

Evaluating the impact of family physicians within the district health system of South Africa

by

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Declaration

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

This dissertation includes one original paper published in a peer reviewed journal, two unpublished publications that were accepted for publication in a peer reviewed journal, as well as one original paper submitted for publication in a peer reviewed journal. The development and writing of the papers (published and unpublished) were the principal responsibility of myself and, for each of the cases where this is not the case, a declaration is included in the dissertation indicating the nature and extent of the contributions of co-authors.

_ Date: December 2017

Abstract

The majority of the South African population are dependent on the public health sector in helping them deal with the quadruple burden of disease, consisting of HIV/AIDS and tuberculosis, maternal and child health problems, non-communicable diseases as well as trauma and violence-related injuries. The post-1994 South African government has embraced the global shift towards primary health care (PHC) as the vehicle for delivering quality health care to all. The health of communities is better in countries with strong PHC-centred health systems. Global evidence supports PHC delivered by primary care teams that include doctors with postgraduate training in family medicine (family physicians). However, the evidence on the contribution of family physicians (FPs) to strengthening health systems is mainly derived from high income countries.

African leaders and policy makers are looking for local evidence on the potential role of FPs, as investment in the training and development of a new cadre of specialists in family medicine represents a significant financial commitment within the health system. According to a 2015 national consensus paper, South African FPs have six roles in the PHC team: care provider to patients, consultant to the PHC team (mainly nurses and doctors), champion of community-oriented PHC, clinical governance leader (focus on quality improvement), clinical trainer of students and registrars, and capacity building of the PHC team members.

FPs are working in various aspects of the South African district health system (DHS), namely district hospitals, primary care facilities (health centres and clinics) and community based PHC teams (community health workers). The DHS consists of all health services relating to the health and wellbeing of a community within a defined geographic area (the health district).

The discipline of family medicine was made a specialty in 2007 by the South African health professions council and resulted in re-structured training of FPs in keeping with the training model of other medical specialities. Graduates from this new training model have entered the DHS since 2011. These graduates are deployed in a heterogeneous manner in the different provinces, which reflect the uncertainty among policy makers and health managers on how best to use FPs in their districts. FPs represent a costly human resource investment in an environment dominated by vertical disease programmes and nurse-driven PHC services. This uncertainty together with the paucity of local evidence paved the way for a

national study that was conceptualised in response to a joint funding call of the National Department of Health and EuropeAid in 2013, titled: *“Strengthening primary health care through primary care doctors and family physicians”*.

This PhD research project represents one component of the overall project that aimed to evaluate the contribution of FPs to the DHS in South Africa. The study aimed to evaluate the impact of FPs within the DHS of South Africa. The study objectives are shown below:

- A. To describe the perceived impact of FPs in terms of their six roles within the DHS.
- B. To describe co-health workers’ perception of the impact of FPs compared to medical officers who had received no postgraduate training.
- C. To compare the perceived impact of FPs between metropolitan and rural districts, between facility types (district hospitals vs. primary care facilities), as well as by training programme model (graduation before and after 2011).
- D. To explore the perceptions of district managers regarding the impact of FPs in the following three domains: health system performance, clinical processes and health outcomes.
- E. To assess the influence of FPs at primary care facilities and district hospitals. The influence of FPs was evaluated in terms of two domains: health system performance, and quality of clinical processes across the burden of disease.
- F. To evaluate the impact of an increase in FP supply in each district (number per 10 000 population) on key health system performance indicators, key clinical processes and key health outcomes.

The abstracts of the four articles presented for the degree are presented here. Each article describes a different methodological approach towards addressing the central research question.

Abstract: Article 1

Title

The perceived impact of family physicians on the district health system in South Africa: a cross-sectional survey.

Background

Evidence from first world contexts support the notion that strong PHC teams contain FPs. African leaders are looking for evidence from their own context. The roles and scope of practice of FPs are also contextually defined. The South African family medicine discipline has agreed on six roles. These roles were incorporated into a family physician impact assessment tool, previously validated in the Western Cape Province.

Methods

A cross-sectional study design was used to assess the perceived impact of FPs across seven South African provinces. All FPs working in the DHS of these seven provinces were invited to participate. Sixteen respondents per enrolled FP were asked to complete the validated 360-degree assessment tool.

Results

A total number of 52 FPs enrolled for the survey (a response rate of 56.5%) with a total number of 542 respondents. The mean number of respondents per FP was 10.4 (SD = 3.9). The perceived impact made by FPs was high for five of the six roles. Co-workers rated their FP's impact across all six roles as higher, compared to the other doctors at the same facility. The perceived beneficial impact was experienced equally across the whole study setting, with no significant differences when comparing location (rural vs. metropolitan), facility type or training model (graduation before and \geq 2011).

Conclusions

The findings support the need to increase the deployment of FPs in the DHS and to increase the number being trained as per the national position paper.

Abstract: Article 2

Title

The bird's-eye perspective: how do district health managers experience the impact of family physicians within the South African district health system? A qualitative study.

Background

Health policy makers in Africa are looking for local solutions to strengthen primary care teams. A South African national position paper (2015) described six aspirational roles of FPs

working within the DHS. However, the actual contributions of FPs are unclear at present; and, evidence is required as to how this cadre may be able to strengthen health systems.

Methods

Using semi-structured interviews, this study sought to obtain the views of South African district health managers about the impact made by FPs within their districts on health system performance, clinical processes and health outcomes.

Results

A number of benefits of FPs to the health system in South Africa were confirmed, including: their ability to enhance the functionality of the local health system by increasing access to a more comprehensive and coordinated health service, and by improving clinical services delivered through clinical care, capacitating the local health team and facilitating clinical governance activities.

Conclusions

District managers confirmed the importance of all six roles of the FP and expressed both direct and indirect ways in which FPs contribute to strengthening health systems' performance and clinical outcomes. FPs were seen as important clinical leaders within the district healthcare team. Managers recognised the need to support newly appointed FPs to clarify their roles within the healthcare team and to mature across all their roles. This study supports the employment of FPs at scale within the South African DHS according to the national position paper on family medicine.

Abstract: Article 3

Title

Measuring the influence of family physicians within the South African district health system: a cross-sectional observational study.

Purpose

Evidence of the influence of FPs on health care is required to assist managers and policy makers with human resource planning in Africa. Since the international argument for FPs

derives mainly from research in high income countries, this study aimed to evaluate the influence of FPs on the South African DHS.

Methods

A cross-sectional observational study design compared 15 district hospitals and 15 community health centres with FPs to the same number without, across seven South African provinces. Facilities with FPs were compared with matched control facilities in terms of health system performance and clinical processes.

Results

District hospitals with FPs generally scored better in terms of health system performance and clinical processes. Significantly fewer paediatric mortality-associated modifiable factors were found in these district hospitals (mean score intervention 2.2, control 4.7, $p=0.049$). In contrast, the community health centres without FPs generally scored better in terms of health system performance and clinical processes, with a significant difference in terms of continuity (mean score intervention 2.79, control 3.03, $p=0.034$) and coordination of care (mean score intervention 3.05, control 3.51, $p=0.016$).

Conclusions

In this study, district hospitals with FPs generally scored better in terms of health system performance and clinical processes. The suggestion of a lack of or even negative influence in community health centres was surprising. The study supports the need for further research to explain the findings at the primary care level, which were not consistent with the global literature.

Abstract: Article 4

Title

Examining the influence of family physician supply on district health system performance in South Africa: An ecological analysis of key health indicators.

Background

The supply of appropriate health workers is a key building block in the World Health Organization's model of effective health systems. Primary care teams are stronger if they

contain doctors with postgraduate training in family medicine. The contribution of such FPs to the performance of primary care systems has not been evaluated in the African context. FPs with postgraduate training entered the South African DHS from 2011.

Aim

This study aimed to evaluate the impact of FPs within the DHS of South Africa. The objectives were to evaluate the impact of an increase in family physician supply in each district (number per 10 000 population) on key health indicators.

Setting

All 52 South African health districts were included as units of analysis.

Methods

An ecological study evaluated the correlations between the supply of FPs and routinely collected data on district performance for two time periods: 2010/2011 and 2014/2015.

Results

Five years after the introduction of the new generation of FPs, this study showed no demonstrable correlation between family physician supply and improved health indicators from the macro-perspective of the district.

Conclusion

The lack of a measurable impact at the level of the district is most likely because of the very low supply of FPs in the public sector. Studies which evaluate impact closer to the family physician's circle of control may be better positioned to demonstrate a measurable impact in the short term.

Main conclusion

This study's contribution to the evidentiary basis for advancing family medicine within South Africa and the African region, draws on its findings from within the FP's circle of influence (co-workers within the same facility), as well as from the vantage point of district managers who are employing FPs. These findings confirm that FPs are making a difference through their six agreed roles, by influencing the district health system's performance and clinical

processes across the quadruple burden of disease. The district health system should continue to employ FPs, especially at facility-level within the sub-district, where FPs will be best positioned to exert their direct and indirect effects on patient care. The study findings also provide evidence to support the influence of FPs in the broader African context, as many countries share a similar understanding of the FP roles and a similar health system context. Future research may focus on repeating the study when the FP supply is greater, on understanding the contextual enabling factors and constraints that may influence the ability of FPs to exercise their full potential, as well as on conceptualising the process of FP role clarification and maturation within health care teams.

Opsomming

Die meeste Suid-Afrikaners is afhanklik van die publieke gesondheidsorgsektor om hul viervoudige siektelas aan te spreek, wat MIV/VIGS en tuberkulose, moeder- en kindergesondheidsprobleme, nie-oordraagbare chroniese siektes, sowel as trauma en geweld-verwante beserings, insluit. Die post-1994 Suid-Afrikaanse regering het die wêreldwye verskuiwing na die klem op primêre gesondheidsorg (PGS) aanvaar as die meganisme om gehalte gesondheidsorg aan die hele bevolking te bied. Gemeenskappe se gesondheid is beter in lande met sterk PGS-gesentreerde gesondheidstelsels. Internasionale navorsing ondersteun PGS verskaf deur primêre gesondheidsorgspanne, wat dokters insluit met 'n nagraadse opleiding in huisartskunde (huisartse). Die navorsingsbevindinge rakende die bydrae van huisartse tot die verbetering van gesondheidstelsels kom egter hoofsaaklik vanuit hoë-inkomste lande.

Afrika-leiers en -beleidmakers is op soek na plaaslike bewyse rakende die potensiële rol van huisartse, aangesien die belegging in die opleiding en ontwikkeling van hierdie spesialiste in huisartskunde 'n beduidende finansiële belegging vir die gesondheidstelsel verteenwoordig. Volgens 'n 2015 nasionale konsensus dokument, vertolk Suid-Afrikaanse huisartse ses rolle in die PGS-span, naamlik: klinikus, konsultant vir die PGS-spanlede (hoofsaaklik verpleegsters en dokters), voorstander van gemeenskapsgeoriënteerde PGS, kliniese leier (met 'n fokus op kwaliteit verbetering), kliniese opleier van studente en kliniese assistent, en kapasiteitsbou van die PGS-spanlede.

Huisartse is werksaam in verskeie aspekte van die Suid-Afrikaanse distriksgesondheidstelsel (DGS), naamlik distrikshospitale, primêre gesondheidsorgfasiliteite (daghospitale en klinieke) en gemeenskapsgebaseerde PGS-spanne (gemeenskapsgesondheidswerkers). Die DGS bestaan uit alle gesondheidsdienste wat verband hou met die gesondheid en welsyn van 'n gemeenskap binne 'n bepaalde geografiese gebied (die gesondheidsdistrik).

Die huisartskunde dissipline is in 2007 deur die Suid-Afrikaanse Raad vir Gesondheidsberoepes as 'n nuwe spesialiteit aanvaar. Dit het gelei tot 'n hersiene nagraadse opleidingsprogram vir huisartse in ooreenstemming met die opleidingsmodel van ander mediese spesialiteitsrigtings. Afgestudeerdes van hierdie nuwe opleidingsmodel is sedert 2011 in die DGS werksaam. Hierdie afgestudeerdes word egter op verskeie wyses in die

verskillende provinsies aangestel, wat 'n weerspieëling is van die mate van onsekerheid onder beleidmakers en gesondheidsbestuurders rakende die beste wyse om huisartse in hul distrikte aan te wend. Huisartse verteenwoordig 'n duur menslike hulpbronbelegging in 'n omgewing wat oorheers word deur vertikale siekteprogramme en verpleegdiensgedrewe PGS-dienste. Hierdie onsekerheid, tesame met die gebrek aan plaaslike navorsingsbevindinge, het die weg gebaan vir 'n nasionale studie, wat gekonseptualiseer is in reaksie op 'n gesamentlike befondsingsgeleentheid verskaf deur die Nasionale Departement van Gesondheid en EuropeAid in 2013, getiteld: *"Die versterking van primêre gesondheidsorg deur primêre sorg dokters en huisartse"*.

Hierdie PhD-navorsingsprojek verteenwoordig een gedeelte van die algehele projek wat daarop gemik was om die bydrae van huisartse in die DGS in Suid-Afrika na te vors. Die studie het ten doel om die impak van huisartse binne die DGS van Suid-Afrika te evalueer. Die studie doelwitte was as volg:

- A. Om die waargenome impak van huisartse te beskryf in terme van hul ses rolle binne die DGS.
- B. Om mede-gesondheidswerkers se ervaring van die impak van huisartse te beskryf in vergelyking met mediese beamptes sonder nagraadse opleiding.
- C. Die vergelyking van die waargenome impak van huisartse tussen metropolitaanse en landelike distrikte, tussen fasiliteits-tipes (distrikshospitale teenoor primêre gesondheidsorgfasiliteite), sowel as opleidingsmodel (afgestudeer voor en na 2011).
- D. Om die ervaring van distriksbestuurders rakende die impak van huisartse in die volgende drie areas te ondersoek: gesondheidsorgstelsel funksionering, kliniese prosesse en gesondheids uitkomst.
- E. Om die invloed van huisartse in primêre gesondheidsorgfasiliteite en distrikshospitale te evalueer. Die invloed van huisartse is geëvalueer in terme van twee domeine: gesondheidstelsel funksionering en die kwaliteit van kliniese prosesse.
- F. Om die impak van 'n toename in huisartsgetalle in elke distrik (getal per 10 000 bevolking) te evalueer op sleutel gesondheidsorg prestasie-aanwysers, sleutel kliniese prosesse en sleutel gesondheidsuitkomst.

Die abstrakte van die vier artikels wat vir die doktorsale graad aangebied word, word hier vertoon. Elke artikel beskryf 'n ander metodologiese invalshoek rakende die sentrale navorsingsvraag.

Opsomming: Artikel 1

Titel

Die waargenome impak van huisartse op die distriksgesondheidstelsel in Suid-Afrika: 'n dwarsnitstudie.

Agtergrond

Navorsingsbevindings uit die eerste wêreldwye steun die idee dat sterk PGS-spanne huisartse moet bevat. Afrika-leiers soek bewyse uit hul eie omgewing. Die rolle en omvang van die praktyk van huisartse word ook deur hul konteks bepaal. Die Suid-Afrikaanse huisartskunde dissipline het op ses rolle ooreengekom. Hierdie rolle is ingesluit in 'n huisarts impak-meet-instrument, wat voorheen in die Wes-Kaap Provinsie bekragtig was.

Metodes

'n Dwarssnitstudie-ontwerp is gebruik om die waargenome impak van huisartse in sewe Suid-Afrikaanse provinsies te bepaal. Alle huisartse wat in die DGS van hierdie sewe provinsies werksaam was, was genooi om deel te neem. Sestien respondente per huisarts is genader om die bekragtigde 360-grade-meetinstrument te voltooi.

Resultate

Twee-en-vyftig huisartse het ingestem om deel te neem aan die studie ('n responskoers van 56.5%) met 'n totale aantal van 542 respondente. Die gemiddelde aantal respondente per huisarts was 10.4 (SD = 3.9). Die waargenome impak wat deur huisartse gemaak is, was hoog vir vyf van die ses rolle. Mede-werkers het hul huisartse se impak oor al ses rolle as hoër aangeskryf, vergeleke met die ander dokters wat in dieselfde fasiliteit werksaam is. Die waargenome voordelige impak is gelymatig oor die hele studie-omgewing ervaar, met geen beduidende verskille in terme van ligging (landelik teenoor metropolitaanse), fasiliteitstipe of opleidingsmodel (gradeplegtigheid voor en \geq 2011).

Gevolgtrekkings

Die bevindinge ondersteun die behoefte aan meer huisartse in die DGS, asook om die opleidingsgetalle volgens die nasionale konsensus dokument te verhoog.

Opsomming: Artikel 2

Titel

Die groter prentjie: hoe ervaar distriksgesondheidsorg-bestuurders die impak van huisartse in die Suid-Afrikaanse distriksgesondheidstelsel? 'n Kwalitatiewe studie.

Agtergrond

Gesondheidsbeleidmakers in Afrika benodig plaaslike oplossings om primêre sorgspanne te versterk. 'n Suid-Afrikaanse nasionale konsensus dokument (2015) het die ses rolle van huisartse binne die DGS beskryf. Die werklike bydraes van huisartse is egter tans onduidelik en bewyse word benodig oor hoe hierdie gesondheidsorgwerkers kan bydra tot die versterking van gesondheidsorgstelsels.

Metodes

Hierdie studie het deur middel van semi-gestruktureerde onderhoude die opinies van Suid-Afrikaanse distriksgesondheidsorg-bestuurders ingewin, rakende die impak van huisartse in hul distrikte in die areas van gesondheidstelsel-funksionering, kliniese prosesse en gesondheidsuitkomst.

Resultate

'n Aantal voordele wat huisartse aan die gesondheidstelsel in Suid-Afrika toevoeg is bevestig, insluitende: hul vermoë om die werking van die plaaslike gesondheidstelsel te verbeter deur toegang tot 'n meer omvattende en gekoördineerde gesondheidsdienste te bevorder en deur kliniese dienste te versterk deur middel van gesondheidsorg, die opleiding van die plaaslike gesondheidsorgspan, asook deur die fasilitering van kliniese bestuursaktiwiteite.

Gevolgtrekkings

Distriksbestuurders het die belangrikheid van al ses rolle van die huisarts bekragtig en het beide direkte en indirekte maniere aangedui waardeur huisartse bydra tot die bevordering van gesondheidstelsels se werking en kliniese uitkomst. Huisartse word gesien as

belangrike kliniese leiers in die distriksgesondheidsorgspan. Bestuurders ondersteun die belang daarvan om nuut-aangestelde huisartse te help om hul rolle binne die gesondheidsorgspan uit te klaar, sodat hulle ten volle in al hul rolle ontwikkel. Hierdie studie ondersteun die indiensneming van huisartse in groter getalle in die Suid-Afrikaanse DGS volgens die nasionale huisartskunde konsensus dokument.

Opsomming: Artikel 3

Titel

Die invloedsbepaling van huisartse in die Suid-Afrikaanse distriksgesondheidstelsel: 'n dwarsnit waarnemingstudie.

Doelstelling

Navorsingsbewyse rakende die invloed van huisartse op gesondheidsorg word benodig deur bestuurders en beleidmakers tydens menslike hulpbronbeplanning in Afrika. Aangesien die internasionale bewysgrond rondom die waarde van huisartse hoofsaaklik uit navorsing in hoë-inkomste lande kom, het hierdie studie daarop gemik om die invloed van huisartse op die Suid-Afrikaanse DGS te evalueer.

Metodes

'n Dwarssnit waarnemingstudie-ontwerp het 15 distrikshospitale en 15 gemeenskapsgesondheidsentrums (daghospitale) met huisartse vergelyk met dieselfde aantal sonder huisartse in sewe Suid-Afrikaanse provinsies. Fasiliteite met huisartse is vergelyk met afgepaarde kontroles in terme van gesondheidstelselwerking en kliniese prosesse.

Resultate

Distrikshospitale met huisartse het oor die algemeen beter gevaar in terme van gesondheidstelselwerking en kliniese prosesse. Daar is aansienlik minder pediatriese mortaliteit-verwante wysigbare faktore in hierdie distrikshospitale aangetref (gemiddelde telling ingryping 2.2, kontrole 4.7, $p = 0.049$). In teenstelling hiermee, het die gemeenskapsgesondheidsentrums sonder huisartse oor die algemeen beter tellings behaal in terme van gesondheidstelselwerking en kliniese prosesse, met 'n beduidende verskil in

kontinuiteit (gemiddelde telling ingryping 2,79, kontrole 3,03, $p = 0,034$) en koördinerings van sorg (gemiddelde telling ingryping 3,05, kontrole 3,51, $p = 0,016$).

Gevolgtrekkings

In hierdie studie het distrikshospitale met huisartse oor die algemeen beter gevaar in terme van gesondheidstelselwerking en kliniese prosesse. Die bevinding van 'n gebrek aan of selfs negatiewe invloed in gemeenskapsgeestesentrums was onverwag. Die studie steun verdere navorsing om hierdie bevindinge op die primêre sorgvlak te verklaar, aangesien dit nie ooreenstem met internasionale navorsingsbevindinge nie.

Opsomming: Artikel 4

Titel

Die ondersoek van die invloed van huisartse op die werking van die distriksgesondheidstelsel in Suid-Afrika: 'n ekologiese analise van sleutel gesondheidsaanwysers.

Agtergrond

Die voorsiening van toepaslike gesondheidswerkers vorm 'n belangrike bousteen in die Wêreldgesondheidsorganisasie se model van effektiewe gesondheidstelsels. Primêre gesondheidsorgspanne is sterker indien hulle dokters met nagraadse opleiding in huisartskunde bevat. Die bydrae van sulke huisartse tot die werking van primêre gesondheidsorgstelsels is nog nie voorheen in die Afrika-konteks bepaal nie. Huisartse met nagraadse opleiding word sedert 2011 in die Suid-Afrikaanse DGS aangestel.

Doel

Hierdie studie het gepoog om die impak van huisartse in die DGS van Suid-Afrika te evalueer. Die doelwitte was om die impak van 'n toename in die huisarts-getalle in elke distrik (getal per 10 000 bevolking) op sleutel gesondheidsaanwysers te evalueer.

Studie omgewing

Al 52 Suid-Afrikaanse gesondheidsdistrikte was as analise-eenhede ingesluit.

Metodes

'n Ekologiese studie het die korrelasies tussen die aantal huisartse en roetine-versamelde data rakende distrikswerking geëvalueer vir twee tydperke: 2010/2011 en 2014/2015.

Resultate

Vyf jaar na die ingebruikneming van die nuwe generasie huisartse, kon hierdie studie geen bewysbare verband vind tussen die aantal huisartse en verbeterde gesondheidsaanwysers vanuit die makro-perspektief van die distrik nie.

Slotsom

Die gebrek aan meetbare impak op die vlak van die distrik is waarskynlik as gevolg van die baie lae huisarts-getalle in die openbare sektor. Studies wat die invloed nader aan die huisarts se onmiddellike invloedseer evalueer, kan meer geskik wees om 'n meetbare impak te toon in die korttermyn.

Hoof gevolgtrekking

Hierdie studie se bydrae tot die navorsingsbewysgrond rakende die uitbou van die huisartskunde dissipline in Suid-Afrika en die breër Afrika-streek, baseer sy bevindinge op dié van die huisarts se invloedseer (mede-werkers binne dieselfde fasiliteit), sowel as op die opinies van distriksbestuurders wat huisartse indiensneem. Hierdie bevindings bevestig dat huisartse 'n verskil maak via hul ses ooreengekome rolle, deur die werking en kliniese prosesse van die distriksgesondheidstelsel te versterk oor die volledige viervoudige siektelas. Die distriksgesondheidsstelsel moet voortgaan om huisartse aan te stel, veral op fasiliteitsvlak in die subdistrik, waar huisartse hul direkte en indirekte invloed ten beste op pasiëntsorg kan uitoefen. Dié studiebevindinge steun ook die invloed van huisartse in die breër Afrika-konteks, aangesien baie lande 'n soortgelyke begrip van die huisarts-rolle het en 'n soortgelyke gesondheidsstelsel konteks deel. Toekomstige navorsing kan gerig word op 'n opvolg-studie wanneer die huisarts-getalle toegeneem het, om die kontekstuele bevorderingsfaktore asook -beperkings wat die huisarts se vermoëns om hul volle potensiaal te beoefen beïnvloed, beter te begryp, asook rondom die uitbou van die huisarts-rol uitklaring en ervaringsbou in hul gesondheidsorgspanne.

Dedication

I dedicate this work to my loving wife, Mariaan, my beautiful daughters, Jana and Sabine, as well as my parents, Klaus-Gerd and Magda von Presentin. Thank you for your ongoing support and love during this journey.

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List of Abbreviations

ANC: antenatal care

AIDS: acquired immune deficiency syndrome

ART: antiretroviral therapy

ANOVA: analysis of variance

BRICS: Brazil, Russia, India, China and South Africa

BUR: bed utilization rate

CDM: chronic disease management

CFPSA: the College of Family Physicians of South Africa

CDC: community day centre

CHC: community health centre

CHWs: community health workers

Child PIP: child problem identification programme

CI: confidence interval

CMSA: the Colleges of Medicine of South Africa

CNPs: clinical nurse practitioners

COPC: community-oriented primary care

COPD: chronic obstructive pulmonary disease

COREQ: consolidated criteria for reporting qualitative research

CPD: continuous professional development

CYPR: couple year protection rate

DCSTs: district clinical specialist teams

DH: district hospital

DHB: District Health Barometer

DHS: district health system

DMs: district managers

DRC: District Research Committee

EC: Eastern Cape

FaMEC: Family Medicine Education Consortium

FCFP(SA): Fellowship of the College of Family Physicians of South Africa

FM: family medicine

FPs: family physicians

FS: Free State

GDP: gross domestic product

GLM: generalized linear model

GP: Gauteng Province

GPs: general practitioners

HIV: human immunodeficiency virus

HPCSA: Health Professions Council of South Africa

HSP: health systems performance

HREC: Human Research Ethics Committee

HRH: human resources for health

IG: Indiran Govender

IHMR: In-Hospital Mortality Rates

IQR: interquartile range

IMCI: Integrated Management of Childhood Illness

KBvP: Klaus B von Pressentin

KZN: KwaZulu-Natal

LBR: Laurel Baldwin-Ragaven

LG: local government

LMIC: low and middle income country

LP: Limpopo Province

MCH: maternal and child health

MDB: Medical and Dental Professions Board

MFGP(SA): Membership of the Faculty of General Practice (South Africa)

MMed: Master of Medicine (postgraduate academic degree)

MOs: medical officers

MOU: midwife obstetrics unit

MP: Mpumalanga

MRC: Medical Research Council (South Africa)

NC: Northern Cape

NCDs: non-communicable diseases

NCS: National Core Standards

NHI: National Health Insurance

NW: North West

NDOH: South African National Department of Health

OHSC: Office of Health Standards Compliance

PCAT: primary care assessment tool

PCR: polymerase chain reaction

PCV: pneumococcal vaccine

PHC: primary health care

PHRC: Provincial Health Research Committee

PMTCT: prevention of mother-to-child transmission

PRIMAFAMED: Primary Care & Family Medicine Education Network (Africa)

PIIP: perinatal problem identification programme

QUALICOPC: Quality and Costs of Primary Care in Europe

QOC: quality of clinical care and health outcomes

RCGP: Royal College of General Practitioners (United Kingdom)

RJM: Robert J Mash

RPGB: Roelf Petrus Gerhardus Botha

RV: Rota virus

SAAFP: South African Academy of Family Physicians

SD: standard deviation

SDGs: Sustainable Development Goals

SPMS: Staff Performance Management System

STIs: sexually transmitted infections

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

SU: Stellenbosch University

TB: tuberculosis

TBCP: Tuberculosis Control Programme

The Network: TUFH: The Network: Towards Unity for Health

TME: Tonya M Esterhuizen

UET: Undergraduate Education and Training

UHC: Universal Health Coverage

UK: United Kingdom

UNITRA: University of Transkei

USA: United States of America

VLIR: Flemish Inter-University Council (Vlaamse Interuniversitaire Raad)

WBOTs: ward-based outreach teams

WC: Western Cape

WHO: World Health Organization

WJS: Wilhelm Johannes Steinberg

WONCA: World Organization of Family Doctors

CHAPTER 1

INTRODUCTION AND OVERVIEW OF THE THESIS

1.1 INTRODUCTION

This chapter introduces the reader to the thesis and describes the rationale for the study within the South African context. The argument for the social value of the study, the aim and objectives and the overview of the thesis, are included in this chapter.

1.2 THE SOCIAL VALUE OF THE STUDY

The 2008 World Health Report “Primary Health Care - Now More Than Ever” emphasised that strong primary health care (PHC) systems lead to better health outcomes for the population they serve.(1,2) Such strong PHC systems offer first contact care that is patient-centred with an orientation to the patient’s family and community context, embedded in a service that is accessible, comprehensive, integrated, continuous, and community-orientated, and in which patient-care is well co-ordinated.(1,3–5) The report warned against oversimplified approaches to PHC in low or middle income countries, which only focus on priority diseases or rely on unsupported health workers who are poorly equipped for the complexity of PHC.(1) The report noted that strong and effective PHC systems usually include “physicians with a specialisation in family medicine or general practice”.(1) The World Health Assembly has also recommended that PHC be offered by a multidisciplinary team that includes a family physician (FP).(6–10)

In the African region, healthcare is characterised by a significant gap between the high burden of disease and the scarcity of healthcare workers to address this burden, especially doctors, nurses and midwives.(11–13) In the 20th century, the development of family medicine (FM) in Africa consisted mainly of initiatives taken in South Africa and Nigeria.(14) A study exploring the question “what is family medicine in Africa” used an international Delphi-consensus process to define the key principles of FM.(15) The findings highlighted core values and organisational principles, which relate to those described in the World Health Report’s description of a strong PHC system.(1) The study confirmed that there is a specific role for such a clinical discipline in the African PHC team. Following these findings,

the scene was set for the 2009 WONCA (World Organization of Family Doctors) Africa regional conference at which participants reached a consensus statement on FM in Africa, describing the role of the FP in Africa as “a clinical leader and consultant in the primary health care team, ensuring primary, continuing, comprehensive, holistic and personalized care of high quality to individuals, families and communities.” This consensus document forms the core understanding and basis for further development of FM in Africa.(16)

Responding to post-Apartheid imperatives to provide universal health coverage to millions of previously uninsured individuals, the South African National Department of Health (NDOH) has embarked on a project of PHC re-engineering, as the first step in a progression to national health insurance (NHI) and universal health coverage (UHC).(17,18) Some of the PHC re-engineering strategies of the NDOH include: embracing a more community-oriented approach by creating ward-based outreach teams (WBOT) with community health workers, supported by nurses and a doctor, who are responsible for a designated group of households; creating district clinical specialist teams (DCSTs) with a FP as one of the designated specialists, with a focus on improving maternal and child health care; improving school health care for children and adolescents; and, defining the norms and standards for the ideal PHC clinic (this policy includes the goal that every clinic should have access to a doctor). The White Paper on NHI was gazetted on 30 June 2017 (18) and provides some detail on how UHC will be provided to all South Africans. Such reforms are aligned with the country’s domestic and international commitments to universal human rights norms and standards in health.(1,19) These efforts are also driven by the obligation to reduce inequities in health and access to health care that unfortunately still persist along racial and socio-economic lines.(20–22)

These socio-economic disparities are further compounded by the South African mixture of health problems, its so-called quadruple burden of disease, consisting of: HIV/AIDS and tuberculosis (the estimated overall HIV prevalence rate in 2016 was approximately 12,7% of the total South African population, with 18,9% of the population aged 15–49 years estimated to be HIV positive; in addition, South Africa has one of the highest burdens of tuberculosis in the world, with tuberculosis remaining the number one leading cause of death in 2015); maternal and child health (MCH), with inter-provincial gradients in infant mortality rate ranging from 16.5 per 1,000 live births in the Western Cape to 42.8 per 1,000

live births in the Eastern Cape; non-communicable diseases (NCDs) with a 7.6% prevalence of diabetes in 2015 (ages 20 – 79 years) and 31.8% prevalence of hypertension in 2012 (ages 15 years and older); and, violence and injuries (limited data available: the 2016 South African Health Review stated that “injuries are perhaps the most neglected component of the quadruple burden of disease in South Africa”; the Statistics South Africa Victims of Crime Survey 2014/15 showed that most households were of the opinion that the levels for both violent and non-violent crimes had increased in their areas of residence between 2011 and 2014).(20–27)

The post-1994 democratic government phased in the district health system (DHS) model from 1997 as the PHC service delivery mechanism (see Chapter 2 for more detail on the DHS).(28) South Africa’s population of just under 55 million people live within nine provinces which are further sub-divided into 52 health districts. In 2014, these health districts contained 331 health centres and 255 district hospitals (with a total number of 30 703 in-patient beds, an average bed utilization rate of 72% and an average inpatient stay of 6.5 days).(24) The national average PHC utilisation rate in 2014 was 2.4 visits per person per year to a PHC facility (this is a reflection on the access and availability of services).(24) At least 36% of the population live in rural (non-urban) areas, but are served by only 12% of the country’s doctors and 19% of its nurses.(29) Less than half of the gross domestic product (GDP) expenditure on health is spent in the public sector (8.9% of the GDP spent on health; 4.3% of GDP spent in public sector).(30)

South Africa is better resourced in comparison with other African countries and has met the World Health Organization (WHO) targets for human resources for PHC: 2.28 doctors, nurses and midwives per 1,000 population.(13,31) However, these targets represent the bare minimum number of health workers. The national healthcare worker average values (per 100,000 population) for 2015 are presented in Table 1.1.(24) The South African human resources for health (HRH) are still unequally distributed in its two-tiered health system consisting of a public and private sector, with recent figures showing that around 70% of medical practitioners (specialist and non-specialist doctors) work in the private sector, which is used by 16% of the population.(30,32) A 2015 report mentions several causes for the low supply of doctors, such as emigration of doctors and the limited training capacity of South African medical schools.(33) South Africa’s nine medical schools produce around 1300

new doctors per year, which is very low compared to the annual doctor output of other BRICS (Brazil, Russia, India, China and South Africa) country medical school systems.(30)

Looking at the numbers alone will not suffice, as South Africa is facing additional significant challenges in terms of its HRH strategy: skills deficits and gaps in skills mixes in the workforce team; managerial and supervisory capacity required to “optimally deploy, utilise, support and motivate the available health workers by effective human resource management and quality management tools to create working environments that would enable them to achieve their personal, professional and organisational goals”; training of new entrants and re-training of the existing workforce to meet the changing health care demands; and, effective leadership and stewardship at a more macro-level with the ability to “consolidate these HRH essentials into a coherent whole, and then to steer it towards desirable goals”.(32)

South African PHC workers are mainly-facility based, with nurses providing 80% of primary care contact.(34) Nurses at PHC facilities are supported by the broader professional team (doctors, pharmacists, allied health professionals and lay counsellors), often based at community health centres and district hospitals.(30) The WBOT initiative (described above as part of the PHC re-engineering strategies to provide community-based, preventative care) includes community health workers (CHWs), who are mainly employed by non-governmental organisations working in partnership with the DOH.(35) Recently, another health worker category, clinical associates, was introduced as a mid-level doctor. The first graduates of the clinical associate programmes entered the South African DHS in 2011. They are trained to work under the supervision of doctors and to strengthen the district hospital service.(36) All members of the primary care team are seen as generalists and should work together in a multidisciplinary team approach that embraces the principles of medical generalism.(7,37)

Table 1.1. South African national average of public sector health care workers in 2015.(24)

Public sector healthcare worker cadre	Staffing numbers per 100,000 uninsured population*
Dentists (non-specialist)	2.5
Doctors (non-specialist)	30.8

Doctors (specialists)	11.1
Professional nurses	151.3
Enrolled nurses	68.6
Nursing assistants	77.5
Student nurses	15.3
Radiographers	6.1
Psychologists	2.7
Pharmacists	11.0
Occupational therapists	2.9
Physiotherapists	2.9

*Uninsured population: population without medical aid.

Within the context of the health system, as outlined above, has come an increased need to reach consensus on the role of the FP in the South African DHS, and the need for evidence on the potential contribution of FPs to health system strengthening. FM was introduced as a new speciality in South Africa during 2007, which led to the establishment of 4-year postgraduate training programmes with doctors in accredited registrar posts and a single national exit examination.⁽³⁸⁾ Since 2011, graduates from the new registrar programmes have been employed in newly-created specialist posts in the DHS at both district hospitals and primary care facilities.⁽³⁸⁾ Despite the commitment to employing FPs in the DHS, managers still have many questions regarding the impact of FPs and what exactly their role is or should be.^(39,40) Previous research has revealed significant clinical skills gaps in the DHS, due in part to variation in competencies between medical officers (the term used for primary care doctors without postgraduate training, working in the public sector).⁽⁴¹⁾ Decision makers can see the potential value in addressing these skills gaps, but would like more evidence, especially as creating FP posts have a cost implication (with higher salaries compared to other health workers such as community health workers).⁽⁴²⁾ Divergent views on whether having specialty status and investing in a rigorous 4-year training programme, meets the health needs of the country, also exist within the FM community.^(43,44) This dilemma is compounded by the apparent limited understanding of this new discipline and considerable confusion at NDOH policy level.⁽⁴⁵⁾ The National HRH policy and Ideal clinic

policy recognise the need for a generalist doctor in PHC facility teams.(46,47) The HRH policy describes the role of the FP in the DCSTs, albeit with a more narrow focus on MCH.(46) The NHI white paper recognises the role of the FP in the district hospital, but illogically positions the FP within a department of FM in the district hospital rather than recognising that the whole hospital is a generalist environment.(18) The National Development Plan highlights the role of FPs in terms of clinical governance and leading quality improvement in the DHS.(17)

A national position paper on the contribution of family physicians to district health services was written in 2015 by academic leaders of the South African FM community, on request by the NDOH leadership, Dr T Carter (Deputy Director-General: Workforce planning and development) and Ms J Hunter (Deputy Director-General: PHC).(38) A round table meeting was held between them and Profs Naidoo, Hellenberg and Mash, who represented the discipline of Family Medicine of the South African Academy of Family Physicians (SAAFP) and the College of Family Physicians of South Africa (CFPSA). The purpose of this position paper was to provide a comprehensive overview of family physicians' contribution to the health system and to outline issues that need attention, such as role clarification between FPs and other health worker categories, the different deployment strategies (DCSTs with a focus on MCH vs. a more comprehensive PHC focus at sub-district level) training to scale (adequate provision of registrar posts), as well as the implications for FP posts and career paths. The NDOH's HR policy suggested aiming for 0.2 FPs per 10 000 population and calculated the baseline deficit of 888 FPs.(46) At the beginning of 2015, there were around 208 FPs working in the DHS (public sector), which equates to 0.035 per 10,000 population.(48) World Bank figures suggest an overall FP rate of 0.1 per 10,000 in both public and private sectors.(48) These FP supply rates may be compared with countries such as Brazil (0.2 per 10,000) and China (1.2 per 10,000).(30) The authors of the national position paper recommended that, as a country, the initial short-term goal should be for one FP to be employed per sub-district and one per district hospital (680 FPs as a short-term goal).(38) The Western Cape aims to have a family physician at each district hospital (> 50 beds) and each community health centre (> 30 000 people served).(40) Evidence on the impact and contribution of FPs will enable policy-makers to make better informed decisions on the role of FPs in the developing the DHS.

1.3 KNOWLEDGE GAP AND SCIENTIFIC VALUE OF THE STUDY

Chapter 2 will provide a more detailed review of the current literature, required to appreciate the scientific value of this study, which aims to evaluate the impact of FPs within the DHS on a national scale.

The impact of family doctors with postgraduate training is evident in other health systems; however, this evidence is mainly derived from high income countries.(10, 25-28) Africa is the continent with the least engagement with FM (in terms of training and deployment) and most previous research has focused on the need for and the conceptualisation of the role of FM in African health systems.(16,49–52) There is some evidence for the contribution of FM from low and middle income countries (e.g. Brazil) but very little from the African context.(14,53)

South Africa has to some extent led the interest in developing FM within the DHS (Nigeria has also, but appears to have a different model with FM often located in large referral hospitals).(14) Some research on the contribution of FM was conducted within the Western Cape Province, but it was quite localised and small scale.(40,42,54–56)

There is a need for more objective evidence on the current impact made by South African FPs and to understand the contextual factors which influence their impact on DHS performance. There was therefore a need for a larger study with a national frame to evaluate the initial contribution of FM to the health system over the first 5-years.

1.4 CONCEPTUAL FRAMEWORKS

Two conceptual frameworks were used to design the study, as well as interpret its findings: a framework of the DHS and a framework on the roles of the South African FP. The origin of these frameworks is described in more detail in Chapter 2 of the thesis.

AIM

The study aimed to evaluate the impact of FPs within the district health system of South Africa.

1.5 OBJECTIVES

The objectives, which are related to the four different sections of the study, are shown below.

- A. To describe the perceived impact of FPs in terms of their six roles within the district health system
- B. To describe co-health workers' perception of the impact of FPs compared to medical officers who had received no postgraduate training
- C. To compare the perceived impact of FPs between metropolitan (urban) and rural districts, between facility types (district hospitals vs. primary care facilities), as well as by training programme model (graduation before and after 2011).
- D. To explore the perceptions of district managers regarding the impact of FPs in the following three domains: health system performance, clinical processes and health outcomes
- E. To assess the influence of FPs at primary care facilities and district hospitals. The influence of FPs was evaluated in terms of two domains: health system performance, and quality of clinical processes across the burden of disease.
- F. To evaluate the impact of an increase in FP supply in each district (number per 10 000 population) on key health system performance indicators, key clinical processes and key health outcomes.

1.6 SITUATING THE STUDY WITHIN THE LARGER PROJECT

This research study formed a key component of a national project "Strengthening primary health care through primary care doctors and family physicians" that was funded by EuropeAid for 30 months from 1 March 2014.⁽⁵⁹⁾ This national project was designed in response to a call for proposals for improving Access and Quality of Primary Health Care in South Africa by the European Union Delegation to South Africa in conjunction with the NDOH.⁽⁶⁰⁾ The objective of the larger project, was to strengthen primary health care through capacity building of primary care doctors and family physicians. This project comprised of four activities:

- i. Designing, developing and implementing a national Diploma level training for existing primary care doctors, from either the private or public sector, to enable

them to better support the ward-based primary care teams and to offer services commensurate with the government's PHC revitalisation programme.(61)

- ii. To provide training in clinical supervision/training and in assessment for all family physician training programmes.(62)
- iii. To develop a national training module on leadership and clinical governance for family physicians that is incorporated into all training programmes.(63)
- iv. To evaluate the impact of family physicians within the district health system (this PhD study).

The Division of Family Medicine and Primary Care, Stellenbosch University was the main applicant and implementing organisation for this project. The project partners and overall objectives and activities are listed in Appendix A. Prof Mash was the main coordinator of the project, whilst Dr Von Pressentin was responsible to conduct and coordinate the applied research project towards his PhD by publication (with Prof Mash as his supervisor).

1.7 STUDY DESIGN

The study consisted of four sections:

1. Evaluation of the impact of FPs based on a 360-degree evaluation by their co-health workers (objectives A, B, C).
2. Qualitative evaluation of the impact of FPs based on semi-structured interviews with district managers (objective D).
3. A cross-sectional observational study comparing facility-level data of facilities (district hospitals and community health centres) with and without FPs (objective E).
4. Examining the influence of FP supply on district health system performance: An ecological analysis of key health indicators (objective F).

1.8 OVERVIEW OF THE THESIS

Chapter 1 gives an introduction to and overview of the thesis. An argument for the social value of the thesis is made, the knowledge gap that the thesis will address is identified, the conceptual frameworks are presented, and the research aim and objectives are specified.

Chapter 2 argues for the scientific value of the thesis, describes the conceptual frameworks in more detail and identifies the knowledge gap that will be addressed. The chapter synthesises what is already known about the contribution of family medicine to the DHS.

Chapter 3 contains four articles on each of the four sections of the thesis, which address the aim of the thesis from four different angles. Three of the four articles have been published or accepted for publication in line with the regulations for a PhD by publication. Each article describes the methods, results and discusses the findings:

- Article 1: The perceived impact of family physicians on the district health system in South Africa: a cross-sectional survey. Submitted to a peer-reviewed journal (BMC Family Practice) on 6 March 2017.
- Article 2: The bird's-eye perspective: how do district health managers experience the impact of family physicians within the South African district health system? A qualitative study. Accepted for publication in the South African Family Practice journal, on 25 June 2017.
- Article 3: Measuring the influence of family physicians within the South African district health system: a cross-sectional observational study. Accepted for publication in the Annals of Family Medicine journal, on 23 June 2017.
- Article 4: Examining the influence of family physician supply on district health system performance in South Africa: An ecological analysis of key health indicators. Published in the African Journal of Primary Health Care & Family Medicine, on 28 April 2017.

Chapter 4 presents the conclusions and recommendations, derived from triangulating the findings from the four articles in order to give an overall picture of the impact of FPs in the South African DHS.

1.9 ETHICAL CONSIDERATIONS

The PhD study was carried out in compliance with the Helsinki Declaration and approved by the Health Research Ethics Committee of Stellenbosch University (reference S15/01/003), as well as by each partner institution. The seven provincial health authorities and research committees also gave permission to access facilities across the study setting (the full list is available in Table 1.2). The letters of approval, data collection instruments and consent forms are available as addenda.

Table 1.2. Full list of HREC approvals and PHRC/DRC permissions.

Human Research Ethics Committees	Reference number
Stellenbosch University	S15/01/003
University of KwaZulu-Natal	S15/01/003
University of the Free State	ECUFS 28/2015
University of the Witwatersrand	M150488
Sefako Makgatho Health Sciences University	S15/01/003
University of Pretoria	Ref 95/2015
Provincial and District Health Research Committees (PHRC and DRC)	Reference number
Western Cape	WC_2015RP19_867
KwaZulu-Natal	HRKM 034/15; KZ_2015RP21_947
Free State	dated 22 May 2015
Northern Cape	NC2015RP11168
Gauteng	GP_2015RP12_549
North West	NW_2015RP16_816
Mpumalanga	MP_2015RP43_146
Johannesburg District Research Council	2015-16/007
Tshwane Research Council	52/2015

1.10 CHAPTER SUMMARY

This chapter described the social value of conducting the research, the knowledge gap to be addressed, the conceptual frameworks, the aim and objectives and an overview of the thesis. In the following chapter, the scientific value of the study will be argued for in more detail using the existing literature on the contribution of FPs to health systems.

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CHAPTER 2

SCIENTIFIC VALUE OF THE STUDY

2.1 INTRODUCTION

This chapter provides a literature review of the concepts underlying the central research aim, “to evaluate the impact of family physicians within the district health system of South Africa”. The chapter will review the literature with regard to the health system, the discipline of family medicine and the impact of family physicians on health systems. Each of these three concepts will be viewed from the global, regional (Africa) and local (South African) contexts.

This chapter builds on the social value of the study described in chapter 1 and outlines the scientific value of the study in terms of what is already known with regard to the research topic and identifies the knowledge gap that the thesis will address further.

2.2 THE HEALTH SYSTEM

2.2.1 Defining the health system and its components

The WHO defined the health system as consisting of “all organizations, people and actions whose primary interest is to promote, restore or maintain health.”(1) Six building blocks are linked to this WHO description of the health system (see Figure 2.1), namely: the health services; the health workforce (human resources); the health information system; essential medical products, vaccines and technologies; the health financing system; and, the leadership and governance structures and activities.

THE WHO HEALTH SYSTEM FRAMEWORK

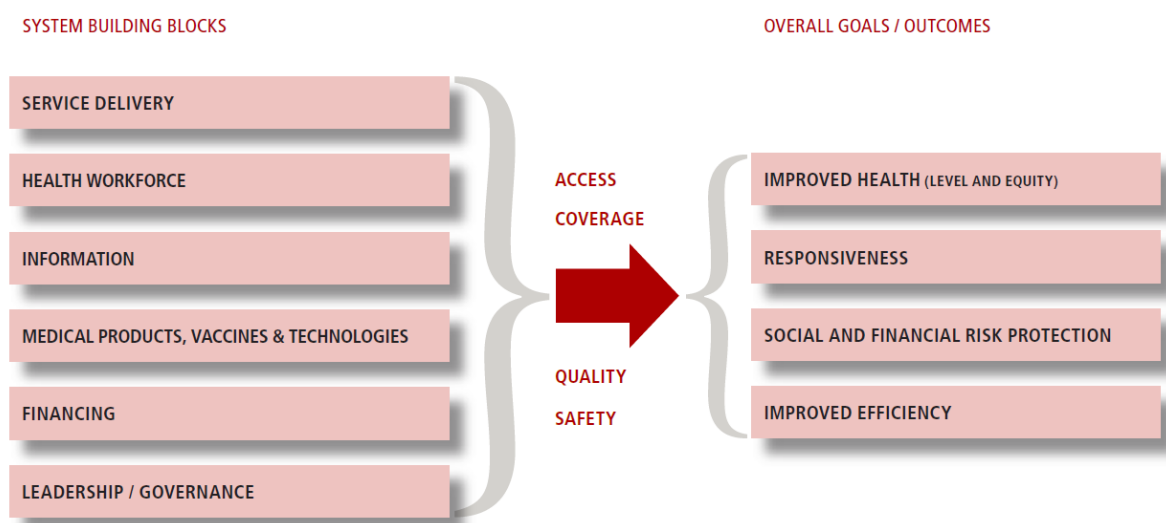


Figure 2.1. World Health Organization’s System Building Blocks(1)

The health services represent the aspects visible to health users, and include all services dealing with the diagnosis and treatment of disease, or the promotion, maintenance and restoration of health. Dr Julian Tudor Hart (a British general practitioner, known for his description of the inverse care law) defined PHC as “doing simple things well, for large numbers of people, few of whom feel ill”.(2) Improving coverage (access) and quality of health services (comprehensiveness, coordination and continuity) depends on key resources (health workforce, essential medical products and financing) being available; and how services are organised and managed (governance and leadership). It is accepted that the ultimate aim of health services (and the health system providing these services) should be equity in improving health for all. This aim links well with the ideals of PHC or “the close-to-client service which can result in equitable access”(3) and universal health coverage (UHC).(4,5) Achieving UHC fits in with the Sustainable Development Goals (SDGs) spearheaded by the United Nations.(6) Whereas SDG 3 is aimed specifically at “ensuring healthy lives and promoting wellbeing for all at all ages”, some of the other SDG goals are also targeting the social determinants of health (the SDGs are described as being “integrated and indivisible”, as progress in one area is dependent upon progress in many others).(3,7,8)

These ideals remain the driving force behind health care reform, as more equitable health outcomes remain aspirational, especially in low and middle income countries (LMIC). The

debate around how best to organise health services is often centred on comparing the percentage of GDP spent on health against health outcomes.⁽⁹⁾ Dr Margaret Chan, in her final address as WHO Director-General at the 70th World Health Assembly on 22 May 2017, reminded her audience of the changes in the political and economic climate since she took office in 2007.⁽¹⁰⁾ She listed a number of socio-economic factors which had interfered with the achievement of health outcomes, including terrorism, extremism, pandemics and armed conflict resulting in the flight of refugees. These so-called “mega-disasters” are co-occurring with the existing social determinants of health (e.g. poverty, low education levels) and environmental challenges (e.g. pollution, climate change). Dr Chang reminded the delegates of the key policy document, the 2010 World Health Report, on health systems financing and the path to UHC, which paved the way for inclusion of UHC in the SDGs. She highlighted the global health priorities (infectious pandemics, chronic disease burden and focus on women and child health), and concluded with “above all, remember the people. Behind every number is a person who defines our common humanity and deserves our compassion, especially when suffering or premature death can be prevented.”

“Putting people at the centre of health care” ⁽¹¹⁾ is one of the prerequisites for health systems to achieve health for all as envisioned by the PHC movement. The 2008 WHO report recommended four sets of PHC reforms (see Figure 2.2): universal coverage reforms (moving towards health equity, social justice and universal access); service delivery reforms (reorganising health services around people’s needs and expectations, so as to make them more socially relevant and more responsive to the changing world while producing better outcomes); public policy reforms (reforms that secure healthier communities, by integrating public-health actions with primary care and by pursuing healthy public policies across sectors); and, leadership reforms (establishing inclusive, participatory leadership that is able to handle the complexity of health systems).⁽⁵⁾



Figure 2.2. The four PHC reforms required to achieve health for all.(5)

2.2.2 The health systems in low and middle income countries

Health systems in LMIC are facing the constraints mentioned in Dr Chan’s final address in 2017; however, these LMIC systems are more under-resourced (compared to their high income country counterparts), which makes the ideal of achieving equitable health outcomes even more challenging. A 2014 review presented an overview of the health care system constraints and suggested some solutions for LMIC, such as health financing strategies.(12) The author of this review admits that the available evidence tends to describe the constraints (such as shortages and poor distribution of staff, inadequate drugs and medical supplies, weak policies and supply systems, bureaucracy and lack of leadership) more than possible solutions (such as increasing pay, strengthening training and supervision of staff, decentralising planning and management, engaging with civic organisations, making greater use of public sector in financing, management and service delivery, encouraging improved stewardship and accountability mechanisms). This review supports “a long-term

process that involves complex systems and requires carefully orchestrated action on a number of fronts.” It advocates for the engagement of the global community in “supporting country-led processes of reform and by helping to create a stronger evidence base that contributes to cross-country learning”.(12)

Brazil, Russia, India, China, and South Africa (BRICS) represent almost half of the world’s population, and all five national governments are committed to realising UHC. A 2014 assessment reported that the BRICS countries show substantial, and often similar, challenges in moving towards UHC. The most pressing problems included “insufficient public spending; stewarding mixed private and public health systems; ensuring equity; meeting the demands for more human resources; managing changing demographics and disease burdens; and addressing the social determinants of health.”(13)

2.2.3 The district health system

Having considered the health system as a whole the chapter will now focus on the DHS, which is the specific context of this thesis. The district has been defined as “the most peripheral fully organized unit of local government and administration” and the DHS as “based on primary health care” and a “more or less self-contained segment of the national health system”, serving “a well-defined population living within a clearly delineated administrative and geographical area”. The DHS “includes all the relevant health care activities in the area, whether governmental or otherwise.”(14)

2.2.4 The South African district health system

The post-Apartheid government introduced a DHS model for health care delivery in 1997.(15) The DHS is intended to provide “healthcare for all” in keeping with the Alma Ata declaration and the WHO description of the DHS.(4,14) The introduction of the DHS model resulted in segmentation of the national health system into 52 geographically defined and contiguous districts. Each health district is responsible for the PHC services to a well-defined population, living in a clearly defined administrative area. The public sector services within the South African DHS focus on services to the majority uninsured or dependant population.

