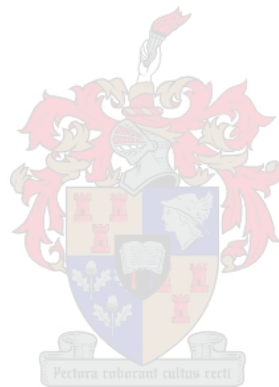


**Allowing the Aged Autonomy to Act or Abstain:
Ethical considerations related to Invasive Medical Procedures
in the Elderly**

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Declaration

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Abstract

Modern medical technology has enabled the use of invasive medical procedures in elderly patients in an attempt to extend life or to improve quality of life. This has created significant complexity in both clinical management and ethical decision making regarding these patients.

From antiquity, the focus of medicine has been to relieve suffering and to provide care, as opposed to the modern focus on cure. This shift in the focus of medicine makes ethical considerations regarding the use of invasive medical procedures in the elderly especially important, as technical advances in medicine could create unrealistic expectations of cure (for both patients and caregivers) and if utilised inappropriately, cause failure to suitably care for the elderly.

The aim of this thesis is to conceptualise a framework of factors that aids ethical deliberation when invasive medical procedures in elderly patients are considered, representing a standard of due care. The factors incorporated in the framework are identified by evaluating the current ethical landscape regarding invasive medical procedures in the elderly within the context of principlism. Principlism refers to the principlist approach as outlined by Tom Beauchamp and James Childress in *Principles of Biomedical Ethics*.

Despite the current focus on patient autonomy in bioethics and in the medical literature, there is a general lack of awareness by clinicians of the factors that drive an increase in intensity of treatment resulting in invasive medical procedures in the elderly. Narrow views of these factors predominate in the literature and no attempt is made to consolidate all these factors into a conceptual framework for ease of ethical deliberation.

It is argued that familiarity with all the factors that influence the use of invasive medical procedures in the elderly, would enable a healthcare practitioner to take these factors into account during ethical deliberations. Reference to a framework that incorporates all these factors would result in more appropriate care of patients, congruent with the principles of respect for autonomy, beneficence and nonmaleficence. Awareness of these factors would also promote the principle of justice by facilitating fair distribution of available resources, as less pressure will be placed on the system if unwanted and unwarranted interventions are avoided.

Opsomming

Moderne mediese tegnologie stel bejaarde pasiënte in staat om indringende mediese prosedures te ondergaan in 'n poging om hulle lewenskwaliteit te verbeter of om hulle lewens te verleng. Beduidende kompleksiteit in die kliniese hantering van sowel as die etiese besluitneming oor hierdie pasiënte vloei hieruit voort.

Die fokus van mediese sorg, van antieke tye af, was om siek mense te versorg en om lyding te verlig. Vandag is die klem egter op die genesing van siekte en die herstel van funksie. Hierdie verandering in die fokus van mediese sorg maak etiese oorwegings rakende die gebruik van indringende mediese prosedures in bejaarde pasiënte noodsaaklik. Tegnologiese vooruitgang in mediese sorg kan onrealistiese verwagtinge van genesing skep by beide pasiënte en medici. Onvanpaste gebruik van indringende prosedures kan ook veroorsaak dat daar nie geskikte sorg aan pasiënte verleen word nie.

Die fokus van hierdie tesis is om 'n raamwerk van faktore te konseptualiseer wat etiese besluitneming fasiliteer wanneer indringende mediese prosedures in bejaarde pasiënte oorweeg word. Hierdie raamwerk verteenwoordig 'n basiese standaard van nodige sorg. Die faktore wat in die raamwerk geïnkorporeer word is geïdentifiseer deur die huidige etiese landskap te evalueer aan die hand van die beginsel-benadering sover dit indringende mediese prosedures in bejaarde pasiënt aanbetref. Die beginsel-benadering is uiteengesit deur Tom Beauchamp en James Childress in hulle boek *Principles of Biomedical Ethics*.

Ten spyte van die huidige klem op pasiënt outonomie in die mediese literatuur sowel as in die bio-etiek, is daar 'n onkunde by klinici aangaande die faktore wat 'n toename in die intensiteit van behandeling (met toenemende indringende mediese prosedures in bejaardes) dryf. Eng benaderings rakende hierdie faktore oorheers die literatuur. Geen poging om al die relevante faktore te konsolideer in 'n konseptuele raamwerk om etiese besluitneming te fasiliteer is tot dusver gemaak nie.

Dit word aangevoer dat 'n grondige kennis van al die faktore wat die gebruik van indringende mediese prosedures in bejaardes beïnvloed, 'n gesondheidspraktisyn in staat sal stel om hierdie faktore teen mekaar op te weeg tydens etiese beraadslaging. Verwysing na 'n raamwerk wat al hierdie faktore insluit sal 'n gesondheidswerker in staat stel om meer toepaslike sorg aan pasiënte te verleen, in lyn met die beginsels van biomediese etiek. Die beginsels van respek vir pasiënt outonomie en pasiënt welsyn asook nie-benadeling van die pasiënt sal eerbiedig word. Die beginsel van geregtigheid sal ook bevorder word as ongewenste en ontoepaslike intervensies vermy kan word wat tot 'n meer regverdigte verdeling van beskikbare hulpbronne sal lei.

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Dedication

To all my patients who allowed me to share the journey of their lives.

*“The good physician treats the disease;
the great physician treats the patient who has the disease.”*
Sir William Osler (1849 – 1919)

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1. Introduction

Life is precious, perhaps especially precious for the ailing elderly at the end of life.

It is a dream of society that, through scientific innovation and technological manipulation of nature, man can achieve total control over disease, aging and perhaps even death (Harari 2017; Olacia 2018). Modern medical technology has created growing access to invasive medical procedures that may improve quality of life or that may extend life in a globally aging population. This has created significant complexity in both clinical management and ethical decision making (Clarke et al. 2017). Medical technologies can be “imperative” as we may feel compelled to use the abilities they give us, without adequately considering whether they will be compatible with humane goals of medical care (Reiser 2017).

During the last two centuries, the focus of medicine has shifted from a responsibility of care to an imperative to cure. The original aim of medicine from antiquity was the relief of suffering. This held true for centuries from the time of the *Hippocratic Corpus* to the early nineteenth century. Modern medical equipment developed since the early nineteenth century, however, transformed medicine from a philosophical to a scientific endeavour (Mantri 2008). The clinician can now effectively treat an ailment, striving to affect a cure. Undergraduate medical training currently follows a medico scientific model where the focus of training is on cure and prolonging life, taught within the arena of different clinical disciplines defined by individual pathologies and organ systems (Mantri 2008; Willmott et al. 2016).

The original philosophical basis of medicine is largely ignored in medical schools, with ethical training too often “... *a mere, and late, add-on* ...” to a curriculum (Van Niekerk 2002). The acquisition of an accepting attitude towards death, dying and comfort care is left to the healthcare professional’s own postgraduate endeavours (Sercu et al. 2015; Willmott et al. 2016). Holistic patient care is neglected due to the fracturing of training into clinical disciplines (with the focus on the disease and not on the patient) and the voice of the patient – so central to the Hippocratic doctrine – is largely silenced (Mantri 2008), irrespective of modern medicine’s appreciation of patient autonomy.

The utilisation of invasive medical procedures resulting in increasing treatment intensity at the end of life is often not guided by patient choices, in spite of the stated respect for patient autonomy in modern biomedicine. Kelley et al. (2010) emphasise that there remains a lack of

comprehension of the obstacles that prevent patient preferences from directing treatment intensity in health care.

As a primary care physician, serving the same patient population for almost three decades, the author experienced that emotive responses abound in both colleagues and patients when the use of invasive medical procedures in the elderly is discussed. A wide spectrum of subjective explanations is given for especially the inappropriate use of invasive medical procedures by both colleagues and patients. Colleagues cite pressure originating from patients or families to perform procedures at all cost as a reason for inappropriate interventions, while patients and their families blame clinicians. Clinicians are often deemed to perform invasive procedures indiscriminately, with little attention given to communication of alternatives or with the aim of enriching themselves.

As more elderly patients receive an escalating number of interventions, these interventions become increasingly accepted as part of the “normal” aging process (Kaufman, Shim, and Russ 2006). Interventions in the form of invasive medical procedures in the elderly are, however, not without risk. Both the risk of dying as result of a procedure (whether immediately after the operation or in the days or weeks thereafter) and the risk of a host of complications, including decline in function, cognitive ability and independence, are higher in geriatric groups when compared to younger adults (Stacie Deiner, Westlake, and Dutton 2014). The trend of increasingly accepting the necessity of invasive procedures as standard treatment for elderly patients can lead to the absence of deliberation (by both patients and clinicians) about whether to implement a procedure (Kaufman, Shim, and Russ 2006), contributing to heedless clinical momentum as well as to unacceptable and unanticipated complications and cost.

The danger is that the heedless use of invasive medical procedures may become “*standard practice*” in older populations and “*standard practice trumps choice*” (Kaufman, Shim, and Russ 2006).

1.1 Significance of ethical considerations when contemplating invasive medical procedures in the elderly

This thesis specifically explores ethical considerations related to performing invasive medical procedures in the *elderly*, as healthcare practitioners are increasingly responsible for the healthcare needs of a globally ageing population and have access to new technologies to do so. The United Nations published a *World Aging Report* in 2013 stating that “*population aging is*

unprecedented” with “*profound global socio-economic implications*” including a direct impact on healthcare spending (Sabharwal et al. 2015).

Improvement in nutrition and living conditions in rapidly industrialising countries significantly increased health and longevity even before the advent of modern medical care (Benatar 2013). In addition to this, the utilisation of modern medical technology allows people to enjoy longevity to an unprecedented extent. Although the human life span (the upper limit of years a human can live) has stayed constant at approximately 125 years for the last 100 000 years, life expectancy has increased by roughly 27 years in the last 100 years, especially in Western countries (Tosato et al. 2007), mainly due to advances in medicine. The consequential increase in *healthy* life expectancy, however, is considerably less – people are merely living longer with disease and disability, according to an editorial published in *The Lancet Respiratory Medicine* (2016).

There is broad consensus amongst the elderly about the desire to maintain a good quality of life and to retain independence (Nabozny et al. 2016). The hope to regain previously lost function and to be able to enjoy one’s sunset years free of pain and disability motivates many elderly patients to consider invasive medical procedures. Additionally, many elderly patients yearn to maintain and extend life by utilising life-preserving or even life-extending procedures, for instance cardiac or dialysis procedures. Unrealistic expectations of medical technology may, however, result in inappropriately aggressive medical interventions leading to precisely the loss of independence and quality of life valued so highly by the elderly. Whilst many procedures might be lifesaving, more aggressive treatment with increasing intensity of care (reflected in an increase in the number, technical complexity and attendant risk of services provided) is not necessarily always best for patients.

Invasive medical procedures (both diagnostic and therapeutic) are specifically considered, as most of the cost, risk and suffering regarding health care in elderly patients are centred in these procedures. Worldwide at least 230 million invasive medical procedures are performed annually (Cousins, Blencowe, and Blazeby 2019) . Medical technology is developing so fast that healthcare professionals are struggling to keep up with it in an ethical sense (Van Niekerk 2002), creating uncertainty about the moral rectitude in the performance of certain medical interventions.

Ethical considerations regarding invasive medical procedures in the elderly warrants investigation as it should provide guidance in treatment decisions. Perusal of the available literature reflects a piecemeal approach to the ethical factors that influence utilisation of invasive procedures with a narrow focus on specific elements only. Elements discussed in the literature include a lack of respect for patient preferences (lack of respect for autonomy), the effect of time pressure and specific clinician communication styles (highlighting problems of paternalism) as well as the effect of specific disease entities and patient characteristics. Elements of fairness regarding the utilisation of available resources are also discussed in the literature, stressing the importance of distributive justice. These elements are all relevant, but the literature is silent on the fact that these ethical considerations are all part of a larger group of factors that have bearing on ethical decision making. An attempt will be made to develop a conceptual framework that encompasses all the relevant factors with the aim of aiding ethical treatment decisions.

As a primary care physician, it is the author's experience that patients and their families often complain about treatment styles by interventionists that harken back to problems with paternalism. Elderly patients report that they are often exposed to invasive medical procedures with little time allocated by interventionists to discuss risk-benefit scenarios or individual preferences with them. When offering an invasive procedure to a patient, 'softer' possible adverse outcomes (including deterioration of mobility and memory) are often ignored by interventionists, possibly in an attempt to gain a few extra years of life for the patient, regardless of the possible deterioration in the quality of that life. Interventionists seem to have tunnel vision, focussing on treatment of the disease and losing sight of treating the patient.

Taylor et al. (2017) found that surgeons initiated discussions with patients by exploring the clinical problem, offering surgery as an option followed by a discussion of the patient's fitness for the procedure. Procedural risks and adverse events were discussed, but they neglected to elicit the patient's values and goals. Oresanya et al. (2014) reported that in the United States, over 4 million major operations were annually performed on patients aged 65 years and older. Risks such as decline in function, memory and mobility related to the interventions were, however, much higher in this population group. This was in addition to the obvious risks of dying or suffering from complications related to the intervention, as both mortality and complications related to surgery were higher in geriatric groups when compared to younger adults (Stacie Deiner, Westlake, and Dutton 2014). Nabozny et al. (2016) observed that

although most older chronically ill patients in the United States would refuse a low-risk intervention if the consequence was serious functional impairment, 25% of Medicare (a national health insurance program primarily providing health cover for Americans aged 65 and older) beneficiaries had surgery in the last 3 months of life. This was incompatible with patient preferences, suggesting a lack of respect for patient autonomy as well as transgression of the principle of nonmaleficence.

Furthermore, the cost of invasive medical procedures in the elderly is cause for concern as increased healthcare costs in this age group are associated with increased intensity of care. Healthcare expenditure is approximately five times higher in the last year of life than in other years (Luta et al. 2015). Scitovsky's (1984) ground-breaking study on health related expenditure at the end of life confirmed that the high cost of medical treatment at the end of life is not a recent development and that this cost reflects standard (though expensive) medical care for the very sick. French et al. (2017) recently demonstrated that in nine different countries studied, personal spending on medical care at the end of life was high compared to spending at other ages, with spending in the last three calendar years of life being especially high. This high level of healthcare costs toward the end of life has implications for both individual patients (and families) as well as for society at large as fairness of utilisation of resources should be considered, stressing the importance of the principle of justice.

Although there is a plethora of information regarding invasive medical procedures in the elderly, the subject is generally approached from a specific vantage point. There are some attempts in the literature to consider the effect of several diverse factors, but no framework encompassing all the different factors affecting invasive therapy in the elderly exist. Additionally, there is a paucity of literature regarding specifically ethical considerations regarding this subject and no structured aids to making ethical treatment decisions.

1.2 Objective of this study

Reuben asserted in a 2010 article in the *Journal of the American Medical Association* that there are three do's in Medicine: "*the can do, the actually do, and the should do*". The "can do" is driven by science and technology and reflects the possible. By contrast, that which is actually done for patients is driven by both patients and clinicians. It is also influenced by various other factors, including access to and availability of services, insurance, practice patterns and

individual choices. The “should do” is shaped by medical evidence with emphasis on personal, societal and ethical values (Reuben 2010).

As bioethics is an expression of normative ethics, exploring how the world *should be* within the context of the health-related sciences (Quintelier, van Speybroeck, and Braeckman 2011), it is perfectly poised to explore the “should do” referred to in the paragraph above.

The objective of this study is to address ethical considerations related to invasive medical procedures in the elderly by focussing on the factors that impact on the decision-making process in late-life medical interventions. A conceptual framework that will aid ethical deliberation is developed to help answer the question of what we “should do” when considering invasive treatment in these patients.

Medical practitioners have a responsibility to engage with their elderly patients in the deliberation of submitting to invasive medical procedures, ensuring that procedures are done *for* them rather than *to* them. As there is significant complexity in achieving an ethically sound decision, reference to an ethical decision aid would be helpful.

The conceptual framework presented in this study represents a standard of due care. This framework incorporates all the different factors that have an impact on ethical decision making when invasive medical procedures in the elderly are contemplated. The factors are derived from contemplation of the current ethical landscape (by studying the relevant literature) with adherence to the *principlist* approach as set out by Tom Beauchamp and James Childress in *Principles of Biomedical Ethics*. These principles are moral norms viewed as central to biomedical ethics (Beauchamp and Childress 2013, 13). It is illustrated that a complex interaction of factors influences ethical treatment decisions in this context, as opposed to the narrow, simplistic reasons often cited in the literature. These factors are discussed in detail, illustrating how each of these factors has an impact on ethical decisions regarding treatment. It is argued that knowledge of and insight into these factors will result in ethically appropriate decisions, congruent with the principles of respect for autonomy, beneficence and nonmaleficence. Additionally, awareness of these factors will promote the principle of justice, focusing on fair distribution of available resources.

Adhering to the unified framework of factors developed in this study will enable a healthcare practitioner to consider all the relevant factors when an invasive medical procedure in an elderly patient is contemplated. Consideration of these factors would promote true patient-

centred care, where patients are considered in their own unique context and are “*listened to, informed, respected, and involved*” in their own treatment decisions with their wishes “*honoured ... during their health care journey*” (Epstein and Street 2011). Use of the unified framework of factors developed will thus enable the healthcare practitioner to take appropriate, ethically sound care of patients.

In summary, the focus of this thesis is the development of a standard of due care by conceptualising a framework of factors as an ethical decision aid to assist when contemplating invasive medical procedures in the elderly.

1.3 Outline of the study

The study commences by considering the narrative of medical progress culminating in today’s technical capabilities, while touching on the possible shape of things yet to come (as the technological advances of tomorrow might compound the ethical pressures already present in decision making today). Subsequently, the aim of medical care is considered. Current medical care in the elderly is specifically deliberated on, including attempts at longevity and at improving quality of life by implementing invasive procedures.

The next section of the study focusses on the specifics of invasive medical procedures by starting with a definition of what these procedures entail. The concept of futile care is defined with the intention of excluding futile care from the discussion in this thesis, as it represents a discretely different issue. The purpose of invasive medical procedures is addressed next by discussing both diagnostic and therapeutic interventions, as well as the different kinds of therapeutic interventions. Finally, time constraints are discussed, highlighting the difference between elective and emergency procedures.

Consideration is subsequently given to who the elderly is by considering different definitions of old age. Chronological and biological age are discussed as well as the concept of frailty.

The following section in the thesis explores ethical matters regarding invasive medical procedures in the elderly by considering the topic through the lens of principlism. The principles of biomedical ethics as developed by Tom Beauchamp and James Childress are briefly reviewed and systematically applied to the topic, allowing for reflection on the ethical issues involved.

Current ethical considerations are discussed next. The focus of this section is the exploration of current ethical issues regarding invasive medical procedures in the elderly with the objective of identifying the factors that influence ethical decision making. The relevant literature on the subject is considered within the context of the principles of biomedical ethics identified by Beauchamp and Childress and discussed in the previous section. The factors identified are then organised into four clusters.

The literature that has bearing on factors that influence ethical decision making regarding the use of invasive medical procedures in the elderly is subsequently reviewed and summarised. It is concluded that the literature in the field of biomedicine, psychology and bioethics reiterates the importance of the same four clusters of factors found to be important in the previous section. Although there are several attempts in the literature to consider the effect of different factors, a unified framework of all the factors has not yet been developed.

A conceptual framework that incorporates all the relevant factors impacting on the decision-making process is now presented. This framework represents a standard of due care and will facilitate ethical decisions when contemplating invasive medical procedures in the elderly.

Finally, the factors that influence ethical decision making are discussed in depth. This section expounds relevant factors regarding the healthcare professional, the elderly patient (and his or her family), the specific illness and intervention planned as well as local resources and service delivery models. Treatment goals and realistic holistic prognostication are also carefully considered. Awareness of the impact of and interaction between the different factors is important, as values and preferences of patients (and families) should be respected within the confines of rational care, relying on best practice principles as well as on fairness of utilisation of resources.

