels providing information about HIV services	[55], [62]			[33]		[26], [33]
Individual	Knowledge and understanding	Knowledge of HIV, ART and HAART	Understanding importance of adherence	Understand need for compliance				[2], [25]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Knowledge and understanding	Uncertainty and conflicting messages	Conflicting messages from religious leaders and community leaders.	Religious beliefs and spirituality (barrier: belief in religious cures for HIV over conventional medicine and conflicting messages from community leaders	[42]		[30], [43], [44], [52], [56], [60]	[1], [44], [23]	[44]	[44], [17]
Individual	Knowledge and understanding	Uncertainty and conflicting messages	Local traditions, beliefs and medicines	Uncertain about the pros and cons of traditional medication and how to respect for local traditions and beliefs while using Western medicine			[30], [52]			
Individual	Knowledge and understanding	Uncertainty and conflicting messages	Uncertain of long term effects	Uncertainty of long term effects			[54], [59]			
Individual	Knowledge and understanding	Uncertainty and conflicting messages	Uncertainty about onset of labour	Uncertainty about the onset of labour in order to swallow NVP						
Institutional	Knowledge and understanding	Uncertainty and conflicting messages	Adolescents are uncertain about services	Adolescents are uninformed about service cost and location			[62]		[33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Medication	Being away from home	Travelling interrupting treatment	Carrying ART while out of the house/travelling. Delaying doses (when traveling or entertaining. Some take a treatment holiday)			[30], [36], [43], [44], [54], [59], [61], [62]	[7]		
Individual	Medication	Forgetting and misplacing medication	Forgetfulness (Study 14: due to using alcohol)	Forgetfulness (Study 14: due to using alcohol)	[44]		[30], [36], [43], [44], [47], [53], [54], [59], [61]			
Individual	Medication	Medication characteristics	Type, palatability, smell and colour	Type, palatability, smell, colour and in tablet form			[30], [36], [37], [45], [54], [58], [59], [62]	[1]		
Individual	Medication	Medication reminders	Use of reminders	Use of reminders (watches, clocks and mobile phones)				[1], [7], [14], [44], [25], [30], [32], [33]		
Individual (this row must be added to table)	Medication	Negative side effects of medication	Physical manifestations of HIV and AIDS may lead to isolation and belief that the person is already dead	Physical manifestations of HIV and AIDS may lead to isolation and belief that the person is already dead			[37], [45]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Medication	Negative side effects of medication	Negative side effects	Anticipated side effects			[49], [54]			
Individual	Medication	Negative side effects of medication	Negative side effects	Unpleasant side effects			[30], [32], [37], [43], [54], [55], [58], [59], [61]			
Individual	Medication	Negative side effects of medication	Negative side effects	Adverse reactions with EFV containing regimens (intense body heat, delusions, anxiety, intense dizziness and nightmares: pain and suffering)			[50], [54], [59], [62]		[33]	
Individual	Medication	Negative side effects of medication	Negative side effects	Body changes, buffalo hump, excess sweating, darkening of the skin led to low self-esteem and taking longer treatment holidays			[50], [59]			



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Medication	Negative side effects of medication	Negative side effects	Side effects (increased with taking ART without food) such as diarrhoea and changing body, buffalo hump, excess sweating, darkening of the skin, body odor, hair loss, weight loss/gain, skin rash. Fear that this may lead to involuntary disclosure	[34], [53]		[30], [33], [36], [37], [43], [44], [49], [50], [51], [53], [54], [55], [56], [57], [59], [61], [62]		[17], [33]	
Individual	Medication	No privacy when taking pills	Lack of privacy	Dispensing windows in prisons may cause accidental disclosure			[31]			
Individual	Medication	No privacy when taking pills	Lack of privacy	Lack of private spaces to take medication (for children at boarding schools and at home)			[30], [36], [59]			
Individual	Medication	Pill burden and regimen	Pill burden and regimen	Change in medication or treatment			[59]			
Individual	Medication	Pill burden and regimen	Pill burden and regimen	Dietary Instructions			[43], [59]			
Individual	Medication	Pill burden and regimen	Pill burden and regimen	Duration of treatment	[53]		[32], [43], [57], [61]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Medication	Pill burden and regimen	Pill burden and regimen	Pill burden (quantity and size)/regimen complexity	[53]		[30], [32], [33], [36], [37], [43], [44], [45], [51], [53], [54], [57], [58], [59], [61], [62]	[4]	[17]	
Individual	Medication	Pill burden and regimen	Pill burden and regimen	Middle of the day/early morning dose difficult to maintain			[54]			
Individual	Medication	Pill burden and regimen	Pill burden and regimen	Simple regimen				[2], [25], [28], [31], [33]		
Individual	Medication	Reminder of status	Unwanted reminder of disease	Denial and Taking medication is an unwanted reminder of disease	[32]	[54]	[32], [59]			
Individual	Medication	Skipping medication	Avoiding medication to avoid disclosure	Skip medication to avoid disclosure			[30], [59]			
Individual	Medication	Skipping medication	Taking medication breaks to rid body of toxins and relieve side effects temporarily	Taking medication breaks to rid body of toxins and relieve side effects temporarily			[59]			
Individual	Past trauma and abuse	Experienced past trauma or abuse	Experienced trauma	Trauma			[43]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Past trauma and abuse	Experienced past trauma or abuse	Psychological abuse	Psychological abuse					[12]	
Individual	Past trauma and abuse	Experienced past trauma or abuse	Sexual abuse	Sexual abuse			[57]			
Individual	Past trauma and abuse	Experienced past trauma or abuse	Suicidal	Prior suicidal attempt or feeling suicidal	[62]		[57], [62]		[33]	
Individual	Physical health	Comorbidities	Living with comorbidities and drug interactions	Comorbidities and drug interactions: Including wanting to complete TB treatment first and coping with multiple diseases and ailments barrier. Co-infections of HPV facilitator.	[32], [42]	[43], [53]	[32], [37], [44], [54]	[44]		
Individual	Physical health	Feeling better and healthier	Feeling better	Physical benefits associated with taking medication			[32], [50], [52], [56]	[21], [23], [27]		
Individual	Physical health	Feeling better and healthier	Feeling better	Regaining life, strength and sexual power. Improved body image and attractiveness			[52]	[23]		
Individual	Physical health	Feeling better and healthier	Feeling better and being able to work again	Being able to work again			[36], [43]	[7], [14]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Physical health	Feeling better and healthier	Feeling better and not wanting further care	Feeling better or healthier/seeing positive results, could also lead to people feeling like they have been cured.	[39]	[43]	[36], [43], [52], [54], [59], [61]	[7], [14], [23], [25], [30], [32]	[10]	
Individual	Physical health	Feeling better and healthier	Feeling better and not wanting further care	HIV infected but asymptomatic, the successful management of the disease due to being in care led patients to question the necessity of repeated medical tests and procedures (Feeling better)	[39], [42], [44]		[30], [36], [43], [52], [54], [61], [62]	[7], [23]	[10], [17]	
Individual	Physical health	Feeling ill and disease progression	Disease Progression	Disease progression. Feeling worse			[56], [57], [62]			
Individual	Physical health	Feeling ill and disease progression	Experiences of HIV related symptoms	Experience of HIV related symptoms			[52]	[23]		
Individual	Physical health	Feeling ill and disease progression	Feeling sick and decreasing quality of health	Feeling sick or ill/ impairments of general health/quality of life decreasing		[39], [42]	[36], [53], [54]			[10]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Physical health	Feeling ill and disease progression	Low CD4 count	Low CD4 count or advanced immunodeficiency		[43]	[43]	[14]		
Individual	Physical health	Feeling ill and disease progression	When feeling ill take medication	Feeling ill. Seeking healthcare is a necessity.	[53]	[53]	[62]		[17]	
Individual	Psychological distress and emotional reactions	Demotivated	Lack of commitment	Not feeling ready to commit or intimidated by lifelong treatment (will have lifelong financial implications)	[32], [38], [42], [44]		[52], [59], [60]		[17]	
Individual	Psychological distress and emotional reactions	Demotivated	Lack of motivation	Lack of motivation to adhere; desire to control one's life, disease, and or pill taking.			[36], [37], [52], [61]			
Individual	Psychological distress and emotional reactions	Negative emotion	Feeling lonely	Feeling lonely			[36]			
Individual	Psychological distress and emotional reactions	Negative emotion	Feeling low or depressed	Depression (study 14: feeling ready to die/Mental health problems. Feeling low mood, hopeless and down	[32], [62]		[30], [32], [33], [36], [43], [52], [53], [54], [57], [59], [60], [61]	[14], [33]	[12], [33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Psychological distress and emotional reactions	Negative emotion	Feeling shame	Shame associated with specific transmission modes	[39]					
Individual	Psychological distress and emotional reactions	Negative emotion	Frustration around lack of independence	Frustration around lack of independence			[62]		[33]	
Individual	Psychological distress and emotional reactions	Negative emotion	Negative attitude towards treatment regimen	Negative attitude towards treatment regimen			[36], [59], [61]		[17]	
Individual	Psychological distress and emotional reactions	Perception of self	Doubt self-efficacy	Doubt ability to adhere	[62]		[54], [62]	[33]	[33]	[33]
Individual	Psychological distress and emotional reactions	Perception of self	Self-efficacy and self-worth	Self-image and identity	[39]		[30], [60]			
Individual	Psychological distress and emotional reactions	Perception of self	Self-efficacy and self-worth	Self-esteem and self-worth as an infected wife and mother	[49]					
Individual	Psychological distress and emotional reactions	Perception of self	Self-stigma	Internalised stigma when taking medication			[36], [43], [62]		[33]	
Individual	Psychological distress and emotional reactions	Psychological distress and emotional impact	Emotional impact	Emotional impact			[33]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Psychological distress and emotional reactions	Psychological distress and emotional impact	Mental treatment fatigue	Mental fatigue from being engaged in care and treatment fatigue	[39]		[30], [62]		[10]	
Individual	Psychological distress and emotional reactions	Psychological distress and emotional impact	Psychological state on diagnosis	Psychological state at diagnosis	[39]		[56]			
Individual	Psychological distress and emotional reactions	Psychological distress and emotional impact	Psychological state on diagnosis	Shock from unexpected results and revealed infidelity issues in their primary relationships	[39], [53]		[56]			
Individual	Psychological distress and emotional reactions	Psychological distress and emotional impact	Psychological suffering and stress	Psychological suffering (being reminded of being sick, delusional, fear of being killed by taking drugs, getting mad)			[43], [50], [52], [56], [59]	[14]	[10]	
Individual	Psychological distress and emotional reactions	Psychological distress and emotional impact	Wants to maintain control	Wants to maintain control			[54]			
Individual	Sociodemographic	Age	Age	Being older (for women it means more responsibilities, in women having children)/ in adolescents over the age of 15 years	[53]		[30], [43], [44], [60]	[44], [31]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Sociodemographic	Age	Age	Younger age linked to lower adherence	[32]		[32], [43], [44], [57], [60]	[28]		
Individual	Sociodemographic	Education	Education level	Higher levels of education			[43], [44]	[14], [44], [28]		
Individual	Sociodemographic	Education	Education level	Lower levels of education			[43], [44], [57]			
Individual	Sociodemographic	Education	Education level	Being in school				[28]		
Individual	Sociodemographic	Education	Education level	Repeating a grade in school			[57]			
Individual	Sociodemographic	Employment	Employment	Having employment			[43]	[14], [26]		
Individual	Sociodemographic	Employment	Employment	Lacking or insecure employment	[32]		[32], [37], [43]		[12]	
Individual	Sociodemographic	Employment	Type of occupation	Occupation (such as sex work. Participants felt they had to leave their jobs in order to adhere as using substance and alcohol during work)	[34]			[18]	[18]	
Individual	Sociodemographic	Gender	Gender	Gender	[49], [53]		[32], [37], [43], [53], [57]	[14], [28]		
Individual	Sociodemographic	Gender	Gender	Being male			[30], [32], [43]	[14]		



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Sociodemographic	Gender	Gender	Female gender: in some places female gender did not influence willingness to engage and in some cases women's status was seen as a result of partners infidelity, in other places women is seen as hyper sexual	[49], [53]		[43], [52], [53]	[14]		
Individual	Sociodemographic	Marital status	Marital Status	Marital status			[43]			
Individual	Sociodemographic	Race/nationality	Race/nationality	Immigration Status			[37]			
Individual	Sociodemographic	Race/nationality	Race/nationality	Race/being in a minority group			[37], [44]			
Individual	Sociodemographic	Sexual partners	Number sexual partners	Number of sexual partners			[43]			
Individual	Sociodemographic	Identification	Identification	Being undocumented	[55]		[55]		[26]	
Individual	Sociodemographic	Identification	Identification	Fear of deportation	[55]		[55]		[26]	
Individual	Sociodemographic	Identification	Identification	Inability to provide documentation for care and lack of health insurance	[55]		[55]		[26]	
Individual	Spiritual beliefs	Beliefs: Spiritual	Belief in a higher power	Belief in Gods will and relinquishing control of their lives				[16]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Spiritual beliefs	Beliefs: Spiritual	Belief in a higher power	Belief and faith that God provided the knowledge to make ART				[7], [14]		
Individual	Spiritual beliefs	Beliefs: Spiritual	Belief in a higher power	Prayers or faith in God				[7], [14], [23]		
Individual	Spiritual beliefs	Beliefs: Spiritual	Belief in a higher power	Religious fasting			[30]			
Individual	Spiritual beliefs	Beliefs: Spiritual	Belief in a higher power	Religious fasting period needs to adjust dosing time regimens				[1]		
Individual	Spiritual beliefs	Beliefs: Spiritual	Belief in a higher power	Religious beliefs or treatments.			[36], [50], [60]	[14], [31]	[44], [17]	
Individual	Stigma and discrimination	Experiences of stigma	Stigma about mode of transmission	Mode of transmission is not regarded as socially acceptable behaviour			[45]			
Individual	Traditional Beliefs	Beliefs: Traditional	Cultural attitudes and beliefs	Cultural attitudes and beliefs	[32], [39], [42], [62]	[32]	[56], [62]		[33]	
Individual	Traditional Beliefs	Beliefs: Traditional	Traditional beliefs and alternate medicines	Alternate medication can reduce side effects of ART	[32], [39], [42], [62]	[32]		[24]		
Individual	Traditional Beliefs	Beliefs: Traditional	Traditional beliefs and alternate medicines	Traditional beliefs or medicines may be superior than science-based medicines	[39], [42], [53]		[36], [52], [53], [56]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Staying away from negativity	Staying away from negative relationships			[36], [43]	[7], [12], [23], [24]		
Individual	Coping strategies	Coping strategies for emotional regulation and self-management	Staying away from negativity	Avoiding internalised self-stigma			[33]	[4]		
Interpersonal	Caregiver Factors	Access to caregivers	Two or more caregivers	Having two or more caregivers				[1]		
Interpersonal	Caregiver factors	Caregiver beliefs	Caregiver Factors	Caregivers instil fear and perceived stigma and discrimination			[30]			
Interpersonal	Caregiver factors	Caregiver beliefs	Caregiver wants to preserve family and normality	Caregiver wants to preserve normality or prioritising a normal life for the child			[58]			
Interpersonal	Caregiver Factors	Caregiver beliefs	Competing beliefs of caregiver	Caregiver has competing beliefs and concerns regarding treatment and the condition itself (Caregiver wants to preserve family relationships and conflict between	[42]		[56], [58]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
				caregiver and child on beliefs about treatment)						
Interpersonal	Caregiver Factors	Caregiver Disclosure	Caregiver disclosure to child after the age of 12 years	Late disclosure			[30]			
Interpersonal	Caregiver Factors	Caregiver Disclosure	Caregiver disclosure to child before the age of 12 years	Early disclosure of status, before age 12				[1]		
Interpersonal	Caregiver Factors	Caregiver Disclosure	Denial of child's status	Caregiver denial of child status (especially in perinatally infected youth) and does not want to disclose	[42]			[1]		
Interpersonal	Caregiver Factors	Caregiver education	Caregiver education	Education level of caregiver			[44], [57]	[28]		
Interpersonal	Caregiver Factors	Caregiver education	Caregiver education	Caregiver perception of child adherence						
Interpersonal	Caregiver Factors	Caregiver reminders	Caregiver reminders	Caregiver support (reminding to take medication and accompanying to clinic)			[54]	[1], [25]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Interpersonal	Caregiver Factors	Relation to caregiver	Caregiver is not biological parent	Caregiver is someone else other than biological parent				[28]		
Interpersonal	Competing life demands	Competing life demands	Competing family life demands	Needs of one's family is prioritised over health needs (such as finance, food, school fees). Competing priorities and role strain (especially for women)	[39], [42], [49], [55]		[41], [44], [54], [60]		[10], [12], [26]	
Interpersonal	Competing life demands	Competing life demands	Needs of workplace are prioritised over health needs in order to be financial secure causes difficulty when managing multiple daylong clinic visits.	Needs of workplace are prioritised over health needs in order to be financial secure causes difficulty when managing multiple daylong clinic visits.	[39]				[10]	
Interpersonal	Disclosure	Disclosure	Disclosure	Disclosure to family members	[39], [62]		[30], [62]	[1], [7], [14], [27], [31], [32], [33]	[10], [33]	[10]
Interpersonal	Disclosure	Disclosure	Disclosure to partner	Disclosure to partner			[30]	[1], [14], [44], [27], [32]	[44]	[44]
Interpersonal	Disclosure	Disclosure	Disclosure with stigma	Post disclosure stigma	[62]		[30], [52], [56], [62]		[33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Interpersonal	Disclosure	Disclosure	Family and friends reactions to an individual's HIV positive diagnosis.	Family and friends reactions to an individual's HIV positive diagnosis.	[39], [62]		[30], [62]	[30], [33]	[10], [33]	[10], [33]
Interpersonal	Disclosure	Non-disclosure	Non-disclosure to family	Non-disclosure to other family members (for women were at risk of spousal or family rejection , withdrawal from financial support or expulsion from home leading to sporadic care with health care system	[39], [42], [49], [62]		[30], [45], [53], [59], [60], [62]		[10], [33]	
Interpersonal	Disclosure	Non-disclosure	Non-disclosure to partner	Non-disclosure of HIV status to women's sexual partner to avoid conflict	[38], [42], [44]		[52], [60]			
Interpersonal	Disclosure	Non-disclosure	Non-disclosure to peers	HIV nondisclosure to peers			[30], [36], [59]			
Interpersonal	Family on ART	Family on ART	Other family members on ART	Other family members on ART				[1]		
Interpersonal	Family on ART	Family on ART	Sharing and selling ART	Sharing and selling ART			[36]			
Interpersonal	Family on ART	Family on ART	Sharing medication with others	Sharing medication with others (partner, family or friends)			[43], [56]	[14]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Interpersonal	Family on ART	Family on ART	Stealing pills	Relatives stealing ART pills			[44], [56]			
Interpersonal	Relationships in household	Conflict and tension in family relationships	Accused of infecting others	Being accused of infecting others			[54]	[14]		
Interpersonal	Relationships in household	Conflict and tension in family relationships	Family perceives HIV positive patient as an economic burden and wants legitimate reasons and why extra needs must be met	Family perceives HIV positive patient as an economic burden and wants legitimate reasons and why extra needs must be met			[52]			
Interpersonal	Relationships in household	Conflict and tension in family relationships	Negative relationships will conflict	Poor and conflict in relationships with family	[32], [33]		[32], [41], [61]			
Interpersonal	Relationships in household	Gender and power in household	Allocation of ARVs to the provider in the house	ARVs are allocated to the provider in the house, sometimes cost does not allow for more than one person to be on ART: social triage			[52]			
Interpersonal	Relationships in household	Gender and power in household	Dependent on partner, lack of autonomy	Sex (wives have lack of autonomy)	[42]		[36], [35], [52], [60]			
Interpersonal	Relationships in household	Gender and power in household	Dependent on partner, lack of autonomy	Permission needed from or dependence on partner (women cannot seek treatment or travel)	[44]		[44], [45], [56], [60]		[44], [17]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
				alone to the clinic in some cultures)						
<b>Interpersonal</b>	<b>Relationships in household</b>	Gender and power in household	Fear of domestic violence and abandonment	Fear of domestic violence or abandonment after disclosure: for men and women	[39], [42]		[45], [52], [56], [60]		[10], [44], [17]	
<b>Interpersonal</b>	<b>Relationships in household</b>	Gender and power in household	Men have decision making power over resources in household	Women often not entitled to decide over use of resources. Men may deny women ARVs.			[52]			
<b>Interpersonal</b>	<b>Relationships in household</b>	Supportive family relationships	Family mitigating discrimination by support	Experiences of discrimination can be mitigated by patient relying on strong family support				[11]		
<b>Interpersonal</b>	<b>Relationships in household</b>	Supportive family relationships	Family supporting	Social interaction, support and relationships (supportiveness, quality and presence of personal relationship and interactions with others	[62]			[8], [23], [25], [33]		[12]