The health district management team consists of a director and deputy directors, and are responsible for “allocating the available resources in the best possible way to meet the basic health needs of the community they serve” and to aim for “improving the health status of the community they serve.”(16) This means that district management are responsible and accountable for all the services that take place in all the facilities and communities in the district.(17) Each health district is sub-divided into so-called sub-districts, whose management structures report to the district management team. The health district management team support the sub-district management teams with policy implementation (policies developed at district, provincial or national level), interact with the other governmental departments at district level (such as social services and education), and report to the provincial and national management structures.

Each health sub-district aims to provide a comprehensive healthcare service to a smaller unit of the district population. These services may be divided into facility based services and community based services.(18)

The different facility types include the level 1 district hospital, which in turn forms the referral hub for the PHC facilities. These district hospitals provide outpatient services (emergency centre, outpatient department and day surgery) as well as inpatient services (general adult, maternal and neonatal, and paediatric wards, as well as theatre services).

PHC facilities are further divided into community day centres (CDC) or community health centres (CHC) (the former providing an 8-hour service, whilst the latter provides a 24-hour service, often with a midwife-driven maternity service and/or an emergency centre), and smaller clinics (including satellite clinics which provide a service for less than 5 days per week, as well as mobile clinics). All PHC facilities provide a nurse-driven and mainly nurse-managed service with doctor-support either full-time, as in the case of the CDCs or CHCs, or part-time to clinics via a planned outreach service from the district hospital.

District level services refer to a level 2 regional hospital with general specialist disciplines, which forms the referral hub of the surrounding healthcare network. The level 2 hospitals refer patients to level 3 academic or central hospitals for sub-specialist and other specialized

services. The public health system also includes specialized tuberculosis and psychiatric hospitals.

2.2.5 The Health Workforce

The post-2015 global health debate (transition from Millennium Development Goals towards the SDGs) includes a renewed focus on the health workforce, or HRH.(19) LMIC health policy analysis revealed that countries should link efforts to address the scarcity of human resources (described in the 2006 World Health Report) with realising UHC.(19,20) The 2016 WHO policy document, “Global strategy on Human Resources for Health: Workforce 2030”, supports this combined focus and aims to accelerate the progress towards UHC and the SDGs by “ensuring equitable access to health workers within strengthened health systems”.(21) This document describes four objectives, as well as “global milestones” for 2020 and 2030. One of the policy options to be considered in all countries, includes the effective use of available resources. This would include modifying and correcting “the configuration and supply of specialists and generalists, advanced practitioners, the nursing and midwifery workforce, and other mid-level and community-based cadres. Appropriate planning and education strategies and incentives, adequate investment in the health-care workforce, *including general practice and family medicine*, are required to provide community-based, person-centred, continuous, equitable and integrated care.”(21) There is a need for the enhanced use of metrics to capture the “density, distribution and performance of this workforce”.(22)

In the BRICS countries, primary care doctors (mainly without postgraduate training) are required to function in support of the primary care team, which provides first-contact care in the community- or facility-based health services. Workshop participants from four of these countries met at an international conference of The Network: Towards Unity for Health in 2014, and reflected on how primary care doctors will need to be equipped to take on new roles, beyond clinical care provision, namely: “change agent, critical thinker, capability builder, collaborator and community advocate”.(23)

Table 2.1 compares the supply of primary care doctors, family physicians, and nurses and midwives between these countries. This table shows how low the supply of primary care

doctors and family physicians is in South Africa, in comparison to Brazil, India and China. The South African supply of nurses and midwives is on par with China and better compared to India. This mismatch between the supply of doctors and nurses represents an inefficient skills combination, and this challenge around the appropriateness of available staffing levels was echoed in a South African study which applied the WHO's workload indicator of staff needs (WISN).(24) The next section will describe the South African DHS workforce.

Table 2.1. Supply of primary care workforce per 10,000 population (23)

Country	Primary care doctors (not specialists)	Family physicians	Nurses and midwives
South Africa	3.7	0.1	51
Brazil	19	0.2	76
India	7	-	17
China	14	1.2	51

2.2.5.1 The South African DHS health workforce

The multi-disciplinary DHS clinical team consists of the FP, medical officers (doctors with no recognised postgraduate training in FM), registrars (FM registrars enrolled in a formal postgraduate training programme affiliated with an university), nurses (including clinical nurse practitioners, midwives, professional nurses), clinical associates (a recently introduced mid-level doctor in the district hospital), pharmacy staff (pharmacists and pharmacy assistants), dental staff (dentist and oral hygienist), physiotherapists, occupational therapists, speech therapists, dieticians, clinical psychologists, lay counsellors, health promoters, and social workers. Community-oriented primary care services are also emerging with teams of community health workers (CHWs) led by a nurse taking responsibility for a certain number of households within a defined municipal ward.(18)

The roll-out of the NHI system has seen an increased partnership between the private and public health sectors, with the contracting of private general practitioners to help provide outreach services to clinics. Other HRH residing outside the public sector, but utilised by the community include traditional healers and alternative practitioners (including homeopathy, Chinese medicine, acupuncture, chiropractice, naturopathy, osteopathy and therapeutic reflexology).(18)

The FP is trained to work within the DHS and is employed typically at the level of the sub-district, where he or she is usually based at a larger facility (such as the district hospital or CHC) and performs an outreach service to the surrounding smaller clinics. The FP may also work at the level of the larger health district, often as a member of the DCST. Historically (and at present), FPs may also be working at level 2 hospitals, where they may provide clinical care within the emergency centre, wards, theatre and outpatient department as part of the larger clinical team, consisting of other disciplines such as paediatricians, general physicians (internal medicine specialists), obstetricians and gynaecologists, surgeons (including orthopaedic specialists), emergency physicians and anaesthetists.(18,25)

2.2.5.2 The South African health education system

The continuum of medical education consists of three phases: undergraduate, postgraduate and continuous professional development (CPD).(26) Education may also be viewed from the perspective of the four educational settings over the lifetime of a medical career: formal education at undergraduate and postgraduate levels; maintenance of competence through CPD; development of new or extended roles, such as academic research or professional leadership; and finally the skills needed for teaching, mentoring and supervising others.(27)

The health education system is intertwined with the health service delivery system, and both should be aligned in terms of the health needs of the population.(28) Insufficient coordination between ministries of education and health can be a barrier to medical schools' ability to increase the capacity of the health workforce.(29) Figure 2.3 illustrates this close relationship between these two systems. The educational system generates the

supply of health professionals. People (the population) are the “base and driver of these systems”, as they define the needs for both the education and health systems.(28)

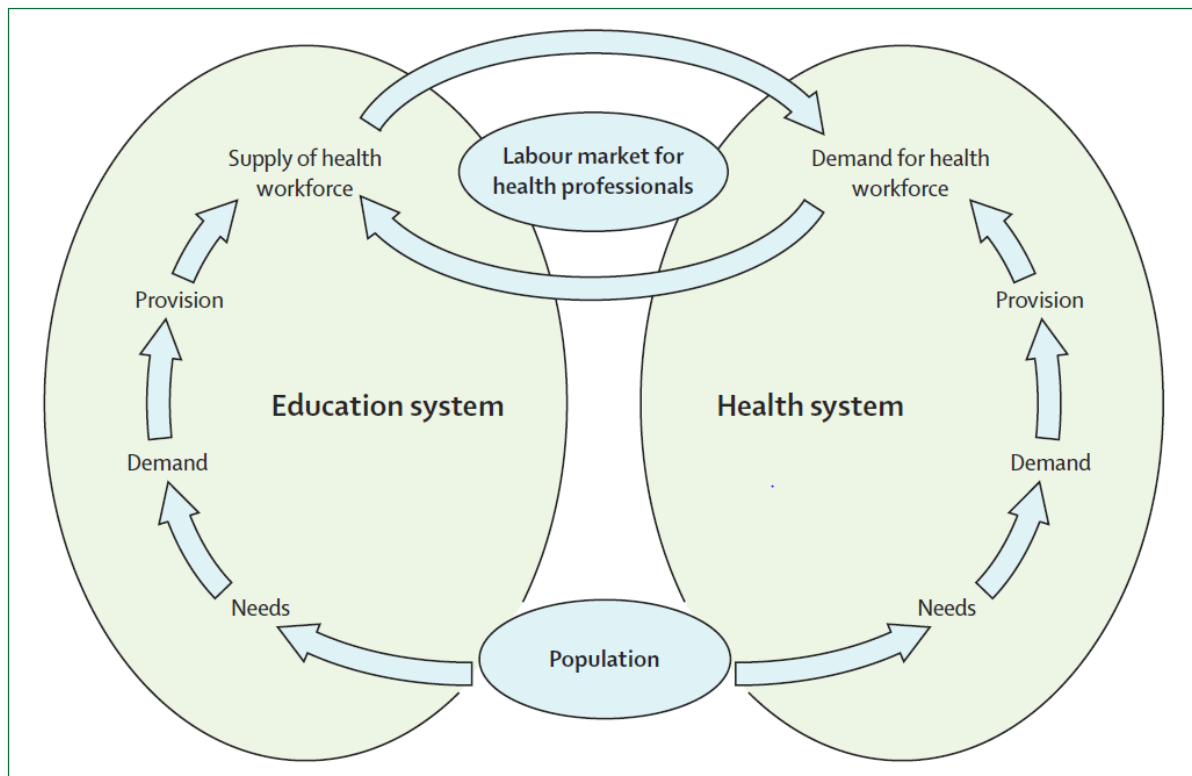


Figure 2.3. The interdependent relationship between education and health systems (28)

A recent publication described the challenges around the primary care education of South African doctors, nurses, CHWs and clinical associates.(30) Whilst the undergraduate education of doctors is embracing primary care (see below), more needs to be done to establish postgraduate training in FM and to re-orientate and up-skill the existing primary care doctor workforce (a recent initiative to address this is described below). In addition, the authors concluded that more effective courses should be developed for primary care nurses, clinical associates and CHWs, in order for these health workers to have the appropriate educational background for functioning within effective PHC teams. The educators of these health worker cadres should aim to equip them with the necessary depth of learning required of competent generalists and the ability to work together as functional teams. This could involve models of inter-professional education and ongoing professional development.(30,31)

The undergraduate training of clinical associates, dentists and medical doctors in South Africa resorts under the custodianship of the Undergraduate Education and Training (UET) subcommittee of the Medical and Dental Professions Board (MDB) of the Health Professions Council of South Africa (HPCSA). Nine South African medical schools were established at intervals since 1912, with the tenth school promulgated in 2016.⁽³²⁾ In February 2011, the UET subcommittee embraced the Lancet commission report ⁽²⁸⁾ and agreed on the five key elements that should inform future training of these professionals. These five elements include: i) a competency-driven instructional design; ii) the ability of graduates to work in inter- and trans-professional teams; iii) the ability of graduates from various professions to share tasks where needed and appropriate; iv) the willingness of training institutions to utilise and share open educational resources; and, v) the willingness to engage with other stakeholders in the health and education systems to optimise collaboration (e.g. in joint planning of training and service delivery). South African higher education institutions have also embraced this Lancet commission report, particularly the need to become more socially accountable.^(28,33) A core competency framework for physicians, CanMEDS (developed by the Royal College of Physicians and Surgeons of Canada), was adapted to define the key competencies applicable to undergraduate training of health professionals in the South African context.⁽³³⁾

With the NDOH's prerogative to increase the number of medical doctors in the DHS, care should be taken to ensure adequately supervised primary care exposure of interns and community service doctors. Newly qualified medical doctors have to complete a two-year internship which includes a three-month exposure to primary care. Following internship, an additional compulsory year of community service is required in order to register successfully with the HPCSA. This will necessitate the large-scale expansion in training sites and equipped supervisors, given the NDOH's prerogative above.⁽³⁰⁾ These supervisors of junior doctors will include the current pool of primary care doctors with no formal postgraduate training, namely medical officers (MOs) working in the DHS. These MOs will also be expected to play the extended roles of primary care doctors, such as leadership skills required to supporting the multidisciplinary PHC team.⁽²³⁾ In the next decade, improvement in PHC will rely on the contribution of these MOs until FPs have been trained to scale. A recent initiative, a national Diploma in Family Medicine, is aimed at the existing

pool of primary care doctors in both public and private health sectors, who are unlikely to become registrars and train as FPs.(34) This diploma is aimed at re-orientating these primary care doctors towards the changing health care landscape dominated by the drive towards achieving UHC via a NHI system.(30,34)

2.2.6 Evaluating health system policy and service interventions

Governments and international organisations such as the WHO are constantly engaging with processes of health system reform and evaluation, in order to meet the changing health needs of populations and the progression of science and health technology.(35,36) Thinking about the DHS has evolved from disease-oriented vertical programmes, focusing on major diseases such as malaria and HIV/AIDS, to horizontal integrated approaches that provide comprehensive care.(37,38) This change in thinking leads to different policy related questions at the macro- (architecture and oversight of systems), meso- (functioning of organisations and interventions), and micro- (the individual in the system) system perspectives.(39) In particular thinking shifts from a focus on specific priority diseases to a focus on performance of the system as a whole. Evaluation of the DHS must then also shift from just evaluating disease orientated programmes and the implied clinical processes to also evaluating system performance and cross-cutting issues such as accessibility, comprehensiveness, continuity and co-ordination of care.

2.2.7 The health system conceptual framework used in this study

A modified Donabedian causal chain framework was used in this study, Figure 2.4. It is based on the work of Avedis Donabedian (40–42), and modified by Lilford *et al.*(43). Avedis Donabedian conceptualised the linkages in the health system between structure, process, and outcome.(40,41) In this framework, structure refers to issues of governance and economics which are largely affected by changes in policy. In a modified version of the original model, the process issues are split into three categories: generic (cross-cutting organizational processes), targeted (aimed at a specific programme or condition) and clinical (services at the level of the patient for specific conditions). Generic and targeted processes can affect health system performance, which also influences the quality of clinical processes. Key aspects of DHS performance were identified as: accessibility; coordination;

comprehensiveness; and continuity.(44) The key clinical processes were drawn from South Africa’s quadruple burden of disease: HIV/AIDS and tuberculosis; violence and injury; MCH; and, NCDs.(45–47) The quality of clinical processes influences the clinical outcomes. FPs were seen as a generic intervention as they were not limited to a specific programme or condition and could impact broadly on health system performance and clinical processes. This framework was used in the pilot studies which preceded this study.(48,49)

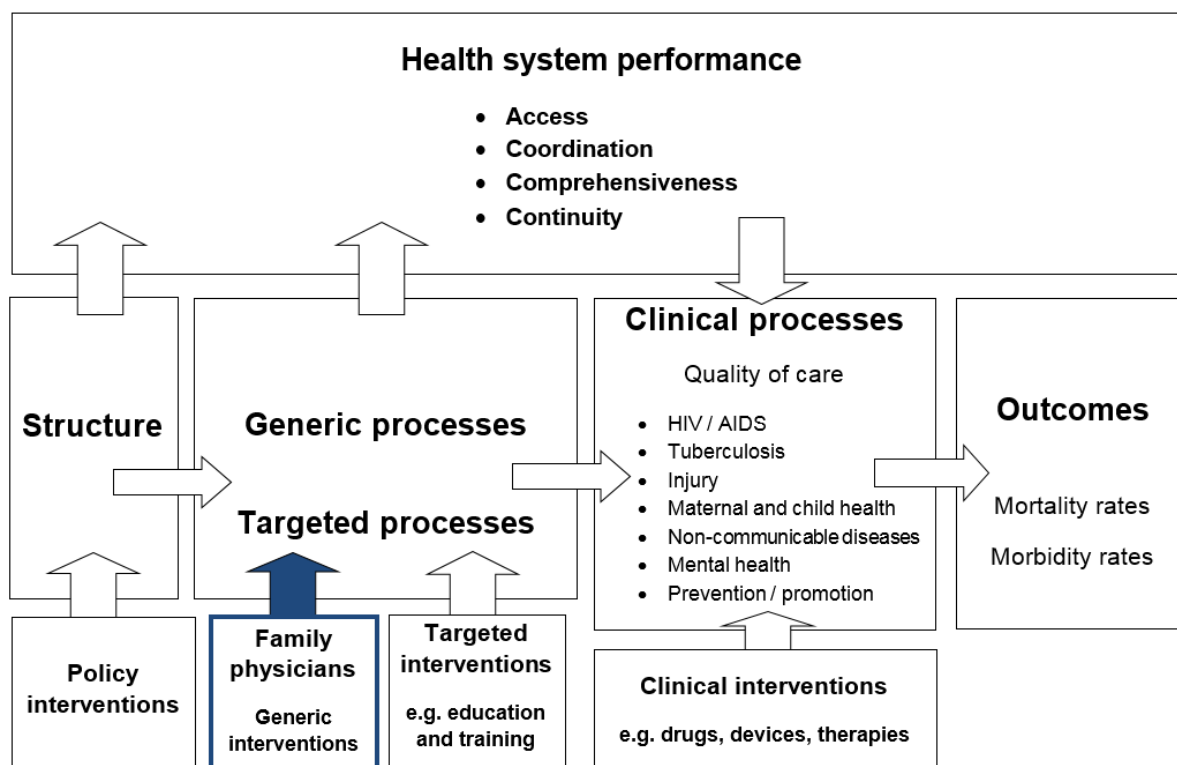


Figure 2.4. Conceptual framework of study (modified Donabedian causal chain)(40,43)

2.3 THE DEVELOPMENT OF THE FAMILY MEDICINE DISCIPLINARY IDENTITY

The journey of identity formation is a complex and multifaceted process, which is influenced by individual realities and social contexts.(50) Howard Stein paraphrased Erik Erikson’s definition of identity as “the experience of who and what one is both from within and interactionally”.(51) Changes in identity seldom follow a linear curve and are marked by “moments of dissonance and crisis” that lead to “places of change and growth”.(52) The identity of the global FM discipline was shaped across the past century by a number of key publications, which captured these “moments of dissonance and crisis”. One needs to

remember that the dynamics of disciplinary change may not be entirely internal to the discipline, but may also result from significant circumstances outside the discipline itself. So old disciplines can be changed over time from within by their practitioners, and even abandoned. New disciplines may be created *de novo* or may begin as fragmentation from a larger discipline.(53)

Does FM represent a new creation or may it perhaps be viewed as the “oldest discipline” in medicine? Ian McWhinney, the first professor of FM in Canada, described the evolution of FM from an older branch of medicine, general practice, in his textbook on FM.(54) Jacalyn Duffin, a Canadian medical historian and haematologist, however, argues that FM arose *de novo* in the 1950s as one of the newest specialties.(55)

2.3.1 Development of the family medicine disciplinary identity in high income countries

The FM discipline developed at the onset of the era of specialisation, which coincided with the declining numbers of general practitioners (GPs) in the more populated centres of the United States and Great Britain, as well as increasingly common criticisms of incompetence of the “less scientific” GPs. Most doctors practising during the 19th century were “general” practitioners and looked after patients from all age groups. The rules governing practice were dictated by legislation in each country and reflected societal expectations. Societal expectations changed during the latter half of the 19th century. Doubts about competence had “tarnished the image of the kindly GP and respect began to wane”.(55) The 1910 Flexner report, albeit a seminal document in terms of medical education reform by stamping out “the over-production of uneducated and ill trained medical practitioners” through mainly didactic teaching in profit-driven (“commercial”), under-resourced (lack of laboratories) schools, (56) also cemented the specialist-driven, hospital-based method of training doctors, and in effect, ended the era of community-based training of generalists.(57,58)

The realisation that the number of GPs was declining in parts of the UK and USA dawned after the 2nd World War. This realisation coincided with a so-called “identity crisis” within the general practice community, as it seemed as if GPs were not of the same standard as their specialist colleagues.(55) Mechanisms for maintaining and guaranteeing standards

were few, which resulted in the first of several efforts to consolidate, as well as calls for the recognition of general practice as a speciality in its own right.⁽⁵⁷⁾ The public and the medical fraternity realised that the void of delivering quality, generalist first contact care had to be filled.⁽⁵⁹⁾

The road to acceptance as a speciality is well-documented in the USA. In the 1960s a number of events helped the discipline to regain its momentum in the USA. One of these events was the 1962 WHO report by its Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel in response to the worldwide shortage of FPs, required to serve as physicians of first contact with patients.⁽⁶⁰⁾ The report concluded that all medical students should receive exposure to family practice during their training, and that family doctors should experience “some form of specially designed postgraduate study”. The report supported more research in the field of FM. It was only in 1969 that the type of examination and residency training necessary for family practice were finalised and accepted. The year 1969 also saw the official approval of family practice as the newest medical speciality in the USA.⁽⁵⁷⁾

FM has evolved at different rates throughout the world. The 1960’s saw the UK starting a general practice vocational programme (1967), as well as the initiation of dedicated family doctor training programmes in Canada, the USA and several other countries.⁽⁶¹⁾ By 1995, at least 56 countries had developed speciality training programmes.⁽⁶²⁾ In 2012, the College of Family Physicians in Canada hosted its first annual Besrouer conference as an initiative aimed at advancing the discipline of FM globally.⁽⁶³⁾ At the 2013 conference, the Besrouer Papers Working Group was formed, with one of its first papers describing the challenge of finding a global definition of the FM discipline.⁽⁶⁴⁾ Various definitions, training and competency models of FM were reviewed, including the definitions from McWhinney, WONCA, the UK, Africa and the Canadian Four Principles of Family Medicine (1986).^(58,65–68) The different interpretation around the globe of what is meant by “general practice” and “family medicine” was discussed (typically, family physicians are those graduates from residency training; although the term general practitioners are still used to refer to those physicians with accredited training in the UK, Europe, Australia and Asia). The group concluded with the acknowledgement that the discipline was practised in various forms, but remained socially accountable and responsive to local health needs. In order to adapt to the existing

health infrastructure and to remain locally relevant, ongoing skills development is required, providing that its unifying role (and identity) remained grounded in relationships of care (with patients, colleagues and the community). The Besroux Papers Working Group also explored the evidentiary basis of FM, which will be discussed later.(69)

The first international conference of general practice was held in 1964 in Montreal, which paved the way for the founding of a global organisation in Melbourne in 1972, the World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians, now commonly referred to as the World Organization of Family Doctors (WONCA). WONCA has been instrumental in helping shape the global FM identity through ongoing engagement from within (its regional bodies (27,70,71,65)) and without (engagement with stakeholders such as the WHO (5,72,73) and The Network: Towards Unity for Health (74)). The current WONCA president, Professor Amanda Howe, who was also the lead author in the work performed by the RCGP's Commission on Generalism (75), coined the following checklist in 2014, to help WONCA members identify if FM was being practiced in a clinic, or being designed into a new service: (76)

- What is the training of the doctors?
- Is there some continuity?
- What is the scope of practice of the doctors? Do they see patients of all ages and conditions?
- Is their clinic offering a non-communicable disease management service, and screening and preventive work?
- Would their routine practice be objectively seen as person-centred? Is it integrated?
- If they are working in hospital, or with access to hospital beds, what is the routine balance of their work?
- Finally, are they the first point of access to medical contact for their patients, and do the hospital specialists need a referral to see their patients?

2.3.2 Development of the family medicine disciplinary identity in Africa

After reviewing the international narrative on the development of FM, it is worth assessing the status of the discipline on the African continent. It is important to differentiate between the ways in which FM is practiced in high income country health care systems and LMIC health care systems.(77–79) LMIC health care systems are faced by a combination of higher disease burdens and less resources, particularly lower numbers of health care workers (also see description in Chapter 1).(80,81) This makes it difficult to implement FM as a first-contact and “gate-keeping” service in LMICs such as Africa, where the supply of FPs and primary care doctors is much lower.(82,83) This results in most of the first contact care being provided by mid-level health workers such as clinical nurse practitioners (CNPs) and clinical officers, with support by primary care doctors and FPs as members of the primary care teams.(84) This team approach to health care is more feasible in this setting, as also demonstrated in the team-based COPC approach employed in other countries such as Brazil or Cuba.(61,85) This understanding lies central to the way in which FM has been introduced in African countries.(86)

At the second regional WONCA Africa conference in 2009, a statement of consensus on FM in Africa was agreed on, which looked at specific aspects of how FM contributes to achieving equity in health care and strengthening PHC, as the principles correspond closely with the principles of FM.(67) The roles of the African family physician revolve around team leadership and promoting comprehensive person-centred care, whilst maintaining a family and community orientation. The importance of the advocacy role and having cultural competency was stressed. This consensus also discussed how the comprehensive set of skills required for this context should be adapted to local needs and available resources. FPs are often required to possess key surgical skills aimed at the district hospital, as well as having leadership and teaching abilities to support the first-contact primary care team.(86,87) Issues around enhancing quality of care and training were also addressed in the WONCA Africa consensus statement, with a focus on the importance of evidence-based health care and community-based training within the DHS.

FM is still a young discipline in Africa, with countries occupying different phases in an adapted version of the “stages of change” model: precontemplation, contemplation, action, maintenance, and relapse.(84,88) The integration of FM into African health systems has been a slow process, as health systems are orientated toward referral hospitals, hospital

specialists and vertical disease-specific programmes.(81) South Africa started in the 1960's, Nigeria started in 1980, other countries only started in the last decade.(81,84,89–92) The output of training programmes is still low and more time is required to reach the critical “turning (or tipping) point”.(81) A critical mass of well-trained FPs is needed to demonstrate the contribution of FM to effective PHC in South Africa and the wider African region.(81) Countries such as South Africa and Botswana who are in the maintenance phase, are facing the challenge of integrating FPs into the health care system. Key issues identified in this maintenance phase include obtaining consensus among key stakeholders on the roles of the FP within the health care system, aligning HRH policy and budgets with the emergence of FPs to ensure adequate remuneration and career pathways, as well as addressing potential tensions as MOs and other specialists adapt to the presence of FPs.(84,93).

A number of networks and collaborations (such as the PRIMAFAMED network and the Flemish Inter-University Council, VLIR, project with FaMEC – see below) have contributed to introducing and building FM into these African health and educational settings, with South-to-South partnerships becoming increasingly more established in recent years.(84,91,94,95) One of the products of these collaborations was the establishment of the regional journal, *African Journal for Primary Health Care & Family Medicine* (<http://www.phcfm.org>), which continues to help develop the discipline through primary care research.(85,96) Other activities by these collaborations focused on building research and training capabilities.(81,94,96–98)

2.3.3 Development of the family medicine disciplinary identity in South Africa

Three key stakeholders should be considered when implementing FM in each country (the national departments of health, higher education institutions, as well as the national health professions licensing body) and more research is required to help convince the leadership of these stakeholders to buy in into this investment in FPs as part of the country's HRH strategy.(84) In South Africa, this process of engagement with these stakeholders has followed an interesting road over the past few decades.

2.3.3.1 South African family medicine in the pre-1994 era

In the pre-1994 era, when the Apartheid regime was still in charge, FM was introduced in the 1970's as a new academic discipline at some of the medical schools. The first FM academic department was established in 1968 at the University of Pretoria (99). A South African College of General Practitioners was established on 1 June 1969 with the support of the RCGP (UK), but existed only for one year, as the newly created Colleges of Medicine of South Africa (CMSA) also included "general practice/family medicine".(100) Thus was the Faculty of General Practice formed in 1970 as part of the CMSA, with the first examination for the Membership of the Faculty of General Practice, MFGP(SA), held in 1972 (at this initial examination, experienced practitioners were examined predominantly by specialists in other disciplines and subsequent membership was by examination only). A conflict between the Faculty of General Practice and the CMSA led to the establishment of the independent South African Academy of Family Practice/Primary Care, renamed later to the South African Academy of Family Physicians (SAAFPP), registered as a not-for-profit company on 11 August 1980. This happened shortly after the creation of new university departments at the Medical University of South Africa in 1977 and the University of the Free State in 1978.(100) The University of Transkei (UNITRA), which later became Walter Sisulu University, was established in 1985 to cater for the needs of the disadvantaged communities in the previous homeland of Transkei. UNITRA was orientated towards community-based education and the community orientated primary care work pioneered by Drs Sydney and Emily Kark in the 1940's.(101–103) This was the start of medical schools buying into the global shift towards training health professionals in a more community-based and socially accountable manner.(104) The recognition of FM at Stellenbosch University (SU) and the University of Cape Town followed relatively later, with SU creating a Unit in 1983 and a Department of Family Medicine in 1992.

2.3.3.2 South African family medicine in the first decade of democracy

In the 1990's, the newly elected democratic government embraced the global approach to PHC and introduced the DHS as the foundation of its public health care strategy aimed at improving the health of the country's previously disadvantaged citizens. During this time, the number of academic FM departments grew, and developments were made in introducing community-based education at undergraduate level (105), as well as introducing postgraduate training in FM.(103,106) The Faculty of General Practice (CMSA) changed its

name to the College of Family Practitioners in 1994.(103) In 1996, UNITRA hosted the international conference of The Network: Community Partnerships for Health through Innovative Education, Service and Research (which later became The Network: Towards Unity for Health) in Durban.(107) Durban also saw the 2nd WONCA Rural conference a year later in September 1997, which culminated in the Durban declaration, which supported the rights of rural communities to access health.(103,108) This period of progress around the turn of the century was partially overshadowed by some ambivalence from within the FM community around the state of South African family practice: mixed opinions on whether the SAAFP leadership managed to address the fragmenting effect of Apartheid and to promote a non-racialism, common philosophy and ethos of FM.(100,106) FM was established, however, within all eight faculties of health sciences, with teaching in FM offered at both undergraduate and postgraduate levels.(109,110) The academic FM community in South Africa became better organised with the formation of the Family Medicine Education Consortium (FaMEC) in 1997, which agreed on a national set of outcomes for postgraduate training.(111) South African FM's research basis was expanding, as well as its international engagement, notably with the hosting of the 16th WONCA World Congress in Durban in May 2001, where Prof Bruce Sparks (head of FM at the University of Witwatersrand) was elected as the WONCA President-Elect.(100)

2.3.3.3 South African family medicine in the first decade of the 21st century

In the Western Cape Province, research highlighted the skills deficit among MOs (primary care doctors without formal postgraduate training working in the DHS) in rural district hospitals.(112) The advantages of a postgraduate qualification to equip these doctors became evident to the Department of Health, which paved the way for creating training posts in FM within the DHS in the early 2000's.(93)

During this decade, the South African government started embracing the discipline and becoming less ambivalent about having FPs in the DHS. The HPCSA, as national licensing body of South African health professionals, announced in 2007 that FM was a new speciality.(25) This cemented the road for re-organising postgraduate training in FM to mirror the training model used by other specialities: registrars now needed to be employed within accredited training posts, complete 4-years of postgraduate training and a research

dissertation (under the supervision of an academic department), and sit a national exit examination conducted by the College of FPs within the CMSA. New graduates from these postgraduate training programmes are able to register on the HPCSA's specialist register with their MMed degree (university) or FCFP(SA) from the College. A number of existing practitioners were brought onto the new specialist register via a grandfathering clause, allowing them to also be called FM specialists and form the faculty required for the training programmes. A national journal (South African Family Practice: www.safpj.co.za), a Handbook of Family Medicine (18), a South African Family Practice Manual, and regional and national conferences aided the creation of a shared identity and training ideals.(103)

The appointment of FPs across the nine South African provinces occurred in a rather heterogeneous fashion, largely due to different contextual needs and policy drivers, as consensus on academic training outcomes preceded the official deployment policies.(67,113,114) As the primary employer of FPs within the public sector health services, the provincial departments of health determined the local placement strategy. In the Western Cape Province, the Department of Health appointed family physicians at district hospitals to address the previously identified skills gap in essential services, for example, in the arena of emergency obstetric care.(93,112) In the City of Tshwane, Gauteng Province, the Department of Family Medicine at the University of Pretoria championed the establishment of ward-based outreach teams (WBOTs) to enable a better community-based services approach towards universal health care.(115,116) Here, FPs have a diffuse role in supporting the WBOTs and other primary care services. In Kwa-Zulu Natal Province, the initial focus was on creating FP posts in DCSTs and district hospitals, with some FPs working in clinical manager posts at community health centres.(117,118) Consequentially, the different employment strategies led to different types of FM exposure, ranging from facilities with their own FP, facilities with an occasional supervisory FP visit, to facilities without any FM influence.(25)

2.3.3.4 South African family medicine in the second decade of the 21st century

During the early 2010's ambivalence from both within the FM community and the government's policy makers remained around this newly created specialist category.(119) Members of the South African FM community critiqued the use of these FM specialists,

appointed in small numbers within the DHS, as being the “saviours” of district hospitals.(120) Concern was raised that this elite specialist status and long duration of the training programme, with the focus on procedural skills, would create the wrong type of practitioner required for strengthening the PHC system.(120)

The PHC system was being re-engineered by the South African government by strengthening community-based PHC teams, and it was felt that FPs should be part of these PHC teams, similar to the Brazilian and Cuban models.(25) The term family medicine specialist also seemed to confuse the policy makers, as HRH policy documents calculated the need for FP supply in similar quantities as other sub-specialists such as ophthalmologists.(121) Furthermore, FPs were included in the new DCSTs, created as part of the Department of Health’s strategy aimed at improving maternal and perinatal mortality (a more narrow focus not aligned with the generalist training of FPs).(122) Conversations around the role and name of family physicians extended beyond the South African borders, as other African FM leaders also grappled with clarifying the identity of the African family physician.(83,123,124)

2.3.3.5 Strategies aimed at developing South African family medicine

In 1995, Cynthia Haq, William Ventres and colleagues took on the challenge of advocating for the development of FM around the world, by writing a landmark paper in response to the identified need for well-trained generalist physicians in the USA and the global call for expanded training of primary care physicians.(62) They reviewed the global status of training in FM and delineated twelve strategies for furthering the discipline across the world.

A national position paper in South Africa represents one of these strategies, namely, encouraging governments to take a more active role in establishing the FM discipline. This paper followed after conversations between the NDOH and the academic FM leadership (SAAFP and CFPSA) were held during 2014.(25) Issues around training, roles and deployment strategies were addressed in this paper, which now serves as the basis for ongoing conversations around clarifying the contribution of FPs to strengthening the DHS. FP specialists were described as expert generalists trained to help lead PHC teams in terms of skilled clinical service support and addressing clinical governance deficiencies through their

extended skills set in leadership and education.(25,125–127) This paper articulates the potential contribution of FPs to district health services within the national policy framework, which includes the National Development Plan, policy on HRH and legislation on PHC re-engineering towards establishing UHC and NHI.(121,128,129)

The 2012 PRIMAFAMED Statement on “Scaling up family medicine and primary health care” provides a list similar to the one by Haq et al (see Table 2.2).(91) From the discussion above and the content of the national position paper, one may deduct that the South African FM community has engaged with most of these strategies.(25,81,84,85,91,96) The first graduates of the new training programmes entered the DHS from 2011.(25) Family physicians from the previous training programmes in South Africa and elsewhere still form the bulk of the available family physicians, as the nine South African training institutions are not yet training to the scale envisaged by the national position paper.(25) The training standards are coordinated through the SAAFP, while the CFPSA is responsible for the national exit examination. A portfolio of learning was developed to capture work-based learning (130,131) and consensus was obtained on the skills required by graduates (132,133).

Table 2.2. Responding to global strategies aimed at developing family medicine.

	Strategies suggested by Haq, et al.	Response in South Africa
1.	Obtain political and financial support for universal access to primary care.	The South African government has committed itself to quality PHC and UHC.
2.	Integrate public health and medical care.	South Africa is engaging with COPC by implementing WBOTs as part of its PHC re-engineering strategy.
3.	Upgrade the status of general practitioners.	Family physicians are appointed at specialist level within the DHS.
4.	Develop family physician faculty and clinician role models.	The critical mass of FPs trainers and teachers should be expanded with faculty development (training the trainer) programmes.
5.	Develop undergraduate (medical school) curriculum.	Undergraduate students should be exposed to community-based placements and service-learning within

	Strategies suggested by Haq, et al.	Response in South Africa
		PHC and FM.
6.	Develop postgraduate (residency) curriculum.	Curricula are developed according to agreed learning outcomes and unit standards. The number of funded training posts for FM trainees should be sufficient according to the PRIMAFAMED statement and national position paper.
7.	Engage subspecialists in training and work with family physicians.	FPs work closely with the specialists based within the referral networks, in coordinating patient care. It is anticipated that as the numbers and quality of FP-containing teams increase, subspecialists will be enabled to maintain their expertise by looking after patients with more complex conditions.
8.	Develop organisations of family physicians.	The South African Academy of FPs was established.
9.	Establish speciality board certification with national medical speciality status.	The CMSA is responsible for the exit examination, and successful candidates are allowed to register on the specialist register of the HPCSA.
10.	Encourage governments to take a more active role.	The SAAFP leadership are engaging with the national and provincial governments around issues of training and deployment of family physicians (national position paper). The PRIMAFAMED statement recommends the establishment of well-equipped training complexes for PHC teams and creating an environment for transformational learning.
11.	Involve leadership in international health organisations.	South African leaders in FM are engaging with the WHO and The Network: TUFH organisations.
12.	Work with the leadership of international FM organisations.	South African FM departments and the SAAFP are engaging with WONCA and other African and international FM departments.

2.3.3.6 The second conceptual framework used in this study: the six roles of the South African family physician

South African FPs are trained by the nine training programmes to fulfil six key roles (Figure 2.5), according to nationally-agreed learning outcomes, within the context of the DHS.(25) These six roles, which link closely with regional and international trends (61,67,83,134), represent this study's second conceptual framework:

- Care provider: a competent clinician, able to deal with the majority of the health problems in the community that he or she serves, within the DH or primary care setting, and competent in relational skills (including patient centeredness, communication skills and bio-psychosocial approach).
- Consultant: as part of a well-functioning healthcare team, he or she provides support to other practitioners (e.g. CNPs and MOs) by seeing referred patients in primary care facilities or district hospitals.
- Capacity builder: as a senior clinician, he or she is responsible for the mentoring and training of less qualified clinicians within the PHC or DH teams.
- Clinical trainer: he or she may need to function as the clinical trainer in the workplace for students enrolled in formal education: medical students, clinical associate trainees, interns or registrars.
- Clinical governance leader: responsible for improving the quality of clinical services within the sub-district and facility where he or she is appointed.
- Champion of COPC: supports the development of a COPC approach to the DHS, particularly the development and integration of WBOTs (a team of CHWs responsible for a geographically defined group of households).

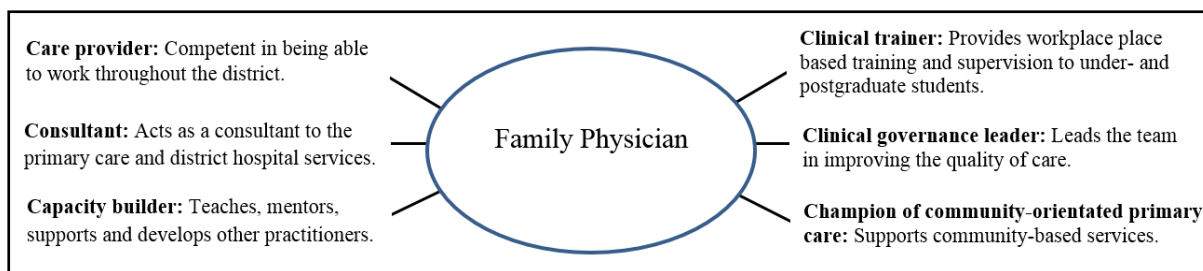


Figure 2.5. Six roles of the South African family physician(25)

2.4 EVALUATING THE CONTRIBUTION OF FAMILY PHYSICIANS TO IMPROVING HEALTH SYSTEMS

The contribution of FM to health system improvement has been supported by empirical research evidence, policy documents and public statements from global health leaders.(61,73,75,135,136) Primary care teams are stronger if they contain doctors with postgraduate training in FM.(5)

The paper by Haq et al (62) paved the way for the WONCA book on the contribution of FM to improving health systems, which is now in its 2nd edition. The first chapter in this WONCA book suggests three strategies for engaging the key stakeholders in the health system, namely: presenting the evidence (factual information and scientific evidence), showing living examples (successful programmes and case studies), and developing international collaboration (international exchanges of information and experts).(61)

The next section will focus on the first of these strategies, namely generating the evidence for the contribution of FM to health systems. One of the ways in which the discipline may be advanced, is through research on and in the discipline of FM and expanding its footprint as an academic discipline.

2.4.1 The evidence base on the contribution of family physicians

The research evidence base on the contribution of FPs to strengthening the health care system in which they work arises mainly from high income settings. As described before, the nature of the communities and health systems in these high income countries are different to their LMIC counterparts. This explains the methodological obstacles encountered by the aforementioned Besrou group in their effort to expand the evidentiary basis of FM globally:

the difference in roles within the health systems makes aggregation of data difficult; available research comes mainly from high income countries; and, separating the influence of FPs from other members of the primary care team is not always easy.(69) One of the key principles of FM is to serve a specific population *in its context*.(69) When designing studies to evaluate the impact of the discipline, “it is important to recognize and manage the tension between standardized measurement and the support of desirable heterogeneity based on local needs”.(137)

2.4.2 The potential of primary care research in advancing family medicine

In keeping with the description of the history of the FM discipline above, it must be noted that, globally, primary care research has also developed exponentially over the past few decades. Primary care research refers to the body of knowledge generated in primary care or by primary care providers with the purpose of contributing towards the improvement of people’s health and well-being.(138) A framework is useful to understand the potential broad scope of primary care research, starting with basic research (focus on the methods used to conduct research in primary care), clinical research (focusing on the diagnosis and treatment of clinical problems), health services research (exploring factors which impact the delivery and organisation of clinical care), health systems research (exploring the macro-scale economic and political factors that affect primary care), and educational research (focus on the education for students, practitioners and the health workforce for primary care).(138,139) There is an increasing realisation of the value of expanding primary care research capacity to strengthen primary care and build the discipline of FM.(139–141) Ironically, LMIC countries, where such research will add immense value, face a combination of challenges, namely the relative scarcity of academic FM departments with research champions and academic primary care providers overburdened by their teaching and service responsibilities coupled with a lack of more advanced research skills.(97,138) Furthermore, funding remains a challenge, especially for research on health systems and services.(138) LMICs need to develop research capacity and specific suggestions were discussed at the 2014 PRIMAFAMED conference in Pretoria, South Africa.(97,142) One of the most successful strategies for engaging large numbers of primary care providers is primary care research networks.(138,139,143)

Different research paradigms and methods may be used to look at different research questions: the empirical-analytic research paradigm (quantitative methods which generate evidence at different levels of a methodological hierarchy, with systematic reviews of randomised controlled trials at the pinnacle), the interpretative-hermeneutic research paradigm (qualitative methods such as interviewing individuals or groups), and the emancipatory-critical paradigm (action research methods that engage with communities or professional groups and work collaboratively to improve clinical care or solve real world problems).(138)

2.4.3 Applying different primary care research paradigms to generate the evidence base

2.4.3.1 The empirical-analytic research paradigm

International studies in the empirical-analytic research paradigm (mainly in the USA, UK, Canada and Korea) have described the public health benefits associated with an increased supply of primary care doctors, especially regarding a reduction in all-cause, infant and chronic disease-related morbidity and mortality.(144–151) Many of these studies applied a broad definition of primary care doctors, by including all clinical specialities that work in primary care (family medicine, general practice, general internal medicine and general paediatrics).(144–146,148,150) Some of these studies (notably UK and Canada) focused on family physicians or general practitioners, namely a primary care doctor with postgraduate training in FM or general practice.(149,151)

Research conducted in LMIC includes studies from Brazil and China. Research from other LMIC, such as Thailand and countries in the Eastern Mediterranean, are limited by the short exposure to FM in their health systems.(61) The Brazilian model, the Family Health Strategy, consists of multi-disciplinary family health teams who are responsible for a community of between 3000 and 4000 people, defined by a geographical area.(61) These teams, which contain community health workers, nurses and doctors, take on the health needs of their community through a process of mapping the health needs. A number of studies were done, including a study which linked a 10% increase in Family Health coverage to a 4.6% reduction in infant mortality.(152) Hospital admissions were also decreased by 20%.(61) Studies comparing the quality of care provided by Family Health teams also employed the Primary

Care Assessment Tool (PCAT), described below.(153) One of the challenges faced by the Brazilian model, however, is the lack of doctors trained in FM and primary care.(23) This research confirms the benefits of having a strong PHC model, but does not specify the contribution of FPs. In China, almost half of the medical colleges (63 of 128) had established departments of general practice by the end of 2010.(61) Between 2005 and the end of 2011, the number of primary care physicians increased by 0.08 per 1000 residents to 0.42 per 1000 residents. Improvements in chronic disease management were recorded; however, this may be as a result of the increased provision and utilisation of PHC facilities.(61)

In Africa, however, there is almost no quantitative evidence to guide policy- and decision-makers on the deployment of family physicians. In the context of a policy commitment to strengthen PHC, uncertainty may revolve around the relative cost-effectiveness of different interventions, for example whether to employ a new cadre of specialist FPs or a more extensive network of community health workers, and how best to position family physicians within the health system, for example at the district hospital or primary care facility. The relationship between family physician supply and DHS performance has not been evaluated in the African context, except for a pilot study in the Western Cape Province.(48)

A number of instruments exist, which have been used to evaluate the contribution of family physicians to health systems. Three of these instruments are described here. The PCAT is one of several primary care tools used to measure the domains of PHC from the viewpoint of users and providers of the PHC service.(154,155) The PCAT was developed and validated by Starfield and colleagues at Johns Hopkins University, and subsequently adapted and validated for use in several countries, including Brazil and South Africa.(153,156) The Quality and Costs of Primary Care in Europe (QUALICOPC) instrument was developed for practice-based FM in Europe, which differs contextually from the African setting.(157) A 360-degree instrument to measure the perceived impact of family physicians from the perspective of the family physician's co-workers and managers was validated and piloted in the Western Cape Province.(158)

2.4.3.2 The interpretative-hermeneutic research paradigm

In the the interpretative-hermeneutic research paradigm, qualitative studies have explored the opinions of African leaders and managers on the potential contribution and possible roles of family physicians in the DHS.(49,86,123,159–161) These opinions revealed different levels of support coupled with uncertainty and even apprehension regarding the contribution of FPs. When analysing South African policy documents, the role of FPs in terms of clinical governance and leadership within the DHS is acknowledged.(121,128) Their role within district hospitals and at district level as members of the DCST is clearer than their contributions to primary care and community based services, which remains less well-defined.(25,122,126) During interviews held in 2012 and 2013 in the Western Cape Province of South Africa, district health managers agreed on the positive impact of FPs on the quality of clinical processes, specifically in relation to HIV/AIDS, tuberculosis, maternal and child health, non-communicable diseases and mental health.(49,161) In addition, FPs appear to have some impact on health system performance in terms of improved access to care, better coordination and the provision of a more comprehensive and efficient service.(49,161)

2.4.3.3 The emancipatory-critical research paradigm

Previous African studies from the emancipatory-critical paradigm within DHS were limited to basic or educational research (162–164) and future research on the contribution of FPs could explore this paradigm.

2.4.4 The need for primary care research to advance family medicine in South Africa

Research remains one of the key strategies to advance the FM discipline. Building research capacity and creating collaborations which will enable more robust study designs within larger study settings will help to generate the evidence required to inform policy makers and politicians.(84,143,165) From a methodological viewpoint, most of the research in South Africa has been conducted by registrars with an emphasis on small-scale descriptive studies using surveys or qualitative interviews and quality improvement projects. The topics and methods reflect the amount of time, expertise and funding available for these studies. Fortunately, the South African academic FM research community is growing as a result of more PhD graduates in FM.

In South Africa, the future of the discipline has been re-imagined at different intervals during these last two decades, namely at the turn of the century (106,109), when FM was made a new South African speciality (166) and in 2016, when SAAFP conference workshop participants explored the potential future scenarios using scenario planning methods.(167) It is clear that each stage was met with a mixture of reservations and excitement around the potential of the discipline, both from within and outside the FM community. The 2016 workshop participants, consisting of forty FPs from academic, public and private sector settings, painted three potential scenarios (an improvement, maintaining the status quo, or an impoverished future) and gave a clear message that the SAAFP as a professional body needs to take a stronger role in advocating for the contribution of FM to the government, health managers and the general public.(167)

Local evidence of the contribution of FPs is required to guide policy making and to strengthen the commitment of employing FPs in PHC teams. Similar questions around how best to employ FPs are being asked elsewhere in Africa.(84,85,94) These significant knowledge gaps support the need for a larger study with a national frame to evaluate the initial contribution of FPs to the DHS within the first 5-years of producing the graduates from the new registrar training programmes.

2.5 CHAPTER SUMMARY

This chapter described the scientific rationale for the study by, firstly, exploring the context of the DHS and outlining a conceptual framework that can be used to evaluate the impact of FPs on it. Secondly, the chapter outlined the development of the discipline of family medicine and introduced a conceptual framework that describes the current thinking of the roles that the South African FP should play in the DHS. Lastly, the chapter reviewed the evidence for the contribution of FPs to the DHS and identified that there is a significant knowledge gap in the African and South African context.

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CHAPTER 3: THE ARTICLES

This chapter contains the four articles as follows:

- 3.1 **Article 1:** The perceived impact of family physicians on the district health system in South Africa: a cross-sectional survey.
- 3.2 **Article 2:** The bird's-eye perspective: how do district health managers experience the impact of family physicians within the South African district health system? A qualitative study.
- 3.3 **Article 3:** Measuring the influence of family physicians within the South African district health system: a cross-sectional observational study.
- 3.4 **Article 4:** examining the influence of family physician supply on district health system performance in South Africa: an ecological analysis of key health indicators.

3.1 ARTICLE 1:

THE PERCEIVED IMPACT OF FAMILY PHYSICIANS ON THE DISTRICT HEALTH SYSTEM IN SOUTH AFRICA: A CROSS-SECTIONAL SURVEY

This article was submitted to a peer reviewed journal, BMC Family Practice on 6 March 2017 (current status: under review).

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3.1.1 BACKGROUND

Strong primary health care (PHC) systems lead to better health outcomes for the population they serve.(1,2) The 2008 World Health Report “Primary Health Care - Now More Than Ever” defines strong PHC systems as those systems which offer first contact care that is patient-

centred with an orientation to the patient's family and community context, embedded in a service that is comprehensive, integrated, continuous, and community-orientated, and in which patient-care is well co-ordinated.(1) This report warned against oversimplified approaches to PHC in developing countries, which only focus on priority diseases or rely on unsupported health workers who are poorly equipped for the complexity of PHC. The World Health Assembly supports the report's recommendation that PHC should be offered by a multidisciplinary team that includes a family physician (FP).(3-6)

The contribution of family medicine to health system improvement has been supported by empirical research evidence, policy documents and public statements from global health leaders.(7-11) The research evidence base, however, arises mainly from high income settings, in which communities and health systems are different from their LMIC (low and middle income country) counterparts.(12)

Defining the roles of the family physician (or general practitioner) with postgraduate training has been a complex undertaking since the origins of academic family medicine in the 1960's.(13-16) The golden thread remains the commitment to the individual within the context of their family and community. The roles of the FP are based on values and principles that are shared almost universally.(11,17) However the roles and scope of practice are also contextually defined by factors such as whether the FP is the first contact person, whether the FP also provides hospital based care and the skills-mix in the PHC team.(11,18)

In the African LMIC region, healthcare is characterised by a significant imbalance between the high burden of disease and the scarcity of healthcare workers to address this burden, especially doctors, nurses and midwives.(19-21) Family medicine only obtained recognition in the past two decades, with South Africa obtaining family medicine "specialty status" in 2007.(22) The 2009 WONCA (World Organisation of Family Doctors) Africa regional conference reached a consensus statement on family medicine in Africa, describing the role of the FP as "a clinical leader and consultant in the primary health care team, ensuring primary, continuing, comprehensive, holistic and personalized care of high quality to individuals, families and communities." This consensus document forms the core understanding and basis for further development of family medicine in Africa.(23)

In South Africa, a recent national position paper summarised the local consensus on the roles and competencies required of FPs.(22) This paper represents the viewpoint of the SAAFP and the CFPSA, and articulates the potential contribution of FPs to district health services within the national policy framework. Key elements of this policy framework include the National Development Plan, policy on Human Resources for Health and draft legislation on health system re-engineering towards establishing universal health coverage and national health insurance.(24–26) Six key roles for the FP were described (Figure 3.1)(22), which link closely with regional and international trends:

- Care provider: a competent clinician, able to deal with the majority of the health problems in the community that he or she serves, within the district hospital or primary care setting, and competent in relational skills (including patient centeredness, communication skills and bio-psychosocial approach).
- Consultant: as part of a well-functioning healthcare team, he or she provides support to other practitioners (e.g. clinical nurse practitioners and medical officers) by seeing referred patients in primary care facilities or district hospitals.
- Capacity builder: as a senior clinician, he or she is responsible for the mentoring and training of less qualified clinicians within the primary health care or district hospital teams.
- Clinical trainer: he or she may need to function as the clinical supervisor in the workplace for medical students, clinical associate trainees, interns or registrars.
- Clinical governance leader: responsible for improving the quality of clinical services within the sub-district and facility where he or she is appointed.
- Champion of COPC: supports the development of a COPC approach to the district health system, particularly the development and integration of ward-based outreach teams (a team of community health workers responsible for a geographically defined group of households).