In conclusion it is argued that familiarity with the unified framework of factors developed in this thesis will promote ethically sound decisions. It will facilitate recognition and logical contemplation of the different facets involved in a specific scenario. It will also reduce the risk of decisions being unwittingly influenced by external factors. Consideration of this framework of factors will ensure appropriate care for patients, consistent with the principles of respect for autonomy, beneficence and nonmaleficence, while simultaneously promoting the principle of justice.

2. Sketching the landscape (defining the concepts)

Ethical considerations related to decisions on invasive medical procedures in the elderly can only be explored once the specifics of the concepts are understood. The following section will define and clarify these concepts by considering where invasive medical procedures fit into health care, what invasive medical procedures are and when invasive medical procedures become an option (addressing the purpose of these interventions). Care is also taken to define the elderly.

2.1 The background of invasive medical procedures in health care

2.1.1 *Narrative of progress and advances in medical care and technological innovation*

Western medical customs and beliefs stretch over millennia. Its roots are in the prehistoric use of herbs and plants with a prescientific holistic approach. In 400BC, Hippocrates suggested a new paradigm in which natural (as opposed to supernatural) explanations for diseases were contemplated. The Hippocratic Canon, the oldest collection of scientific and philosophical literature on medicine in Western literature, reflects a paradigm shift from theoretical religious and superstitious accounts of disease (where the deities were generally deemed to be responsible for disease), to a scientific evidence-based model of medicine (Mantri 2008; Doufas and Saidman 2010). Hippocratic physicians relied primarily on logic and philosophy and natural causes for disease were sought (Mantri 2008). Though not solely responsible for this paradigm shift, Hippocrates undeniably provided the momentum for it (Doufas and Saidman 2010). The Hippocratic paradigm included – apart from an implicit privacy contract between physician and patient with the patient’s health being the leading principle – the specific diagnosis of a disease, the establishment of an external cause for the disease and treatment of the cause by therapeutics (Franco, Bouma, and Van Bronswijk 2014). Although this radical approach to medicine was only one of many approaches to human illness, the structure of medieval and early modern European medical education advanced its dominance (Mantri 2008).

Despite its early misgivings regarding medicine, the Christian church embraced the care of the ill and destitute as a duty of charity. In addition to “*sharing the Jewish theology of a God whose loving power heals through human instruments*”, Christians added the parable of Jesus’s Good

Samaritan who cared for a stranger out of compassion (Jonsen 1990). Monks and nuns became healers.

Universities began systematic training of physicians in Italy around the year 1220. As physicians were unable to study physiology and anatomy (because the dissection of human cadavers was forbidden on religious grounds), they relied on logic and philosophy to explain disease. In 1539 an Italian judge finally gave Andreas Vesalius, a Belgian physician, permission to dissect executed criminals. This heralded the scientific, empiric study of human anatomy and set the stage for understanding human physiology. Simultaneously, the advent of medical technology in the form of microscopes revolutionised biology. The understanding of gross and microscopic anatomy jointly transformed medicine from a philosophical to a scientific endeavour, with a milestone the publication of Giovanni Battista Morgagni's 1761 work *On the Seats and Causes of Disease* (Mantri 2008).

The English physician Thomas Sydenham (1624-1689), author of *Observationes Medicae*, greatly contributed to medical science by initiating an empirically based nosology or classification of diseases (Wohlfarth 1968; Jonsen 1990, 84). A skilled clinician and consummate observationalist, he empirically identified and classified individual diseases by their discrete signs and symptoms (Dewhurst 1962, 113). Sydenham's method of empirically identifying specific disease entities gradually replaced older, unscientific and unempirical explanations of disease and its cause (Jonsen 1990, 85). It was now recognised that there were different *diseases* with discrete pathophysiological causes in contrast to the classical concept of Hippocrates who only recognised *disease* as such (Van Niekerk 2017, 130).

This spirit of scientific investigation into physiology and pathophysiology, together with advances in technology, changed the face of clinical medicine.

The impact of technology on clinical medicine initiated an era of experiment-based medical development that continues to this day. Equipped with dedicated knowledge about human anatomy and pathophysiology, the clinician could at last attempt to treat disease, striving to affect a cure once the diagnosis was made. With the anatomic basis for disease established, several simple technologies functioned to extend the doctor's senses, allowing him to search for clinical signs related to pathology hereto undetectable in his attempt to make a diagnosis. The stethoscope (1819), ophthalmoscope (1850), clinical thermometer (1867) and the sphygmomanometer (1896) were introduced during the nineteenth century (Reiser 2017). The

introduction of anaesthetics (1846) and antiseptic techniques (1867) to surgery liberated surgeons to perform procedures with ever-increasing complexity. X-rays (1895), the ward laboratory containing microscopes and chemical tests kits for evaluating body fluids (early 1900s) and the electrocardiograph (1906) all constitute technologies enabling advanced medical diagnosis (Reiser 2017). Medical care shifted from the home to the hospital.

The discovery of penicillin by Alexander Fleming in 1928 also had a profound impact on the course of medicine (Gaynes 2017). Mass production of penicillin by 1944 was a significant achievement of World War 2 technology, resulting in mortality rates from infections in front-line hospitals dropping from around fifteen percent in World War 1 to three percent in World War 2 (Neushul 1993).

Other critical innovations in medical technology described by Reiser (2017) include the development of the artificial respirator in the mid-1950's (replacing the iron-lung that sustained victims of poliomyelitis) and renal dialysis technologies (1960's).

Currently, the growing availability of endoscopic procedures as well as advanced imaging techniques, such as MRI and PET scans, provide refined capabilities regarding diagnosis and treatment that augurs complete cure (Reiser 2017).

Recent innovations in biomedicine seem poised to revolutionise clinical medicine even further. Recently, Goldman et al. (2005) identified ten of the most promising medical technologies forecasted to affect the health of the future elderly by conducting a literature search and then eliciting consensus from several panels of experts. These technologies include: intraventricular cardioverter defibrillators (an implantable cardiac monitor/defibrillator); left ventricular assist devices (similar to an 'artificial heart'); pacemakers to control atrial fibrillation (irregular heart beat); cancer treatments including cancer vaccines, telomerase inhibitor medication and anti-angiogenesis injections or infusions; treatment of acute stroke with a neuroprotective drug; prevention of Alzheimer's and diabetes with protective medication as well as compounds that extend life span (Goldman et al. 2005).

Medical technologies can, however, be imperative as healthcare professionals may feel compelled to use the abilities they bestow, without adequately considering whether their usage will be compatible with humane goals of medical care (Reiser 2017). This fact compels one to evaluate the goal or aim of medical care.

2.1.2 The goal or aim of medical care

Current thinking about the goals of medicine should guide decisions regarding invasive medical procedures in the elderly as a component of suitable healthcare delivery (Anderson 2007). It is thus imperative to consider the goals of medical care.

The aim of medicine from antiquity was the relief of suffering. According to the online archives of the University of Utah (2015), the aim of medicine is defined in *The Art in the Hippocratic Corpus* (c. 450-c. 350 B.C.) as:

“...to do away with the sufferings of the sick, to lessen the violence of their diseases, and to refuse to treat those who are overmastered by their diseases, realising that in such cases medicine is powerless.”

This goal or aim of medicine held true for centuries. Throughout the ages, the focus of medicine was to care for the ill, to relieve suffering and to provide comfort. An anonymous aphorism, reportedly a 15th century folk saying, maintained centuries after Hippocrates that the aim of medicine was: *‘To cure sometimes, to relieve often, and to comfort always’* (Shaw 2009).

As the science of medicine developed, with growing knowledge and the technological advances discussed in the previous section, the aim of relieving suffering was augmented by the possibility of curative medicine as well as of preventative medicine (“Aims of Medicine” 1948). As early as 1871, the Graduates in Medicine of the University of Glasgow were urged by Professor John Young to heal the sick as well as to better the healthy (Young 1871, 555).

The aim of medicine was now not only to care, but also to prevent disease and to cure. Science became “the overarching theme” in medical education, driven by a system where physician scientists were trained and the scientific investigation of disease was promoted. Medical education in North America followed the pattern initiated in Europe, especially after acceptance of the Fletcher report of 1910. This report transformed medical education in America and established the biomedical model embedded in science as the gold standard of medical training (Duffy 2011).

American surgeon and physician William J. Mayo, son of the founder of the Mayo Clinic, stated in 1928:

“The aim of medicine is to prevent disease and prolong life, the ideal of medicine is to eliminate the need of a physician.” (Tan and Furubayashi 2012)

Medicine could now hope to prolong life as it could both prevent and cure disease. Advances in medicine increased life expectancy by almost three decades in the last century – especially in Western countries (Tosato et al. 2007). The historian and author Yuval Noah Harari (2017) predicts that scientists will increasingly focus on the god-like quests of pursuing immortality (wellness) and enduring happiness (wellbeing). Dr Aubrey de Grey, anti-aging pioneer and biomedical gerontologist, believes that medical technology will allow humans to control the aging process and allow us to live healthily into our hundreds, if not thousands (Olacia 2018). Natural causes of death will be eradicated and death will become “preventable” as death will continually be postponed, creating a sense of immortality.

Medicine as a philosophical endeavour with its emphasis on holistic care for the patient as a person is now replaced by medicine as a scientific endeavour. The love-affair of medicine with the hyper-rational world of research and science resulted in excellence in the curing of diseases, but this was not balanced by a comparable excellence in caring for the patient. Duffy (2011) states in his evaluation of the impact of the Flexner Report on medical training that the focus of medicine shifted to a scientific endeavour “*without the life blood of caring*”. The goal in medicine shifted from a responsibility to care to an imperative to cure. Where the traditional goal of medicine formulated in antiquity by the philosophers was clear, modern goals became blurred. Problems regarding ethical issues, such as purposes and values, tend to be crowded out by technical, scientific issues and the literature on the contemporary goals of medicine remain sparse (Anderson 2007).

At present, there is a growing realisation that scientific medicine must be joined to the professional ethos of holistic care reflected in so many of medicine’s traditional medical codes derived from philosophical medicine (Duffy 2011; Mambu 2017). The patient should be viewed as a person and not as the sum of his mechanistic parts or organs. Major emphasis is increasingly placed on the professional formation of medical students with courses in medical ethics forming part of the curriculum in medical schools alongside the scientific modules (Duffy 2011). As the field of biomedical ethics received increasing attention, the Hastings Center was founded in 1969 as an interdisciplinary ethics research institute to address, amongst other issues, ethical issues in health care.

Callahan, writing for the Hastings Center Goals of Medicine project, proposed four goals of medicine endorsed by the Hastings Center:

- (1) the prevention of disease and injury and the promotion and maintenance of health;
- (2) the relief of pain and suffering caused by maladies;
- (3) the care and cure of those with a malady and the care of those who cannot be cured; and
- (4) the avoidance of premature death and the pursuit of a peaceful death (Callahan 1996).

Care for the patient as a person is firmly imbedded in these contemporary goals of medicine, respecting the traditional philosophical basis of medicine and augmenting the impoverished scientific goal of cure alone. Knowledge of these goals will aid physicians when invasive medical procedures in the elderly are considered.

2.1.3 Current medical care in the elderly: Illusion of longevity vs Quality of life

In contemplating medical care and especially invasive medical procedures in the elderly, it is imperative that the patient understands the aim of the procedure. Is the procedure offered to maintain health, to relieve suffering, to cure, or to prolong life? As invasive medical interventions (especially surgery) are associated with increased adverse outcomes in the elderly including death, post-operative complications and functional decline, a comprehensive evaluation of the patient's treatment goals is imperative (Oresanya, Lyons, and Finlayson 2014).

Against the background of (often unrealistic) expectations of medical technology, an elderly patient may place too high a value on invasive medical procedures offered by healthcare personnel. For example, surgeons using the "fix-it" model to convey information when deliberating with patients before high-risk operations may inadvertently create the impression that normal form and function may be restored in a patient suffering from a chronic condition where normalcy cannot be achieved (Kruser et al. 2015). By "fixing" a specific problem, existing co-morbidities will not necessarily be addressed (and may in fact be adversely affected).

In an original investigation Taylor et al. (2017) found that surgeons *universally* started discussions with in-depth explanations of the disease process, connecting the acute illness to a surgical solution. Discrete procedural risks and the likelihood of adverse events were discussed,

but they did not integrate co-morbidities or functional status within a description of possible adverse outcomes, neglecting to discuss goals and values.

In the United States, 20% of patients over 65 years of age who undergo an emergency abdominal operation die within a month of surgery and those who do survive often lose their independence. Despite this bleak prospect, nearly a third of Medicare beneficiaries in the United States have surgery during their last year of life. The effect of these interventions may conflict with the long-term goals of patients as most Americans would avoid burdensome, inefficient treatments to rather preserve their functional status and protect their current quality of life (Taylor et al. 2017).

When discussing quality-of-life decisions in the elderly in this thesis, weight is given to personal preferences of patients regarding the quality-of-life still available to them, balancing prospective benefit against the pain and suffering involved in treatment, as well as against the risk of adverse outcomes and functional impairment. Personal quality-of-life decisions by the elderly are considered an evaluative judgement, resting on anticipated measures such as freedom from pain and distress, physical mobility and the capacity to interact socially and perform the activities of daily life. This contrasts with instruments that use quality-adjusted life-years (QALYs), a cost-effectiveness analysis tool used to measure health outcomes by looking at both the quantity and the quality of life produced by medical interventions. Senior (elderly) focus groups, when discussing quality of life with regards to surgical decision making, have indicated that elderly people are particularly worried about their future ability to communicate with relatives, their mobility and their decision-making ability (in addition to being concerned about suffering). Loss of independence was seen as abhorrent, with many seniors believing that this would lead to personal suffering, isolation, depression and a descending trajectory towards the end of life (Nabozny et al. 2016).

Contemplation of both quantity of life to be gained (or lost in the event of an adverse outcome) and quality of life to be gained by relief from pain and suffering (or lost if function is permanently lost) is important. It is important for patients to know that while they may survive the operation, diagnostic test or procedure they might lose function or mobility.

Treatment decisions are often based on results of clinical trials that have been done on younger and healthier subjects, skewing estimates and evaluation of benefit, mortality and morbidity (Priest 2012). Deiner et al. published a retrospective cohort study that evaluated patterns of

surgical care and complications in more than 8 million elderly patients in the United States. Both mortality and complications were increased in the geriatric groups relative to younger adults (Deiner, Westlake, and Dutton 2014). With regards to benefit, Barra et al. (2014) for example found that the assumption of persistent benefit from an implantable cardioverter-defibrillator (an implantable cardiac monitor and defibrillator) in the elderly is questionable. As septuagenarians and octogenarians who received this intervention have *higher* annual all-cause mortality rates, any advantage of the device on arrhythmic death may be largely diminished. In addition, quality of life may be adversely affected and the co-morbid burden (burden of co-occurring diseases) may be increased for this population. Regarding morbidity, current evidence indicates that there is significant occurrence of long-term cognitive impairments after, for instance, coronary artery bypass grafting (cardiac coronary artery bypass surgery) in older adults (Keage et al. 2016).

Finally, Nabozny et al.(2016) found that although both elderly patients and surgeons may highly value quality of life (with seniors regularly asserting that quality of life, not life prolongation, should be the aim of medical decision making), this belief is difficult to integrate into acute surgical decisions. While some seniors may engage with their own preferences and values when considering the choice between an invasive procedure and palliative care, others view it simply as a choice between life and death (with choosing life seen as an obligation) or as a decision about how to die (“*it is better to die trying*” [Nabozny et al. 2016]).

2.2 Consideration of invasive medical procedures

2.2.1 Defining invasive medical procedures or interventions (including surgery)

Worldwide, at least 230 million invasive medical procedures are performed every year. As there is currently no generally recognised definition of an invasive procedure and as the terms “surgery” and “interventional procedure” are used inconsistently, Cousins, Blencowe and Blazeby (2019) proposed a definition for invasive procedures after analysing 3 946 papers from the last decade. The definition has three crucial aspects: (1) the *method* of access to the body (2) the use of *instrumentation* and (3) the requirement for *operator skill*. The proposed definition states that:

“An invasive procedure is one where purposeful/deliberate access to the body is gained via an incision, percutaneous puncture, where instrumentation is used in addition to

the puncture needle, or instrumentation via a natural orifice. It begins when entry to the body is gained and ends when the instrument is removed, and/or the skin is closed. Invasive procedures are performed by trained healthcare professionals using instruments, which include, but are not limited to, endoscopes, catheters, scalpels, scissors, devices and tubes.”

The means of access to the body (surgical incision, skin puncture or natural opening) and the clinical discipline involved (gastro-enterology, cardiology, intensive care) are thus irrelevant as is the purpose of the procedure (diagnostic or therapeutic). Crucially, the definition excludes the use of medicinal products, except where the dispensing of the product occurs within an invasive procedure needing operator skill (Cousins, Blencowe, and Blazebey 2019).

Evidence shows that patients who undergo an invasive procedure are at an increased risk of suffering an adverse event (World Health Organization 2016). The risk of an adverse event was also found to be increased with the number of exposures to potentially iatrogenic actions (due to the activity of a physician or therapy [Aranaz-Andrés et al. 2011]). This is compounded by the fact, as already discussed, that elderly surgical patients undergoing procedures have an increased risk for complications and death relative to younger patients (Stacie Deiner, Westlake, and Dutton 2014).

2.2.2 Emphasising the exclusion of futile (non-beneficial / potentially inappropriate) care

This thesis specifically excludes interventions that are regarded as futile care, as an ethical deliberation in this regard is beyond the scope of this study. Non-beneficial and inappropriate treatments are terms that are often used as synonyms for futile care. The practice of non-beneficial treatments has been recognised for at least two decades in the literature reviewed by Cardona-Morrell et al. (2016) and it persists despite many publications about its adverse effects on patients and their families, healthcare professionals and the health system. Medical futility is a concept commonly used to refer to medical treatment that has no genuine anticipated long-term benefit and it is in this sense that this thesis refers to futile care (Whitmer et al. 2009).

The concept of futility arises from Greek mythology where the daughters of Danaus were punished by having to fill a bath with leaky vessels in Hades (*futility* stems from the Latin word *futilis*, meaning leaky [Rinehart 2013]). Medical futility as a concept is an ancient one, with

most codes of medical ethics for centuries dissuading doctors from providing treatment that cannot help a patient.

Modern controversy about this arises when doctors and patients disagree about the presence of futility in a specific case. The use of advanced medical technology can conflict with deep-seated moral and ethical beliefs as to the value of life held by the specific parties affected (Miller-Smith et al. 2018).

A universal definition of medical futility has proven to be elusive. Two well-known concepts of futility are *quantitative futility*, a purely factual judgement of a patient's prognosis (containing a numeric probability of achieving the intended goal of therapy) and *qualitative futility*, a finding that focusses on the quality of the potential benefits and thus containing a value judgement (Miller-Smith et al. 2018; Jox et al. 2012). What is considered to be futile is relative to a host of factors (Whitmer et al. 2009). Redman (2011) found in a review of studies that specific criteria for futility are absent in medical literature. In 2015, five major critical care societies officially endorsed new and specific terminology, where it is advised to refrain from using the term "futile" except in very rare circumstances, but to rather use the term "potentially inappropriate", as disagreements about "potentially inappropriate" treatments are value based in contrast to "futile" treatment (Miller-Smith et al. 2018).

The concept of futility (in an advanced care medical setting) is perhaps best illustrated by a quote from a palliative care physician interviewed by Jox et al.(2012):

"An intensive care unit is like a bridge which can be used to cross over a marsh. Having crossed the bridge, the path must continue; if it does not, there is no reason to build the bridge in the first place or to force the patient onto the bridge."

2.2.3 Assessing the purpose of invasive medical procedures

The purpose of performing an invasive medical procedure may vary according to the specific clinical scenario. The purpose of a procedure may be therapeutic or diagnostic.

2.2.3.1 Therapeutic procedures

When considering therapeutic interventions, a procedure may be employed to treat life-threatening conditions or to treat non-fatal conditions. An important distinction exists between the ethical considerations contemplated and proposed regarding life preserving (prolonging or

sustaining) interventions and those considered regarding the treatment of non-fatal conditions, including those that would directly improve quality of life.