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Interpersonal	Relationships in household	Supportive family relationships	Mutuality-fostering relationships	Mutuality-fostering relationships involving reciprocal care and empathy, providing a sense of family	[33], [39], [62]			[12], [44], [16], [23], [25], [30], [32], [33]	[10]	[10]
Interpersonal	Relationships in household	Supportive family relationships	Reminder to take medication	Family supporting by assisting with medication reminders				[33]		
Interpersonal	Relationships in household	Supportive partner	Intimate partner	Partner involved in care (assist with reminding to take medication and sending reminders through cell phone when not present)				[27], [30]		
Interpersonal	Relationships in household	Supportive partner	Intimate partner	Partner emotional support	[47]			[18]		[18]
Interpersonal	Relationships in household	Supportive partner	Intimate partner	Partner financial support (money to go to the clinic, money for ART, through providing transport, accompanying to doctors' visits and couples counselling)	[47]			[18], [27]		[18]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Interpersonal	Relationships in household	Supportive partner	Partner support healthier lifestyle	Partner encouraging to live healthy, eat healthy, exercise and reduce alcohol use	[47]			[18]		[18]
Interpersonal	Relationships in household	Unsupportive family relationships	Family not supporting	No family support	[32], [39], [44]		[30], [32], [44], [54], [59], [61]		[10], [17]	
Interpersonal	Relationships in household	Unsupportive family relationships	Family not supporting	Neglect or orphan hood	[62]		[62]		[33]	
Interpersonal	Relationships in household	Unsupportive family relationships	Family not supporting	Punishment for adherence slips leads to dishonesty			[62]			
Interpersonal	Relationships in household	Unsupportive family relationships	Negative experiences of stigma in family	Stigma associated with a child's HIV status: Maternal shame and stigma related to perinatal acquisition			[43], [45]			
Interpersonal	Relationships in household	Unsupportive family relationships	Negative experiences of stigma in family	Stigma from family/friends	[39]		[57], [59], [61], [62]		[10], [33]	
Interpersonal	Relationships in household	Unsupportive partner	Intimate partner	Partner on different schedule to take medication of discouraging about taking meds			[59]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Interpersonal	Relationships in household	Unsupportive partner	Not involved in care	Partner not involved in care	[44]				[44], [17]	[44]
Community	Community beliefs and practices	Beliefs about HIV and ART	Long-held beliefs and shared Community views such as witchcraft, hospitals are places of death	Long-held beliefs and shared community views such as HIV as witchcraft, hospitals are places of death	[39]		[52], [53]		[10]	
Community	Community beliefs and practices	Beliefs about HIV and ART	Positive community beliefs about HIV and ART	Positive community beliefs about HIV and ART				[27]		
Community	Community beliefs and practices	Gender norms	Masculinity	Masculinity	[39]		[43], [52]	[14]	[10]	
Community	Community beliefs and practices	Patient lacks autonomy	Lack of autonomous decision making in childbirth for women in rural villages	Lack of autonomous decision making in childbirth for women in rural villages			[44]			
Community	Community beliefs and practices	Patient lacks autonomy	Negative community beliefs about HIV and ART	Negative community beliefs about HIV and ART (Patient has no choice)			[56]			
Community	Community beliefs and practices	Preference for traditional healers and medicines	Bypassing clinic or hospital services for traditional healers.	Bypassing clinic or hospital services for traditional healers (also reported as cheaper)	[39]		[52]		[10]	[33]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Community	Community beliefs and practices	Supportive traditions	Community traditions supporting patient	Experiences of discrimination can be mitigated by patient relying on cultural and religious traditions				[11]		
Community	Financial support	Financial support	Community financial support	Financial support from social networks to cover expenses, this creates obligation to adhere				[23], [30], [32]		
Community	Peers and support groups	Medication companion	Having a treatment buddy	Having a treatment buddy	[62]		[62]	[14], [23]		[33]
Community	Peers and support groups	Medication companion	Identification of a confidante	Identification of a confidante (at work, school or within network)	[62]			[4], [33]		[33]
Community	Peers and support groups	Medication companion	Medication companions and treatment partners	Medication companions and treatment partners	[31]			[2]		
Community	Peers and support groups	Medication companion	Unable to identify a treatment buddy	Unable to identify a treatment buddy	[62]					
Community	Peers and support groups	Peer support	Peer support helped with new normal	Peer support helped with new normal and acted as a proxy for lack of family support	[31]			[1], [2]		[2]
Community	Peers and support groups	Social isolation	Social Isolation	Social Isolation and inadequate community/social support			[33], [54]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Community	Peers and support groups	Support groups	Peer and support groups	Attending support group allowed patients to share wisdom and attain inner peace/ Support groups, peer support, treatment partners, medication companions helped with linkage, feelings of belongingness and reduce stigma	[33],			[7], [33]		[17], [33]
Community	Peers and support groups	Supportive supervisors and teachers	Support to take ART	Supervisors and teachers should be enlisted to facilitate workers and students taking medication with minimal disruption	[62]			[33]		[33]
Community	Peers and support groups	Supportive supervisors and teachers	Support to take ART	Supervisors and teachers be enlisted to assist with adherence and non-disclosure	[62]			[2], [33]		[33]
Community	Peers and support groups	Unsupportive supervisors and teachers	Supervisors and teachers	Enacted stigma by teachers	[62]		[62]		[33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Community	Religious institutions	Religious institutions	Religious institutions	Support from religious institutions were helpful when family was not supportive. For prisoners helped to counter rejection, violence and abandonment	[39], [62]			[24], [33]		[10], [33]
Community	Social support	Social support	Family supporting	Material, emotional and social support helps to overcome stigma	[33], [42]			[7], [12], [14], [16], [23], [25], [30], [31]		[12]
Community	Stigma and discrimination	Experiences of stigma	Cannot find work due to stigma	Economic insecurity because of HIV related stigma: unable to find a job	[34]					
Community	Stigma and discrimination	Experiences of stigma	Negative experiences of stigma and discrimination	Multilevel encounters of stigma (family, friends, religious groups, healthcare providers, employers and prison employees.	[42], [55], [62]		[41], [61], [62]		[12], [17], [26], [33]	
Community	Stigma and discrimination	Experiences of stigma	Negative experiences of stigma and discrimination	Stigma and Discrimination such as being laughed at, exclusion from activities and being fired)	[42], [62]		[41], [43], [53], [62]		[12], [33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Community	Stigma and discrimination	Experiences of stigma	Negative experiences of stigma and discrimination	Negative public perceptions and past experiences of stigmatisation	[32], [39], [42]		[32]		[10]	
Institutional	Benefits of being in care	Stigma management	Stigma easier to manage when in care rather than out of care	Stigma easier to manage when in care rather than out of care						
Institutional	Counselling practices and principles	Addressing shared community uncertainties	Address issues that clinics and hospitals are where people come to die	Address issues that clinics and hospitals are where people come to die. Open communication that addresses fears and anxieties				[4]		
Institutional	Counselling practices and principles	Awareness of literacy and language barriers	Language barriers	Communication barriers between providers and patients including language barriers and inability of provider to explain to patients. Aware of cultural and language differences (patients want pictures and visual aids)	[39], [55]		[43], [55]		[10], [26]	[2]
Institutional	Counselling practices and principles	Awareness of who is providing the counselling	Provided by peer support groups or case workers	Ongoing patient education from peer support groups or by caseworkers		[39]				[10]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Counselling practices and principles	In depth pre and post counselling when testing	Assignment to case workers or peer navigators	Assignment to case workers or peer navigators helped to educate participants and address their anxieties and frustrations	[39]				[10]	
Institutional	Counselling practices and principles	In depth pre and post counselling when testing	In depth pre and post counselling to mitigate shock and denial on diagnosis	In depth pre and post counselling to mitigate shock and denial on diagnosis	[62]	[31], [53]		[33]		[2], [33]
Institutional	Counselling practices and principles	In depth pre and post counselling when testing	Provided through pre and post-test counselling	Patient education provided through pre and post-test counselling improved linkage and gave patients a chance to ask questions		[39], [42]				
Institutional	Counselling practices and principles	In depth pre and post counselling when testing	Providing more education about ART to enhance familiarity with medication	Providing more education about ART to enhance familiarity with medication		[62]		[2], [33]		[33]
Institutional	Counselling practices and principles	In depth pre and post counselling when testing	Receiving counselling and/or teaching	Receiving counselling and/or teaching				[1]		



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
<b>Institutional</b>	<b>Counselling practices and principles</b>	Including patients beliefs and respecting cultural practices	Encouragement from a traditional birth attendant	Encouragement from a traditional birth attendant						
<b>Institutional</b>	<b>Counselling practices and principles</b>	Including patients beliefs and respecting cultural practices	Integration of spirituality into HIV care	Integration of spirituality into HIV care			[12]			
<b>Institutional</b>	<b>Counselling practices and principles</b>	Including patients beliefs and respecting cultural practices	Medical providers who incorporated traditional beliefs earned patients trust and were sought out in conjunction with traditional medicine	Medical providers who incorporated traditional beliefs earned patients trust and were sought out in conjunction with traditional medicine		[39]	[2]		[2], [10]	
<b>Institutional</b>	<b>Counselling practices and principles</b>	Including patients beliefs and respecting cultural practices	Patients want to communicate with health care provider about the known and unknown side effects of traditional medicine on ART	Patients want to communicate with health care provider about the known and unknown side effects of traditional medicine on ART. Patients may hide that they are using traditional medicines			[2], [23]		[2]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	<b>Counselling practices and principles</b>	Including patients beliefs and respecting cultural practices	Respecting the place of traditional medication	Provider respecting the place of traditional medication		[39]				[2], [10]
Institutional	<b>Counselling practices and principles</b>	Poor counselling	Does not provide sufficient information	Patient dissatisfaction with HIV/ART information provided			[36], [59]			
Institutional	<b>Counselling practices and principles</b>	Poor counselling	Poor counselling	Lack of or poor counselling: pre and post test	[42], [62]		[52], [61]		[17], [33]	
Institutional	<b>Counselling practices and principles</b>	Types of narrative used by health care workers	Providers must frame ART as part of the daily routine	Providers must frame ART as part of the daily routine				[2]		[2]
Institutional	<b>Counselling practices and principles</b>	Types of narrative used by health care workers	Reminders of past illness	Reminders of past illness				[33]	[33]	
Institutional	<b>Engagement with health care workers</b>	Disengaged and unsupportive relationships	Cannot build relationship due to high staff turnover	Inadequate number of skilled providers and high turnover rate at HIV clinics made it difficult for patients to form trusting relationships	[42], [62]		[52], [61]		[33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Engagement with health care workers	Disengaged and unsupportive relationships	No trust and confidentiality	Patient provider relationship (lack of trust/confidence)			[43], [59]		[2], [12]	
Institutional	Engagement with health care workers	Disengaged and unsupportive relationships	No trust and confidentiality	Lack of confidence and trusting relationship in health care worker			[36], [37], [43], [54]		[12], [20]	
Institutional	Engagement with health care workers	Disengaged and unsupportive relationships	Unequal power relationship	Unequal power relationship between patient and health care worker			[36], [37], [43], [54]		[12], [20]	
Institutional	Engagement with health care workers	Frequency and duration of engagements	Directness, intensity, frequency, and extension of provider engagement with women.	The success of efforts to initiate and retain HIV-infected pregnant women in ANC and HIV care was shaped by the directness, intensity, frequency, and extension of provider engagement with women.		[35]		[28]		[6]
Institutional	Engagement with health care workers	Frequency and duration of engagements	More interactions with case managers	More encounters with case manager contributed to providing a holistic approach to care	[39]				[10]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
<b>Institutional</b>	<b>Engagement with health care workers</b>	Supportive and collaborative relationships	Collaborative relationship	Good relationship with provider/collaborative relationship that provides support. This includes caring attitude, effective communication, frank and clear instructions, being responsive, being accessible, listening and showing respect.		[39]		[7], [11], [25], [30], [32]		[2], [10]
<b>Institutional</b>	<b>Engagement with health care workers</b>	Supportive and collaborative relationships	Open communication	Discuss decision to adhere with provider				[4], [25], [30]		
<b>Institutional</b>	<b>Engagement with health care workers</b>	Supportive and collaborative relationships	Strong relationship	Having a strong relationship with a health care provider can mitigate conspiracy beliefs				[11]		
<b>Institutional</b>	<b>Engagement with health care workers</b>	Supportive and collaborative relationships	Trust	Nursing and physician support to gain trust and overcome social isolation associated with stigma		[39], [42]		[16]		[10]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Health care worker recommendations and care	Health care worker does not do timely tests or referrals	Health care workers not always drawing blood for CD4 counts	Health care workers not always drawing blood for CD4 counts leading to low uptake of CD4 count testing.						
Institutional	Health care worker recommendations and care	Health care worker does not do timely tests or referrals	Provider fails to refer patient	Provider fails to refer patient and not sensitive to value of timely HAART initiation	[38]					
Institutional	Health care worker recommendations and care	Health care worker does not provide holistic care	Engagement is not patient focused but rather on child	Health care workers focus on infant health instead of HIV related services for their own health	[38]					
Institutional	Health care worker recommendations and care	Health care worker provides holistic care	Provider open and sensitive to needs of patient and other healthcare issues	Provider open and sensitive to needs of patient and other healthcare issues						[2]
Institutional	Health care worker recommendations and care	Provider input	Input from HCP	Input from health professionals for child adherence			[58]			
Institutional	Health care worker recommendations and care	Provider input	Lack of doctors recommendation to continue ART	Lack of doctors recommendation to continue ART			[32]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Health care worker recommendations and care	Provider input	Lack of doctors recommendation to initiate	Lack of doctors recommendation to initiate	[32], [53]					
Institutional	Health care worker recommendations and care	Provider input	Quality of care in case management	Active referrals in health care and case management which offers a holistic approach		[39], [42]				[10]
Institutional	Models of Care	Adolescent services	Assisting with family disclosure	Clinic coordinates disclosure process with families		[62]		[33]	[33]	
Institutional	Models of Care	Adolescent services	Offer health education	HCW offer HIV and SRH education		[62]		[33]	[33]	
Institutional	Models of Care	Adolescent services	Offer health education	Full disclosure by HCW of HIV status and what ARVs are for.		[62]		[33]	[33]	
Institutional	Models of Care	Adolescent services	Relatable counsellors	Nurses and counsellors are similar ages and gender as the patient		[62]		[33]	[33]	
Institutional	Models of Care	Adolescent services	Relatable counsellors	HCW sensitized to work with HIV+ adolescents		[62]		[33]	[33]	
Institutional	Models of Care	Adolescent services	Youth hours	Youth target hours and services		[62]		[33]	[33]	
Institutional	Models of Care	Family driven care	Family driven treatment	Family focused care which enrolls HIV positive patient and				[16]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
				all HIV positive family members						
<b>Institutional</b>	<b>Models of Care</b>	Gaps in referrals	Gaps in the referral processes	Gaps in the referral processes	[38]					
<b>Institutional</b>	<b>Models of Care</b>	Gaps in referrals	Lack of continuity of care	Lack of continuity of care	[38]					
<b>Institutional</b>	<b>Models of Care</b>	Hospital admission	Linking those admitted for comorbid diseases	Being admitted to hospital for TB treatment		[42]				
<b>Institutional</b>	<b>Models of Care</b>	Integrated care	Integrated care will reduce patient burden	Integrated care will reduce patient burden: this includes electronic health records resulted in efficiency and reduced processing time and receipt of lab results.		[39]				[10]
<b>Institutional</b>	<b>Models of Care</b>	Integrated mental health care	Integrated mental health care	Psychiatric care services			[43]	[14]		[12]
<b>Institutional</b>	<b>Models of Care</b>	Integrated mental health care	Mental health included in care	Treatment of depression and anxiety related to diagnosis				[16]		
<b>Institutional</b>	<b>Models of Care</b>	Integrated mental health care	Mental health included in care	Provider addressing issues of depression through social support				[12]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Models of Care	Integrated mental health care	Mental health included in care	Diagnosing and managing depressive symptoms associated with HIV diagnosis and HIV related stigma		[62]		[33]	[33]	
Institutional	Models of Care	Integrated mental health care	Mental health included in care	Early intervention through regular mental health assessment by providers		[53], [62]		[33]	[33]	
Institutional	Models of Care	Involving patients as peer facilitators	Participating as a peer facilitator gave meaning and promoted adherence	Participating as a peer facilitator gave meaning and promoted adherence		[62]		[33]	[33]	
Institutional	Models of Care	Lack of integrated care	Does not consider structural factors in care	Health care workers focusing exclusively on biomedical aspects and fail to address social factors such as care-seeking, poverty and food insecurity	[38]					
Institutional	Models of Care	Lack of integrated care	Does not include mental health care	Provider not addressing issues of depression						
Institutional	Models of Care	Lack of integrated care	Lack of integrated care which increase patient burden	Lack of integrated care which increase patient burden						



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Models of Care	Male services	Male friendly services	Men want male-friendly health clinics and did not want to receive care in an antenatal clinic.			[31], [52]			[2]
Institutional	Models of Care	Mobile and home visits	Home visits and mobile care	Being visited at home contributed to visibility of infection and potential involuntary disclosure	[42]		[52]			
Institutional	Models of Care	Mobile and home visits	Home visits and mobile care units	Mobile care units						[2]
<b>Institutional this row must be added to tables</b>	<b>Models of Care</b>	PMTCT, ANC and HIV Integration	Completion of PMTCT pre-delivery	Successful completion of PMTCT pre delivery					[10], [33]	
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Enrolment in ART pre delivery	Previous experience with PMTCT				[27]		
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Delivering HIV in the context of ANC	Dropout from and delays in the maternal ART cascade are driven by problems in delivering HIV services in the context of ANC programs.			[35]		[6]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Enrolment in ART postdelivery	Enrolment in Art post pre delivery						
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Enrolment in ART pre delivery	Enrolment in Art pre delivery			[44]			[44]
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Escorts for women between ANC and HAART services allowing pregnant women to bypassing queues	Escorts for women between ANC and HAART services allowing pregnant women to bypassing queues						
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Gaps between ANC/PMTCT and HIV services and dropout along maternal ART cascade	Gaps between ANC/PMTCT and HIV services and dropout along maternal ART cascade	[35], [38]		[35]		[6]	
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Integrated models of care	Provision of HAART services on-site only once per week in the integrated model may be insufficient to affect HAART initiation during pregnancy						