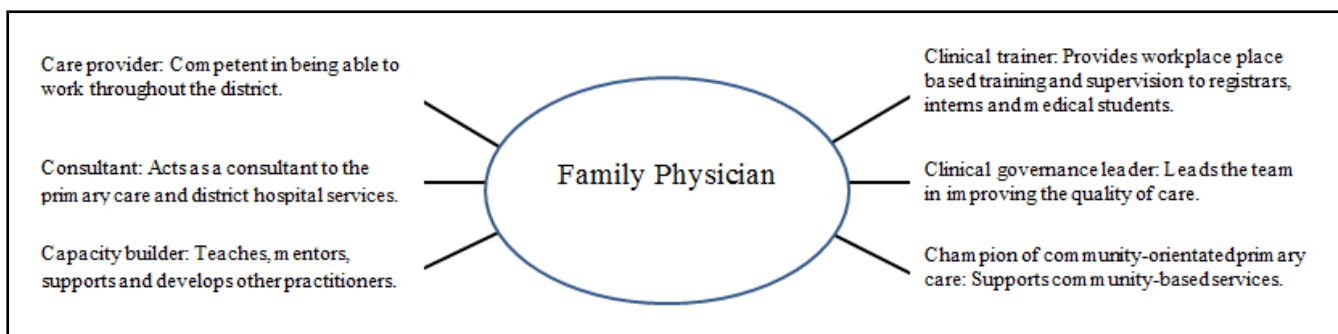


Figure 3.1: The six key roles of the South African family physician(22)

In South Africa policymakers and managers of the health services continue to hold diverse views on the value of FPs and provinces have significant autonomy when deciding whether to employ FPs at scale.(22,27) Although the entry of FPs into the healthcare system is relatively recent, evidence of their impact would contribute to decision making. Prior to 2007 FPs were trained in a variety of part-time programmes, whereas after 2007 FPs were trained in full-time registrar posts to a set of national learning outcomes and started entering the health system from 2011. Within the African region evidence of their impact would also be of value to countries that are contemplating the training of FPs or deciding on whether to scale up training.(28) The African continent remains the only continent that has not widely embraced the training of FPs.(12)

In order to collect evidence of the early impact of FPs in South Africa a national research project utilised four different methods – a quasi-experimental study, a survey of FPs using a validated 360-degree impact assessment tool, correlation of FP supply with routine district health indicators and interviews with district managers. This article presents the findings from the survey and the other studies will be reported elsewhere. Using a validated 360-degree impact assessment tool(29), this study aimed to evaluate the impact of FPs within the district health services of South Africa from the perspective of those working around them at district hospitals or primary care facilities. The study also intended to compare their perceived impact with that of medical officers who had not received postgraduate training. Secondary outcomes include comparing the perceived impact of FPs between rural and metropolitan (urban) contexts, by facility type (district hospitals and community health centres), and training programme model (graduation before and after 2011).

3.1.2 METHODS

3.1.2.1 Study design

A cross-sectional survey of the perceived impact of FPs was conducted using a validated 360-degree FP impact assessment tool.(29) The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist for cross-sectional studies was used to guide this report.(30)

3.1.2.2 Setting

The study was conducted in public sector district health services (DHS) within seven out of the nine provinces of South Africa, as determined by the provincial footprint of the six participating universities.

FPs in the public sector are primarily employed within the DHS, and are typically based at a district hospital (DH), community health centre (CHC) or sub-district and provide support to the sub-district's PHC services. Some FPs are also based at the regional hospital (within a family medicine, emergency medicine or out-patient department) or at the level of the district, either as a district FP with a general clinical governance role or a more specific role for maternal and child health care as a member of DCSTs.(22)

3.1.2.3 Characteristics and selection of participants

All FPs working in the DHS (public sector) of these seven provinces were invited to participate (via the collaborating academic family medicine departments, who consulted their departmental databases of all the DHS-employed FPs). FPs working at regional or tertiary hospitals, those working only at the district level (DCSTs or district office) or those working in the private sector, were excluded.

After accepting the invitation, providing their informed consent and receiving a briefing on the data collection procedure, each FP generated a list of 25-30 potential respondents from within their work environment (this list included the co-workers' job titles and contact information). This list of potential respondents was converted by the lead researcher into an Excel document and sorted into three categories: people who the FP reports to (e.g. managers), people who work alongside the FP (e.g. senior medical officers, pharmacists) and people who report to the FP (e.g. junior medical officers, nurses). For each participating FP,

five respondents were randomly selected from each of these categories. The final list of participants contained the study codes of the FP and his/her 15 selected co-workers.

3.1.2.4 Data collection tool

This study made use of a Family Physician Impact Assessment Tool, which was developed, validated and piloted previously in the Western Cape Province of South Africa.(29) The tool comprises of a section that provides information on use of the tool, a section that gathers information about the respondents and a section that asks about six domains representing each of the six previously described FP roles (Figure 3.1).

Each domain consisted of a number of positively-phrased statements as items, with six response options in a Likert scale format: not performed by the FP (0), strongly disagree (1), disagree (2), agree (3) and strongly agree (4). Respondents could also state that they were not able to answer that question.

One additional item was added for each domain as a whole, asking the respondents to compare the impact of the FP to that of the medical officers at the same facility. This additional item had seven Likert scale options: does not perform this role (0), significantly less impact (1); less impact (2); same impact (3); more impact; (4), significantly more impact (5); and unable to answer.

Respondents were asked to complete the tool either on a hard copy (printed booklet) or online via a secure webpage (Stellenbosch University: Checkbox® survey software version 6).(31)

3.1.2.5 Data collection process

The research team included local co-ordinators from each of the academic family medicine departments and a total number of 16 fieldworkers were trained. A fieldwork protocol ensured a uniform approach to conducting the fieldwork. The fieldwork team contacted the FP and each respondent (in person, via email or phone call) and invited them to complete the paper or online version of the tool. The completed paper tools were collected in a secure box in a neutral space within the facility or collected in person by the fieldwork team. Data were collected between March 2015 and February 2016. Data collected on paper were captured with EpiData version 3.1(32) via a double-entry method and using checks to

minimize data entry errors. Answers to the individual statements were substituted for numbers according to the Likert scale. The data captured online were exported to Excel as a SPSS compatible file. The data from the two versions were combined into a single database. This database was checked for any errors and protected.

3.1.2.6 Data analysis

Data analysis was performed using IBM SPSS version 23(33) and a data analysis protocol (see supplemental file in addenda section). Descriptive analysis was performed to describe the FPs in terms of the number of respondents, provincial distribution, location (metropolitan vs. rural), DHS facility type (district hospital vs. community health centre) and training model (qualification as FP before 2011 and \geq 2011).

Data analysis of the perceived impact for each domain or role was conducted at the level of the FP (the unit of analysis), which required aggregating the respondent-level data into domain mean values. The data analysis protocol specified that no score per domain at individual respondent level will be calculated into the total mean score at the level of the FP, should more than 50% of the items (questions) in a domain not be answered.

A weighted mean score for each FP role was calculated based on the Likert scale from 0 to 4. The mean score was weighted according to the number of respondents per FP as the assessment would be more valid with more respondents. The weighted mean score could then be interpreted as:

- Score < 1.5: No impact in this area
- Score \geq 1.5 but < 2.5: Little impact in this area
- Score \geq 2.5 but < 3: Moderate impact in this area
- Score \geq 3: High impact in this area

A comparison was made between the various roles to assess if the perceived impact of the FPs differed between the roles. A repeated measures analysis of variance (ANOVA) was used to obtain an overall p-value (Wilks' Lambda test statistic) for the differences between the six roles. Subsequently, paired samples t-test analyses were performed to compare the six individual roles against each other (15 pairs in total were compared). Using the Bonferroni correction, the level of α (critical p-value) was divided by the number of tests.(34) The new

α for comparing the weighted means between the individual domains was calculated by dividing 0.05 with 15, which resulted in a new critical p-value of 0.0033 for the between-role comparisons.

The FP's perceived impact in each role was compared to the medical officers. The score for the comparative evaluation between FPs and the other medical officers (Likert scale from 0 to 5) was interpreted as follows:

- Score < 2.5: In favour of the medical officers for a particular role
- Score \geq 2.5 but < 3.5: No perceived difference between medical officers and the FP for a particular role
- Score \geq 3.5: In favour of the FP for a particular role

The independent samples test (t-test for equality of means) was used to assess the relationship between the mean scores for each domain and the secondary outcomes (metropolitan vs. rural, district health facility type, qualification before and after 2011).

3.1.2.7 Ethical considerations

This study was approved by the Health Research Ethics Committee, Stellenbosch University (reference S15/01/003), as well as the relevant institutions and provincial authorities in the study setting (the full list is available in Chapter 1 of this thesis). All respondents gave their informed consent and study codes were used to enter the information into the anonymised database.

3.1.3 RESULTS

A total number of 52 FPs enrolled for the survey with a total number of 542 respondents. The average response rate of the eligible, invited FPs was 56.5% (see Table 3.1) and the mean number of respondents per FP was 10.4 (SD = 3.9; minimum 1 and maximum 18), which indicated a response rate of 63.9% (542/848) for the invited respondents.

The distribution of enrolled FPs by rural vs. metropolitan location, facility type and training programme was fairly equal (Table 3.2). The enrolment by province was unequally distributed. Table 3.3 outlines the four different groups of respondents who evaluated the enrolled FPs. Only 30 of the 52 enrolled FPs (57.7%) completed the tool as a self-

assessment. An additional 14 FPs participated as respondents for other FPs, which meant that of all the respondents, 44 (8.1%) were FPs.

Table 3.4 presents the weighted and unweighted mean values for each domain and demonstrates a close correlation. The FP was seen to have a high impact in all six roles apart from that of capacity builder, which was rated as a moderate impact. The perceived impact for the role of capacity builder was significantly ($p < 0.001$) lower compared to the other roles. The remaining between role-comparisons were not significantly different. The mean values for each role are visually represented in the radar graph (Figure 3.2). FPs were also perceived to have a greater impact than the medical officers across all six roles with a mean score above 3.5 (Table 3.5). No significant differences were found when comparing the weighted means according to rural vs. metropolitan location, facility type (DH vs. CHC), and the training model (Table 3.6).

Table 3.1. Family physician and respondent enrolment per province

Province	Family physicians employed in DHS at facility level		Total number of respondents per province	
	Invited and eligible	Enrolled	Invited	Enrolled
Free State	4	3	48	48
Gauteng	28	12	192	107
KwaZulu-Natal	8	6	96	76
Mpumalanga	12	5	80	53
North West	5	5	80	71
Northern Cape	2	2	32	24
Western Cape	33	19	304	163
Total	92	52	848	542

Table 3.2. Distribution of enrolled FPs by DHS facility type, rural/metropolitan location and training programme type

Rural/Metropolitan			FP training programme		Total
			New	Previous	
Rural	Facility type	CHC	5	6	11
		DH	9	9	18
	Total		14	15	29
Metro	Facility type	CHC	3	11	14
		DH	6	3	9
	Total		9	14	23
Total	Facility type	CHC	8	17	25
		DH	15	12	27
	Total		23	29	52

CHC: community health centres; DH: district hospitals

Table 3.3. Profile of respondents (N = 542)

Respondent Category	n (%)
Managers (including district, facility and operational managers)	111 (20.5)
Colleagues (including other family physicians, senior medical officers, allied health workers and pharmacists)	169 (31.2)
Junior colleagues (including family medicine registrars and junior doctors) and colleagues who consult the family physician (including nurses and community health workers)	164 (30.3)
Family physician self-evaluations	30 (5.5)
Undefined role (including missing data for this variable)	68 (12.5)

Total	542 (100.0)
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Table 3.4. Mean values per domain (family physician role)

Domain	Unweighted means		Weighted means	
	N	mean (SD)	N	mean (SD)
Care provider	52	3.31 (0.36)	52	3.33 (1.26)
Consultant	52	3.23 (0.36)	52	3.24 (1.25)
Capacity builder	52	2.93 (0.36)	52	2.95 (1.16)
Clinical trainer	52	3.21 (0.37)	52	3.24 (1.30)
Clinical governance leader	51	3.13 (0.63)	51	3.11 (1.29)
Champion of community-orientated primary care	52	3.25 (0.36)	52	3.26 (1.30)

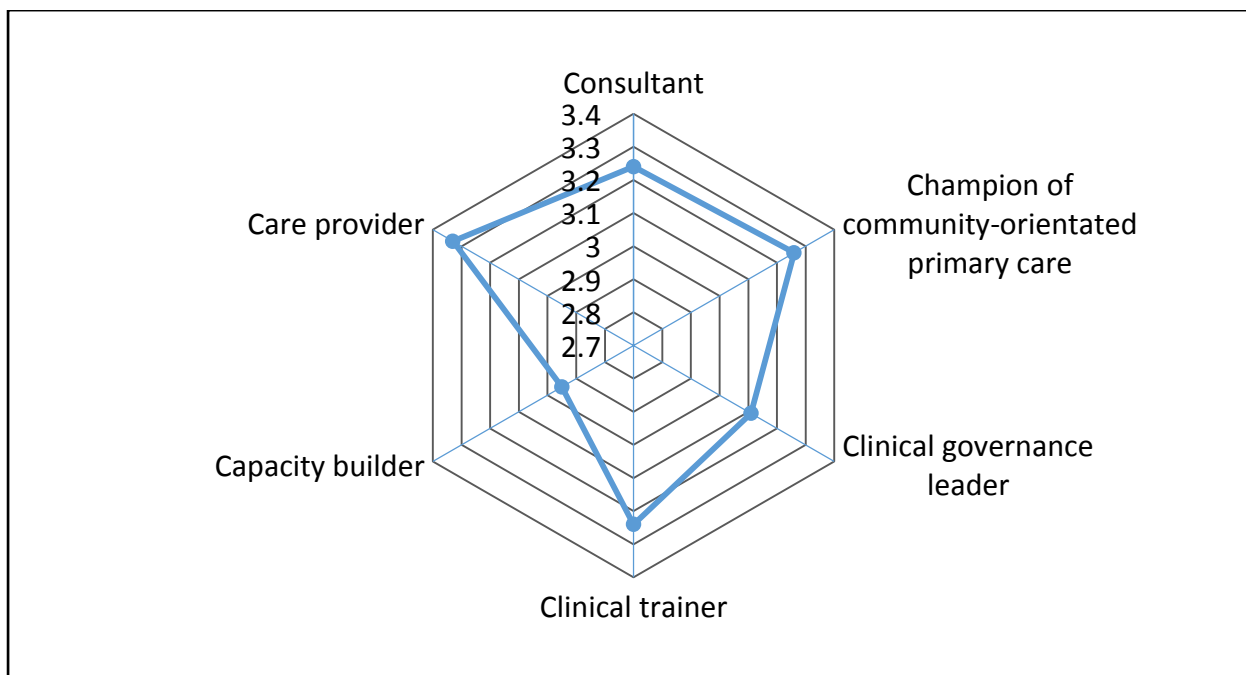


Figure 3.2. The overall perceived impact of the participating family physicians across the seven provinces (weighted means)**Table 3.5. Perceived impact in each role compared to the other doctors at the facility**

Additional question for each domain	Unweighted means	Weighted means
	Mean (SD)	Mean (SD)
Care provider	3.91 (0.65)	3.87 (1.54)
Consultant	3.92 (0.63)	3.87 (1.55)
Capacity builder	3.63 (0.60)	3.61 (1.47)
Clinical trainer	3.89 (0.72)	3.86 (1.59)
Clinical governance leader	3.91 (0.87)	3.82 (1.62)
Champion of community-orientated primary care	3.99 (0.58)	3.94 (1.54)

*A mean value greater than 3.5 is in favour of the family physician making a greater impact than the other doctors at the facility for this role (Likert scale 0 – 5).

Table 3.6. Comparison of weighted means for secondary outcomes

Domain		N	Mean (SD)	t	p-value
Rural vs. metropolitan location					
Care provider	rural	29	3.39 (1.13)	0.441	0.661
	metro	23	3.24 (1.42)		
Consultant	rural	29	3.31 (1.16)	0.468	0.642
	metro	23	3.15 (1.38)		
Capacity builder	rural	29	2.99 (1.12)	0.286	0.776
	metro	23	2.90 (1.23)		
Clinical trainer	rural	29	3.27 (1.19)	0.183	0.856

Domain		N	Mean (SD)	t	p-value
	metro	23	3.20 (1.46)		
Clinical governance leader	rural	28	3.17 (1.30)	0.365	0.717
	metro	23	3.04 (1.29)		
Champion of community-orientated primary care	rural	29	3.31 (1.18)	0.289	0.774
	metro	23	3.21 (1.45)		
DHS facility type					
Care provider	CHC	25	3.27 (1.14)	-0.285	0.777
	DH	27	3.37 (1.38)		
Consultant	CHC	25	3.22 (1.12)	-0.129	0.898
	DH	27	3.26 (1.38)		
Capacity builder	CHC	25	2.97 (1.04)	0.096	0.924
	DH	27	2.94 (1.28)		
Clinical trainer	CHC	25	3.26 (1.15)	0.109	0.914
	DH	27	3.22 (1.45)		
Clinical governance leader	CHC	24	3.26 (1.18)	0.776	0.441
	DH	27	2.98 (1.38)		
Champion of community-orientated primary care	CHC	25	3.27 (1.15)	0.043	0.965
	DH	27	3.26 (1.44)		
New vs. previous training model					
Care provider	new	23	3.27 (1.23)	-0.284	0.778
	previous	29	3.37 (1.30)		

Domain		N	Mean (SD)	t	p-value
Consultant	new	23	3.11 (1.22)	-0.650	0.519
	previous	29	3.34 (1.29)		
Capacity builder	new	23	2.74 (1.10)	-1.208	0.233
	previous	29	3.13 (1.19)		
Clinical trainer	new	23	3.07 (1.27)	-0.842	0.404
	previous	29	3.37 (1.33)		
Clinical governance leader	new	22	2.77 (1.17)	-1.664	0.102
	previous	29	3.37 (1.33)		
Champion of community-orientated primary care	new	23	3.08 (1.24)	-0.914	0.365
	previous	29	3.41 (1.34)		

*significant at $p < 0.05$

3.1.4 DISCUSSION

3.1.4.1 Summary

The impact made by family physicians in DHS facilities across seven South African provinces was perceived by co-workers as high for five of the six agreed roles: care provider, consultant, clinical trainer, leader of clinical governance and champion of community-orientated primary care. Their impact in the role of capacity builder was significantly less than the other roles although still seen as a moderate impact. Furthermore, co-workers rated their FP's impact across these six roles as higher than the other doctors at the same facility. The perceived beneficial impact was experienced equally across the whole study setting, as no significant differences were found when comparing location, facility type or training model.

3.1.4.2 Comparison with existing literature

Overall perceived impact for the different roles

The role of the FP in COPC was perceived to be much higher in the national study compared to the initial pilot study. This may be due to the greater involvement of family medicine departments in the implementation of COPC in provinces such as Gauteng and the limited commitment of the Western Cape, where the pilot study was conducted, to implement COPC as part of PHC re-engineering.

Conversely, the role of the FP in building the capacity of the healthcare team was rated much lower in the national study compared to the pilot study. This might be due to the emphasis on implementing clinical governance in the districts included in the pilot study.(35) In other provinces the DCSTs may have taken more of a lead in capacity building around maternal and child health.(36) FPs in the Western Cape may also have had a greater emphasis on educational skills in their training programme.(37)

A new postgraduate training programme was introduced post-2007 aimed at equipping the new graduates with the competencies needed for their six roles. This study, however, did not demonstrate a significant difference in perceived impact between FPs graduating from the old and new programmes. This may be attributed to the many years of vocational experience of FPs trained previously that ensured they developed the competencies required for their roles.(22) In addition, newly qualified FPs may require some time to grow into all six roles, especially the leadership roles, which require a degree of seniority and maturity.(22)

Comparison of their impact relative to the medical officers

An ongoing concern voiced by managers in the health system revolves around the perceived benefit of employing a FP with postgraduate training vs. a MO with a lower salary package.(22,38,39) This study found that FP co-workers (including the facility managers who function closer to the FP's circle of control and influence) rated their perceived impact higher compared to the other doctors within the facility for all six roles. A quasi-experimental study also utilised the FP impact assessment tool as one of the instruments to compare DHS facilities with and without FPs, and showed a significantly stronger perceived impact in facilities with FPs for the roles related to COPC, clinical training and capacity building.(40)

Relationship between their impact in these roles and other indicators of health system performance and clinical processes

The study was not designed to demonstrate a causative link or correlation between the six FP roles and health outcomes. Nevertheless the six roles are incorporated by the DOH into the job description of FPs as these roles are important to strengthening the DHS and national health priorities.(24,26) If policy makers agree on the potential value embodied by these six roles, further investment in the training and employment of FPs within the DHS should be promoted.

The link between FP supply and health system indicators has been explored and an ecological study did not show a demonstrable correlation from the macro-perspective of the district, as the FP supply was still too low.(41) A quasi-experimental study, however, demonstrated how FPs add value to in-hospital clinical care (especially in terms of paediatric care).(40) Qualitative studies have also explored this question from the perspective of the district managers and suggested that family physicians have had a positive impact on the quality of clinical processes across the quadruple burden of diseases, and some impact on health services performance (in terms of improved access to care, better coordination, and the provision of a more comprehensive and efficient service).(22,38)

3.1.4.3 Implications for research and practice

Given the alignment of these six roles with national priorities for strengthening the DHS and the perceived impact of FPs demonstrated in this study, there is a need to employ FPs at scale and to strengthen the training programmes (including number of registrar posts) as described in the national position paper.(22)

The finding of a lower perceived impact in the capacity building role may require more research to understand the factors involved, such as the implementation of clinical governance in districts or training provided to registrars for this role.

The Family Physician Impact Assessment tool could be used to evaluate the perceived impact of FPs in other African or LMIC health systems, providing that the FPs are similarly positioned within the PHC teams and share the same roles. This will require adaptation and

validation of the instrument for the new context, but may produce useful data for between country-comparisons.

This study should be repeated after 5-years in order to evaluate changing perceptions of the impact of FPs as more FPs are employed and the health system undergoes further transformation.

3.1.4.4 Limitations

This study was conducted congruent to the methods described in the pilot study, by conducting the analysis at the level of the FP (and not at the level of the individual respondent).(29) The weighting of means to control for the variation in respondent numbers per FP resulted in larger standard deviations, which decreased the likelihood of finding statistically significant findings when comparing sub-groups. The weighting was applied in the direction of FPs with more respondents, as this increased the number of observations per FP which should result in a more valid 360-degree appraisal.(42)

The potential bias of asking the FPs to nominate respondents was addressed in the pilot study's article.(29) The researchers implemented the pilot study's recommendation of selecting respondents randomly from the total pool of eligible people in each category.(29) Further bias may be introduced by only considering responses from FPs (and their co-workers) who chose to enrol for this study (this enrolment bias may have excluded better and/or worse performing FPs). The enrolment procedure included several strategies to help convince eligible FPs of the social and scientific value of the study, and inform them of the measures employed to ensure anonymity. Fortunately, Table 3.2 demonstrates the equal distribution of enrolled FPs by location, facility type and training model. The unequal distribution by province was predetermined by the differences in employment of eligible FPs.(39) The exclusion of two South African provinces (Eastern Cape and Limpopo) was predetermined by the provincial footprint of the academic family medicine departments. The number of eligible FPs in these excluded provinces was small and their omission from the survey is unlikely to have a substantial effect on the findings.

3.1.5 CONCLUSIONS

FPs working within the DHS have a high perceived impact in their roles as care providers, consultants, clinical trainers, leaders of clinical governance and champions of community-orientated primary care, and a moderate perceived impact as capacity builders. Their impact was perceived to be greater than the medical officers at the same facilities across all six roles. The impact was the same regardless of location, facility type or training model. The findings support the need to increase the deployment of family physicians in the DHS and to increase the number being trained as per the national position paper.

3.1.6 LIST OF ABBREVIATIONS

ANOVA: analysis of variance; CFPSA: the College of Family Physicians of South Africa; CHC: community health centre; COPC: community-oriented primary care; DCSTs: district clinical specialist teams; DH: district hospital; DHS: district health system; FP: family physician; LMIC: low and middle income countries; MO: medical officer; PHC: primary health care; SAAFP: South African Academy of Family Physicians; SD: standard deviation; STROBE: Strengthening the Reporting of Observational Studies in Epidemiology; WHO: World Health Organization; WONCA: World Organisation of Family Doctors

3.1.7 DECLARATIONS

3.1.7.1 Ethics approval and consent to participate

This study was approved by the Health Research Ethics Committee, Stellenbosch University (reference S15/01/003), as well as the relevant institutions and provincial authorities in the study setting (the full list is presented in Chapter 1). All the participants gave their informed consent.

3.1.7.2 Consent for publication

Not applicable.

3.1.7.3 Availability of data and materials

The raw data used to calculate the results is stored at the Division of Family Medicine and Primary Care, Stellenbosch University, and can be made available on request once all identifiers have been removed.

3.1.7.4 Competing interests

The authors declare that they have no competing interests.

3.1.7.5 *Funding*

This study was conducted with the financial assistance of the European Union. The contents of this document are the sole responsibility of the authors and can under no circumstances be regarded as reflecting the position of the European Union. Additional funding was received from the Discovery Foundation (South Africa) and the Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.

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3.1.7.7 *Authors' information*

At the time of conducting the study, KBvP and RJM were both located at the Division of Family Medicine and Primary Care, Stellenbosch University, in South Africa and co-ordinating a national project entitled "*Strengthening primary health care through primary care doctors and family physicians*" that was funded by the European Union. Subsequent to completing the study, KBvP started working as a family physician within the Eden district health system, Western Cape Department of Health, where he supervises postgraduate family medicine trainees. RJM is KBvP's PhD supervisor and head of the Division of Family Medicine and Primary Care, Stellenbosch University. LBR, RPGB, IG and WJS are academic family physicians based at the family medicine departments (respectively at the University of Witwatersrand, the University of Pretoria, the Sefako Makgatho Health Sciences University and the University of the Free State), which participated in the national,

European Union-funded project. TME is a consultant biostatistician in the Biostatistics Unit, Faculty of Medicine and Health Sciences, Stellenbosch University.

3.1.8 AUTHORS' CONTRIBUTIONS

KBvP and RJM conceptualised the study. LBR, RPGB, IG and WJS provided critical input during the design and data collection phases of the study (such as checking the list of FPs who qualified for the study, helping to recruit suitable members to the fieldwork team, and assisting KBvP during the training of the fieldwork team and coordinating the data collection). KBvP prepared the database and conducted the data analysis with TME under the supervision of RJM. KBvP drafted the manuscript under the supervision of RJM. All authors reviewed the manuscript and approved the final version.

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3.2 ARTICLE 2:

THE BIRD'S-EYE PERSPECTIVE: HOW DO DISTRICT HEALTH MANAGERS EXPERIENCE THE IMPACT OF FAMILY PHYSICIANS WITHIN THE SOUTH AFRICAN DISTRICT HEALTH SYSTEM? A QUALITATIVE STUDY.

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3.2.1 BACKGROUND

The 1978 Alma-Ata declaration represented a global commitment to primary health care (PHC).(1) Dr Margaret Chan, in her introduction to the 2008 World Health Report: "Primary Health Care – Now more than Ever", stated, in reference to Alma-Ata, that, "despite enormous progress in health globally, our collective failures to deliver in line with these values are painfully obvious and deserve our greatest attention".(2) Since then, there have

been renewed global efforts towards more integrated people-centred PHC, and attaining the Sustainable Development Goals, including universal health coverage.(3,4)

One of the strategies to strengthen PHC is to review the composition and deployment of the primary care workforce.(5) Health policy makers in South Africa are faced with a quadruple burden of disease: HIV/AIDS and tuberculosis; maternal and child health; injuries and violence; and non-communicable chronic diseases.(6) Internationally, there is increasing support for PHC services that are provided by multidisciplinary teams led by doctors with postgraduate training in family medicine.(2,7–11) Paradoxically (and in line with the inverse care law), PHC teams on the African continent lack this cadre of specialist trained family physicians (FPs).(7,12) The majority of primary care doctors working in both private and public sectors do not have a postgraduate qualification in family medicine.(7,8,13,14)

The academic discourse around the roles and potential contribution of African family physicians is ongoing. Historically, the training and employment of FPs in African health systems has occurred asynchronously, with consensus on academic training outcomes preceding the official deployment policies.(15–17) The African continent's academic leadership have engaged with a number of processes to obtain consensus on the roles and contributions of FPs, and advocate for their training and deployment within the evolving health care landscape.(17,18) In South Africa, the specialty was officially recognised by the health professions' council in 2007.(8,19) This event enabled the development of accredited postgraduate training according to a set of nationally agreed unit standards and learning outcomes.(8,19–21) Graduates are expected to fulfil six key roles (see Figure 3.3): care provider, consultant, capacity builder, clinical trainer, clinical governance leader and champion of COPC.(8,21) In 2015, a national position paper made recommendations to the South African National Department of Health (NDOH) on how best to deploy FPs as expert generalists within the District Health System (DHS).(8) The South African academic family medicine departments are also playing a strong leadership role in supporting the establishment of family medicine training programmes elsewhere in Africa.(22,23)

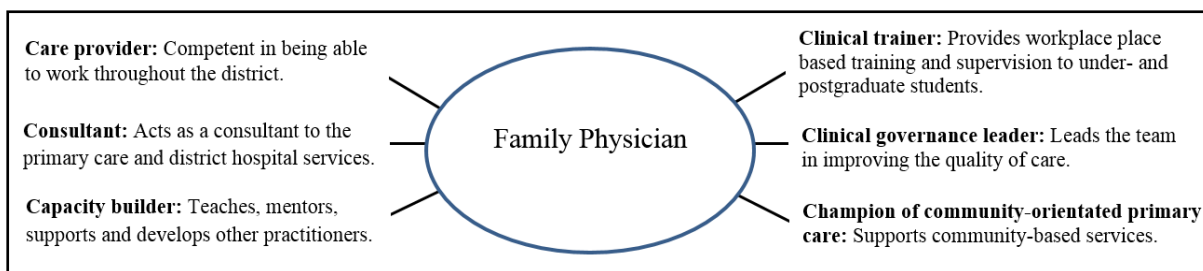


Figure 3.3. Six roles of the South African family physician(8)

The opinions of African health care leaders on the role of FPs in their health systems were published previously.(13,24) The literature on this topic described different levels of support coupled with uncertainty and even apprehension regarding the contribution of this discipline.(8) The official policy direction is often not aligned with these opinions or the aforementioned position statements by the academic leadership.(8,25) In South Africa, policy documents acknowledge the role of FPs in terms of clinical governance and leadership within the DHS.(26,27) Their role within district hospitals and at district level as members of the district clinical specialist teams (DCSTs) is clearer than their contributions to primary care and community based services, which remains less well-defined.(8,28,29) During interviews held in 2012 and 2013 in the Western Cape Province of South Africa, district health managers agreed on the positive impact of FPs on the quality of clinical processes, specifically in relation to HIV/AIDS, tuberculosis, maternal and child health, non-communicable diseases and mental health.(30,31) In addition, FPs appear to have some impact on health system performance in terms of improved access to care, better coordination and the provision of a more comprehensive and efficient service.(30,31)

A national research project has attempted to provide evidence from the South African context on the early impact of FPs within the DHS.(32) The authors conducted four different studies, including: a cross-sectional observational study comparing DHS facilities exposed to FPs to matched controls; a survey of FPs using a validated 360-degree impact assessment tool; correlation of FP supply with routine district health indicators; and, interviews with district health managers. This article presents the findings from district manager interviews, while the results from the other studies are reported elsewhere.(33–35) This study aimed to evaluate the impact of FPs within the DHS of South Africa from the perspective of the district managers in the following three domains: health system performance, clinical processes and health outcomes.

3.2.2 METHODS

3.2.2.1 Study design

This was a phenomenological qualitative study using semi-structured interviews with district managers. The consolidated criteria for reporting qualitative research (COREQ) checklist was used to guide this report.(36)

3.2.2.2 Setting

This study was conducted in the DHS of the South African public health sector in seven of the country's nine provinces according to the provincial footprint of the universities collaborating in the study. Each province consists of a number of districts defined geographically by the South African Constitution.(37,38) Each health district is sub-divided into defined sub-districts, each of which usually has a district hospital (DH) or community health centre (CHC) that serves several fixed or mobile smaller PHC clinics. DHs typically have inpatient services with male, female, child and maternity wards, as well as operating theatres, outpatient and emergency departments. CHCs are usually larger primary care facilities with a multidisciplinary team, often including a FP and can also include dedicated 24-hour emergency centres and/or midwife obstetric units (MOUs). PHC clinics are smaller facilities generally run by nurses with occasional outreach support from doctors, typically primary care doctors or medical officers (MOs) with no postgraduate training. Most primary care consultations in the public health sector (more than 80%) are with nurses who thus become the first point of contact for patients in the public health system.(39) COPC services are also emerging with community health workers and nurses as team leaders taking responsibility for a certain number of households within a defined municipal ward.(40) These ward-based outreach teams (WBOTs) are linked to local CHCs and primary care clinics.(14,38)

In terms of reflexivity, the research team consisted of FPs engaged with the training of FPs for the DHS. Two of the authors, KBvP and WJS, helped conduct the interviews. All interviewees were encouraged to voice honest views. KBvP conducted the qualitative data analysis under the supervision of RJM. KBvP is a FP and PhD student, has experience and training in qualitative research methods, and took care with conducting the analysis in a rigorous manner.

3.2.2.3 Characteristics and selection of participants

District managers (at director or chief director level) for all FP-containing districts in each of the seven provinces were invited to participate in the study. District managers (DMs) are the highest ranking members of the district management team and are responsible for implementing policy decisions and determining expenditure priorities for the district. Chief directors (CDs) are higher-ranking DMs who oversee a cluster of health districts and/or substructures within a defined geographical area. DMs and CDs therefore have a bird's eye view of the performance of their district as a whole. This vantage point allows them to reflect on how FPs and other interventions impact on the performance of their districts. All eligible DMs were approached via the collaborating academic family medicine departments. Informed consent was obtained from all DMs who participated.

3.2.2.4 Data collection

Semi-structured face to face interviews were held between September 2014 and March 2016 depending on the readiness of each province and local Health Research Ethics Committee approvals to conduct the research. The interview started with an open question, which explored the interviewee's experience of the FPs working in their district. Further potential questions focused on aspects of health system performance, clinical processes and health outcomes, as well as the six roles of the FP and were contained in an interview guide (**Table 3.7**). Interviews were conducted by two co-authors, as well as five research assistants who were trained in qualitative interviewing. Interviews were held at a location convenient to the interviewee, in the language preferred by the interviewee (either English or Afrikaans) and were audiotaped.

Table 3.7. Interview guide

1. What has been your experience of family physicians in your district so far?
2. What impact, if any, do you think your family physicians have had on the quality of clinical care (HIV/AIDS, TB, STIs, NCDs, maternal, child, injury, trauma and mental health)?
3. What impact, if any, do you think your family physicians have had on the performance of the district health system or facilities (access, continuity, coordination, comprehensiveness, other)?

4. Do you think that your family physicians are having any impact on health outcomes in your district (mortality)?
5. To what extent have the predicted roles of the family physician been seen in practice (care provider, consultant, capacity builder, clinical trainer, clinical governance leader and champion of community-orientated care)?
6. Have there been any unanticipated impacts or roles?

Abbreviations: AIDS: acquired immune deficiency syndrome; HIV: human immunodeficiency virus; NCDs: non-communicable diseases; STIs: sexually transmitted infections

3.2.2.5 Data analysis

All the interviews were transcribed verbatim in the original language of the interview. All the transcripts were checked against the original recording by the researcher. Qualitative data analysis used the framework method (familiarization, develop a thematic index, coding source documents, charting, interpretation) and was assisted by ATLAS.ti® software (version 7.5.17).(41,42) Direct quotations from the interviews were identified to illustrate key points.

3.2.2.6 Ethical considerations

This study was approved by the Human Research Ethics Committee (Medical), Stellenbosch University (reference S15/01/003), as well as by each partner institution. The seven provincial health authorities and research committees also gave permission to access the study setting (the full list is available **in Chapter 1 of this thesis**).

3.2.3 RESULTS

Twenty one district managers out of 36 eligible districts agreed to participate in this study (see **Table 3.8**). All seven provinces were represented.

Table 3.8. Enrolment of district managers by province

Province	Number of eligible districts	Number of district managers enrolled
Free State	5	2
Gauteng	5	4

KwaZulu-Natal	10	4
Mpumalanga	3	3
Northern Cape	4	1
North West	4	2
Western Cape	5	5
Total	36	21

Health system performance

Most DMs felt that FPs enabled better access to a comprehensive package of care at the appropriate level. This was achieved both directly, by providing care requiring a more advanced skills set closer to the community, and indirectly, by ensuring that appropriately capacitated healthcare workers were available at the primary care coalface. They thought that FPs ensured more appropriate referrals to specialist care and therefore improved the coordination of care between different levels of the health system. FPs also improved the flow of patients through the emergency centre of the district hospital to either the inpatient wards or the primary care platform:

“The impact of family medicine on the performance of health services and health facilities has been very great in my view. We very rarely had specialists at primary health care level and the coming in of family medicine makes it very easy, because we are bringing somebody who would know what will happen in the next second, third and fourth stage in case we have got to refer the patient. So you are, you are actually increasing access of services, you’re bringing a very comprehensive person who would understand what is needed for this patient.” (DM, North West Province)

Clinical processes

The majority of DMs reported specific examples of how FPs contributed to the enhancement of clinical service delivery, specifically in the areas of chronic disease management (HIV/AIDS, tuberculosis, mental health and non-communicable diseases),

maternal and child health, and emergency care. FPs engaged with these clinical processes by creating competent multidisciplinary teams, performing applied research and audits, and developing locally relevant clinical governance activities:

“... I'd like to zoom in to non-communicable diseases. They've really assisted us in terms of clinical upscaling of our staff. When they visit our facilities, they're not only seeing patients but they also make sure that when they pick up challenges around management of, of clients, we can say diabetic clients, or hypertensive clients, they do on the job training. And they also assist in terms of arranging formal in-service trainings, where they touch on topics relating to conditions that [are] of serious concern within our district.” (DM, Mpumalanga Province)

Family physician roles

In general, the DMs were satisfied that the FPs were having direct patient contact, especially by seeing referred patients with more complicated or difficult cases. The DMs also appreciated the supporting role of FPs as consultants, supervisors and mentors to other members of the PHC team (nurses, doctors, GPs and foreign qualified doctors). Although one DM stressed that the FP should be more hands-on with clinical work as *“you cannot sit and call yourselves consultants and you do not do work”*. Some DMs also mentioned the value of FPs conducting consultant ward rounds in the district hospitals:

“... their role particularly, we see it as more consultancy and mentoring. They also, I can also say they are a care provider as well because they also see patients. But for us the consultancy role and mentoring role that they play has actually assisted us in terms of the standard of care that we're providing to our patients.” (DM, Mpumalanga Province)

DMs mentioned various healthcare worker categories that benefited from the in-service training and capacity building efforts of the FPs, including nurses, doctors, nursing and medical students, family medicine registrars and community health workers.

“... we've got ... primary health care students in our facility; so they conduct in-service trainings as well and they actually help them out to, to do other practicals with students” (DM, Gauteng Province)

The clinical governance role featured strongly in the interviews, with numerous examples cited of how FPs assist the management structures with audits, operational research, interpretation of routinely collected data, investigation of adverse events, and “*harmonising*” the services within the sub-districts by implementing protocols and standard operating procedures (SOPs):

“She does audits which were not done in the past ... She does clinical governance by reviewing the adherence to protocols around chronic care, tuberculosis, etc. And she addresses the gaps identified. And she also looks at the quality of referrals made by the doctors.” (DM, Western Cape Province)

The contribution of FPs to developing COPC and supporting WBOTs featured less strongly. DMs mentioned some examples of FPs who were engaging with this role, specifically in the Gauteng, Mpumalanga and Kwa-Zulu Natal provinces. These activities could be in conjunction with university, governmental or non-governmental organisations:

“In terms of continuity of care, family physicians, they also go into the ward, into the houses, because Doctor [Surname] is the one who is going to, when these community health workers and the team leaders refer their patients, and then they have got a difficult patient at home, Doctor [Surname] literally goes into the family to go and see the, the patient and as he refers the patient to the hospital, he is able also to follow the patient into the hospital to see what is happening and also back referral into, into the district or into primary health care.” (DM, Gauteng Province)

Clarifying roles and expectations

DMs spoke about the range of employment options available to FPs both within and outside the DHS. FPs might be employed at the level of the district, either as a member of DCSTs or at the district office, at the sub-district level, within the primary care facilities or district hospital. Some FPs were working outside the DHS at the referral hospital, where they worked in the outpatient department. Some FPs were employed in clinical manager positions and not as FPs. Each employment option came with different perceptions on what roles the FP should fulfil.

Dual or joint appointments with the university raised the additional concern that some FPs spent more of their energies on teaching activities and that the district clinical services were not *“getting the time out of them.”* Other DMs reported on how a formal communication structure between DMs and academic family medicine departments enabled ongoing conversations around balancing the tensions of adequate student supervision and service delivery demands. Some DMs mentioned examples of how the presence of students benefited the DHS, such as student-supported clinical services, university-built infrastructure and postgraduate operational research.

“So I think the university also has a better understanding now that we need to prioritise service delivery. But you need to have a well balanced approach here. And not to harm the student in the process in terms of curriculum requirements. So yes, we are learning all the way in the rural areas. You know how to best manage students on the platform. ... I really don't think we can afford in rural areas to be having the luxury of family physicians operating as academic consultants you know.”
(DM, Western Cape Province)

At the level of the district, a greater focus on clinical governance and coordination was expected. Some DMs reported on the uncertainty among existing doctors in the DHS on how the FPs will be able to complement the existing service. A North West DM also reported on the interplay between FPs and the GPs contracted as part of the NHI piloting process, where the NHI GPs were perceived to be more engaged with the primary care facilities' clinical governance activities. Three of the Western Cape DMs also reflected on how FPs and clinical managers complemented each other in the larger sub-district service platforms.

FPs often have to take the lead in helping their colleagues and managers understand *“how broad their role is”*. A KwaZulu-Natal DM reflected on how it may not be *“a nice position to be in ... having them like they're fighting for their position”*. A Gauteng DM was wondering whether *“I'm expecting too much from them”*, by hoping that FPs will be functioning at the forefront in the community and not in the health facility. A Western Cape DM highlighted the role of the DM in helping the DHS team to *“focus on the roles and responsibilities from the start”*. Another Western Cape DM was concerned that FPs would only be associated

with a narrow clinical focus of chronic disease management. This was echoed by a Gauteng DM in the quote below, which emphasises the difference in roles of FPs and MOs:

“But however for me I think they are not doing what is expected of them. Because they work as if they’re normal, they don’t do anything you know more than an ordinary MO. I used to challenge them to say that you need to be, you need to transcend, you don’t have to be like an ordinary MO, because medical officers you know that their work is just to look at, you know push the queue and look at the patients and whatever.” (DM, Gauteng Province)

Unanticipated roles

Many of the DMs were able to highlight examples where FPs took on additional duties. Some DCST FPs fulfilled the role of other members of the DCST such as the obstetrician, particularly where such positions were vacant. Other FPs acted as consultants for other disciplines, such as internal medicine, where such specialties were not accessible to the clinical team. Other unanticipated roles included the FP’s value in addressing human resources and other managerial tasks, including the line management of clinical staff. Some FPs impressed their DMs with their levels of engagement with research activities, especially where the research focused on operational issues.

Perceived impact of family physicians on health outcomes

Some of the DMs were able to indicate specific areas where FPs were making a perceived impact, specifically in maternal health (reduction in caesarean rate) and primary health care (better access to a more comprehensive service). The DMs acknowledged that the health outcomes of the community will be *“a much more long term thing”*, as *“there are just not enough”* FPs. Their ability to influence the team and ensure a well-organised service was cited as examples of them making a *“huge difference as part of a complex system”*. Some DMs mentioned potential indicators which may help to gauge the impact of the FPs, such as: maternal mortality/morbidity, infant mortality rate, TB cure rate and chronic disease management outcomes. One Western Cape DM stressed that the FP’s qualities which s/he *“brings to the table ... [are] not measurable in terms of statistics of [number of] patients seen”*, requiring a more nuanced or sophisticated analysis of what is going on.

Interplay between context and family physicians

A recurring theme was the issue of the FP's ability to influence his/her context. An expectation of FPs in the DHS is that they will help the healthcare system to improve, expand and develop. FPs who were seen to be *"at the mercy of the system"* were those lacking leadership skills and not able to integrate themselves into the clinical team. Additional constraints on the FP's ability to function successfully were high turnover or shortage of staff, specifically other doctors (MOs) to address the clinical workload, as well as a restrictive managerial and/or policy environment (such as budgetary constraints, role confusion and inefficient support structures).

Role clarification and support were identified as enabling factors. Some DMs mentioned the mentoring support of senior FPs and other specialists to newly qualified FPs. Newly qualified FPs appeared to gradually embrace all of their six roles in an incremental process as they gained experience and maturity. An understanding of the complexity of the DHS environment was also seen as beneficial. FPs with leadership qualities, resilience and the ability to be change agents were seen as FPs able to shape their context. A supportive team and management were identified as pivotal enabling factors:

"And I think I shared freely previously that we cannot expect that we put a new staff category on the service platform and we don't assist in defining roles and responsibilities. Because I feel as a district manager, that's your strategic, it's your responsibility, and it's a strategic function, to ensure that every staff category represented on the DHS platform needs to know exactly where does he or she fit in. And if you are poor at doing that it will pan out operationally. ... It was a deliberate focus to ensure that we don't get it wrong, that we take everybody on this journey to ensure that the family physician is a recognised specialty in the district." (DM, Western Cape Province)

DMs' message to training programmes

The DMs appreciated that the FPs' training had prepared them to understand *"the bigger picture"* of the DHS. Some DMs cautioned academic departments to select mature candidates with previous DHS exposure for the training programmes. Trainees need to embrace a community-perspective and to look beyond facility-based care. Ongoing

conversations were required to ensure that academic training programmes remain in step with the evolving service delivery needs and expectations:

“My assumption has always been to say, the doctor who is a family physician [has] the skills, but also you need the doctor that knows the territory, ..., because you find that we expect them as a consultant to be able to argue for things that we think are important for the district ... We feel as they come as the specialist, they have to make a tailor-made plan for the district and we work on that.” (DM, Free State Province)

3.2.4 DISCUSSION

3.2.4.1 Key findings

Interviews with DMs confirmed a number of benefits of FPs to the health system in South Africa: their ability to increase access to a more comprehensive and coordinated health service, to improve clinical care, to capacitate the healthcare team and facilitate clinical governance activities. The FPs’ ability to act as a leader and to influence their colleagues was seen as a key factor in determining their impact on the health outcomes of the community served. Managers involved with integrating new FPs into the health care team needed to take cognizance of the variance in roles with different employment models, the need for initial role clarification and to support role maturation with experience over time. DMs agreed that the FPs, their team members (including senior colleagues, other specialists, local and district managers), as well as the academic training coordinators should engage in ongoing conversations around role-clarification, mentoring support (senior FPs) and role maturation (from clinician/consultant to clinical governance leader and trainer) as it applies to each local context.(8,24,43) An approach that understands the contextual challenges and enabling factors will help amplify the contribution of FPs to strengthening the DHS. Figure 3.4 is based on the modified Donabedian causal chain by Lilford *et al*(44), and provides a visual summary of the key points highlighted by the DMs on the perceived impact of FPs and important issues to consider.

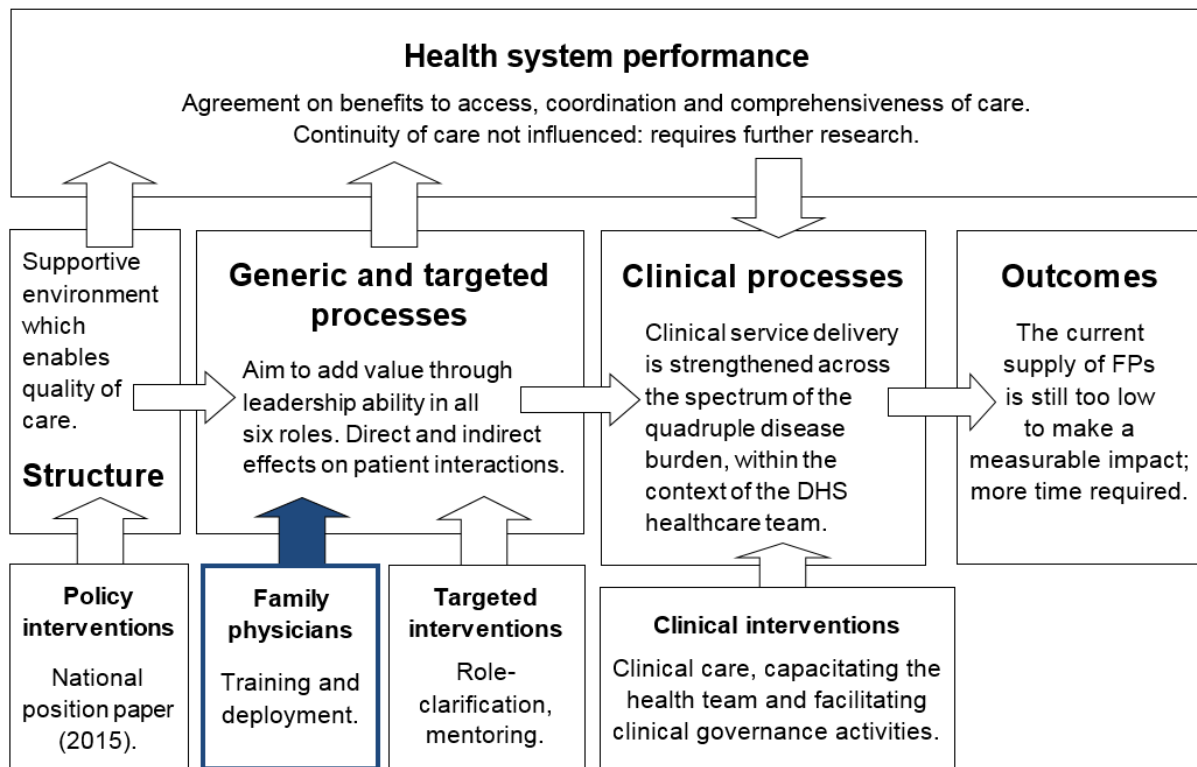


Figure 3.4. Visual summary of the key study findings

3.2.4.2 Discussion of the findings in relation to the literature:

Perceived impact on health system performance

Three of the four domains of health system performance⁽⁴⁵⁾ were benefited, namely access, coordination of care and comprehensiveness of care. The benefits to health system performance, described previously in the Western Cape Province, were echoed across the spectrum of district settings nationally.^(30,31) Continuity of care was not specifically mentioned by DMs in this study and FPs do not appear to be affecting this important dimension of effective primary care.⁽³³⁾ Continuity of care is a complex phenomenon and may be divided into relational continuity (a continuous therapeutic relationship with a designated healthcare team), informational continuity (information as the link between one provider to another and between healthcare event and another) and managerial continuity (continuity and consistency of clinical management within the healthcare team).⁽⁴⁶⁾ Continuity is influenced by patient, provider and practice factors.⁽⁴⁷⁾ In South Africa, primary care services at clinics and community health centres are struggling to cope with high patient volume, the complexity of undifferentiated problems, multiple co-morbidities

and serious illness.(8) Further research is required on how FPs, their teams and policy makers may improve the continuity of care within the South African DHS.

Perceived impact on clinical processes and health outcomes

The DMs in the wider South African setting were in agreement with the previously published benefits of FPs to strengthening clinical service delivery across the spectrum of the quadruple disease burden.(30,31) These benefits were ascribed to the effect of the six FP roles, which allowed the FP to have direct and indirect effects on patient interactions within the context of the DHS healthcare team. The FPs' training as an expert generalist across ten clinical domains enables them to care for the majority of health problems encountered in the DHS.(8) DMs appreciated the FP's ability of bringing a range of skills closer to the coalface of primary care, as described in the national position paper.(7) DMs also appreciated the fact that the supply of FPs within the DHS was still too low to make a measurable impact and that more time is required to appreciate the full impact of their integration into the healthcare system. This is in keeping with the findings of an ecological study, which found little correlation between the supply of family physicians and routinely collected data on district performance.(35)

The roles of family physicians

The DMs appreciated how the six roles of the FP, which were agreed on by the South African academic family medicine departments and incorporated into the generic FP job description by the NDOH, enabled FPs to influence the DHS. Other studies have also shown that South African FPs are having a recognisable impact across all six roles that is also greater than that of the medical officers.(33,34,48) DMs in this study appreciated that a FP could play a broader role than the clinical role represented by MOs (primary care doctors without postgraduate training, who are employed primarily to provide clinical care). DMs saw the contribution of FPs to COPC as their weakest role, although other studies at the level of the facility have seen FPs having a high impact in this area.(34) DMs made the connections between the performance of these six roles and improvements in health system performance and clinical outcomes.