A life preserving therapeutic intervention would be any invasive medical procedure that defers the moment of death, regardless of whether the underlying life-threatening disease is affected (“Policy on Forgoing Life-Sustaining or Death-Prolonging Therapy” 2005). Examples include not only mechanical ventilation, dialysis and transfusions, but also surgical repair of vascular aneurisms or cardiac valve lesions. Life preserving or prolonging interventions may aim to maintain health, to relieve suffering, to cure or to prolong life (for instance, cardiac valve replacement surgery may “cure” an ailing heart valve resulting in maintained health and a prolonged life, while avoiding the suffering associated with cardiac failure). Care often converges on several goals or aims at the same time: palliation, life-prolongation and even cure. Unfortunately, these aims are often incompatible. For instance, care aimed at cure or life-prolongation will reduce quality of life in the short or longer term (by causing pain and impairing independence). Despite this, aggressive treatment in the elderly is increasingly utilised in Western countries (Bolt et al. 2016).

Interventions that *treat non-fatal conditions* include those that improve quality of life as well as those that attempt to cure a non-life-threatening condition. The aim of treatment in the first case will be to maintain health, to relieve suffering or to cure. In the second case the aim will be to maintain health or to cure. Examples of interventions that improve quality of life include joint replacement surgery that restores lost function and improves pain and cataract surgery with lens implantation to improve vision. Interventions for attempted cure of nonfatal conditions would include, for example, surgery for nonmelanoma skin cancer (a type of skin cancer that typically has no impact on longevity or on immediate quality of life). In this case, an elderly patient would have little to gain from surgery that would expose him or her to procedure-related complications without a corresponding benefit in either quality or quantity of life (Linos et al. 2013). As noted, different ethical considerations would apply in these cases as opposed to treatment of fatal conditions. The ethical considerations to be proposed in contemplating procedures that would positively impact on quality of life would also differ from those where this benefit to the patient does not exist.

2.2.3.2 Diagnostic procedures

Ethical considerations also need to be proposed regarding *invasive diagnostic procedures*. The risks of these tests may exceed the possible benefit to the patient. No invasive diagnostic

procedure is without risk of complication (Kronlund and Phillips 1985). Additionally, diagnostic procedures may contribute pointlessly to both unnecessary suffering and upward spiralling healthcare cost.

2.2.4 Considering time constraints: elective vs emergency procedures

In the contemplation of invasive medical procedures in the elderly, it is important to know that there are varying time constraints present in different procedures. An invasive procedure may be electively planned or may be needed as an emergency procedure.

Elective treatment is treatment that is planned in advance – it is a prearranged, non-emergency procedure. This kind of procedure is usually well-organised and executed at the patient's and healthcare practitioner's convenience (Johns Hopkins University 2019). It may be implemented to extend life or to improve quality of life, either physically or psychologically. Lifesaving surgery, such as surgery for cancer, is often planned electively, choosing an optimal time for both patient and doctor. Surgery to improve quality of life, for instance hip replacement or cataract surgery, is also planned electively.

Urgent or emergency interventions are usually done due to an urgent medical condition. It is a non-elective intervention employed when the patient's life or well-being is in direct jeopardy. According to *Dorland's Illustrated Medical Dictionary* (1988), surgery in this context cannot be postponed as delay could result in the death or permanent impairment of health of the patient. Emergency surgery is often performed in critical or urgent cases resulting from trauma, cardiac events or brain injuries. Emergency general surgery is linked to a higher incidence of medical errors, complications and deaths relative to elective procedures. The mortality rate in the post-operative period of patients who receive emergency general surgery is six times that of patients undergoing elective surgery (Columbus et al. 2018).

Ethical considerations for elective and emergency procedures are considered to be similar, with emphasis on the fact that elective procedures allow for much more time in the decision-making process.

2.3 Defining old age: Who are “elderly” patients?

The biological aging process can be defined as the accumulation of various harmful changes in cells and tissues as a person's age increases. These changes occurring in cells result in increased risk of disease and death in the elderly (Tosato et al. 2007).

Since even healthy elderly patients continue to have a relatively higher rate of both mortality and morbidity, both chronological age and biological age (including measures of frailty) need to be considered when making decisions regarding invasive medical procedures in the elderly.

2.3.1 Chronological age

From ancient to contemporary times, authorities located the beginning of old age at around the chronological age of sixty. Different views regarding the beginning of old age has endured within specific historical contexts. A distinction between young-old and old-old has also been recognised over time. As time progressed, emphasis was placed on an individual's ability to performs tasks as well as his or her relationship with society (functional age). With the advent of formal retirement, however, more emphasis was placed on chronological age as the definition for old age (Covey 1992).

In the medical literature, "elderly" has conventionally been defined as a chronological age of 65 years or older, although there is a lack of general rigor and consensus regarding the definition in many studies (Singh and Bajorek 2014; Sabharwal et al. 2015). "Early elderly" was conventionally viewed as those from 65 to 74 years old and those over 75 years of age was viewed as "late elderly". This last definition is no longer appropriate as advances in medical and health science have resulted in an increased average life expectancy globally. Based on a thorough analysis of data from many sources, a recent review article has suggested that the definition of "elderly" should be changed to those over 75 years of age (Orimo et al. 2006). For the purpose of this study, this latter definition of chronological old age will be applied.

Presently, as healthy life expectancy has increased more so than simply time spent alive (health span as opposed to life span [Kim and Jazwinski 2015]), there is a shift back to viewing old age as a functional or biological entity as opposed to a purely chronological entity.

2.3.2 Biological age

In addition to suggestions that the chronological definition of old age or "elderly" should be adjusted, there is increasing emphasis in the literature that chronological age alone is an insufficient marker for old age. The concept of *biological age* is used in aging research to gauge the advancement of the biological aging process as opposed to the simple passage of time (chronological age). Although biological aging advances in parallel with chronological age, the rate and degree of aging varies amongst individuals of any given chronological age. The

variation in biological aging amongst chronological peers makes a dependable measure of biological or functional age imperative (Kim et al. 2017). Various approaches and methods to calculate biological age have been developed, including the use of biomarkers, epigenetic markers and the use of deficit indices or frailty indices (Jazwinski and Kim 2019).

Frailty indices are especially important in the clinical setting as it is an important independent risk factor for major morbidity and mortality related to invasive medical procedures in the elderly. Assessment of frailty in aging patients has gained prominence in the medical literature during the last two decades. Recognising frailty in the older surgical population would enable clinicians to risk stratify their patients and also to proactively identify and optimise modifiable factors with the aim of reducing adverse outcomes.

Frailty can be described as a diminished physiological reserve across various organ systems, but consensus about the exact definition remains elusive. Campbell (Partridge, Harari, and Dhesi 2012) defines frailty as:

“a condition or syndrome which results from a multi-system reduction in reserve capacity to the extent that a number of physiological systems are close to, or past, the threshold of symptomatic clinical failure. As a consequence, the frail person is at increased risk of disability and death from minor external stresses”

Two key models of frailty exist. The “frailty phenotype model” reflects the association between a group of criteria that define frailty and the effect of these on certain outcomes. The “deficit accumulation model of frailty” indicates the number of deficits a patient has accumulated across several different domains, including illnesses, physical signs and ability to manage activities of daily living (ADL). This model enables the calculation of a “frailty index”, reflecting the patient’s combined or accrued deficits (Partridge, Harari, and Dhesi 2012). Currently, no consensus regarding the best clinical tool for assessment of frailty exists, but knowledge of the available tools is important for the clinician. Measuring the severity of frailty in routine clinical practice, especially in primary care, would assist in decisions on invasive procedures in the elderly. It could also form a foundation for a shift of care in the elderly towards more suitable goal-directed care (Clegg et al. 2013).

In summary, as chronological age alone is not a good indicator of aging physiology, due to significant inter-individual variability, the assessment of each patient becomes critically important. Cognisance should be taken of chronological age, normal aging processes and co-

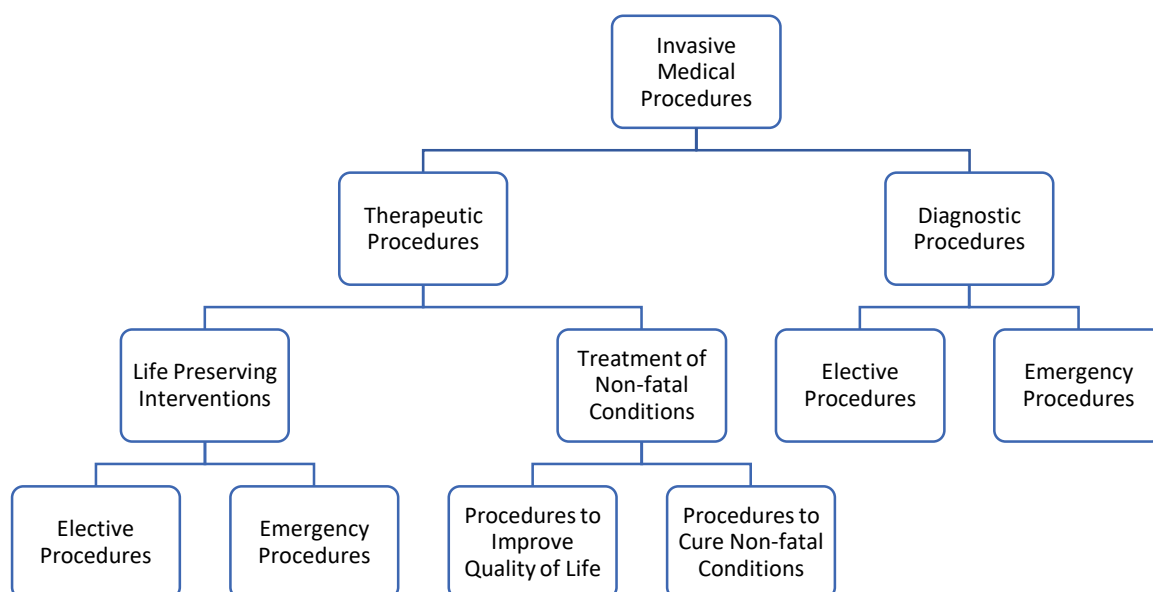
morbidities (Deiner and Silverstein 2012), as well as of available frailty measurement tools (Partridge, Harari, and Dhesi 2012). The importance of validated frailty index measures (Sabharwal et al. 2015) as well as of individual patient characteristics (Singh and Bajorek 2014) cannot be over-emphasised. Neglecting to detect frailty may result in patients being subjected to invasive procedures from which they may not benefit and might be harmed, whilst exclusion of physiologically robust (non-frail) elderly people merely based on chronological age is unacceptable (Clegg et al. 2013).

2.4 Summary of the concepts

2.4.1 Invasive medical procedures

With an invasive medical procedure, deliberate access to a patient's body is gained via an incision, natural orifice or by a percutaneous puncture. It requires operator skill and is performed by a trained healthcare professional using instruments. The instruments may include (but are not restricted to) catheters, scalpels, endoscopes and other devices. These procedures are used across various clinical disciplines, such as interventional cardiology, vascular and orthopaedic surgery.

The purpose of such a procedure could be either diagnostic or therapeutic. Procedures may be planned electively or may be utilised in emergency situations due to urgent medical conditions. The purpose of invasive medical procedures could be summarised schematically as follows:



The aim of the procedure could be any of the four goals of medicine as formulated by the Hasting Centre project discussed in section 2.1.2, namely maintaining health, relieving suffering, curing disease or prolonging life. Care may focus on several goals or aims simultaneously: palliation, life-prolongation and even cure. These aims are, unfortunately, not always compatible.

2.4.2 Elderly

The contemporary definition of chronological old age that suggests that the term “elderly” should be applied to those over 75 years of age, is accepted for this study. Chronological age alone, however, is not a good gauge of aging physiology as there is a heterogeneity in biological aging amongst chronological peers. Cognisance should be taken of chronological age, normal aging processes, co-morbidities and available frailty measurement tools when deciding on interventions.

3. Harnessing the principles of biomedical ethics to consider ethical ramifications

Decisions regarding invasive medical procedures in the elderly raise both clinical and ethical challenges. A globally aging population that lives longer with multiple comorbidities and with access to advances in medical technology that offer more treatment options, has created significant complexity in both clinical management and ethical decision making (Clarke et al. 2017).

The *clinical* concepts and background, including advances in medical care, technological innovation and current medical care in the elderly with specific attention to invasive medical procedures, were addressed in section 2.

This section will address the *ethical* issues involved by considering the topic through the lens of principlism.

The book *Principles of Biomedical Ethics* written by Tom L Beauchamp and James F Childress and first published in 1979 remains one of the most important and prominent works in biomedical ethics to this day. They developed four basic clusters of principles or moral norms in an attempt to bring a measure of order and logic to the consideration of relevant issues in biomedicine (Rauprich and Vollmann 2011). These principles are both familiar to and resonate with healthcare professionals. Some of them are also incorporated in traditional medical codes. These principles represent *prima facie* (non-absolute) moral obligations to be considered when making ethical decisions in health care. The principles may conflict with each other in many situations. Beauchamp and Childress propose that tension existing in a particular case between the different principles can be resolved by further specification and by balancing judgements (as the principles are not absolute).

A summary of each of the principles is presented, illustrating how knowledge of the four clusters of principles allows for systematic reflection on the ethical issues involved regarding invasive medical procedures in the elderly.

3.1 Nonmaleficence

In medical ethics the principle of nonmaleficence has been treated as almost identical to the celebrated maxim: *Primum non nocere*: “Above all (or first) do no harm”. Although this

principle does not (as is popularly believed) appear in the Hippocratic Oath, it does appear in *Epidemics* in the Hippocratic Corpus (Trakoli 2013), making it one of the ancient moral tenets of medicine.

Although the term “do no harm” does not occur verbatim in the Hippocratic Oath, the underlying concept contained in the phrase permeates the oath. In conjunction with the central principle that the physician shall work for the benefit of the patient, the principle “do no harm” represents the normative core of the Oath (“Hippocratic Corpus - The” 2015). Prohibitions regarding euthanasia, abortion and surgery (reserved for another profession) as well as a mandate to use dietetic measures only (understood as the use of medication in contemporary medicine) illustrate the underlying idea of “doing no harm” (North 2002).

Nonmaleficence requires intentional avoidance of actions that cause harm – it is a negative prohibition of action. Because harm is such an important concept in ethical deliberations when considering invasive medical procedures in the elderly, attention is now given to what constitutes harm.

The core meaning of the concept of harm is that a person is made worse off (Bayles 1976, 293) by something or someone adversely affecting or thwarting a person’s *net* interests. Though a person can be harmed without being wronged (for instance by unpreventable disease), the type of harm referred to in this thesis also implies wrongdoing. This thwarting or setback of the interests of a person may be viewed in a broader sense, including setbacks to reputation, privacy or liberty or in a narrower sense with the focus on psychological or physical impediments (Beauchamp and Childress 2013, 153). The emphasis in this thesis will fall on this latter narrower concept of wrongful harm, concentrating on physical and emotional harm including pain, disability, suffering, loss of independence and death. Importantly, the private harm principle (pertaining to specific persons such as individual patients) as opposed to the public harm principle (pertaining to the general public and public institutions) holds that specific conduct may be prohibited if it adversely affects a person’s net interests, but also if it *unreasonably risks* adversely affecting a person’s net interests (Bayles 1976, 293). Obligations of nonmaleficence thus include obligations not to inflict harm and obligations not to impose the risk of harm (Beauchamp and Childress 2013, 154). This is especially important in the care of the elderly as the risk of harm (due to a greater risk of complications and mortality) associated with invasive medical procedures is increased in the elderly population as discussed in section 2.1.3.

Two conceptions of harm are distinguished and analysed by Hall (2012, 145). The first conceptual connotation of harm states that harm makes a person worse off than he or she was before. The harmful behaviour thwarts a person's interests resulting in the person being in a worse position than the baseline position the person was in originally. According to Hall, this condition is described by Joel Feinberg as "the worsening test". The second concept of harm states that harm makes a person worse off than he or she could have been. This concept of harm does not take the baseline position of the person into account and regards harm as deriving from any act or omission to act that would make the harmed person worse off than he or she could have been. Feinberg categorised this concept of harm as the "counterfactual test" where harmful behaviour is considered as behaviour that would result in a person's interests being in a worse condition than it would have been in if no action or omission of action was performed, regardless of the baseline condition. This counterfactual description of harm is a broader concept of harm as it not only includes all the instances of harm embraced by the first concept described (resulting in a setback from a prior superior to a more inferior position), but also includes conduct that would impede the advancement of a person's interests from an inferior prior position to a more superior position (Hall 2012, 149).

Both these concepts of harm have bearing on the use of invasive medical procedures in the elderly. Inappropriate use of invasive medical procedures that leaves the elderly person in a worse off position would constitute harm as conceptualised in the first concept of harm in the paragraph above (described by Joel Feinberg as harming because it passes the "worsening test"). Failure to use an invasive medical procedure that might improve an elderly person's position (causing the person to be in a worse condition than if the procedure was not performed) would, on the other hand, correspond with the second, counterfactual description of harm. Both performing and failing to perform an invasive medical procedure on an elderly person might then constitute harm (depending on the context of the situation). Inappropriate *action* would violate the principle of nonmaleficence as this principle requires the intentional *avoidance* of actions that cause harm. Inappropriate *failure to act* would violate the principle of beneficence as this principle refers to a moral obligation to *act* for the benefit of others as discussed in section 3.2. Consideration of the appropriateness of action or inaction in a specific case is thus central to ethical decision making. This assessment of appropriate treatment can be defined as taking *due care* in the management of a patient's condition – due care is discussed in more detail in the following paragraphs as it is an important specification of the principle of nonmaleficence.

Nonmaleficence can override the other principles as the obligations of nonmaleficence may well be more stringent. However, as the weight of the moral principles varies in different circumstances, nonmaleficence may justifiably be overridden if outweighed by other ethical principles or rules. If, for instance, the pain (directly harming) and risk (potentially harming) inflicted by major heart surgery in an elderly patient is deemed to be outweighed by the benefits of the surgery, nonmaleficence can be seen to be outweighed by beneficence (provided the choice made by the patient or his authorised surrogate was autonomous).

As already noted, obligations of nonmaleficence include obligations not to inflict harm or to impose risks of harm, as the private harm principle maintains that both conduct adversely affecting a person's net interests and conduct carrying unreasonable risk of adversely affecting a person's net interests (Bayles 1976, 293) are prohibited. Furthermore, an agent of harm may be causally responsible for harm without being morally or legally responsible for the harm. If a surgeon performs an invasive medical procedure with a high complication risk on an elderly patient with full disclosure of risks to and informed consent from the patient (or authorised surrogate) and complications develop, the surgeon might be causally responsible for the complications, but not legally or morally responsible.

Both law and morality recognise a standard of due care in the case of risk evaluation. This standard is a specification of the principle of nonmaleficence and determines the legal and moral responsibility of the agent who is causally responsible for the risk of harm. Due care is defined as taking appropriate care (as circumstances would demand of a reasonable person) to avoid causing harm. This standard very importantly demands that the *goals* pursued must justify the *risks* taken in the attempt to achieve the goal. In the case of (high risk) invasive medical procedures in the elderly it is thus imperative for the clinician to ascertain the goals or aims of treatment as envisioned by the elderly patient (as opposed to personal medical goals held by the clinician) when discussing risk with patients.

Negligence is the absence of due care. Elements of failure of due care in a professional model are that the professional must have a duty to the affected party, the duty must be breached by the professional, the affected party must experience a harm and the harm must be caused by the breach of duty. Both advertent (intentionally imposing unreasonable risks of harm) and inadvertent negligence (unintentionally, but carelessly imposing unreasonable risks of harm) are morally blameworthy. Inadvertent negligence may play a central role in the inappropriate utilisation of invasive medical procedures in the elderly. The clinician has a duty to discuss the

relative risks and benefits of the intervention with the patient, but would be unable to do so (and would thus breach this duty) if he or she is ignorant of the underlying factors that facilitate or drive the use of invasive medical procedures in elderly patients. The elderly patient might then experience a harm caused by this breach of duty. I would argue that this ignorance would constitute failure to follow professional standards of care, especially in an ethical sense, given the risk an elderly patient is exposed to when an invasive medical procedure is contemplated.