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Late disengagement (within 30 days of delivery).	Women who disengaged from HIV services in the 30 days before delivery (i.e. late disengagement) were more likely to be lost to follow up postpartum when compared to women who stayed until delivery					[44]	
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Late or low attendance at ANC	Late or low attendance at ANC	[44]				[44]	
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Maternal ART services struggle to retain women in care and involve partners during postpartum when women are ART ineligible or declined ART	Maternal ART services struggle to retain women in care and involve partners during postpartum when women are ART ineligible or declined ART	[35]					
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Maternal ART under prioritised in ANC. PMTCT and HIV programmes.	Maternal ART under prioritised in ANC. PMTCT and HIV programmes.	[35]		[35]		[6]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Multii pronged and multileveled interventions	Interventions typically move beyond integrating discrete elements of service delivery, and instead, provide multi-pronged and multi-levelled interventions in the broader health system to support maternal ART initiation, retention and adherence.		[53]				
Institutional	Models of Care	PMTCT, ANC and HIV Integration	PMTCT and ANC	First pregnancy registration						[44]
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Screening for HAART eligibility and initiation of HAART within pregnancy related services	Screening for HAART eligibility and initiation of HAART within pregnancy related services		[38]				
Institutional	Models of Care	PMTCT, ANC and HIV Integration	Strengthen linkages between PMTCT and HAART services	Strengthen linkages between PMTCT and HAART services		[38]				
Institutional	Perception of health care workers	Expectations of providers	To provide care and instruct patient	Unquestioning acceptance of provider's attitudes towards their health can affect				[11]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
				experiences of health services.						
<b>Institutional</b>	<b>Perception of health care workers</b>	Expectations of providers	Want to feel safe with providers	Want to feel safe with providers				[2]		[2]
<b>Institutional</b>	<b>Perception of health care workers</b>	Negative perceptions of health care workers	Negative perceptions of providers skills	Negative perceptions of providers skills	[32], [42]		[32]			[2]
<b>Institutional</b>	<b>Perception of health care workers</b>	Negative perceptions of health care workers	Poorly trained health care workers	Weak training and supervision of healthcare workers			[35]		[6]	
<b>Institutional</b>	<b>Perception of health care workers</b>	Negative perceptions of health care workers	Unable to gain attention from staff	Unable to gain attention from staff			[36]			
<b>Institutional</b>	<b>Perception of health care workers</b>	Perception of health care workers	Patients perception of provider skill	Patients perception of provider skill					[2]	[2]

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Perception of health care workers	Positive perceptions of health care workers	Consistent provider	Consistent provider						[2]
Institutional	Perception of health care workers	Positive perceptions of health care workers	Support mitigates lack of other support	Health care workers as proxy for lack of family support		[39]	[52]			[10]
Institutional	Perception of health care workers	Positive perceptions of health care workers	Supportive	Supportive health care workers			[52]	[1]		[44]
Institutional	Perception of health care workers	Positive perceptions of health care workers	Well trained	Well trained health care staff			[52]			
Institutional	Relocation to other facility	Transfers and Relocation	Change of service provider	Change of service provider due to relocation. Treatment may be interrupted.	[42]		[53]			
Institutional	Relocation to other facility	Transfers and Relocation	Request to be transferred to other clinic	Patient request to be transferred to other clinic	[42]					
Institutional	Relocation to other facility	Transfers and Relocation	Travelling interrupting treatment	Limited medication availability during migration periods			[55]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Service delivery	Clinic times	Inconvenient clinic times and time needed off work and school	Inconvenient clinic times and no time to go to the clinic/ limited availability of services	[39]		[30], [41], [43], [54]		[2], [10], [12], [17]	
Institutional	Service delivery	Clinic times	Long waiting times and queues	Unable to get to clinic due to work constraints.	[42]		[36]		[2], [17]	
Institutional	Service delivery	Clinic times	Short waiting time and sufficient time for consultations	Sufficient time for consultations				[1], [30]		
Institutional	Service delivery	Drug and test resources	Drug and test stock outs	Erratic clinic drug supply	[42]		[31], [35], [36], [37], [43], [50], [54]		[2], [6]	
Institutional	Service delivery	Drug and test resources	Drug and test stock outs	Prison officials to ensure that there is no interruption in medications						
Institutional	Service delivery	Drug and test resources	Laboratory service failure	Laboratory service failure	[42]		[31]			[2]
Institutional	Service delivery	Drug and test resources	Limit on amount of medication given (limit of a 1-month supply)	Limit on amount of medication given (limit of a 1-month supply)			[37]			
Institutional	Service delivery	Drug and test resources	Medication available	Medications that are easily available				[16]		
Institutional	Service delivery	Drug and test resources	Pharmacy problems	Pharmacy problems: medicine not dispensed correctly			[44]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Service delivery	Lack of privacy	Lack of privacy	Fear of breach of confidentiality in health centre	[39], [42]		[44]		[10], [12], [44]	
Institutional	Service delivery	Lack of privacy	Long queues may risk patient being seen and stigmatised.	Long waiting times to see health care provider and clinic visits can take up to a full day.	[39], [42], [44], [49], [62]	[49]	[31], [35], [36], [37], [43], [50], [54]		[2], [10], [12], [44], [17], [33]	
Institutional	Service delivery	Lack of privacy	No privacy	Flaws in the healthcare system such as forced disclosure people delayed decision making			[52]			
Institutional	Service delivery	Lack of privacy	No privacy	Perceived or experienced breaches of confidentiality by health care workers	[39], [49]	[49]	[31]		[2], [10]	
Institutional	Service delivery	Negative experiences at the clinic	Negative experiences at health care facility	Negative health services experiences such as confusion with regards to referral cases and not knowing who needs HIV care	[39], [42], [49]		[43]		[10], [12]	
Institutional	Service delivery	Negative experiences at the clinic	Negative experiences of patients HIV testing	Patients experiences of HIV testing	[39], [20]	[39], [20]			[10]	[10]



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Service delivery	Negative experiences at the clinic	Negative treatment and interactions with health care staff	Negative attitude, treatment and interactions with health care staff	[38], [42], [44], [47], [55], [62]		[36], [37], [43], [44], [54], [55], [62]	[33]	[44], [17], [20], [26], [33]	[33]
Institutional	Service delivery	Physical clinic environment	Comfort and convenience of services	Comfort and conveniences of services						[2]
Institutional	Service delivery	Physical clinic environment	Confusing set up at clinic	Confusing set up at clinic	[42]		[52]			
Institutional	Service delivery	Physical clinic environment	General dislike	Dislike of health facilities	[38], [42]					
Institutional	Service delivery	Physical clinic environment	Overcrowding	No privacy at clinic due to crowded pharmacies, consultations with multiple patients and lost files	[62]		[43], [52]		[17], [33]	
Institutional	Service delivery	Physical clinic environment	Physical clinic environment	Physical clinic environment						
Institutional	Service delivery	Physical clinic environment	Providing disability accommodations	Providing disability accommodations						[2]
Institutional	Service delivery	Physical clinic environment	Type of facility	Health centre versus hospital care			[43]	[1]		
Institutional	Service delivery	Physical clinic environment	Welcoming atmosphere at clinic	Staff member to welcome and assist new patients		[42]				

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Service Delivery	Scheduled appointments	Difficulty getting appointments	Difficulty getting appointments			[37], [52]		[12]	
Institutional	Service Delivery	Scheduled appointments	Missing scheduled visits	Missing scheduled visits			[43], [56]			
Institutional	Service Delivery	Scheduled appointments	Patient has difficulty scheduling appointments	Difficulty scheduling	[44]		[44]		[44]	
Institutional	Service Delivery	Scheduled appointments	Repeated missed appointments	Repeated missed appointments			[30]			
Institutional	Service Delivery	Scheduled appointments	Same day appointments	Same day appointments						[2]
Institutional	Service Delivery	Scheduled appointments	Scheduling difficulties	Scheduling difficulties.			[35]		[2], [6]	
Institutional	Service Delivery	Scheduled appointments	Scheduling during school holidays	Scheduling appointments during school holidays				[1]		
Institutional	Service Delivery	Scheduled appointments	Scheduling too far in advance	Medical appointments too far into the future					[10]	
Institutional	Service delivery	Staff turnover	Shortages of staff and supplies to service patients	Shortages of skilled staff and supplies to service patients	[38], [39], [42], [49], [62]	[49]	[52], [62]		[10], [33]	
Institutional	Service delivery	Staff turnover	Staff shortages and high turnover	Staff shortages and high turnover	[42]		[35]		[6]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Service Delivery	Weak systems and protocols	Poor patient tracking and weak information systems	Poor follow-up and tracing of patients and weak information systems			[35]		[2], [6]	
Institutional	Service Delivery	Weak systems and protocols	Using updated protocols	Failure to keep up with rapidly changing treatment protocols and referral procedures.			[35]		[2], [6]	
Institutional	Service Delivery	Weak systems and protocols	Weak information systems	Each information systems			[35]		[2], [6]	
Institutional	Stigma and health care engagement	Favouritism	Stigma and discrimination	Favouritism	[42]					
Institutional	Stigma and health care engagement	Gender and sexuality bias	Judgement based on gender	Health care workers attitudes towards gender norms. In some countries women's HIV status were due to male partners sexual needs and in other women were seen as hypersexual if positive						
Institutional	Stigma and health care engagement	Gender and sexuality bias	Sexual orientation	Stigma and discrimination of patients based on sexual orientation	[53]		[45]			

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Stigma and health care engagement	Gender and sexuality bias	Sexual orientation	Transgender women are unable to be reissued new identity document and therefore not able to link to care	[49]					
Institutional	Stigma and health care engagement	Gender and sexuality bias	Sexual orientation	Transgender women no longer included on family record and therefore unable to get insurance and then access services	[49]					
Institutional	Stigma and health care engagement	Gender bias	Gender biases and norms	Women cannot seek care without husbands consent	[39]				[10]	
Institutional	Stigma and health care engagement	Gender bias	Gender biases and norms	Men going and waiting in clinics perceived as a sign of weakness and absence from work reduces ability to be a breadwinner for the family.	[39]				[10]	
Institutional	Stigma and health care engagement	HIV related stigma	Discriminating against poverty and HIV status	Not helping patients because they are poor and do not have much time to live. HIV seen as a disease of poverty.			[45], [52]			
Institutional	Stigma and health care engagement	HIV related stigma	Stigma and discrimination	HIV-related stigma	[42]		[41], [56], [61]		[12], [17]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Institutional	Stigma and health care engagement	HIV related stigma	Stigma and discrimination	Insensitivity and judgement by the provider	[42]				[12], [17]	
Institutional	Stigma and health care engagement	HIV related stigma	Stigma and discrimination	Limited sensitisation and high levels of stigma of providers and clients on the importance of CD4 count testing.						
Institutional	Stigma and health care engagement	HIV related stigma	Stigma and discrimination	Perceptions about the healthiness of pregnant women.						
Institutional	Stigma and health care engagement	HIV related stigma	Stigma and discrimination	Persistent condescending attitudes	[39]				[10]	
Institutional	Stigma and health care engagement	HIV related stigma	Stigma and discrimination	Provider is sensitive and non-judgemental about other issues such as substance abuse	[39]				[10]	
Institutional	Stigma and health care engagement	Occupational stigma	Stigma and discrimination	Stigma (sex workers publically called out over intercom to move to back of the line (study 18)						
Institutional	Stigma and health care engagement	Patient anticipates stigma	Stigma and discrimination	Perception of racism and discrimination in health care setting	[47]		[40]			
Institutional	Stigma and health care engagement	Patient anticipates stigma	Stigma and discrimination	Actual or anticipated stigma when seen accessing clinic	[39], [42], [62]				[10], [17], [33]	

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Structural	Financial costs for care	Free ART still has costs	Cost of ART	Mandatory counselling is not free	[62]		[62]		[10], [17], [33]	
Structural	Financial costs for care	Free ART still has costs	Cost of ART	Pay for HIV diagnosis and high administration costs including opportunistic infection (but not TB)			[49]			
Structural	Financial costs for care	Free ART still has costs	Free ART still has costs	Costs associated with treatment (even free ART becomes expensive when thinking of the loss of wages and the cost to travel to the clinic)	[32], [38]		[31], [32], [36], [43], [44], [45], [49], [52], [53], [61]	[7]	[18], [20]	
Structural	Financial costs for care	Free ART still has costs	Lack of childcare	Cost of childcare when visiting clinic					[2], [12]	
Structural	Financial costs for care	Free ART still has costs	Loss of grants	Disability grant loss/livelihood			[36]			
Structural	Financial relief for care	Grants	Food supplementation	Provision of food		[34]		[1]		
Structural	Financial relief for care	Grants	Incentives provided	Food, soap, travel reimbursement, skills training				[33]		[33]
Structural	Financial relief for care	Grants	Free ART Treatment	Free ART Treatment				[7]		

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
Structural	Financial relief for care	Grants	Provision of vouchers for transport	Provision of vouchers for transport	[42]	[42]		[1]		
Structural	Financial relief for care	Grants	Provision of vouchers to reduce cost of medication and cut down regimen to reduce cost	Provision of vouchers to reduce cost of medication and cut down regimen to reduce cost				[2], [14]		
Structural	Healthcare policies	Access and eligibility policies	Access laws which send people to their birthplace for medication	Discouraged by access laws which send people to their birthplace for medication			[31]		[2]	
Structural	Healthcare policies	Access and eligibility policies	Policy limitations	Policies directed at specific populations make it hard to access care such as threats of criminalisation for transgender, sex workers and drug users and deportation threats for immigrants	[39], [47]				[10], [18]	
Structural	Healthcare policies	Access and eligibility policies	Policy Limitations	Policies not allowing women to seek care without the consent of her husband						

Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
<b>Structural</b>	<b>Healthcare policies</b>	Health insurance	Health care insurance policies	Health insurance concerns state, requirements, policies, practices and limitations of one's health insurance and its coverage for HIV medications	[39]		[37]		[10]	
<b>Structural</b>	<b>Healthcare policies</b>	Policies are hard to understand	Patients have a hard time understanding the limitations and eligibility rules as well as the laws and policies that govern adherence and linkage	Discouraged by lack of understanding of laws and policies that govern adherence and linkage			[31]		[2]	
<b>Structural</b>	<b>Income and food security</b>	Income and financial status	Food Insecurity	Hunger and food insecurity (also side effects from meds such as gastrointestinal upset) and fear that drugs will increase appetite	[34], [42], [47]		[36], [37], [43], [44], [47], [52], [54], [56], [59], [61]	[7]		
<b>Structural</b>	<b>Income and food security</b>	Income and financial status	High income	Higher income	[33]			[44], [32]		[44]



Socio-ecological Level	Fourth order theme	Fourth order sub-themes	Fourth order codes	Third order concepts	Linkage		Adherence		Retention	
					Barrier	Facilitator	Barrier	Facilitator	Barrier	Facilitator
<b>Structural</b>	<b>Income and food security</b>	Income and financial status	Low income and poverty	Low income/poverty and difficult material circumstances	[32], [42], [62]		[30], [31], [37], [41], [43], [45], [54], [56], [59], [60], [61], [62]		[12], [33]	[44], [17], [20]
<b>Structural</b>	<b>Living conditions and context</b>	Housing	Stable housing	Unstable and inadequate or absent housing	[32]		[32], [37], [41], [43], [54], [57], [59]		[12]	
<b>Structural</b>	<b>Transport and distance to clinic</b>	Transport and distance to clinic	Geographic location of the facility	Rural living and difficulty accessing comprehensive care	[48]		[30], [36], [43], [48], [49], [50], [61]	[1]	[12], [33]	[26]
<b>Structural</b>	<b>Transport and distance to clinic</b>	Transport and distance to clinic	Logistical challenges in accessing care	Transport to access services (including no money to pay for transport, negotiating cost of transport over other household costs, poor road conditions, difficulty accessing reliable transport)	[42], [44], [47], [48], [62]		[30], [31], [36], [41], [43], [44], [48], [49], [50], [52], [54], [56], [60], [61], [62]		[12], [44], [17], [19], [20], [33]	[19]
<b>Structural</b>	<b>Transport and distance to clinic</b>	Transport and distance to clinic	Safety when traveling to clinic	Escorts to clinic		[42], [55]				

**Additional file 10: Overlap of included primary studies (n=826)**

Overlap of included primary studies (n=826) within included systematic reviews (n=33)