The role of leadership within the DHS context

The DMs provided rich data on the need for the FP to demonstrate leadership in collaboration with the local managers in order to create a supportive environment in which healthcare workers and the quality of their work could flourish. Collaborative leadership between FPs and the local managers has also been showcased in the Western Cape with regard to implementation of the clinical governance framework.(28) The importance and nature of leadership competencies in the training of FPs has also been recently emphasised and new learning outcomes created to guide the South African training programmes.(21) The FP should add value through his/her leadership ability in all his/her roles, in keeping with a collaborative and complex adaptive leadership style.(21,49) The conversation around leadership should also include the need for the district health system to integrate with the educational system (academic family medicine departments) to enhance the support of the teaching and learning environment. This is needed to train the district workforce in the appropriate context, including future FPs, and for the educational system to understand the evolving needs of the district level services. FPs across the country are also being trained as clinical trainers to facilitate workplace based learning.(8,22,50,51)

3.2.4.3 Strengths and limitations

The voices of eligible DMs who chose not to participate or who were not available may have provided further information, although it is unlikely that additional themes would have emerged, as data saturation was reached within the available interviews. Furthermore, the findings of this qualitative study triangulate well with other studies.(24,30,31,33–35) The size of districts differs between provinces and this may have resulted in DMs having different levels of understanding of their FPs' impact. Some DMs were able to comment in more detail in relation to FPs employed at higher levels in their district, such as those FPs employed as the district FP or serving as a member of the DCST. DMs, however, are better placed to view their district as a whole system. This vantage point supported the researchers' decision to select DMs as key informants to address the study's aim and objectives.

3.2.4.4 Recommendations

This study supports the need to employ FPs at scale within the South African district health system as outlined in the national position paper, namely, that *“as a country, initially the*

short-term goal should be for one family physician to be employed per sub-district and one per district hospital".(8)

Newly appointed FPs need an active process of support and role clarification with their healthcare teams to establish themselves in the health system and to mature in all their different roles. Further research may be needed to understand and conceptualise this process more clearly.

More attention should be given to developing continuity of care and to the contribution of the FP towards this goal.

The importance of FPs developing leadership competencies was reinforced and the need for training in this across all their roles.

The need to integrate the educational system with the district health system was clear in order to create an appropriately trained workforce, including the FP.

3.2.5 CONCLUSION

DMs affirmed the importance of all six roles of the FP and the direct and indirect ways in which they contribute to strengthening health system performance and clinical outcomes. FPs were seen as important clinical leaders within the district healthcare team. Newly appointed FPs needed support to clarify their roles within the healthcare team and to mature across all their roles. The study supports the need to employ FPs at scale within the South African district health system according to the national position paper on family medicine.

3.2.6 ACKNOWLEDGMENTS

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3.2.7 CONFLICT OF INTEREST STATEMENT

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

3.2.8 AUTHORS' CONTRIBUTIONS

KBvP and RJM conceptualised the study. LBR, RPGB, IG and WJS provided critical input during the design and data collection phases of the study (such as checking the list of DMs who qualified for the study, helping to recruit suitable members to the fieldwork team, and assisting KBvP during the training of the fieldwork team and coordinating the data collection). KBvP conducted the interviews in the Western Cape Province, whereas WJS conducted the interviews in the Free State and Northern Cape Provinces (the remaining interviews were conducted by the fieldwork team). KBvP checked and analysed the transcripts under the supervision of RJM. KBvP drafted the manuscript under the supervision of RJM. All authors reviewed the manuscript and approved the final version.

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**3.3 ARTICLE 3:
MEASURING THE INFLUENCE OF FAMILY PHYSICIANS WITHIN THE SOUTH
AFRICAN DISTRICT HEALTH SYSTEM: A CROSS-SECTIONAL OBSERVATIONAL
STUDY.**

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3.3.1 INTRODUCTION

The discipline of family medicine must constantly adapt to be relevant within different health systems and national contexts.(1–4) The discourse on the roles and competencies of family physicians (FPs) attempts to define their contribution to strengthening primary health care (PHC) systems.(5–9) International policy documents on family medicine and PHC rely on data that are mostly derived from high income countries; and, African health care leaders are looking for evidence of benefit from their own low and middle income country contexts.(10–12)

Responding to post-Apartheid imperatives to provide universal health coverage, the South African government has embarked on a project of PHC re-engineering, as the first step in a progression to national health insurance.(13,14) Such reforms are aligned with the country's commitments to universal human rights norms and improving health access and equity.(15–17)

Although South Africa has had informal vocational training in family medicine for almost 35 years, the discipline was only formally registered in 2007; and, the four-year full time residency training program only began to graduate new FPs from 2011.(2,18,19) FPs are trained to fulfil six key roles: a competent clinician, a consultant and capacity-builder to the health care team, a leader of clinical governance, a supporter of community-orientated primary care and a clinical trainer.(2) A national position paper argues that FPs should be expert generalists placed throughout the district health system (DHS), which includes: district hospitals; community health centres; and sub-districts with several primary health care clinics.(2) However, the appointment of FPs into public sector posts across the country's nine provinces has occurred in a heterogeneous fashion. The variation in deployment can partly be explained by a lack of local evidence to support their contribution and confusion as to the roles of this new 'specialist' in the health system.(12,20)

The aim of this study was to assess the influence of FPs at primary care facilities and district hospitals. The influence of FPs was evaluated in terms of two domains: health system performance, and quality of clinical processes across the burden of disease. This article presents the findings from one of four studies that evaluated the early impact of FPs on the South African health care system.(21–23)

3.3.2 METHODS

3.3.2.1 Study design

A cross-sectional, observational study design compared primary care facilities and district hospitals with and without FPs. The intervention (FP exposure) was not randomized as the creation and filling of FP posts were pre-determined by local policy and service requirements. An exposed facility was defined as a DHS facility with a FP in a designated post for a minimum of two years. A control facility did not have a FP post on the staff establishment or any additional exposure to a FP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement's checklist was used to guide this report.(24)

3.3.2.2 Conceptual framework

A conceptual framework (Figure 3.5) informed our approach to designing the study and determining the data collection instruments. In this framework, structure refers to issues of governance and economics which are largely affected by changes in policy. Health service processes are sub-divided into generic (cross-cutting organizational processes), targeted (aimed at a specific program or condition) or clinical (services at the level of the patient). Generic and targeted processes can affect health system performance, which also influences the quality of clinical processes, which in turn influences the clinical outcomes. FPs were seen as a generic intervention as they were not limited to a specific program or condition and could impact broadly on health system performance and clinical processes. Key aspects of PHC system performance were identified as: accessibility; coordination; comprehensiveness; and continuity.(25) The key clinical processes were drawn from South Africa's quadruple burden of disease: HIV/AIDS and tuberculosis; violence and injury; maternal and child health (MCH); and, non-communicable diseases (NCDs).(17)

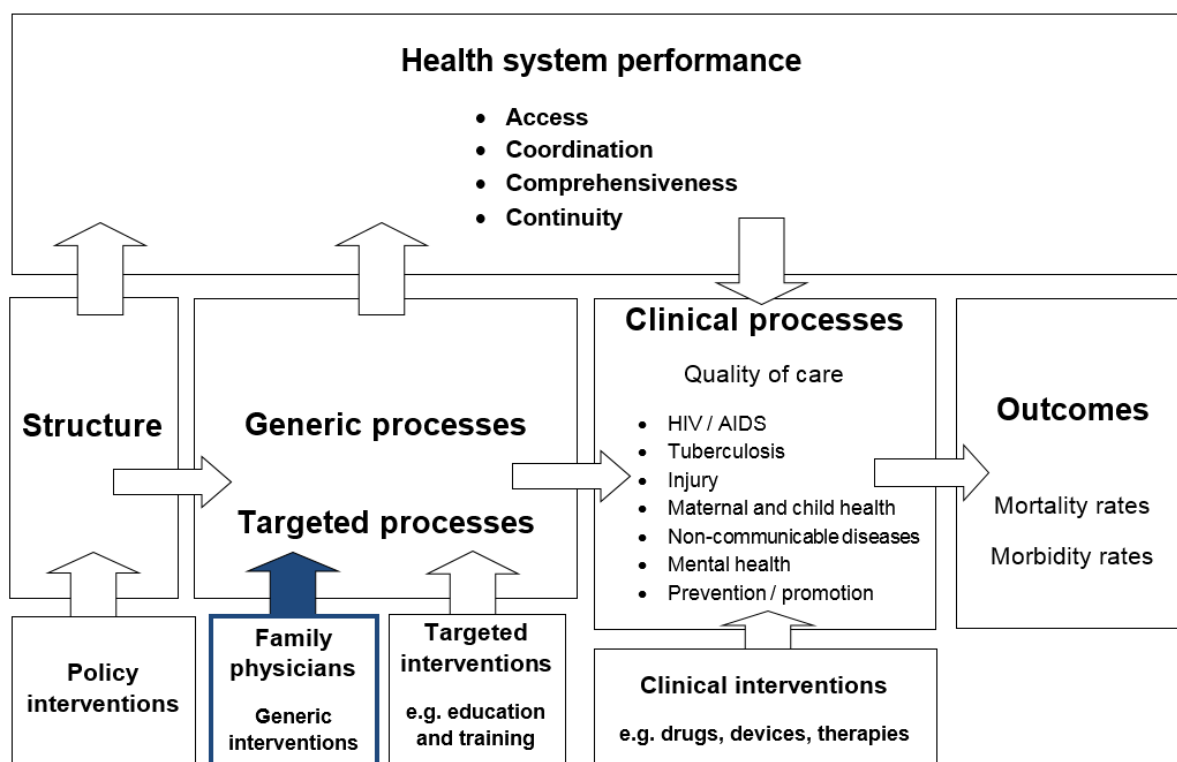


Figure 3.5. Conceptual framework of study (Modified Donabedian causal chain)(26,27)

3.3.2.3 Setting

This study was conducted in the DHS of the South African public sector in seven of the country's nine provinces (see supplemental file 1 for a brief description of the South African DHS).

3.3.2.4 Sample size calculation

One clinical process indicator (the diabetes management score) and one health outcome indicator (the facility-based perinatal mortality rate) were used for the calculation, given that FPs are reported to impact positively on these indicators, with an earlier study providing standard deviations and estimates of likely effect size.(28)

A sample size of 14 CHCs in each arm gave a power of 80% to detect an effect size of 10% in the diabetes management score (standard deviation of 13%) with a possible 5% type 1 error.(28) A sample size of 14 DHs in each arm gave a power of 80% to detect an effect size of 8.4 perinatal deaths per 1000 births in perinatal mortality rate (standard deviation of 7.91) with 5% type 1 error.(28)

A final sample size of 15 DHs and 15 CHCs in each arm (60 facilities in total) was therefore chosen to have sufficient power and to allow for some loss of facilities or incomplete data collection during the study.

3.3.2.5 Selection of facilities

Seven out of the nine provinces were included in the study frame as determined by the educational footprint of the six participating universities that train FPs in South Africa.

A complete list of DHs and CHCs was obtained from the National Department of Health. With the assistance of the participating universities, this list was then divided into facilities with and without exposure to a FP, which were then randomly re-ordered. Starting at the top of the randomly ordered lists, we selected two intervention DHs and two CHCs from each province in order to give a sample size of 14 DHs and 14 CHCs. Each intervention facility was selected first and then matched with a control facility from the other list using the matching criteria described in Table 3.9 (see also supplemental file 2 for a schematic presentation of the facility sampling selection process). One additional facility for each arm was selected from the Western Cape Province, where the study was based, in order to arrive at the intended number of 15 facilities for each arm.

Table 3.9. Matching criteria by DHS facility type

DHS facility type	Criteria used to match controls
District hospitals (DHs)	Same province Rural vs. metropolitan setting Bed size: <ul style="list-style-type: none"> • small (50 – 150 beds) • medium (150 – 300 beds) • large (300 – 600 beds)
Community Health Centres (CHCs)	Same province Rural vs. metropolitan setting Annualized number of patient visits

	(PHC headcount) 24-hour open-access Presence of a midwife obstetric unit (MOU)
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3.3.2.6 Data collection tools

We intended to select indicators that related to the influence of the FP on: clinical processes; health system performance; and, clinical outcomes (Figure 3.5). The selection of measurement instruments (Table 3.10) was dependent on the availability of reliable and valid routinely collected data or existing tools, the feasibility of collecting data, the different scope of practice in DH and CHCs and an *a priori* consensus between the researchers at the participating academic departments.

Table 3.10. Data collection instruments

Facility type	Aspect of conceptual framework measured	Data collection instrument/tool	Reliability/ validity of tool	Data source	Data collection method	Nature of variables
DH	HSP	Signal functions (percentage of essential functions and services available for each clinical domain)(29–31)	Audit tool used by MRC team (adapted from WHO document, validated for South African context)	Staff, managers and key documents	Interviews and review of documents	Continuous variables (percentage of total score for each clinical domain)
		South African National Core Standards (Domain 2, which focuses on aspects of patient safety, clinical governance and clinical care)(32)	National tool, validated by OHSC			Continuous variables (percentage of total score for Domain 2)
	QOC	Child health and Perinatal PIP (problem identification programs)(33)	Validated tools (software-based) used in South African health facilities	Child PIP and PPIP national databases	Assessment of data at facility level (admissions and deaths of children and perinatal losses)	Continuous variables (rates)
CHC	HSP	Primary Care Assessment Tool (PCAT): 4-point Likert scale; domains of Primary Health Care(34)	Pilot study and validation in Western Cape province	Patients, practitioners and managers	Interviews, asking respondents to rate their agreement with each item on a 4-point Likert scale	Continuous variables (the 4-point Likert scale options were ordinal values, but the variables were

Facility type	Aspect of conceptual framework measured	Data collection instrument/tool	Reliability/ validity of tool	Data source	Data collection method	Nature of variables
						treated as continuous)
	QOC	Integrated Chronic Disease Management (CDM) Audit tool: percentage score(35,36)	Valid tool (annual audit in Western Cape provincial facilities)	Observation and patient medical records	Assessment of facility's structural components for CDM, as well as audit of 20 folders for each of the five chronic conditions (diabetes, hypertension, asthma, COPD and epilepsy)	Continuous variables (percentage of total score for each chronic condition)

Abbreviations: CDM: chronic disease management; CHC: community health centres; Child PIP: child problem identification program; COPD: chronic obstructive pulmonary disease; DH: district hospitals; HSP: health system performance; MRC: Medical Research Council of South Africa; OHSC: Office of Health Standards Compliance; PPIP: perinatal problem identification program; QOC: quality of clinical care and health outcomes; WHO: World Health Organization

3.3.2.7 Fieldwork and data management operational process

Four teams with a total number of 16 fieldworkers (11 health professionals and five assistants with previous experience in research data collection) were trained to collect data in the seven provinces according to a detailed fieldwork protocol (see supplemental file 2). Fieldworkers were interviewed before appointment. Training was facilitated by KBvP over two to three days and consisted of face-to-face training, role play and practical evaluation in the field. Each team was led by one of the health professionals and was supervised by an academic FP attached to one of the participating universities. The teams also interacted remotely with the lead investigator, KBvP, via telephone, email and WhatsApp. Facility-level data were collected between June 2015 and March 2016 and then captured with EpiData version 3.1 via a double-entry method and using checks to minimize data entry errors.(37)

3.3.2.8 Data analysis

Data were then imported from Epidata into Microsoft Excel; and, IBM SPSS version 23 was used to conduct the analysis in consultation with a biostatistician.(38) Data analysis commenced with descriptive statistics for the facilities. Subsequently, the independent samples t-test for equality of means was used to compare means between the two arms (continuous dependent variables, see Table 3.10 for detail on the data collected). For those means found to be significantly different, regression analysis was performed using a generalized linear model (GLM) to control for the effect of confounders. Confounding variables for health system performance were staffing levels (professional nurses, junior and senior doctors) and distance from referral hospital. The presence of outreach to the DHS facility (from the general specialties at the referral hospitals) and bed utilization rate (BUR, as proxy of DH inpatient workload) were included as confounding variables for clinical processes.

3.3.2.9 Ethical considerations

This study was approved by the Health Research Ethics Committee (Medical), Stellenbosch University (reference S15/01/003), as well as by each partner institution. The seven provincial health authorities and research committees also gave permission to access facilities across the study setting (the full list is available in Chapter 1 of this thesis).

3.3.3 RESULTS

The spread of the final DHS facility selection is available as supplemental file 3. The distribution of sites across the provinces differed from the intended sampling method as some provinces did not employ FPs at CHCs or instead exposed all CHCs to FPs employed at the sub-district level. One province did not have any DHs unexposed to FPs. On average, 26 out of 30 CHCs (87.5%) and 24 out of 30 DHs (80.7%) had complete datasets (dataset completion per tool is available as supplemental file 4). Table 3.11 compares the facilities in terms of their descriptive variables. The comparative analysis results in Table 3.12 should be interpreted in conjunction with the instrument description in Table 3.10.

District Hospitals

In the DHs, the availability of essential services across the clinical domains was higher in the FP exposed arm, with the availability of key paediatric services being statistically significant (Table 3.12). The score for Domain 2 of the National Core Standards (which measures aspects of patient safety, clinical governance and clinical care) was higher in the intervention arm, but was not statistically significant; and, only 19 out of 30 DH facilities had completed this particular tool. The child health findings (specifically, the number of modifiable factors identified per audited in-hospital child death) from the child death audit tool (Child PIP) was significantly more favourable in the intervention arm. Similarly, the findings from the perinatal problem identification program (PPIP) (which focuses on perinatal, stillbirth and neonatal mortality rates) were in favour of the intervention arm, but not statistically significant. When adjusting for the influence of confounders on the key paediatric services, the presence of senior doctors had a statistically significant (B coefficient = 1.317 with $p=0.014$) influence and the exposure to the FP was no longer significant (B coefficient = -0.782 with $p=0.887$). The significant effect of the FP on the number of modifiable factors per child death, persisted ($p<0.001$) after adjusting for confounding.

Community Health Centres

In the CHCs, however, the findings from the primary care assessment tool (PCAT) (as perceived by users of primary care, Table 3.12) favoured the control arm, reaching statistical significance in two domains: continuity and coordination of care. The GLM for the continuity domain was a poor fit and therefore not suitable to test for confounders. The GLM for the coordination domain still favoured the control arm after adjusting for the confounders (B

coefficient for FP exposure = -0.476 with $p=0.019$; intercept B coefficient = 3.552). The findings for continuity of care in favour of the control arm were affirmed by the managers of primary care (mean difference of 0.25, 95% confidence interval of 0.03 – 0.5, $p=0.027$). The other domains as measured by PCAT provider and manager tools were not significantly different between the arms. The findings from the CDM audit tool were not significantly different between the arms.

Table 3.11. Description of the facilities

District hospitals		Control (N = 15)	Intervention (N = 15)
Rural : Metropolitan		15 : 0	12 : 3
Number of beds. Mean (SD)		153.5 (92.37)	198.0 (81.74)
Bed size category (Number of DHs in each category)	small	8	6
	medium	7	7
	large	0	2
Primary care facilities		Control (N = 15)	Intervention (N = 15)
Rural : Metro		6 : 9	6 : 9
Number of patient visits per year. Mean (SD)		152 541 (122 714)	255 094 (178 501)
Number of CHCs open 8 hours : 24 hours		6 : 9	4 : 11
MOU available (yes : no)		10 : 5	12 : 3

DH: district hospital; CHC: community health centre; MOU: midwife obstetric unit

Table 3.12. Comparison of control and intervention groups

Domain	Control Mean (SD)	Intervention Mean (SD)	Mean Difference (95% CI)	p-value
Signal functions (essential services) tool in DHs (N = 22)				
Newborn care (%)	92.7 (6.4)	95.0 (6.5)	-2.29 (-8.05 – 3.46)	0.416
Maternal care (%)	89.1 (19.2)	96.2 (5.4)	-7.05 (-20.21 – 6.11)	0.277
Surgery (%)	63.6 (24.5)	76.4 (16.7)	-12.73 (-31.80 – 6.34)	0.179
General medicine (%)	65.8 (17.8)	78.0 (21.0)	-12.17 (-29.41 – 5.07)	0.157
Mental health (%)	83.3 (15.1)	80.8 (7.9)	2.50 (-8.55 – 13.55)	0.642
Pediatric care (%)	69.2 (15.1)	85.0 (14.3)	-15.83 (-28.99 – -2.67)	0.021*
Emergency care (%)	78.3 (20.0)	90.0 (15.6)	-11.67 (-27.85 – 4.52)	0.148
South African National Core Standards tool in DHs (N = 19)				
Score for Domain 2, which focuses on aspects of patient safety, clinical governance and clinical care (%)	76.25 (24.79)	89.79 (14.28)	-13.54 (-35.20 – 8.11)	0.195
Child PIP tool in DHs (N = 26)				
In-hospital mortality	2.9 (2.3)	1.4 (1.3)	1.50	0.059

Domain	Control Mean (SD)	Intervention Mean (SD)	Mean Difference (95% CI)	p-value
rate (number of deaths per 100 paediatric admissions)			(-0.06 – 3.06)	
Modifiable factor rate per death (number of modifiable factors identified per audited paediatric death, i.e. instances of suboptimal care or missed opportunities.)	4.7 (3.9)	2.2 (1.9)	2.49 (0.18 – 4.96)	0.049*
Perinatal PIP tool in DHs (N = 26)				
Perinatal mortality rate (number of perinatal deaths per 1000 total births, all deliveries)	26.74 (12.13)	23.32 (7.79)	3.42 (-4.53 – 11.38)	0.383
Neonatal mortality rate (number of neonatal deaths per 1000 live births, all deliveries)	10.75 (7.02)	7.44 (3.53)	3.31 (-1.01 – 7.63)	0.126
Stillbirth rate (number of stillbirths per 1000 total births, all deliveries)	17.54 (9.30)	16.64 (5.39)	0.90 (-5.34 – 7.14)	0.769
PCAT tool completed by healthcare users of CHCs (N = 30)				
Score from 1 = <i>Definitely not</i> to 4 = <i>Definitely</i>				

Domain	Control Mean (SD)	Intervention Mean (SD)	Mean Difference (95% CI)	p-value
<p><i>First contact utilization</i></p> <p>(Care is first sought from the primary care provider when a new health need arises; a behavioural characteristic.)</p>	3.41 (0.42)	3.22 (0.34)	0.19 (-0.1 – 0.5)	0.188
<p><i>First contact access</i></p> <p>(Services must be accessible; a structural characteristic.)</p>	2.52 (0.99)	2.48 (0.93)	0.04 (-0.7 – 0.8)	0.904
<p><i>Continuous (ongoing) care</i></p> <p>(The longitudinal use of a regular source of care over time, resulting in a long-term relationship between provider and patient.)</p>	3.03 (0.31)	2.79 (0.29)	0.24 (0.02 -0.5)	0.034*
<p><i>Coordination of care</i></p> <p>(The linking of health care visits and services so that patients receive appropriate care for all their health problems.)</p>	3.51 (0.39)	3.05 (0.55)	0.45 (0.1 – 0.8)	0.016*

Domain	Control Mean (SD)	Intervention Mean (SD)	Mean Difference (95% CI)	p-value
<p><i>Coordination of information</i></p> <p>(The essence of coordination is the availability of information about prior, and existing problems and services.)</p>	3.41 (0.43)	3.16 (0.47)	0.25 (-0.1 – 0.6)	0.140
<p><i>Comprehensiveness: services available</i></p> <p>(The availability of a wide range of primary care services.)</p>	3.32 (0.44)	3.16 (0.43)	0.16 (-0.2 – 0.5)	0.311
<p><i>Comprehensiveness: services provided</i></p> <p>(The appropriate provision of primary care services, including services that promote and preserve health.)</p>	3.33 (0.62)	3.15 (0.58)	0.18 (-0.3 – 0.6)	0.413
<p><i>Family-centeredness</i></p> <p>(The appropriate care that recognizes the family as a major participant in the assessment and treatment of a patient.)</p>	3.37 (0.52)	2.97 (0.63)	0.40 (-0.02 – 0.8)	0.065

Domain	Control Mean (SD)	Intervention Mean (SD)	Mean Difference (95% CI)	p-value
<i>Community orientation</i> (This aspect refers to care that is delivered in the context of the community.)	2.83 (0.58)	2.63 (0.57)	0.20 (-0.2 – 0.6)	0.344
<i>Cultural competency</i> (This aspect refers to care that honors and respects the beliefs, interpersonal styles, attitudes, and behaviors of people as they influence health.)	3.52 (0.49)	3.24 (0.49)	0.28 (-0.1 – 0.6)	0.128
<i>PHC team</i> (The availability of other members of the PHC team, such as physiotherapists, social workers, dentists, dietitians, mental health workers and community health workers.)	3.52 (0.52)	3.24 (0.52)	0.28 (-0.1 – 0.7)	0.151
Integrated Chronic Disease Management (CDM) Audit score in CHCs (%)				
Structural aspects required for CDM (N = 25)	72.45 (19.04)	72.55 (22.57)	-0.10 (8.39 – 17.26)	0.991

Domain	Control Mean (SD)	Intervention Mean (SD)	Mean Difference (95% CI)	p-value
Diabetes score (N = 27)	39.48 (10.85)	40.55 (13.79)	-1.07 (-10.86 – 8.73)	0.824
Hypertension score (N = 28)	45.96 (10.99)	44.59 (13.66)	1.37 (-8.27 – 11.00)	0.773
Asthma score (N = 25)	47.41 (8.08)	42.28 (8.08)	5.13 (-1.60 – 11.87)	0.129
COPD score (N = 18)	32.24 (16.90)	29.49 (15.98)	2.75 (-13.85 – 19.34)	0.730
Epilepsy score (N = 26)	35.78 (18.51)	39.01 (16.26)	-3.23 (-17.45 – 10.99)	0.643

*p-value significant at < 0.05

DH: district hospitals; CDM: chronic disease management; CHC: community health centres; COPD: chronic obstructive pulmonary disease; SD: standard deviation; CI: confidence interval

3.3.4 DISCUSSION

Data from DHs showed that facilities with FPs generally had higher scores for health system performance and clinical care, and were associated with significant fewer modifiable factors associated with in-hospital paediatric mortality. Senior doctors also contributed to increased access to paediatric life-saving procedures and equipment. A number of initiatives over the last decade also targeted obstetric and neonatal care in district hospitals.(29,33,39,40) These findings echo the previously published child and neonatal health benefits associated with an increased supply of primary care doctors.(41)

Data from CHCs showed that facilities with FPs generally had lower scores for health system performance and clinical care, and were associated with significantly lower scores for continuity and coordination of care. These unexpected findings appear inconsistent with the

international literature that reports the FP being ideally placed to improve PHC and specifically to enhance continuity and coordination of care.(9,42–45) It is possible that FPs were deployed where the need was greatest, as suggested by the control sites having a higher average workload, and that these sites were predisposed to perform more poorly. In addition the FP's influence is primarily through the healthcare team(46) and their influence on the DH team (primarily led by doctors) may have been greater than the PHC team (primarily led by nurses), bearing in mind the recognized professional boundaries and hierarchies.(47) The FP is also not formally positioned within the organization's management structure and he/she will need to exert a systemic influence through other managers. It is again possible that their influence was greater within the DH management structure than in PHC.(48) It is also possible that the training of FPs prepared them better for the DH as opposed to the PHC context as many training programs are still dominated by hospital-based exposure.(49,50) The need for and deployment of FPs in DHs has been more clearly conceptualized and operationalized in South Africa than their role and placement in the PHC team.(2,14,50,51)

This study was limited by a number of factors. The assignment of the FP exposure was not randomized and there may therefore be additional confounders not accounted for nor measured. The variability in how FPs were deployed within the different provinces made it difficult to fully match the facilities between arms. The minimum duration of exposure to FPs of two years might be too short to allow for some aspects of their impact to be measurable. There was no baseline measurement of the indicators at these facilities, prior to the deployment of FPs, which would have enabled correction for significant differences and measurement of change over time. The type of training the family physician received as well as the length of time practicing in the field were not factored into the analysis.

The findings support the need for further research to understand the effect of FPs on PHC. District manager interviews and 360-degree evaluation of FPs in PHC settings, however, suggest that they are having a beneficial impact.(21,23,52) The findings may reflect a need to strengthen the FP's role in PHC and to integrate them more fully into the team as well as to ensure that training programs focus sufficiently on the PHC setting.

The application of the family medicine and PHC models from the higher income countries into low- or middle-income health systems (such as Sub-Saharan Africa) was reviewed previously in terms of exportability and relevance.(46,53–55) A Delphi-study among African family medicine leaders demonstrated consensus and commitment towards realizing the principles of PHC and core values of family medicine, such as person-centeredness, continuity and coordination of care.(56) The application of these principles, however, may differ in African health systems where FPs do not usually provide first contact care and must acquire contextually defined competencies, such as the extended range of procedural skills required for working at the DH.(2,46) African countries that are committed to achieving the Sustainable Development Goals should invest more in training FPs to scale as well as contextualizing their roles within their PHC teams, in keeping with the team-based models used in other low- and middle-income countries such as Brazil and Cuba, and supported by the WHO.(12,57–59)

This study also contributes to the task of refining the methods, indicators and tools used to measure the influence of South African FPs. More research will also help to understand the enabling factors and constraints within the local context that may influence the ability of FPs to exercise their full potential.(9) Such research will guide the ongoing efforts to implement the principles of family medicine within the DHS.(18,50,54,60)

3.3.5 CONCLUSION

In this study, district hospitals with family physicians scored better in terms of health system performance and clinical processes. Their lack of influence at primary care facilities and association with worse continuity and coordination of care, was surprising. The study supports the need for further research to explain the findings at the PHC level, which are not consistent with the global literature.

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3.3.7 CONFLICT OF INTEREST STATEMENT

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

3.3.8 AUTHORS' CONTRIBUTIONS

KBvP and RJM conceptualised the study. LBR, RRGB, IG and WJS provided critical input during the design and data collection phases of the study (such as checking the list of FPs who qualified for the study, helping to recruit suitable members to the fieldwork team, and assisting KBvP during the training of the fieldwork team and coordinating the data collection). KBvP prepared the database and conducted the data analysis with TME under

the supervision of RJM. KBvP drafted the manuscript under the supervision of RJM. All authors reviewed the manuscript and approved the final version.

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3.4 ARTICLE 4:

EXAMINING THE INFLUENCE OF FAMILY PHYSICIAN SUPPLY ON DISTRICT HEALTH SYSTEM PERFORMANCE IN SOUTH AFRICA: AN ECOLOGICAL ANALYSIS OF KEY HEALTH INDICATORS.

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3.4.1 INTRODUCTION

Strong primary health care systems require primary care teams that consist of an appropriate mix of health workers tailored to the health care needs of the communities they work in.(1) The supply of appropriate health workers is a key building block in the WHO's model of effective health systems.(2) In Sub-Saharan African countries these primary care teams and their communities are challenged by a mix of health system constraints, socio-economic disparities and disease burdens.(3) Primary care teams are stronger if they contain doctors with postgraduate training in family medicine.(2) The contribution of such family physicians to the performance of primary care systems has been established in high income countries.(4,5) International studies (mainly in the USA, UK, Canada and Korea) described the public health benefits associated with an increased supply of primary care doctors, especially regarding a reduction in all-cause, infant and chronic disease-related morbidity and mortality.(6–13) Many of these studies applied a broad definition of primary care doctors, by including all clinical specialities that work in primary care (family medicine,

general practice, general internal medicine and general paediatrics).(6,7,10,12,14) Some of these studies (notably UK and Canada) focused on family physicians or general practitioners, two terms which apply to the same professional: a primary care doctor with postgraduate training in family medicine or general practice.(9,11,13)

Family medicine is a young discipline in Africa, with a number of countries only commencing postgraduate training during the last decade.(3,15–22) Qualitative studies have explored the opinions of African leaders and managers on the potential contribution and possible roles of family physicians in the district health system.(23–26) There is, however, little quantitative evaluation of their actual impact to guide policy- and decision-makers on the deployment of family physicians. The uncertainty revolves around their cost-effectiveness and how best to position these family physicians within the different levels and components of the health system. The relationship between family physician supply and district health system performance has not been evaluated in the African context.

In South Africa, family medicine was gazetted as a new speciality during 2007 by the Health Professions Council of South Africa.(5,19) This event paved the way for structured postgraduate training through training posts (registrars) and a consensus on training outcomes.(5) This developmental phase included the creation of new family physician posts within the district health system. These posts are mainly at district hospitals and community health centres, although a few are located at regional hospitals. During this same period, the national department of health started implementing primary health care reforms, which included family physicians within district clinical specialist teams that were tasked with strengthening maternal and child health care.(27–29) In addition, the new national policy on human resources for health and the national development plan support the deployment of family physicians within the district health system, but lack sufficient detail to guide managers on how best to utilise these expert generalists.(30) Following further discussions with the national department, a national position paper was published by the leadership of academic family medicine, in order to clarify the contribution of family physicians to the district health system.(5) This consensus statement introduced the “new” definition of the family physician as an expert generalist in the district health system capable of supporting and leading health care teams through six interwoven roles: competent clinician, consultant to the primary care team, capacity builder, leader of clinical governance, supporter of

community orientated primary care and in some instances a supervisor of undergraduate or postgraduate students.

The first graduates of the new training programmes entered the district health system from 2011.(5) Family physicians from the previous training programmes in South Africa and elsewhere still form the bulk of the available family physicians, as the nine South African training institutions are not yet training to the scale envisaged by the national position paper.(5) The training standards are coordinated through the SAAFP, and the CFPSA is responsible for the national exit examination. The nine training institutions, SAAFP and CFPSA successfully responded to a funding call from the NDOH and EuropeAid to implement a project aimed at strengthening the contribution of family physicians to the primary health care system.(31) This project included an applied research activity, which aimed to evaluate the initial impact of family physicians on the district health system in South Africa. This paper presents one of the four complementary studies and looks at the relationship between the supply of family physicians and district health system performance. The other three studies consist of a quasi-experimental comparison of facilities with and without family physicians, a 360-degree evaluation of family physician's impact by their colleagues and qualitative interviews with district managers who employ family physicians.

3.4.1.1 Aim and objectives

This study aimed to evaluate the impact of family physicians within the district health system of South Africa. The objectives were to evaluate the impact of an increase in family physician supply in each district (number per 10,000 population) on key health system performance indicators, key clinical processes and key health outcomes.

3.4.2 RESEARCH METHODS AND DESIGN

3.4.2.1 Study design

This ecological study was informed by a pilot study conducted in the Western Cape, South Africa.(32) A retrospective cohort design was used, whereby data were collected for the period 2010/2011 as a baseline and 2014/2015 representing five years post deployment of the new generation of family physicians. The STROBE statement's checklist for reporting cohort studies was used as standard for presenting this research.(33)

3.4.2.2 Setting

This study evaluated all 52 health districts across all nine provinces of South Africa (a national study frame, see Figure 3.6) for two time periods.

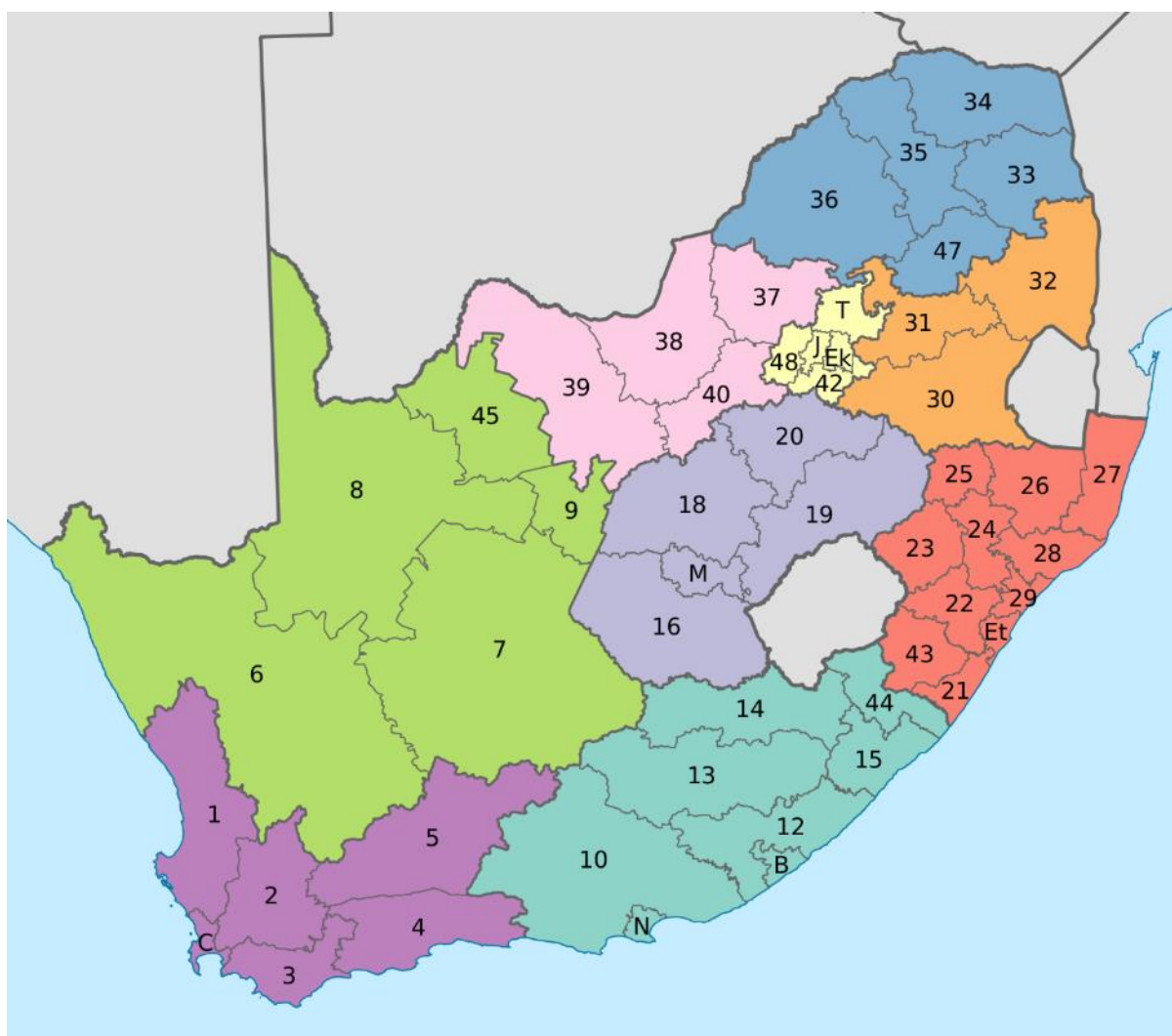


Figure 3.6. Map of South Africa depicting its 52 districts.(34)

3.4.2.3 Study population and sampling strategy

All 52 South African health districts were included as units of analysis.

3.4.2.4 Data collection

A national dataset, the District Health Barometer (DHB), contributed the data on district performance for two time periods: 2010/2011 and 2014/2015.(35,36) The DHB draws data from several data sources provided by the NDOH. Compilation of the DHB is guided by an advisory committee made up of managers from the NDOH as well as health experts from Health Systems Trust (HST). The DHB is designed to assist the NDOH in monitoring health service delivery at district level for all of South Africa's health districts. Furthermore, the HST

encourages providers, managers, researchers and policy-makers to use DHB information by making the publication and its data freely available online on their website.

Table 3.13 presents the list of DHB indicators used. The DHB system of categorising the indicators was used throughout (ranging from financial indicators to clinical process and outcome indicators). The official DHB indicator descriptions are also presented in Table 3.13.

For the family physician supply, public sector family physicians working in joint appointments (with the universities) or non-joint appointments, and employed at facility-, sub-district and district level (including district office and district clinical specialist team appointments) were included. Those family physicians employed at regional or tertiary hospitals, in full time academic positions or in the private sector were excluded. The data on FP supply per district for these two time periods were obtained from all nine academic institutions involved with postgraduate FM training in South Africa and who were familiar with the health system in their catchment area. The absolute FP numbers were converted to FP supply per 10 000 population (using the DHB population data for the respective time periods).

3.4.2.5 Data analysis

The DHB data, as well as data on FP supply was entered into an Excel sheet and subsequently converted into IBM SPSS version 23 for descriptive and inferential analysis.(37)

The data analysis applied to all 52 units of analysis and commenced with descriptive analysis of the independent and dependant variables. Subsequently, the correlation between change in FP supply and change in the indicators available for both time periods (37 indicators) was analysed. In addition, a cross-sectional correlation analysis was done for time period 2 (2014/2015) on the remaining DHB data set (data for 12 indicators were available only for time period 2). Simple scatterplots of the bivariate correlations were inspected to identify the nature of each relationship. A non-parametric test, Spearman's rho, was selected to test for correlation between the independent and dependent variables, due to the non-parametric distribution of the data as well as the presence of outliers (especially in reference to the independent variable). The level of significance chosen was $p < 0.05$. For those relationships found to be linear and showing at least a low to moderate correlation

coefficient (see interpretation guide below), further regression analysis was performed using a generalized linear model (GLM), to control for the effect of available confounders, namely province and socio-economic quintile (SEQ) of the districts. Using GLMs with province as covariate created better regression models as opposed to GLMs with SEQ as covariate (using the omnibus test and its likelihood ratio Chi-square value as guide).

Correlation values may be interpreted as:(32,38)

0.90–1.00 (–0.9 to –1.00)	Very high positive (negative) correlation
0.70–0.90 (–0.70 to –0.90)	High positive (negative) correlation
0.50–0.70 (–0.50 to –0.70)	Moderate positive (negative) correlation
0.30–0.50 (–0.30 to –0.50)	Low positive (negative) correlation
0.00–0.30 (0.00 to –0.30)	Negligible correlation

3.4.2.6 Ethical considerations

This study was approved by the Health Research Ethics Committee, Stellenbosch University (reference S15/01/003) and HST also confirmed their permission for use of the open access data.

3.4.3 RESULTS

Tables 3.14 and 3.15 present descriptive statistics for the dependent variables, as well as the results for the non-parametric correlation analysis. The median (and interquartile range) of the independent variable, the supply of FP per 10 000 total population, was 0.027 (0.000 – 0.043) for time period 1 and 0.035 (0.016 – 0.054) for time period 2. The medians (and interquartile ranges) for the absolute numbers of FPs per district were 2.00 (0.00 – 4.00) for time period 1 and 2.00 (1.00 – 5.00) for time 2 (total numbers were 153.5 for time period 1 and 208.5 for time period 2). The majority of correlations were negligible to low and not statistically significant. Two correlations from the change over time correlation analysis were found to be statistically significant (using the initial Spearman’s rho analysis): a HIV management indicator, “Percentage of TB cases with known HIV status” (low negative

correlation, $\rho = -0.351$, $p = 0.011$) and an additional indicator, “Vaccine expenditure per population under 1 year”, a measure of the efficiency of immunisation and not the coverage (low negative correlation, $\rho = -0.378$, $p = 0.006$). One indicator from the cross-sectional time 2 analysis showed a statistically significant, low negative correlation, namely “Inpatient crude death rate” ($\rho = -0.340$, $p = 0.014$). Scatter plots of these correlations are depicted in Figures 3.7, 3.8 and 3.9. The influence of the three outlying values were clear on inspection: for example, the scatterplot of “Percentage of TB cases with known HIV status” (Figure 3.7) showed a random scatter if one ignores the three outliers.

Regression analysis of these three correlations was performed. After adjusting for province in a GLM, the overall vaccine expenditure became positive in most of the nine provinces (see Table 3.16). This is a real example of confounding by province. Relative to the Western Cape Province, most of the provinces increased their expenditure on vaccines between time periods 1 and 2. The effect of family physicians (not statistically significant at $p = 0.861$) only accounted for an additional R268.249 (after subtracting the intercept value R107.949 from the B coefficient, R376.198). A similar influence of province on the correlation between FP supply for time period 2 and “Inpatient crude death rate” was demonstrated in a different GLM (Table 3.17). The correlation remained negative, but decreased in its strength and became non-significant (B coefficient for FP supply in time period 2 was -0.024 with $p = 0.334$; intercept B coefficient = 3.250). The influence of province on the correlation between FP supply over time and “Percentage of TB cases with known HIV status”, however, was not demonstrated in a GLM (Table 3.18). Here the B coefficient for change in FP supply was -138.039% with $p = 0.029$; intercept B coefficient = 15.143% . The overall significance of the provincial covariate was $p = 0.810$ (Wald Chi-Square test).

Table 3.13. List of DHB data indicators arranged by DHB categories.(35)

Category	DHB indicator name	DHB 2014/2015 description of the indicators
Finance	Provincial and LG PHC expenditure per PHC headcount ^a	Provincial and LG expenditure under programme 2 (budget for District Health Services) per PHC headcount on non-hospital PHC divided by the total PHC headcount. PHC programmes include nutrition; HIV and AIDS; community-based services; community health centres; and community health clinics.
	Provincial and LG expenditure on District Health Services per capita (uninsured) ^a	Provincial and LG expenditure per capita (uninsured) on DHS is the total amount spent per person without medical aid coverage. The numerator is the sum of provincial and LG expenditure under programme 2, except for expenditure on sub-programme 2.8 (Coroner Services). The denominator is the estimated uninsured population per district. Uninsured individuals have no medical scheme coverage.
	Provincial and LG PHC expenditure per capita (uninsured) ^a	PHC expenditure for the uninsured population includes expenditure on sub-programmes 2.2–2.7 of the DHS expenditure. This forms the numerator for this indicator. The denominator is the estimated uninsured population per area.
	Provincial and LG expenditure on District Health Services per capita (total population) ^a	The provincial and LG district expenditure on DHS per capita (total population) refers to the total amount of money spent on DHS (all sub-programmes except 2.8 Coroner services) per person with and without medical scheme coverage.
	Provincial and LG PHC expenditure per capita (total population) ^a	The PHC expenditure per capita (total population) measures the total amount of money spent annually by each district as a percentage of the total population in the district.
Management PHC	PHC supervisor visit rate (fixed clinic/CHC/CDC) ^a	The PHC facility supervision rate is the number of fixed PHC facilities, including CHCs and CDCs, visited by a clinical supervisor at least once a month, as a proportion of the total number of fixed PHC facilities. A dedicated clinic supervisor conducts the visit according to the clinic supervision manual, which entails use of the red flag and/or regular review tools. Each fixed facility should be visited by a clinic supervisor once a month.
Management Inpatients	ALOS (district hospitals) ^a	ALOS refers to the average number of days that patients spend in hospital. It is generally calculated as follows: total number of inpatient days during a year plus half the number of day patients, divided by the number of separations (deaths, discharges and transfers out).
	Inpatient bed utilisation rate (district hospitals) ^a	BUR measures the occupancy of available beds and therefore indicates how efficiently a hospital is using its available capacity. It is calculated as follows: the number of inpatient days is added to half the number of day patients, and divided by the usable bed days; this is expressed as a percentage.
	OPD new client not referred rate	OPD new client not referred rate refers to the percentage of new outpatient clients who enter a hospital without a referral letter.

Category	DHB indicator name	DHB 2014/2015 description of the indicators
	(district hospitals) ^a	The percentage is calculated by dividing new OPD cases that are not referred (numerator) by all new OPD cases (denominator). OPD follow-up and emergency clients are excluded from the denominator. OPD new client not referred rate monitors the utilisation trends of clients who by-pass PHC facilities.
	Expenditure per PDE (district hospitals) ^a	Expenditure per PDE is a composite process indicator that connects financial data with service-related data from the hospital admissions and outpatients' records. This indicator measures how the resources available to the hospital are being spent and is a marker of efficiency. The indicator measures the average cost per PDE at a district hospital and is expressed as Rand per PDE. The indicator value is calculated by dividing the total expenditure of the hospital (within budget programme 2: district health services, as recorded in the BAS) by the number of PDEs. PDEs are calculated by adding the number of inpatients, plus half of day patients, plus one-third of outpatients and emergency room visits, as recorded in the DHIS. As expenditure per PDE is a ratio between costs and services, improved performance is possible if costs are reduced or utilisation increased.
Inpatient mortality	Child under 5 years diarrhoea case fatality rate ^a	CFRs for diarrhoea, pneumonia and SAM in children under 5 years of age. The CFR for the priority childhood illnesses (pneumonia, diarrhoea and SAM) is the proportion of all children under 5 years admitted to hospital with these conditions that die during the admission.
	Child under 5 years pneumonia case fatality rate ^a	
	Child under 5 years severe acute malnutrition case fatality rate ^a	
	ICDR	The ICDR is an impact indicator that refers to the proportion of all inpatient separations because of death. Inpatient separations include inpatient transfers out, deaths and inpatient discharges. The indicator therefore includes deaths from all causes that occur in a health facility.
Delivery care	Delivery in facility under 18 years rate ^a	This indicator measures the proportion of all deliveries that occur among women younger than 18 years. The numerator is the number of deliveries among women under 18 years of age, while the denominator represents all deliveries that have been recorded at the health facility. This outcome indicator is used as a proxy to track success in the prevention of teenage pregnancies.
	Inpatient ENDR ^a	The inpatient ENDR or inpatient death 0–7 days measures the number of deaths among liveborn babies that occur within seven completed days after birth per 1000 live births. It only includes neonatal deaths when the foetus is at 26 or more weeks' gestational age and/or weighs 500 g or more.

Category	DHB indicator name	DHB 2014/2015 description of the indicators
	Maternal mortality in facility ratio ^a	The WHO definition of a maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. The MMR is the number of maternal deaths per 100 000 live births. This indicator refers to the facility-based (and not the population-based) MMR.
	Stillbirth in facility rate ^a	The stillbirth rate measures the number of babies born dead per 1000 total births. The indicator does not differentiate between fresh and macerated stillbirths. Stillbirths should only be counted when the foetus is at 26 or more weeks of gestational age and/or weighs 500 g or more.
	Delivery by C-section rate (district hospitals) ^a	The C-section rate measures the proportion of deliveries in hospitals that are carried out by C-section. The numerator is the number of C-sections conducted in the facility, and the denominator is the number of deliveries that took place in that facility over the same time period. It is therefore a facility-based and not a population-based indicator. This chapter focuses on C-sections performed at district hospitals.
	Mother postnatal visit within 6 days rate ^a	The mother postnatal visit within 6 days rate indicator monitors access to postnatal care. The numerator for this indicator is the number of postnatal visits by a mother within 6 days of delivery, either at a PHC facility or a postnatal home visit by facility staff. The purpose of the visit is for a postnatal check-up. Only the first visit after delivery should be counted. The denominator is the number of deliveries in facility. Deliveries include deliveries at hospitals and at PHC facilities.
PMTCT	Antenatal first visit before 20 weeks rate ^a	Early registration for antenatal care is an important entry point into the health system for pregnant women, allowing them to access health care services (and health information), including PMTCT services. This indicator shows the percentage of pregnant women who have their first antenatal visit before 20 weeks, out of all antenatal clients' first visits (those whose first visit was before and after 20 weeks).
	Antenatal client initiated on ART rate ^a	All HIV-positive pregnant women should be initiated on ART at the first antenatal visit if not already on ART. The antenatal client initiated on ART rate indicator measures the percentage of antenatal clients initiated on ART out of all antenatal clients eligible for ART.
	Infant first PCR test positive around 6 weeks rate ^a	This indicator measures the percentage of HIV-exposed infants who receive an early HIV test (around 6 weeks of age). It is calculated by dividing the number of PCR tests performed in infants around 6 weeks (numerator) by live births to HIV-positive women (denominator). It can be used as a proxy for early infant diagnosis coverage.