Rules and guidelines governing nontreatment are part of another specification of the principle of nonmaleficence. These guidelines were historically influenced by religious traditions, philosophical debates, professional codes, public policy and the law. Though some of these guidelines are helpful, others need revision or replacement. Outdated and morally dangerous distinctions include withholding vs withdrawing life-sustaining treatment, extraordinary vs ordinary treatment, sustenance technologies vs medical treatments and intended vs merely foreseen effects. A basic distinction should rather be made between obligatory and optional treatments with specific emphasis on quality-of-life considerations. Cases should be categorised as obligatory to treat, obligatory not to treat and optional whether to treat.

Conditions for overriding the prima facie obligation to treat would be valid refusal of treatment by an autonomous patient or his authorised surrogate (as discussed under the principle of autonomy in section 3.3), requests for futile, pointless or non-beneficial treatment (as discussed in section 2.2.2) and situations where the burden of the treatment outweighs the benefits. I would argue that proper discussion of the burden of the treatment once again necessitates knowledge of the factors that drive the use of invasive medical procedures in the elderly. Honest consideration and discussion of the burden of the treatment relative to the benefits of the treatment are central to making an ethical treatment decision. This discussion will guide both patient and clinician towards deciding whether treatment is warranted (obligatory to treat), to be avoided (obligatory not to treat) or to be judiciously contemplated (optional whether to treat).

If categories of obligatory and optional treatment are primary, discussions about killing and letting die (with its vagueness and moral confusion) can be avoided. As a discussion regarding the feasibility of an invasive medical procedure for a critically ill elderly patient may easily lead to this subject, it is important to emphasize that the focus in this case should be on the healthcare professional's obligations to treat as well as on aspects of legal and moral responsibility (Beauchamp and Childress 2013, 177). I contend once again that knowledge of

the factors that drive treatment decisions in utilising invasive medical procedures in the elderly would contribute to the clinician's insight regarding his or her obligations as well as his or her legal and moral responsibilities.

A further important specification of the principle of nonmaleficence is to attend to determining the best system to protect incompetent patients from negligence and harm. While families are often the most proper decision makers for incompetent patients as they usually have the deepest interest in protecting their incompetent family member, a system is needed that will shield incompetent members from family conflicts of interest and from neglect. Residents of nursing homes, psychiatric hospitals and facilities for the disabled and mentally handicapped also need protection in cases where they rarely, if ever, see a family member.

An advance directive, arranged by a person whilst competent with the intent to guide decisions about life-sustaining treatments during periods of incompetence, is an increasingly popular procedure rooted in obligations of nonmaleficence (as well as in respect for autonomy). The advance directive could either be a living will (representing specific directives regarding medical procedures in specific circumstances) or a durable power of attorney for the person's health care (representing a surrogate or proxy decision maker where one person assigns to another the authority to perform specified actions on behalf of the signer). When an incompetent patient has left no advance directives, competent and knowledgeable surrogate decision makers should be established. Possible classes of decision makers would be families, physicians and other healthcare professionals, institutional committees and courts.

The definition and determination of competence of patients are examined in more detail when the principle of autonomy is considered in section 3.3. The development of standards for surrogate decision making for incompetent patients are discussed when the principle of beneficence (section 3.2) is considered.

As the focus of this thesis is the development of a standard of due care by conceptualising a framework of factors that would impact on ethical decision making, considerations regarding incompetent patients are important.

3.2 Beneficence

The principle of beneficence refers to a moral obligation to act for the benefit of others. Both beneficence and nonmaleficence are concerned with the well-being of individuals, but these

two principles are notably different in their demands. The principle of nonmaleficence requires *refraining* from harmful acts – thus *not* acting – a negative prohibition of action. In addition, it must be followed impartially and can provide moral grounds for legal prohibitions of certain types of conduct. By contrast, the principle of beneficence requires *acting* – taking positive steps to *benefit* others. It need not be followed impartially and generally does not provide legal reasons for punishment should an agent fail to abide by this principle (except where specific obligations of beneficence exist). We are morally prohibited by the rules of nonmaleficence from causing harm to *anyone*, whereas the rules of beneficence do not necessarily apply to everyone. In as far as this principle is often invoked by utilitarianism, the question as to who is included and who is excluded when beneficence is cited can become a serious problem.

Several different distinctions exist regarding beneficence. General beneficence is aimed at all persons, regardless of special relationships whereas specific beneficence permits us to help those with whom we have a special relationship, including that of a professional-patient relationship. A difference also exists between ideal beneficence (incorporating extreme generosity, altruism and sacrifice) and obligatory beneficence (as required by the common morality), yet the line between the two is often unclear.

In the case of healthcare professionals, obligatory beneficence is related to specific beneficence. Many specific obligations of beneficence (often referred to as duties) in health care rest on the contract a healthcare professional enters into with a patient, by accepting the person as a patient to be taken care of (thus creating a professional-patient relationship). In what follows the discussion and analysis of beneficence relating to healthcare professionals will denote this specific (obligatory) beneficence.

Additional specification of the principle of beneficence into rules of obligation regarding healthcare professionals would be the obligations of the healthcare professional to take positive action to do good to others, to prevent or remove harm, to protect the rights of others, to help people with disabilities and to rescue people in danger.

Each of these specifications is relevant to the thesis topic. The principle of beneficence would constrain a healthcare professional to act positively by performing an invasive medical procedure in an elderly patient if the procedure could benefit (do good to) the patient. This benefit could be the maintenance of the patient's health, the relief of the patient's suffering,

curing of the patient's disease or prolonging of the patient's life as discussed under the aims of medicine in section 2.1.2.

The principle of beneficence would also constrain a healthcare professional to perform a positive action (invasive medical procedure) to prevent or remove harm by positively attempting to prevent deterioration of the patient's condition. The concept of harm was discussed in some detail in the previous section. It was demonstrated that according to Feinberg's "counterfactual test", harmful behaviour could be considered as behaviour that would result in a person's interests being in a worse condition than it would have been in if no action was performed (Hall 2012). Inappropriate failure to act would thus violate the principle of beneficence as this principle refers to a moral obligation to act for the benefit of a patient.

Acting beneficently by protecting the rights of others and by helping people with disabilities have direct bearing on the use of invasive medical procedures in the elderly. Though old age is not a disability, the elderly does have special needs and might be functionally (physically or mentally) impaired. Impaired competence of elderly patients needs to be specifically considered in this context. The healthcare practitioner should aim to protect the rights of an elderly patient with possible impaired competence to the best of his or her ability. Competence is discussed in more detail under section 3.3 on autonomy, whereas surrogate decision making for incompetent patients is discussed later in this section.

The rule of rescue as obligatory beneficence is an important specification of the principle of beneficence. An elderly patient needing an invasive medical procedure might be in danger of dying or suffering severe pain or disability, should the procedure not be attempted. According to the rule of rescue, an attempt should be made to assist the patient. This "Rule of Rescue" reflects the "*powerful human proclivity to rescue endangered life*" (Hadorn 1991). The rule has an emotive component that could create tension with the principle of justice. The risks, costs or burdens to the rescuer (clinician supported by the funder of the procedure) are weighed against the potential harms, risks or costs to the person in danger (patient). As a medical rescue attempt is often funded by a third party (health insurance company or state medical cover), considerations of the monetary costs of the rescue attempt weighed against possible clinical outcomes are also relevant. This reflects tension between the principle of beneficence and that of justice as all the other beneficiaries of the funder will be affected by the decision to rescue, especially if it is an expensive rescue attempt (invasive medical procedure) and if funds are finite. The tension between beneficence (the rule of rescue) and distributive justice need not,

however, reflect a “*fundamental and irreconcilable conflict*” (Hadorn 1991). I contend that proper knowledge of all the factors that impact on ethical decision making would allow for the development of a standard of due care that would relieve much of the tension between these two principles.

Although professional beneficence was traditionally seen as the primary obligation in health care, it can come into conflict with assertions of autonomy by patients, highlighting problems of paternalism. Paternalism arises if a clinician *intentionally* overrides a patient’s preferences with the justification of either benefitting (beneficence) or preventing harm (nonmaleficence) to the person whose preferences are overridden. Acting out of misplaced beneficence, focussing on the illness and not on the patient as a person with specific values and preferences (or failing to discuss these values and preferences and thus disregarding true autonomy) would be paternalistic in the extreme. Denials of requests for nonbeneficial procedures including futile care may also be paternalistic, though ethically defensible if a physician believes that performing the procedure would violate the standard of due care. A justified belief in futility revokes a physician’s obligation to perform a medical procedure (Beauchamp and Childress 2013, 169-170). The standard of due care was discussed in the previous section 3.1 on nonmaleficence and futile care was discussed in section 2.2.2.

The standards developed for surrogate decision making in incompetent patients are important specifications in applying the principle of beneficence. Competence is discussed in section 3.3 on autonomy, although it can be noted here that the assessment of decisional capacity or competence currently remains a matter of clinical judgement. Three general standards for surrogate decision making in incompetent patients exist, namely the pure autonomy standard, the substituted judgement standard and the best interests standard.

Previously competent patients should generally be treated under the pure autonomy standard. This standard emphasises that surrogate decision makers should act according to the now incompetent patient’s previously known autonomous wishes, whether or not a formal advance directive (in the form of either a living will or a durable power of attorney) exists. The substituted judgement standard is viewed as essentially identical to the pure autonomy standard in the case of previously competent patients. In this case the surrogate decision maker dons the “*mental mantle of the (now) incompetent*” patient (Beauchamp and Childress 2013, 227) and attempts to make the decision that the patient himself would have made if he was still competent. If no reliable trace remains of the patient’s preferences or if the patient has never

been competent, the best interests standard is preferred, constraining the surrogate decision maker to determine the highest possible net benefit for the patient after weighing up all available options. Surrogate decision making for incompetent patients should attempt to follow a standard of due care and adhere to the same ethical considerations valid for autonomous patients proposed in this thesis.

A final specification of beneficence would be beneficent health policies, including policies that would regulate access to expensive medical procedures. It is morally legitimate for a society to act beneficently through the government and its agencies as well as through private institutions like health insurance companies, by implementing the principle of utility (for its members or beneficiaries) as one principle of beneficence. This interpretation of utility in health care also has bearing on the principle of distributive justice as was discussed earlier in this section.

3.3 Autonomy

The principle of respect for autonomy protects the rights of individuals to hold certain views and to make certain kinds of choices – it empowers a person to take actions based on his or her own individual values and beliefs. Respect for autonomy stresses a patient’s right to information about their disease and their inclusion in the decision-making process without conferring a corresponding duty on the patient, leaving them free to delegate or cede that right to some-one else, whether their family or the healthcare professional.

The principle of respect for autonomy was neglected in traditional medical ethics for many centuries and only recently became prominent. From the time of antiquity to the 18th century, a healthcare practitioner carried out his duties from a benevolent position of authority, with a “fatherly” concern for his patient’s wellbeing, hence the term “paternalism”. Educating patients about their disease and including them in clinical or ethical decisions were irrelevant and foreign concepts. The advice of the Hippocratic Decorum (Palmieri and Stern 2009) was to:

“Perform your medical duties calmly and adroitly, concealing most things from the patient while you are attending to him”.

For centuries, this style of practising medicine continued unabated. In 1847 the American Medical Association adopted a Code (of professional ethics) that drew heavily on the work of the English physician-philosopher Thomas Percival (Baker and Emanuel 2000). Although this code put patients’ interests before professional interests (stressing a physician’s duty to his

patients above all other duties, including intra-professional relations in contrast to the Hippocratic tradition), patient's rights did not feature in this code. The code encouraged physicians to "*unite tenderness with firmness, and condescension with authority*" (Cummiskey 2010).

In the late 18th century, however, new ideas about ethics started to evolve. As modern democratic nation-states emerged from previous monarchies, liberty, equality and fraternity triumphed as moral ideas (Rachels and Rachels 2019, 101). Increasingly, human (and patient) rights and preferences were emphasised. In the 1914 case of *Schloendorff versus Society of New York Hospital*, U.S. Justice Benjamin Cardozo ruled against a surgeon that removed a tumour without a patient's consent. Kuhse (1999) reports that he famously declared that:

"Every human being of adult years and sound mind has a right to determine what shall be done with his own body".

Emphasis on human rights gained further impetus in the aftermath of World War 2. The atrocities committed in this conflict led the United Nations General Assembly to adopt the Universal Declaration of Human Rights on 10 December 1948 (Coléou 2013). Finally, actual cases of violation of patient rights by physicians and medical doctors in the 20th century also highlighted the importance of patients' rights. Among other cases, the death in detention of Steve Biko in South Africa in 1977 reflected a "*profound failure of care*" by the attending doctors (McLean and Jenkins 2003). This case was an important stimulus to moral awareness for the medical fraternity in South Africa, emphasising patients' rights and resulting in increased emphasis on ethical responsibilities towards detainees and prisoners (Van Niekerk and Benatar 2015).

It is clear that the relationship between healthcare practitioners and their patients has undergone a paradigm shift in the last two centuries. The authoritarian, paternalistic practice pattern of yesteryear (problems with paternalism were discussed under section 3.2 on beneficence) is now replaced by one of mutual respect and attention to patient rights and patient autonomy (Cummiskey 2010).

Central to virtually all theories of autonomy are two conditions: agency and liberty. Agency entails that an agent possesses the capacity for independent action and liberty entails that the agent is free from any controlling influences. Whereas some theories of autonomy may focus on the abilities, traits and skills of the autonomous person, the focus in Beauchamp and

Childress's book regarding the principles of biomedical ethics is on autonomous decision making. Emphasis is given to autonomous choice, as many autonomous persons may fail to govern themselves in particular circumstances because of temporary constraints caused by illness, ignorance and other conditions.

Given the nonideal conditions of everyday medical practice, a real-world construal of an autonomous choice by a generally competent agent (or by the agent's surrogate if the agent is not deemed competent) is that it should be made intentionally, with understanding and free from controlling influences and interference (Beauchamp and Childress 2013, 104). These three conditions are of crucial importance when considering invasive medical procedures in the elderly, as any of these three conditions can easily be violated in a situation where an invasive procedure is contemplated, especially in an emergency situation.

Discussion between a healthcare professional and his or her patient regarding an invasive medical procedure would usually ascertain that the choice for or against a procedure is intentional. While most procedures offered would be accepted or rejected intentionally, escalating clinical momentum in a very ill patient may result in further actions by the surgeon that the patient might not have sanctioned or intended. The second condition of autonomous choice is that it must be made with understanding. Pain, illness, fear, education and physician communication styles are but a few of the factors that can impact on an agent's understanding of a contemplated procedure. The last condition of autonomous choice is that it must be made free of external or internal control or influence. External influences would include the attending medical team's opinions and recommendations, influences from family and other loved ones or persons perceived to be in a position of authority (such as a rabbi or a church elder). External influences are especially important in the care of the elderly, as many of our elderly patients grew to adulthood in an era of paternalistic care and remnants of this paradigm could impel an elderly patient to be easily coerced into submitting to an invasive procedure that is discordant with his or her own preferences. Internal influences would include severe pain and mental illness. It is important to note, however, that not all influences exerted on another person are controlling and interfering.

An act or decision may be autonomous to a greater or lesser extent. Autonomy can be seen to exist on a continuum with perfect understanding and non-control on one side of the spectrum and total absence of understanding and full control on the other side of the spectrum. A cut-off point on this continuum is needed to categorise a decision as autonomous. A substantial degree

of understanding and non-coercion need to exist in order to make an autonomous choice, as a fully autonomous action is rarely, if ever, possible in a practical world (Beauchamp and Childress 2013, 104).

The principle of respect for autonomy protects the rights of individuals to hold certain views and to make certain kinds of choices – to take actions based on the values and beliefs of the individual. It can be stated as both a positive and a negative obligation. As a positive obligation, the principle requires that individuals must be appropriately informed and assisted to enhance their autonomous decision-making capacity. Autonomous actions and decisions must then be treated respectfully. As a negative obligation, the principle requires that autonomous choices must not be subjected to controlling constraints by others (including the way information is presented). It requires more than mere non-interference as it includes promoting others' capacities for autonomous choice whilst addressing possible fears and other conditions that might constrain free agency.

Respect for autonomy, however, has only prima facie standing and competing moral considerations can override this principle. If an agent's autonomous choice requires a scarce resource for which limited funds are available, this agent's autonomy may justifiably be restricted (as it comes into conflict with the principle of justice). An elderly individual might, for instance, make an autonomous choice to receive an expensive invasive medical procedure. If the procedure is funded by a third party, for example a medical aid fund, the cost of this procedure would impact negatively on the available funds of the medical aid and by extension on all the other members of the medical aid, conflicting with the principle of justice. The patient's autonomous choice may then reasonably be restricted in an attempt to utilise resources justly.

Implementation of autonomy in health care and research is exemplified by express or explicit consent, usually informed consent (or refusal). Biomedical ethics has placed informed consent at the forefront of its concerns since the Nuremberg trials following World War 2. Consent requirements seek to both minimise the potential for harm (harm and the risk of harm was discussed in sections 3.1 and 3.2) and to protect autonomous choice (autonomous choice was discussed in the paragraphs above). A five-element definition of informed consent would be that a person gives consent to an intervention if he or she is competent to act, receives a thorough disclosure, comprehends the disclosure, acts voluntarily and consents to the intervention.

The capacity of a person to make an adequate autonomous choice depends on the person's competence. The single core meaning of competence that applies in all contexts is "the ability to perform a task". Although competency exists as a continuum of abilities, a threshold level of competence is crucial for making an autonomous choice. Patients are considered competent to make a decision regarding medical procedures if they have the capacity to understand the information imparted (for example the nature of the ailment and the suggested procedure), to make a judgement about this information in the light of their values (after deliberating on risks and benefits), to intend a certain outcome by making a conscious decision and to communicate their wishes freely to the caregiver (Beauchamp and Childress 2013, 116). Competence may also be intermittent and can vary over time, as for example in the case of transient illness where a usually competent person is less competent due to the illness.

Both law and medicine presume a context in which the characteristics of the competent person are also the properties possessed by the autonomous person. Although competence differs in meaning from autonomy (self-governance), the criteria of the competent and of the autonomous person are strikingly similar.

The practical medical assumption is that an adult is competent and should be treated as such in the absence of any determination of incompetence. Standards for surrogate decision making for incompetent patients were discussed in section 3.2 on beneficence. Inquiry into a patient's competence is usually triggered in a clinical context only when the decision at stake is very complex, carries a high risk or when the patient rejects the physician's recommendations. Several standards are used alone or in combination to determine incompetence in a clinical setting, utilising tests and instruments to assess decisional capacity for clinical treatment and research. The assessment of competence for decisional capacity ultimately, however, remains a matter of clinical judgement.

3.4 Justice

The principle of justice makes up the fourth and final principle. The broad term "justice" refers to fair and appropriate treatment considering what is due or owed to individuals. The narrower term "distributive justice" refers to fair and appropriate distribution of burdens and benefits (including resources, privileges and opportunities) determined by norms that structure the terms of social cooperation. No single moral principle can address the diverse array of obligations of justice, therefore there is no single principle of justice in principlism.

Attention to principles of justice in health care has also only recently risen to prominence in medical ethics, although the definition of the formal principle of justice is centuries old. Traditionally attributed to Aristotle, it states that: “*Equals must be treated equally, and unequals must be treated unequally*” (Beauchamp and Childress 2013, 250). This definition lacks all substance as no criteria are given to determine equality and no respects are identified in which equals should be treated equally.

Material principles of justice specify the relevant characteristics for equal treatment because they identify the substantive properties for distribution, both benefits and burdens. All public and institutional policies based on distributive justice ultimately derive from an acceptance or rejection of material principles as well as on procedures for specifying and balancing them. In principlism issues of social justice thus centres on the rationale for distribution of primary social goods (i.e. material principles) such as essential health benefits and fundamental political rights as well as on the distribution of burdens such as bearing the risks of participating in medical research. Six general theories of justice call to attention various general principles that have bearing on justice in different contexts of biomedical ethics.