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Abdelrahman, 2013	Uganda		2
Abel, 2003	Egypt	11	3
Abrahams, 2010	Burkina Faso and Mali	29	1
Adam, 2003	South Africa	35	3
Adamian, 2004	Canada	20	1
Addo-Atuah, 2012		20	2
Adedimeji, 2011	Ghana	50	1
Agbonyitor, 2009	Nigeria	30	2
Alemu, 2011		1722	2
Alfonso, 2009		12	2
Allen, 2011	Canada	41	1
Alliance, 2004	Uganda		1
Amankwah, 2015	Zambia	136	1
Amberbir, 2008	Ghana	400	2
Amolloh, 2011			1
Ankrah, 2016	Uganda	19	1
Aransiola, 2014	Nigeria	15	1
Arem, 2011	Uganda		1
Arrivillaga 2011	Columbia	47	2
Asgary, 2014	Ethiopia	18	1
Aspeling, 2008	South Africa	11	3
Atanga, 2017	Cameroon	36	1
Atuyambe, 2008	Uganda	32	1
Audu, 2013	Nigeria	35	2
Audu, 2014	Nigeria	35	2
Aversa, 1996	USA		1
Avong, 2015	Nigeria	502	1
Awiti-Ujiji, 2011		26	2
Axelsson, 2015	Lesotho	28	1
Badahdah, 2011	Egypt	27	2
Baghazal, 2011	Kenya	27	1
Bajunirwe, 2009	Uganda	175	3
Balcha, 2011	Ethiopia	14	3
Balira, 2010	Tanzania	244	1
Bancheno, 2010	Swaziland	64	1
Barnett, 2013	South Africa	12	1
Barton Laws, 2000	USA	25	1
Batchelder, 2013	USA	15	1
Beckham, 2009	Tanzania	68	1
Beer, 2009	USA	37	2
Beer, 2012	USA	47	1
Benzekri, 2015	Senegal	109	1
Bernays, 2009			1
Bernays, 2010	Uganda and Zimbabwe		1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Bernays, 2015	Serbia	20	1
Beusterien, 2008	USA	35	4
Beyene, 2009	Ethiopia		2
Bezabhe, 2014	Ethiopia	58	1
Bezabhe, 2014	Ethiopia	24	1
Bezabhe, 2014	Ethiopia	58	1
Bhagwanjee, 2008	South Africa	19	2
Bhagwanjee, 2011	South Africa	33	2
Bhat, 2010	South Africa	168	2
Bhushan, 2015	USA	30	1
Bila, 2009	Burkina Faso		1
Blake, 2008	USA	23	2
Boateng, 2013	Ghana	23	2
Bogart, 2013	South Africa	51	2
Bohle, 2014	Tanzania	59	1
Bontempi, 2004			1
Bowden, 2006	USA	10	1
Bowie, 2010	Malawi	1266	1
Brigido	Brazil	182	1
Brion, 2008	USA	24	4
Brody, 2016	USA	22	1
Buesseler, 2014	Ivory Coast	29	1
Buregyeya, 2017	Uganda	57	1
Buseh, 2006	USA	20	1
Busesh, 2008	USA	29	1
Busza, 2014	Tanzania		1
Butt, 2011	Indonesia		1
Butt, 2013	Indonesia		1
Butt, 2015a	Indonesia		1
Butt, 2015b	Indonesia		1
Bwirire, 2008	Malawi	25	2
Byakika-Tusiime, 2005	Uganda	304	3
Byakika-Tusiime, 2009	Uganda	15	2
Byron, 2008	Kenya	79	2
Campbell, 2011	Zimbabwe	48	2
Cataldo, 2007	Malawi	24	1
Chabikuli 2010	South Africa	100	1
Chakrapani, 2009	India	19	2
Chakrapani, 2011	India	34	2
Chan, 2011	Malawi	306	1
Chen, 2009	China	29	2
Chen, 2013	China	29	1
Chhagan, 2008	South Africa	21	1
Chileshe, 2010	Zambia	7	1
Chinkonde, 2009		40	5
Chomat, 2009	India	26	2
Ciambrone, 2006	Puerto Rico		2
Ciambrone, 2007	Puerto Rico	17	1
Clark, 2008	USA	113	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Clouse, 2013	South Africa	50	1
Cocohoba, 2013	USA	19	1
Comulada 2003	USA	253	1
Cooper, 2007	South Africa	61	1
Corneli	Uganda		1
Crane, 2006	Uganda	10	1
Crankshaw, 2010	South Africa	300	1
Culbert, 2015	Indonesia		1
Curioso, 2010	Peru	31	1
Curiosom, 2010	Peru	31	1
Daftary, 2012	South Africa	40	2
Daftary, 2013	South Africa	40	1
Dahab, 2008	South Africa	6	5
Dahab, 2011	South Africa	27	2
Dalmida, 2010	USA	20	1
Damar, 2010	Indonesia		1
Dang, 2010	USA	22	2
Dawson-Rose, 2016	Mozambique	57	1
de la Hera, 2011	Spain	23	1
de Sumari-de Boer, 2015	Tanzania	5	1
Delvaux, 2009		236	4
Demessie, 2014	Ethiopia	350	1
Demoss, 2013	USA	12	1
Denison, 2015	Congo	55	2
Dewing, 2015	South Africa	600	1
Do, 2010	Botswana	300	2
Duff, 2010	Uganda	45	8
Duwell, 2013	South Africa	172	1
Dyrehave, 2015	Guinee Bissau	494	1
Ebuy, 2015	Ethiopia	227	1
Edwards, 2006	USA	20	3
Edwards, 2012	USA	20	1
Eholie, 2009	Ivory Coast	308	1
Elliott et al., 2011	Cambodia	27	1
Elul, 2013	Rwanda	1417	2
Elwell, 2015	Malawi	78	1
Elwell, 2016	Malawi	78	2
Erlen, 1999		6	1
Essomba, 2015	Cameroon	524	1
Eyassu, 2015	South Africa	290	1
Ezekiel, 2009	Tanzania	189	1
Fagbami, 2015	USA	18	1
Ferguson, 2012	Kenya	19	2
Fetzer, 2011	Zimbabwe	40	2
Fielding-Miller, 2014	Swaziland	20	2
Flax, 2017	Malawi	64	1
Fletcher, 2006	USA	42	1
Foster, 2010	Uganda	40	2
Frank, 2009	South Africa	7	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Fredriksen-Goldsen, 2010	China	10	2
Gachanja, 2016	Kenya	16	1
Garang, 2009	Uganda	200	2
Georgette, 2016	South Africa	100	1
Georgeu, 2012	South Africa	1	1
Gilbert, 2007	South Africa		1
Gilbert, 2009	South Africa	44	1
Gilbert, 2010	USA	90	1
Gill, 2017	Rwanda	121	1
Goar, 2015	Nigeria	160	1
Golin, 2002.	USA	24	3
Golooba, 2007	South Africa	27	1
Golub, 2006	USA	42	2
Goudge, 2011	South Africa	22	3
Gourlay, 2014	Tanzania	91	1
Govender, 2015	South Africa	17	1
Granato, 2016	Ivory Coast	30	1
Graney, 2003	USA	67	1
Grant, 2008	Zambia	40	4
Gray, 2006	USA	11	1
Groh, 2011	Mozambique	164	1
Guiro, 2011	Burkina Faso	412	1
Gusdal, 2009a	Ethiopia		1
Gusdal, 2009b	Multi-country	118	3
Gusdal, 2011		79	1
Habib, 2009	Nigeria	58	1
Hammami, 2004	Belgium	11	2
Han, 2009	Thailand	27	1
Hardon, 2007		377	3
Hatchett, 2004	Malawi	46	1
Herrmann, 2012b		22	2
Hidayana, 2015	Indonesia		1
Hill, 2003		78	2
Hodgson, 2012	Zambia		3
Holtzman, 2015	USA	51	1
Hong, 2014	Namibia	390	1
Horne, 2004	France, Germany, Italy, Spain, UK, US	111	1
Horwood, 2010	USA	312	1
Hussen, 2014	Ethiopia	20	1
Ibrahim, 2011	Indonesia		2
Imelda, 2014	Indonesia		1
Izugbara, 2011			2
Jaquet, 2010	Mali	2920	2
Jeneke, 2011	South Africa	40	1
Jerome, 2011		18	2
Joglekar., 2011	India	32	1
Johnston-Roberts, 2000	USA	20	1
Johnston-Roberts, 2002	USA	28	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Johnston-Roberts, 2003	USA	38	1
Jones, 2009	South Africa	35	2
Jones, 2011	Zambia	160	1
Jones, 2012	South Africa	50	1
Kagee, 2012	South Africa	10	1
Kalanzi, 2009	Uganda		1
Kamau, 2012	Kenya	354	1
Ka'opua, 2004	USA	80	1
Karanja, 2013	Kenya	22	1
Kasenga, 2010			3
Kastner, 2014	Uganda	25	1
Katirayi, 2016a	Malawi	132	3
Katiyari, 2016b	Swaziland	132	1
Kawuma, 2014	Zimbabwe	26	1
Kemppainen, 2001	USA	46	1
Kemppainen, 2004	USA	46	2
Ketema, 2015	Ethiopia	422	1
Kgatlwane, 2006	Botswana	249	1
Khalid, 2012	Tanzania	15	1
Kiarie, 2003	Kenya		1
Kibicho, 2011	USA	19	1
Kidia, 2015	Zimbabwe	47	1
Kim, 2016	Malawi	65	3
Kimmel, 2012	South Africa	12	1
Kingori, 2012	Kenya	370	1
Kip, 2009	Botswana	400	3
Klitzman, 2004	USA	152	2
Kohler, 2014	Kenya	213	1
Konkle-Parker, 2008			2
Koole, 2016	Kenya, Uganda and Zambia	4425	1
Kourrouski, 2009	Brazil	9	1
Kremer, 2006	USA	79	1
Kremer, 2009	USA	79	1
Krummenacher, 2014	Switzerland	17	2
Kumarasamy, 2005	India	60	2
Kunapareddy, 2014	Kenya	23	1
Kunapareddy, 2015	Kenya		1
Kunihira, 2010	Uganda		1
Kunutsor, 2010	Uganda	967	2
Kuteesa, 2012	Uganda	40	1
Kyajja, 2010	Uganda	166	1
Laws, 2012	USA	46	1
Laws, 2000	USA	82	3
Lekhuleni, 2013	South Africa	25	1
Lencha, 2015	Ethiopia	239	1
Letta, 2015	Ethiopia	626	1
Lifson, 2013	Ethiopia	21	1
Lowenthal, 2014	Botswana		1
Lubega, 2010	Uganda	74	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Lubega, 2010	Uganda	1	3
Luseno, 2008	South Africa		1
Lyimo, 2012	Tanzania	61	3
MacLachlan, 2016	Namibia	10	1
Maixenchs, 2015	Mozambique	51	1
Makua, 2015	South Africa	18	1
Malangu, 2008	South Africa	180	2
Malcolm, 2000	USA	44	1
Malcolm, 2003		44	1
Markos, 2008	Ethiopia	286	1
Martin, 2011	Uganda	20	1
Martin, 2013	Latin America and Caribbean	1	1
Martin, 2013	Uganda	20	1
Masquillier, 2015	South Africa	32	1
Matovu, 2012	Uganda		2
Mattes, 2014	Tanzania	24	2
Mavhu, 2013	Zimbabwe		2
Mawar, 2007	India	31	1
Mbonye, 2013	Uganda	24	3
Mbonye, 2014	Uganda	40	1
Mbopi-Kéou, 2012	Cameroon	356	1
Mbuagbaw, 2012	Cameroon	30	2
Mburu, 2014	Zambia		1
McDonald, 2001	Australia	16	1
McDonald, 2011	Australia	13	6
McDoom, 2015	USA	20	1
McKinney, 2014	Malawi	8	1
McLean, 2017	Tanzania, Uganda and Malawi	22	1
Melchior, 2007	Brazil		1
Mendelsohn, 2014	Kenya	12	1
Merati, 2005	Indonesia		1
Merzel, 2008	USA	14	1
Meystre-Agustoni, 2000	Switzerland	37	1
Mfecane, 2011	South Africa	25	1
Midtbo, 2012	Botswana and Tanzania		2
Miller, 2002	USA	30	1
Miller, 2010	South Africa	14	1
Miller, 2012	Malawi	24	1
Mimiaga, 2010	Ukraine	16	1
Misener, 1998	USA	22	1
Mitchell, 2007	South Africa		1
Mkandawire-Valhmu, 2012	Kenya and Malawi	180	1
Mohammadpour, 2010			2
Moilola, 2012	South Africa	24	1
Monroe, 2013	USA	35	1
Montoya, 2014	USA	20	1
Moremi, 2012	South Africa	20	1
Mouala, 2006			1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Mshana, 2006	Tanzania	170	2
Mtetwa, 2013	Zimbabwe	38	1
Muessig, 2015	USA	56	1
Muhamadi, 2010	Uganda	20	2
Mupambireyi, 2014	Zimbabwe		1
Murphy, 2003	USA	39	4
Murphy, 2005	USA	74	1
Murray, 2009	Zambia	47	6
Musheke, 2012	Zambia	25	1
Musheke, 2013 (a)	Zambia	37	1
Musheke, 2013 (b)	Zambia	62	1
Musumari, 2013	Democratic Republic of Congo	38	4
Musumari, 2014	Ivory Coast	38	3
Mutabazi-Mwesigire (2014) [70]	Uganda	20	1
Mutchler, 2011	USA	25	2
Mutithi, 2015	Kenya	12	1
Mutumba, 2015	Uganda	38	2
Mutwa, 2013	Rwanda	42	2
Nachega, 2004	South Africa	12	1
Nachenga, 2006	South Africa	19	1
Nagata, 2012	Kenya	49	1
Nakiyemba, 2006	Uganda	124	1
Nam, 2008	Botswana	32	7
Napua, 2016	Mozambique	51	2
Ndlovu, 2009	Zimbabwe	15	1
Nduaguba, 2015	Nigeria	361	1
Newman, 2012	Australia	27	1
Newman, 2015 (a)	Australia	27	1
Ngarina, 2013	Tanzania	23	2
Nghoshi, 2016	Namibia	281	1
Nguyen, 2007	Multi-country		1
Nguyen, 2013	vietnam	10	1
Nozaki, 2011	Zambia	518	2
Nsimba, 2010	Tanzania	207	2
Nunn, 2010	USA	19	1
Nwauche, 2006	Nigeria	187	2
Nyanzi-Wakholi, 2009	Uganda	82	3
Nyanzi-Wakholi, 2012	Uganda	120	4
Nyogea, 2015	Tanzania		1
Oggins, 2003	USA	62	1
O'Gorman, 2010		70	3
Ohene, 2013	Ghana	683	1
Okoror, 2013	Nigeria	35	3
Oku, 2013	Nigeria	411	2
Oku, 2014	Nigeria	393	2
O'Laughlin, 2012			1
Olupot-Olupot, 2008	Uganda	40	2



<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Omenka, 2012	Nigeria	28	1
Omole, 2012	Nigeria	305	1
Omotala, 2015	Nigeria	12	1
Onyango, 2013	Kenya	116	1
Oumar, 2007	Mali	344	1
Oyore, 2013	Kenya	450	1
Parrott, 2011	Malawi	60	1
Pecoraro, 2013	USA	38	1
Penn, 2011	South Africa	34	2
Peraza, 2015	Cuba	21	1
Petersen, 2014	South Africa		1
Peterson, 2006	The Gambia	64	1
Phaswana-Mafuya, 2009	South Africa	1	1
Pienaar, 2012	South Africa	6	1
Portelli, 2012			2
Posse, 2009	Uganda		1
Powell-Cope, 2003	USA	24	4
Price et al, 2014	Malawi	43	1
Proctor, 1999	USA	39	3
Prutch, 2005	USA	15	1
Pugatch, 2002	USA	6	1
Puoane, 2012	South Africa	6	1
Pyne-Mercier	Kenya	2534	2
Radcliffe, 2006	USA	30	1
Rao, 2007	USA	25	1
Rasmussen, 2013	Guinea-Bissau	20	1
Rasschaert, 2014	Mozambique	79	1
Reback, 2003	USA	23	2
Remien, 2003	USA	152	4
Reynolds, 1999	USA	15	1
Rhodes, 2012	Russia	38	1
Richter, 2002	USA	33	2
Rivero-Mendez, 2010	Puerto Rico	1	2
Roberson, 2009	USA	12	1
Roberson, 2012	USA	12	1
Roberts, 2000 (a)	USA	28	2
Roberts, 2003	USA	23	1
Roberts, 2005	USA	20	1
Rochon, 2011	USA	31	1
Rongkavilit, 2010	Thailand	10	1
Root, 2013	Swaziland	79	1
Ross, 2011	South Africa	19	2
Roura, 2009 (a)	Tanzania	77	1
Roura, 2009 (b)	Tanzania	42	1
Roura, 2009 (c)	Tanzania	53	1
Roura, 2009 (d)	Tanzania	42	1
Rowe, 2005	South Africa	6	1
Ruanjahn, 2010	Thailand	32	3
Russell, 2003	Uganda	38	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Russell, 2016	USA	57	1
Ryan, 2003	USA	27	3
Saberi, 2013	USA	14	1
Sabin, 2008	China	36	3
Sacajiu, 2009	USA	90	1
Salami, 2010	Nigeria	253	1
Salmen, 2015	Kenya	82	1
Sam, 2015	Ghana	426	1
Samuels, 2016	Indonesia		1
Sanjobo, 2008	Zambia	60	3
Sanjobo, 2009	Zambia	60	1
Sankar, 2002	USA	15	3
Sankar, 2011	USA	80	1
Sarang, 2013	Russia	34	1
Sasaki, 2012	Zambia	157	2
Schenk, 2014	Kenya		1
Schilder, 2001	Canada	47	2
Schrimshaw, 2005	USA	158	1
Schumaker, 2008	Zambia	31	1
Seeley, 2010	Uganda	70	1
Selman, 2013	Kenya and Uganda	83	1
Senkomago, 2011	Uganda	140	2
Shaliyu, 2014	Namibia	18	1
Shambley-Ebron, 2001	USA	10	1
Shedlin, 2013	USA	113	3
Shin, 2011	Peru	13	2
Shuster, 2009	South Africa	1	2
Siegel, 2000	USA	51	2
Siril, 2014	Tanzania	78	1
Sisay, 2013	Ethiopia	518	1
Siu, 2013	Uganda	17	2
Skhosana, 2006	South Africa		1
Skovdal, 2011 (a)	Zimbabwe	78	1
Skovdal, 2011 (b)	Zimbabwe	78	1
Small, 2009	British Columbia	12	1
Smith, 2007	Namibia	22	1
Sowell, 2001	USA	322	1
Sprague, 2011		153	1
Starks, 2008	China	29	2
Stevens, 2009	USA	55	1
Stinson, 2012	South Africa	28	2
Stone, 1998	USA	56	2
Tadesse, 2014	Ethiopia	647	2
Talam, 2008	Kenya	384	2
Tarakeshwar, 2007	India		1
Taylor, 2014	USA	35	1
Tessema, 2010	Ethiopia	504	2
Theilgaard, 2011	Tanzania	40	2
Thobias, 2009	Namibia		1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Thompson, 2009	Australia	20	2
Thorpe, 2008 (a)	Australia	18	1
Thorpe, 2008 (b)	Australia	18	1
Thurman, 2010	Rwanda	75	1
Tilahun, 2012	Ethiopia	9	1
Tiruneh, 2016	Ethiopia	105	1
Tomori, 2014	Tanzania	14	1
Topp, 2010	Zambia		1
Treffry-Goatley, 2016	South Africa	20	1
Treves-Kagan, 2016	South Africa		1
Tsarenko, 2011	Australia	15	1
Tsega, 2015	Ethiopia	351	1
Tsuyuki, 2015	USA	44	1
Tuller, 2009	Uganda	41	1
Tuller, 2010	Uganda	41	2
Tumwine, 2012	Uganda	39	1
Tweya, 2014	Malawi	111	1
Ujiji, 2011	Kenya	37	2
Unge, 2010	Kenya		1
Van Dyk, 2011	vietnam	48	1
van Loggerenberg, 2015	South Africa	30	1
Van Oosterhout, 2005	Malawi	176	2
Van Tam, 2011 (a)	Vietnam		1
Van Tam, 2011 (b)	South Africa	394	1
Varga, 2008		140	1
Varga, 2008	South Africa	100	1
Vaughan, 2011	USA	31	1
Vervoort, 2009	Multi-country	30	3
Vissman, 2011	USA	25	1
Vissman, 2012	USA	20	1
Vreeman, 2012	Kenya		1
Vyankandondera (b)	Rwanda	47	2
Vyavaharkar, 2010	USA	22	1
Wagner, 2004	Uganda	24	1
Wakibi, 2011	Kenya	403	2
Walcott, 2016	USA	60	1
Walstrom, 2013	Rwanda	18	1
Wang, 2011	China	36	2
Ware, 2005			1
Ware, 2006	Multi-country	252	1
Ware, 2009	USA	52	3
Wasti, 2009	Nepal	34	1
Wasti, 2012	Nepal	17	4
Watermeyer, 2011	South Africa	1	1
Watermeyer, 2012	South Africa	26	1
Watt, 2010	Tanzania	340	2
Watt., 2009	Tanzania	36	6
Weidle, 1999	Uganda	987	1
Weiser, 2010	Uganda	47	4

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Wekesa, 2013	Nairobi	41	1
Wendorf, 2012	USA	21	1
Westerfelt, 2004	USA	21	3
Whetten, 2006	USA	611	1
Wilson, 2001	USA	66	3
Winstone, 2010		36	1
Witteveen, 2002	Netherlands	28	4
Wood, 2003	USA	36	1
Wood, 2004		36	3
Woolgar, 2014	South Africa	15	1
Wroe, 2014	Rwanda	292	1
Wrubel, 2005	USA	71	1
Wrubel, 2010	USA	40	1
Wyatt et al	USA	75	1
Zhou, 2016	Malawi	65	1
Zunner, 2015	Kenya	25	1
Abah, 2014	South Africa	588	1
Erlen, 2002			1
Abaasa, 2008	Columbia	897	1
Aboubacrine, 2007	USA	270	1
Addala, 2010	USA	13163	1
Adewuya, 2010	Zambia	182	1
Adeyemo, 2009	Nigeria	127	1
Akhila, 2010	South Africa	313	1
Alakija, 2010	India	253	1
Albrecht, 2006	Nigeria		2
Ammassari, 1200	Ethiopia		1
Amuron, 2009	Tanzania	2483	1
Asimwe, 2007	Uganda	84	1
Ayuo, 2013		4284	2
Aziz, 2011	Uganda	40	1
Bardequez, 2008	USA	519	3
Barr, 2013		19735	1
Bartos, 2010	Australia	76	1
Bastard, 2011	Senegal	330	1
Becker, 2002	USA	3788	1
Begley, 2008	Australia	179	2
Belenky, 2014	Tanzania	403	1
Bhengu, 2011	South Africa	149	1
Bianchi, 2010	South Africa		1
Bii, 2007	Kenya		2
Birbeck, 2009	Zambia	255	1
Birbeck, 2011	Zambia	496	1
Bogart, 2004	USA	181	1
Bogart, 2010	USA	214	1
Bogart, 2011	USA	315	1
Boyer, 2011	Cameroon	2381	1
Braitstein, 2011	Kenya	97	1
Braunstein, 2011	Rwanda	141	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Brinkley- Rubinstein, 2013	South Africa	171	1
Brook, 2001			1
Bullo, 2009		291	1
Carlucci, 2008	Uganda	424	1
Catz, 2000			1
Cauldbeck, 2009	India	60	1
CDC, 2013			1
Charurat, 2010	Nigeria	5760	1
Chesney, 2000			1
Chi, 2009	Zambia	27115	1
Clouse, 2010		273	1
Clouse, 2014	Zimbabwe and South Africa		1
Cohn, 2008	USA	149	3
Coria, 2012		473	1
Cowan, 2013	Zimbabwe	870	1
Crisp, 2004	USA	137	1
Cupsa, 2000			1
Dale, 2014	USA	138	1
de visser	Australia	894	1
Dean, 2012		7	2
Demas, 2005			2
Diabaté, 2007	Benin	53	1
Diabaté, 2011	Benin	747	1
Diabaté, 2013	Ivory Coast	614	1
Dilorio, 2009	USA	236	1
Dodds, 2003	USA	21	1
Down, 2014	Australia	53	1
Eholie, 2007	Ivory Coast	308	2
Ekwunife, 2012	Nigeria	212	1
Eldred, 1998			1
Erah, 2008	Nigeria	125	1
Esiru, 2013		350	1
Etard, 2007	Senegal	158	1
Etienne, 2010	Kenya, Uganda, Zambia, Nigeria and Rwanda	921	1
Falang, 2012	Nigeria	461	1
Fassinou, 2004	Ivory Coast		1
Ferguson, 2002		1129	1
Ferguson, 2014			1
Ford, 2010	South Africa	207	1
Giacomet, 2003			1
Gibb, 2003			1
Giles, 2009	Australia	45	1
Gold, 2000	Australia	270	1
Gold, 2001	Australia	20	1
Goldman, 2008	Zambia	913	1
Graham, 2013	Kenya	68	1
Grierson, 2004	Australia	925	1
Gross, 2015	Zimbabwe	262	1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Guy, 2013	Australia	961	1
Habib, 2010	Nigeria	142	1
Harzke, 2004a	USA	137	1
Harzke, 2004b	USA		1
Heckman, 2004	USA		1
Hegazi, 2010	Australia	147	1
Hermann, 2008	Australia	357	1
Hermann, 2012a	Australia	152	1
Hofer, 2004	Rio de Janeiro		1
Horne, 2008			1
Ickovics, 2002			2
Idindili, 2012	Tanzania	316	1
Jasserson, 2013	France	2952	1
Johnson, 2003			1
Jones, 2014	Zambia	446	1
Kalichman, 1999	USA	343	1
Kalichman, 2010	USA		1
Kanjipite, 2012	Zambia	2759	1
Kebede, 2012	Ethiopia	296	1
Kekwaletswe, 2014	South Africa	304	2
Kerr, 1999			1
Killam, 2010		37203	1
Kim, 2012	Malawi	1688	1
Kirsten, 2011		122	5
Kisenyi, 2013	Uganda	220	1
Kleeberger, 2001			1
Knowlton, 2001	USA	295	1
Knowlton, 2005	USA	287	1
Kohler, 2012	Kenya	615	1
Konate, 2011	Burkina Faso	658	1
Krebs, 2008	Zambia	430	1
Kreitchmann, 2012	Latin America	393	1
Kuonza, 2010		212	2
Laine, 2000			2
Lanièce, 2003		158	1
Lawan, 2012	Nigeria	124	1
Levy, 2009	Malawi		1
Li, 2010	Thailand	507	2
Lubinga, 2012	Uganda	334	1
Lyimo, 2014	Tanzania	158	1
Mandala, 2009		14815	1
Maqutu, 2010	South Africa	688	1
Maqutu, 2011	South Africa	688	1
Marcellin, 2008		533	1
Marhefka, 2004			1
Markos, 2009	Ethiopia	291	1
Martinez, 2000	USA	25	1
Mayanja, 2013	Uganda	315	1
McAllister, 2013	Australia	335	2