Category	DHB indicator name	DHB 2014/2015 description of the indicators
	Infant first PCR test around 6 weeks uptake rate ^a	This indicator measures the percentage of early infant PCR tests that have a positive result; it is used as a proxy for early vertical (intra-uterine and intra-partum) transmission for those infants who access an early PCR test.
Child Health	Vitamin A dose 12–59 months coverage (annualised) ^a	Proportion of children 12–59 months who received vitamin A 200 000 units, preferably every 6 months.
	School Grade 1 screening coverage (annualised)	Proportion of Grade 1 learners screened by a nurse in line with the Integrated School Health Programme service package.
Immunisation	Immunisation coverage under 1 year ^a	Immunisation coverage under 1 year measures the percentage of children under 1 year old who have received the primary schedule of immunisations.
	Measles second dose coverage (annualised) ^a	
Reproductive health	Cervical cancer screening coverage (annualised) ^a	The cervical cancer screening coverage measures the annual number of cervical smears taken in women 30 years and older as a proportion of the female population 30 years and older, factored for one smear every 10 years. In practice this means that the denominator is 10% of the female population aged 30 years and older.
	CYPR (annualised) ^a	The CYPR indicator measures the percentage of women aged from 15 to 49 years who are protected against unplanned pregnancies for a year using modern contraceptive methods, including sterilisation. The volume of all contraceptives dispensed to clients during a specified period of time (a year) is used to estimate the amount of protection against pregnancy during that particular period. This estimate of protection is called the 'contraceptive year equivalent'. This forms the numerator for the CYPR indicator. Each type of contraceptive method that is distributed is adjusted by a conversion factor (country-specific) to yield an estimate of the duration of contraceptive protection. The denominator for the CYPR is the 'female target population 15–49 years', where females are used as a proxy for couples.
Tuberculosis case finding	Incidence (diagnosed cases) of TB – all types ^a	The number of TB patients (all TB types) starting treatment and recorded in the Electronic TB Register (ETR.Net).
	TB Rifampicin resistance confirmed client rate	This indicator measures the proportion of TB suspects detected to have rifampicin resistance. In 2011, GeneXpert diagnostic machines were introduced across South Africa; these machines can detect both TB and rifampicin resistance in just 2 hours. The rifampicin resistance confirmed client rate was reported for the first time in the 2013/14 DHB.
HIV	Male condom	Male condom distribution coverage refers to the number of male

Category	DHB indicator name	DHB 2014/2015 description of the indicators
management	distribution coverage ^a	condoms distributed through public health facilities, identified outlets and other non-medical sites in a given 12-month period per male aged 15 years and older. Distribution of condoms remains an integral and cost-effective component of South Africa's HIV prevention efforts.
	Percentage of TB cases with known HIV status (ETR.net) ^a	This indicator measures the percentage of TB cases with known HIV status entered into the ETR.Net system.
	TB/HIV co-infected client on ART rate (ETR.Net)	The TB/HIV co-infected client on ART indicator entered into the ETR.Net system measures the percentage of all HIV-positive TB patients on ART. It is an important indicator that may be used as a proxy for measuring integration of HIV and TB services.
	HIV testing coverage (including ANC)	The HIV testing coverage indicator measures all people aged from 15 to 49 years who were tested for HIV (including antenatal care) during the year as a percentage of the total population in this age group. People are tested either through provider-initiated or client-initiated counselling and testing services.
Non-communicable diseases	Hypertension incidence (annualised)	This indicator measures the number of newly diagnosed hypertension clients initiated on treatment per 1000 population 40 years and older. The numerator is 'hypertension client treatment new' and the denominator is 'population 40 years and older'.
	Mental health admission rate	The mental health admission rate indicator measures the proportion of clients admitted/separated for mental health problems. The numerator is the 'mental health admissions total' and the denominator is 'inpatient separations total' (total of inpatient discharges, inpatient deaths and inpatient transfer outs).
Human resources	PHC doctor clinical work load	The PHC doctor clinical workload is expressed as the number of consultations (clients) per doctor per day.
	PHC PN clinical work load	PN clinical workload is defined as the average number of clients attended by all PNs in a PHC facility per day. The numerator for this indicator is expressed as the total number of clients seen at a PHC facility, while the denominator is the total number of PN clinical work days. This is a useful indicator to measure the efficiency of PHC services rendered to clients, and to analyse PHC utilisation patterns, staffing and training needs.
Additional indicators reported in the DHB 2014/2015 dataset	PCV third dose coverage (annualised) ^a	PCV vaccine third dose given to a child under 1 year, preferably around 9 months after birth.
	Percentage of DHS expenditure on	Percentage of total provincial district health services expenditure on district hospitals.

Category	DHB indicator name	DHB 2014/2015 description of the indicators
	district hospitals ^a	
	Percentage of DHS expenditure on district management ^a	Percentage of total provincial district health services expenditure on district management.
	Percentage of DHS expenditure on PHC ^a	Total amount spent on non-hospital PHC health services.
	RV second dose coverage (annualised) ^a	RV vaccine second dose given to a child under 1 year, preferably around 14 weeks after birth and not later than 24 weeks after birth.
	HIV prevalence among antenatal clients (survey)	Proportion of antenatal clients surveyed who test positive for HIV.
	Vaccine expenditure per population under 1 year ^a	Expenditure (in Rand) per child fully immunised under 1 year of age (immunised according to the routine Expanded Programme on Immunisation).
	HIV testing coverage (annualised)	Clients HIV tested as proportion of population 15–49 years.
	Tracer items stock-out rate (fixed clinic/CHC/CDC)	The availability of a trace list of essential medicines (this measure of medicine shortages is routinely reported).
	TB/HIV co-infected client on ART mm rate	Proportion of TB/HIV co-infected clients initiated on ART.

^aIndicators available for both time periods.

ALOS, average length of stay; ANC, antenatal care; ART, antiretroviral therapy; BAS, Basic Accounting System; BUR, bed utilisation rate; CFRs, case fatality rates; CHC, community health centre; CDC, community day centre; C-section, caesarean section; CYPR, couple year protection rate; DHIS, District Health Information Software; DHB, District Health Barometer; DHS, District Health System; ENDR, early neonatal death rate; ETR.Net, Electronic TB Register; ICDR, inpatient crude death rate; LG, local government; MMR, maternal mortality ratio; OPD, outpatient department; PCR, polymerase chain reaction; PCV, pneumococcal vaccine; PDE, patient day equivalent; PHC, primary health care; PMTCT, prevention of mother-to-child transmission; PN, professional nurse; RV, Rota virus; SAM, severe acute malnutrition; TB, tuberculosis; WHO, World Health Organization.

Table 3.14. Correlations: difference over time (37 variables available for both time periods).

DHB indicator name (unit)	2010/2011 Median (IQR)	2014/2015 Median (IQR)	Spearman's rho	<i>p</i>
Financial indicators				
Provincial and LG PHC expenditure per PHC headcount (Rand)	262.78 (232.49– 291.32)	314.15 (276.35– 342.80)	0.192	0.174
Provincial and LG expenditure on District Health Services per capita (uninsured) (Rand)	1430.15 (1232.31– 1571.91)	1600.22 (1351.84– 1895.19)	0.015	0.917
Provincial and LG PHC expenditure per capita (uninsured) (Rand)	761.89 (672.41– 828.93)	929.56 (794.46– 1018.46)	0.136	0.336
Provincial and LG expenditure on District Health Services per capita (total pop) (Rand)	1218.82 (1028.83– 1462.29)	1341.33 (1149.76– 1737.68)	0.012	0.933
Provincial and LG PHC expenditure per capita (total pop) (Rand)	629.89 (577.72– 713.14)	755.34 (674.76– 898.70)	0.132	0.351
Management of PHC				
PHC supervisor visit rate (fixed clinic/CHC/CDC) (%)	66.50 (54.09– 83.73)	77.53 (62.15– 85.22)	0.125	0.376
Management of inpatients				
Average length of stay (district hospitals) (days)	4.02 (3.04– 5.22)	4.32 (3.51– 5.37)	-0.205	0.145
Inpatient bed utilisation rate (district hospitals) (%)	64.42 (60.57– 71.62)	66.70 (59.33– 73.18)	-0.83	0.557
OPD new client not referred rate (district hospitals) (%)	63.98 (35.39– 82.41)	59.87 (42.94– 70.15)	-0.148	0.337
Expenditure per patient day equivalent (district	1925.71 (1706.56–	2078.39 (1918.54–	0.052	0.715

DHB indicator name (unit)	2010/2011 Median (IQR)	2014/2015 Median (IQR)	Spearman's rho	p
hospitals) (Rand)	2163.24)	2420.58)		
Inpatient mortality				
Child under 5 years diarrhoea case fatality rate (%)	7.81 (3.19–10.05)	2.97 (1.79–4.68)	0.73	0.608
Child under 5 years pneumonia case fatality rate (%)	6.22 (3.09–9.03)	2.66 (1.61–4.45)	-0.085	0.548
Child under 5 years severe acute malnutrition case fatality rate (%)	17.46 (10.76–23.12)	11.14 (8.27–15.04)	0.005	0.975
Delivery care				
Delivery in facility under 18 years rate (%)	8.58 (7.25–10.22)	8.00 (6.97–9.81)	0.098	0.49
Inpatient early neonatal death rate (per 1000 live births)	9.64 (8.26–13.04)	10.27 (8.34–12.40)	0.14	0.321
Maternal mortality in facility ratio (per 100 000 live births)	132.51 (58.38–197.22)	130.21 (69.80–195.03)	0.036	0.802
Stillbirth in facility rate (%)	22.95 (18.87–25.98)	20.88 (16.99–24.15)	-0.143	0.312
Delivery by caesarean section rate (district hospitals) (%)	18.43 (13.13–22.20)	21.86 (18.94–27.33)	-0.19	0.177
Mother postnatal visit within 6 days rate (%)	29.28 (11.84–44.09)	69.31 (56.48–76.00)	0.056	0.695
PMTCT				
Antenatal first visit before 20 weeks rate (%)	40.38 (34.98–45.55)	56.95 (52.54–60.89)	-0.148	0.295
Antenatal client initiated on ART rate (%)	74.63 (52.08–109.10)	92.21 (87.41–95.98)	0.052	0.716

DHB indicator name (unit)	2010/2011 Median (IQR)	2014/2015 Median (IQR)	Spearman's rho	<i>p</i>
Infant first PCR test positive around 6 weeks rate (%)	5.61 (4.98–8.26)	1.54 (1.32–1.95)	0.026	0.855
Infant first PCR test around 6 weeks uptake rate (%)	89.15 (76.92–99.44)	97.89 (89.97–107.98)	0.038	0.791
Child health immunisation				
Vitamin A dose 12–59 months coverage (annualised) (proportion of children aged 12–59 months)	32.98 (26.00–38.14)	51.01 (46.56–58.25)	0.086	0.544
Immunisation coverage under 1 year (%)	77.35 (70.11–88.55)	82.88 (78.77–92.92)	-0.107	0.452
Measles second dose coverage (annualised) (%)	78.96 (72.62–85.94)	79.28 (73.59–87.72)	0.134	0.343
Reproductive health				
Cervical cancer screening coverage (annualised) (proportion of the female population 15–44 years)	49.20 (39.36–61.74)	54.73 (41.68–66.30)	-0.146	0.3
Couple year protection rate (annualised) (proportion of the female population 30 years and older)	28.98 (25.56–36.39)	45.92 (39.61–52.37)	0.026	0.854
TB case finding				
Incidence (diagnosed cases) of TB – all types (per 100 000 people in the catchment population)	919.30 (653.34–1063.57)	680.27 (504.10–831.39)	0.019	0.893
HIV management				
Male condom distribution coverage	12.28 (8.93–16.04)	36.78 (24.49–46.53)	0.087	0.542

DHB indicator name (unit)	2010/2011 Median (IQR)	2014/2015 Median (IQR)	Spearman's rho	<i>p</i>
(number of male condoms)				
Percentage of TB cases with known HIV status (ETR.net) (%)	73.11 (68.25–79.52)	93.07 (90.73–94.93)	-0.351	0.011*
Additional indicators				
PCV third dose coverage (annualised) (%)	74.95 (63.06–82.80)	86.09 (81.20–96.20)	0.047	0.74
Percentage of DHS expenditure on district hospitals (%)	44.23 (33.75–49.42)	37.99 (27.58–48.16)	-0.038	0.791
Percentage of DHS expenditure on district management (%)	5.57 (2.90–6.89)	5.49 (3.24–8.06)	0.094	0.507
Percentage of DHS expenditure on PHC (%)	53.88 (45.80–61.08)	58.00 (48.21–66.74)	0.006	0.968
RV second dose coverage (annualised) (%)	72.57 (61.76–82.77)	89.32 (82.89–100.08)	0.072	0.612
Vaccine expenditure per population under 1 year (Rand)	925.74 (0.35–1278.64)	1282.37 (902.57–1445.37)	-0.378	0.006*

*Statistically significant at $p < 0.05$.

IQR, interquartile range; LG, local government.

Table 3.15. Cross-sectional correlations time period 2.

DHB indicator name (unit)	2014/2015 Median (IQR)	Spearman's rho	<i>p</i>
Inpatient mortality			
Inpatient crude death rate (proportion of all inpatient separations)	5.54 (4.66–6.36)	-0.34	0.014*
Child health immunisation			
School Grade 1 screening coverage (annualised) (%)	21.37 (13.31–32.69)	0.23	0.102
TB case finding			
TB rifampicin resistance confirmed client rate (% of positive TB tests that are rifampicin resistant)	5.95 (4.76–7.04)	-0.052	0.712
HIV care			
TB/HIV co-infected client on ART rate (ETR.Net) (%)	81.32 (70.21–86.83)	-0.261	0.061
HIV testing coverage (including ANC) (%)	32.84 (27.04–41.33)	0.012	0.931
NCD care			
Hypertension incidence (annualised) (per 1000 population 40 years and older)	14.82 (11.82–17.69)	-0.18	0.201
Mental health admission rate (proportion of clients admitted/separated for mental health problems)	0.96 (0.53–1.72)	-0.066	0.641
Human resources			
PHC doctor clinical work load (average number of clients seen per doctor per clinical work day)	25.46 (19.05–32.87)	0.073	0.608
PHC professional nurse clinical work load (average number of clients seen per professional nurse per clinical work day)	28.80 (25.40–35.33)	-0.071	0.616
Additional indicators			
HIV testing coverage (annualised) (%)	29.39 (24.39–37.22)	0.036	0.799

Tracer items stock-out rate (fixed clinic/CHC/CDC) (%)	16.35 (8.26–32.69)	-0.131	0.353
TB/HIV co-infected client on ART rate (%)	48.44 (35.37–59.34)	0.221	0.14

*Statistically significant at $p < 0.05$.

IQR, interquartile range.

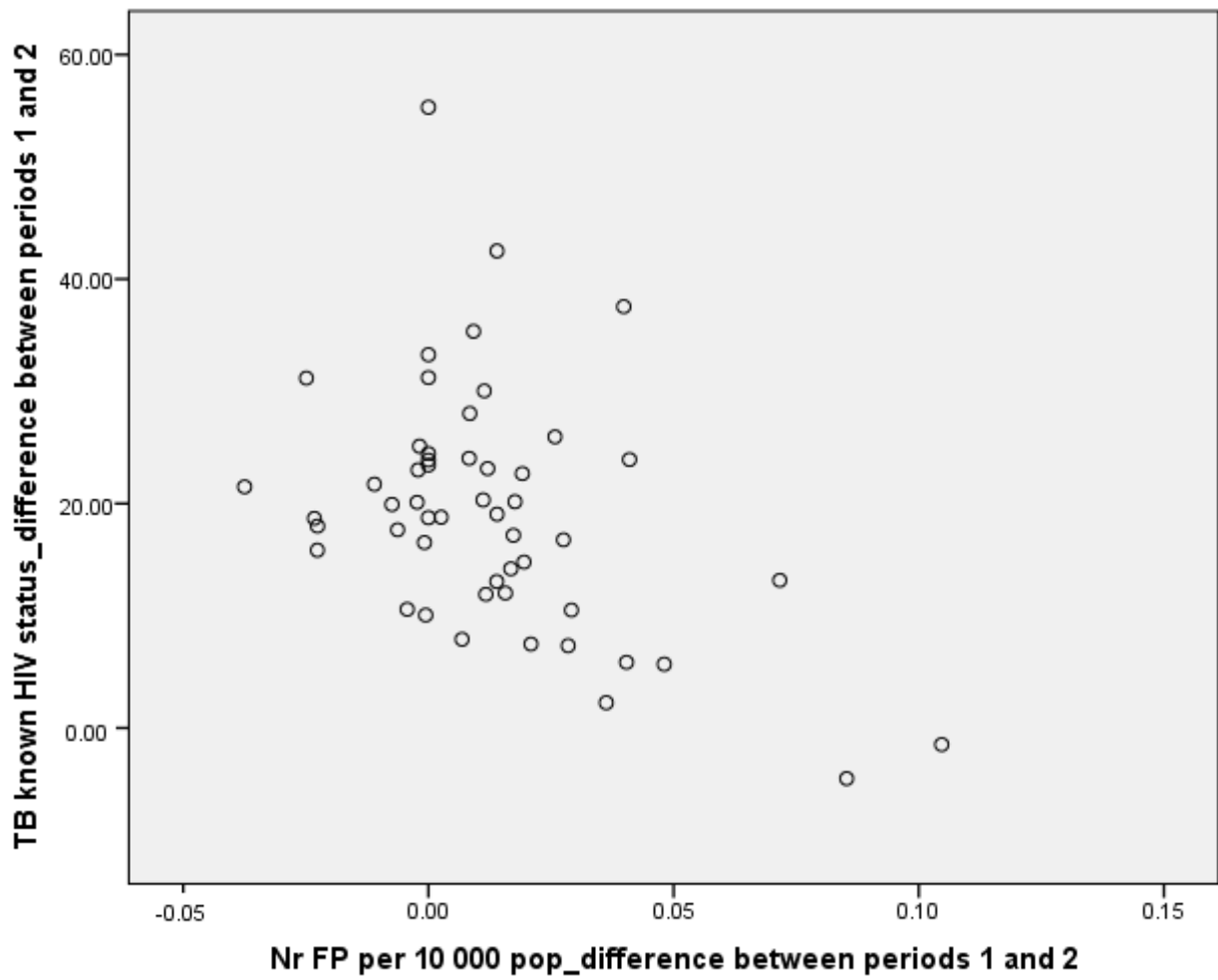


Figure 3.7. Scatter plot of significant correlation ($p < 0.05$): difference between time periods 1 and 2 for supply of family physicians (FPs) and percentage of TB cases with known HIV status.

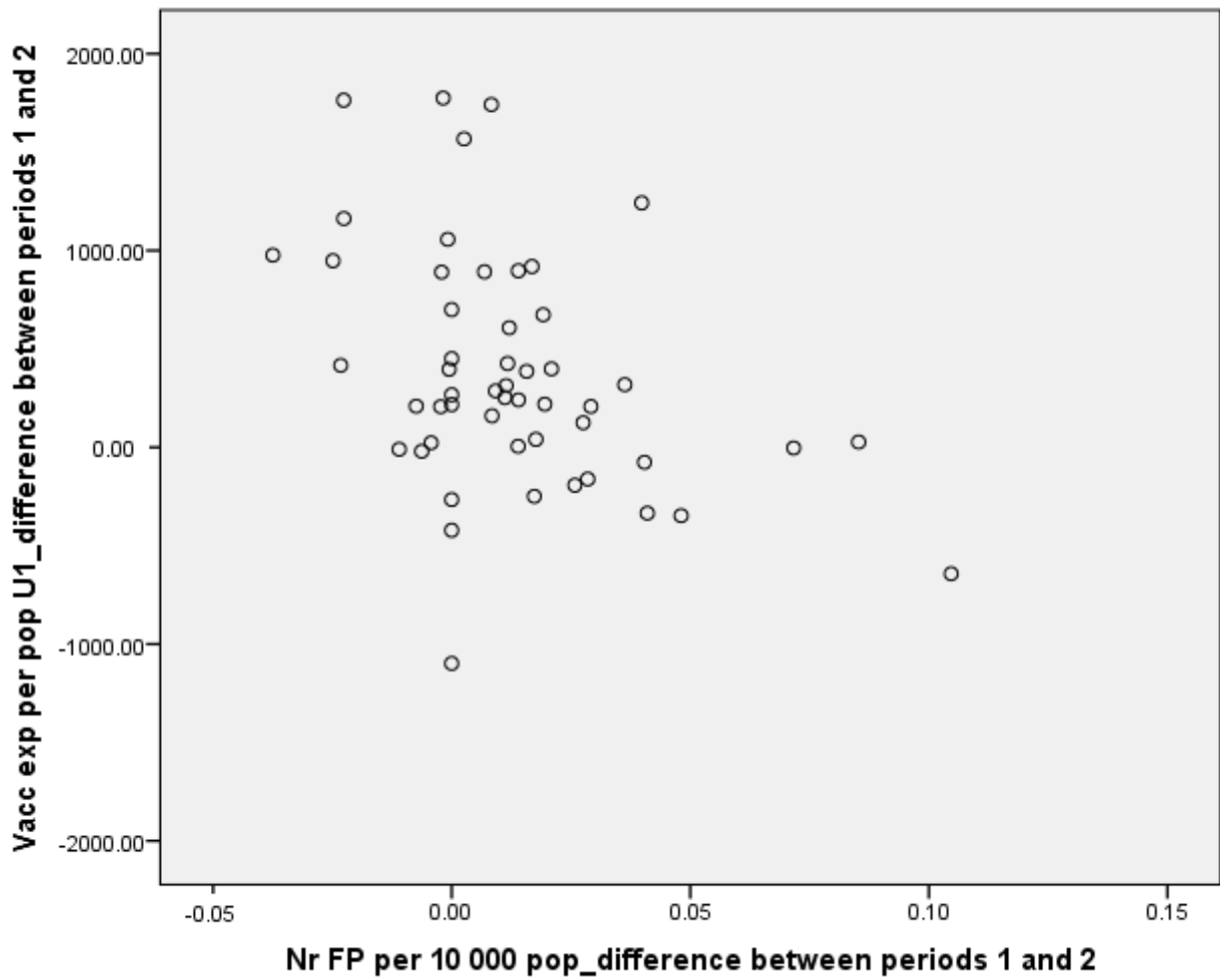


Figure 3.8. Scatter plot of significant correlation ($p < 0.05$): difference between time periods 1 and 2 for supply of family physicians (FPs) and vaccine expenditure per population under 1 year.

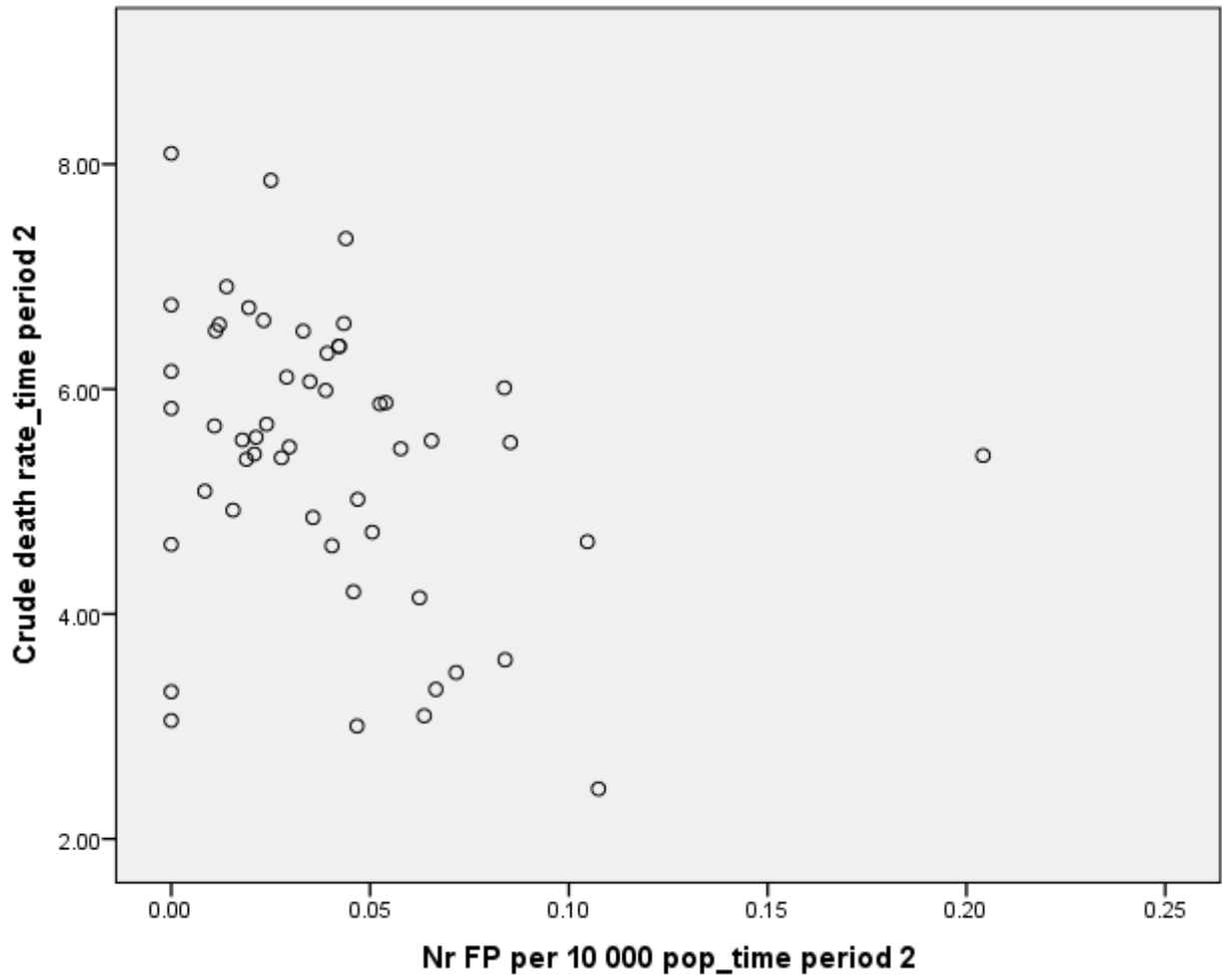


Figure 3.9. Scatter plot of significant correlation ($p < 0.05$): supply of family physician (FPs) and inpatient crude death rate for time period 2 (2014/2015).

Table 3.16. Generalised linear model (regression analysis) to control for the effect of province on the correlation between changes in family physician supply per 10 000 population and vaccine expenditure per population under 1 year.

Parameter estimates

Parameter	B	s.e.	95% Wald confidence interval		Hypothesis test		
			Lower	Upper	Wald Chi-square	df	Sig.
(Intercept)	-107.949	104.9363	-313.620	97.722	1.058	1	0.304
FPppop_change	376.198	2153.2942	-3844.181	4596.577	0.031	1	0.861
[Province=EC]	402.050	134.5360	138.365	665.736	8.931	1	0.003
[Province=FS]	9.567	155.9614	-296.111	315.246	0.004	1	0.951
[Province=GP]	1611.691	149.7983	1318.092	1905.290	115.758	1	0.000
[Province=KZN]	424.724	123.3641	182.935	666.513	11.853	1	0.001
[Province=LP]	1023.000	150.5760	727.876	1318.123	46.157	1	0.000
[Province=MP]	155.624	170.7158	-178.973	490.220	0.831	1	0.362
[Province=NC]	-355.870	170.6256	-690.290	-21.450	4.350	1	0.037
[Province=NW]	1210.934	160.8308	895.711	1526.156	56.689	1	0.000
[Province=WC]	0 ^a						
(Scale)	57991.602 ^b	11716.0729	39029.809	86165.575			

Dependent variable: Vacc exp per pop U1_difference

Model: (Intercept), FPppop_change, Province

^aSet to zero because this parameter is redundant.

^bMaximum likelihood estimate.

EC, Eastern Cape; FS, Free State; GP, Gauteng Province; KZN, KwaZulu-Natal; LP, Limpopo Province; MP, Mpumalanga; NC, Northern Cape; NW, North West; WC, Western Cape.

Table 3.17. Generalised linear model (regression analysis) to control for the effect of province on the correlation between family physician supply per 10 000 population and inpatient crude death rate, for time period 2.

Parameter estimates

Parameter	B	s.e.	95% Wald confidence interval		Hypothesis test		
			Lower	Upper	Wald Chi-square	df	Sig.
(Intercept)	3.250	0.3644	2.536	3.964	79.527	1	0.000
FP_time2	-0.024	0.0251	-0.073	0.025	0.932	1	0.334
[Province=EC]	3.129	0.4496	2.248	4.011	48.437	1	0.000
[Province=FS]	2.660	0.4830	1.713	3.606	30.325	1	0.000
[Province=GP]	2.407	0.4788	1.469	3.346	25.275	1	0.000
[Province=KZN]	2.338	0.4075	1.540	3.137	32.930	1	0.000
[Province=LP]	2.352	0.4860	1.400	3.305	23.422	1	0.000
[Province=MP]	2.611	0.5591	1.515	3.706	21.805	1	0.000
[Province=NC]	1.574	0.4971	0.600	2.549	10.027	1	0.002
[Province=NW]	3.550	0.5168	2.537	4.562	47.179	1	0.000
[Province=WC]	0 ^a						
(Scale)	0.625 ^b	0.1226	0.426	0.918			

Dependent variable: Crude death rate_time 2

Model: (Intercept), FP_time2, Province

^aSet to zero because this parameter is redundant.

^bMaximum likelihood estimate.

EC, Eastern Cape; FS, Free State; GP, Gauteng Province; KZN, KwaZulu-Natal; LP, Limpopo Province; MP, Mpumalanga; NC, Northern Cape; NW, North West; WC, Western Cape.

Table 3.18. Generalised linear model (regression analysis) to control for the effect of province on the correlation between changes in family physician supply per 10 000 population and percentage of TB cases with known HIV status.

Parameter estimates

Parameter	B	s.e.	95% Wald confidence interval		Hypothesis test		
			Lower	Upper	Wald Chi-square	df	Sig.
(Intercept)	15.143	3.8935	7.512	22.774	15.127	1	0.000
[Province=EC]	8.552	5.0515	-1.349	18.453	2.866	1	0.090
[Province=FS]	5.782	5.6366	-5.265	16.830	1.052	1	0.305
[Province=GP]	6.294	5.6398	-4.760	17.348	1.246	1	0.264
[Province=KZN]	7.198	4.6770	-1.968	16.365	2.369	1	0.124
[Province=LP]	6.616	5.6577	-4.473	17.705	1.367	1	0.242
[Province=MP]	5.978	6.4898	-6.741	18.698	0.849	1	0.357
[Province=NC]	1.777	5.9560	-9.896	13.451	0.089	1	0.765
[Province=NW]	10.369	6.0384	-1.466	22.204	2.949	1	0.086
[Province=WC]	0 ^a						
FPppop_change	-138.039	63.2795	-262.065	-14.014	4.759	1	0.029
(Scale)	83.979 ^b	16.4696	57.179	123.340			

Dependent variable: TB known HIV status_difference

Model: (Intercept), Province, FPppop_change

^aSet to zero because this parameter is redundant.

^bMaximum likelihood estimate.

EC, Eastern Cape; FS, Free State; GP, Gauteng Province; KZN, KwaZulu-Natal; LP, Limpopo Province; MP, Mpumalanga; NC, Northern Cape; NW, North West; WC, Western Cape.

3.4.4 DISCUSSION

3.4.4.1 Key findings

Five years after the introduction of family physicians this study showed no demonstrable correlation between family physician supply and improved health indicators from the macro-perspective of the district. The lack of a measurable impact at the level of the district is most likely due to the very low supply and deployment of family physicians in the public sector, which makes their impact undetectable.

3.4.4.2 Discussion of key findings

The family physician supply in the international literature (supply ranging between 4.3 and 12.0 per 10,000 population in countries such as the USA, UK, Canada and Korea) was at least 100 times more than the 0.03 per 10,000 reported here. Our definition of FP supply, however, differed from the definitions of primary care physician supply in these references, as the international literature generally included all clinical primary care physicians (usually with postgraduate training in specialities such as paediatrics and internal medicine). These international studies were also conducted in less socio-economically deprived settings where postgraduate training of primary care physicians was well established. It may be more appropriate to compare our FP supply to that of other BRICS countries (Brazil, Russia, India, China and South Africa): the total FP supply in South Africa (private and public sector, all levels of health care) was 0.1 per 10,000 in 2015, compared to 0.2 per 10,000 in Brazil and 1.2 per 10,000 in China.⁽³⁹⁾ The total South African supply of FP per 10,000 needs to double in order to meet at least Brazil's supply. South Africa's NDOH echoes this by identifying a shortfall of 888 family physicians in their 2011 HR policy document.⁽³⁰⁾

While some correlations demonstrate a possible trend, the size of these correlations did not exceed 0.5 in either direction. The initial significant correlations disappeared after controlling for the available confounders, especially the provincial covariate. This large degree of heterogeneity between the provinces makes it difficult to assess for an effect of the FP supply per 10,000 population at a country level.

3.4.4.3 Strengths and limitations

Our study was limited by our definition of primary care physician supply, by excluding primary care doctors who were not registered as family physicians with the Health

Professions Council of South Africa. A further limitation is the exclusion of private sector family physicians who may have an indirect effect on DHS performance, as they are seeing uninsured patients for out-of-pocket consultations. Some private sector family physicians may be contracted into public sector primary care facilities in the NHI pilot districts since 2013.

The study was also limited by the set of DHB variables that were determined by the NDOH and were not specifically intended to measure the impact of the family physician. The DHB data is based on routinely collected data which may lack the rigour required for research, though HST apply statistical methods to clean and improve data quality. Data quality issues of source data were described in the DHB.(35) Furthermore, our analysis was limited by the availability of data for all indicators in both time periods, as an analysis over time is more sensitive to the effect of FPs as opposed to a cross-sectional analysis.

3.4.4.4 Implications or recommendations

While this study from a broad macro-level district perspective did not demonstrate an impact of the family physicians on the DHS performance, other studies to be published elsewhere will present additional data from the facility and individual levels. These studies at a meso- and micro-levels are more likely to demonstrate an impact as they evaluate the family physicians closer to their circle of control and influence. The correlation analysis should be repeated in five years, when the FP supply is greater. It is also recommended that this correlation analysis includes a comparison with a broader definition of primary care doctor supply (all primary care doctors working in the DHS).

3.4.5 CONCLUSION

It is still too early to demonstrate the impact of an increase in supply of family physicians at the district level on key health system performance indicators, key clinical processes and key health outcomes. Studies which evaluate impact closer to the family physician's circle of control may be better positioned to demonstrate a measurable impact in the short term. A repeat correlation analysis is recommended in five years to allow for time (duration of effect) and training output (size of supply). Opportunities to deploy more FPs within the DHS should be explored and supported.

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3.4.6.1 Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

3.4.6.2 Authors' information

KBvP and RJM are both located at the Division of Family Medicine and Primary Care, Stellenbosch University, in South Africa and co-ordinate a national project entitled “Strengthening primary health care through primary care doctors and family physicians” that is funded by the European Union. RJM is KBvP’s PhD supervisor. TME is a consultant biostatistician in the Biostatistics Unit, Faculty of Medicine and Health Sciences, Stellenbosch University.

3.4.7 AUTHORS' CONTRIBUTIONS

KBvP and RJM conceptualised the study. KBvP prepared the database and conducted the data analysis with TME under the supervision of RJM. KBvP drafted the manuscript. All authors revised the manuscript and approved the final version.

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CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 INTRODUCTION

This chapter presents the conclusions of the thesis in relation to each of the initial objectives and to the conceptual frameworks used in this study. Based on the aforementioned, key recommendations to the different audiences will be made regarding the contribution of FPs to the DHS of South Africa.

4.2 CONCLUSIONS RELATED TO THE OBJECTIVES

The aim of this research was to evaluate the impact of FPs within the DHS of South Africa. In this section I will conclude on the findings in relation to the original objectives.

4.2.1 Objective A

To describe the perceived impact of FPs in terms of their six roles within the district health system

The impact made by FPs in DHS facilities across seven South African provinces was perceived by co-workers as high for five of the six agreed roles: care provider, consultant, clinical trainer, leader of clinical governance and champion of COPC. Their impact in the role of capacity builder was significantly less than the other roles, although still seen as a moderate impact. Of note, DMs appreciated the benefits of in-service training and capacity building efforts by FPs. In addition, DMs made the connections between the performance of these six roles and improvements in health system performance and clinical outcomes. DMs had different perceptions of which roles should be emphasised depending on where FPs were employed within the DHS. For example, DMs expected a greater focus on clinical governance and coordination of services from FPs employed at district level, whereas FPs employed within the sub-district were expected by some DMs to function more in the community and not in the health facility. DMs felt that the contribution of FPs to developing COPC featured less strongly compared to the other roles.

4.2.2 Objective B

To describe co-health workers' perception of the impact of FPs compared to medical officers who had received no postgraduate training

Co-workers (including the facility managers who function closer to the FP's circle of control and influence) rated their FP's impact across these six roles as significantly higher than the other medical officers at the same facility. In the qualitative study, DMs appreciated that a FP could have broader roles than the mainly clinical role performed by medical officers: the FPs' training prepared them for a wider scope of influence across both clinical (a range of expert generalist skills across ten clinical domains) and non-clinical (capacity builder, leadership and governance) roles.

4.2.3 Objective C

To compare the perceived impact of FPs between metropolitan and rural districts, between facility types (district hospitals vs. primary care facilities), as well as by training programme model (graduation before and after 2011).

Co-workers perceived that the beneficial impact was experienced equally across the whole study setting and no significant differences were found when comparing location, facility type or training model.

4.2.4 Objective D

To explore the perceptions of district managers regarding the impact of FPs in the following three domains: health system performance, clinical processes and health outcomes

The impact of FPs on three of the four domains of health system performance were highlighted, namely access, coordination of care and comprehensiveness of care. Most DMs felt that FPs enabled better access to a comprehensive package of care at the appropriate level. This was achieved both directly, by providing care requiring a more advanced skills set closer to the community, and indirectly, by ensuring that appropriately capacitated healthcare workers were available at the primary care coalface. They thought that FPs ensured more appropriate referrals to specialist care and therefore improved the coordination of care between different levels of the health system. FPs also improved the

flow of patients across the DHS platform (from the entry into the DH to either inpatient or outpatient care). Continuity of care was not specifically mentioned by DMs in this study and FPs did not appear to be influencing this important dimension of effective primary care.

In terms of clinical processes the DMs perceived that FPs strengthened clinical service delivery across the whole spectrum of the quadruple disease burden. These benefits were ascribed to the combined effect of the six FP roles, which allowed the FP to have both direct and indirect effects on patient care. Some of the DMs were able to indicate specific areas where FPs were making a perceived impact, such as maternal and child health (reduction in caesarean rate), chronic disease management (HIV/AIDS, tuberculosis, mental health and non-communicable diseases) and emergency care.

DMs anticipated a positive impact by FPs on health outcomes in the long term, given the present low supply of FPs. Potential indicators were mentioned by DMs which may help to gauge the impact of the FPs, such as: maternal mortality/morbidity, infant mortality rate, tuberculosis cure rate and chronic disease management outcomes.

4.2.5 Objective E

To assess the influence of FPs at primary care facilities and district hospitals. The influence of FPs was evaluated in terms of two domains: health system performance, and quality of clinical processes across the burden of disease.

Data from DHs showed that facilities with FPs generally had higher scores for health system performance and clinical care, and were associated with significantly fewer modifiable factors associated with in-hospital paediatric mortality.

Surprisingly, data from CHCs showed that facilities with FPs generally had lower scores for health system performance and clinical care. The chronic care findings were not significantly different between the arms. However, CHCs with FPs were associated with significantly lower scores for continuity and coordination of care.

Given the body of international evidence for the beneficial impact of FPs on primary care services and the perception of DMs and co-workers on the FPs' impact in this thesis, it is difficult to conclude that in South Africa FPs are having a negative effect on primary care. FPs may have less influence in CHCs which have primarily nurse-led management structures.

However, this would also have been true for CHCs without FPs, as the influence of MOs may also have been impaired by the nurse-led organisational culture. It is more likely that this finding is due to confounding factors in the matching of CHCs. The higher workload at facilities with FPs may imply that they were placed at facilities where the quality of care was already worse at baseline. Unfortunately in this study it was not possible to collect baseline data prior to the placement of the FP. Furthermore, the current focus of the FP training programmes may be more centred on the skills and competencies required for the DH.

4.2.6 Objective F

To evaluate the impact of an increase in FP supply in each district (number per 10 000 population) on key health system performance indicators, key clinical processes and key health outcomes.

From an ecological perspective, it is still too early to demonstrate the impact of an increase in supply of FPs at the district level on key health system performance indicators, key clinical processes and key health outcomes. During correlation analyses, some correlations demonstrated a possible trend, but the size of these correlations did not exceed 0.5 in either direction (correlation values ≥ 0.5 were interpreted as moderate to high). The initial significant correlations disappeared after controlling for the available confounders, especially the provincial covariate. This large degree of heterogeneity between the provinces makes it difficult to assess an effect of the FP supply per 10 000 population at a country level. Studies which evaluated impact closer to the FP's circle of control (such as the study using the 360-degree evaluation instrument) were better positioned to demonstrate a measurable impact in the short term. A repeat correlation analysis is recommended in 5 years to allow for time (duration of effect) and training output (size of supply). In the qualitative study, DMs also confirmed that the supply of FPs within the DHS was still too low to make a measurable impact and that more time is required to appreciate the full impact of their integration into the healthcare system.

4.3 CONCLUSIONS RELATED TO THE CONCEPTUAL FRAMEWORK

The key findings of the thesis have also been summarised in terms of the conceptual framework of the DHS in Figure 4.1. The explanation below relates to the labels (a to d) in the Figure.

- (a) FPs are seen as a generic service intervention and have the potential to impact health system performance, processes and outcomes either directly or indirectly.
- (b) The findings from this thesis are summarised in these areas: health system performance; generic, targeted and clinical processes; and outcomes.
- (c) The structure of the DHS, consisting of its governance, economics and workforce, was not evaluated in this study.
- (d) Other interventions which may influence the system include structural (policy) interventions, targeted service interventions and clinical interventions. Factors that were identified in the thesis that may have enhanced or hindered the impact of the FP in these areas are summarised in the Figure.

The conceptual framework used in this study was based on the modified Donabedian causal chain by Lilford et al.(1) At this stage, one may also reflect on the usefulness of using this conceptual model in evaluating the introduction of a generic intervention, such as FPs, into the complex DHS. The DHS may be viewed as a complex adaptive system with multiple interacting relationships and feedback loops, as opposed to seeing it as linear and mechanistic.(2–4) This understanding of FPs being part of a complex system was also shared by the DMs. The FP’s ability to influence the health service through their team depended on their capability for leadership and support for their leadership across all their roles from senior FPs, managers and other specialists. Chapter 2 described some of the methods of analysing health systems. One example, is the causal chain model that links closely with the logic model used in programme evaluations.(2) This study used a modified causal chain model, by adding the domain of health system performance, which in turn influences (and is influenced by) the structure, processes and outcomes components. Another framework, the Primary Health Care Performance Initiative (PHCPI), was launched after this study was conceptualised.(5) The PHCPI represents the latest addition to instruments used to measure the strength of PHC and its dimensions.(6–11) The core functions of PHC described by Starfield (12) are at the centre of this PHCPI framework. The PHCPI framework, however, does retain some resemblance to the more linear logical model, also employed by this study (adapted by Lilford et al).(1)

Lilford et al concluded that their framework, like all representational models, is intended to assist service and policy evaluation by providing a “simplified view of the world to help us

think about complex issues”, albeit “not a true representation of the complexity itself.”(1) I would like to argue for the ongoing use of this framework, as it balances the complexity of the system with the conceptual clarity required for designing a study tasked with evaluating the influence of a generic intervention, such as FPs.

Given the complexity of the system and intervention one may also reflect on whether the term influence would have been more accurate than the term impact in the aim and objectives of the thesis. The study’s findings point more towards evidence of early influence (evident closer to the FP’s circle of influence). “Impact” implies causality, and this may be challenging to prove given the generic and complex nature of viewing FPs as an intervention, who are articulating with a number of role players in the DHS to affect a range of indicators, which in turn are influenced by a range of other factors.

Figure 4.2 summarises the key findings in a different visual format. An ecological model portrays the findings in different layers according to the family physician’s sphere of influence. An ecological model shows the linkages or interactions between the family physician and his/her environment, the district health system. The model may serve to enhance the understanding of the dynamic interrelations among various individual and environmental/contextual factors, as demonstrated by the findings from the various studies. The different layers of the model consist of the intrapersonal (the FP as an individual), interpersonal (team), institutional (facility), community (district health system) and societal (national or policy) factors. The findings of the study have been organised according to these layers in Figure 4.2.

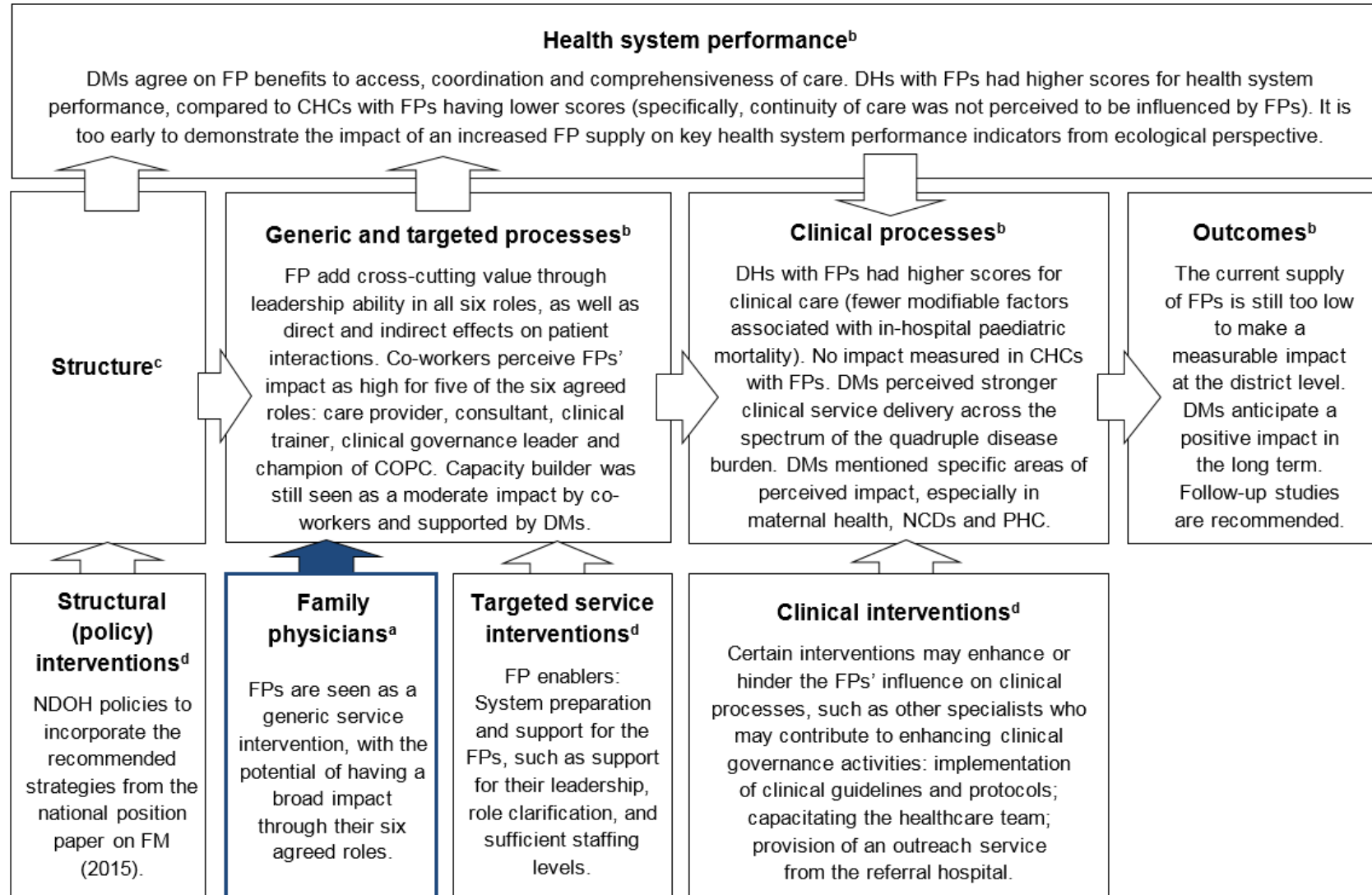
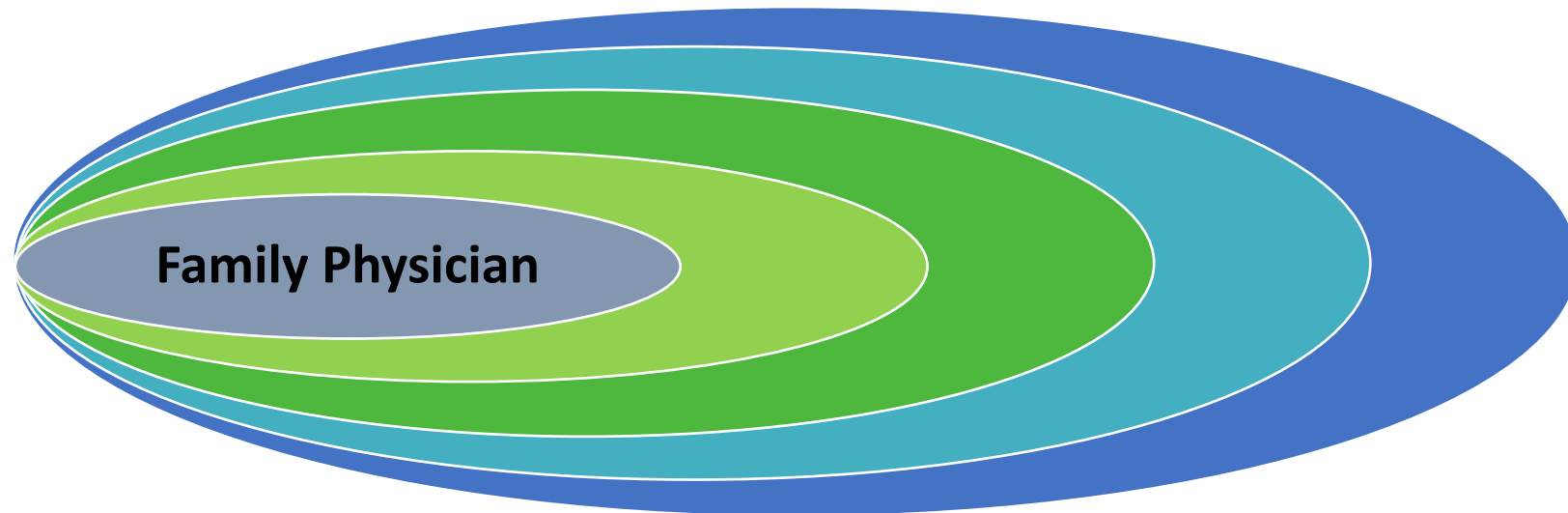


Figure 4.1 Conceptual framework summarising key findings from all four articles.



Interpersonal (team)

Co-workers perceive FPs' impact as high for five of the six agreed roles: care provider, consultant, clinical trainer, clinical governance leader and champion of COPC. Capacity builder was still seen as a moderate impact by co-workers. The FPs' impact was perceived as greater than that of medical officers across all six roles.

Institutional (facility)

DHs with FPs had higher scores for health system performance, but CHCs with FPs had lower scores (specifically, continuity of care). DHs with FPs had higher scores for clinical care. No impact measured in CHCs with FPs.

District-level

District managers (DMs) agreed on FP benefits to access, coordination and comprehensiveness of care. DMs perceived stronger clinical service delivery across the quadruple disease burden. DMs anticipated a positive impact in the long term.

National-level

The current supply of FPs was still too low to demonstrate an impact of an increased FP supply on key health system performance, clinical process and outcome indicators.

Figure 4.2 Key findings summarised in an ecological model.

4.4 RECOMMENDATIONS

The following key recommendations are presented according to three key audiences: the health system (including managers and policy makers within the department of health at national, provincial and district levels, as well as the national licensing body, the Health Professions Council of South Africa); the educational system (including the postgraduate training programmes, the SAAFP and the CFP SA); and, primary care researchers (both from within and without the discipline of family medicine).

It is hoped that this research may function as a catalyst for future studies and assist with strengthening research collaborations, as well as contributing to the growth and maturation of the South African family medicine disciplinary identity.⁽¹³⁸⁾ The South African family medicine leadership (academic heads of departments, SAAFP and CFP SA) should continue to engage with the Department of Health at all levels, and employ the growing body of local evidence to support the strategies around incorporating family medicine towards creating stronger health systems.^(36,138,71,176) The Department of Health should include the educational system during policy review activities, in order to ensure curricular alignment.⁽³⁶⁾

4.4.1 The health system

- Continue to employ FPs and go to scale within the South African DHS as the current supply is too low and yet key findings support the early beneficial influence of the FPs on the DHS. This will be achieved by creating more FP posts within the DHS. This study supports the appointment of FPs in both metropolitan and rural districts, and in both DHS facility types (district hospitals and CHCs), as their perceived impact was experienced across the whole study setting.
- The findings also provide evidence to support the influence of FPs in the broader African context. Many countries in Africa, such as Botswana, Namibia and Ghana, share a similar understanding of the roles of the FP and a similar health system context. The evidence contained in this thesis should be considered by key stakeholders in other countries that are considering the development of family medicine.

- FPs should be appointed at facility-level within the sub-district, where FPs will be best positioned to exert their direct and indirect effects on patient care. DMs felt that appointing FPs at district level will limit their scope to mainly the clinical governance role. FPs are trained to work within teams, where they will practice the full spectrum of the six roles. This will enable FPs to provide better value for money, as they will be able to perform roles in addition to the mainly clinical role performed by medical officers.
- More attention should be given to developing continuity of care within primary care facilities (CHCs) and to involve the FP towards achieving this goal. The findings may reflect a need to strengthen the FP's role in PHC and to integrate them more fully into the team. Working closer to the community will also enable FPs to expand their role in COPC.(13) Person-centeredness and COPC also feature strongly in the national policy documents around PHC re-engineering, and FPs may need to take on a stronger role in implementing these policy directions.
- Newly appointed FPs need an active process of support and role clarification with their healthcare teams to establish themselves in the health system and to mature in all their different roles. DMs have an important role to play in this process of support and FP role clarification within DHS teams. Opportunities for mentorship of newly graduated FPs by more experienced FPs should be created and supported. Creating more FP posts will help to support the implementation of family medicine within the DHS, especially in areas with no or isolated FPs.
- FPs are better suited to make an impact in capacitated healthcare teams (appropriate numbers and skills mix of staff) working in a health system with strong governance structures. Investing in strengthening the DHS and PHC will help create this enabling environment.

4.4.2 The educational system

- The educational system should be better aligned with the DHS, as this will ensure an appropriately trained workforce for the DHS, including the FP. The study raised a concern that training programmes might not be sufficiently exposing registrars to the PHC setting and that this might be one factor behind the negative findings in the observational study for the influence of FPs on primary care. Training programmes

should ensure that there is a sufficient focus on training in the PHC setting, especially in the PHC domains of continuity and coordination. Registrar posts need to be increased and better positioned within the DHS to ensure sufficient exposure and training at both DH and PHC levels.