Utilitarian theories emphasise a mixture of criteria for the purpose of maximising public utility or welfare. This theory articulates that public utility is viewed as the material principle for distribution of justice. Burdens and benefits should be distributed to each person according to rules that would maximise public utility or welfare. This consequentialist moral approach is focussed on the overall good of society, rather than on the individuals within it (Garbutt and Davies 2011). These theories are valuable in the formation of just health policies in publicly supported institutions. Public health care in South Africa specifically is largely based on utilitarian principles as discussed in section 4.4.

Libertarian theories emphasise individual rights to economic and social liberty as material principles of justice, invoking fair procedures as the basis of justice. The theory suggests that each person should have a maximum of liberty and property resulting from the exercise of liberty rights and participation in a free-market system. Any distribution of goods is just and justified if the individuals in the relevant community freely choose it. In this system investors in health care have property rights, physicians and patients have liberty rights and society is not morally constrained to provide health care. Health care in the United States is largely based on this theory with the distribution of health insurance and health care left to a material principle of ability to pay for these services (Beauchamp and Childress 2013, 256). According

to a congressional research report, almost 70 percent of the population in the United States was covered by private health insurance by April 2020 (Rosso 2020). Government health coverage remained restricted to only some of the poor as well as to the disabled and the elderly (Lew and Greenberg 1992; Rosso 2020). Private medical care in South Africa is also based on this theory, although some restrictions apply. This will be discussed in more detail in section 4.4 when current ethical considerations regarding justice are discussed.

Communitarian theories highlight principles of justice developed from models of the good as they were shaped in moral communities. Each person receives his share according to the principles of fair distribution derived from the conceptions of the good established in a specific moral community. According to this theory the common good takes precedence over individual rights. This thought pattern is reflected in suggested communitarian policies for the allocation of health care. As an example, communitarian policies support the routine removal of cadaveric organs for transplantation in the absence of registered objections, stressing society's (the community's) ownership of cadaveric organs (Etzioni 2003).

Egalitarian theories underscore equal access to the goods of life that every rational person values. The material principles of need and equality are often invoked in this theory. Distribution in this case is meted out according to the maximum amount of basic liberty for a person compatible with an equal amount of liberty for other people, as well as according to equal access to the goods in life that rational people value. An important concept of egalitarian theory is Rawls's fair-opportunity rule. It asserts that individuals should not receive or be denied social benefits on the basis of undeserved advantageous or disadvantageous properties (including ethnicity, gender, IQ, etc) as they are not responsible for these properties but merely winners or losers in life's lottery. Rawls uses fair opportunity as a rule of redress, demanding compensation for disadvantages derived from life's lotteries as the outcome of these lotteries is arbitrary from a moral perspective. Current social systems of distributing benefits and burdens, including access to health care and research programmes, would undergo enormous modification if this approach is accepted. Rawls also devised the "veil of ignorance" as a moral reasoning device, in order to promote impartial decision making. By imagining people making choices from behind a "veil of ignorance", without knowledge of their own places in the social order, Rawls aimed to identify fair governing principles (Huang, Greene, and Bazerman 2019).

Capability theories recognise capabilities and forms of freedom essential for a flourishing of life and identify ways that social institutions can protect them. The means necessary for the

exercise of the capabilities essential to a flourishing life should be justly distributed to each person. Pioneered by Amartya Sen and developed by Martha Nussbaum (Beauchamp and Childress 2013, 259), ten core human capabilities are seen as of central relevance to social justice. These “capabilities” include the availability to all citizens of: life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, living with other species, ability to play and having control over one’s environment. Nussbaum stresses that social justice can only be achieved once policies are crafted that would *promote* this wide range of human capabilities that are fundamental to human life (Nussbaum 2008).

Wellbeing theories highlight essential core dimensions of wellbeing. The material principle of justice to be distributed here is the *means* necessary for the realisation of the core dimensions of well-being. The six core dimensions of wellbeing justice should be concerned with in this regard are health, personal security, reasoning, respect, attachment and self-determination. Devised by Madison Powers and Ruth Faden as a theory explicitly for bioethics, public health and health policy (Beauchamp and Childress 2013, 260), they state that they adopt an “*outcome-oriented approach, one that emphasizes the ultimate ends that a theory of justice should have in its sights*” (Powers and Faden 2011).

The concern of the last two theories is the right to health, as opposed to the right to health care.

Acceptance of more than one of these theories as valid in a pluralistic theory of justice is possible, but some of these principles may be considered competitive. Most societies do invoke more than one of these material principles in framing public policies for different contexts. Public policies will sometimes emphasise elements of one theory and at other times elements of another theory. The existence of the different theories mentioned does not justify the piecemeal approach many countries have taken to their healthcare systems – *nor does ignorance of these theories excuse this approach*. Intelligent use of the various principles of justice at work in the theories mentioned above has enormous practical significance for biomedical ethics and the development of just healthcare systems, with the inclusion of both public and private institutions.

Problems of justice in access to health care differ widely throughout the world, but centres on who should receive what share of a society’s resources. A demanding interpretation would be that everyone everywhere has equal access to all goods and services available to anyone, a utopian conception. The right to a decent minimum of health care represents a more attainable

goal. It implies that society ought to provide a decent or “just” amount of health care to all people in a specific society. The “decent minimum” of health care is not represented by the bare minimum, but rather by an acceptable level of care within an allocated budget (Fourie 2018, 38-39). This egalitarian goal is one of universal accessibility to fundamental health care and resources. It is conceptualised as a two-tiered system of health care with enforced social coverage for basic and catastrophic health needs representing tier 1, and voluntary private coverage for other health needs and desires representing tier 2 (Beauchamp and Childress 2013, 273). This approach incorporates moral premises from most of the theories defined, finding pockets of support from each.

Within a specific system, problems of justice in utilisation of resources remain. The necessity to use an invasive medical procedure could reflect the presence of a catastrophic health need in tier 1 (for instance the need for an organ transplant), but might also reflect a health need or desire (for instance joint replacement surgery) in tier 2. In both instances the cost involved in the procedure would impact on the collective resource pool of the institution responsible for coverage of the procedure, necessitating the use of allocation and rationing as well as the setting of priorities to ensure fair distribution of available resources.

The original meaning of the word rationing does not suggest harshness. It denotes a form of allowance, share or portion of something – for example when food is divided into rations in the military (Beauchamp and Childress 2013, 284). Rationing of scarce resources is a necessity (as explained in the paragraphs above) and can be achieved by focussing on various criteria in order to allocate a resource. Criteria for rationing could include assessment of a person’s social utility (with emphasis on a person’s social value in specific circumstances, for instance allowing medical personnel to receive a scarce vaccine in a pandemic) or medical utility (given on the grounds of a higher probability of successful treatment or a better prognosis). A person’s medical utility could include his age, along with his functional status and co-morbidities. Rationing could also be affected by impersonal mechanisms, for instance chance or queuing.

The recent COVID-19 pandemic brought the premise of rationing to the attention of the general public. Though rationing affected many people with regards to, for instance, organ transplants, the general population in high income countries has not been affected by rationing of healthcare resources to date. Since the beginning of 2020, however, many countries had to deal with rationing of finite medical resources to deal with the COVID-19 pandemic as demand for health care – especially the demand for intensive medical care and mechanical ventilation – soared

and resources have been overwhelmed. In April 2020, Arthur L. Caplan, director of the Division of Medical Ethics at New York University Langone Medical Center and School of Medicine, states in an online article in *The Medscape Journal of Medicine* that, for perhaps the first time, rationing will apply to any and all Americans (Caplan 2020), regardless of colour, creed, medical insurance or income. He states that fairness is including everybody in having a chance at accessing a resource, but justice is using principles that make sense to decide who should ultimately get access to the resource. These principles were discussed in the paragraphs above. As noted in section 3.3, the principle of justice might in this case conflict with the principle of autonomy.

The difficulty of withholding a resource (invasive medical procedure) is compounded in the case of elderly patients, as age is often used both implicitly and explicitly to ration available resources. Rationing by age can be justified based on medical utility (as advanced age would lower the likelihood of successful treatment) and based on the “fair-innings” theory.

In the case of medical utility, advanced age can be used to deny a patient the chance of an invasive medical procedure, for instance an organ transplant, based on the fact that a younger person would have a better chance to recuperate from the surgery and thus benefit from the resource. A contemporary example of rationing by age due to medical utility would be the allocation of mechanical ventilators (invasive medical procedure) to younger patients during the COVID-19 pandemic as young people generally do better than the elderly in responding to treatment for COVID-19 (Weiss and Murdoch 2020; Caplan 2020).

The fair-innings theory, on the other hand, states that people are entitled to a “normal” span of life, not necessary longer than this. According to Williams (1997):

“... anyone failing to achieve this has been cheated, whilst anyone getting more than this is ‘living on borrowed time’ ...”

An impartial person would then shift resources that would be consumed by an elderly patient to prolong an already long life to the treatment of a younger patient in an effort to at least attain a normal life span. This notion of intergenerational equity thus “*demand*s” (not only permits) “*greater discrimination against the elderly*” (Williams 1997). In the context of the COVID-19 pandemic, Miller (2020), professor of medical ethics at Weill Cornell Medical College and a Hastings Center fellow, defends age as a criterion for rationing. He argues in an essay published online in the *Hastings Bioethics Forum* that the young have more to lose from death than the

elderly, as the aged have had the opportunity to experience a greater number of life years (supporting the fair-innings theory).

4. Consideration of the current ethical landscape with the objective of identifying factors that influence ethical decision making

As a medical doctor in family practice, the author has repeatedly experienced that responses by patients and their families are emotionally charged when factors that drive decisions to utilise invasive medical procedures are discussed with them. If an intervention is deemed appropriate by a patient and his or her family, the response is overwhelmingly positive. Where care seems inappropriate, however, patients and their families are often of the opinion that financial incentives that compensate clinicians for undertaking procedures are to blame, as are aggressive treatment patterns by doctors who allow little time for deliberation of alternative treatment methods. This notion of attributing the blame for inappropriate use of invasive medical procedures to the clinicians involved is supported in much of the layman literature (Szabo 2018).

The author's colleagues, on the other hand, often report feeling pressured to deliver interventions with dubious value in an effort to provide the best possible care (regardless of the patient's age or frailty). The presence of this pressure is supported by the available literature and is also exacerbated by the doctor's fear of conflict and of litigation (Hurst et al. 2005). Additionally, the availability or lack of funds or medical insurance coverage for an invasive medical procedure for a specific patient adds another layer of complexity to treatment decisions, as does the lack of alternative and more conservative management resources (A. S. Kelley et al. 2010; Henson et al. 2016).

The author argues that although narrow, simplistic explanations for the inappropriate and perceived unethical use of invasive medical procedures in the elderly abound, there is, in reality, a complex set of interacting factors that influence ethical decision making. Knowledge of these factors could and would aid in ethical decision making and result in more appropriate care of patients, congruent with the principles of respect for autonomy, beneficence and nonmaleficence. Awareness of these factors would also promote the principle of justice by facilitating fair distribution of available resources, as less pressure will be placed on the system by unnecessary interventions.

It is therefore of the utmost importance to identify, examine and understand the relevant factors impacting on decision making when contemplating invasive medical procedures in the elderly.

The focus of this section of the thesis is the identification of these factors. In order to do so, the current state of affairs regarding invasive medical procedures in the elderly is considered by reviewing the relevant literature on the subject. The discussion of the relevant literature is done within the context of principlism. Specific factors that influence ethical decisions regarding treatment are identified in each instance. The factors identified are indicated in cursive script for ease of recognition.

4.1 Current ethical considerations regarding nonmaleficence

The principles of nonmaleficence and beneficence reassert the ancient ethical tenets of medicine harkening back to the Hippocratic corpus. Interpreted together, these two principles implore doctors to act in such a way as to promote the welfare of their patients, both by refraining from harming them and by positively endeavouring to help them. It is thus expected of doctors to act nonmaleficently and beneficently in a selfless manner in order to do what is best for their patients, disregarding their own interests.

Western society allows their doctors to use their skills to earn a living, but at the same time confers a responsibility on them to use these skills to respond to the needs of others. Tension might be caused by the paradox of the existence of both self-interest and altruism in the practice of Western medicine (Jonsen 1990, 7). This paradoxical presence of both self-interest and altruism derives from two traditions of Western medicine, one originating from ancient Greek medicine and the other originating from medieval Christian medicine. According to Jonsen (1990, 9): *“Hippocratic medicine was a skill, its practitioners were craftsmen, and their objective was a good living.”* Altruism did not feature and excesses of self-interest were safeguarded or tempered by the principle of nonmaleficence. Over the centuries, however, Western medicine became Judeo-Christian as discussed in section 2.1.1. The Christian church embraced the care of the ill and destitute as a duty of charity in line with Jesus’ parable of the Good Samaritan. Altruism and medical care were thus morally joined. Both traditions still exist as the deep moral foundations of Western medicine (Jonsen 1990, 10) and are responsible for a physician’s dual goals of earning a good living and respectable reputation (self-interest) and serving society (altruism).

This paradox is particularly concerning in medical systems with a strong libertarian basis, especially in a fee-for-service environment. A fee-for-service system is a system where a doctor receives a fee for every service he or she performs, in contrast to a capitation system where a

doctor is paid a set fee per capita for the patients he or she is responsible for. In the United States and in South African private health care, a fee-for-service system is currently predominantly used. In a fee-for-service system the danger exists that a doctor may utilise invasive medical procedures superfluously or unnecessarily to enhance his or her income. In a recently published North American article, more than 70% of respondents believed that “*physicians are more likely to perform unnecessary procedures when they profit from them*” (Lyu et al. 2017). If a physician did perform an unnecessary procedure on a person with the objective of self-enrichment, it would be unethical as it would conflict with the principle of nonmaleficence.

It is not proven, however, that a fee-for-service libertarian system of healthcare delivery does in fact lure healthcare professionals into acting unethically. In an original investigation, comparing the use and cost of care in patients aged older than 65 years with terminal cancer in seven developed countries, it was found that both Canada and Norway spent more per capita than the United States in the last 180 days of these patients’ lives when hospital expenditures were compared (Bekelman et al. 2016). Canada and Norway both have egalitarian healthcare systems with universal access to care, whilst the United States has a fee-for-service system. As the type of payment model utilised did not affect hospital costs (and this is where invasive medical procedures are performed), it seems unlikely that over-utilisation of procedures can be blamed on healthcare practitioners’ proclivity to employ procedures in an attempt to augment their income. This finding is compatible with the author’s professional experience. Interventionists in South African private medical practice are currently overwhelmed with work and often have long waiting lists of patients who need invasive procedures. There is absolutely no need to perform any unnecessary procedures to augment income.

Factors that influence ethical decision making identified from this situation are the virtues, beliefs, training and practice style of the healthcare practitioner as well as reimbursement models and practice styles related to medical resources and local service delivery models.

Invasive medical procedures (especially surgery) are associated with increased adverse outcomes in the elderly – especially the frail elderly (Stacie Deiner, Westlake, and Dutton 2014). Adverse outcomes refer to the risk of dying and of suffering from complications due to the intervention. It also refers to risks like decline in function, memory and mobility as well as to loss of independence due to the intervention. In spite of this, major surgery is performed on more than 4 million elderly patients in the United States every year (Oresanya, Lyons, and

Finlayson 2014). Poor communication of the risks and implications of increased adverse outcomes following invasive procedures in the elderly, as well as failure to elicit a patient's value system may be partially to blame (Taylor et al. 2017). There is a disconnect between the generally held beliefs and values of the elderly (if quality of life is valued more than quantity of life) and the treatment they receive at the end of life (Nabozny et al. 2016). This situation represents transgression of the principle of nonmaleficence.

In this instance, the factors impacting on ethical decision making are the healthcare professional's communication skills, understanding of patient autonomy and ability to elicit patient preferences (reflecting ethics training) as well as his or her understanding of holistic patient care (reflecting clinical training). Patient and family expectations, goals and fears, including possible unrealistic expectations of medical technology are also important factors to be considered.

South Africa, although classified as an upper middle-income country, is unique as its health care consists of two sectors: a public sector comparable to that of other lower middle-income countries and a private sector with resources similar to those of high-income countries (Dell, Kahn, and Klopper 2018). According to Benatar (2013), the annual per capita healthcare expenditure in the public sector is R1 200 as opposed to R12 000 in the private healthcare sector. 84% of the population is dependent on public health care and 16% of the population has access to private health care. There is clearly an unequal (and unjust) distribution of medical resources in South Africa (Maphumulo and Bhengu 2019). Due to both the geographical maldistribution of surgical resources and the discrepancies between private and public health care in South Africa, there is no *cumulative data* available on the incidence of invasive medical procedures in the elderly (Dell and Kahn 2017). A shortage of healthcare professionals and other resources (including infrastructure and equipment) in public health care in South Africa prevents the delivery of sufficient safe and effective surgical care to this sector (Patel et al. 2016), resulting in an inadequately low incidence of surgery. Surgical resources in the private sector are, however, comparable to those available in high-income countries (Dell, Kahn, and Klopper 2018) and the utilisation of resources, including the implementation of invasive medical procedures in the elderly, thus follows a similar pattern to these countries (as is described in much of the Western literature).

Factors to be considered in this context are those related to medical resources and local service delivery models. The characteristics and availability of resources, specific reimbursement

structures and regional practice models will all have an impact on the utilisation of invasive medical procedures in the elderly.

An elderly patient suffering from a chronic condition might also have unrealistic expectations of medical technology, expecting an invasive medical procedure offered by a clinician to restore normal form and function where normalcy cannot be achieved (Kruser et al. 2015). Whilst the procedure might improve or even restore the function of the specific organ, the adverse effects on the patient as a whole are often ignored to the detriment of the patient. Aggressive treatment patterns, often tailored to treating younger patients with fewer co-morbidities and the heedless escalation of interventions as the health of patients deteriorates, do more harm than good. As discussed in section 2.1.3, an intervention aimed at addressing a *specific* problem will not necessarily address other existing co-morbidities and might in fact make the overall condition of the patient worse. Careless action in this case would be unethical as it would transgress the principle of nonmaleficence.

Once again, factors regarding the healthcare professional are identified as influencing ethical decision making. The healthcare professional's recognition of unrealistic expectations by the patient (reflecting communication and ethics training) is important. Avoidance of thoughtless or aggressive treatment styles by respecting holistic care and patient preferences would reflect both the healthcare professional's ethics and clinical training. The characteristics and professional chains of referral resulting in escalating clinical momentum (reflecting on resources and local service delivery models) as well as the type of illness and the planned intervention are also important factors.

Conceptually, the factors identified that have bearing on ethical decision making when contemplating the principle of nonmaleficence, can be organised into four clusters. These clusters of factors are, in order of discussion: the *healthcare practitioner, medical resources and local service delivery models*, the *patient* and his or her *family* as well as the *type of illness and the planned intervention*.

The primary aim of the clinician might be an attempt at beneficence, but failing to take a holistic approach and being unaware of the many factors that influence treatment decisions would constitute failure to exercise a standard of due care and would violate the principle of nonmaleficence.

4.2 Current ethical considerations regarding beneficence

The aim of the clinician would usually be beneficent when conducting an invasive medical procedure, either in an attempt to diagnose or in an attempt to treat a patient. It is important, however, that clinicians act in line with the overall best interests of their patients (by respecting their values and preferences) and not only focus on the best *medical* interest of their patients. This is discussed in more detail in the section on autonomy.

Invasive medical procedures done for diagnostic purposes enable a clinician to make a definitive diagnosis and might also have an impact on estimating a patient's prognosis. Once a diagnosis is made a patient can be effectively cared for and treated. It is important for the clinician to be aware of the risks and complications related to invasive diagnostic procedures in elderly patients. Diagnostic invasive procedures should only be considered if the knowledge gained by conducting the procedure is imperative in planning or guiding subsequent treatment. If this is adhered to it would reflect respect for the principle of beneficence. Conducting invasive diagnostic procedures with unclear goals or with no real anticipated effect on the future treatment of the patient is morally inexcusable and would violate the principle of nonmaleficence.