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
McGuire, 2010	Malawi	221	2
Medley, 2014		353	1
Mellins, 2008		396	4
Memiah, 2013		234	1
Mirkuzie, 2010		282	1
Mirkuzie, 2011		663603	1
Mitiku, 2013	Ethiopia	239	1
Moatti, 2000			1
Mohammed, 2004	USA		1
Molassiotis, 2002			1
Monreal, 2002	Brazil		1
Morojele, 2014	South Africa	304	1
Mostashari, 1998			1
Muchedzi, 2010		147	3
Muma, 1995			1
Mûnene, 2014	Kenya	392	1
Munseri, 2008	Tanzania	8	1
Murphy, 2000	USA	231	3
Muya, 2014	Tanzania	4424	1
Muyingo, 2008	Uganda and Zimbabwe	2957	1
Myer, 2012 (a)		221	2
Myer, 2012 (b)		490	1
Naar-King, 2006	USA	24	1
Nachega, 2006	South Africa		3
Nachenga, 2009	South Africa	7622	1
Nachenga, 2012	South Africa	274	1
Naidoo, 2010	South Africa	3164	1
Nakimuli- Mpungu, 2009	Uganda	122	1
Nakimuli- Mpungu, 2013	Uganda	400	1
Nassali, 2009		289	3
Ncama, 2008	South Africa	149	1
Ndiaye, 2013	Botswana	82	1
Negash, 2013	Ethiopia	355	1
Nel, 2013	South Africa	101	1
Newman, 2015 (b)	Burundi, Cameroon and DRC	18839	1
Ngidi, 2013			1
Nieuwkerk, 2001			1
Nsigaye, 2010	South Africa		1
Obirikorang, 2013	Ghana	201	1
Ochieng-Ooko, 2010	Kenya	50275	1
Olisah, 2010	Nigeria	310	1
Olowookere, 2008	Nigeria	318	2
Omosanya, 2014	Nigeria	100	1
Orrell, 2003	South Africa	289	1
Otieno, 2010	Kenya	116	1
Oyugi, 2007	Uganda	97	1
Pai, 2012		1002	1
Palmer, 2003			1
Parke, 2006	Uganda		1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Parkes-Ratanshi, 2010	Uganda	400	2
Pefura- Yone, 2013	Cameroon	889	2
Peltzer, 2010		815	6
Peltzer, 2011		746	3
Peretti-Watel, 2006	France	2932	2
Pinheiro, 2002	Brazil		1
Potchoo, 2010	Togo		2
Ramadhani, 2007	Tanzania	150	1
Ramers, 2010		57210	1
Reddington, 2000			1
Reynolds, 2004			1
Rougemont, 2009	Cameroon	312	1
Roux, 2011	Cameroon	401	1
Safren, 2005	India	304	1
Sarna, 2008	India	310	1
Savini, 2003			1
Schneider, 2004			1
Schwartz, 2001	USA	215	1
Shaahu, 2008	Nigeria	428	1
Shah, 2007	India	279	1
Sherr, 2008	UK	502	1
Shumba, 2013	Uganda	763	1
Siegel, 2001			2
Simoni, 2002	USA		1
Sogarwal, 2009	India	1366	1
Sow, 2012	Senegal	60	1
Spire, 2002	Cambodia	346	1
Spire, 2008			1
Stein, 2000			1
Sterhout, 2005	Malawi		1
Sternhell	Australia	79	1
Stinson, 2010		14987	1
Stirrat, 2006	USA	215	1
Stoskopf , 2001	USA	111	1
Stout, 2004	Costa Rica		1
Stubbs, BA; et al; 2009	Mozambique	375	1
Thielman, 2014	Tanzania	442	1
Tiyou, 2010	Ethiopia	319	1
Toth, 2013	USA	140	1
Tsague, 2010		40674	1
Tucker, 2004			1
Turner, 2000			2
Ukwe, 2010	Nigeria	299	1
Unge, 2008	Kenya	830	3
Unge, 2009	Kenya	352	1
Uzochukwu, 2009	Nigeria	174	1
Van den Ven		532	1
Van Dijk, 2009	Zambia	192	1
van Griensven, 2010	Rwanda	609	1



<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Van Schalkwyk, 2013		250	1
Vaz, 2007			2
Venkatesh, 2010	India	198	1
Vissman, 2011	USA	66	1
Vyankandondera, 2013 (a)	Rwanda	213	1
Vyavaharkar, 2008	USA	340	2
Wagner, 2009			1
Walsh, 2001			1
Wanchu, 2007	India	200	1
Wang, 2007	China	308	1
Wang, 2008	China	181	1
Watson-Jones, 2012		433	2
Weidle, 2006			1
Weigel, 2012		942	1
Weiser, 2003	Botswana	169	3
Weiser, 2014	Uganda	438	1
Whetten, 2013	Tanzania	468	1
Williams, 2006	USA	219	1
Wilson, 2002	USA	200	2
Wilson, 2004	Australia		1
Yahaya, 2006	Nigeria	100	1
Zablotska, 2009	Australia	270	1
Zekeri, 2009	USA	205	1
Afolabi, 2009	Nigeria	120	1
Akello, 2011	Bangladesh		1
Assefa, 2010	Ethiopia		3
Belzer, 1999	USA	31	1
Benoit, 2013	Kenya	30	1
Chow, 2012	Australia	188	2
Cluver, 2015	Zambia	684	2
Cummins, 2004	Australia	33	1
Ekama, 2012	Nigeria	170	2
Ezzy, 2000	Australia	1320	1
Feucht, 2007	South Africa		1
Fox, 2010	Zambia		1
Goode, 2003	Australia	18	2
Govindasamy, 2011	South Africa		1
Hosek, 2005	USA	42	1
Mavhu, 2013	Zimbabwe	229	1
McDonaldm 2010	Australia	1001	1
Mephram, 2011	South Africa	199	4
Murphy, 2001	USA	161	1
Nabukeera-Barungi, 2015	Uganda	1824	1
Naidoo, 2013	Kenya		1
Nunu, 2010	Swaziland		1
Sharma, 2007	India	226	1
Thomas, 2015	Australia	163	1
Wooley, 2012	Australia	3	1
Arrivillaga, 2012	Nigeria		1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Ahsan Ullah, 2011	Nigeria		1
Alemu, 2013	Ethiopia		1
Alfonso, 2006	South Africa		3
Auvinen, 2013	Zambia		1
Benotsch, 2008			1
Boehme AK, 2012			1
Campbell, 2015	Zimbabwe		1
Church K, 2012			1
Cook, 2009			1
Dutcher, 2011			1
Enriquez, 2013			1
Evans, 2009			1
Garland PM, 2011			1
Grierson, 2004	Australia		2
Grierson, 2011	Australia		2
Grierson, 2013	Australia		1
Groft, 2007			1
Ho, 2010	China		2
Huntington, 2011			1
Johansen, 2012			1
Joseph, 2011			1
Kempf, 2010	USA		1
McCoy, 2009	USA		1
Mill, 2009	Canada		1
Milloy, 2012			1
Moneyham, 2010	USA		1
Nakigozi, 2013	Uganda		1
Ndirangu, 2009	UK		1
Newman, 2007			2
Njunga, 2010	Malawi		1
O'Brien, 2013	Zimbabwe		1
Odlum M, 2012			1
Orner, 2008	South Africa		1
Parasher, 2011			1
Phakathi Z, 2011	South Africa		1
Plitt, 2009			1
Prentice, 2001	Canada		1
Quinlivan EB, 2013			1
Rajabiun ,2011			1
Schrader, 2011			1
Shroufi, 2013	South Africa		1
Sidat, 2007			1
Sison, 2013	USA		1
Stevens, 2009	USA		2
Tapp, 2011			1
Tripathi, 2013	Ukraine		1
Tshabalala, 2010			1
Ware, 2013			1
Wei, 2013	China		1

<b>Primary studies included in reviews (First author, Year of publication)</b>	<b>Country</b>	<b>Sample size</b>	<b>Total number of reviews including the primary study</b>
Williams, 2011			1
Winestone, 2012	Kenya		1
Xavier, 2012	USA		1
Yeap, 2010	South Africa		1

## **PART B**

## **Appendix A: Correspondence with Journal: Use of PRISMA-ScR**

## Appendix B: Correspondence with Journal: Font size

**From:** [REDACTED]  
**To:** [REDACTED]  
**Cc:**  
**Subject:** RE: (1st request) 00958445: Text size for tables  
**Date:** Thursday, 29 November 2018 17:40:17

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Dear Ms. Hendricks,

I hope all is well with you.

Please note that you can have a font size 10-12.

Should there be concern, please let me know.

Kind regards,

[REDACTED]  
Springer  
Journals Editorial Office (JEO)

## Appendix C: Instruction to Authors for BMC Systematic Reviews

<https://systematicreviewsjournal.biomedcentral.com/submission-guidelines/preparing-your-manuscript/research>

### Research

#### Criteria

Research articles include any original primary research relating to the design, conduct or reporting of systematic reviews, as well as traditional systematic review results papers.

*Systematic Reviews* strongly encourages that all datasets on which the conclusions of the paper rely should be available to readers. We encourage authors to ensure that their datasets are either deposited in publicly available repositories (where available and appropriate) or presented in the main manuscript or additional supporting files whenever possible. Please see Springer Nature's [information on recommended repositories](#).

#### Reporting standards

For completed systematic reviews, *Systematic Reviews* requires the submission of a populated PRISMA checklist and flow diagram. The flow diagram should be included in the main body of the text and the checklist should be provided as an [additional file](#), both the flow diagram and the checklist should be referenced in the text. Submissions received without these elements will be returned to the authors as incomplete. A Word file of the checklist and flow diagram can be downloaded [here](#). It is understood that for some systematic reviews certain aspects of the report may not comply fully with the PRISMA checklist. The checklist will not be used as a tool for judging the suitability of manuscripts for publication in *Systematic Reviews*, but is intended as an aid to authors to clearly, completely, and transparently let reviewers and readers know what authors did and found. Using the PRISMA guideline to write the completed systematic review report, completing the PRISMA checklist, and constructing a flow diagram are likely to optimize the quality of reporting and make the peer review process more efficient.

#### Preparing your manuscript

The information below details the section headings that you should include in your manuscript and what information should be within each section. Please note that your manuscript must include a 'Declarations' section including all of the subheadings (please see below for more information).

#### Title page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:

- "A versus B in the treatment of C: a randomized controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
- or for non-clinical or non-research studies a description of what the article reports
- list the full names, institutional addresses and email addresses for all authors
  - if a collaboration group should be listed as an author, please list the Group name as an author. If you would like the names of the individual members of the Group to be searchable through their individual PubMed records, please include this information in the "Acknowledgements" section in accordance with the instructions below
- indicate the corresponding author

## Abstract

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of systematic reviews should follow the [PRISMA](#) extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used
- **Results:** the main findings
- **Conclusions:** brief summary and potential implications
- **Systematic review registration:** if your systematic review is registered in a publicly accessible registry, include the name of the registry and registration number.

## Keywords

Three to ten keywords representing the main content of the article.

## Background

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

## Methods

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials
- a clear description of all processes, interventions and comparisons. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses



- the type of statistical analysis used, including a power calculation if appropriate

## **Results**

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

## **Discussion**

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

## **Conclusions**

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

## **List of abbreviations**

If abbreviations are used in the text they should be defined in the text at first use, and a list of abbreviations should be provided.

## **Declarations**

All manuscripts must contain the following sections under the heading 'Declarations':

- Ethics approval and consent to participate
- Consent for publication
- Availability of data and material
- Competing interests
- Funding
- Authors' contributions
- Acknowledgements
- Authors' information (optional)

Please see below for details on the information to be included in these sections. If any of the sections are not relevant to your manuscript, please include the heading and write 'Not applicable' for that section.

### ***Ethics approval and consent to participate***

Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

Studies involving animals must include a statement on ethics approval.

See our [editorial policies](#) for more information.

If your manuscript does not report on or involve the use of any animal or human data or tissue, please state "Not applicable" in this section.

### ***Consent for publication***

If your manuscript contains any individual person's data in any form (including any individual details, images or videos), consent for publication must be obtained from that person, or in the case of children, their parent or legal guardian. All presentations of case reports must have consent for publication.

You can use your institutional consent form or our [consent form](#) if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication).

See our [editorial policies](#) for more information on consent for publication.

If your manuscript does not contain data from any individual person, please state "Not applicable" in this section.

### ***Availability of data and materials***

All manuscripts must include an 'Availability of data and materials' statement. Data availability statements should include information on where data supporting the results reported in the article can be found including, where applicable, hyperlinks to publicly archived datasets analysed or generated during the study. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article. We recognise it is not always possible to share research data publicly, for instance when individual privacy could be compromised, and in such instances data availability should still be stated in the manuscript along with any conditions for access.

Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets):

- The datasets generated and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS]

- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [third party name] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [third party name].
- Not applicable. If your manuscript does not contain any data, please state 'Not applicable' in this section.

More examples of template data availability statements, which include examples of openly available and restricted access datasets, are available [here](#).

BioMed Central also requires that authors cite any publicly available data on which the conclusions of the paper rely in the manuscript. Data citations should include a persistent identifier (such as a DOI) and should ideally be included in the reference list. Citations of datasets, when they appear in the reference list, should include the minimum information recommended by DataCite and follow journal style. Dataset identifiers including DOIs should be expressed as full URLs. For example:

Hao Z, AghaKouchak A, Nakhjiri N, Farahmand A. Global integrated drought monitoring and prediction system (GIDMaPS) data sets. <http://dx.doi.org/10.6084/m9.figshare.853801>

With the corresponding text in the Availability of data and materials statement: The datasets generated during and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS].<sup>[Reference number]</sup>

### ***Competing interests***

All financial and non-financial competing interests must be declared in this section. See our [editorial policies](#) for a full explanation of competing interests. If you are unsure whether you or any of your co-authors have a competing interest please contact the editorial office. Please use the authors initials to refer to each authors' competing interests in this section.

If you do not have any competing interests, please state "The authors declare that they have no competing interests" in this section.

### ***Funding***

All sources of funding for the research reported should be declared. The role of the funding body in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript should be declared.

### ***Authors' contributions***

The individual contributions of authors to the manuscript should be specified in this section. Guidance and criteria for authorship can be found in our [editorial policies](#).

Please use initials to refer to each author's contribution in this section, for example: "FC analysed and interpreted the patient data regarding the hematological disease and the transplant. RH performed the histological examination of the kidney, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript."

### ***Acknowledgements***

Please acknowledge anyone who contributed towards the article who does not meet the criteria for authorship including anyone who provided professional writing services or materials. Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements section. See our [editorial policies](#) for a full explanation of acknowledgements and authorship criteria.

If you do not have anyone to acknowledge, please write "Not applicable" in this section.

Group authorship (for manuscripts involving a collaboration group): if you would like the names of the individual members of a collaboration Group to be searchable through their individual PubMed records, please ensure that the title of the collaboration Group is included on the title page and in the submission system and also include collaborating author names as the last paragraph of the "Acknowledgements" section. Please add authors in the format First Name, Middle initial(s) (optional), Last Name. You can add institution or country information for each author if you wish, but this should be consistent across all authors.

Please note that individual names may not be present in the PubMed record at the time a published article is initially included in PubMed as it takes PubMed additional time to code this information.

### ***Authors' information***

This section is optional.

You may choose to use this section to include any relevant information about the author(s) that may aid the reader's interpretation of the article, and understand the standpoint of the author(s). This may include details about the authors' qualifications, current positions they hold at institutions or societies, or any other relevant background information. Please refer to authors using their initials. Note this section should not be used to describe any competing interests.

## Endnotes

Endnotes should be designated within the text using a superscript lowercase letter and all notes (along with their corresponding letter) should be included in the Endnotes section. Please format this section in a paragraph rather than a list.

## References

Examples of the Vancouver reference style are shown below. See our editorial policies for author guidance on good citation practice

**Web links and URLs:** All web links and URLs, including links to the authors' own websites, should be given a reference number and included in the reference list rather than within the text of the manuscript. They should be provided in full, including both the title of the site and the URL, as well as the date the site was accessed, in the following format: The Mouse Tumor Biology Database. <http://tumor.informatics.jax.org/mtbwi/index.do>. Accessed 20 May 2013. If an author or group of authors can clearly be associated with a web link, such as for weblogs, then they should be included in the reference.

### Example reference style:

#### *Article within a journal*

Smith JJ. The world of science. *Am J Sci.* 1999;36:234-5.

#### *Article within a journal (no page numbers)*

Rohrmann S, Overvad K, Bueno-de-Mesquita HB, Jakobsen MU, Egeberg R, Tjønneland A, et al. Meat consumption and mortality - results from the European Prospective Investigation into Cancer and Nutrition. *BMC Medicine.* 2013;11:63.

#### *Article within a journal by DOI*

Slifka MK, Whitton JL. Clinical implications of dysregulated cytokine production. *Dig J Mol Med.* 2000; doi:10.1007/s801090000086.

*Article within a journal supplement*

Frumin AM, Nussbaum J, Esposito M. Functional asplenia: demonstration of splenic activity by bone marrow scan. *Blood* 1979;59 Suppl 1:26-32.