- The importance of FPs developing leadership competencies was reinforced and the need for training in this across all their roles. This study supports the need for the training programmes to transition from a focus on traditional management and administration skills to leadership and governance skills.(17)

4.4.3 Primary care researchers

- This was the first study to use the newly validated South African Family Physician Impact Assessment tool in a national survey. This tool could be used to evaluate the perceived impact of FPs in other African or LMIC health systems, providing that the FPs are similarly positioned within the PHC teams and share the same roles.(19) This would require adaptation of the instrument for the new context, but could produce useful data for between country-comparisons.
- Similarly, this was the first study to use the South African version of the PCAT in a national observational study. Not all the data from this tool has been presented in the thesis and there is an opportunity to further analyse and present the total data set for all the facilities included in the study. There is also potential to adapt the tool for other African countries and to create comparative data on the strength of primary care systems.(20)
- The ecological correlation analysis at a macro-level should be repeated in 5 years, when FP's have been present for longer, the supply is greater and the health system has undergone further transformation. It is also recommended that the correlation analysis includes a comparison with a broader definition of primary care doctor supply (all primary care doctors working in the DHS). Cost-effectiveness of FPs may also be evaluated in future studies.(21)
- More research will also help to understand the enabling factors and constraints within the local context that may influence the ability of FPs to exercise their full potential.(22) The finding of a lower perceived impact in the capacity building role may require more research to understand the factors involved, such as enhancing

the linkage between clinical governance and training activities. The unexpected finding around the effect of FPs on PHC also requires further research, especially as the district manager interviews and 360-degree evaluation suggest that FPs are having a beneficial impact in PHC.(23)

- More research should also focus on conceptualising the process of FP role clarification and maturation within health care teams. Family medicine remains a relatively new discipline in the South African context and newly qualified FPs are often entering newly created posts in the health system where they must navigate not only their own transition from registrar to specialist, but also the changes required in the system itself to understand and accept the role of a new cadre of health professional.(13,24)

4.5 IMPACT OF THE FINDINGS

The following section describes the impact of the findings to date. Opportunities to maximise the findings of the study include communicating the findings to the relevant stakeholders: authorities who gave permission (provincial departments of health); funding organisations; FPs, facility managers and DMs who participated in the study; family medicine forums who were briefed on the study; the SAAFP and CFPSA; the African PRIMAFAMED network; as well as WONCA (international and regional offices). Research findings will also be communicated through social media platforms (Twitter and Facebook) and other internet-based publication platforms (such as the university's webpage and other science communication platforms such as The Conversation: <https://theconversation.com/africa>).

4.5.1 Publications

Of the four articles in Chapter 3 three have been accepted for publication and one is still in peer review. Of the three, two were accepted in international journals and one in a national journal. This research was included in the report of the national EuropeAid-funded project: <http://www.sun.ac.za/english/faculty/healthsciences/Family%20Medicine%20and%20Primary%20Care/Pages/EuropeAid.aspx>.

4.5.2 Conferences

This research has also been presented at local, national, regional and international conferences:

4.5.2.1 International and regional conferences

2017: WONCA Africa Regional Conference in Pretoria, South Africa (joint conference with the SAAFP national conference): 18 – 20 August 2017. Two abstracts accepted for oral presentation of PhD research.

2016: The Network: Towards Unity for Health (TUFH) in Shenyang, China: 26 – 30 July 2016. Poster presentation on the ecological analysis study.

2016: 8th PRIMAFAMED (Africa) network meeting in Nairobi, Kenya: 21 – 24 May 2016. Oral presentation on the design of the four studies.

2015: WONCA Africa Regional Conference in Accra, Ghana: 6 – 9 May 2015. Oral presentation (District managers' perceptions of the impact made by family physicians in the district health system, Western Cape, South Africa).

2015: WONCA Rural Conference in Dubrovnik, Croatia: 16 – 18 April 2015. Oral presentation (District managers' perceptions of the impact made by family physicians in the district health system, Western Cape, South Africa).

4.5.2.2 National conferences:

2016: SAAFP national conference: Cape Town, 12 - 14 August 2016. Oral and poster presentations on PhD research.

2015: SAAFP national conference: Durban, 31 July – 2 August 2015. Oral presentation (District managers' perceptions of the impact made by family physicians in the district health system, Western Cape and KwaZulu-Natal, South Africa).

4.5.2.3 Local and institutional conferences:

2017: Two abstracts were submitted to the scientific committee of the 61st Annual Academic day, Faculty of Medicine and Health Sciences, Stellenbosch University: 30 August 2017.

2016: Oral and poster presentations: Presented initial findings of the PhD research at the 60th Annual Academic day, Faculty of Medicine and Health Sciences, Stellenbosch University: 11 August 2016.

4.5.3 Additional steps to facilitate stakeholder engagement and advocacy

- A submission to the South African Health Review 2018 is planned in the form of a chapter summarising the research findings on evaluating the impact of family physicians within the South African district health system.
- The research findings will be communicated to stakeholders through the SAAFP.
- A generic PowerPoint presentation will be shared with the participating universities for dissemination. This will facilitate engagement with local health managers at meetings and research days/symposia (provincial and district level).
- A podcast of this presentation will be made with a 10 to 20 minute narration. This will enable communication of findings to national and provincial stakeholders/policymakers: via participating institutions and co-authors, as well as via the website and social media platforms of the Division of Family Medicine and Primary Care, Stellenbosch University.

4.6 CHAPTER SUMMARY

In this chapter I have concluded the thesis and summarised its contribution to the evidentiary basis for advancing family medicine both nationally and within the African region. Key recommendations aimed at various stakeholders were also presented.

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ADDENDA

A. OVERVIEW OF NATIONAL EUROPEAID-FUNDED PROJECT

Project title:	Strengthening primary health care through primary care doctors and family physicians
Implementing organisation	Stellenbosch University
Partners (=co-applicants, associates, affiliates)	Departments of Family Medicine and Primary Care at University of Limpopo, University of Kwa-Zulu Natal, Pretoria University, University of Witwatersrand, Free State University, Walter Sisulu University, University of Cape Town, University of Ghent (Belgium). South African Academy of Family Physicians, South African College of Family Physicians, Royal College of General Practitioners (UK).
Location(s) of the project:	South Africa (mainly in Western Cape, Gauteng, Kwa-Zulu Natal, Limpopo, North-West, Eastern Cape, Free State Provinces)
Total duration of project:	30 months (from 1-3-2014 until 31-8-2016)
Project budget	€1 131 259.60
Objectives of the project	<p>To strengthen primary health care through capacity building of primary care doctors and family physicians</p> <ul style="list-style-type: none"> i) To build the capacity of primary care doctors and family physicians to function in support of community-based primary care teams and to improve the quality of PHC services ii) To build the capacity of family physicians to offer effective leadership and clinical governance to PHC facilities iii) To evaluate the contribution of family physicians to strengthening district health services
Target group(s)	Primary care doctors and family physicians
Final beneficiaries	Communities served by primary health care teams
Estimated results	<ul style="list-style-type: none"> i) A new nationally designed Diploma level training programme to up-skill and re-orientate existing primary care doctors. ii) The quality of and number of family physicians available to the country is increased iv) All family physicians involved in the clinical training of registrars are trained for this specific role iii) That all family physicians involved in assessment are trained for this specific role and that the quality of assessment in the national exit exam is improved v) That all MMed training programmes for family physicians include a new module on clinical leadership and governance vi) An applied research project on the impact and benefits of family physicians in the district health system that is completed and the results disseminated
Main activities	<p>Designing, developing and implementing a national Diploma level training for existing primary care doctors, from either the private or public sector, to enable them to better support the ward-based primary care teams and to offer services commensurate with the government's PHC revitalisation programme</p> <p>To provide training in clinical supervision/training and in assessment for all family physician training programmes</p> <p>To develop a national training module on leadership and clinical governance for family physicians that is incorporated into all training programmes</p> <p>To evaluate the impact and benefits of family physicians within the district health system.</p>

B. HREC APPROVAL LETTERS

i. HREC APPROVAL: STELLENBOSCH UNIVERSITY



UNIVERSITEIT-STELLENBOSCH-UNIVERSITY
Jou kennisvenoot • your knowledge partner

Approval Notice New Application

09-Feb-2015
Von Pressentin, Klaus KB

Ethics Reference #: S15/01/003

Title: Evaluating the impact of family physicians within the district health system of South Africa.

Dear Doctor Klaus Von Pressentin,

The New Application received on 14-Jan-2015, was reviewed by Health Research Ethics Committee 1 via Committee Review procedures on 04-Feb-2015 and has been approved.

Please note the following information about your approved research protocol:

Protocol Approval Period: 04-Feb-2015 -04-Feb-2016

Present Committee Members:

Weber, Franklin CFS
Unger, Marianne M
Sprekels, Marie-Louise MHE
Els, Petrus PJJ
Kearns, Elaine E
Bardsdorf, Nicola N
Botha, Paul JP
DeCloedt, Eric EH
Hall, David DR
Hendricks, Melany ML
Ferris, William WF
Welzel, Tyson B

Please remember to use your **protocol number** (S15/01/003) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No 61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel:

+27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.
For standard HREC forms and documents please visit: www.sun.ac.za/rds

If you have any questions or need further assistance, please contact the HREC office at 219389156.

Included Documents:

Declaration R. Mash
Consent form: Staff (Primary Care Facilities)
CV R. Mash
Consent form (FM)
Data collection tool: Signal functions, Child PIP
Table of ethical considerations and document guide
Declaration K von Pressentin
Participant information leaflet (MO)
Consent form: Patients (Primary Care Facilities)
Participant information leaflet (DM interviews)
Cover letter
Protocol Synopsis
Consent form: Staff (District Hospitals)
Applicatin form
Protocol
Mental Health Audit Tool
Consent form (FP and MO)
Participant information leaflet (FP)
KNO Approval letter
Manual for Integrated Chronic Disease Management
CV B von Pressentin
Checklist

Sincerely,

Franklin Weber
HREC Coordinator
Health Research Ethics Committee 1

ii. HREC APPROVAL: UNIVERSITY OF KWAZULU-NATAL



UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

RESEARCH OFFICE
BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel. 27 31 2604769 - Fax: 27 31 260-6609
Email: BRECA@ukzn.ac.za

Website: <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>

13 March 2015

Dr Laura Campbell
Family Medicine
College of Health Sciences
laura@hss.co.za
kvonpressentin@sun.ac.za

Dear Dr Campbell

Re: Reciprocity (Stellenbosch University: S15/01/003)
Study Title: *"Evaluating the impact of family medicine within the district health system of South Africa"*

I wish to advise that your application dated 24 February 2015 has been noted by the Chair of the Biomedical Research Ethics Committee (BREC).

The chair has granted reciprocity to the Stellenbosch University's registered Health Research Ethics Committee (HREC) approval dated 09 February 2015.

This approval will be noted at the next Biomedical Research Ethics Committee meeting to be held on 14 April 2015.

Yours sincerely

Ms A Marimuthu
Senior Administrator: Biomedical Research Ethics Committee

iii. HREC APPROVAL: UNIVERSITY OF THE FREE STATE

IRB nr 0006240
REC Reference nr 230408-011
IORG0005187
FWA00012784

22 July 2015

Dr KB von Pressentin
Division of Family Medicine and Primary Care
Stellenbosch / Department of Internal Medicine

Dear Dr KB von Pressentin

ECUFS 28/2015

PROJECT TITLE: EVALUATING THE IMPACT OF FAMILY PHYSICIANS WITHIN THE DISTRICT HEALTH SYSTEM OF SOUTH AFRICA

1. You are hereby kindly informed that, at the meeting held on 21 July 2015, the Ethics Committee approved the above project after all conditions were met.
2. Any amendment, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.
3. A progress report should be submitted within one year of approval of long term studies and a final report at completion of both short term and long term studies.
4. Kindly use the ECUFS NR as reference in correspondence to the Ethics Committee Secretariat.
5. The Ethics Committee functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the Ethics Committee of the Faculty of Health Sciences.

Yours faithfully


DR SM LE GRANGE
CHAIR: ETHICS COMMITTEE

Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | F: +27 (0)51 444 4359 | E: ethicsfhs@ufs.ac.za
Block D, Dean's Division, Room D104 | P.O. Box/Postbus 339 (Internal Post Box 640) | Bloemfontein 9300 | South Africa
www.ufs.ac.za



iv. HREC APPROVAL: UNIVERSITY OF THE WITWATERSRAND



R14/49 Dr Klaus B von Pressentin et al

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**CLEARANCE CERTIFICATE NO. M150488**

NAME: Dr Klaus B von Pressentin et al
(Principal Investigator)

DEPARTMENT: Family Medicine
 Stellenbosch University
 District Health System, Gauteng and Northwest

PROJECT TITLE: Evaluating the Impact of Family Physicians within
 the District Health System South Africa

DATE CONSIDERED: 24/04/2015

DECISION: Approved unconditionally

CONDITIONS:

SUPERVISOR: Prof Bob Mash

APPROVED BY: 
 Professor P Cleaton-Jones, Chairperson, HREC (Medical)

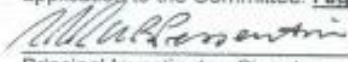
DATE OF APPROVAL: 07/09/2015

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.**


 Principal Investigator Signature

Date 18/9/2015

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

v. HREC APPROVAL: SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY



Sefako Makgatho Health Sciences University
Research & Postgraduate Studies Directorate
Sefako Makgatho University Research Ethics Committee
(SMUREC)

Motlotlegi Street, Ga-Rankuwa 0208
Tel: (012) 521 5617/3698 | fax: (012) 521 3749
Email: lorato.phiri@smu.ac.za
P.O. Box 163 Medunsa 0204

Dr Klaus B von Pressentin
University of Stellenbosch
Family Medicine & Primary Care
P.O Box 19063
Francie van Zijl Drive, Fisan Building F315
Tygerberg, 7505

Dear Dr von Pressentin

RE: APPLICATION TO CONDUCT STUDY AT SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY

SMUREC NOTED an email dated 10 February 2015 requesting permission to conduct study at Sefako Makgatho Health Sciences University.

Study Title: Evaluating the impact of family physicians within the district health systems of South Africa
Principal Investigator: Dr KB von Pressentin
Institution: University of Stellenbosch
Faculty of Medicine and Health Sciences, Family Medicine and Primary Care
Ethics Reference No: S15/01/003
Approval date: 04 February 2014 – 04 February 2016
Type of Research: Synopsis of PhD

MREC APPROVED and GRANTED the researcher permission to conduct the research study at the Sefako Makgatho Health Sciences University.

Yours Sincerely,

pp 

PROF GA OGUNBANJO
CHAIRPERSON SMUREC



SEFAKO MAKGATHO
HEALTH SCIENCES UNIVERSITY
SMU Research Ethics Committee

Chairperson
Date: 12/02/2015

12 February 2015

Members of the Interim Council:

Prof O Shisana (Chairperson), Ms SA Mchunu, Mr P Slack, Dr N Simelela, Prof AM Segone, Dr E van Staden

vi. HREC APPROVAL: UNIVERSITY OF PRETORIA

The Research Ethics Committee, Faculty Health Sciences, University of Pretoria complies with ICH-GCP guidelines and has US Federal wide Assurance.

- FWA 00002567, Approved dd 22 May 2002 and Expires 20 Oct 2016.
- IRB 0000 2235 IORG0001762 Approved dd 22/04/2014 and Expires 22/04/2017.



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Health Sciences Research Ethics Committee

30/04/2015

Approval Certificate
New Application

Ethics Reference No.: 95/2015

Title: Evaluating the impact of family physicians within the district health system of South Africa

Dear Dr Klaus von Pressentin

The **New Application** as supported by documents specified in your cover letter dated 4/03/2015 for your research received on the 4/03/2015, was approved by the Faculty of Health Sciences Research Ethics Committee on its quorate meeting of 29/04/2015.

Please note the following about your ethics approval:

- Ethics Approval is valid for 2 years
- Please remember to use your protocol number (**95/2015**) on any documents or correspondence with the Research Ethics Committee regarding your research.
- Please note that the Research Ethics Committee may ask further questions, seek additional information, require further modification, or monitor the conduct of your research.

Ethics approval is subject to the following:

- The ethics approval is conditional on the receipt of 8 monthly written Progress Reports, and
- The ethics approval is conditional on the research being conducted as stipulated by the details of all documents submitted to the Committee. In the event that a further need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.

We wish you the best with your research.

Yours sincerely

*** Kindly collect your original signed approval certificate from our offices, Faculty of Health Sciences, Research Ethics Committee, H W Snyman South Building, Room 2.33 / 2.34.*

Dr R Sommers; MBChB; MMed (Int); MPharMed.

Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

The Faculty of Health Sciences Research Ethics Committee complies with the SA National Act 61 of 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 and 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

☎ 012 354 1677 📠 0866516047 ✉ deepeka.behari@up.ac.za 🌐 <http://www.healthethics-up.co.za>
 📧 Private Bag X323, Arcadia, 0007 - 31 Bophelo Road, HW Snyman South Building, Level 2, Room 2.33, Gezina, Pretoria

C. PHRC AND DRC APPROVAL LETTERS

i. PHRC APPROVAL: WESTERN CAPE PROVINCE



STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 6857; fax: +27 21 483 9895
5th Floor, Norton Rose House, B Riebeeck Street, Cape Town, 8001
www.capegateway.gov.za

REFERENCE: WC_2015RP19_867
ENQUIRIES: Ms Charlene Roderick

Stellenbosch University
Private Bag X1
Matieland
7602

For attention: **Dr Klaus von Pressentin and Prof Bob Mash**

Re: EVALUATING THE IMPACT OF FAMILY PHYSICIANS WITHIN THE DISTRICT HEALTH SYSTEM OF SOUTH AFRICA

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research. Please contact the following people to assist you with any further enquiries in accessing the following sites:

Details removed to ensure anonymity

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (annexure 9) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za)
3. The reference number above should be quoted in all future correspondence.

Yours sincerely



Dr A Hawkrige

DR A HAWKRIDGE
DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 14/5/2015

CC L PHILLIPS
H SCHUMANN
A PATENTIA
P OLCKERS
G PEREZ
K GRAMMER
W KAMFER

DIRECTOR: CAPE WINELAND
DIRECTOR: EDEN& CENTRAL KARO
DIRECTOR: NORTHERN/ TYGERBERG
DIRECTOR: KLIPFONTEIN/ MITCHELLS PLAIN
ACTING DIRECTOR: EASTERN/ KHAYELITSHA
DIRECTOR: SOUTHERN/ WESTERN
DIRECTOR: OVERBERG

ii. PHRC APPROVAL: KWAZULU-NATAL PROVINCE



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel.: 033 – 3953189
Fax.: 033 – 394 3782
Email.: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 034/15
NHRD: KZ_2015RP21_947
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Dr Klaus Botho von Presentin

Subject: Approval of a Research Proposal

1. The research proposal titled 'Evaluating the impact of family physicians within the district health system of South Africa' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken in all districts.

2. You are requested to take note of the following:
 - a. Make the necessary arrangement with the identified facility before commencing with your research project.
 - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

Dr E Lutge


Chairperson, Health Research Committee

Date: 23/02/15

uMnyango Wezempilo . Departement van Gesondheid

Fighting Disease, Fighting Poverty, Giving Hope

iii. PHRC APPROVAL: FREE STATE PROVINCE



health
Department of
Health
FREE STATE PROVINCE

22 May 2015

Dr Von Pressentin
University of Stellenbosch


Dear Dr K Von Pressentin

Subject: Evaluate the impact of family physicians within the district health system of South Africa.

- Permission is hereby granted for the above – mentioned research on the following conditions:
- Participation in the study must be voluntary.
- A written consent by each participants must be obtained and participants to consent recording of the interviews.
- Ascertain that your data collection exercise neither interferes with the day to day running of the facility nor the performance of duties by the respondents or health care workers.
- Confidentiality of information will be ensured and no names will be used.
- Research results and a complete report should be made available to the Free State Department of Health on completion of the study (a hard copy plus a soft copy).
- Progress report must be presented not later than one year after approval of the project to the Ethics Committee of the University of the Stellenbosch and to Free State Department of Health.
- Any amendments, extension or other modifications to the protocol or investigators must be submitted to the Ethics Committee of the University of the Stellenbosch and to Free State Department of Health.
- Conditions stated in your Ethical Approval letter should be adhered to and a final copy of the Ethics Clearance Certificate should be submitted to khusenj@fshhealth.gov.za or sibocelats@fshhealth.gov.za before you commence with the study
- No financial liability will be placed on the Free State Department of Health
- Please discuss your study with the institution managers/CEOs on commencement for logistical arrangements
- Department of Health to be fully indemnified from any harm that participants and staff experiences in the study
- Researchers will be required to enter in to a formal agreement with the Free State department of health regulating and formalizing the research relationship (document will follow)
- You are encouraged to present your study findings/results at the Free State Provincial health research day
- Future research will only be granted permission if correct procedures are followed see <http://nhrd.fst.org.za>

Trust you find the above in order.

Kind Regards




Dr D Motau
HEAD: HEALTH
Date: 28/05/2015

Head : Health
PO Box 227, Bloemfontein, 9300
4th Floor, Executive Suite, Baphelo House, cnr Maitland and, Harvey Road, Bloemfontein
Tel: (051) 408 1646 Fax: (051) 408 1556 e-mail khusenj@fshhealth.gov.za/sibocelats@fshhealth.gov.za/chibovup@fshhealth.gov.za

www.fs.gov.za

iv. PHRC APPROVAL: NORTHERN CAPE PROVINCE



DEPARTMENT OF HEALTH
LEFAPHA LA BOITEKANELO
ISEBE LEZEMPILO
DEPARTEMENT VAN GESONDHEID

Department of Health
Private Bag X5049
KIMBERLEY
8301

Enquiries :
Dipatlisiso :
Imbuzo :
Navrae :
Reference :
Tshupeto :
Isalathiso :
Verwydings :

Dr. Eshetu Worku
Tel: 053 830 2122
Fax: 086 541 7122

Date :
Letsho :
Umhla :
Datum :

25 June 2015

Dr. KB von Pressentin
Division of Family Medicine and Primary Care
Faculty of Medicine and Health Sciences
Stellenbosch University
P.O. Box 19063
Tygerberg, 7505

Dear Dr. KB von Pressentin

TITLE: Evaluating the impact of family physicians within the district health system of South Africa.

Reference Number: NC2015RP11 168


The application to conduct the study was received and has been reviewed by the Provincial Health Research and Ethics Committee (PHREC)

Approval is hereby granted to conduct the above-mentioned study in the Northern Cape Province

Please note: This approval is valid for a period of one year from the date of approval.

The following conditions have to be noted:

1. The research project shall be conducted at no cost to the Northern Cape Department of Health.
2. The approval is limited to the research proposal as submitted in the application.
3. Variation or modification on the research must be notified formally to PHREC for further consideration.
4. The PHREC may monitor the project at any time.



We are committed to achieving our vision through a decentralized, accountable, accessible and constantly improving health care system within available resources. Our caring, multi-skilled, effective personnel will use evidence-based, informative health care and maturing partnerships for the benefit of our clients and patients.

5. A six months progress report should be submitted to the PHREC
6. At the completion of your study a copy of the final report must be submitted to the Research and Development Directorate.
7. The Northern Cape Senior Management Committee will be briefed on the outcome of the study prior to publishing.

Furthermore, after the completion of you project, you may be requested to do a presentation on the final findings of your study.

The committee wishes you success on your study

Yours Faithfully


Dr. Eshetu Worku
Chairperson: PHREC
E-mail: eworku@ncpg.gov.za
Tel: 053 830 2122
Fax: 086 541 7122

25/06/2015
Date

v. PHRC APPROVAL: GAUTENG PROVINCE**GAUTENG PROVINCE**HEALTH
REPUBLIC OF SOUTH AFRICA**OUTCOME OF PROVINCIAL PROTOCOL REVIEW COMMITTEE (PPRC)**

Researcher's Name (Principal Investigator)	Dr Klaus von Pressentin
Organization / Institution	Stellenbosch University
Research Title	Evaluating the impact of family physicians within the district health system of South Africa.
Contact number	Contact no: 0219389109 Cell: 0 714016868 Email: kvonpressentin@sun.ac.za
Protocol number	GP 2015RP12 549
Date submitted	25/06/2015
Date reviewed	30 July 2015
Outcome	APPROVED

It is a pleasure to inform that the Gauteng Health Department has approved your research on "Protocol Title: Evaluating the impact of family physicians within the district health system of South Africa, study should be conducted at the following districts; Tshwane Metsweding, Ekurhuleni, West Rand and Sedibeng.

The Provincial Protocol Review Committee kindly requests that you to submit a report after completion of your study and present your findings to the Gauteng Health Department.

Recommended

Dr B Ikalafeng (on behalf of PPRC)

Date

03/08/2015

Approves/ not approves

Dr R Lebethe
Acting DDG: Hospital Services

Date

05 08 2015

vi. PHRC APPROVAL: NORTH WEST PROVINCE



POLICY, PLANNING, RESEARCH, MONITORING AND EVALUATION

Name of researcher : Dr K Von Presentin
Stellenbosch University


Physical Address _____
(Work/ Institution) _____

Subject : Research Approval Letter- Evaluating the impact of family
physicians within the District Health Systems of South Africa.

This letter serves to inform the Researcher that permission to undertake the above mentioned study has been granted by the North West Department of Health. The Researcher is expected to arrange in advance with the chosen facilities, and issue this letter as proof that permission has been granted by the Provincial office.

This letter of permission should be signed and a copy returned to the department. By signing, the Researcher agrees, binds him/herself and undertakes to furnish the Department with an electronic copy of the final research report. Alternatively, the Researcher can also provide the Department with electronic summary highlighting recommendations that will assist the department in its planning to improve some of its services where possible. Through this the Researcher will not only contribute to the academic body of knowledge but also contributes towards the bettering of health care services and thus the overall health of citizens in the North West Province.

Kindest regards



Dr. FRM Reichel
Director: PPRM&E

14/02/2015
Date

Researcher

Date

vii. PHRC APPROVAL: MPUMALANGA PROVINCE



Department of Health
Mpumalanga Provincial Government

Building No. 3, No. 7 Government Boulevard, Riverside Park Extension 2, Mbombela, 1200, Mpumalanga
Private Bag X 11285, Mbombela 1200, Tel: 013 766 3429, int: +27 13 766 3429, Fax: 013 766 3459, int: +27 13 766 3459

Litiko Letemphilo Umnyango WezaMaphilo Departement van Gesondheid

Enquiries: Themba Mulungo (013) 766 3511

02 July 2015

Dr. Klaus von Pressentin
P.O Box 241
Cape Town
0008

Dear Dr. Klaus von Pressentin

**APPLICATION FOR RESEARCH & ETHICS APPROVAL: EVALUATING THE IMPACT OF
FAMILY PHYSICIANS WITHIN THE DISTRICT HEALTH SYSTEM OF SOUTH AFRICA**

The Provincial Health Research and Ethics Committee has approved your research proposal in the latest format that you sent.

PHREC REF: MP_2015RP43_146

Kindly ensure that you provide us with the soft and hard copies of the report once your research project has been completed.

Kind regards


MR. MOLEFE MACHABA
RESEARCH AND EPIDEMIOLOGY

02/07/2015
DATE



viii. DRC APPROVAL: JOHANNESBURG DISTRICT RESEARCH COUNCIL

Form 2



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA



a world class African city

JOHANNESBURG HEALTH DISTRICT

Enquiries:
Johannesburg_research@gmail.com
coralF@joburg.org.za

02/11/2015

Klaus von Pressentin
UNIV. OF PRETORIA
E-mail: kvonpressentin@sun.ac.za

Reference no: 2015-16/007

Dear Klaus von Pressentin,

Re: Study protocol: *Evaluating the impact of family physicians within the district health system of South Africa.*

Your application the above approval project refers. The District Research Committee has reviewed your application. This letter serves as an in-principle approval to access the Districts Health facilities (mentioned below) for the above project, subject to following conditions:

Details removed to ensure anonymity

- This facility will be visited from 02 November 2015 to 30 April 2016.
- Please contact the Regional Health Managers (Region D and G) prior to visiting the health facilities:

Regional Health Managers	Contact no	Cell phone
Ms Morwa Molebatsi	011-933-0054	082-413-4809
Mr Peter Mathole	011-440-1231	082-772-0582
Ms Zaye Suleiman	011-213-9602	082-854-2298

- You will report to the Facility managers of the Clinic before initiating the study.
- Participants' rights and confidentiality will be maintained all the time.
- No resources (Financial, material and human resources) from the above facilities will be used for the study. Neither the District nor the facility will incur any additional cost for this study.
- The study will comply with Publicly Financed Research and Development Act, 2008 (Act 51 of 2008) and its related Regulations.
- You will submit a copy (electronic and hard copy) of your final report. In addition, you will submit a six-monthly progress report to the District Research Committee. Your supervisor and University of the Witwatersrand will ensure that these reports are being submitted timeously to the District Research Committee.
- The District must be acknowledged in all the reports/publications generated from the research and a copy of these reports/publications must be submitted to the District Research Committee.

- We reserve our right to withdraw our approval, if you breach any of the conditions mentioned above.

Please feel free to contact us, if you have any further queries. On behalf of the District Research Committee, we would like to thank you for choosing our District to conduct such an important study.

Regards,



Ms M. Morewana
Chief Director
Johannesburg Health district

ix. DRC APPROVAL: TSHWANE RESEARCH COUNCIL



Kuyasheshwal Gauteng Working Better

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

427 Hilda Street, 4th floor, The Fields Building, Hatfield Pretoria 0001 South Africa. Tel: +27 12 451 9036
Enquiries: Dr. Molapane Chueu-Shabangu
e-mail: Molapane.Shabangu@gauteng.gov.za

TSHWANE RESEARCH COMMITTEE

CLEARANCE CERTIFICATE

Meeting: N/A

PROJECT NUMBER: 52/2015

Title: Evaluating the impact of family physicians within the district health systems of South Africa

Researcher: Dr Klaus von Pressentin

Supervisor: Prof Bob Mash

Co-Supervisor:

Department: Faculty of Medicine and Health Sciences, Family Medicine and Primary care

DECISION OF THE COMMITTEE

Approved

NB: THIS OFFICE REQUESTED A FULL REPORT ON THE OUTCOME OF THE RESEARCH DONE

Date: 10/11/15

Dr. Molapane Chueu-Shabangu
Chairperson Tshwane Research Committee
Tshwane Health District

Mr. Pitsi Mothomone
Chief Director: Tshwane District Health
Tshwane District

NOTE: Resubmission of the protocol by researcher(s) is required if there is departure from the protocol procedures as approved by the committee.

D. CONSENT FORMS

i. Consent form for Article 1

Article 1: The perceived impact of family physicians on the district health system in South Africa: a cross-sectional survey.

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

For completion by the participating family physician.

(The consent form for respondents is included in the Family Physician Impact Assessment Tool).

TITLE OF THE RESEARCH PROJECT: Evaluating the impact of family physicians within the district health system of South Africa

HREC REFERENCE NUMBER: S15/01/003 (Stellenbosch University)

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin

ADDRESS: Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences, Stellenbosch University, PO Box 19063, Tygerberg 7505, South Africa

CONTACT NUMBER: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff or doctor any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

This research project aims to provide answers to the question: what is the impact of family physicians within the District Health System of South Africa? The research will be submitted as a scientific article to a peer-reviewed journal and will contribute to a PhD degree.

Since the introduction of family physicians in the DHS, there are still questions regarding the impact of family physicians and what exactly their role is or should be. This study aims to partly address these questions and is itself part of a larger national research project (funded by the European Union's EuropeAid), which intends to evaluate the impact of family physicians within the district health system. The national project is titled "Strengthening primary health care through primary care doctors and family physicians" and consists of **four** complementing research activities:

- A cross-sectional observational study comparing facilities with family physicians to matched facilities without family physicians.
- Evaluation of the impact of family physicians based on a 360-degree evaluation by their co-health workers (**represented by this study**).

- Evaluation of the impact of family physicians per population on key health indicators for health system performance, clinical processes and health outcomes.
- Qualitative evaluation of the impact of family physicians based on in-depth interviews with district managers.

The objectives of this study are to describe the perceived impact of family physicians in terms of their six roles within the District Health System, compare the perceptions regarding the difference in impact between family physicians and medical officers, compare the perceptions according to different districts, compare perceptions between urban and rural districts, compare perceptions between district hospitals and community health centres, and compare self-perceived impact of family physicians with the perceptions of the respondents in their work environment.

All the family physicians employed in the District Health System (public health sector) of the seven South African provinces (determined by the provincial footprint of the respective family medicine academic departments who are part of the national project) will be invited to participate in this study.

Why have you been invited to participate?

You have been invited because of your employment as family physician in the District Health System (public health sector) in one of the following provinces: Western Cape, Northern Cape, Free State, Gauteng, North West, Free State, KwaZulu-Natal and Mpumalanga.

What will your responsibilities be?

Participants from your work environment will be invited to complete the 360-degree validated tool (Family Physician Impact Assessment Tool). They will indicate how they perceive the impact you are making in the 6 roles of the family physician.

Each participating family physician will also be asked to complete the tool, as well as assist the research team in conducting the fieldwork at your facility. The research will only be conducted at your facility if you consent to the 360-degree evaluation by your co-workers.

The research team will identify at least 25 to 30 respondents in your work context, including managers, doctors, nurses and allied health workers. Respondents will be randomly selected from this list by the researcher.

These respondents will be invited to complete the tool. A study code will be assigned to each facility and family physician. This study code will appear on the tool (your name will not appear on the tool). The completed questionnaires will be collected at each facility in a sealed ballot box in a neutral area (for example, HR office) and returned to the researchers.

Will you benefit from taking part in this research?

There will be no financial gain from participating in this research.

This research may offer benefit to the future role of all family physicians and their discipline in South Africa.

The combined findings of the national project will carry a greater weight and offer more scientific and social value.

A collective report per district or province will be available for the district of provincial family physician forum meeting. This report may be discussed at the forum and may guide reflection on future development as individuals and as a group.

Are there risks involved in your taking part in this research?

There is risk to the family physician in that they may feel threatened or intimidated by such an evaluation process and it may impact negatively on their interpersonal relationships and their functioning within the health team. Thus confidentiality will be preserved and family physicians will not need to fear being publically criticised or evaluated.

Those involved in evaluating the family physicians (the respondents) are also at risk as they share information that could jeopardise relationships. They will therefore remain anonymous and information will be protected so that they can answer honestly without fear of reprisal from their colleagues.

If you do not agree to take part, what alternatives do you have?

Participation is completely voluntary and your choice to participate or not will be respected by the research team.

Who will have access to your questionnaire results?

The information collected will be treated as confidential and protected. When used in an aggregated report, published article or project report, the identity of the participant will remain anonymous. Only the research team will have access to the questionnaires and study codes will be allocated to each participating family physician to preserve anonymity during the data entry and analysis.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact Dr Von Pressentin (tel 071 401 68686) if you have any further queries or encounter any problems.

You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.

You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I agree to take part in a research study entitled: **Evaluating the impact of family physicians within the district health system of South Africa.**

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.

I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)

Signature of participant

Signature of witness

Declaration by investigator

I (*name*) declare that:

I explained the information in this document to

I encouraged him/her to ask questions and took adequate time to answer them.

I am satisfied that he/she adequately understands all aspects of the research, as discussed above

I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) on (*date*)

Signature of investigator

Signature of witness

Declaration by interpreter

I (*name*) declare that:

I assisted the investigator (*name*) to explain the information in this document to (*name of participant*) using the language medium of Afrikaans/Xhosa/Other language:.....

We encouraged him/her to ask questions and took adequate time to answer them.

I conveyed a factually correct version of what was related to me.

I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) on (*date*)

Signature of interpreter

Signature of witness

ii. Consent form for Article 2

Article 2: The bird's-eye perspective: how do district health managers experience the impact of family physicians within the South African district health system? A qualitative study.

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

For completion by the participating district manager.

TITLE OF THE RESEARCH PROJECT: Evaluating the impact of family physicians within the district health system of South Africa

HREC REFERENCE NUMBER: S15/01/003 (Stellenbosch University)

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin

ADDRESS: Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences, Stellenbosch University, PO Box 19063, Tygerberg 7505, South Africa

CONTACT NUMBER: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

Dear Colleague,

My name is Klaus von Pressentin and I would like to invite you to participate in a research project that aims to investigate the impact of family physicians on health outcomes, clinical processes and health system performance in South Africa.

Please take some time to read the information presented here, which will explain the details of this project and contact me if you require further explanation or clarification of any aspect of the study. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee (HREC) at Stellenbosch University** and will be conducted according to accepted and applicable National and International ethical guidelines and principles, including those of the international Declaration of Helsinki October 2008.

I would like to interview you because as a health manager (director or chief director) you have first-hand insight into the impact of family physicians and other recent interventions on services and health outcomes in your district. The interview will last 30-60 minutes and will be audio recorded and transcribed. Your views will be included in the analysis and reporting, but your identity will not be divulged. Your confidentiality will therefore be respected. The recording and transcription will be kept privately and secure by members of the research team. Once an accurate transcription is obtained the recording will be destroyed. The interview transcripts will be included in a national study, evaluating the impact of family physicians on the District Health System (DHS) in the South Africa (this national study is funded by the European Union). The research will be submitted as a scientific article to a peer-reviewed journal and will contribute to a PhD degree.

If you are willing to participate in this study please sign the attached Declaration of Consent and hand it to the investigator.

Yours sincerely, **Dr Klaus B von Pressentin** (Principal Investigator)

Declaration by participant

By signing below, I agree to take part in a research study entitled **Evaluating the impact of family physicians within the district health system of South Africa.**

I declare that:

I have read the attached information leaflet and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.

I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) On (*date*)

Signature of participant

iii. Consent forms for Article 3

Article 3: Measuring the influence of family physicians within the South African district health system: a cross-sectional observational study.

a. Completed by staff and managers at participating district hospitals

TITLE OF THE RESEARCH PROJECT: Evaluating the impact of family physicians within the district health system of South Africa

HREC REFERENCE NUMBER: S15/01/003 (Stellenbosch University)

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin

ADDRESS: Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences, Stellenbosch University, PO Box 19063, Tygerberg 7505, South Africa

CONTACT NUMBER: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff or doctor any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is entirely voluntary and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

This research project aims to provide answers to the question: what is the impact of family physicians within the District Health System of South Africa? The research will be submitted as a scientific article to a peer-reviewed journal and will contribute to a PhD degree.

Since the introduction of family physicians in the DHS, there are still questions regarding the impact of family physicians and what exactly their role is or should be. This study aims to partly address these questions and is itself part of a larger national research project (funded by the European Union's EuropeAid), which intends to evaluate the impact of family physicians within the district health system. The national project is titled "Strengthening primary health care through primary care doctors and family physicians" and consists of four complementing research activities:

- A cross-sectional observational study comparing facilities with family physicians to matched facilities without family physicians (**represented by this study**).
- Evaluation of the impact of family physicians based on a 360-degree evaluation by their co-health workers.
- Evaluation of the impact of family physicians per population on key health indicators for health system performance, clinical processes and health outcomes.
- Qualitative evaluation of the impact of family physicians based on in-depth interviews with district managers.

The purpose of this section of the study (cross-sectional observational study) is to evaluate the impact of family physicians at both primary care facilities and district hospitals (in terms of health system performance and clinical processes).

For this cross-sectional observational study, 30 district hospitals and 30 Primary Care Facilities will be selected across the following 7 provinces: Western Cape, Northern Cape, Gauteng, North West, Free State, KwaZulu-Natal and Mpumalanga.

Intervention facilities (with family physicians) will be randomly selected and purposively matched to control facilities without family physicians.

At the district hospitals, the researchers will complete a fieldwork tool, which consists of the following tools: signal functions tool, Domain 2 of the National Core Standards tool, and the Child and Perinatal Problem Identification Programmes tools. (A modified set of tools will be used for primary care facilities.)

The research team plan to talk directly with facility managers and practitioners / providers (clinical nurse practitioners and primary care doctors) about their experiences providing care in district hospitals (specifically regarding the range of signal functions).

Why have you been invited to participate?

You have been invited because of your employment at a district hospital identified within the District Health System (public health sector) in one of the following provinces: Western Cape, Northern Cape, Gauteng, North West, Free State, KwaZulu-Natal and Mpumalanga.

What will your responsibilities be?

Practitioners and facility managers in the district hospital are invited to be interviewed. You will be interviewed by a member of the research team. The interview will take approximately 30 minutes.

The facility manager will also be asked to provide access to the facility to the research team.

Will you benefit from taking part in this research?

There will be no financial gain from participating in this research.

This research may offer benefit to the future role of all family physicians and their discipline in South Africa.

The combined findings of the national project will carry a greater weight and offer more scientific and social value.

Are there in risks involved in your taking part in this research?

There are no risks to you in this study but the interview will require some of your time.

If you do not agree to take part, what alternatives do you have?

Participation is completely voluntary and your choice to participate or not will be respected by the research team.

Who will have access to your questionnaire results?

The information collected will be treated as confidential and protected. When used in an aggregated report, published article or project report, the identity of the participant will remain anonymous. Only the research team will have access to the questionnaires and study codes will be allocated to each facility to preserve anonymity during the data entry and analysis.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact Dr Von Pressentin (tel 071 401 68686) if you have any further queries or encounter any problems.

You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.

You will receive a copy of this information and consent form for your own records.

MANAGER / PROVIDER PARTICIPANT CONSENT

F.Mngr/Practitioner code |__|__|__| Interviewer code |__|__|__| Interviewer Case no |__|__|__|

Designation: 1 Medical Officer 2 Family Physician 3 Nurse practitioner
 4 Manager 5 Other (Please specify): _____

Declaration by participant

By signing below, I agree to take part in a research study entitled:
Evaluating the impact of family physicians within the district health system of South Africa.

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is voluntary and I have not been pressurised to take part.

I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)

Signature of participant

Signature of witness

Declaration by investigator

I (*name*) declare that:

I explained the information in this document to

I encouraged him/her to ask questions and took adequate time to answer them.

I am satisfied that he/she adequately understands all aspects of the research, as discussed above

I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) on (*date*)

Signature of investigator

Signature of witness

Declaration by interpreter

I (*name*) declare that:

I assisted the investigator (*name*) to explain the information in this document to (*name of participant*) using the language medium of Afrikaans/Xhosa/Other language:.....

We encouraged him/her to ask questions and took adequate time to answer them.

I conveyed a factually correct version of what was related to me.

I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) on (*date*)

Signature of interpreter

Signature of witness

b. Completed by staff and managers at participating primary care facilities

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT: Evaluating the impact of family physicians within the district health system of South Africa

HREC REFERENCE NUMBER: S15/01/003 (Stellenbosch University)

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin

ADDRESS: Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences, Stellenbosch University, PO Box 19063, Tygerberg 7505, South Africa

CONTACT NUMBER: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff or doctor any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is entirely voluntary and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

This research project aims to provide answers to the question: what is the impact of family physicians within the District Health System of South Africa? The research will be submitted as a scientific article to a peer-reviewed journal and will contribute to a PhD degree.

Since the introduction of family physicians in the DHS, there are still questions regarding the impact of family physicians and what exactly their role is or should be. This study aims to partly address these questions and is itself part of a larger national research project (funded by the European Union's EuropeAid), which intends to evaluate the impact of family physicians within the district health system. The

national project is titled “Strengthening primary health care through primary care doctors and family physicians” and consists of four complementing research activities:

- A cross-sectional observational study comparing facilities with family physicians to matched facilities without family physicians (**represented by this study**).
- Evaluation of the impact of family physicians based on a 360-degree evaluation by their co-health workers.
- Evaluation of the impact of family physicians per population on key health indicators for health system performance, clinical processes and health outcomes.
- Qualitative evaluation of the impact of family physicians based on in-depth interviews with district managers.

The purpose of this section of the study (cross-sectional observational study) is to evaluate the impact of family physicians at both primary care facilities and district hospitals (in terms of health system performance and clinical processes).

For this cross-sectional observational study, 30 district hospitals and 30 Primary Care Facilities will be selected across the following 7 provinces: Western Cape, Northern Cape, Gauteng, North West, Free State, KwaZulu-Natal and Mpumalanga.

Intervention facilities (with family physicians) will be randomly selected and purposively matched to control facilities without family physicians.

At the primary care facilities, the researchers will complete a fieldwork tool, which consists of the following tools: PCAT (Primary Care Assessment Tool) and audit of non-communicable chronic conditions. A modified set of tools will be used for district hospitals.

The research team plan to talk directly with facility / practice managers and primary care practitioners / providers (clinical nurse practitioners and primary care doctors) about their experiences providing comprehensive primary care in primary care facilities. Patients, practitioners and facility managers are being interviewed about their experiences receiving, providing and managing health care.

The study is not assessing your performance. The questions in the PCAT are about the presence and utilisation of universally accepted features of primary care practice. A good overview of these can be found in the following reference: *Starfield B. Primary care tomorrow: Is primary care essential?. The Lancet. 1994;344:1129-33.*

Why have you been invited to participate?

You have been invited because of your employment at a Primary Care Facility (Community Health Centre) identified within the District Health System (public health sector) in one of the following provinces: Western Cape, Northern Cape, Gauteng, North West, Free State, KwaZulu-Natal and Mpumalanga.

What will your responsibilities be?

All the practitioners and facility managers in the Primary Care Facility are invited to be interviewed. You will be interviewed by a member of the research team. The interview will take approximately 30 minutes.

The facility manager will also be asked to provide access to the facility to the research team.

Will you benefit from taking part in this research?

There will be no financial gain from participating in this research.

This research may offer benefit to the future role of all family physicians and their discipline in South Africa.

The combined findings of the national project will carry a greater weight and offer more scientific and social value.

Are there in risks involved in your taking part in this research?

There are no risks to you in this study but the interview will require some of your time.

If you do not agree to take part, what alternatives do you have?

Participation is completely voluntary and your choice to participate or not will be respected by the research team.

Who will have access to your questionnaire results?

The information collected will be treated as confidential and protected. When used in an aggregated report, published article or project report, the identity of the participant will remain anonymous. Only the research team will have access to the questionnaires and study codes will be allocated to each facility to preserve anonymity during the data entry and analysis.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact Dr Von Pressentin (tel 071 401 68686) if you have any further queries or encounter any problems.

You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.

You will receive a copy of this information and consent form for your own records.

MANAGER / PROVIDER PARTICIPANT CONSENT

F.Mngr/Practitioner code |__|__|__| Interviewer code |__|__|__| Interviewer Case no |__|__|__|

Designation: 1 Medical Officer 2 Family Physician 3 Nurse practitioner
4 Manager 5 Other (Please specify): _____

Declaration by participant

By signing below, I agree to take part in a research study entitled:
Evaluating the impact of family physicians within the district health system of South Africa.

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is voluntary and I have not been pressurised to take part.

I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)

Signature of participant

Signature of witness

Declaration by investigator

I (*name*) declare that:

I explained the information in this document to

I encouraged him/her to ask questions and took adequate time to answer them.

I am satisfied that he/she adequately understands all aspects of the research, as discussed above

I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) on (*date*)

Signature of investigator

Signature of witness

Declaration by interpreter

I (*name*) declare that:

I assisted the investigator (*name*) to explain the information in this document to (*name of participant*) using the language medium of Afrikaans/Xhosa/Other language:.....

We encouraged him/her to ask questions and took adequate time to answer them.

I conveyed a factually correct version of what was related to me.

I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) on (*date*)

Signature of interpreter

Signature of witness

c. Completed by patients at participating primary care facilities

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT: Evaluating the impact of family physicians within the district health system of South Africa

HREC REFERENCE NUMBER: S15/01/003 (Stellenbosch University)

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin

ADDRESS: Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences, Stellenbosch University, PO Box 19063, Tygerberg 7505, South Africa

CONTACT NUMBER: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

You are invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the research team or doctor any questions about any part of this project that you do not fully understand.

What is RESEARCH?

Research is something we do to find new knowledge about the way things (and people) work. We use research projects or studies to help us find out more about disease or illness. Research also helps us to find better ways of helping, or treating people who are sick.

What is this research study all about?

This research project aims answer the question: what is the impact of family physicians within the District Health System of South Africa?

Family physicians are specialist doctors who work in senior posts at primary care facilities (clinics and community health centres). They are responsible to lead the health team who treat patients. They also help to treat patients with difficult problems.

The District Health System is the part of the health service which looks after the health needs of communities. Most patients receive treatment in this part of the Department of Health, which includes clinics and district hospitals.

We are doing this research to learn how these senior doctors (family physicians) help their teams to do their job in treating patients and communities.

Why have you been invited to take part in this research project?

A member of the research team will talk to patients who visit clinics selected for the study. We would like to learn about your experience at this clinic.

You have been invited because of your visited a Primary Care Facility (Community Health Centre or clinic) as a *patient* in one of the following provinces: Western Cape, Northern Cape, Gauteng, North West, Free State, KwaZulu-Natal and Mpumalanga.

What will your responsibilities be?

A member of the research team will ask you to talk with them for about 30 minutes.

Will you benefit from taking part in this research?

This research aims to help improve the service provided to patients and communities. By helping us with the research, you will make a difference in how health teams help their patients. You will not receive any direct award or special treatment.

Are there in risks involved in your taking part in this research?

There are no risks to you in this study but the interview will require some of your time.

Your treatment will not be changed by talking to the research team.

If you do not agree to take part, what alternatives do you have?

Participation is completely voluntary and your choice to participate or not will be respected by the research team.

Who will have access to your questionnaire results?

The information collected will be protected. Your name will be protected (you will remain anonymous). Only the research team will have access to the information we collect.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact Dr Von Pressentin (Tel 071 401 68686) if you have any further queries or encounter any problems.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University. You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by the research team.

You will receive a copy of this information and consent form for your own records.

PATIENT PARTICIPANT CONSENT

Patient code |__|__|__| **Interviewer code** |__|__|__| **Interviewer Case no** |__|__|__|

Declaration by participant

By signing below, I agree to take part in a research study entitled:
Evaluating the impact of family physicians within the district health system of South Africa.

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is **voluntary** and I have not been pressurised to take part. I understand this research study and am willing to take part in it.

I may choose to pull out of the study at any time. I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)

Signature of participant

Signature of witness

Declaration by investigator

I (*name*) declare that:

I explained the information in this document to

I encouraged him/her to ask questions and took adequate time to answer them.

I am satisfied that he/she adequately understands all aspects of the research, as discussed above

I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) on (*date*)

Signature of investigator

Signature of witness

Declaration by interpreter

I (*name*) declare that:

I assisted the investigator (*name*) to explain the information in this document to (*name of participant*) using the language medium of Afrikaans/Xhosa/Other language:.....

We encouraged him/her to ask questions and took adequate time to answer them.

I conveyed a factually correct version of what was related to me.

I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) on (*date*)

Signature of interpreter

Signature of witness

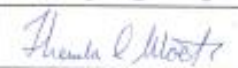
E. MEMORANDA OF UNDERSTANDING

i. MOU: Health Systems Trust

COLLABORATION AGREEMENT

(for European Union Grant Contract DCI-AFS/2013/336-452)

Between

STELLENBOSCH UNIVERSITY ("Coordinator")	
Physical Address	RW Wilcocks Building, Room 2037, Cnr Ryneveld & Victoria Street, Stellenbosch, 7600, South Africa
Postal Address	Private Bag X1, Matieland, Stellenbosch, 7602, South Africa
Telefax Number	+27 (0)21 808 4537
Telephone Number	+27 (0)21 808 2187
Contact Person for Contractual matters	Research Development: Mark Mulder mmulder@sun.ac.za
Contact Person: Project and financial related matters	Prof Bob Mash bm@sun.ac.za
Signature who warrants that s/he is duly authorised to sign	
Name	Prof NC Gey Van Pittius
Position	Deputy Dean Research: Faculty of Medicine & Health Sciences
Date	14/10/2014 and
Health Systems Trust (HST) ("Collaborating Partner")	
Physical Address	34 Essex Terrace, Westville, 3061
Postal Address	P O Box 808, Durban, 4000
Telefax Number	031 299 9199
Telephone Number	031 299 9090
Contact Person	Dr René English
Email Address	Rene.english@hst.org.za
Signature who warrants that s/he is duly authorized to sign	
Name	Dr Themba Moeti
Position	Chief Executive Officer
Date	12 December 2014
Project title: Strengthening primary health care through primary care doctors and family physicians	Project Leader: Prof Bob Mash Department: Division of Family Medicine and Primary Care SU Contract number: S003502

1. INTRODUCTION**1.1 The organisations**

HST - Health Systems Trust

SU – Stellenbosch University: The Division of Family Medicine and Primary Care at Stellenbosch University is the Applicant and Coordinator in the Project "Strengthening primary health care through primary care doctors and family physicians", which is funded by a grant from the European Union. (EuropeAid/134286/L/ACT/ZA).

1.2 The project

The Table below gives an overview of the whole Project to which the collaboration detailed in this agreement will contribute.

Project title:	Strengthening primary health care through primary care doctors and family physicians
Implementing organisation	Stellenbosch University
Partners (=co-applicants, associates, affiliates)	Departments of Family Medicine and Primary Care at University of Limpopo, University of Kwa-Zulu Natal, Pretoria University, University of Witwatersrand, Free State University, Walter Sisulu University, University of Cape Town, University of Ghent (Belgium). South African Academy of Family Physicians, South African College of Family Physicians, Royal College of General Practitioners (UK).
Location(s) of the project:	South Africa (mainly in Western Cape, Gauteng, Kwa-Zulu Natal, Limpopo, North-West, Eastern Cape, Free State Provinces)
Total duration of project:	30 months (from 1-3-2014 until 31-8-2016)
Objectives of the project	To strengthen primary health care through capacity building of primary care doctors and family physicians <ul style="list-style-type: none"> i) To build the capacity of primary care doctors and family physicians to function in support of community-based primary care teams and to improve the quality of PHC services ii) To build the capacity of family physicians to offer effective leadership and clinical governance to PHC facilities iii) To evaluate the contribution of family physicians to strengthening district health services
Target group(s)	Primary care doctors and family physicians
Final beneficiaries	Communities served by primary health care teams
Estimated results	i) A new nationally designed Diploma level training programme to up-skill and re-orientate existing primary care doctors. ii) The quality of and number of family physicians available to the country is increased iv) All family physicians involved in the clinical training of registrars are trained for

Theresa L. Moots

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	<p>this specific role</p> <p>iii) That all family physicians involved in assessment are trained for this specific role and that the quality of assessment in the national exit exam is improved</p> <p>v) That all MMed training programmes for family physicians include a new module on clinical leadership and governance</p> <p>vi) An applied research project on the impact and benefits of family physicians in the district health system that is completed and the results disseminated</p>
Main activities	<p>1) Designing, developing and implementing a national Diploma level training for existing primary care doctors, from either the private or public sector, to enable them to better support the ward-based primary care teams and to offer services commensurate with the government's PHC revitalisation programme</p> <p>2) To provide training in clinical supervision/training and in assessment for all family physician training programmes</p> <p>3) To develop a national training module on leadership and clinical governance for family physicians that is incorporated into all training programmes</p> <p>4) To evaluate the impact and benefits of family physicians within the district health system.</p>

2. Purpose of this Agreement

The purpose of this Agreement is to clarify the collaboration arrangements between SU and HST.