In contemplating treatment decisions, the ethical considerations of both life preserving treatments and treatment of non-fatal conditions warrant more discussion. Life preserving interventions (discussed in section 2.2.3.1) may aim to maintain health, to relieve suffering, to cure, or to prolong life. All these goals would reflect respect for the principle of beneficence. Care can focus on several of these goals simultaneously, but these goals are unfortunately not always compatible. Treatment aimed at life-prolongation generally reduces quality-of-life in the short term and may also adversely affect quality of life in the long term. As noted before, 20% of patients in the United States who undergo emergency abdominal surgery die within a month of the surgery and those who do survive often lose their independence (Taylor et al. 2017). This loss of independence is an outcome to be specifically avoided, as loss of independence is seen as abhorrent by the elderly, a fate viewed by many as worse than death (Nabozny et al. 2016). It is thus evident that there is tension between the principles of beneficence (curing or prolonging life) and nonmaleficence (causing loss of independence) in considering life-preserving interventions.

Interventions that treat non-fatal conditions include those that improve quality of life as well as those that attempt to cure a non-life-threatening condition (section 2.2.3.1). Interventions aimed at improving quality of life (by restoring lost function or by reducing pain), reflect respect for the principle of beneficence, provided that the benefit outweighs the risk of the invasive procedure. This implies that the risks of adverse outcomes of the planned intervention were fully considered. Treatment of non-fatal conditions where a patient may not survive long enough to gain any value from surgery (and will thus derive minimal benefit), but is nonetheless subjected to the risk of treatment-related complications, would be morally indefensible and would disregard the principle of nonmaleficence.

Factors that influence ethical decision making in the circumstances described above, include those related to the intervention and the illness. The purpose (diagnostic or therapeutic) as well as the aim of the planned intervention will have bearing on the ethical decision. The healthcare practitioner's ability to conceptualise and communicate the goals of his or her proposed intervention (reflecting ethical and communication training), as well as his or her ability to elicit the goals, values and expectations of the patient (reflecting ethical training) in order to gain insight into the patient's preferences would play a role. The healthcare professional's ability to render holistic care by focussing on the patient and not the diseased organ system (reflecting clinical training) is also important and ethically relevant. The preferences, fears and expectations of the patient and the patient's family are significant, as is the ability of the patient and the family to communicate their values and goals of treatment. Finally, a fee-for-service reimbursement model might make injudicious use of invasive medical procedures tempting, underlining how resources and local service delivery models may also impact on ethical decision making.

Clinicians should particularly be aware of the remnants of paternalistic belief systems in older populations, especially in the African context. Paternalism was discussed in section 3.2 on beneficence and in section 3.3 on autonomy. Older populations would be more vulnerable to paternalistic practice styles (as was discussed before), as would people with poor literacy as well as previously disadvantaged, disempowered patients utilising public health care.

Norman (2015) concluded that the average patient in the developing world is unable to fully understand issues of autonomy and paternalism due to functional illiteracy in basic education or in medical matters. He questioned whether paternalism in Ghana and Sub-Saharan Africa should be considered from the vantage point of the ethical standards developed by Western

Industrialised nations or from an African cultural vantage point. He noted that medical doctors in Ghana do not have the time or resources to launch into lengthy exploratory conversations with patients, similar to the situation found in the South African public healthcare system. He did, however, find that paternalism enhanced patients' health seeking behaviour.

In South Africa, we are still faced with problems of illiteracy resulting from no or poor education. Language and cultural barriers further compound the problem of trying to empower a patient with knowledge and information in order to make an autonomous choice. Time and resources needed to truly ensure proper autonomy and informed consent are also often lacking in a public care setting and many patients seem to prefer the doctor taking charge by enacting a paternalistic role (Rowe and Moodley 2013). While Rowe and Moodley (2013) state that it is "*doubtful whether meaningful patient autonomy is possible in the setting of South Africa's pervasive inequality*", it remains the physician's responsibility to be aware of this problem and to do his or her best to try to mitigate it in order to act with true beneficence.

The healthcare professional's characteristics including his or her personality, dedication and ethics training are important factors in this respect. Lack of resources (including patient interpreters) and poor local service delivery models (for instance time constraints where large volumes of patients are seen at outpatient clinics) are also factors to contend with. These factors would all impact on ethical patient care regarding invasive medical procedures in the South African as well as global context.

No distinction is made in this study between the ethical considerations related to elective procedures and those related to emergency procedures as they are considered to be similar. However, cognisance needs to be taken of the fact that there are time constraints related to emergency procedures that are not present with elective procedures. This makes the practical application of ethical guidance more challenging in the case of emergency procedures.

Time constraints are directly related to the type of illness and the intervention planned. Clear understanding of the factors impacting on treatment decisions is imperative, as time constraints complicate the practical application of ethical guidance in emergency care.

The factors identified that have bearing on ethical decision making when contemplating the principle of beneficence, can be consolidated into the same four clusters as those conceptualised in section 4.1. These clusters of factors are, in order of discussion: the *type of*

illness and the planned intervention, the healthcare practitioner, the patient (and his or her family) as well as medical resources and local service delivery models.

4.3 Current ethical considerations regarding autonomy

Respect for the principle of autonomy is firmly embedded in contemporary medical ethics. Clinicians are aware of this and generally ensure that a patient (or surrogate) has the capacity to make an intentional choice with understanding and without being coerced. Respect for this principle forms the basis of informed consent, where informed consent “*is an individual’s autonomous authorisation of a medical intervention*” (Beauchamp and Childress 2013, 122). Explicit legal or institutionally valid informed consent is required before an invasive medical procedure can be performed. Clinicians usually ascertain that this consent is obtained.

The author’s personal professional experience as a medical doctor suggests that the elements of disclosure, understanding, competence and voluntariness are usually present when consent is requested for a procedure. The focus of the discussion, however, often seems to be a narrow medical discussion focussing on the medical condition and not holistically on the patient. The available literature on this subject supports this impression. Kruser et al. (2015) demonstrated in an original article in the *Annals of Surgery* that surgeons are prone to use a “fix-it” model to communicate with patients. They are prone to initiate discussions on invasive procedures with explanations of the disease process, offering a surgical solution to the problem at hand. This model of communication allows a patient to understand *how* their problem could be fixed with surgery, but not *whether* they should opt for surgery. Taylor et al. (2017) found that whilst procedural risks and risks of adverse events were discussed with patients, surgeons often did not integrate co-morbidities or functional status into their description of possible adverse outcomes. They neglected to discuss the goals and values of their patients, failing to incorporate a holistic approach. This constitutes a breach of the principle of respecting patient autonomy, as truly respecting autonomy would entail respecting patient preferences and eliciting the patient’s goal in seeking treatment.

Factors that influence ethical decision making in this context are the healthcare professional’s training and skills. The healthcare professional should be comfortable with both eliciting and respecting patient values and preferences (reflecting good ethical training) and also be able to envision holistic care by the ability to view and treat the patient as a whole and not as an organ system (reflecting clinical training). Preferences, values and aims of the patient and his or her

family need to be identified and communicated to the healthcare professional. Finally, the type of illness and intervention planned are also important factors in ethical decision making.

Voluntariness is a key component of informed consent and *liberty* (independence from controlling influences) is a condition essential to autonomy (Beauchamp and Childress 2013, 102, 124). Several unwanted influences may impact adversely on these two conditions and thus on the freedom of a patient's choice.

In the first place, patients often feel forced into making a decision without being allowed sufficient time to consider their options. Communication, negotiation and joint decision making are central to respecting patient autonomy. Failure to allow time for discussion or failure to at least have systems and decision aids in place that can facilitate the patient in his or her decision-making process would constitute a lack of respect for the patient (including the patient's liberty) and thus lack of respect for patient autonomy.

Secondly, as already noted, failure of the clinician to disclose and discuss all possible treatment options as well as failure to discuss possible adverse events including risks like decline in function, memory and mobility related to the interventions, also violate the principle of autonomy. This was discussed in more detail in section 2.1.3.

Finally, patients are sometimes coerced into making decisions by the style of communication of the clinician, where treatment options are framed and communicated in a biased manner (Nabozny et al. 2016). Nabozny et al. (2016) illustrated in an original article that surgeons have different ways of presenting treatment options to frail elderly patients. Although some surgeons allow the patient (and family) a simple choice by presenting different treatment options, without intruding with his or her own opinion, other surgeons may present the treatment options in a biased manner, framing the options in such a way as to favour a specific choice. This communication style harks back to medical paternalism. Although a clinician might have a preference for a specific approach, different patients will assign unique values to the possible outcomes and side-effect profiles (Misak, White, and Truog 2014) and patients should be allowed the autonomy to make their own decisions.

Attributes of the healthcare professional such as the ability to communicate relevant information (reflecting clinical and communication training), as well as an awareness of the dangers of authoritarian coercion of patients into a specific treatment option (reflecting ethical training), are important factors impacting on ethical decision making. The healthcare

professional should also guard against practice patterns vulnerable to clinical momentum, as heedless clinical momentum can overtake ethical deliberation. Neglect by a healthcare professional to discuss more conservative treatment options may be due to a lack of awareness of other options (reflecting poorly on clinical training), a genuine lack of trust in more conservative alternatives (reflecting a need for improved ethics training as the final decision is up to the patient) or a lack of availability of other options. This lack of availability of other options has bearing on available resources and local service delivery options. Patients often end up in acute care facilities due to lack of supportive care facilities in the community. The availability of community healthcare services, especially community palliative care facilities, is associated with a significantly lower incidence of inappropriately aggressive end-of-life care (Henson et al. 2016).

In summary, the same four clusters of factors established in sections 4.1 and 4.2 are identified when the factors that have bearing on ethical decision making regarding the principle of autonomy are contemplated. The clusters of factors are, in order of discussion: the *healthcare professional*, the *patient* and his or her *family*, the *type of illness and intervention planned* as well as *resources and local service delivery models*.

4.4 Current ethical considerations regarding justice

Health care costs money. In both private and in public contemporary health care, costs continue to rise dramatically. This is due to a longer average life expectancy, the development of new medical technologies and the failing health of a globally aging population. The resources to provide all medically technically possible healthcare benefits to all people, simply do not exist (Beauchamp and Childress 2013, 281). This is true globally, but more specifically so in South Africa.

South Africa remains one of the countries in the world with the highest income inequality. According to recent figures from the World Inequality Database, “the *top 1% of South African earners take home almost 20% of all income in the country, while the top 10% take home 65%. The remaining 90% of South African earners get only 35% of total income*” (Webster 2019). A wide disparity exists in wealth as well as in health in the South African population, with health care divided into a large public sector, serving 84% of the population and a small private sector, serving 16% of the population (Benatar 2013). The Mapungubwe Institute for Strategic Reflection recently published a review of data from the World Health Organisation stating that

approximately the same amount of money is spent on servicing the small private sector as that spent on servicing the overburdened public sector, when expenditure is stated as a fraction of the gross domestic product (“NHI: A View from Bonitas Medical Fund” 2019). This fact highlights the imbalance present in South Africa’s healthcare system, emphasising a lack of distributive justice (as there currently remains an unfair and inappropriate distribution of burdens and benefits in health care).

Factors that impact on ethical decision making in this instance are related to available resources and local service delivery models. Rationing systems are in place within both the public and private healthcare sectors in South Africa, but attempts at dividing health care justly across these sectors are not successful at present. Since 1994, praiseworthy changes to healthcare legislation and practice were made but reaching the admirable National Health Insurance’s goals of more “equitable access to high-quality health services through increased solidarity” between sectors might take several decades (Benatar 2013).

As current healthcare costs are escalating rapidly (especially in the case of utilisation of invasive medical procedures as discussed in section 1.1), non-selective use of resources in the private sector will drive up health insurance costs to an unaffordable level. Health insurance contributions will escalate, forcing many privately insured patients (especially elderly patients relying on pensions that fail to increase at the same rate as medical costs) to relinquish their private health insurance to rely on public health care. Additional strain will then be placed on an already overburdened public healthcare system. Ineffective and inefficient use of resources in public health care will compound this problem. Priorities must thus be set in the use and allocation of available resources (in both the public and private healthcare sectors), including attempts at rationing resources. Thoughtful use of the various principles of justice would allow for allocation and rationing of resources in an attempt to fairly distribute these resources within each specific sector.

Rationing of healthcare resources in the public sector in South Africa is done explicitly by implementing formularies and care protocols. Care protocols are often based on utilitarian principles in an attempt to maximise health outcomes for the greatest number of people. Rationing is also done implicitly by means of queues and waiting lists (Ranchod et al. 2017). Rationing of healthcare resources in the public sector and especially in tertiary or academic hospitals are also done at a grass-root level by the multidisciplinary teams responsible for

treating patients with a focus on prognosis and expected treatment outcomes. This reflects respect for individual rights.

Rationing of healthcare resources in the private sector in South Africa is currently accomplished by the medical benefit designs of the different medical aid scheme options. Medical schemes also use a combination of implicit and explicit means of rationing. Implicit rationing, where the rationing of resources is implied, would include rationing by inconvenience, by policy or by contract. It could, however, be argued that even explicit rationing by medical schemes could be viewed to be implicit due to the complexity of the benefit options. The lack of standardisation, coupled with the number of options available and the confusing terminology used by medical schemes, serves to create a very intricate system in a poorly regulated environment that complicates decision making by patients. Explicit rationing by medical schemes are achieved by using price rationing as a primary rationing tool. Price rationing entails that benefits of patients are dependent on the price they pay for the benefit. From the demand side this encompasses contribution rates (a higher contribution rate would result in better benefits and a higher benefit limit) and out-of-pocket payments from patients including co-payments (this rationing system encourages patients to limit their healthcare spending as they are personally responsible for expenditures above a certain limit). Supply-side mechanisms are represented by those that limit access to providers and those that attempt to influence decision making by providers. Access is limited by restricting members to specific (restricted) networks of healthcare providers that practice cost-effective medicine by adhering to defined clinical protocols. Decisions are influenced by implementing alternative reimbursement models for providers, case and disease management plans, treatment protocols and restricted formularies (Kaplan and Ranchod 2014). An attempt is made towards just allocation of resources within the private sector, although rationing systems are complex and not always transparent. The inherent complexity of South Africa's healthcare system combined with the lack of a standardised benefit design across schemes make it a daunting task for a consumer to make a wise and informed choice regarding a specific medical aid and benefit plan (Kaplan and Ranchod 2014).

Once again, the factors that impact on ethical decision making in this case are related to available resources and local service delivery models. Availability of resources differs widely across the public and the private healthcare sector in South Africa, though rationing of resources is implemented within both sectors. Apart from rationing, lack of resources in the

form of community healthcare services and palliative care centres causes escalating cost for the elderly at the end of life in both public and private health care settings. Increased availability of palliative care resources would alleviate unnecessary pressure on acute care hospitals resulting in invasive medical procedures that are unwarranted (Henson et al. 2016).

Decisions regarding the allocation of resources become particularly difficult if a patient has a debilitating or life-threatening condition and if the resource is scarce or very expensive (as is true in the case of many invasive medical procedures). This holds true for both the public and the private sector. Withholding the resource might be justified on utilitarian grounds. Utilitarian theories of justice were discussed in section 3.4, as was the concept of rationing. The COVID-19 pandemic of 2020 focussed attention on rationing globally as was discussed in section 3.4. This pandemic also focussed attention on rationing by age. Rationing by age can be justified on the basis of medical utility and on the basis of the “fair-innings” theory as discussed in section 3.4.

Conflict between patient autonomy (where a patient chooses to receive an invasive medical procedure – perhaps a ventilator) and distributive justice (where the resource pool is finite) was acknowledged in section 3.3 and 3.4.

As a practical example of contemporary rationing, the triage guidelines published by the Critical Care Society of Southern Africa in conjunction with the South African Medical Association regarding treatment during the COVID-19 pandemic in South Africa (SAMA 2020) are itemised. Triage refers to the classification of patients to determine priority of need and proper place of treatment – including admission to intensive care facilities (Baller and Padoveze 2020).

The word “triage” is derived from the French word “trier”, meaning picking or choosing (Jonsen 1990, 45). The term was originally used to denote the sorting of wounded soldiers for further management on the battlefield in France around 1800. Although often attributed to Baron Dominique Jean Larrey, surgeon in chief to Napoleon’s Imperial Guard (Jonsen 1990, 45; Robertson-Steel 2006, 154), the military surgeon-general Pierre-Francois Percy involved in Napoleon’s expedition to Egypt and Syria might also be responsible for the development of Napoleonic triage (Nakao, Ukai, and Kotani 2017). Triage as applied in Napoleonic times and in disaster management differs from triage as applied to medical scenarios as the objective for classification or sorting differs. The objective for selection in the first two instances is the

common good – saving the most salvageable so that they can once again contribute to the common good (Jonsen 1990, 45). In medical scenarios such as the emergency room the most seriously wounded would be treated first (with stable patients waiting for their turn) as the objective would be to save as many lives as possible.

In the case of the COVID-19 pandemic, the triage guidelines published by the Critical Care Society of Southern Africa regarding admission to available Intensive Care facilities, reflect that cognisance was taken of several principles. The objective to respect principles of social and medical utility can clearly be seen, as well as the objective of rationing fairly by age only once medical utility was taken into account. Care was also taken to respect patient autonomy by first taking cognisance of a patient's wishes regarding receipt of intensive care before triaging is commenced.

The Critical Care Society of Southern Africa allocated intensive care resources (and thus access to invasive medical procedures) in the case of the COVID-19 pandemic by first employing a clinical frailty scale for those patients who wanted intensive care treatment. This frailty scale consists of a scale from 1 to 9 with very fit patients scoring 1 and terminally ill patients with a life expectancy of less than 6 months scoring 9. Chronological age is not incorporated into this scale. Only patients with a frailty score of less than 5 (calculated a week or two prior to admission) would be offered intensive care treatment should healthcare resources come under pressure. For the patients qualifying for intensive care treatment, a priority score is then calculated by combining the score of sequential organ failure assessments with the number of co-morbid conditions a patient has. Scores are grouped into red (score of 1-3), orange (score of 4-5) and yellow (score of 6-8) cohorts. The lower this calculated score is, the higher the patient's priority for a ventilator becomes. It is clear that up to this point, medical utility as a principle of justice is used in the rationing process. Advanced age is implicitly used as it would impact negatively on the frailty scale, but chronological age is only used explicitly later on in the triage process. Ties within the same colour group are now ranked further. Firstly, patient age in years now plays a role. The following order of priority is used: 12-40 year olds get first priority, then 41-60 year olds, then 61-75 year olds and lastly patients older than 75 years. Chronological age is thus also explicitly used in the allocation of resources. Should ties again exist, individuals whose work support provision of acute care to others would have priority in receiving intensive care treatment. Social utility is thus also incorporated as a principle of justice in the allocation of resources. Final ties are resolved by evaluating the initial priority

score and allocating remaining resources by giving priority to the lowest raw score first. Thus, medical utility is once again used as a principle of justice to allocate resources. Referrals are to be admitted sequentially from red to orange to yellow groups based on real time knowledge of the degree of scarcity of resources and well as of knowledge of the anticipated new cases in the near future. Patients are assessed again at 48 hours and thereafter every 24 hours. Changes in a patient's condition are quantified and patients are reclassified into the three colour groups at these times. At any stage, patients triaged not to receive intensive care, and patients with substantial clinical deterioration and a very low chance of survival, should be referred to the appropriate treatment site including palliative care (SAMA 2020).

The autonomous right of a patient to receive invasive, life-sustaining treatment during a pandemic might need to be limited, but all critically ill patients should have access to palliative care. In the race to save lives during a pandemic, palliative care may be neglected, abandoning patients to unnecessary suffering and bad deaths. The provision of palliative care for critically ill patients is a “*moral imperative*” (Miller 2020).

In summary, the frailty and medical condition of the patient including his or her prognosis, the cost and availability of the procedure or resource as well as the age and social utility of the patient may justifiably be used to achieve distributive justice in the rationing of resources.