*Book chapter, or an article within a book*

Wyllie AH, Kerr JFR, Currie AR. Cell death: the significance of apoptosis. In: Bourne GH, Danielli JF, Jeon KW, editors. *International review of cytology*. London: Academic; 1980. p. 251-306.

*OnlineFirst chapter in a series (without a volume designation but with a DOI)*

Saito Y, Hyuga H. Rate equation approaches to amplification of enantiomeric excess and chiral symmetry breaking. *Top Curr Chem*. 2007. doi:10.1007/128\_2006\_108.

*Complete book, authored*

Blenkinsopp A, Paxton P. *Symptoms in the pharmacy: a guide to the management of common illness*. 3rd ed. Oxford: Blackwell Science; 1998.

*Online document*

Doe J. Title of subordinate document. In: *The dictionary of substances and their effects*. Royal Society of Chemistry. 1999. [http://www.rsc.org/dose/title of subordinate document](http://www.rsc.org/dose/title%20of%20subordinate%20document). Accessed 15 Jan 1999.

*Online database*

Healthwise Knowledgebase. *US Pharmacopeia*, Rockville. 1998. <http://www.healthwise.org>. Accessed 21 Sept 1998.

*Supplementary material/private homepage*

Doe J. Title of supplementary material. 2000. <http://www.privatehomepage.com>. Accessed 22 Feb 2000.

*University site*

Doe, J: Title of preprint. <http://www.uni-heidelberg.de/mydata.html> (1999). Accessed 25 Dec 1999.

### *FTP site*

Doe, J: Trivial HTTP, RFC2169. <ftp://ftp.isi.edu/in-notes/rfc2169.txt> (1999). Accessed 12 Nov 1999.

### *Organization site*

ISSN International Centre: The ISSN register. <http://www.issn.org> (2006). Accessed 20 Feb 2007.

### *Dataset with persistent identifier*

Zheng L-Y, Guo X-S, He B, Sun L-J, Peng Y, Dong S-S, et al. Genome data from sweet and grain sorghum (*Sorghum bicolor*). GigaScience Database. 2011. <http://dx.doi.org/10.5524/100012>.

## **Figures, tables and additional files**

See [General formatting guidelines](#) for information on how to format figures, tables and additional files.

## **Preparing main manuscript text**

Quick points:

- Use double line spacing
- Include line and page numbering
- Use SI units: Please ensure that all special characters used are embedded in the text, otherwise they will be lost during conversion to PDF
- Do not use page breaks in your manuscript

## **File formats**

The following word processor file formats are acceptable for the main manuscript document:

- Microsoft word (DOC, DOCX)
- Rich text format (RTF)
- TeX/LaTeX (use BioMed Central's TeX template)

**Please note:** editable files are required for processing in production. If your manuscript contains any non-editable files (such as PDFs) you will be required to re-submit an editable file when you submit your revised manuscript, or after editorial acceptance in case no revision is necessary.

Note that figures must be submitted as separate image files, not as part of the submitted manuscript file. For more information, see [Preparing figures](#) below.

## Additional information for TeX/LaTeX users

Please use BioMed Central's TeX template and BibTeX stylefile if you use TeX format. Submit your references using either a bib or bbl file. When submitting TeX submissions, please submit both your TeX file and your bib/bbl file as manuscript files. Please also convert your TeX file into a PDF (please do not use a DIV file) and submit this PDF as a supplementary file with the name 'Reference PDF'. This PDF will be used by our production team as a reference point to check the layout of the article as the author intended. Please also note that all figures must be coded at the end of the TeX file and not inline.

The Editorial Manager system checks for any errors in the Tex files. If an error is present then the system PDF will display LaTeX code and highlight and explain the error in a section beginning with an exclamation mark (!).

All relevant editable source files must be uploaded during the submission process. Failing to submit these source files will cause unnecessary delays in the production process.

<b>TeX templates</b>
<a href="#">BioMedCentral article</a> (ZIP format) - preferred template
<a href="#">Springer article</a> svjour3 (ZIP format)
<a href="#">birkjour</a> (Birkhäuser, ZIP format)
<a href="#">article</a> (part of the <a href="#">standard TeX distribution</a> )
<a href="#">amsart</a> (part of the <a href="#">standard TeX distribution</a> )

## Style and language

For editors and reviewers to accurately assess the work presented in your manuscript you need to ensure the English language is of sufficient quality to be understood. If you need help with writing in English you should consider:

- Visiting the [English language tutorial](#) which covers the common mistakes when writing in English.
- Asking a colleague who is a native English speaker to review your manuscript for clarity.



- Using a professional language editing service where editors will improve the English to ensure that your meaning is clear and identify problems that require your review. Two such services are provided by our affiliates [Nature Research Editing Service](#) and [American Journal Experts](#). BMC authors are entitled to a 10% discount on their first submission to either of these services. To claim 10% off English editing from Nature Research Editing Service, click [here](#). To claim 10% off American Journal Experts, click [here](#).

Please note that the use of a language editing service is not a requirement for publication in the journal and does not imply or guarantee that the article will be selected for peer review or accepted.

## **Data and materials**

For all journals, BioMed Central strongly encourages all datasets on which the conclusions of the manuscript rely to be either deposited in publicly available repositories (where available and appropriate) or presented in the main paper or additional supporting files, in machine-readable format (such as spread sheets rather than PDFs) whenever possible. Please see the list of [recommended repositories](#) in our editorial policies.

For some journals, deposition of the data on which the conclusions of the manuscript rely is an absolute requirement. Please check the Instructions for Authors for the relevant journal and article type for journal specific policies.

For all manuscripts, information about data availability should be detailed in an 'Availability of data and materials' section. For more information on the content of this section, please see the Declarations section of the relevant journal's Instruction for Authors. For more information on BioMed Centrals policies on data availability, please see our [editorial policies].

### ***Formatting the 'Availability of data and materials' section of your manuscript***

The following format for the 'Availability of data and materials' section of your manuscript should be used:

"The dataset(s) supporting the conclusions of this article is(are) available in the [repository name] repository, [unique persistent identifier and hyperlink to dataset(s) in http:// format]."

The following format is required when data are included as additional files:

"The dataset(s) supporting the conclusions of this article is(are) included within the article (and its additional file(s))."

BioMed Central endorses the Force 11 Data Citation Principles and requires that all publicly available datasets be fully referenced in the reference list with an accession number or unique identifier such as a DOI.

For databases, this section should state the web/ftp address at which the database is available and any restrictions to its use by non-academics.

For software, this section should include:

- Project name: e.g. My bioinformatics project
- Project home page: e.g. <http://sourceforge.net/projects/mged>
- Archived version: DOI or unique identifier of archived software or code in repository (e.g. enodo)
- Operating system(s): e.g. Platform independent
- Programming language: e.g. Java
- Other requirements: e.g. Java 1.3.1 or higher, Tomcat 4.0 or higher
- License: e.g. GNU GPL, FreeBSD etc.
- Any restrictions to use by non-academics: e.g. licence needed

Information on available repositories for other types of scientific data, including clinical data, can be found in our [editorial policies](#).

## Preparing figures

When preparing figures, please follow the formatting instructions below.

- Figures should be provided as separate files, not embedded in the main manuscript file.
- Each figure of a manuscript should be submitted as a single file that fits on a single page in portrait format.
- Tables should NOT be submitted as figures but should be included in the main manuscript file.
- Multi-panel figures (those with parts a, b, c, d etc.) should be submitted as a single composite file that contains all parts of the figure.
- Figures should be numbered in the order they are first mentioned in the text, and uploaded in this order.
- Figures should be uploaded in the correct orientation.
- Figure titles (max 15 words) and legends (max 300 words) should be provided in the main manuscript, not in the graphic file.
- Figure keys should be incorporated into the graphic, not into the legend of the figure.
- Each figure should be closely cropped to minimize the amount of white space surrounding the illustration. Cropping figures improves accuracy when placing the figure in combination with other elements when the accepted manuscript is prepared

for publication on our site. For more information on individual figure file formats, see our detailed instructions.

- Individual figure files should not exceed 10 MB. If a suitable format is chosen, this file size is adequate for extremely high quality figures.
- **Please note that it is the responsibility of the author(s) to obtain permission from the copyright holder to reproduce figures (or tables) that have previously been published elsewhere.** In order for all figures to be open access, authors must have permission from the rights holder if they wish to include images that have been published elsewhere in non open access journals. Permission should be indicated in the figure legend, and the original source included in the reference list.

## Figure file types

We accept the following file formats for figures:

- EPS (suitable for diagrams and/or images)
- PDF (suitable for diagrams and/or images)
- Microsoft Word (suitable for diagrams and/or images, figures must be a single page)
- PowerPoint (suitable for diagrams and/or images, figures must be a single page)
- TIFF (suitable for images)
- JPEG (suitable for photographic images, less suitable for graphical images)
- PNG (suitable for images)
- BMP (suitable for images)
- CDX (ChemDraw - suitable for molecular structures)

For information and suggestions of suitable file formats for specific figure types, please see our [author academy](#).

## Figure size and resolution

Figures are resized during publication of the final full text and PDF versions to conform to the BioMed Central standard dimensions, which are detailed below.

Figures on the web:

- width of 600 pixels (standard), 1200 pixels (high resolution).

Figures in the final PDF version:

- width of 85 mm for half page width figure
- width of 170 mm for full page width figure
- maximum height of 225 mm for figure and legend
- image resolution of approximately 300 dpi (dots per inch) at the final size

Figures should be designed such that all information, including text, is legible at these dimensions. All lines should be wider than 0.25 pt when constrained to standard figure widths. All fonts must be embedded.

### **Figure file compression**

- Vector figures should if possible be submitted as PDF files, which are usually more compact than EPS files.
- TIFF files should be saved with LZW compression, which is lossless (decreases file size without decreasing quality) in order to minimize upload time.
- JPEG files should be saved at maximum quality.
- Conversion of images between file types (especially lossy formats such as JPEG) should be kept to a minimum to avoid degradation of quality.

If you have any questions or are experiencing a problem with figures, please contact the customer service team at [info@biomedcentral.com](mailto:info@biomedcentral.com).

### **Preparing tables**

When preparing tables, please follow the formatting instructions below.

- Tables should be numbered and cited in the text in sequence using Arabic numerals (i.e. Table 1, Table 2 etc.).
- Tables less than one A4 or Letter page in length can be placed in the appropriate location within the manuscript.
- Tables larger than one A4 or Letter page in length can be placed at the end of the document text file. Please cite and indicate where the table should appear at the relevant location in the text file so that the table can be added in the correct place during production.
- Larger datasets, or tables too wide for A4 or Letter landscape page can be uploaded as additional files. Please see [below] for more information.
- Tabular data provided as additional files can be uploaded as an Excel spreadsheet (.xls) or comma separated values (.csv). Please use the standard file extensions.
- Table titles (max 15 words) should be included above the table, and legends (max 300 words) should be included underneath the table.
- Tables should not be embedded as figures or spreadsheet files, but should be formatted using 'Table object' function in your word processing program.
- Color and shading may not be used. Parts of the table can be highlighted using superscript, numbering, lettering, symbols or bold text, the meaning of which should be explained in a table legend.
- Commas should not be used to indicate numerical values.

If you have any questions or are experiencing a problem with tables, please contact the customer service team at [info@biomedcentral.com](mailto:info@biomedcentral.com).

## Preparing additional files

As the length and quantity of data is not restricted for many article types, authors can provide datasets, tables, movies, or other information as additional files.

All Additional files will be published along with the accepted article. Do not include files such as patient consent forms, certificates of language editing, or revised versions of the main manuscript document with tracked changes. Such files, if requested, should be sent by email to the journal's editorial email address, quoting the manuscript reference number. Please do not send completed patient consent forms unless requested.

Results that would otherwise be indicated as "data not shown" should be included as additional files. Since many web links and URLs rapidly become broken, BioMed Central requires that supporting data are included as additional files, or deposited in a recognized repository. Please do not link to data on a personal/departmental website. Do not include any individual participant details. The maximum file size for additional files is 20 MB each, and files will be virus-scanned on submission. Each additional file should be cited in sequence within the main body of text.

If additional material is provided, please list the following information in a separate section of the manuscript text:

- File name (e.g. Additional file 1)
- File format including the correct file extension for example .pdf, .xls, .txt, .pptx (including name and a URL of an appropriate viewer if format is unusual)
- Title of data
- Description of data

Additional files should be named "Additional file 1" and so on and should be referenced explicitly by file name within the body of the article, e.g. 'An additional movie file shows this in more detail [see Additional file 1]'.

For further guidance on how to use Additional files or recommendations on how to present particular types of data or information, please see [How to use additional files](#).

## Additional files

### Guidelines

This page provides general information for authors creating additional files to maximize the quality of those files. It includes tips on handling files like these as well as supported formats.

- [How to use additional files](#)

- [Additional files formats](#)
- [TeX templates supported by BMC](#)

### **How to use additional files**

Additional files are those that contain additional information which support or expand upon items referred to in the main manuscript. Additional files will be linked to the final published article in exactly the same form you supplied them in, but will not be displayed within the article in this format. You are encouraged to provide large data sets, tables or figures, movie files, software or other information as additional information. Results that would otherwise be indicated as "data not shown" can and should be included as additional files. Additional files are considered integral to articles published by BMC. There is no distinction between the main article and 'supplementary material'.

Figure files and tables should only be uploaded as additional files if they are too large. See tables ([small, portrait, csv or excel](#)) and figures ([larger than one page](#)).

Since weblinks and URLs frequently become broken, we require that all supplementary data are included as additional files rather than links to web pages. You should upload these files using the 'Additional material files' button in the manuscript submission tool.

Additional files published under and open access license in BMC journals are deposited in Figshare, to increase the discoverability and reuse of additional files and their related articles. Depositing additional files in Figshare also enhances the quality of articles' appearance by making the files preview-able within the published article, and enables searching across additional files via [springernature.figshare.com](http://springernature.figshare.com). More information on how Figshare supports journal article publishing is [here](#). Please [contact us](#) with questions about additional file hosting in Figshare or if you are interested in publishing a data rich - with files of >20Mb – article.

### *Inserting and referencing*

If additional files are provided, please list the following information in a separate section after the reference list:

- File name (e.g. Additional file 1).
- File format including the three-letter file extension (including name and a URL of an appropriate viewer if format is unusual).
- Title of data.
- Description of data.

Additional files should be named "Additional file 1" and so on and should be referenced explicitly by file name within the body of the article.

Additional files should be numbered in the order they are first mentioned in the text, and uploaded in this order.

### *File size and resolution*

The maximum file size for additional files is 20 MB each and files will be virus-scanned on submission.

Data over 20 MB should be deposited in a suitable permanent repository for that type of data, where one exists (e.g. GEO for microarray data). Please see our [list of recommended repositories](#) for guidance.

Additional files can be submitted in any format.

Instructions for commonly submitted file types are available within [guidelines for specific types of additional files](#).

### *Frequently asked questions*

**What are Additional files?** Additional files are files containing additional information that supports or expands upon items referred to in the main manuscript. All additional files must be referenced in the main manuscript.

**What is the difference between an additional file and a figure file?** A figure file is an image file that will appear in the final published manuscript. On the other hand, additional files will be made available alongside the published manuscript, but will not be visible within it. Additional files should be named "Additional file 1" and so on and should be referenced explicitly by file name within the body of the article.

**Can I upload my figures files as additional files?** The only time you should do this is when the figure image must be larger than A4 in order to be legible.

**Why is it important to include additional files?** Additional information is considered integral to articles published by BMC. You are encouraged to provide data sets, tables, movie files, software or other information as additional information. Results that would otherwise be indicated as "data not shown" can and should be included as additional files.

**How large can additional files be?** You should aim for all additional files to be as low a file size as possible. The maximum file size for additional files is 20 MB each.

**Is there a limit to how many additional files I can include?** No; you can include as many relevant additional files as necessary.

**Can I use image manipulation software to increase the clarity of images within additional files?**

A. Enhancement of digital images using image-editing software is acceptable practice if carried out responsibly. However, it is crucial that artefacts are not introduced and the original data is not misrepresented.

**Within my manuscript, can I make references to individual items within my additional files?**

A. Yes, items within additional files can be referenced in the main manuscript. However, please use the format set out in the following example: "See Supplementary Table 1, Additional File 1".

**Can I submit earlier versions of the final manuscript as additional files?** No.

**Can I cite references in additional files?** You can cite references in additional files, as long as you list them in a separate section within the additional file; any references that are only cited in the additional files should not be listed in the main manuscript reference list.

**Additional files formats**

This section provides information on which formats you should use for specific types of additional files.

*Additional documentation and Algorithms*

Additional documentation and algorithms can be provided in a number of formats, including PDF (Adobe Acrobat), DOC (Microsoft Word), TXT, RTF, EPS, HTML and PPT.

*Animations and Movies*

Animations can be provided in SWF (Shockwave Flash) format (or converted in a video format).

Movies in mp4, mpeg, mov, avi, swf and animated GIF formats will be embedded in the additional files page. The first frame of the movie will be used as 'poster frame' and will be shown before the user starts movie playback. Other formats will be available for download.

MOV is a common multimedia format, which is often used for saving movies and other video files. This format uses a proprietary compression algorithm developed by Apple Computer; compatible with both Macintosh and Windows platforms. MPG is a common digital video format, which typically incorporates MPEG-1 or MPEG-2 audio and video compression. AVI files can contain both audio and video data in a file container that allows synchronous audio-with-video playback.

*Audio*



Audio files can be uploaded in a number of formats, including: WAV, MP3, FLAC, AIFF and AU. WAV is a Microsoft and IBM audio file format standard for storing audio bitstreams. It is the main format used on Windows systems for raw and typically uncompressed audio.

### *Chemical Structures*

CDX (ChemDraw) is the file format for saving chemical reaction schemes prepared using ChemDraw. Suggested ChemDraw settings are:

- Chain Angle 120°
- Bond spacing 18%
- Fixed length 0.406 cm (11.5 pt)
- Bold width 0.056 cm (1.6 pt)
- Line width 0.018 cm (0.5 pt)
- Margin width 0.046 cm (1.3 pt)
- Hash spacing 0.071 cm (2 pt)

TGF (ISIS/Draw) is the file format for saving chemical reaction schemes prepared using ISIS/Draw.

### *Computational models*

We encourage authors to prepare models of biochemical reaction networks using the [Systems Biology Markup Language](#) (SBML).

### *Generic Data Files*

DAT (Data file) files are generic data files created by specific applications. They are not an ideal format to use, as they can typically only be accessed by the application that created the file. However, text within DAT files can sometimes be viewed using a text reader.

### *Geospatial Data*

KML (Keyhole Markup Language) is an XML-based language schema for expressing geographic data in two or three-dimensions. KML can be used for geospatial biomedical data suited to 3D spatial visualisation. Google Earth will be used as a viewing application for KML data.

### *Genomic sequences*

Genomic sequences should be formatted according to the Genomic Standards Consortium (GSC) and follow the minimum information about a genome sequence (MIGS) specification. The sequence should be deposited to the International Nucleotide Sequence Database Collaboration (INSDC) prior to submission and the accession numbers provided in the text of the manuscript.

### *Metabolic networks*

Networks can be defined as a collection of interactions between different pairs of nodes. Frequently used formats include KML, BioPax, SBML, PSI-MI, SIF, XML and KGML.

### *Microarray data*

The Minimum Information About a Microarray Experiment (MIAME) or Minimum Information about a high-throughput Sequencing Experiment (MINSEQE) guidelines should be adhered to when reporting microarray data and we recommend using the spreadsheet-based MAGE-TAB format. We also recommend that you include a copy of the appropriate MIAME checklist.