3. Activities

SU and HST will collaborate on the following activities:

Project activity 3: To develop a national training module on leadership and clinical governance for family physicians that is incorporated into all training programmes:

- HST will participate in the planned stakeholder workshop in 2015

Project activity 4: To evaluate the impact of family physicians within the district health system. This activity is conceptualized as an applied research project which will be conducted by Dr Klaus von Pressentin for his PhD under the supervision of Prof Bob Mash. The project has 4 components: Interviews with district managers; 360-degree evaluation of family physicians; a quasi-experimental study; and an analysis of nationally collected district level data. The collaboration will focus on the last component which aims to analyse the relationship between the number of family physicians per 10,000 population in each district and selected indicators of their impact in the areas of health system performance, clinical processes and health outcomes (see full proposal in appendix A). The collaboration will specifically involve:

- Technical assistance with the selection of suitable indicators
- Access to data from national datasets that are available to HST
- Interpretation of data analysis and reporting of results

4. Contribution to publications and reports

Dr Klaus von Pressentin will be the first author of articles used towards his PhD by publication (as per SU PhD regulations). Members from HST, who contribute to the study (according to journal author guidelines), will be eligible as co-authors in publications.

Professor Bob Mash and/or Dr Klaus von Pressentin and/or members of the SU team will make themselves available as authors/co-authors of HST-related publications that relate to this work (for example, District Health Barometer or South African Health Review) when invited by HST.

5. Coordination, roles and responsibilities

The project coordinator Professor Bob Mash will represent SU and designates Dr Klaus von Pressentin to be responsible for co-ordinating activities with HST on behalf of the Project.

Dr Rene English, from HST, will be responsible for coordinating activities with SU and fulfilling this Agreement.

6. Budget

Out of pocket expenses incurred in fulfilling the terms of the agreement, such as travel, may be reimbursed by SU. Responsibility for these expenses must be agreed to beforehand.

7. Intellectual property

The Parties may make certain of their background intellectual property available in order to facilitate and promote the Project. All background intellectual property will remain and constitute the sole and exclusive property of the Party that first provided it. The data shared with SU for the purposes of this collaboration cannot be used by SU for purposes other than for the Project and further academic research and teaching purposes without the written agreement of HST. The analysis and results of the research will be owned by SU and any intellectual property created by SU including but not limited to part of the doctoral thesis to be written by Dr Von Pressentin will vest in SU. Co-authorship in publications is dealt with in section 4. SU and HST specifically agree not to disclose any product of this collaboration to a third party without prior written agreement.

8. Entry into effect, amendment and termination

From the date of signing this Agreement shall be in effect for the duration of the Project period until 31-8-2016 and/or the completion of the research project. This Agreement can only be amended by mutual agreement. Either party may terminate this Agreement on 30 (thirty) days prior written notice to the other.

9. Consequential Losses.

In no event shall a Party or its personnel be liable to the other Party for any punitive, indirect, incidental, extrinsic, special or consequential loss (whether foreseeable or unforeseeable) of any kind that may arise in connection with this Agreement, whether based on contract, delict, statute or otherwise, save to the extent that the limitation of liability contained herein is not permitted by applicable Law.

Theresa O'Neel 3

10. Governing Law and jurisdiction

This Agreement shall be governed and construed according to the laws of the Republic of South Africa and the Parties agree to submit to the non-exclusive jurisdiction of the Western Cape High Court, Cape Town of South Africa.

10. Work plan and timelines

Proposed project Gantt chart

Activity	Partner	2014			2015								2016														
		August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	
Project activity 3 Leadership and clinical governance module	SU									Stakeholder workshop: dates and activities to be confirmed																	
	HST																										
Project activity 4 DEIS analysis	SU	Preparation phase		Collection of 2012/2013 data set			Analysis																				
	HST																										

MHIRD (National Health Information Repository and Data Warehousing) dataset available from National Department of Health: once available, submitted to HST's data cleaning processes prior to analysis for HST's publications (District Health Barometer's chapters written in July and publication launched in October).

Collaboration - EU Grant
Heinrich O. Albrecht

Confidential

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APPENDICES

A. Research proposal

Theresa L. Moots 3

ii. MOU: Dr Graham Bresick (UCT PCAT team)

30 March 2015

MEMORANDUM OF UNDERSTANDING REGARDING THE COLLABORATION WITH DR GRAHAM BRESICK (DIVISION OF FAMILY MEDICINE, SCHOOL OF PUBLIC HEALTH AND FAMILY MEDICINE, UCT) AND THE DIVISION OF FAMILY MEDICINE AND PRIMARY CARE, STELLENBOSCH UNIVERSITY: 1ST APRIL 2015 TO 30TH AUGUST 2016

Dr Klaus von Pressentin and Prof Bob Mash (Division of Family Medicine and Primary Care, University of Stellenbosch) will enter into an agreement with Dr Graham Bresick (Division of Family Medicine, UCT) to collaborate on a research project "Evaluating the impact of family physicians within the district health system of South Africa" as from 1st April 2015 until 30 August 2016. In terms of the collaboration Dr Bresick will:

1. Assist with the design of a quasi-experimental study in terms of the use, at selected primary care facilities, of the Primary Care Assessment Tool (PCAT) adapted for South African use by the UCT Division of Family Medicine (ZA PCAT and Training Manual 2013). This includes providing data from the Division's 2011 Cape Town PCAT study to assist with the sample size calculation for this research project. The PCAT-related outcome data will be used by Dr Von Pressentin as part of his PhD.
2. Provide training to Dr Von Pressentin and the research team/field workers, in order to conduct the facility-level PCAT-related field work to a sufficient standard (to ensure valid and reliable data).
3. Assist Dr Von Pressentin and Prof Mash with the interpretation of the PCAT-related data findings.
4. Any costs incurred by Dr Bresick on jointly agreed collaborative activities will be covered by the research project and will be discussed beforehand.
5. Both parties will access and sub-analyze the PCAT-related data from this research project. Any research outputs or publications derived from this will be discussed by the parties concerned and will follow accepted guidelines for authorship (e.g. <http://phcfm.org/index.php/phcfm/pages/view/authors#5>).
6. Dr Von Pressentin, as well as Prof Mash, will liaise directly with Dr Bresick, as required, to conduct the project successfully.



Prof Bob Mash

Date 09/05/2015



Dr Graham Bresick

Date

F. DATA COLLECTION INSTRUMENTS

i. Family Physician Impact Assessment Tool

This instrument was used in Article 1: The perceived impact of family physicians on the district health system in South Africa: a cross-sectional survey.

Title page:

FAMILY PHYSICIAN IMPACT ASSESSMENT TOOL

Evaluating the impact of family physicians within the district health system of South Africa

Von Pressentin KB, Mash B – Division of Family Medicine and Primary Care, FMHS, Stellenbosch University



Link to electronic version of
survey tool:

[https://sunsurveys.sun.ac.za/
Family-Physician-Impact-
Assessment-Tool.aspx](https://sunsurveys.sun.ac.za/Family-Physician-Impact-Assessment-Tool.aspx)

Dr Klaus von Pressentin:

Cell: 071 401 6868; Office: 021 938 9109; Email: kvonpressentin@sun.ac.za

Administrator: Ms Lana Fortuin:

Tel: 021 938 9563; Fax: 021 928 9704; Email: lanaf@sun.ac.za

Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences,
Stellenbosch University

Postal Address: PO Box 241, Cape Town 8000, South Africa

Physical Address: Francie van Zijl Drive, Fisan Building F315, Tygerberg 7505, South Africa



FAMILY PHYSICIAN IMPACT ASSESSMENT TOOL

PARTICIPANT INFORMATION LEAFLET

Evaluating the impact of family physicians within the district health system of South Africa

HREC REFERENCE NUMBER: S15/01/003 (Stellenbosch University)

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin

ADDRESS: Division of Family Medicine and Primary Care, Faculty of Medicine and Health Sciences, Stellenbosch University, PO Box 19063, TYGERBERG 7505.

Tel nr: 021 9389109/9563; 071 401 6868; Email: kvonpressentin@sun.ac.za

Dear *colleague/co-worker/manager of a family physician*

We would like to invite you to participate in a research project that aims to evaluate the impact of family physicians on the District Health Services in South Africa.

Please take some time to read the information presented here and then answer the questionnaire. **Your name was randomly selected from a list of potential respondents provided by the family physician at your facility.** Please answer the questions in relation to **this family physician**. As the questionnaire will be answered anonymously your confidentiality will be preserved. Your participation is **entirely voluntary**, and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. **If you are the family physician, please complete and sign the full consent form supplied by the researchers.**

This study has been approved by the Health Research Ethics Committee (HREC) at Stellenbosch University, Division of Research Development and Support (tel. 021 9389075) and will be conducted according to accepted and applicable National and International ethical guidelines and principles, including those of the international Declaration of Helsinki October 2008.

The information that you provide will be used to evaluate the impact of family physicians in the district health system of South Africa. The research will be submitted as a scientific article to a peer-reviewed journal and will contribute to a PhD degree. This study is part of a national project funded by EuropeAid (European Union), titled "Strengthening primary health care through primary care doctors and family physicians" (It aims to assess whether family physicians are making a measurable impact on health system performance, key clinical processes and health outcomes in South Africa. The research project aims to provide clarity to policy makers, academics and clinicians regarding the role and impact of family physicians in South African communities.) **An overview of the six roles of the family physician is available at the end of this questionnaire.**

If you are willing to participate in this study please complete the attached questionnaire. Seal the completed questionnaire in the envelope provided and place the envelope in the central box/courier envelope, which will be sealed and collected by the courier or hand it to the researcher(s) visiting your facility. Feel free to contact the research team with any queries. We thank you for your time and contribution.

Yours sincerely, Dr Klaus von Pressentin (Principal Investigator)

PARTICIPANT INFORMATION				Only for Administration
Participant Study code (provided by research team) (Information will be kept confidential - code supplied by research team)				FP Code nr:
				District Code:
				Province Code:
Please identify one of the following categories which best describes your work role / position:				
District Manager	Sub-District Manager	Medical Manager/ Clinical Manager	Family Physician See below #	Cat 1
Family Medicine Registrar	Medical Officer	Community Service Medical Officer	Intern	
Nursing Manager / Operational Manager	Nursing: Sister/Staff Nurse/Nurse/ Clinical Nurse Practitioner	Speech Therapist and/or Audiologist	Dietician	Cat 2
Pharmacist / Pharmacy Assistant	Physiotherapist	Occupational Therapist	Radiographer and/or Sonographer	
Employed in Administration / Support Services	Social Worker	Psychologist	Community Health Worker	Cat 3
Other (please specify):				
(Section only for family physician) # I am the family physician being evaluated	Please describe your training/registration method to become a registered family physician	New registrar training method		Cat 4.1
		Previous training methods (grandfather clause)		
Appointment date as family physician at facility				Cat 4.2

Kindly complete this tool, by responding to the statements below and ticking the appropriate box.

The following scale is used:

Not part of the family physician's work i.e. job description doesn't require this family physician to fulfill this role	Strongly Disagree	Disagree	Agree	Strongly Agree	Unable to answer
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For each section (role) an amended scale is used for the last question, in which you are asked to select one option which best describes the impact of the family physician AS COMPARED TO THE OTHER DOCTORS (MEDICAL OFFICERS) IN YOUR FACILITY.

A comment section is available after each domain/role – feel free to include comments.

CARE PROVIDER						Domain 1	
	0	1	2	3	4	9	Admin
	<i>Not part of the family physician's work</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Unable to answer</i>	
1. The family physician is competently able to manage patients with HIV at a primary care level.							
2. The family physician is able to competently diagnose TB and to initiate treatment.							
3. The family physician is able to competently manage patients with non-communicable diseases, e.g. hypertension/diabetes /asthma.							
4. The family physician is able to competently manage women in labour and deal with obstetric and gynaecological emergencies.							
5. The family physician is able to competently manage children with							

common childhood conditions e.g. malnutrition/diarrhoeal disease/lower respiratory tract infections.								
6. The family physician is able to competently stabilise patients with poly-trauma.								
7. The family physician is able to competently manage patients with common medical emergencies and conditions.								
8. The family physician is able to competently manage patients with common surgical and orthopaedic emergencies and conditions.								
9. The family physician is able to recognise and manage patients with mental illness and refer appropriately, and where appropriate, to begin treatment.								
10. The family physician is able to competently give anaesthetic/sedation to patients who are a low anaesthetic risk.								
11. The family physician is able to competently manage sexual assault or intimate partner violence.								

For the following section, select the option which best describes the impact of the family	<i>Not part of the family physician's work</i>	<i>Significant less impact</i>	<i>Less impact</i>	<i>Same impact</i>	<i>More impact</i>	<i>Significant more impact</i>	<i>Unable to answer</i>	
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physician, AS COMPARED TO THE OTHER DOCTORS IN YOUR FACILITY								
12. Compare the family physician's impact as care provider to the other doctors (medical officers).								

Comments for Domain 1

CONSULTANT				Domain 2			Admin
	0	1	2	3	4	9	
	<i>Not part of the family physician's work</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Unable to answer</i>	
1. I feel more supported in my clinical work knowing that there is a family physician on site.							
2. The family physician is a role model for patient-centred clinical care.							
3. When dealing with a patient, the family physician often asks about their family and context.							
4. The presence of the family physician has decreased unnecessary referrals to level 2 and 3 hospitals.							
5. The family physician often sees patients with more complicated conditions referred by Clinical Nurse Practitioners/							

Doctors in primary care.									
6. The family physician often sees patients with more complicated conditions in the hospital wards.									
7. The family physician knows and understands the limitations as a consultant (i.e. knows when to refer or ask for help appropriately).									
8. The family physician performs outreach to other clinics or health centres.									
9. The family physician remains up to date with the latest guidelines and evidence									
10. The family physician is available for consultation and is not taken up by too many non-clinical duties.									
For the following section, select the option which best describes the impact of the family physician, AS COMPARED TO THE OTHER DOCTORS IN YOUR FACILITY	<i>Not part of the family physician's work</i>	<i>Significant less impact</i>	<i>Less impact</i>	<i>Same impact</i>	<i>More impact</i>	<i>Significant more impact</i>	<i>Unable to answer</i>		
11. Compare the family physician's impact as consultant to the other doctors (medical officers).									
Comments for Domain 2									
COMMUNITY INVOLVEMENT					Domain 3				
	0	1	2	3	4	9	Admin		

	<i>Not part of the family physician's work</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Unable to answer</i>	
1. The family physician is aware of the health problems of the local community/district.							
2. The family physician has a vision for health promotion in the community served and has communicated this to the staff.							
3. The family physician is currently engaged in/supporting health promotion in the community served.							
4. The family physician engages with other community-based resources and services i.e. NGOs, churches, local government.							
5. The family physician engages with local community leaders.							
6. The family physician is involved in strengthening community-based services i.e. joining, training, collaborating or supporting community health care workers and home-based carers.							
7. The family physician has a vision beyond the hospital/clinic to making a positive impact on the health of the community served and has							

communicated this to the staff.								
8. The family physician manages patients in a step-down or rehabilitation facility.								
9. The family physician is involved in strengthening/ improving a step-down or rehabilitation facility.								
For the following section, select the option which best describes the impact of the family physician, AS COMPARED TO THE OTHER DOCTORS IN YOUR FACILITY	<i>Not part of the family physician's work</i>	<i>Significant less impact</i>	<i>Less impact</i>	<i>Same impact</i>	<i>More impact</i>	<i>Significant more impact</i>	<i>Unable to answer</i>	
10. Compare the family physician's impact regarding community involvement to the other doctors (medical officers).								

Comments for Domain 3

LEADERSHIP AND GOVERNANCE					Domain 4		Admin
	0	1	2	3	4	9	
	<i>Not part of the family physician's work</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Unable to answer</i>	
1. The family physician creates a positive climate at work that motivates/ supports staff to do their best.							
2. The family physician promotes increased levels of teamwork through his/her leadership							

style.							
3. The family physician displays skill in resolving conflict productively.							
4. The family physician handles his/her own stress and pressure well and is sensitive to the needs of staff with regards to handling their stress.							
5. The family physician has a calming influence on others.							
6. The family physician is concerned with the personal wellbeing of his/her staff.							
7. The family physician is continuously trying to improve systems to provide better quality of care i.e. through quality improvement cycles, morbidity and mortality meetings, clinical management meetings, functional business meetings etc.							
8. The family physician promotes or engages in health prevention strategies i.e. cervical or breast cancer screening programmes etc.							

<p>9. The family physician places high emphasis on the involvement of the multidisciplinary team (i.e. nurses/ occupational therapists/ physiotherapists/ social worker etc.) in clinical decision-making.</p>								
<p>10. The family physician creates or helps to drive plans to further develop your hospital/clinic.</p>								
<p>11. The family physician improves the patients' experience of care at this facility i.e. tries to reduce waiting times etc.</p>								
<p>For the following section, select the option which best describes the impact of the family physician, AS COMPARED TO THE OTHER DOCTORS IN YOUR FACILITY</p>	<p><i>Not part of the family physician's work</i></p>	<p><i>Significant less impact</i></p>	<p><i>Less impact</i></p>	<p><i>Same impact</i></p>	<p><i>More impact</i></p>	<p><i>Significant more impact</i></p>	<p><i>Unable to answer</i></p>	
<p>12. Compare the family physician's impact regarding leadership and governance to the other doctors (medical officers).</p>								
<p>SUPERVISOR / TRAINER</p>						<p>Domain 5</p>		

Comments for Domain 4

	0	1	2	3	4	9	Admin
	<i>Not part of the family physician's work</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Unable to answer</i>	
1. The family physician contributes to the training of interns or community service doctors.							
2. The family physician contributes to the training of family medicine registrars, e.g. through educational meetings, observed consultations of registrars or by supervising their course work.							
3. The family physician contributes to the training of undergraduate students, e.g. through giving tutorials, bedside teaching, or supervising their projects.							
4. The family physician is involved in the assessment of under- and post-graduate students e.g. portfolio, oral and OSCE assessments.							
5. Having students supervised by the family physician has a positive impact on the quality of care at the facility e.g. through student projects.							
6. Having students supervised by the family physician has a positive impact on							

the learning environment at the facility e.g. more academic meetings and greater academic influence.								
For the following section, select the option which best describes the impact of the family physician, AS COMPARED TO THE OTHER DOCTORS IN YOUR FACILITY	<i>Not part of the family physician's work</i>	<i>Significant less impact</i>	<i>Less impact</i>	<i>Same impact</i>	<i>More impact</i>	<i>Significant more impact</i>	<i>Unable to answer</i>	
7. Compare the family physician's impact as supervisor/trainer to the other doctors (medical officers).								

Comments for Domain 5

CAPACITY BUILDER						Domain 6		
	0	1	2	3	4	9		
	<i>Not part of the family physician's work</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Unable to answer</i>	Admin	
1. The family physician promotes the continuous professional development of his/her staff by organizing or facilitating CPD activities or by creating space for staff to attend courses/workshops.								
2. The family physician builds capacity through delegating tasks and responsibilities while giving support.								

3. The family physician is interested in the development of the staff as professionals and as people.							
4. The family physician is easily approachable.							
5. The family physician provides constructive feedback to staff on professional development and openly discusses mistakes in a constructive manner.							
6. My clinical practice has improved because of the presence of a family physician.							
7. The family physician helps to make the CHC/DH a place where learning happens on a daily basis, e.g. calls people to see an interesting patient, puts up articles for others to read, encourages one to discuss mistakes.							

For the following section, select the option which best describes the impact of the family physician, AS COMPARED TO THE OTHER DOCTORS IN YOUR FACILITY	<i>Not part of the family physician's work</i>	<i>Significant less impact</i>	<i>Less impact</i>	<i>Same impact</i>	<i>More impact</i>	<i>Significant more impact</i>	<i>Unable to answer</i>	
8. Compare the family physician's impact as capacity builder to the other doctors (medical officers).								

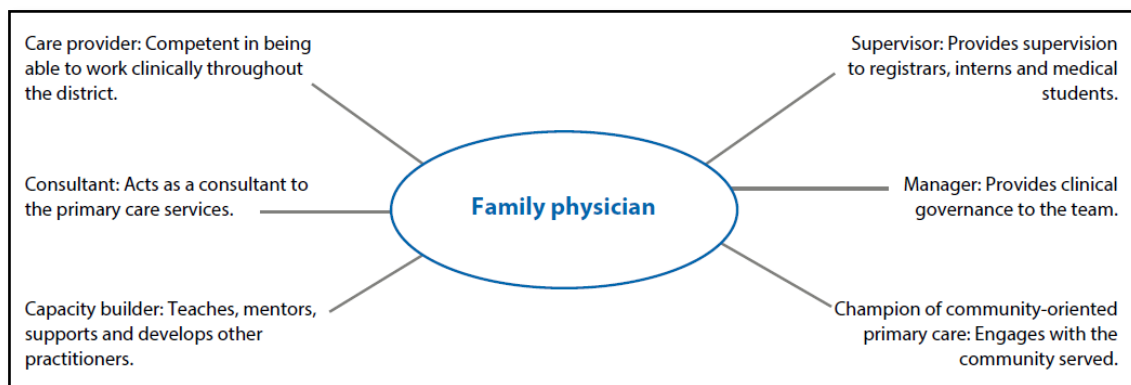
Comments for Domain 6

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE – YOUR TIME AND CONTRIBUTION IS APPRECIATED

Seal the completed questionnaire in the envelope provided and place the envelope in the central box/courier envelope, which will be sealed and collected by the courier. Alternatively, please hand the completed questionnaire to the researcher(s) visiting your facility. If you are unsure about the collection method at your facility, please contact the family physician or research team.

You are also free to contact the research team with any queries.

www.sun.ac.za/fammed



Overview of the six roles of the family physician

Further reading: Mash R, Ogunbanjo G, Naidoo SS, Hellenberg D. The contribution of family physicians to district health services: a national position paper for South Africa. *South African Family Practice*. 2015;57(3):54-61.

This research has been conducted with the financial assistance of the European Union. The contents of this document are the sole responsibility of Stellenbosch University and can under no circumstances be regarded as reflecting the position of the European Union.

ii. Data collection tools: District Hospital

These instruments were used in Article 3: Measuring the influence of family physicians within the South African district health system: a cross-sectional observational study.

Part 1: Facility details

Please complete form and hand it to the research team. Please contact research team if questions (also see information leaflet and consent form). Thank you for your time!

Principal Investigator: Dr Klaus B von Pressentin

Contact Number: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

Ms Lana Fortuin: +27 21 938 9563; lanaf@sun.ac.za

1. Date of field visit	DD	MM	YYYY
2. Form completed by:			
3. Name of District Hospital			
4. Study code for facility OFFICE USE ONLY			

1.1	Facility core details
Sub-district	
District	
Province	
Bed size	
Metro vs. Rural	
Distance to next referral hospital (km)	
Number of Clinics/CHC(s) draining to this hospital	

1.2 Estimated size of population served by facility (sub-district or defined population)	
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1.3.1 Average length of stay (2014/2015)		1.3.2 Inpatient bed utilization rate (2014/2015)	
1.3.3 Expenditure per Patient Day Equivalent (2014/2015)		1.3.4 OPD new client not referred rate (2014/2015)	
1.3.5 Number of deliveries/month Number of mothers giving birth to babies/month			

1.4. Hospital beds (state 0 if no beds in the category)	Number
• Number of female ward beds	
• Number of male ward beds	
• Number of mental health ward beds	
• Number of paediatric ward beds	
• Number of maternity ward beds	
• Number of delivery beds	
• Number of Neonatal ward beds	

1.5 Family physicians at this facility

1.5.1	Number of family physicians (FPs) appointed on the staff establishment (state as full time equivalents) = FPs registered with HPCSA as Family Medicine specialists	
1.5.1.1	Number of FPs appointed on the staff establishment for two or more years (state as full time equivalents on day questionnaire completed) (sub-group of those described in 1.5.1)	
1.5.1.2	Number of FPs spending at least 50% of their working hours in the extended and comprehensive clinical role of a family physician (for example, across clinical domains, clinical governance, consultant to team, etc.) (sub-group of those described in 1.5.1)	
1.5.2	Number of family medicine (FM) registrars based at this facility (working full time at facility)	
1.5.3	Number of FM registrars performing outreach to this facility (doing sessions at the facility)	
1.5.4	Number of District Clinical Specialist Team FPs performing outreach to this facility	
1.5.5	Number of other family FPs performing outreach to this facility (not from District Clinical Specialist Team, but from another facility or institution)	

1.5.6	Describe the outreach programme of the FPs or FM registrars to this facility (1.5.3, 1.5.4, 1.5.5) <i>Example: FP visiting once a month for a ward round or M&M meeting.</i>		
	Number of visits	Type / Nature of activity	Discipline / Department
1.5.7	Number of doctors with postgraduate family medicine training, but not registered or appointed as family physicians (e.g. diploma in family medicine/primary care, foreign qualified general practitioners/family physicians on old register) – please specify		

1.6 Number of staff <u>providing district hospital care at this facility</u>		
Staff category		Numbers at facility
1.6.1 Nurses	Advanced midwives	
	Professional nurses/ Midwives	
	Staff nurses	
	Nursing assistants	
1.6.2 Doctors	Medical interns	
	Community service doctors	
	Medical officers	
	Family Medicine registrars	

	Sessional private General Practitioners	
	Family physicians	
	Registered specialists	
1.6.3 Clinical Associates		
1.6.4 Allied health workers	Radiographers	
	Sonographers	
	Physiotherapists	
	Occupational therapists	
	Dieticians	
	Speech/audiologists	
	Social workers	
	Pharmacists	
	Pharmacy assistants	
	Laboratory staff	
Total		

1.6.5 Comments if any to expand on any issues from the above table (1.6).

1.7 Access to services

1.7.1 Is the emergency centre open 24 hours a day?	Yes	No
1.7.2 If no specify hours (emergency centre)		
1.7.3 Is the maternity service open 24 hours a day?	Yes	No
1.7.4 If no specify hours (maternity)		
1.7.5 Is there a functional operating theatre available?	Yes	No
1.7.6 If yes to 1.7.5, is this operating theatre available after-hours?	Yes	No

1.8 Quality Improvement (QI) and clinical governance activities at facility:

	QI / clinical governance activity		Availability		Number of activities performed in the last 3 months
			No	Yes	
1.8.1	CME/CPD activities	Nurses/midwives			
		Medical doctors			
1.8.2	Outreach and support visits received at this hospital (Do these specialists visit this hospital?)	Physician			
		Surgeon			
		Obstetrician & Gynaecologist			
		Paediatrician			
		Psychiatrist			
		DCST members			
		Other specialists (expand/name in section 1.10)			

CME = continuing medical education; CPD= continuing professional development;

DCST = District Clinical Specialist Team

*Part 2: Signal functions***Part 2: Range of services – signal functions of district hospital care (core district hospital domains)****Principal Investigator: Dr Klaus B von Pressentin**Contact Number: +27 21 938 9109; 071 401 6868; kvonpressentin@sun.ac.za

1. Date of field visit	DD	MM	YYYY
2. Form completed by:			
3. Name of District Hospital			
4. Study code for facility			
OFFICE USE ONLY			

These signal functions represent the minimum skills/competencies required in the important dimensions of routine and emergency district hospital care. The main question for each of these signal functions: does our facility provide this signal function? (Yes/No). The second set of questions per domain focuses on the ability of the different staff cadres to perform signal skills (Yes/No/Not Applicable).

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
2.1 Newborn care									
2.1.1	Availability of antibiotics for preterm or prolonged PROM to prevent infection (Premature Rupture of Membranes)								
2.1.2	Availability of corticosteroids in preterm labour								

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
2.1.3	Availability of staff trained in resuscitation with bag and mask of non-breathing baby								
2.1.4	Availability of KMC for premature/very small babies (Kangaroo Mother Care)								
2.1.5	Availability of injectable antibiotics for neonatal sepsis								
2.1.6	Administer oxygen to neonate safely								
2.1.7	Availability of Neopuff ventilator for neonates								
2.1.8	Provide MBFHI feeding counselling if baby is unable to breastfeed (Mother and Baby Friendly Hospital Initiative)								
2.2 Maternal health and Obstetric care									
2.2.1	Availability of parenteral antibiotics								
2.2.2	Availability of uterotonic drugs (oxytocin, misoprostol)								
2.2.3	Availability of parenteral anticonvulsants for pre-eclampsia/ eclampsia (Magnesium sulphate)								
2.2.4	Availability of emergency blood for transfusion								
2.2.5	If a Caesarean section needed to be performed as								

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
	an emergency would there be sufficient staff on site to do so at all times?								
2.2.6	Partogram routinely used								
2.2.7	Manually remove placenta								
2.2.8	Remove retained products by Manual Vacuum Aspiration								
2.2.9	Remove retained products by Dilatation and Curettage								
2.2.10	Perform assisted vaginal delivery (Vacuum extraction delivery)								
2.2.11	Perform Surgery: Caesarean section								
2.2.12	Perform Surgery: Postpartum sterilisation								
2.2.13	Perform Laparotomy for Ectopic Pregnancy								
2.3 General Surgery									
2.3.1	Availability of ultrasound for bedside diagnosis (FAST: Focused Assessment with Sonography in Trauma)								

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
2.3.2	Perform packing of epistaxis								
2.3.3	Perform closed reduction of dislocated mandible								
2.3.4	Perform removal of foreign body in eye								
2.3.5	Perform ultrasonic diagnosis of intra-abdominal fluid (FAST: Focused Assessment with Sonography in Trauma)								
2.3.6	Perform male circumcision								
2.3.7	Perform escharotomy for circumferential burns								
2.3.8	Perform suprapubic catheterisation								
2.3.9	Perform tonsillectomies								
2.3.10	Perform scrotal exploration for suspected testicular torsion								
2.3.11	Perform appendicectomy								
2.4 General Adult Medicine									
2.4.1	Administration of thrombolytic agent for ST-elevation myocardial infarction								
2.4.2	Application of external pacing for symptomatic complete heart block								

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
2.4.3	Use of point-of-care test: arterial blood gas								
2.4.4	Availability of blood culture bottles/containers								
2.4.5	Able to perform basic office spirometry								
2.4.6	Perform therapeutic and diagnostic pleural tap								
2.4.7	Perform therapeutic and diagnostic ascites tap								
2.4.8	Perform fundoscopy in diabetic patients								
2.4.9	Perform fine needle aspiration biopsy								
2.4.10	Perform skin biopsy - excision/incision								
2.5 Mental Health									
2.5.1	Availability of trained staff to admit involuntary and assisted patients according to the MHCA (Mental Health Care Act)								
2.5.2	Availability of safe single observation room (according to seclusion policy)								
2.5.3	Availability of sedation for violent/aggressive patients	Lorazepam							
		Diazepam							
		Haloperidol							

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
	Chlorpromazine								
	Clopixol acuphase								
2.5.4	Availability of protocol to manage suicidal patients								
2.5.5	Availability of protocol to refer stable client to community mental health teams								
2.5.6	Availability of protocol to work-up and manage children with Attention Deficit Hyperactivity Disorder (ADHD)								
2.5.7	Perform post trauma counselling								
2.5.8	Perform brief motivational interviewing								
2.6 Child Health									
2.6.1	Use of referral protocol to stabilise and refer ill children								
2.6.2	Use of ventilator for infants and children								
2.6.3	Availability of point-of-care arterial blood gas test								
2.6.4	Availability of PPD for Tine and Mantoux tests								
2.6.5	Availability of paediatric c-spine collar								
2.6.6	Perform CPR for infants and children								

	Signal function	Availability		Skills performed by (Y, N, NA)					
		Yes (Y)	No (N)	Nurse	Midwife/CNP	Clinical Associate	Doctor	Family Physician	Specialist
2.6.7	Perform intravenous access for infants and children								
2.6.8	Perform intraosseous access								
2.6.9	Perform lumbar puncture in infants and children								
2.6.10	Perform arterial blood gasses								
2.7 Emergency Medicine									
2.7.1	Availability of central venous catheter								
2.7.2	Availability of traction splint for stabilising of femur fractures								
2.7.3	Perform tube thoracostomy (intercostal drain)								
2.7.4	Identify and manage compartment syndrome								
2.7.5	Perform reduction of simple dislocations of limbs								
2.7.6	Stabilise unstable pelvic fracture								
2.7.7	Complete sexual abuse crime kit								
2.7.8	Insert central venous catheter								
2.7.9	Perform debridement of compound fractures								
2.7.10	Perform simple amputations of digits or lower limbs								

2.8 General comments/remarks:

Part 3: National Core Standards



NCS Assessment Questionnaire (District Hospital)

Adapted for Research project

Used with permission – OHSC, Department of Health

Facility:

Date:

Evaluating the impact of family physicians within the district health system of South Africa

PRINCIPAL INVESTIGATOR: Dr Klaus B von Pressentin
Division of Family Medicine and Primary Care, Stellenbosch University.

Instructions:

This tool focuses on Domain 2 of the National Core Standards audit tool:

Patient Safety / Clinical Governance / Clinical Care.

The evidence is compiled into a set of questionnaires and checklists for different functional areas (column 1: Unit) of the facility. One measure may be looked for in different areas/units.

The M units refer to management and may be completed by the manager group in a meeting session.
Clinical manager group refers to operational/unit/clinical managers.

The P units refer to patient management areas in the facility.

Assessment type refers to the method used to assess compliance: document analysis (DOC) and staff interview (SI) – *see page 5*.

Score – the compliant (1) or non-compliant (0) score for that question.

If it is a CHECKLIST, then a fraction of 1 is the score i.e. 0.75.

The score for each item on the CHECKLIST is either:

1 for compliant or 0 for non-compliant;

Not applicable (N/A) if it does not apply to facility

The total score is a fraction of 1 i.e. 0.75. (Sum of all the scores/ total questions in the checklist)

One of the questions (2.2.1.2.1) in the questionnaire start with the word “CHECKLIST”: checklists provide a list of compliance requirements to match the question. Please refer to the checklist for the question/measure.

Please provide completed the comment column according to the guide– *see page 5*.

Contact details of central research team

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Measures selected from Domain 2: Patient Safety, Clinical Governance and Clinical Care

Only one criterion per sub-domain has been selected for this study: The **Patient Safety, Clinical Governance and Clinical Care** domain covers how to ensure quality nursing and clinical care and ethical practice; reduce unintended harm to health care users or patients in identified cases of greater clinical risk; prevent or manage problems or adverse events, including health care associated infections, and support any affected patients or staff.

Sub-domain	Standard	Criteria selected for study
2.1 Patient care	2.1.1 Patients receive care and treatment that follows nursing protocols, meets basic needs and contributes to their recovery	2.1.1.2 There is evidence that care provided optimises health outcomes
2.2 Clinical management of priority health conditions	2.2.1 Care provided contributes positively to national priorities, including the United Nations Millennium Development Goals for maternal and child health, HIV and Tuberculosis	2.2.1.2 There is evidence that the health establishment implements priority programmes or health initiatives according to the latest guidelines available
2.3 Clinical leadership	2.3.1 Doctors, nurses and other health professionals constantly work to improve the care they provide through proper support systems	2.3.1.2 There is a formal supervision programme for health professionals
2.4 Clinical risk	2.4.1 Clinical risk identification and analysis takes place in every ward to prevent patient safety incidents	2.4.1.2 A system is in place to monitor clinical risk and ensure control measures are carried out
2.5 Adverse Events	2.5.2 Adverse events are routinely analysed and managed to prevent recurrence and learn from mistakes	2.5.2.1 A system is in place to monitor adverse events and carry out control measures
2.6 Infection prevention and control	2.6.1 An Infection Prevention and Control Programme is in place to reduce health care associated infections	2.6.1.5 The health establishment reports health care associated infections and notifiable diseases to appropriate public health agencies

Criterion	Measure	Unit	Assessment type	Score	Comment
2.1.1.2 There is evidence that the provision of care contributes to positive health outcomes	2.1.1.2.1 There is evidence that the health establishment participates in monthly maternal and perinatal morbidity and mortality meetings	M14 Clinical Management Group	DOC		
	2.1.1.2.2 There is evidence that the establishment monitors its morbidity and mortality statistics and implements improvement programmes to address concerns	M01 CEO or Hospital Manager	DOC		
2.2.1.2 There is evidence that the establishment ensures that the priority programmes or health initiatives are implemented according to the guidelines provided	2.2.1.2.1 CHECKLIST <i>(See page 6)</i> The establishment conducts clinical audits of each priority programme/health initiative Review the clinical audit reports - checklist provided If no clinical audits conducted review 3 patient files per priority program	M14 Clinical Management Group	DOC		
2.3.1.2 There is a formal supervision programme for healthcare professionals	2.3.1.2.1 Healthcare professionals indicate that they have access to adequate supervision (excluding doctors for private sector) <i>(See page 8 – 11 for Staff Interview guide and forms; interview one clinical staff member in each of these 4 areas and enter the information on the forms)</i>	P03 Maternity Ward including maternity theatres	SI		
		P06 Paediatric ward	SI		
		P07_1 Generic wards / e.g. Male: Measure is generic to any ward or day ward	SI		
		P07_2 Generic wards / e.g. Female: Measure is generic to any ward or day ward	SI		
2.4.1.2 A formal structure exists	2.4.1.2.1 Terms of reference of a forum reviewing clinical	M14 Clinical Management	DOC		

Criterion	Measure	Unit	Assessment type	Score	Comment
within the establishment to monitor all aspects of clinical risk and ensure implementation of control measures	risk is available which details the interdisciplinary membership / responsibilities / accountability / strategy to manage clinical risks	Group			
	2.4.1.2.2 Clinical risk assessments are conducted in each service/department of the establishment according to relevant policy and/or guidelines	M14 Clinical Management Group	DOC		
	2.4.1.2.3 Minutes of the forum reviewing clinical risks (from within the last quarter) indicate that clinical risks and adverse events are regularly discussed / analysed and actions have been taken to reduce significant risks	M14 Clinical Management Group	DOC		
2.5.2.1 A formal structure exists within the establishment to monitor all aspects of adverse events and ensure implementation of control measures	2.5.2.1.1 Establishment has a reporting system for adverse events indicating severity / categorisation and actions taken	M14 Clinical Management Group	DOC		
	2.5.2.1.2 The forum reviewing clinical risk strategy has clear terms of reference which details the interdisciplinary membership / responsibilities / lines of accountability and strategy to manage clinical risks	M14 Clinical Management Group	DOC		
2.6.1.5 The health establishment reports information on health care associated infections and notifiable disease to appropriate public health agencies	2.6.1.5.1 The health establishment reports information on health care associated infections to the appropriate public health agencies View recent submission within 6 months	M07 Infection Control	DOC		
	2.6.1.5.2 There is evidence that the establishment records all notifiable disease and reports them to the appropriate public health agency	M07 Infection Control	DOC		

Guide for completing the NCS tool (Assessment types)

Type code	Description
Doc	Document review and analysis – <ul style="list-style-type: none"> • check for availability of a document, policy or protocol eg patient records, personal files, policies or guidelines • review content of a document to serve as evidence that the standard has been fulfilled eg minutes of meetings, reports and plans
OBS	Observation – directly observe staff carrying out their duties or performing certain functions eg observe infection control and hand hygiene practices, performance of procedures or the way patients are counseled.
PI	Patient interview – one on one interviews with a small sample of patients to ask specific questions using a structured checklist
SI	Staff interview - one on one interviews with a small sample of staff to ask specific questions using a structured checklist
PRA	Patient record assessment – review of the content of the patients records to serve as evidence for compliance

Guide for completing the comments column

Notes Legend – Guide for comments		
(1) No Evidence	(2) Evidence not valid/irrelevant	(3) Evidence inappropriate
(4) Document not reviewed as per policy	(5) Document not dated/signed	(6) Document still in draft form
(7) Item not in place	(8) Item not in working order	(9) Item expired
(10) Not applicable	(11) Missing data	

2.2 Clinical management for improved health outcomes

Checklist 2.2.1.2.1

The health establishment provides clinical care so as to ensure positive outcomes in identified priority initiatives including meeting the Millennium Development Goals.

Number of checklist	Criterion	Checklist reference	Measure:				
2.2.1.2.1	There is evidence that the facility ensures that the priority programmes or health initiatives are implemented according to the guidelines	Performance of Clinical Audits	Does the establishment conduct clinical audits of each priority programme/health initiative? If Yes - review the clinical audit reports.				
Number of questions	Planned number of responses	Unit where assessed	Type of assessment				
8	15	M14	Document Analysis				
Instructions: Does the facility conduct clinical audits of strategic priority programmes? IF YES review the clinical audit report-checklist (DA). If the aspect is performed, tick Y if not, tick N. (Abbreviations explained on page 7)							
No.	Question / Aspect	HIV	TBCP	IMCI	PMTCT	STIs	Standard treatment guidelines
1	Does the establishment conduct clinical audits on each priority programme at least yearly?						
2	Does their audit cover the aspects appropriate to the new guidelines in terms of:						
2.1	- Counselling/education of patients						
2.2	- Treatment plan development						
2.3	- Suitable Laboratory tests and frequency						
2.4	- Compliance monitoring						
2.5	- Monitoring of treatment effect						
3	Does the audit show that action plans have been put in place to rectify areas of concern						
Actual Score (Sum of positive responses)							
Maximum possible score (Sum of all questions minus the not applicable responses)							

Abbreviations in Checklist 2.2.1.2.1

HIV	Human Immunodeficiency Virus
TBCP	Tuberculosis Control Programme
IMCI	Integrated Management of Childhood Illness
PMTCT	Prevention of Mother-to-Child Transmission
STIs	Sexually transmitted infections

Examples of Standard treatment guidelines (Checklist 2.2.1.2.1)

1	Standard Treatment Guidelines and Essential Drug List for Primary Health Care (2010 or latest version)
2	Standard Treatment Guidelines and Essential Drug List for Hospitals - Adults (2010 or latest version)
3	Standard Treatment Guidelines and Essential Drug List Hospital level – Paediatrics (2010 or latest version): Not applicable to adult wards.
4	Control and Management of Diabetes (2010 or latest version)
5	Control and Management of Hypertension at primary level (1998 or latest version)
6	Management and Control of asthma in children at primary level (2007 or latest version): Not applicable to adult units
7	Management of asthma in adults at primary level (2002 or latest version)
8	National Tuberculosis Management Guidelines 2008 or latest version
9	Guidelines for the Management of HIV – infected children 2005 or latest version)
10	National Anti-retroviral Treatment Guidelines 2004 or latest version
11	Guidelines for the treatment of Malaria in South Africa (2009 or latest version)
12	Guidelines for completing the maternal Death notification
13	Saving Mothers – essential steps to the management of common conditions associated with maternal mortality
14	Clinical guidelines for the use of Blood and Blood Products
15	Practical guidelines for Infection Control in health care facilities 2003 or latest version
16	Guidelines for sexually transmitted infections (STIs)
17	Guidelines for Contraception (Family planning)
18	Guidelines for Choice of termination of pregnancy
19	Cervical cancer screening guidelines (Pap smear)
20	Guidelines for Post exposure prophylaxis (Sexual assault)

Staff interview for 2.3.1.2.1

Please interview a clinical staff member (not part of management) in the each of the clinical areas highlighted.

P03 Maternity Ward including maternity theatres		
No.	Question / Aspect	Yes / No
1	Have you had a one-to-one conversation with your supervisor/line manager in the last 6 months, as part of SPMS?	
2	Do you know which senior colleague (such as midwife or CNP or doctor) to contact when you experience a clinical query in your work unit/area?	
3	During the last 6 months: think of clinical emergency scenarios where you had to contact one of the senior colleagues (such as midwife or CNP or doctor); were they available to support you in dealing with every scenario?	
4.	During the last 6 months: think of a patient-related administration query (such as a concern/complaint raised by a family member); was a senior colleague or management member available to support you in dealing with the query?	
Actual Score (Sum of positive responses)		
Maximum possible score (Sum of all questions)		

Abbreviations:

SPMS: Staff Performance Management System

CNP: Clinical Nurse Professional

Staff interview for 2.3.1.2.1

Please interview a clinical staff member (not part of management) in the each of the clinical areas highlighted.

P06 Paediatric ward		
No.	Question / Aspect	Yes / No
1	Have you had a one-to-one conversation with your supervisor/line manager in the last 6 months, as part of SPMS?	
2	Do you know which senior colleague (such as midwife or CNP or doctor) to contact when you experience a clinical query in your work unit/area?	
3	During the last 6 months: think of clinical emergency scenarios where you had to contact one of the senior colleagues (such as midwife or CNP or doctor); were they available to support you in dealing with every scenario?	
4.	During the last 6 months: think of a patient-related administration query (such as a concern/complaint raised by a family member); was a senior colleague or management member available to support you in dealing with the query?	
Actual Score (Sum of positive responses)		
Maximum possible score (Sum of all questions)		

Abbreviations:

SPMS: Staff Performance Management System

CNP: Clinical Nurse Professional

Staff interview for 2.3.1.2.1

Please interview a clinical staff member (not part of management) in the each of the clinical areas highlighted.

P07_1 Generic wards / e.g. <u>Male</u>		
No.	Question / Aspect	Yes / No
1	Have you had a one-to-one conversation with your supervisor/line manager in the last 6 months, as part of SPMS?	
2	Do you know which senior colleague (such as midwife or CNP or doctor) to contact when you experience a clinical query in your work unit/area?	
3	During the last 6 months: think of clinical emergency scenarios where you had to contact one of the senior colleagues (such as midwife or CNP or doctor); were they available to support you in dealing with every scenario?	
4.	During the last 6 months: think of a patient-related administration query (such as a concern/complaint raised by a family member); was a senior colleague or management member available to support you in dealing with the query?	
Actual Score (Sum of positive responses)		
Maximum possible score (Sum of all questions)		

Abbreviations:

SPMS: Staff Performance Management System

CNP: Clinical Nurse Professional

Staff interview for 2.3.1.2.1

Please interview a clinical staff member (not part of management) in the each of the clinical areas highlighted.

P07_2 Generic wards / e.g. <u>Female</u>		
No.	Question / Aspect	Yes / No
1	Have you had a one-to-one conversation with your supervisor/line manager in the last 6 months, as part of SPMS?	
2	Do you know which senior colleague (such as midwife or CNP or doctor) to contact when you experience a clinical query in your work unit/area?	
3	During the last 6 months: think of clinical emergency scenarios where you had to contact one of the senior colleagues (such as midwife or CNP or doctor); were they available to support you in dealing with every scenario?	
4.	During the last 6 months: think of a patient-related administration query (such as a concern/complaint raised by a family member); was a senior colleague or management member available to support you in dealing with the query?	
Actual Score (Sum of positive responses)		
Maximum possible score (Sum of all questions)		

Abbreviations:

SPMS: Staff Performance Management System

CNP: Clinical Nurse Professional

Part 4: In-facility mortality (Child PIP and PPIP)

This section will focus on the Child PIP and PPIP tools (outcomes of clinical processes related to the quality of maternal and child care).

Child PIP/PPIP = Child and Perinatal Problem Identification Programmes

3.1 Child PIP

The report codes/numbers refer to the **Child PIP software**.

In-facility management of children (<18 years of age): 2014*		
3.1.1	Total admissions	
3.1.2	Total deaths	
3.1.3	In-hospital mortality rate/IHMR (%)	
3.1.4	Under-5 mortality rate	
3.1.4	Audited deaths	
3.1.5	Total modifiable factors	
3.1.6	Modifiable factor rate per death	

***Depending on data cycle**

3.2 Perinatal care indicators - from PPIP v3

Please indicate numeric value of rate, or use X if no data available.

Nr	Birth weight	Year	Perinatal mortality rate (PMR)	Neonatal mortality rate (NNMR)	Stillbirth rate (SBR)
3.2.1	All deliveries	2014			
3.2.2	Deliveries of weight categories 2 000g – 2 499 g	2014			
3.2.3	Deliveries 2 500 g and above	2014			

Definitions of rates (Rates are indicated as number of deaths per 1000 total births in facility):

- PMR: Stillbirths plus the number of children who have died in a health facility between birth and 28 days of life, expressed per 1000 total births in facility.
- NNMR: Number of live born children who have died in a health facility between birth and 28 days of life, expressed per 1000 total births in facility.
- SBR: Number of stillbirths, expressed per 1000 total births in facility.

3.3 General comments/remarks for the child health care and perinatal care sections:

iii. Data collection tools: Community Health Centre

These instruments were used in Article 3: Measuring the influence of family physicians within the South African district health system: a cross-sectional observational study.

Part 1: Primary Care Assessment Tool

The version of the PCAT (ZA PCAT AS) for used for patients in this study is reproduced here. This version applies to adult patients and is the shortened version as validated by Dr Graham Bresick and the UCT PCAT team. The abbreviation “ngt” refers to the nominal group technique used during the validation process. A different version of the PCAT was used for providers (health care workers), ZA PCAT PE, and managers, ZA PCAT FE. These versions of the PCAT look at the same domains. The significant findings from the providers and managers were limited to the continuity of care domain in the tool for managers (the questions for domain D in the ZA PCAT FE are shown in the table below). The second table below compares the findings for the domains of continuity of care (domain D: ongoing care) and coordination of care (domain E).

Dr Bresick supported this study by sharing the PCAT tools and guide, as well as by assisting Dr Klaus von Pressentin with the training of the fieldwork teams. The ZA PCAT AS tool was also translated into the local languages used in each study setting. Dr Bresick’s PCAT team colleague, Dr Abdul-Rauf Sayed, assisted Dr Von Pressentin and Ms Tonya Esterhuizen during the data analysis, to ensure that the data analysis adhered to the procedure used during their initial study, during which they adapted and validated the PCAT for use in South Africa. The original PCAT was designed by Prof Barbara Starfield and colleagues at Johns Hopkins University: http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-primary-care-policy-center/pca_tools.html.

Table. Domain D: Ongoing care (continuity of care) – ZA PCAT FE (managers)

Please check the <u>one</u> best answer.		Definitely	Probably	Probably not	Definitely not	Not sure/ don't remember
D1.	At your facility, do patients see the same clinician each time they make a visit?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D2.	Can your clinicians understand the questions their patients ask?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D3.	Do you think the patients in your facility understand what the clinicians ask them or say to them?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D4.	If patients have a question, can they call and talk to the doctor or nurse who knows them best?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D5.	Do you think the clinicians give patients enough time to talk about their worries or problems?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D6.	Do you think patients feel comfortable telling the clinicians about their worries or problems?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D7.	Do the clinicians know the patients who use your facility “very well”?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D8.	Do the clinicians know who lives with each patient?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D9.	Do the clinicians understand what problems are most important to the patients they see?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D10.	Do you think the clinicians know each patient’s complete medical history?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D11.	Do you think the clinicians know each patient’s work or employment?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D12.	Would the clinicians know if patients had trouble getting or paying for their prescribed medication?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D13.	Do the clinicians know all the medications their patients are taking? E.g. any meds prescribed by a GP or at another CHC, or hospital	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

Table. Comparison between three groups of respondents: PCAT domains D and E

Domain Mean (SD)	Control (N = 15)	Intervention (N = 15)	Mean Difference (95% CI)	p-value
ZA PCAT AS: users of primary health care				
D: ongoing care	3.03 (0.31)	2.79 (0.29)	0.24 (0.02 - 0.5)	0.034*
E: coordination	3.51 (0.39)	3.05 (0.55)	0.45 (0.1 - 0.8)	0.016*
ZA PCAT PE: providers of primary health care				
D: ongoing care	3.10 (0.38)	2.90 (0.22)	0.20 (-0.05 - 0.4)	0.112
E: coordination	3.29 (0.36)	3.26 (0.32)	0.03 (-0.2 - 0.3)	0.816
ZA PCAT FE: managers of primary health care				
D: ongoing care	3.05 (0.25)	2.80 (0.30)	0.25 (0.03 - 0.5)	0.027*
E: coordination	3.23 (0.28)	3.24 (0.47)	-0.01 (-0.3 - 0.3)	0.923

*p-value significant at < 0.05

ADMINISTRATIVE INFORMATIONInterviewers name:

Date:

D	D	M	M	Y	Y

Time interview be

		:		
--	--	---	--	--

Time interview fin

		:		
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INTRODUCTION / SCREENING QUESTIONS**RECRUITING & PURPOSE OF THE SURVEY.**

Interviewer: *Hello, my name is _____ I'm working with health services in this District doing a survey of what patients' think about the health care they receive. All the information given is private and confidential and will remain anonymous. I will not record your name and address on this form. I only need your name and signature on the consent form to show that you gave your permission to be asked questions about your experience and agreed to be part of the study.*

Would you be willing to answer a few questions about your experience of health care while you are waiting?