Factors that have bearing on ethical decision making here are the type of illness and planned intervention, the clinical condition of the patient (as this will determine the prognosis of the patient) as well as the cost and availability of the planned intervention. Availability of resources and local service delivery models influencing local and regional rationing protocols as well as the healthcare practitioner's knowledge of these protocols (reflecting his or her clinical training) are additional factors that have bearing on ethical decision making in this instance. Other factors relating to the patient and his or her family also play a role as patient preferences, co-morbid conditions and frailty indexes all have an impact on an ethical decision. Treatment and care more in line with patient preferences and goals could make rationing less important, alleviating the tension between justice and autonomy. The responsibility to elicit patient preferences and goals remains with the healthcare professional (reflecting his or her ethical training).

The four clusters of factors established in sections 4.1, 4.2 and 4.3 are again recognised when the specific factors that have bearing on ethical decision making when contemplating the

principle of justice are explored. These clusters of factors are, in order of discussion: *resources and local service delivery models*, the *type of illness and planned intervention*, factors relating to the *patient* and his or her *family* as well as the *healthcare professional*.

5. Substantiating the factors identified

Four clusters of factors that influence ethical decision making when invasive medical procedures in the elderly are contemplated were identified in the previous section. Relevant literature regarding this subject was considered from the perspective of each of the four principles of biomedical ethics. The four clusters of factors identified were relevant to each of the four principles.

The available literature perused and referred to in section 4 when consideration was given to the current ethical landscape regarding invasive medical procedures in the elderly, confirmed that there are a multitude of factors to be considered. None of the authors, however, acknowledged all the different factors identified in section 4.

A narrow view of the factors that have an impact in the use of invasive medical procedures in the elderly predominates in the literature. Additionally, different vantage points can be identified. The medical literature focusses strongly on physician, patient and disease parameters, utilising various frailty indexes and scores to predict clinical outcomes and prognosis. Cognisance is taken of ethical considerations, but the emphasis is most often on practical, clinical considerations. The literature on palliative care and health services has a stronger focus on patient and family preferences as well as on resources and on physician service delivery patterns. Ethics literature highlights the importance of patient and family preferences (as well as the variability of preferences) and argues the justification of rationing of resources.

Some authors did attempt to consider multiple factors, most notably Kelley et al. (2010), who developed a theoretical model published in the *Journal of Palliative Medicine* that incorporates several factors affecting treatment intensity for seriously ill adults. This model was based on the relevant empirical literature in palliative care, health services and economics. It was developed as a response to the variability of medical care at the end of life in an attempt to improve the efficiency and quality of care. It describes a framework of interacting factors that includes physician (healthcare practitioner) determinants, determinants regarding the patient and his or her family as well as determinants related to regional and local service delivery models.

Nabozny et al. (2016) also considered various factors by exploring “*high-stakes*” surgical decision making from the perspective of both the surgeon (healthcare practitioner) and the senior (patient). They reported that different attributes of these two groups impacted on decisions. Additionally, surgeons described a clinical momentum that promoted surgical intervention (relating to variables regarding regional and local service delivery models).

In a Scandinavian article on general practitioners’ perspectives on end-of-life home care, a different range of factors were considered. The nature and time of the health crisis as well as the patient’s clinical condition at the time of the crisis (thus variables regarding the illness and the planned intervention), factors regarding the general practitioner (healthcare practitioner) as well as the patient’s and family’s wishes were found to influence decisions (Sercu et al. 2015).

Several other studies (Taylor et al. 2017; Kruser et al. 2015; Kwok et al. 2011) found that surgeon communication (healthcare practitioner factors) and different practice patterns (factors related to local and regional service delivery models) are important groups or clusters of factors that influence treatment decisions. Bolt et al. (2016) identified patient and caregiver (healthcare practitioner) characteristics, as well as specific disease entities (variables related to the type of illness and intervention planned) to be important when they explored appropriate and inappropriate care at the end of life.

In an editorial published in the journal *Intensive Care Medicine*, the complexity of decisions regarding the use of life-sustaining therapies in critically ill patients is confirmed. The article identifies important considerations as the potential benefits and burdens of the therapy planned (thus factors related to the illness and intervention), the availability of resources (referring to the variability of resources and local service delivery models) and the knowledge of patient goals and preferences (Ehlenbach 2013).

Finally, Forero et al. (2012) determined in a review article published in *Emergency Medicine International*, that when a thematic analysis of the available literature (160 studies) on end-of-life care in the Emergency Department of hospitals was done, six main topics of interest could be identified. These topics included uncertainty in treatment and prognostication (thus factors related to the illness and the planned intervention), quality of life, ethical and social issues (pertaining to factors regarding the patient and his or her family as well as the healthcare practitioner’s ability to elicit these values). Cost issues, interaction between different departments as well as existing strategies for out-of-hospital care (referring to factors related

to local and regional service delivery models) were also found to be important. Among other recommendations, the article emphasises that a structured approach to decision making is needed.

It is concluded that there is a complex set of interacting factors that have bearing on ethical decisions regarding invasive medical procedures in the elderly. These factors were identified by contemplation of the current ethical landscape and substantiated by perusal of the relevant literature. Although a variety of factors receive attention by different authors in diverse disciplines, no attempt is made to incorporate all the factors into a unified conceptual framework with the intent of guiding ethical decisions.

The author will consequently endeavour to develop a unified framework of all the factors discussed, representing a standard of due care. This framework will aid ethical deliberation regarding invasive medical procedures in the elderly. The four clusters of factors identified in section 4, namely factors related to the healthcare practitioner, the patient and his or her family, the illness and planned intervention, available resources and local service delivery models will form the foundation for this framework.

6. Presentation of a conceptual framework to aid ethical decision making

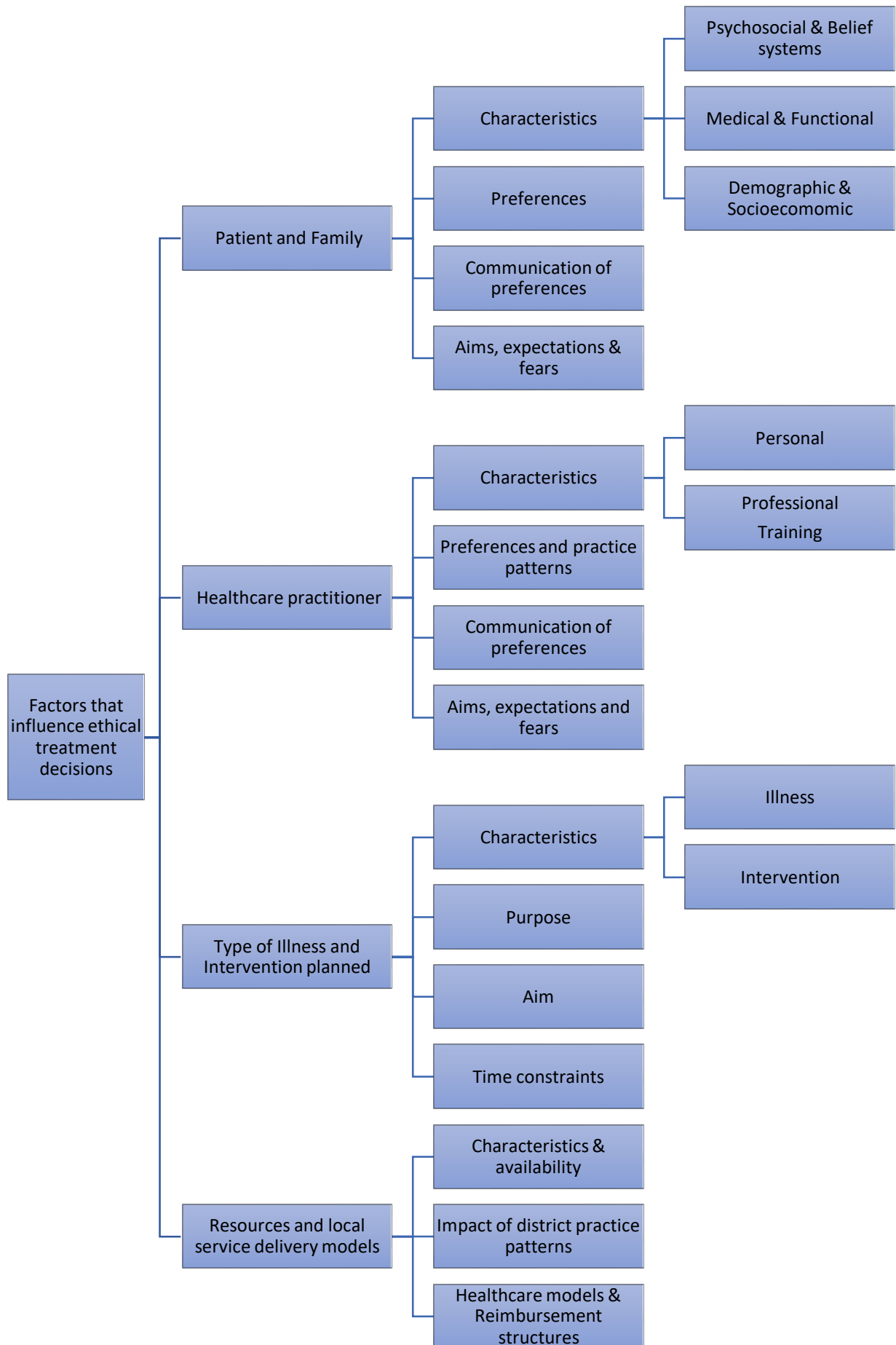
Cognisance of the multitude of diverse factors that influence the use of invasive medical procedures in the elderly is important. Familiarity with these factors will assist with ethical deliberation.

Although consideration of the current ethical landscape as well as the relevant literature confirm that a multitude of interacting factors need to be considered in this regard, no unified framework incorporating all the factors identified exists. Narrow views of the subject predominate with specific perspectives dictated by the relevant discipline involved as discussed in section 5.

A unified framework was therefore developed with the intent of guiding ethical decisions. The factors identified in section 4 and substantiated in section 5 were organised into four clusters, namely factors related to the healthcare practitioner, the patient and his or her family, the illness and planned intervention as well as available resources and local service delivery models. These clusters or groups of factors form the foundation for the unified framework.

All the diverse factors that impact on ethical decision making are coherently organized under these four clusters. Further refinement is achieved by categorizing the factors into logical sub-groups. Patients, families and healthcare practitioners all have different characteristics, preferences, goals and communication styles that impact on ethical decision making. The type of illness and type of intervention contemplated also have different characteristics, purposes and aims and are often responsible for varying time constraints. Lastly, resources and local service delivery patterns also have diverse characteristics, availability, district practice patterns, healthcare models and reimbursement structures that impact on ethical decision making regarding the use of invasive medical procedures in the elderly. Care was taken to include all the factors alluded to in section 4 and section 5 in the unified framework for the sake of comprehensiveness.

The unified framework of factors is schematically presented as follows:



The impact and importance of the different factors incorporated in this unified framework is discussed in section 7.

Modern health care increasingly focusses on the central role of the patient with patient-centred health care accepted as one of the key elements of high quality medical care (Epstein and Street 2011; Clay and Parsh 2016). This holistic patient-centred care is based on “*deep respect for patients as unique living beings*” – with the “*obligation to care for them on their terms*” (Epstein and Street 2011). Patient-centred care includes the concept of “*patient-physician collaboration*” where the physician facilitates a patient’s choice (Clay and Parsh 2016). Healthcare practitioners have an ethical duty to guide their patients in treatment decisions in order to reach a decision that is in line with the patients’ preferences. This duty will be discussed in more detail in section 7.2.1.2.

The framework presented is intended to be used by physicians as an ethical decision aid in the patient-physician collaboration and represents a standard of due care. Cognisance of this framework will enable a healthcare practitioner to consider all the relevant factors when an ethical decision regarding an invasive medical procedure in an elderly patient is to be made.

7. Discussion of the factors that influence ethical decision making

Contemplation and consideration of the diverse factors that influence the use of invasive medical procedures in the elderly is important. In-depth knowledge and understanding of these factors will assist with ethical deliberation regarding invasive medical procedures in the elderly.

A unified framework of factors was presented in the previous section. The individual factors and how they impact ethical decision making are now discussed systematically by cluster under the relevant headings.

7.1 The patient and family

7.1.1 Characteristics

7.1.1.1 Individual psychosocial factors and belief systems

Individual patient characteristics will influence choices regarding invasive medical procedures in the elderly. Characteristics that may influence treatment preferences include patient gender, marital status and education (Kelley et al. 2010; Philippart et al. 2013). Education is especially important as sufficient literacy enables a person to better understand a planned procedure, impacting positively on autonomous choice (as autonomous choice demands that a choice is made *intentionally*, with *understanding* and free from *controlling influences* as discussed in section 3.3). Better education and literacy will also improve a patient's (and family's) ability to conceptualise and communicate his or her values.

Functional illiteracy in general and medical matters leading to sustained paternalism in the African context were discussed in section 4.2. It is important for the healthcare provider to know that illiterate and semi-literate, previously disadvantaged patients utilising public health care in Sub-Saharan Africa are more vulnerable to paternalistic practice styles, impacting negatively on patient autonomy.

Ethnicity has also been shown to have a significant impact on increasing treatment intensity at the end of life in the United States. Kelley et al. (2011) analysed Medicare expenditures and concluded that, consistent with other studies, Hispanic ethnicity and African American population groups were associated with higher expenditures at the end of life. This may be due

to, amongst other variables, patient preferences and belief systems, differential access to medical services or paucity of able interpreters (Kelley et al. 2011; Rowe and Moodley 2013).

Kelley et al. (2011) also found a substantial association between having a nearby family member and lower Medicare costs, indicating lower rates of hospitalisations and interventions. Family members may act as caregivers or as advocates for patients to avoid unwanted invasive treatment, allowing a patient to choose a treatment plan that incurs fewer expenses and that might be more in line with patient preferences.

The composition and dynamics of a family will also influence decisions regarding invasive medical procedures in the elderly. Family units in some groups of society may play a pivotal role in decision making for a specific patient. In Malaysia and many African nations, individual choice can be overridden by familial choice, regardless of the individual's capacity (Norman 2015). Power dynamics within the marital African home could see women deferring important medical decisions to their husbands and the hierarchical nature of natural African cultures could also impact in personal decision making with patients deferring decisions to the elders, or to better educated or "*wiser*" family members (Norman 2015).

Lastly, conflicts of interests within a family may play a major role in treatment decisions (Beauchamp and Childress 2013, 190-191), as could feelings of guilt (Bolt et al. 2016; Dzung et al. 2016). Awareness of these conflicts will alert a healthcare professional that family decisions might not be in line with patient preferences. Reaching out to other colleagues to assist with a mediation process within the family might help to resolve conflict in this area.

7.1.1.2 Medical and functional characteristics

The medical and functional characteristics of a patient plays a pivotal role in the clinical decision of whether an invasive medical procedure in an elderly patient is warranted. These characteristics also have an impact on the ethical decision as the patient's prognosis and the benefit/risk ratio of the procedure hinge considerably on these factors.

Functional characteristics and status in the elderly are often portrayed by frailty indexes in the medical literature. Frailty in elderly people as well as the two main models of frailty in elderly populations were discussed in section 2.3.2.

Co-morbid medical conditions are also important in the elderly when ethical decisions regarding invasive medical procedures are made. Although some frailty scales incorporate co-

morbid medical conditions, (Partridge, Harari, and Dhesi 2012), co-morbid conditions per se are also important. Performing an invasive medical procedure on a person who would not live long enough to benefit from the procedure due to a life-threatening co-morbid condition, regardless of the person's frailty index, would be unethical.

7.1.1.3 Demographic and socioeconomic factors

The access of a patient to medical care and specifically to invasive medical procedures influences the utilisation of invasive medical procedures. Both financial and physical resources with regards to access to care are important. In the South-African context a patient who makes use of the public health sector would have access to fewer resources than a patient who utilises private health care as was discussed in section 4.4. Additionally, geographic factors play a role, as a study by Dell and Kahn (2017) reflected a marked variation of surgical resources among the different provinces in South Africa. A patient's medical insurance coverage and benefit design as well as his or her ability to pay for additional services (such as home care and safety equipment) which might not be covered by medical insurance will also influence the care a patient can access (Kelley et al. 2010), regardless of their preferences.

A patient's income, net worth and location of residence will influence the odds that patient preferences have been discussed and legalised in the form of advance care planning and formal advance directives (e.g. a living will or a durable power of attorney [Kelley et al. 2010]). Income and net worth will influence the execution of estate planning that might include formal advance directives. The admission of a patient to a nursing home (thus impacting on the location of residence) might also require a formal advance directive.

In summary, numerous patient and family characteristics influence ethical decision making when contemplating invasive medical procedures in the elderly. Many of these characteristics have an effect on personal choice preferences or on access to care, while others have an effect on communication of preferences, as well as on unwitting or unconditional submission to figures of authority. These figures of authority could include the healthcare professional (harkening back to paternalism as discussed in sections 3.2 and 4.2 on beneficence), family members or spouses.

7.1.2 Preferences

As discussed in section 2.2.3, invasive medical procedures can be used for therapeutic or for diagnostic purposes. Additionally, in the case of therapeutic procedures, the intention of the

intervention could be to preserve life or to treat non-fatal conditions (including interventions to improve quality of life).

Elderly patients often view quality of life as paramount and agree that maximising quality of life should guide treatment decisions (Nabozny et al. 2016). Many older patients also value quality of life above short-term survival (Ehlenbach 2013) and may refuse invasive medical treatment due to concern about loss of self-sufficiency (Philippart et al. 2013). Though many elderly people value quality of life highly, Nabozny et al. (2016, 66-67) report that they find it difficult to use this value to assist with decision making in the acute situation. Though some seniors are able to use this value to decide between invasive treatment and palliative care, others see it as a choice between life and death. Many feel it is “*obligatory*” to choose life (due to for instance religiosity or a perceived moral imperative to keep on living) and will thus opt to choose in favour of the invasive procedure, reasoning that “*it’s better to die trying*”.

The preference for quality over quantity of life of people in general and the elderly in particular is supported by numerous studies (Philippart et al. 2013; Nabozny et al. 2016; “Prolonging Life at All Costs: Quantity versus Quality” 2016). It is important, however, to be aware of the fact that people’s preferences can change over time. Some studies conclude that people adapt to a lower functional ability and diminished quality of life over time, placing increasing importance on quantity of life. In a study of determinants of decisions regarding invasive procedures to prolong or shorten life in patients with a fatal neurological disease, quality of life was not found to influence decisions. Decisions to prolong life were “*flexibly adapted*” throughout function loss and the wish to shorten life declined in tandem (Lulé et al. 2014). It is thus clear that, though many patients are willing to trade some life-years for improved quality of life during the life they have left to live (Beauchamp and Childress 2013, 239), this is not always the case. In a study evaluating more than 400 hospitalised patients aged 80 to 98 years, Macready (1998) found that 69% of the patients were unwilling to exchange more than one month of life in exchange for excellent health. Clarke et al. (2017) also concluded that a “*significant number (of people) chose preservation of life at all costs*” when preferences of care towards the end of life were evaluated.

Kelley et al. (2010) state that the reasons why patient preferences do not guide treatment choices is poorly understood when the intensified use of invasive medical procedures is considered. I would argue that in this context, it is important to consider that patient preferences may change over time as discussed in the paragraph above. A treatment choice that may seem

discordant with a previously stated preference may in fact be directed by the patients' preference *at the time of the procedure*.

In summary it is important for the healthcare practitioner to be aware of patient preferences as well as of the fact that preferences are dynamic (Oresanya, Lyons, and Finlayson 2014) and may change over time.

7.1.3 Communication of preferences

The characteristics of a patient and his or her family will have an effect on communication of preferences, as well as on unwitting or unconditional submission to figures of authority. Family members, spouses or healthcare professionals could be seen as figures of authority.

Ackerman and Strong note in the preface of their book *A casebook of medical ethics* that there may be factors present in the cultural milieu a patient lives in that may influence cases. A “*polite deference to authority*”, notable in the Mid-South in Northern America (Ackerman and Strong 1989, ix), may for instance influence communication of preferences. A patient (or family) may in this case submit to an invasive medical procedure without thorough discussion and evaluation of alternative treatment options due to their submission to authority.