### *Mini-websites*

Small self-contained websites can be submitted as additional files, in such a way that they will be browsable from within the full text HTML version of the article. In order to do this, please follow these instructions:

1. Create a folder containing a starting file called index.html (or index.htm) in the root
2. Put all files necessary for viewing the mini-website within the folder, or sub-folders
3. Ensure that all links are relative (i.e. "images/picture.jpg" rather than "/images/picture.jpg" or "http://yourdomain.net/images/picture.jpg" or "C:\Documents and Settings\username\My Documents\mini-website\images\picture.jpg") and no link is longer than 255 characters
4. Access the index.html file and browse around the mini-website, to ensure that the most commonly used browsers (Internet Explorer and Firefox) are able to view all parts of the mini-website without problems; it is ideal to check this on a different machine
5. Compress the folder into a ZIP, check the file size is under 20 MB, ensure that index.html is in the root of the ZIP, and that the file has .zip extension, then submit as an additional file with your article

### *Tabular data*

Tabular data can be provided in formats including: DAT, TXT, XLS, CSV, XML and TSV.

### **TeX templates supported by BMC**

*BMC templates:*

- [bmc\\_article](#) (ZIP format)

## Appendix D: Protocol

### **Barriers and facilitators to linkage, adherence and retention among HIV positive patients: An overview of systematic reviews**

**17 August 2017**

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**Protocol registered on PROSPERO:**

[http://www.crd.york.ac.uk/PROSPERO/display\\_record.php?ID=CRD42017078155](http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017078155)

**Date of registration: 13 December 2017**

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**Title: Barriers and facilitators to linkage, adherence and retention among HIV positive patients: An overview of systematic reviews.****Background****Description of the condition: The burden of HIV/AIDS**

Human Immunodeficiency Virus (HIV) represents the greatest global public health challenge in history with approximately 78 million people been infected with the HIV virus worldwide and 35 million people who died of HIV<sup>1</sup>. Nearly 37 million people are estimated to be living with HIV, however 60% of them are aware that they have the virus and only 49% of those who know their status are accessing treatment<sup>2</sup>. Although the burden of the epidemic continues to vary considerably between countries and regions, HIV prevalence is highest in Africa<sup>1</sup> and the leading cause of death in South Africa, accounting for 25.5% of deaths<sup>3</sup>. Antiretroviral therapy initiation and adherence to antiretroviral therapy is closely linked to HIV viral suppression and patients are expected to take their medication consistently every day for the rest of their lives. The success of treatment is dependent on sufferers being diagnosed, linked to care, being on antiretroviral therapy and adherence to therapy and care.

**Description of the Issue: Linkage, adherence, retention in care**

The expansion of access to HIV testing has led thousands of people to learning about their HIV status, however only a small percentage of people are enrolling in HIV care and treatment programmes at time of diagnosis. The enrolment in care following testing positive for HIV is referred to as linkage in this overview. There are complex barriers to linkage that occur on all levels, such as, individual, relational, community and health system<sup>4</sup>. It is therefore important to understand the interrelatedness of these barriers. Persons testing positive are provided with linkage to care however, many wait until they are critically ill before seeking care. For those who do start ART there is a decline in the number from initiation and those remaining on treatment. Additionally, scaling up of services has pressured programmes to maintain care for existing patients while continuing to expand services to new patients has resulted in an increase in demand and capacity while many patients who start care discontinue treatment. The other issues of concern in this overview is retention in care and adherence. Retention in care refers to the process of helping HIV patients keep their scheduled clinic appointments, whereas adherence refers to the extent to which a patient follows a prescribed regimen of care.

**Rationale for doing this overview**

Adherence to medication continues to be a challenge in healthcare with the mitigating factors including healthcare and system related factors, condition related factors, therapy related factors and patient related factors. There is a lack of the comprehensive understanding of the barriers and facilitators of adherence and patients experiences of these factors. Current systematic reviews address the barriers and facilitators to either linkage, adherence<sup>5,6</sup> or retention in care or address various combinations of these<sup>7</sup> and include different target

populations<sup>8,9</sup>. A scoping review elicited over 25 reviews in this area of study. A systematic approach is needed to gather, evaluate and synthesize the review-level evidence on the barriers and facilitators to linkage, adherence and retention in care in HIV positive patients. Such an understanding will support the development of interventions, contribute to better service delivery and uptake and inform future research agendas. This overview aims to assess and describe the quality of review level evidence and to identify the gaps in evidence of the barriers and facilitators with regards to patient linkage, adherence and retention in care to antiretroviral therapy (ART) medication protocols for patients who are HIV positive.

## **Research Question**

What is the quality and evidence gaps of existing reviews regarding the barriers and facilitators to linkage, adherence to ART and retention in care among persons living with HIV?

## **Research Objectives**

1. To provide an overview of the available evidence at systematic review level regarding the barriers and facilitators to linkage, adherence to ART and retention in care among persons living with HIV through description of reviews.
2. To assess the quality of the available evidence at systematic review level regarding the barriers and facilitators to linkage, adherence to ART and retention in care among persons living with HIV using the Joanna Briggs Institute Critical Appraisal Checklist for Systematic Reviews.
3. To identify the barriers and identify evidence gaps to linkage, adherence to ART and retention in care among persons living with HIV using the socio-ecological framework.
4. To identify the facilitators and identify evidence gaps to linkage, adherence to ART and retention in care among persons living with HIV using the socio-ecological framework.

## **Methods**

### **Overview Design**

This overview will be descriptive of study characteristics and quality and use a qualitative framework approach to identify barriers and facilitators of linkage, adherence and retention in care of HIV positive patients. Using thematic-content analysis within a framework approach, this overview will identify the evidence gaps in existing reviews. The conceptual framework that will be used to understand the study findings was proposed by Kaufman et al.<sup>10</sup> (2014).

### **Conceptual Framework**

The model proposed by Kaufman and colleagues<sup>10</sup> (2014) includes the following factors 1. Individual (includes factors such as knowledge, emotions, motivation, socio economic status, self-efficacy and mental health), 2. Interpersonal and network (includes factors such as relationships, social networks and interpersonal violence) 3. Community (includes factors such as stigma, peer pressure and cultural norms) 4. Institutional and health system, (includes

factors such as provision of services and service integration) and 5. Structural (includes factors such as poverty, political context and gender equity) as presented in Figure 1.

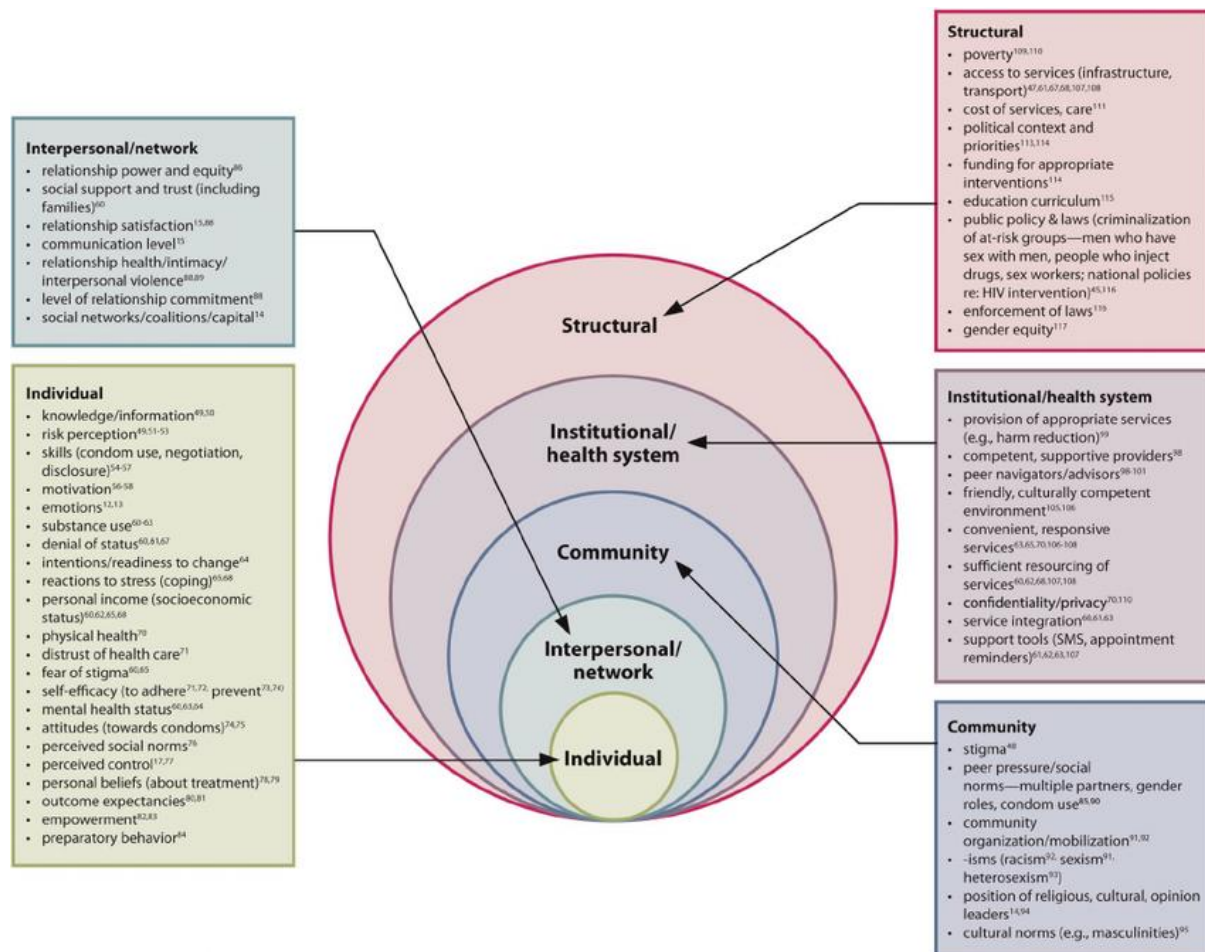


Figure 7: Kaufman et al. 2014 - Factors influencing HIV Behaviour Change Model

## Criteria for Considering Systematic Reviews for Inclusion

### Types of studies

Qualitative systematic reviews that include self-report data, quantitative studies (specifically cross sectional or survey studies that contain open ended questions), or mixed methods studies that make reference to the perceived barriers and facilitators to linkage, adherence and retention in care of HIV positive persons will be included in this overview. Systematic reviews will be defined as those reviews that had predetermined objectives, predetermined criteria for eligibility, searched at least two data sources, of which one needed to be an electronic database, and performed data extraction. Systematic reviews specifically synthesising results of randomised controlled trials, cohort studies, or case control studies only will be excluded. No studies will be excluded on the basis of inclusion of quality assessments. Studies only examining adherence pre- or post-exposure prophylaxis will be excluded. Studies without full text available at the time of this review will be identified as awaiting appraisal and excluded from this overview. No language restrictions will be placed on the inclusion of studies



in order to identify as many relevant articles as possible. An online translator service will be used for Non-English language translations.

### *Types of participants*

Children and adults living with HIV will be included as participants and studies will be excluded if the sample of interest includes populations who are not HIV positive. Although people living with HIV are the target participants in this review, information obtained from health professionals and primary caregivers will be considered. High, middle and low-income countries will be included.

### *Issue*

The issues of interest in this overview are linkage, adherence to treatment and retention in care of persons testing positive for HIV.

### *Types of outcomes*

The primary outcomes of interest are review level self-reported perceptions of barriers and facilitators to linkage, adherence and retention in care among HIV positive patients.

## **Search Methods for Identification of Systematic Reviews**

A search for systematic reviews will be conducted using the Cochrane Library (specifically the CDSR and DARE), *The Campbell Library*, MEDLINE via PubMed, SCOPUS, and CINAHL. PROSPERO will also be checked for ongoing systematic reviews. Experts in the field will be contacted and reference lists of included reviews will be checked to identify further potential reviews for inclusion. Key words that will be included in the search are: HIV, retention in care and linkage, adherence, and systematic reviews. Search terms will be modified appropriately for the various resources (see Appendix A). No language restriction will be used for included studies.

The SCOPUS search strategy is presented below:

```
(( ( TITLE ( meta-analysis ) OR ABS ( meta-analysis ) ) ) OR ( ( TITLE ( "systematic review" ) OR ABS ( "systematic review" ) ) ) ) AND ( ( TITLE-ABS-KEY ( hiv OR aids ) ) AND ( ( TITLE-ABS-KEY ( "treatment initiation" OR link* OR "link to care" OR "link to treatment" OR "linkage to treatment" OR "link into care" OR "linkage into treatment" ) OR TITLE-ABS-KEY ( retention OR retain* OR "lost to follow-up" OR ( "loss*" AND "follow up" ) OR lfu OR "loss-to-follow-up" OR attrition OR "loss to care" OR "loss to program*" OR default* OR engage* OR disengage* OR "retention in care" OR "lost to retention" ) OR TITLE-ABS-KEY ( adherence OR adher* OR compliance OR complian* OR comply OR
```

```
complied OR noncompliant* OR non-compliant* OR non-adher* OR nonadher* )))) AND  
( LIMIT-TO ( SUBJAREA , "MEDI" ) )
```

## **Systematic Review Selection**

Two authors will independently and in duplicate search and screen titles and abstracts of the records retrieved by the electronic searches for relevance; based on the participant characteristics, issues addressed, and study design. Next, the full text articles of all selected abstracts will be obtained, as well as those where there was disagreement with respect to eligibility, to determine final selection. The full-text articles will be assessed for eligibility by the primary author and checked by the second author. Together, authors will categorise the studies as included or excluded. Discrepancies and differences in opinion at the eligibility screening stage and at the assessment of full text article stage will be resolved by discussion and if needed, with a third party. Title, abstract and full text screening will be conducted in the Covidence Software<sup>11</sup> software package.

## **Data Extraction**

Data will be extracted by one author and checked by the second author using a pre-specified data extraction form (See Appendix B). Data that will be extracted will include: the key characteristics of the systematic reviews, information about the objectives, participant characteristics, setting, information about the search strategy, outcomes assessed, barriers and facilitators related to outcomes; critical appraisal tools, theoretical frameworks or models, methods of synthesis, comparisons performed, results, limitations, recommendations for policy and practice, recommendations for future research and main conclusions. Primary studies relevant to the overview will be extracted, in order to describe the overlap between primary studies in systematic reviews included. Only primary studies relevant to the outcomes of linkage, adherence and retention in care will be included in the overview to assess overlap and draw conclusions. Study authors will be contacted for any missing data if necessary. The data extraction form will be piloted and revised before using it in the study.

## **Risk of bias assessment**

The risk of bias in systematic reviews will be assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Systematic Reviews<sup>12</sup> (JBI-SR-Checklist) (see Appendix C). The critical appraisal will be conducted by the first author and checked by the second author. Discrepancies and differences in opinion at the eligibility screening stage and at the assessment of full text article stage will be resolved by discussion and if needed, mediated with a third party. The appraisal is used to assess the 'methodological quality of a study and to determine the extent to which a study has addressed the possibility of bias in its design, conduct and analysis'<sup>12</sup>. All papers selected for inclusion in the systematic review (that is – those that meet the inclusion criteria described in the protocol) need to be subjected to rigorous appraisal by two critical appraisers. No study will be excluded based on the results of the quality assessment but rather it will be used to identify weaknesses in study methodologies and to strengthen and inform the synthesis and the interpretation of the results of the study.

The JBI-SR-Checklist contains 10 guidance questions for the appraisal of qualitative reviews, and 1 additional question, 'Was the likelihood of publication bias assessed?' (see question 9 in Appendix C), for use with quantitative or mixed methods reviews. Each question can be answered as "yes", "no", or "unclear". Not applicable "NA" is also provided as an option and may be appropriate in rare instances<sup>10</sup>. The following questions from the JBI will be used to assess quality and consensus on appraisal decision will be guided by the following overview appraisal decision rules based on descriptions of appraisal questions in the JBI manual.

*1. Is the review question clearly and explicitly stated?*

The review questions are useful in guiding the search strategy, study design and how the review was conducted. Reviews with evidence of the main objective or question clearly stated that contains the PICO elements of Population, Issue, Context and Outcomes will be graded as a "yes". As this overview is not inclusive of intervention studies the PICO elements have been redefined to incorporate qualitative systematic reviews. If the review contains many questions or aims that may not be clearly defined then the review will be graded as "unclear". Reviews without review questions will be graded as a "no".

*2. Were the inclusion criteria appropriate for the review question?*

Included studies should be appropriate to the review question. The inclusion criteria but be clearly stated before an assessment can be made or this appraisal question will be marked as "unclear". If study designs are aligned to review questions, the review will be graded as a "yes", otherwise if no alignment is established the review will be graded as a "no".

*3. Was the search strategy appropriate?*

Systematic reviews use specific search strategies relevant to databases to locate evidence in the literature. Evidence of the search strategy may be available in the methods sections of the review or available in the supplementary material of the publication. The search strategy will be deemed appropriate if it contains the PICO components of the research question or the review authors provided a description of the approach with key words and how the terms were derived. A systematic review should present a clear search strategy that addresses each of the identifiable PICO components of the review question.

Some reviews, due to word limit may only provide a description of the approach to searching, the relevant key words and terms, how the terms that were ultimately used were derived, and Subject Headings or Index terms. Search limiters such as search date or language may impact the results of the search and these will be considered for each review. If reviewers state a pre-specified search strategy was used but do not provide detail of the strategy, the reviews will be considered "unclear". If no information on the search strategy or languages included is provided then the appraisal result for this question will be "no".

*4. Were the sources and resources used to search for studies adequate?*

The systematic reviews should provide evidence of a comprehensive search strategy. Databases searched should be relevant to the review with at least two or more databases being searched, such reviews will result in a “yes” appraisal. Resources may include grey literature, conference abstracts or thesis repositories. Lack of evidence of these will result in a downgrade for this overview. If search sources are not specified the review question will be appraised as a “no” and if too little information is available to make a decision then the review question will be appraised as “unclear”.

5. *Were the criteria for appraising studies appropriate?*

To be appraised as “yes” reviews need to include a clear statement that a critical appraisal tool was used and provide details of the items used to assess the included studies. Additionally, the critical appraisal tool used should be relevant to the objective and scope of the review. If both these criteria are not met the review will be downgraded to a “no”. If the review authors state that an appraisal was used but do not provide details of the appraisal, the review will be graded as “unclear”.

6. *Was critical appraisal conducted by two or more reviewers independently?*

In some instances all appraisals may have been conducted by one author and checked by another, however discrepancies must be resolved by consensus or with a third person to be graded as a “yes”. Not meeting these requirements will result in a “no”. Where no critical appraisal was used in the review, the review will be graded as a “no”. Where too little information is available to make a decision, the review will be graded as “unclear”.

7. *Were there methods to minimize errors in data extraction?*

Reviews will be graded as a “yes” if efforts to minimize errors in data extraction include extracting data in duplicate and independently, using specific tools to guide the extraction or piloting of extraction tools. If it is clear that none of these strategies are used, the review will be graded as a “no”. If no information is provided, the review will be graded as “unclear”.

8. *Were the methods used to combine studies appropriate?*

If the method of synthesis the review used is aligned to the review question, the type of review and the type of evidence included in the review will be graded as a “yes”. The appraisal will also include whether the descriptive and explanatory information support the final synthesized findings from the original research. If the data synthesis method is not aligned to the review question and method, the review will be graded as a “no”. Where too little information is available to make a decision, the review will be graded as “unclear”.

9. *Was the likelihood of publication bias assessed?*

Systematic reviews included in this overview contain qualitative studies and this question is not applicable for qualitative evidence, therefore most included studies will be graded as “not

applicable". However, there may be mixed methods reviews that present statistical tests, such as Egger's test or funnel plots to test publication bias and these can be graded as a "yes".

*10. Were recommendations for policy and/or practice supported by the reported data?*

This question assesses the review validity rather than quality and appraises whether the recommendations made are aligned clearly to the results of the review, evidence of which will result in a "yes" grade for the review question. If recommendations are provided but are not aligned to the research data, the review question will be graded as a "no". If no recommendations are provided, the review question will be graded as an "unclear".

*11. Were the specific directives for new research appropriate?*

The purpose of reviews are to identify gaps in the literature and areas where further research is identified. If review authors present recommendations for future research, relevant to findings and methods of the review, the review will be graded as "yes" for this review question. If the directives for future research are not appropriate to the review, the question will be graded as a "no". If no directives for future research are provided, the review question will be graded as "unclear".