1 Yes. **If Yes, in which language would you prefer to speak? (Go to separate consent form)**

2 No **If No, terminate interview by saying: Thank you for your time. I apologize for any inconvenience.**

AFTER CONSENT COMPLETED:

THANK YOU FOR AGREEING TO ANSWER A FEW QUESTIONS ON YOUR EXPERIENCE OF HEALTH CARE.

FIRST, I WOULD LIKE TO ASK YOU A FEW GENERAL QUESTIONS BEFORE ASKING ABOUT YOUR EXPERIENCE.

A. EXTENT OF YOUR AFFILIATION (RELATIONSHIP) WITH A PRIMARY CARE PLACE OR PERSON (CLINIC / HOSPITAL / GENERAL PRACTICE / DOCTOR / NURSE)

A1. Where do you **usually** go when you are ill or need to talk to someone about your health? Please give the **name of the place or person:** _____

A2. Is there another place / person you sometimes go for health care?

a No

b Yes Please give **name of place or person:** _____

A3. Which place / person mentioned above knows you best regarding your health care? **Ring** A1 or A2
For the interviewer: 'YOU HAVE BEEN TO THIS CLINIC 3 TIMES OR MORE. ALL THE QUESTIONS ARE ABOUT YOUR EXPERIENCE OF PRIMARY CARE AT THIS CLINIC.'

A5 About how many times in the last 2 years have you been to your clinic? _____ times

A6 How long have you been going to your clinic?

1 Less than 6 months

2 Between 6 months and one year

3 1 - 2 years

4 3 - 4 years

5 5 or more years

6 Difficult to say (too variable to specify)

7 Not sure/don't remember

A7 Did you choose this clinic yourself?

1 Yes.

2 No

3 Other

9 Not sure/don't remember

B. FIRST CONTACT – UTILIZATION

Please check the one best answer				Probably not	Definitely not	Not sure / don't remember
		Definitely	Probably			
B1	When you need a regular checkup, do you go to your CHC before going somewhere else?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
B2	When you have a new health problem, do you go to your CHC before going somewhere else?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
B3	Can you see a specialist doctor (e.g. a heart specialist at a hospital) without a letter or appointment from your CHC?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

C. FIRST CONTACT – ACCESS

Please check the one best answer				Probably not	Definitely not	Not sure / don't remember
		Definitely	Probably			
C1	Is your CHC open on Saturday or Sunday?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
C2	Is your CHC open in the evenings for at least some weekdays?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
C5	When your CHC is closed is there a phone number you can call when you get sick?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
C6	When your CHC is closed on Saturday and Sunday and you get sick, would someone from there see you the same day?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
C7	When your CHC is closed and you get sick during the night , would someone from there see you that night?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

D. ONGOING CARE

Please check the one best answer				Probably not	Definitely not	Not sure / don't remember
		Definitely	Probably			
D1	When you come to this CHC are you taken care of by the same doctor or nurse each time?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D3	Are your questions answered in ways that you understand?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D4	If you have a question about your health, can you phone your CHC and talk to the doctor or nurse who treated you before?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D5	Does your CHC give you enough time to talk about your worries or problems?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D7	Does your CHC know you very well as a <i>person</i> , rather than as someone with a medical problem?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

D9	Does your CHC know what problems are most important to you?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
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Please check the one best answer		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
D10	Does your CHC know your complete medical history?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D13	Does your CHC know about all the medications you are taking? (e.g. getting elsewhere including traditional medicines)	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
D15	If it was easy to do, would you change your CHC to somewhere else?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

E. CO-ORDINATION

Please check the one best answer		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
E1	Are you given the results of your laboratory tests in any form? (e.g. blood or sputum; the actual whether good or bad)?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
E2	Have you ever been referred to a specialist or hospital service? (E.g. Lung or heart specialist doctor)					
	1 <input type="checkbox"/> Yes If Yes, what specialist or hospital was it? (the last visit if more than one visit) _____					
	2 <input type="checkbox"/> No (Skip to question F1)					
	9 <input type="checkbox"/> Not sure/don't remember (Skip to question F1)					

The following questions E6-E13 refer to the specialist or service in E2.1 above (i.e. answered YES)

Please check the one best answer		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
E6	Did your CHC send you to the specialist or hospital?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
E7	Does your CHC know whether you went for your specialist / hospital appointment or not?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
E9	Did your CHC (or someone at your CHC) help you make the appointment for that visit?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

E10	Did your CHC give you a letter for the specialist/hospital about the reason for the visit?	4□	3□	2□	1□	9□
E11	Does your CHC know what the results of the visit were?	4□	3□	2□	1□	9□
E12	After you went to the specialist or hospital did your CHC talk with you about what happened at that visit?	4□	3□	2□	1□	9□
E13	Does your CHC seem interested in the quality of care you get from that specialist or hospital?	4□	3□	2□	1□	9□
E14	Would the CHC assist you to get medical-legal or insurance reports if required?	4□	3□	2□	1□	9□

F. CO-ORDINATION (INFORMATION SYSTEMS)

Please check the one best answer		<u>Definitely</u>	<u>Probably</u>	<u>Probably not</u>	<u>Definitely not</u>	<u>Not sure / don't remember</u>
F1	When you visit your CHC do you take any immunization cards, medical records or results from other health services that you visited?	4□	3□	2□	1□	9□
F2	Can you look at your medical records at your CHC if you wanted to?	4□	3□	2□	1□	9□
F3	When you go to your CHC is your folder (medical records) always available?	4□	3□	2□	1□	9□

G. COMPREHENSIVENESS (SERVICES AVAILABLE)

Please check the one best answer		<u>Definitely</u>	<u>Probably</u>	<u>Probably not</u>	<u>Definitely not</u>	<u>Not sure / don't remember</u>
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Following is a list of services that you or your family might need at some time. For each one, please indicate whether it is available at your CHC?

G2	Vaccinations / immunizations/injections to prevent diseases such as (e.g. flu vaccine/or polio)	4□	3□	2□	1□	9□
G3	Checking to see if anyone in your family qualifies for any social grants e.g. old age pension; child support grant; disability; TB.	4□	3□	2□	1□	9□
G4	Dental check-up – checking and cleaning your teeth	4□	3□	2□	1□	9□
G6	Family planning or birth control methods	4□	3□	2□	1□	9□

(Continue with one best answer)						
		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
G7	Alcohol or drug abuse counseling or treatment	4□	3□	2□	1□	9□
G8	Counseling for mental health problems	4□	3□	2□	1□	9□
G9	TB Testing	4□	3□	2□	1□	9□
G10	Stitching up a cut that needs stitches	4□	3□	2□	1□	9□
G11	Counseling and testing for HIV/AIDS	4□	3□	2□	1□	9□
G12	Checking your hearing	4□	3□	2□	1□	9□
G13	Checking your eyesight	4□	3□	2□	1□	9□
G15	Plastering fractures	4□	3□	2□	1□	9□
G17	PAP tests for cervical cancer	4□	3□	2□	1□	9□
G18	Tests for cancer of the bowel e.g. examining the back passage.	4□	3□	2□	1□	9□
G19	Counseling to stop smoking	4□	3□	2□	1□	9□
G20	Ante-natal care i.e. care for pregnant mothers	4□	3□	2□	1□	9□
G21	Treatment for an ingrown toenail i.e. removing part of the toenail.	4□	3□	2□	1□	9□
G22	What to do in case someone in your family cannot make decisions about his/her care e.g. very old (senile) or severe mental illness.	4□	3□	2□	1□	9□
G23	Support when there are changes in mental or physical abilities that are normal with getting older e.g. when too frail or disabled by a stroke?	4□	3□	2□	1□	9□
G24	Suggestions for nursing home care for someone in your family?	4□	3□	2□	1□	9□
G24b	Suggestions for home-based care e.g. a visit from a home-based carer?	4□	3□	2□	1□	9□
G25	Help with food supplements such as Ensure or food parcels	4□	3□	2□	1□	9□
G27 ngt	Access to termination of pregnancy services at or via your CHC if required?	4□	3□	2□	1□	9□

H. COMPREHENSIVENESS (SERVICES PROVIDED)

The next questions deal with different types of health care services that you sometimes get.

Please check the **one** best answer

		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
<u>In visits to your CHC, are any of the following subjects discussed with you?</u>						
H1	Advice about healthy and unhealthy foods	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H2	Home safety, like storing medicines safely; safe use of paraffin stoves; gun safety; pesticides	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H4	Ways to handle family conflict problems; arguments; disagreements (that may arise from time to time)	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H5	Advice about appropriate exercise for you	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H6	Tests for cholesterol levels in your blood	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H7	Checking and discussing the medications you are taking	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H12	For females: how to prevent osteoporosis (i.e. softening of the bones); breast examination.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H14	For males: Prevention of prostate cancer.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
H15 ngt	Advice and treatment on Sexually Transmitted Infections	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

I. FAMILY-CENTREDNESS

The next questions are about the relationship of your CHC with your family.

		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
Please give the one best answer						
I1	Does your CHC ask you about <i>your</i> ideas and opinions when planning treatment and care for you or a family member?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
I2	Has your CHC asked about illnesses or problems that might run in your family? e.g. alcohol in the family?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
I3	Would your CHC meet with members of your family if you thought it would be helpful?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

J. COMMUNITY ORIENTATION

Please check the one best answer		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
J1	Does anyone at your CHC ever make home visits?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
J2	Do you think your CHC knows about the important health problems of your area?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
J3	Does your CHC get opinions and ideas from people or organizations with knowledge to help provide better health care? E.g. the local health committee, churches, other organizations?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

Does your CHC do any of the following to help determine the effectiveness of services?

J11	Surveys of patients to see if services are meeting people's needs?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
J12	Surveys in the community to find out about health problems it should know about?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
J18	Ask members of your community to be on the local health committee?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

K. CULTURALLY COMPETENT

Please check the one best answer		Definitely	Probably	Probably not	Definitely not	Not sure / don't remember
K1	Would you recommend your CHC to a friend or relative?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
K2	Would you recommend this CHC to someone who <i>only</i> (does not) speaks your home language?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
K3	Would you recommend your CHC to someone who uses traditional medicine or home remedies such as Dutch medicines or herbs, or has special beliefs about health care?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
K4b ngt	Do you think your CHC understands/respects your culture?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
K4c ngt	Do you feel comfortable discussing religious or cultural issues that affect your health with the staff at the CHC?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

P. PRIMARY HEALTH CARE TEAM (ngt)

The following questions deal with health care services that you may need from other members of the PHC team.

Please check the **one** best answer.

	Definitely	Probably	Probably not	Definitely not	Not sure/ don't remember
P1. Can you see a social worker if you need to? E.g. for help with counseling for a family problem or advice about social services?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
P2. Can you see a physiotherapist (and occupational therapist) at your CHC if you need to? e.g. to help with muscle sprains or movement following a stroke.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
P3. Can you be visited in your home by a community health worker linked to your CHC if you need it? E.g. for home-based care for TB, HIV or basic care such as wound dressings.	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
P4. Can you be seen by a health promoter / dietician for advice on these topics?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
P5. Can you be seen by a mental health worker at your CHC for help with any mental health problems?	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>
P6. Can you be seen by a dental / oral health worker at / or linked to your CHC if you need it? E.g. any problems with your teeth	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	9 <input type="checkbox"/>

M. HEALTH ASSESSMENT

Please check the **one** best answer

M1 Would you say your health is:
1 Excellent 2 Very good 3 Good 4 Fair 5 Poor

M2 Do you have any physical, mental, or emotional problem that has lasted or is likely to last longer than one year?

1 Yes 2 No 9 Not sure/don't remember

N. DEMOGRAPHIC & SOCIOECONOMIC CHARACTERISTICS

These are several questions about you and your family.

N1 Are you: 1 Male 2 Female

N2 What is your age in years? _____ years

- N5 What is your home language?
1. English
 2. Afrikaans
 3. IsiXhosa
 4. Sotho
 5. Other _____
- 98 Refuse to Answer
- N8 Which of the following best describes your work situation now? **(Choose one)**
1. Employed full-time
 2. Employed part-time
 3. Self-employed (informal sector)
 4. Self-employed (formal sector)
 5. Student
 6. Homemaker
 7. Retired / pensioner
 8. Disabled
 9. Unemployed
- 98 Refuse to Answer
- N9 What is the highest grade that you completed at school? **(Choose one)**
- 0 No schooling
 1. Grade 7 or less (Std 5 or less)
 2. Grade 8 to 12 (Std 10 or less without senior certificate / matric pass)
 3. Completed high school or equivalent
 4. Completed technical training
 5. Have some college/university education, without completing a degree/diploma
 6. Completed a degree or diploma
- 98 Refuse to Answer
- N10 Do you have piped water in your house?
- 1 Yes **If yes, go to N13**
 - 2 No
- 98 Refuse to Answer
- N11 Do you have piped water in your yard?
1. Yes **If yes, go to N13**
 2. No
- 98 Refuse to Answer
- N12 Do you have piped water nearby?
1. Yes
 2. No
- 98 Refuse to Answer
- N13 Do you have electricity in your home?
1. Yes
 2. No
- 98 Refuse to Answer
- N14 Which of the following best describes your dwelling? **(Choose one)**
- 0 Shack; backyard dwelling (e.g. Wendy house); tent; other traditional dwelling 1 Brick house or flat (council)
 - 2 Other _____
- 98 Refuse to Answer
- N15 Is the head of your household employed? (it could be you)
1. Yes
 2. No
- 98 Refuse to Answer
- N16 Do you have water born sewerage YES / NO **If Yes**, inside / outside (ring). **If NO**, bucket etc

THANK YOU FOR CONTRIBUTING TO IMPROVING HEALTH SERVICES

Part 2: Chronic Disease Management Audit Tool

This data collection tool was used with permission of the Western Cape Provincial Department of Health. The CDM audit tool is based on the NDOH's standard treatment guidelines and essential medicines list. The procedure for using this tool is described in the fieldwork guide for the research team (see supplemental file 3 in Addendum H).



Integrated Audit for Chronic Disease Management Audit Tool 2015

PLEASE READ CAREFULLY

Introduction to the CDM audit tool

The aim of the integrated CDM audit is to monitor and evaluate clinical practice of participating facilities in metro and rural districts against the standards set, as well as to compare performance between consecutive years and trends over time.

This is an audit for facilities, and should not be done at alternative distribution sites, or at mobile clinics.

The criteria used to assess quality of care are based on the NDOH's Standard Treatment Guidelines & Essential Medicines List (EDL), evidence from the literature, and the Cape Town Metropolitan District Health Services' Chronic Diseases Record Sheet (Pink sheet) and evaluates the management of five chronic conditions: Diabetes, Hypertension, Asthma, COPD and Epilepsy.

There are two components to this audit; the first part looks at the facility's equipment available for the five conditions and the second part is a folder review for each condition (15 folders per condition). Please read through the instructions on how to complete and submit the audit carefully as we have strived to make this as comprehensive as possible BUT if you have any queries, please feel free to contact your study team leader or Dr Klaus von Pressentin.

We urge you to double check results, and where possible, avoid multiple written corrections on the same document. Please keep your original data entry sheets – to be compiled and send to the Stellenbosch University Family Medicine Division (for attention: Dr Klaus von Pressentin).

Please contact Ms Lana Fortuin (Research project administrator) with any logistical queries:

Email: lanaf@sun.ac.za

Tel: 021 938 9563

Facility Equipment and Processes Audit

<u>Data Element:</u>	<u>Room 1</u>	<u>Room 2</u>	<u>Room 3</u>	<u>Room 4</u>	<u>Room 5</u>
(A) Do each of the Chronic Care consulting rooms have the following:	YES or NO	YES or NO	YES or NO	YES or NO	YES or NO
1. Standard BP cuff:	Y / N	Y / N	Y / N	Y / N	Y / N
2. Obese cuff:	Y / N	Y / N	Y / N	Y / N	Y / N
3. Baumanometer:	Y / N	Y / N	Y / N	Y / N	Y / N
4. Ophthalmoscope	Y / N	Y / N	Y / N	Y / N	Y / N
5. Demonstration material for asthma: (a) Spacer	Y / N	Y / N	Y / N	Y / N	Y / N
(b) Placebo inhaler	Y / N	Y / N	Y / N	Y / N	Y / N
6. Access to PHC Standard treatment guideline EDL book 2008 an/or PACK	Y / N	Y / N	Y / N	Y / N	Y / N
(B) Does the prep room have access to the following:					Yes or No:
• Functioning scale					Y / N
• Tape measure					Y / N
• Height measurement					Y / N
• BMI chart or wheel					Y / N
• Urine dipsticks					Y / N
• Glucometer					Y / N
• Glucostix for glucometer					Y / N
(C) Does your facility have access to:					Yes or No:
• Foot screening forms					Y / N
• Chronic Diseases of Lifestyle stationery					Y / N
• Peak Expiratory Flow Meter					Y / N
• Monofilaments for foot exam					Y / N
• Snellen chart for literate patients					Y / N
• Snellen chart for illiterate patients					Y / N
• Pin-holes					Y / N
• Does your facility have access to a retinal/fundal camera?					Y / N
• Where there is no access to a fundal camera, is the facility visited by a medical officer?					Y / N
• Eye drops for dilating pupils					Y / N
(D) With regard to your facility chronic care processes:					Yes or No:
1. Does your facility use the Central Dispensing Unit (CDU) or a pre-packing system?					Y / N
2. Is there a Chronic Care Team (CCT) for your facility/ sub district that meets at least quarterly?					Y / N
3. Is there an action plan to improve audit outcomes?					Y / N
4. Is there a monthly clinical governance meeting where pharmaceutical and PTC matters are discussed?					Y/N
5. Does your facility receive minutes of this meeting?					Y/N
6. Does your facility do group health education?					Y / N
7. Does your facility have a process for calibrating baumanometers?					Y / N
8. Does your facility have access to community based support groups?					Y / N

Data Element	Folder Review of Diabetic Patients (20 in total)									
	1	2	3	4	5	6	7	8	9	10
Patient Folder Number:										
Number of chronic disease visits in 1 year:										
Yes or No										
Counselling on Lifestyle recorded:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Number of visits that recorded BP:										
Number of visits that recorded body weight:										
Yes or No										
Last BP reading < 140/80	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
If the BP>140/80, was there an action taken on the abnormal result?										
Annual BMI or waist circumference:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
BMI < 25 OR Waist Circ M<94cm, F< 80cm	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Any weight loss in past year?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Annual urine dipsticks done:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Is there protein present on dipstick?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Annual recording of serum Creatinine:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Is the eGFR < 50?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Is the patient on an ACEI or ARB?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Is there a contra-indication to using an ACEI or ARB?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Annual Foot Exam:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Annual Eye Screening	Visual acuity (Snellen):	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
	Retinal Assessment:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Annual HbA1C:	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
HbA1C < 7	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
HbA1C > 10	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Was there a decrease in the most recent HbA1C, compared to the level in the previous year?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Is the patient on Insulin?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

	1	2	3	4	5	6	7	8	9	10
Has a Random Total Cholesterol ever been done:	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Random Total Cholesterol < 4.5	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Does the patient qualify for simvastatin according to policy?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is simvastatin prescribed?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Does the patient qualify for aspirin, according to policy?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is aspirin prescribed?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is the patient known to be HIV positive? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If no record of being HIV+, was the patient offered an HIV test in the last year? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

Data Element	Folder Review of Hypertensive Patients (20 in total)									
	1	2	3	4	5	6	7	8	9	10
Patient Folder Number										
Number of chronic disease visits in 1 year:										
Yes or No										
Counselling on Lifestyle recorded :	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Number of visits that recorded BP:										
Number of visits that recorded body weight:										
Yes or No										
Last visit - BP <140/90	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If BP above target, any action taken?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Does patient receive NSAID for long term use?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is there a compelling indication for long-term NSAID?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Annual BMI/ Waist Circumference	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
BMI < 25 OR Waist Circ M<94cm, F< 80cm	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Any weight loss in past year?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Annual Urine dipstick done:	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is there protein present on dipstick?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Annual recording of serum Creatinine:	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is the eGFR<50?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is the patient on an ACEI or ARB?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is there a contra-indication to ACEI or ARB?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Has a Random Total Cholesterol ever been done:	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

	1	2	3	4	5	6	7	8	9	10
Cholesterol: < 5	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Annual Random blood glucose done	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Has a cardiac risk assessment been done at least one?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is the patient known to be HIV positive? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If no record of being HIV+, was the patient offered an HIV test in the last year? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

Data Element	Folder Review of Asthmatic Patients (20 in total)									
	1	2	3	4	5	6	7	8	9	10
Patient Folder Number:										
Number of chronic disease visits in 1 year:										
Number of acute exacerbation visits in 1 year:										
Yes or No										
Was there counselling about smoking?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Was the patient prescribed an NSAID in the past year?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is patient prescribed inhaled steroids?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Counselling about inhaler technique (yes/no):	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Number of ALL visits that assessed Control of asthma:										
Control of asthma (score or WC, PC, UC) or X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X	WC/PC/UC/X
Is the patient known to be HIV positive?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If no record of being HIV+, was the patient offered an HIV test in the last year?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

Data Element	Folder Review of COPD Patients (20 in total)									
	1	2	3	4	5	6	7	8	9	10
Patient Folder Number:										
Number of chronic disease visits in 1 year:										
Number of exacerbations in the past year:										
Yes or No										
Was there counselling about smoking?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Did the patient receive an influenza (flu) vaccine?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Counselling about inhaler technique (yes/no):	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Is the Patient known to be HIV positive? (Y/N)	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
If no record of being HIV+, was the patient offered an HIV test in the last year? (Y/N)	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

Data Element	Folder Review of Epileptic Patients (20 in total)									
	1	2	3	4	5	6	7	8	9	10
Patient Folder Number:										
Number of chronic disease visits in 1 year:										
Number of acute exacerbation visits for epilepsy:										
Was the cause of epilepsy recorded? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Received counselling about:	Medication? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
	Lifestyle changes? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
	ETOH use/abuse? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
No. of visits that recorded the number of seizures?										
If number of seizures recorded, has the pt been fit-free in the past 12 months?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If any seizures were recorded, any intervention?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Annual enquiry about medication side effects? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Patient on more than one anti-epileptic medication? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If the patient is on more than one anti-epileptic medicine, was the combination therapy initiated by a specialist? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Is the Patient known to be HIV positive? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
If no record of being HIV+, was the patient offered an HIV test in the last year? (Y/N)	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

G. CHAPTER 3.1 (ARTICLE 1): SUPPLEMENTAL FILE

Data Analysis Protocol for the Family Physician Impact Assessment Tool

Domains and items

There are six domains, namely a domain for each FP role:

	Domain	Number of Items	Additional items
d1care	Care provider	11	d1care12
d2cons	Consultant	10	d2cons11
d3comm	Community involvement	9	d3comm10
d4lead	Leadership and governance	11	d4lead12
d5super	Supervisor trainer	6	d5super7
d6capac	Capacity builder	7	d6capac8
	Total number of items	54	

Coding for domains:

0 = Not part of FP's role

1 = Strongly disagree

2 = Disagree

3 = Agree

4 = Strongly agree

9 = Unable to answer or "don't know" (also used for missing data)

Only options 0-4 are used for analysis. At the meeting with supervisor and biostatistician on 4 July 2016, it was agreed to include the option 0, as 0 and 9 are not equivalent. 0 means that the FP does not do it. If they don't do it all, they have a 0 impact. "Don't know" must not count. Therefore 0 is the lowest possible score (0 is a valid score). If 0 is excluded, we are only comparing the roles influenced by the FP (seen as part of their job description); therefore, 0 needs to be included in the analysis.

Coding for additional items

One additional item added to each domain in the FP version of the tool: respondents were asked to compare the FP with the other doctors (medical officers) in the facility for each domain (role), with response options:

0 = Not part of FP's role

1 = Significant less impact

2 = Less impact

3 = Same impact

4 = More impact

5 = Significant more impact

9 = Unable to answer (also used for missing data)

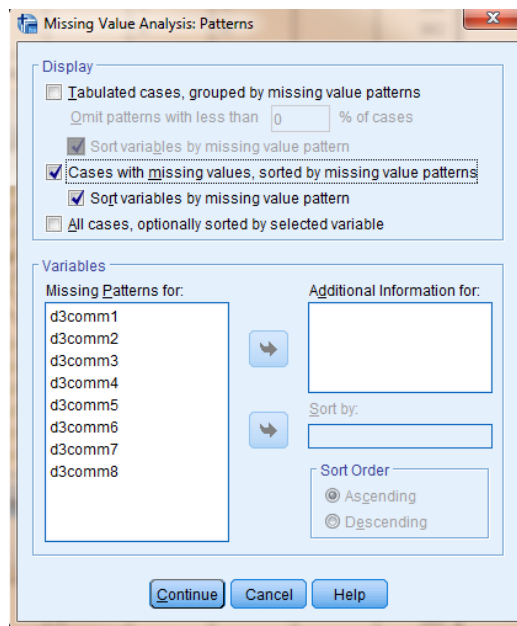
Only options 0-5 are used for analysis.

Data analysis steps

Step 1. No reverse scoring required, as all items are phrased positively.

Step 2. For scoring each domain (at individual respondent level), do not score if coded 9 (missing) for $\geq 50\%$ of questions in the domain.

Using Missing Value Analysis (MVA in SPSS), calculate the percent missing responses per respondent per domain, organised by case number (create a variable, "casenum"). When using MVA in SPSS, select the option under patterns below:

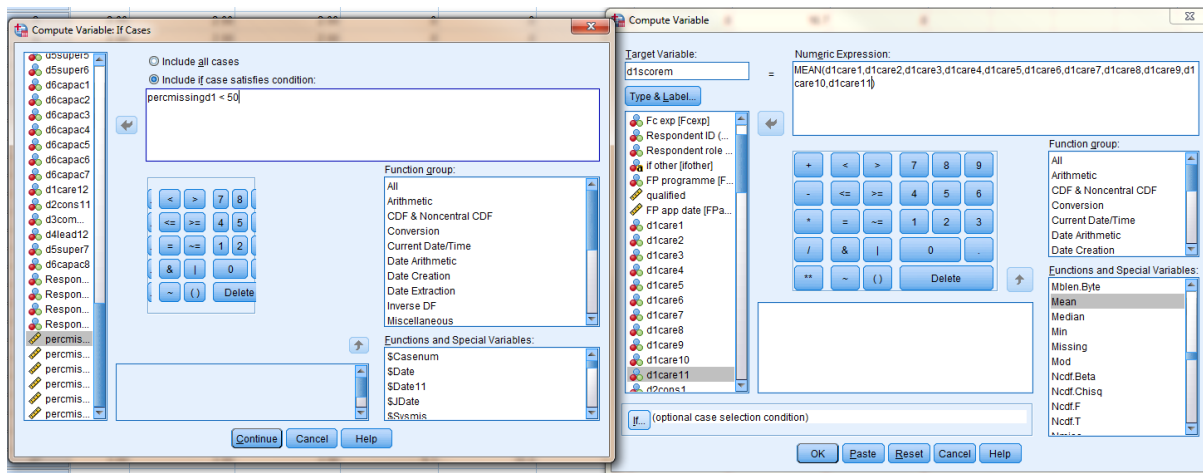


Take the table created in SPSS output into Excel: two columns, with headers “casenum” and “percentmissingd1”, etc. Use a sheet per domain. Sort the Excel sheet per case number (after formatting the cells to number format), open as a new SPSS file and merge into respondent-level dataset (case number as reference). Assign a 0 to the system-missing values in the new variable, “percentmissing1”, by recoding into same variable (0% missing).

Step 3. Scoring each domain

Procedure:

Calculate the mean of each domain (be sure not to include the additional question for each domain). Calculate a new variable, “mean of each domain”, with the condition of excluding those cases where $\geq 50\%$ of the variables have missing values for the domain in question (use the calculated missing value percentage for computing this variable).



When collapsing to the level of the facility, the unit of analysis, total up the number of respondents per facility.

Assess relationship between the number of respondents per facility and unweighted scores in order to assess for bias (see sensitivity analysis below). If no relationship exists, apply weighting – see procedure below.

Both weighted and unweighted means will be presented. Weighting will be applied in the direction of facilities with more respondents (more observations per facility).

Weighting procedure:

Reference: Maletta H. Weighting. Buenos Aires, Argentina. Recuperado el. 2007;3. Available online from URL: <http://www.spsstools.net/static/resources/WEIGHTING.pdf> (last accessed 4 July 2016).

SPSS command: “WEIGHT BY X”, where X = number of respondents per facility.

A new variable Y is created, which is the product of X by n/N = number of facilities/total number of respondents (both intervention and control arms). Here, there are 56 facilities (n) with 660 respondents (N). $n/N = 56/660 = 0.0848484848484848$. Y = the weighting.

Compute the weighted mean of each domain, by multiplying Y with each unweighted mean. The limitation: the weighted mean values may fall outside the boundaries of the Likert scale, as an ordinal variable was treated as a scale variable.

Step 4. Using both the weighted and unweighted means

When reporting the data, we agreed to present both unweighted and weighted means. A sensitivity analysis was done, by excluding the facilities with less than eight respondents (eight being the minimum number of observations required for a reliable assessment of the FP/MO). Will removing these facilities equalise or remove the bias? The weighted mean may only be used if there is no relationship between the number of respondents and the unweighted mean.

Additional variables analysed:

- **Facility type** (DH or CHC)
- **Rural or metropolitan area**
- **Respondent category: FP training model** (treat 3 and 9 as missing)

1	new
2	previous
3	not applicable
9	missing

H. CHAPTER 3.3 (ARTICLE 3): SUPPLEMENTAL FILES

3.3.1 Supplemental file 1: A brief introduction to the South African district health system.

The post-Apartheid government introduced a district health system (DHS) model for health care delivery in 1997 (National Department of Health). The DHS is intended to provide “healthcare for all” in keeping with the Alma Ata declaration and the WHO description of the DHS. This process resulted in segmentation of the national health system into 52 geographically defined and contiguous districts. Each health district is responsible for the primary healthcare (PHC) services for a well-defined population, living in a clearly defined administrative area.

The health district management team consists of a director and deputy directors, including the deputy director for comprehensive health services (who coordinates the clinical services and health programs, such as HIV/AIDS and tuberculosis, women’s health, mental health, chronic conditions and community based services), as well as the deputy director for support services (responsible for finance, supply chain, information management and human resources).

Each health district is sub-divided into so-called sub-districts, whose management structures report to the district management team. The health district management team support the sub-district management teams with policy implementation (policies developed at district, provincial or national level), interact with the other governmental departments at district level (such as social services and education), and report to the provincial and national management structures.

Each health sub-district aims to provide a comprehensive healthcare service to a smaller unit of the district population. These services may be divided into facility based services and community based services.

The different facility types include the level 1 district hospital, which in turn forms the referral hub for the PHC facilities. These district hospitals provide outpatient services (emergency centre, outpatient department and day surgery) as well as inpatient services (general adult, maternal and neonatal, and paediatric wards, as well as theatre services).

PHC facilities are further divided into community day centres (CDC) or community health centres (CHC) (the former providing an 8-hour service, whilst the latter provides a 24-hour service, often with a midwife-driven maternity service and/or an emergency centre), and smaller clinics (including satellite clinics which provide a service for less than 5 days per week, as well as mobile clinics). All PHC facilities provide a nurse-driven and mainly nurse-managed service with doctor-support either full-time, as in the case of the CDCs or CHCs, or part-time to clinics via a planned outreach service from the district hospital. Most primary care consultations in the country (more than 80%) are with nurses who thus become the first point of contact for patients in the public health system.

District level services refer to a level 2 regional hospital with general specialist disciplines, which forms the referral hub of the surrounding healthcare network. The level 2 hospitals refer patients to level 3 academic or central hospitals for sub-specialist and other specialized services. The public health system also includes specialized tuberculosis and psychiatric hospitals.

The human resources situated within the sub-district health structure consist of a multi-disciplinary team. The sub-district management team consists of a medical manager (or chief executive officer), a clinical manager (usually a medical doctor), a family physician (a medical doctor with a postgraduate qualification in family medicine), nursing managers (the hospital matron, the PHC manager, the health program managers and the operational managers of the district hospitals, as well as the respective PHC facilities). This management team also contains the support services managers.

The multi-disciplinary clinical team consists of the FP, medical officers (doctors with no recognized postgraduate training in family medicine), registrars (family medicine residents enrolled in a formal postgraduate training program affiliated with an university), nurses (including clinical nurse practitioners, midwives, professional nurses), clinical associates (a recently introduced mid-level doctor in the district hospital), pharmacy staff (pharmacists and pharmacy assistants), dental staff (dentist and oral hygienist), physiotherapists, occupational therapists, speech therapists, clinical psychologists, lay counsellors, health promoters, and social workers. Community-oriented primary care services are also emerging with teams of community health workers led by a nurse taking responsibility for a certain number of households within a defined municipal ward.

The roll-out of the national health insurance system has seen an increased partnership between the private and public health sectors, with the contracting of private general practitioners to help provide outreach services to PHC clinics. Other human resources for health residing outside the public sector, but utilized by the community include traditional healers and alternative practitioners (including homeopathy, Chinese medicine, acupuncture, chiropractic, naturopathy, osteopathy and therapeutic reflexology).

The FP is trained to work within the DHS and is employed typically at the level of the sub-district, where he or she is based at a larger facility (such as the district hospital or CHC) and performs an outreach service to the surrounding PHC facilities. The FP may also work at the level of the larger health district, often as a member of the DCST. Historically (and at present), FPs may also be working at level 2 hospitals, where they may provide clinical care within the emergency centre, wards, theatre and outpatient department as part of the larger clinical team, consisting of other disciplines such as paediatricians, general physicians (internal medicine specialists), obstetricians and gynaecologists, surgeons (including orthopaedic specialists), emergency physicians and anaesthetists.

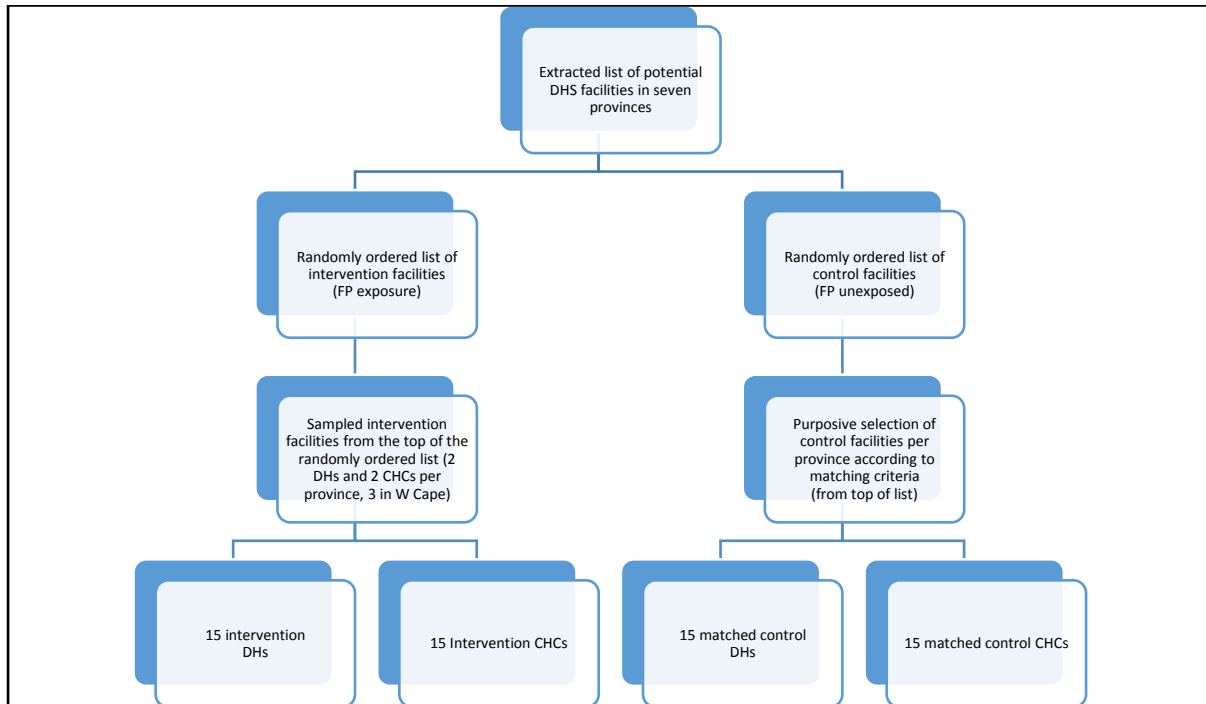
South Africa's population of just under 55 million people live within nine provinces which are further sub-divided into 52 health districts. In 2014, these health districts contained 331 CHCs/CDCs and 255 district hospitals (with a total number of 30 703 in-patient beds, an average bed utilization rate of 72% and an average inpatient stay of 6.5 days). The national average PHC utilization rate in 2014 was 2.4 visits per person per year to a PHC facility (this is a reflection on the access and availability of services). At least 36% of the population live in rural (non-urban) areas (World Bank 2014), but are served by only 12% of the country's doctors and 19% of its nurses. The national healthcare worker average values (per 10,000 population) for 2015 are presented in the table below. At the beginning of 2015, there were around 208 FPs working in the DHS (public sector), which equates to 0.035 per 10,000 population. World Bank figures suggest an overall FP rate of 0.1 per 10,000 in both public and private sectors. These FP supply rates may be compared with countries such as Brazil (0.2 per 10,000), China (1.2 per 10,000) or the UK and North America (4.0–12.0 per 10,000).

Table 1 (supplemental file 1). National average of health care workers in 2015.

Public sector healthcare worker cadre	Staffing numbers per 100,000 uninsured population
Dentists (non-specialist)	2.53
Doctors (non-specialist)	30.8
Doctors (specialists)	11.1
Professional nurses	151.3
Enrolled nurses	68.6
Nursing assistants	77.5
Student nurses	15.3
Radiographers	6.1
Psychologists	2.75
Pharmacists	11.0
Occupational therapists	2.9
Physiotherapists	2.92

(Source: South African Health Review 2016, by Health Systems Trust. Available from <http://www.hst.org.za/publications/south-african-health-review-2016>)

3.3.2 Supplemental file 2: Schematic presentation of the facility sampling selection process.



3.3.3 Supplemental file 3: Fieldwork guide for research team.

1. Introduction

Welcome, and thank you for your hard work in realizing this project. This study has great social and scientific value. We have an opportunity to generate new knowledge and evidence to inform the conversations around family medicine and primary care at local, provincial, national, regional (Africa) and international levels. The study has been approved by the relevant HRECs and PHRCs (details available). This study is funded by the European Union (EuropeAid).

2. Principles and values

A few words on the guiding principles and values that inform this project: communication, accountability, integrity, respect and support. We depend on each other – this project will succeed if we support each other and share the accountability of our team's actions. We will be visiting primary care facilities in which primary care colleagues work hard under challenging circumstances. Client care and service delivery are the primary priorities, and our actions and approach should indicate our respect for these priorities (for example: respecting clinical workload, patient care and clinical areas).

3. Planning and communication

Advanced planning and communication will ensure a smooth visit and an efficient method of data collection. The image of preparing for the harvest comes to mind. When visualizing the harvest (high quality data collected), we need to ensure that the ground is prepared (communication with facility managers and other stakeholders before and during data collection/site visits), seeds are sown at the right time (emailing data collection tools and consent forms/information leaflets in advance, to ensure adequately informed respondents) and the harvest is collected in an efficient manner (at a time and place which suits the facility and respondents). The harvest should be handled carefully (quality data collection, as well as safe and secure management of completed data tools) – this also includes data entry into the correct tools (data entry will be done centrally at Stellenbosch University).

4. Training and support

Research assistant training is offered and reading materials are available to prepare the team for data collection. Please liaise with the co-applicant coordinator or Klaus von Pressentin regarding training needs. Email, phone calls and WhatsApp group messages may be used for each team's in-house conversations. Essential reading: please read the approved protocol and protocol synopsis. The tools, consent forms, data entry forms and training material are available in a Dropbox folder.

5. Cross-sectional observational study

Cross-sectional observational study: to evaluate the impact of family physicians (FPs) at both primary care facilities and district hospitals (in terms of health system performance, clinical processes and the six family physician roles). We are comparing facilities with FPs to matched facilities without FPs.

Across seven provinces, 30 district hospitals (15 intervention: 15 control) and 30 primary care facilities (15 intervention: 15 control) have been selected. Two sets of tools and consent forms have to be considered; be sure about whether the facility is a district hospital (DH) or primary care facility/community health center (CHC), as well as whether it is an intervention facility (exposure to a FP for at least two years) or a control facility (not exposed to a FP as far as possible).

The data will be collected at the facility (the unit of analysis). The tools consist of a demographic tool (descriptive information about the facility, as well as quantifying the family physician influence and confounders), as well as tools aimed at understanding the facility's system and clinical performance. The Null Hypothesis is that there is no difference in these variables at the intervention and control facilities, regardless of the presence or absence of a FP (the "drug"). The study design is cross-sectional observational (and not experimental), because there is no randomization in terms of drug exposure (no control over which facility / "patient" gets the FP "drug" or not).

Know the tools well – who, what and where. Who will be the respondents (patients, staff and managers)? What will be asked or looked for (records, documents and facility level data)? Where will you find the information in the facility (wards, human resources office

and information management office)? The tools have been given codes (Table 1 in supplemental file 2) – this will help you plan the stationary needs before the site visit.

Understand the geographical implications of the facilities in your province(s). If distances are involved, planning the visit becomes more crucial. Review the logistics of each visit (stationary, transport, accommodation, air time/data and meals).

6. General principles of approaching the facility visit

The importance of planning the logistics needs to be emphasized. The data collection can be likened to harvesting a crop (the data).

- **First you will have to prepare the field:** liaise with facility manager – by email/phone/meeting, negotiate a convenient time for visit, and identify a contact person who will communicate with the research assistant(s) onsite. An email template and facility manager letter are available. Remember that emails are not always read – follow-up by phone (or in person) to confirm receipt of important emails. Sometimes, it may be required to contact the facility's health council/board (community representatives) – they may create more buy-in from the community/clients (check with the manager if it is necessary to involve them).
- **Then you plant the seeds:** ideally, some of the tools/forms could be emailed in advance, as this makes the actual visit more efficient. For example: email the facility manager the demographics tool (S1.1 for DH and S1.4 for CHC). This helps the facility to start preparing (and even pre-populating) the information/tools before your visit.
- **Then you harvest:** arrange a site visit at a convenient time/day, contact the liaison person upon arrival, meet the facility manager and FP/MO and tour the facility. Agree on potential spaces to use auditing files/entering data (a boardroom or office could be used, if available). Patient interviews (PCAT – S1.7 to S1.9) does not require personal information and may be conducted in a space adjacent to a waiting area/queue (pharmacy area, for example). Ensure that the tools that are completed are managed securely and safely (to prevent loss of data collected) – invest in a filing system, for use during the field visit and at the office/department.

- **Then you check the crop collected:** quality checks (to ensure complete forms) are vital. Enter the data on the capture sheets (Excel data entry forms). Email the completed tools to the central office at Stellenbosch University.
- **Thank the landowner:** thank the manager and staff for their time and support. Some of them may ask for individual feedback. This is not the primary aim of the study – explain that we will analyse and present/publish the data for the whole pool of facilities (comparing all the intervention with all the control facilities across the 7 provinces – this was how we calculated the sample size with the help of the biostatistician).

7. The district hospital tools

S1.1 – Demographics and Child PIP/PPIP data: this form could be send in advance (“planting the seeds”). It deals with the characteristics of the facility (routine data such as average length of stay, bed count, staff categories). It also collects data on the family medicine influence (used in both intervention and control facilities). Also looks at confounders (other reasons for quality improvement, such as outreach visits by specialists). This information may be obtained from the clinical/operational/nursing manager, with assistance from the Human Resources and Information Management offices.

The Child PIP/PPIP data looks at the data collected on these software programs over the previous year (calendar year) – usually, there is a clinical/nursing manager or a MO/the FP who has the software on their computers. Often, these reports are sent to the district office or regional hospital specialist who collates the data (it may be necessary to communicate with the district/regional office to access the facility’s data).

S1.2 – Signal functions tool: this is an expanded version of the WHO obstetric care signal function tool, which was implemented in South Africa by Prof Bob Pattinson from the MRC (South African Medical Research Council) and is recommended by the National Committee for the Confidential Enquiries into Maternal Deaths (NCCEMD) and National Perinatal Morbidity and Mortality Committee (NaPeMMCo). The signal functions looks at key elements of care (essential services) which should be present in the clinical service area. It also looks at which staff category is able/has been trained to perform key actions in this

clinical domain. Our tool has been expanded to include the key clinical domains of the district hospital, using the level 1 package of care specifications for district hospitals (Western Cape Department of Health). An operation/clinical/unit manager should be able to provide the information to the research assistant(s).

S1.3 – NCS Domain 2: The National Core Standards (NCS) audit tool has been designed by the Office of Health Standards Compliance (OHSC), National Department of Health. Domain 2 looks at patient safety, clinical governance and infection prevention and control (a FP should make an impact in this domain). Key elements from each of the sub-domains of domain 2 were selected. The tool is fairly clear – essentially, the data may be collected with assistance of the nursing/clinical manager, as the NCS audits are performed annually and the source documents should be readily available. The four staff interviews highlight the aspect of supervision: ask a staff member in the 4 key clinical areas the simple 4 questions (remember to obtain consent of these staff members, using form C1.1).

8. The CHC (primary care facility) tools

S1.4 – PCF (primary care facility) demographics: this form could be send in advance (“planting the seeds”). It deals with the characteristics of the facility (PHC head count, staff categories). It also collects data on the family medicine influence (used in both intervention and control facilities. Also looks at confounders (other reasons for quality improvement, such as outreach visits by specialist, and staff turnover rate). This information may be obtained from the clinical/operational/nursing manager, with assistance from the HR and Information Management offices.

S1.5 and S1.6 – CDM audit tool: this tool audits the facility’s chronic disease management (CDM), a proxy of the quality of clinical processes at the facility. The structure audit sheet also speaks to the performance of the facility as a component of the health system: are the rooms used for seeing chronic disease clients adequately stocked and prepared to provide quality care (clinical governance)? Twenty folders of each of the “big 5” of chronic conditions (hypertension, diabetes, asthma, COPD and epilepsy) are audited for evidence of quality care (adherence to guidelines, such as the EDL and PACK). This audit tool was developed in the Western Cape over the last 5 – 7 years and is used with permission of the

Western Cape Department of Health. S1.5 consists of the tool and explanatory manual, whereas S1.6 consists of a slimmer edition (just the data entry tools).

Please note that the files/folders should be selected systematically. This may be done in conjunction with the clinical/unit manager and the “chronic club” nursing sister (if this system is used). The pharmacist may have a register of chronic disease clients (patients receiving chronic medication) and files may be drawn with the help of the patient records manager/team. Alternatively, files may be selected from the “prep room” where the daily influx of client folders are screened (acute vs. chronic visit) – these folders may be used to identify which chronic disease clients are present on a given day. The pharmacy may also be asked to keep the folders of chronic disease clients separately after their medication has been dispensed. Some facilities make use of a statistics form, where health care providers indicate the range of clients seen – on this form chronic disease clients may be identified and this information may be used to select folders.

When auditing a chronic disease client’s file, treat the content with respect. Familiarize yourself with the way the file’s content is organized (acute vs. chronic visits, acute vs. chronic scripts/prescriptions and laboratory results). At some facilities, a flow chart (or chronic disease form) may be used to structure the recording of chronic care elements (BP, BMI, counselling provided, clinical examinations, laboratory tests, and actions on results/follow-up plan). Look also for foot and eye screening tools in diabetic patients’ files.

Clinicians tend to abbreviate – see list of common abbreviations and medication used in chronic disease care (provided as an appendix).

Ultimately, the mantra of “not recorded = not done” applies when completing the data entry sheets. If the information/evidence is not available, mark **N** (No).

S1.7 to S1.11 – PCAT: The Primary Care Assessment Tool was developed in the USA by Prof Barbara Starfield at Johns Hopkins School of Public Health. Its use has been validated in the Western Cape by Dr Graham Bresick and his team from the University of Cape Town, South Africa. Dr Graham Bresick collaborates with us on this project, by helping us with the

training of fieldworkers and interpreting the results of the PCAT component. This tool assesses the experience of primary care across the various key domains: access, continuity, coordination, etc. Three categories of respondents are invited to complete the tool: patients/clients; providers/clinicians (doctors, nurses) and managers. A specific version of the tool applies to these categories: AS – Adult Short (in English, Afrikaans, Xhosa and Zulu) for patients, PE – for providers and FE – for facility managers. The tool is not intended to report on patient or staff satisfaction; it is designed to report on these three categories of respondent’s experience of the primary care provided at this facility (health system performance). Ensure that all the items in the tool have been answered. Keep a record of responders recruited, forms issued and completed. *Please see PCAT training material and manual for more detail.*

Explain the response options in the tools to each respondent:

Definitely	Probably	Probably not	Definitely not	Not sure / don’t remember
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The AS tool for patients should be administered by the research assistant(s). Consent forms C1.3 – C1.5 are available. Patients may be recruited in the waiting areas of the facility (patient records or pharmacy). Liaise with the facility’s contact person regarding the most appropriate area in which to recruit and interview the patients. It may be useful to make a short announcement in the designated area: “We would like to invite you to contribute to an important study. Patients who have been visiting this facility over the past 2 – 3 years (at least 3 visits) are eligible. It is an opportunity to help improve the quality of care delivered at this facility and similar facilities across the country.” (Please translate if indicated). It may be useful to ask one of the staff to introduce you to the “audience”. Interviews should last no longer than 30 minutes each. A total of 15 patients should be interviewed. Keep a tally/record on interviews completed (this helps you to monitor your progress). Ensure that patients do not lose their spot in the queue – the prospect of missing one’s appointment with the doctor/nurse is a huge concern. A handy hint: keep the

response options for each statement handy on a separate sheet/card, to guide the respondent's answers.

The PE tool for providers may be completed by the doctors/nurses (care providers) themselves. Consent form C1.2 applies. Agree on a convenient time period in which the provider may complete the tool, as well as a convenient collection time and place. Keep a record of the providers who were recruited, forms issues and forms collected. Aim for 10 providers. It should take them around 30 minutes to complete.

The FE tool for managers may be completed by up to five managers (unit/operational/clinical managers). Consent form C1.2 applies. Agree on a convenient time period in which the provider may complete the tool, as well as a convenient collection time and place. Keep a record of the providers who were recruited, forms issues and forms collected. Aim for five managers (some facilities may only have two to three managers). It should take them around 30 minutes to complete.

9. Conclusion and acknowledgements

This concludes the fieldwork guide – please let me know if you have any suggestions for improvement or clarification.

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Please visit the website of the Division for more information on the EuropeAid-funded project: www.sun.ac.za/fammed

Facebook page: <https://www.facebook.com/stelfammed>

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Table 1 (supplemental file 2). Tools required (number of respondents/data sources per tool)

Document Code	Name of tool	Per DH facility		Per PCF facility			
		Staff	Managers	Patients	Staff	Managers	CDM folders
S1.1	DH demographics and Child PIP/PPIP		1				
S1.2	DH signal functions		1				
S1.3	NCS domain 2	4 staff interviews	1				
S1.4	PCF demographics					1	
S1.5	CDM audit tool and manual						20 folders per condition = 100
S1.6	CDM audit tool - extra templates						
S1.7	PCAT AS patients - English			15			
S1.8	PCAT AS patients - Afrikaans						
S1.9	PCAT AS patients - Xhosa						
S1.10	PCAT PE practitioner (doctor/nurse)				10		
S1.11	PCAT FE facility manager					5	

For District hospitals (DH):

S1.1: Demographics of the facility– this helps us to gather the data to describe the facility and quantify the family medicine influence.

S1.2: core signal functions of clinical service delivery

S1.3: abbreviated domain 2 of NCS audit tool

For Primary Care Facilities (PCF) = Community Health Centres:

S1.4: Demographics of the facility– this helps us to gather the data to describe the facility and quantify the family medicine influence.

S1.5 – 1.6: Chronic disease management tool: we plan to audit 20 folders for each of the 5 chronic conditions (diabetes, hypertension, asthma, COPD and epilepsy).

S1.7 – 1.11: Primary Care Assessment tool: interviews with 15 patients, around 10 members of the clinical team (CNP/doctors) and some of the management team members.

Abbreviations: PCAT = Primary Care Assessment Tool (AS – patients; PE – providers; FE – managers); NCS = National Core Standards

3.3.4 Supplemental file 4: Final selection of facilities per province.

Province	Control sites		Intervention sites		Total
	DH	CHC	DH	CHC	
Free State (FS)	4	0	2	0	6
Gauteng (GP)	0	4	2	5	11
KwaZulu-Natal (KZN)	2	3	3	2	10
Mpumalanga (MP)	3	0	2	0	5
Northern Cape (NC)	1	0	2	0	3
North West (NW)	2	3	1	2	8
Western Cape	3	5	3	6	17
Total	15	15	15	15	60

DH: district hospital; CHC: community health centre

3.3.5 Supplemental file 5: Number of complete datasets per tool per facility type.

Tool	Number completed	Number expected	Percentage complete (%)
DH			
Signal functions	22	30	73.33
NCS	19	30	63.33
Child PIP	26	30	86.67
PPIP	27	30	90
Average: DH	24.2	30	80.67
CHC			
CDM structural aspects	25	30	83.33
CDM diabetes	27	30	90
CDM hypertension	28	30	93.33
CDM asthma	25	30	83.33
CDM COPD	18	30	60
CDM epilepsy	26	30	86.67
CDM average	24.83	30	82.78
PCAT patients	30	30	100
PCAT providers	27	30	90
PCAT managers	27	30	90
PCAT average	28	30	93.33
Average: CHC	26.24	30	87.46