## **Data analysis**

This overview will use a descriptive approach to report study characteristics and quality assessments of the included reviews. Key study characteristics will be cross-tabulated by study and description will include: databases searched, the date of the search, what the reviews authors searched for and what they found in terms of types of studies, types of participants, the issue of interest, the setting or context, and the main outcomes and quality appraisal. Further individual study summaries will be made available in the appendixes as per the style and formatting guidelines of the selected journal. The overlap between primary studies within the systematic reviews will be tabulated.

This overview will use a qualitative framework approach to the identify barriers and facilitators of linkage, adherence and retention in care of HIV positive patients in the reviews. Themes extracted from the systematic review will be re-organised into the overview framework of Kaufman and colleagues<sup>10</sup> (2014) and content analysis will be used to assess the barriers and facilitators identified across reviews.

This overview aims to integrate findings from multiple source papers to answer specific questions and will therefore use thematic-content analysis without theory generation<sup>13</sup> to aggregate findings from source papers and to identify evidence gaps in existing reviews as shown in Figure 2 below. The strengths of this approach is it's inclusivity of many methodological types of studies and provides a transparent and auditable process of data synthesis, allows for large volumes of literature to be synthesised and provides clear identification of prominent themes<sup>14,15,16</sup>. The challenge of using thematic analysis without theory generation is that when summarising themes reported in the reviews the synthesis may not be able to develop higher order constructs at an interpretivist level and synthesis is only

able to summarise the themes into the framework. Meta-synthesis on a theoretical interpretivist level will not be part of this descriptive qualitative overview. Findings will be supported with tables and figures where relevant. A meta-analysis of quantitative data will not form part of this overview.

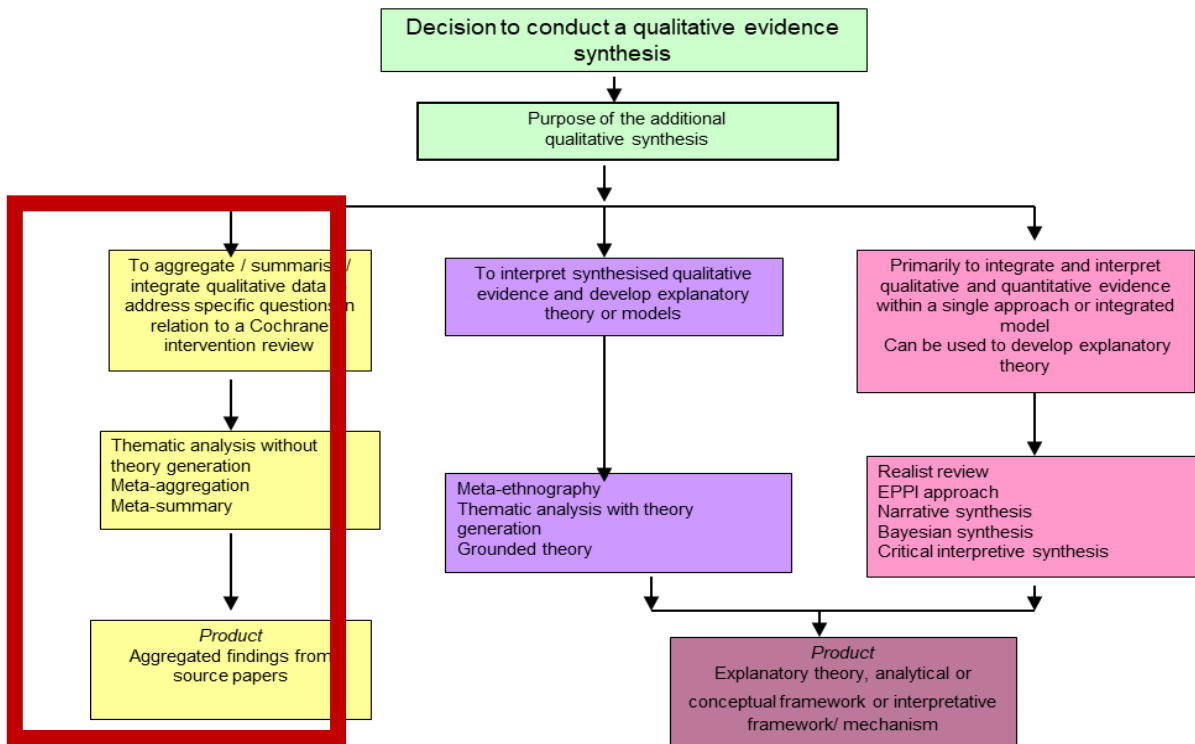


Figure 8: Noyes and Lewin 2011- Qualitative evidence synthesis method decision flow chart

## Reporting guidelines

This protocol has been prepared using the framework for review of reviews in Chapter 22 of the Cochrane Handbook for Systematic Reviews of Interventions<sup>17</sup> as a guide. The overview will use the Enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) guidelines<sup>18</sup> as well as the style and formatting requirements of the selected journal for publication.

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## Specific search strategies for databases

### Pubmed

Search	Query
<u>#29</u>	Search (#28) OR #20
<u>#20</u>	Search (#18) AND (((("HIV Infections"[Majr] OR hiv[MeSH Major Topic]) OR ((HIV[Title/Abstract] OR hiv-1[Title/Abstract] OR hiv-2*[Title/Abstract] OR hiv1[Title/Abstract] OR hiv2[Title/Abstract] OR "hiv infect*"[Title/Abstract] OR "human immunodeficiency virus"[Title/Abstract] OR "human immune deficiency virus"[Title/Abstract] OR "human immuno-deficiency virus"[Title/Abstract] OR "human immune-deficiency virus"[Title/Abstract] OR ((human immun*) AND(deficiency virus))[Title/Abstract] OR "acquired immunodeficiency syndromes"[Title/Abstract] OR "acquired immune deficiency syndrome"[Title/Abstract] OR "acquired immuno-deficiency syndrome"[Title/Abstract] OR "acquired immune-deficiency syndrome"[Title/Abstract] OR ((acquired immun*)[Title/Abstract] AND (deficiency syndrome))[Title/Abstract] OR HIV/AIDS[Title/Abstract]))) Filters: Systematic Reviews; Field: Title/Abstract
<u>#28</u>	Search (#27) AND #19 Field: Title/Abstract
<u>#27</u>	Search (#25) OR #23 Field: Title/Abstract
<u>#19</u>	Search (#18) AND (((("HIV Infections"[Majr] OR hiv[MeSH Major Topic]) OR ((HIV[Title/Abstract] OR hiv-1[Title/Abstract] OR hiv-2*[Title/Abstract] OR hiv1[Title/Abstract] OR hiv2[Title/Abstract] OR "hiv infect*"[Title/Abstract] OR "human immunodeficiency virus"[Title/Abstract] OR "human immune deficiency virus"[Title/Abstract] OR "human immuno-deficiency virus"[Title/Abstract] OR "human immune-deficiency virus"[Title/Abstract] OR ((human immun*) AND(deficiency virus))[Title/Abstract] OR "acquired immunodeficiency syndromes"[Title/Abstract] OR "acquired immune deficiency syndrome"[Title/Abstract] OR "acquired immuno-deficiency syndrome"[Title/Abstract] OR "acquired immune-deficiency syndrome"[Title/Abstract] OR ((acquired immun*)[Title/Abstract] AND (deficiency syndrome))[Title/Abstract] OR HIV/AIDS[Title/Abstract]))) Field: Title/Abstract
<u>#25</u>	Search ("Meta-Analysis as Topic"[Mesh]) OR "Meta-Analysis" [Publication Type] Field: Title/Abstract

Search	Query
<u>#23</u>	Search “integrative research” OR “integrative review*” OR “integrative overview*” OR “research integration*” OR “research overview*” OR “collaborative review*” OR “collaborative overview*” OR “systematic review*” OR “systematic overview*” OR “methodological overview*” OR “methodologic overview*” OR “methodological review*” OR “methodologic review*” OR “quantitative review*” OR “quantitative overview*” OR “quantitative syntheses*” OR “data syntheses*” OR “qualitative overview*” OR “qualitative syntheses*” OR “data extraction” OR “data abstraction*” Field: Title/Abstract
<u>#18</u>	Search (((#17) OR #14) OR #13) OR #11 Field: Title/Abstract
<u>#11</u>	Search "treatment initiation" or link or linkage Field: Title/Abstract
<u>#13</u>	Search Retention OR retain* OR "lost to follow-up" OR ("loss*" AND "follow up") OR LTFU OR “loss-to-follow-up” OR attrition OR "loss to care" OR "loss to program*" OR default* OR engage* OR disengage* OR “retention in care” OR “lost to retention” Field: Title/Abstract
<u>#14</u>	Search Adherence OR adher* OR compliance OR complian* OR comply OR complied OR noncomplian* OR non-complian* OR non-adher* OR nonadher* Field: Title/Abstract
<u>#17</u>	Search "Medication Adherence"[Majr] Field: Title/Abstract
<u>#10</u>	Search “treatment initiation” OR link* Field: Title/Abstract
<u>#9</u>	Search “treatment initiation” OR link* OR “link to care” OR “link to treatment” OR “linkage to treatment” OR “link into care” OR “linkage into treatment” Field: Title/Abstract
<u>#8</u>	Search “treatment initiation” OR link* OR “link to care” OR “link to treatment” OR “linkage to treatment” OR “link into care” OR “linkage into treatment”
<u>#7</u>	Search (("HIV Infections"[Majr]) OR hiv[MeSH Major Topic]) OR ((HIV[Title/Abstract] OR hiv-1[Title/Abstract] OR hiv-2*[Title/Abstract] OR hiv1[Title/Abstract] OR hiv2[Title/Abstract] OR “hiv infect*”[Title/Abstract] OR “human immunodeficiency virus”[Title/Abstract] OR “human immune deficiency virus”[Title/Abstract] OR “human immuno-deficiency virus”[Title/Abstract] OR “human immune-deficiency virus”[Title/Abstract] OR ((human immun*) AND(deficiency virus))[Title/Abstract] OR “acquired immunodeficiency syndromes”[Title/Abstract] OR “acquired immune deficiency

Search	Query
	syndrome"[Title/Abstract] OR "acquired immuno-deficiency syndrome"[Title/Abstract] OR "acquired immune-deficiency syndrome"[Title/Abstract] OR ((acquired immun*)[Title/Abstract] AND (deficiency syndrome))[Title/Abstract] OR HIV/AIDS[Title/Abstract])
<u>#6</u>	Search "HIV Infections"[Majr]
<u>#4</u>	Search hiv[MeSH Major Topic]
<u>#1</u>	Search (HIV[Title/Abstract] OR hiv-1[Title/Abstract] OR hiv-2*[Title/Abstract] OR hiv1[Title/Abstract] OR hiv2[Title/Abstract] OR "hiv infect*"[Title/Abstract] OR "human immunodeficiency virus"[Title/Abstract] OR "human immune deficiency virus"[Title/Abstract] OR "human immuno-deficiency virus"[Title/Abstract] OR "human immune-deficiency virus"[Title/Abstract] OR ((human immun* AND(deficiency virus))[Title/Abstract] OR "acquired immunodeficiency syndromes"[Title/Abstract] OR "acquired immune deficiency syndrome"[Title/Abstract] OR "acquired immuno-deficiency syndrome"[Title/Abstract] OR "acquired immune-deficiency syndrome"[Title/Abstract] OR ((acquired immun*)[Title/Abstract] AND (deficiency syndrome))[Title/Abstract] OR HIV/AIDS[Title/Abstract])

### Cinahl EbscoHost

#	Query
S16	S10 AND S15
S15	S11 OR S12 OR S13 OR S14
S14	TI ( meta analysis or meta-analysis or metaanalysis ) OR AB ( meta analysis or meta-analysis or metaanalysis )
S13	MH systematic review
S12	TI ( "integrative research" OR "integrative review*" OR "integrative overview*" OR "research integration*" OR "research overview*" OR "collaborative review*" OR "collaborative overview*" OR "systematic review*" OR "systematic overview*" OR "methodological overview*" OR "methodologic overview*" OR "methodological review*" OR "methodologic review*" OR "quantitative review*" OR "quantitative overview*" OR "quantitative syntheses*" OR "data syntheses*" OR "qualitative overview*" OR "qualitative syntheses*" OR "data extraction" OR "data abstraction*" ) OR AB (

	“integrative research” OR “integrative review*” OR “integrative overview*” OR “research integration*” OR “research overview*” OR “collaborative review*” OR “collaborative overview*” OR “systematic review*” OR “systematic overview*” OR “methodological overview*” OR “methodologic overview*” OR “methodological review*” OR “methodologic review*” OR “quantitative review*” OR “quantitative overview*” OR “quantitative syntheses*” OR “data syntheses*” OR “qualitative overview*” OR “qualitative syntheses*” OR “data extraction” OR “data abstraction*” )
S11	PT systematic review
S10	S4 AND S9
S9	S5 OR S6 OR S7 OR S8
S8	MH medication adherence
S7	TI ( Adherence OR adher* OR compliance OR complian* OR comply OR complied OR noncompliant* OR non-compliant* OR non-adher* OR nonadher* ) OR AB ( Adherence OR adher* OR compliance OR complian* OR comply OR complied OR noncompliant* OR non-compliant* OR non-adher* OR nonadher* )
S6	TI ( Retention OR retain* OR "lost to follow-up" OR ("loss*" AND "follow up") OR LTFU OR “loss-to-follow-up” OR attrition OR "loss to care" OR "loss to program*" OR default* OR engage* OR disengage* OR “retention in care” OR “lost to retention” ) OR AB ( Retention OR retain* OR "lost to follow-up" OR ("loss*" AND "follow up") OR LTFU OR “loss-to-follow-up” OR attrition OR "loss to care" OR "loss to program*" OR default* OR engage* OR disengage* OR “retention in care” OR “lost to retention” )
S5	TI ( “treatment initiation” OR link* OR “link to care” OR “link to treatment” OR “linkage to treatment” OR “link into care” OR “linkage into treatment” ) OR AB ( “treatment initiation” OR link* OR “link to care” OR “link to treatment” OR “linkage to treatment” OR “link into care” OR “linkage into treatment” )
S4	S1 OR S2 OR S3
S3	TI ( HIV OR hiv-1 OR hiv-2* OR hiv1 OR hiv2 OR “hiv infect*” OR “human immunodeficiency virus” OR “human immune deficiency virus” OR “human immunodeficiency virus” OR “human immune-deficiency virus” OR ((human immun*) AND(deficiency virus)) OR “acquired immunodeficiency syndromes” OR “acquired immune deficiency syndrome” OR “acquired immuno-deficiency syndrome” OR “acquired immune-deficiency syndrome” OR ((acquired immun*) AND (deficiency syndrome)) or HIV/AIDS ) OR AB ( HIV OR hiv-1 OR hiv-2* OR hiv1 OR hiv2 OR “hiv infect*” OR “human immunodeficiency virus” OR “human immune deficiency virus” OR “human immuno-deficiency virus” OR “human immune-deficiency virus” OR

	((human immun*) AND(deficiency virus)) OR “acquired immunodeficiency syndromes” OR “acquired immune deficiency syndrome” OR “acquired immunodeficiency syndrome” OR “acquired immune-deficiency syndrome” OR ((acquired immun*) AND (deficiency syndrome)) or HIV/AIDS )
S2	MH hiv infection
S1	MW hiv

## Cochrane Library

ID	Search	Hits
#1	MeSH descriptor: [HIV] explode all trees	2896
#2	MeSH descriptor: [HIV Infections] explode all trees	
#3	"human immunodeficiency virus"	
#4	"human immuno-deficiency virus"	
#5	"acquired immunodeficiency syndrome"	
#6	acquired immuno-deficiency syndromes	
#7	"acquired immunodeficiency syndromes"	
#8	acquired immuno-deficiency syndrome	
#9	AIDS	
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8	
#11	"treatment initiation" or link* or "link to care" or "link to treatment" or "linkage to treatment" or "link into care" or "linkage into treatment"	
#12	Retention or retain* or "lost to follow-up" or ("loss*" and "follow up") or LTFU or "loss-to-follow-up" or attrition or "loss to care" or "loss to program*" or default* or engage* or disengage* or "retention in care" or "lost to retention"	
#13	Adherence or adher* or compliance or complian* or comply or complied or noncomplan* or non-complian* or non-adher* or nonadher*	
#14	#11 or #12 or #13	
#15	#14 and #10	
#16	MeSH descriptor: [Medication Adherence] explode all trees	
#17	#14 or #16	
#18	#10 and #17	

#19 #1 or #2

#20 #19 and #17

## SCOPUS

(( ( TITLE ( meta-analysis ) OR ABS ( meta-analysis ) ) ) OR ( ( TITLE ( "systematic review" ) OR ABS ( "systematic review" ) ) ) ) AND ( ( TITLE-ABS-KEY ( hiv OR aids ) ) AND ( ( TITLE-ABS-KEY ( "treatment initiation" OR link\* OR "link to care" OR "link to treatment" OR "linkage to treatment" OR "link into care" OR "linkage into treatment" ) OR TITLE-ABS-KEY ( retention OR retain\* OR "lost to follow-up" OR ( "loss\*" AND "follow up" ) OR ltfu OR "loss-to-follow-up" OR attrition OR "loss to care" OR "loss to program\*" OR default\* OR engage\* OR disengage\* OR "retention in care" OR "lost to retention" ) OR TITLE-ABS-KEY ( adherence OR adher\* OR compliance OR complian\* OR comply OR complied OR noncomplan\* OR non-complian\* OR non-adher\* OR nonadher\* ) ) ) ) AND ( LIMIT-TO ( SUBJAREA , "MEDI" ) ) )

## Campbell Library:

HIV or AIDS

## PROSPERO: (limit to ongoing reviews)

HIV adherence, HIV linkage, HIV and retention

<b>Data Extraction Form</b>				
<b>Study ID (First Author, Year):</b>				
<b>Reviewer:</b>			<b>Date:</b>	
<b>Citation:</b>				
<b>Information about the search</b>				
Databases Searched (including <i>n</i> and <i>names</i> )				
Other sources searched				
Date range of Search				
Language restriction				
<b>Information about included studies</b>				
Number of included studies				
Number of included studies relevant to this overview				
Number of excluded studies				
Number of primary studies relevant to the overview				
Types of studies (n)	RCT	Cohort	Cross sectional	Qualitative
	Retrospective Record Review	Intervention/ Evaluation	Mixed Methods	Unclear
Participants (including <i>n</i> )	Comment:	Group	N	Demographics

Predetermined objectives				
Phenomenon of Interest				
Predetermined criteria for eligibility				
Outcomes of Interest	Linkage	Adherence	Retention in Care	
Context/Setting	Rural		Urban	
Country/ies				
Research Question/Objectives				
Methods of synthesis				
Appraisal tool used for included studies				
<b>Information about main findings</b>				
Barriers: Individual				
Barrier: Interpersonal/ network				
Barriers: Community				
Barrier: Institutional/ health system				
Barriers: Structural				
Facilitator: Individual				
Facilitators: Interpersonal/ network				
Facilitators: Community				
Facilitators: Institutional/ health system				
Facilitators: Structural				



Conceptual Framework (including existing or developed for study)	
Limitations	
Recommendations for practice and policy	
Recommendations for research	
Comments or discussion by authors	
<b>Authors Details</b>	
Number of authors	
Contact author	
Email	
Contact Telephone	
Contact author Institution	
Does the author need to be contacted?	

### JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

	Yes	No	Unclear	Not applicable
12. Is the review question clearly and explicitly stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Were the inclusion criteria appropriate for the review question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Was the search strategy appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. Were the sources and resources used to search for studies adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the criteria for appraising studies appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was critical appraisal conducted by two or more reviewers independently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were there methods to minimize errors in data extraction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were the methods used to combine studies appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was the likelihood of publication bias assessed? (exclude for use with qualitative synthesis)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were recommendations for policy and/or practice supported by the reported data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were the specific directives for new research appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall appraisal: Include <input type="checkbox"/> Exclude <input type="checkbox"/> Seek further info <input type="checkbox"/>				

Comments (Including reason for exclusion)

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