Other psychosocial factors that will influence a patient's view of and submission to authority as well as his or her communication of preferences were discussed in section 7.1.1.1. These include a patient's education and literacy, ethnicity and culture as well as the composition and dynamics of a patient's family.

The healthcare practitioner should be cautioned to be aware of these constraints to communication.

Finally, in the case where a patient is incompetent to decide and thus to communicate his or her preferences, surrogate decision makers are utilised to communicate a patient's (prior) preferences. Competence was discussed in section 3.3 and standards for surrogate decision making was discussed in section 3.2. Advance directives, prepared by patients whilst competent to guide decisions about life-sustaining treatments should they become incompetent (as discussed in section 3.1), should be used if at all available. When an incompetent patient has left no formal advance directive, families are often the most proper decision makers and frequently articulate the patient's known preferences. Where an incompetent patient must be shielded from family conflicts of interest and from neglect, other possible decision makers

could be employed. These include physicians and other healthcare professionals, institutional ethics committees, judges and courts (Buchanan and Brock 1986, 81-89).

Surrogate decision makers have the responsibility of communicating an incompetent patient's anticipated preferences, but must be sensitive to the fact that patient preferences are dynamic and may change over time. Jon Neher (2004) eloquently illustrates in a case study in a Hastings Centre report that "*the self is mutable and the mechanisms of our passing remains stubbornly unpredictable*", declaring that it would be best to have a guardian who is "*fluid – like a river*", as circumstances and patient preferences can change over time.

7.1.4 Aims (goals), expectations and fears

7.1.4.1 Aims/Goals

As discussed in section 2.1.2, four goals or aims of medical care were formulated by the Hastings Center project (Anderson 2007). These goals or aims are all relevant to medical care in general and to invasive medical procedures in the elderly in particular.

The aim of an invasive medical procedure might be to:

- Prevent disease and injury and promote and maintain health (for instance cardiac bypass surgery for partially occluded carotid arteries in the elderly to prevent myocardial infarction).
- Relieve pain and suffering caused by maladies (for instance joint replacement surgery for painful osteo-arthritic joints to relieve pain and improve function in the elderly).
- Care for and, if possible, cure maladies (for instance insertion of cardiac pacemakers in elderly patients with cardiac dysrhythmias).
- Avoid premature death or pursue peaceful death. This last goal could be adapted to read "to delay death for the foreseeable future", due to advances in medicine as discussed in section 2.1.2. A contemporary example would be the use of mechanical ventilation for an elderly patient with acute respiratory distress syndrome in the COVID-19 pandemic.

It is important for patients to understand that there are different possible treatment aims, as not all procedures are employed to cure disease. When elderly patients are offered an invasive medical procedure, the anticipated effect of the invasive medical procedure should be discussed with them, with the intent to clarify the goal of the treatment. Is the procedure accepted by the patient to maintain health, to find relief from suffering, to attempt a cure or to prolong life?

As surgery in the elderly may be associated with graver outcomes, a thorough evaluation of the patient's treatment goals or aims is imperative (Oresanya, Lyons, and Finlayson 2014).

Clarification of the aim or goal of the procedure would allow the patient to fully understand the reason for the planned procedure and would enable the patient to consider whether the intent of the procedure is in line with their preferences.

7.1.4.2 Expectations

Elderly patients may have unrealistic expectations of medical technology, placing too high a value on invasive medical procedures. They may struggle to believe that medical technology has only a limited benefit to offer in some situations, doubting the information given by surgeons that they will have markedly impaired function in these circumstances (Nabozny et al. 2016).

Elderly patients may also believe that normal form and function can be restored to them by submitting to an invasive medical procedure, whilst suffering from a chronic condition where normalcy cannot be achieved (Kruser et al. 2015). By addressing a specific medical problem surgically, existing co-morbid conditions will not necessarily be addressed (and may in fact be worsened). These expectations of elderly patients as related to current medical care was discussed in section 2.1.3.

Other unrealistic expectations include those of unexpected adverse events. Elderly patients have a higher mortality and complication rate after surgery when compared to younger adults (Deiner, Westlake, and Dutton 2014). Additionally, risks like decline in function, memory and mobility related to these interventions are increased in these patients, though they may not be aware of it or expect it. Nabozny et al. (2016) demonstrated that the elderly erroneously believed that an invasive procedure such as surgery could be easily attempted and then stopped should the outcome be bad and that if death occurs it would be in the operating room and thus painless. Surgery, once started, cannot be undone and intraoperative death is rare. It is important for healthcare professionals to explain the possible cascade of intra- and postoperative complications as well as the additional interventions that would typically precede death in order for the elderly patient to have realistic expectations (Nabozny et al. 2016).

In summary it is important for the healthcare professional to be aware of unrealistic patient expectations. This includes expectations of unattainable benefits and unexpected adverse events.

7.1.4.3 Fears

Nabozny et al. (2016) reports that the elderly greatly fears a loss of independence, seeing this loss of independence as “*abhorrent*” and frequently endorsing “*death as preferable*” to being dependant on others for basic needs.

The fear of being a burden to others is also important. Terminally ill patients in Oregon in favour of assisted suicide reported “*great distress*” due to the feeling of being a burden and people with a terminal neurological disease reported that “*feeling ... a burden*” to others is an important factor in deciding against prolonging life by invasive measures (Lulé et al. 2014).

The elderly also fear dying badly. They fear dying in pain and discomfort without being able to interact with loved ones. They want death to be peaceful and without an undue burden placed on their families (Nabozny et al. 2016).

It is important for a healthcare professional to be aware of and to address these fears, due to the danger that an elderly patient would opt to choose in favour of an invasive medical procedure because of these fears. An invasive medical procedure may in fact lead to loss of function and independence as discussed in section 4.2, causing the elderly patient to need nursing care or to feel that he or she is a burden. Elderly patients may also choose in favour of a procedure as they believe that death in the operating theatre would be instant, painless and less of a burden. This is a false belief, as discussed in section 7.1.4.2 and should be discussed with the elderly patient by the healthcare practitioner in order for the patient to be able to make an informed decision.

Fears of elderly patients should be addressed by the healthcare professional. A terminally ill patient should never feel pressured into either accepting or declining an invasive medical procedure due to these fears. Alternative options of treatment to invasive therapies, including palliative care to prevent unnecessary suffering and a bad death, should also be discussed with the patient. The patient should know that they will not be abandoned if they choose against an invasive procedure, as the provision of palliative care for a critically ill patient is a “*moral imperative*” (Miller 2020).

7.2 The healthcare practitioner

7.2.1 Characteristics

7.2.1.1 Personal characteristics

Personal characteristics of healthcare providers that may play a role when decisions regarding invasive medical procedures in the elderly are contemplated, are the provider's age, gender, ethnicity, as well as his or her religion (Kelley et al. 2010). These variables would have an impact on the provider's training (7.2.1.2), practice patterns (7.2.2) and communication style (7.2.3), as well as on his or her belief systems.

A healthcare provider's personal belief system may, however, never influence treatment decisions. The United Kingdom's General Medical Council's guidance regarding good medical practice stresses that a physician "*must not imply or express disapproval of the patient's lifestyle, choices or beliefs*". Should a patient decide on a treatment option the physician has a conscientious objection to (for instance the termination of a life-prolonging medical intervention), the patient should be referred to another doctor (General Medical Council 2013, 17). Additionally, the physician should not "*express personal beliefs ... to patients in ways ... likely to cause them distress.*" Sadly, the author's personal professional experience as a medical doctor reflects that colleagues sometimes do allow their personal belief system to overshadow patient preferences. Mindfulness of this is important in order for the healthcare professional to remain vigilant against the risk of superimposing their belief system on a patient's.

Importantly, a healthcare professional's virtues will influence the treatment decisions he or she negotiates. Though allowed to earn a living (discussed in section 4.1), physicians are expected to place the interests of their patients above their own, delivering a "higher professional" service that is seen as a calling, transcends self-interest and is virtue-based (Swick, Bryan, and Longo 2006). A virtue is an internalised disposition which helps an agent to behave appropriately. These virtues could be taught to a healthcare provider by his family of origin, his schooling system or his exposure to formal religion. Students are also taught virtues at medical school, either by formal lectures or through their identification with role models (Madani et al. 2017, 7-8), such as experienced teachers, lead clinicians, senior registrars and department heads. Finally, the character and disposition of the healthcare professional will also influence this virtue-based practice pattern. All of these factors could thus impact on the

development of a healthcare professional's virtues and by extrapolation to how he or she negotiates treatment decisions.

A virtue-based practice style will ensure that invasive medical procedures in the elderly are performed for the correct reasons, with the healthcare professional considering relevant factors that may influence treatment decisions. It will also inhibit harmful actions, where unnecessary invasive medical procedures are performed for the elderly by healthcare practitioners who profit from income derived from performing these procedures.

Finally, healthcare practitioners should be perceptive, have self-confidence and have insight into their own motivations. This will allow the practitioner to understand their own preferences without allowing these preferences to influence patient decisions, to contemplate alternative, less invasive treatment options and to be willing to refer a patient for a second opinion.

In summary, healthcare practitioners should be sensitive to the fact that their own characteristics could have an impact on treatment decisions. The practitioner should endeavour to act virtuously with no reference to personal belief systems and a sound knowledge of how their training, practice patterns and communication styles might influence treatment decisions.

7.2.1.2 Characteristics of professional training

Ethical training

Healthcare professionals' ethical training should enable them to assist a patient in making a decision that is in line with the patient's preferences. They should be able to consciously act with beneficence, avoid maleficence and consider whether a decision is just. Respect for true patient autonomy as discussed in section 4.3 should enable healthcare professionals to discuss treatment options in a non-paternalistic manner, without shirking their duty in assisting with a joint decision.

Sercu et al. (2015) reported that general practitioners interviewed regarding end-of-life decision making differed strongly on their mandate in the decision-making process. Some shied away from the moral responsibility of steering decisions while others felt entitled to do so. I would argue that, although a patient should be allowed the autonomy to make his or her own decisions, the healthcare professional has a duty to assist with the decision-making process. The healthcare professional has a plethora of medical domain knowledge that would assist the patient and he or she should thus play more than simply an advisory role. This ethical duty of

a healthcare professional is echoed in the literature as several authors pleaded “*that it is a physician’s duty to guide a patient ... within the spirit of shared decision making ...*” regarding end-of-life decisions (Sercu et al. 2015).

A healthcare provider’s ethical training should thus enable him or her to assist with and guide decision making in line with the principles of autonomy, nonmaleficence and beneficence, whilst also considering justice.

Clinical training and speciality

Undergraduate medical education worldwide still focusses on cure and prolonging life, leaving the acquisition of an accepting attitude towards death, dying and comfort care to the healthcare professional’s personal postgraduate endeavours (Sercu et al. 2015; Willmott et al. 2016). Training focusses on curing the disease as opposed to caring for the patient. This echoes the author’s personal professional experience as a medical doctor. Many colleagues practice medicine with a life-preserving attitude, displaying “*therapeutic tenacity*” in the face of terminal disease. Though this attitude may be due to a myriad of reasons, the paucity of undergraduate medical training regarding terminal decline, death and palliative care within the context of the finiteness of life is partially to blame (Sercu et al. 2015).

The development of specialities and sub-specialties within medicine allowed for better scientific exploration of individual pathologies and organ systems (Mantri 2008) and undergraduate medical training globally is organised in and taught according to these specialities to this day. The education of medical students in line with specialities or disciplines in medicine can, however, cause an “*ethically problematic depersonalisation of the patient*” where a patient is not viewed holistically as a person but is reduced to a “*silent sum of mechanistic parts*” (Mantri 2008). Willmott et al. (2016) reported in the *Journal of Medical Ethics* that doctors (interviewed in large tertiary public hospitals in Australia) concurred that the development of these specialities in medicine focussed care on a specific organ or body system instead of on the patient himself. This could lead to a healthcare practitioner employed within a specific speciality to focus only on the pathology contained within that specific clinical discipline, failing to consider the combined effects of other comorbidities that would make the planned intervention unfeasible (Willmott et al. 2016; Kruser et al. 2015).

A healthcare provider should recognise the inevitability of terminal decline and death, familiarising him or herself with palliative care, even though recognition of these concepts by

medical schools worldwide is substandard (Sercu et al. 2015). Additionally, a healthcare practitioner should be aware of and guard against the fractionation of care that comes with specialisation of medicine into different clinical disciplines, with the aim to provide holistic, patient centred care.

7.2.2 Preferences and practice patterns

A healthcare practitioner's preferences and practice patterns may also influence decisions regarding invasive medical procedures in the elderly. These preferences and practice patterns will be influenced by personal characteristics as well as by the characteristics of professional training (as discussed in the previous section) and the entrenched local and regional practice patterns.

The contemporary pattern of medical practice, with healthcare practitioners working within different clinical specialities, might fragment patient care. The practice pattern where doctors within a specific clinical department or team communicates poorly with those in another clinical department or team in tertiary care is an additional barrier to coordinated patient care (Willmott et al. 2016). The fact that after-hours medical care for the patient is often rendered by a different clinical team also impacts negatively on coordinated care. Poorly coordinated care is an impediment to ethical decision making. Preferably, a practice pattern that promotes a multi-disciplinary approach, with the intent to promote better coordination and communication (in order to maximise patient care in line with patient preferences) should be adopted in inpatient settings such as hospitals and tertiary care centres. O'Leary et al. (2008) illustrated in a randomised trial that doctors working in a team with a clinical care coordinator in an inpatient setting reported superior efficiency and job satisfaction, compared to doctors working independently. Epstein (2014) reports in a review article that the use of multidisciplinary in-hospital teams where enhanced teamwork counters the "silo effect" of fragmented care, improves patient outcomes and limits adverse events.

Practice referral patterns are also an important factor impacting on invasive medical procedures in the elderly. Due to the hierarchical organisation of medical practice, a patient would often be referred to a specialist consultant for an opinion regarding a specific invasive procedure. Consultants who make treatment decisions would typically spend relatively little time with the patient and may propose a procedure that is inconsistent with the patient's preferences (Willmott et al. 2016). Preferably, the consultant should refer the patient to a multidisciplinary

team in an inpatient setting as discussed in the paragraph above, or back to his or her family physician in an outpatient setting, for a discussion of the proposed procedure. As the core competencies of the family physician includes the delivery of holistic, patient-centred care within the context of the patient's circumstances, managing clinical complexities and comorbidities across different disciplines (Allen et al. 2005), this healthcare provider is well suited to assist the patient with making a decision in line with his or her preferences.

Unwarranted referral of patients to surgical colleagues can also contribute to clinical momentum, resulting in escalation of treatment intensity leading to heedless utilisation of invasive medical procedures. Doctors find it hard to stop active treatment once it is started, experiencing a "*clinical momentum*" where a patient might receive a "*chain reaction*" of interventions that might not be in line with patient preferences (Nabozny et al. 2016; Willmott et al. 2016). Nabozny et al. (2016) also report that surgeons hold referring physicians accountable for starting the process without necessarily considering the patient's overall health (and preferences). Though surgeons may question the value of surgery in some of these cases, they believe that a surgical consultation by a patient (or his or her family) signals the acceptance of surgery by this person as the appropriate treatment. They would then often operate without exploring the decision with the patient or family. Heavy caseloads also cause time constraints that result in the postponement of much-needed end-of-life discussions with patients. The fragmentation of inpatient treatment might also cause avoidance of these discussions by healthcare practitioners as they may hope that someone else will initiate the discussion with the patient (Willmott et al. 2016).

Interestingly, a study done at Stanford University indicated that 88,3% of medical doctors would decline invasive or intensive medical intervention at the end of their lives (Periyakoil et al. 2014). The personal preference of physicians may not be allowed to influence treatment decisions regarding their patients as discussed in the previous section. The fact that the overwhelming majority of healthcare practitioners would *decline* an invasive medical procedure at the end of life should, however, sensitise them to their patient's possible preferences and should warn a healthcare provider to guard against heedless clinical momentum.

Cognisance of how practice patterns influence the utilisation of invasive medical procedures in the elderly is important in order to avoid unethical conduct. The fragmentation of medical care into specialities, poor communication between different clinical departments and different

shifts and heavy caseloads resulting in time constraints could all impact on holistic patient care in an inpatient setting with resulting heedless clinical momentum. The development of multi-disciplinary teams that have access to ethics committees would go a long way towards curbing these problems.

Imprudent referral patterns and the hierarchical organisation of medical practice also influence clinical momentum. Awareness by physicians and consultants that they have a duty to interact with patients and their families regarding treatment preferences would prevent heedless referrals and unintended treatment trajectories resulting in escalating clinical momentum. In the case of heavy consultant caseloads where discussion of patient preferences is not feasible, patients should be referred to their family physicians as these healthcare practitioners can assist with ethical care in line with patient preferences.

7.2.3 Communication of preferences

The communication of preferences by the healthcare provider regarding invasive medical procedures in the elderly would also be influenced by the healthcare provider's personal characteristics and his or her ethical and clinical (including communications) training.

In the case of acute situations where an invasive medical procedure is imperative to save an elderly patient's life, but where the prognosis is very poor, surgeons agree that there is ethical tension between their obligation to limit the burdens of surgery to a frail patient and their duty to rescue a critically ill patient. They note that it is difficult to communicate their opinion: that even though surgery could be done, it should not be done. Surgeons framed the decision-making conversation in a way that either gave the patient no choice of surgery (harkening back to paternalism), in a way that would bias the choice away from surgery, or in a way that would present the patient with a simple choice (thus neglecting their duty to guide a patient) (Nabozny et al. 2016).

As discussed in section 7.2.1.2, healthcare practitioners have an ethical duty to guide their patients in treatment decisions that would be in line with their preferences. This makes it important for the healthcare practitioner to be aware of and to improve their communication skills and style. It is a skill that should be acquired in undergraduate medical training and should be practiced and honed. The healthcare practitioner should be aware of the effect of both verbal and nonverbal communication, both by themselves and by their patients (and their families).

The healthcare practitioner should be able to elicit and conceptualise patient values, preferences and treatment goals and also to ascertain that they have insight into the clinical problem. The healthcare practitioner should be honest, admitting to the uncertainty that exists in these situations. The danger that this uncertainty entices some doctors into optimistically tempering their prognosis of terminal patients – creating false hope – is noted in the literature (Willmott et al. 2016).

Honest communication with a patient and his or her family should include the information that invasive medical interventions are associated with increased adverse outcomes in the elderly. Not only is there an increased incidence of death and surgical complications when compared to younger populations, but there is also increased risk of functional decline, including deterioration of mobility and memory (Oresanya, Lyons, and Finlayson 2014). Communication with patients should also avoid models of communication such as the “fix-it” model used by some surgeons that may inadvertently create an impression that normal function or form could be restored in a patient suffering from a chronic condition, where restoration of normal function is not feasible (Kruser et al. 2015). The narrow focus of in-depth discussions of disease processes while ignoring the co-morbidities or functional status of the patient (Taylor et al. 2017) should also be avoided.

The acquisition of excellent communication skills is an important endeavour for a healthcare professional. The ability to communicate well will enable the healthcare professional to convey critical clinical and ethical information to a patient and his or her family, ensuring that information is understood and that treatment decisions are in line with patient goals and preferences.

7.2.4 Aims (goals), expectations and fears

7.2.4.1 Aims/Goals

Healthcare providers should be aware of the four goals or aims of medical care as discussed in sections 2.1.2 and 7.1.4.1. They should carefully consider what their own goal is in offering a procedure to an elderly patient. Is the procedure offered in order to maintain health, to relieve suffering, to cure or to prolong life?

It is important to have good clinical insight and a holistic view of the patient to do so. The fragmentation of medical care into different clinical disciplines as discussed in section 7.2.1.2 could blind a healthcare professional to the dominant treatment goal by enticing him or her to

focus on a specific organ or organ system to the exclusion of the patient's general health. Surgeons, for instance, may focus on the disease process, offering a surgical solution for the problem at hand, without necessarily considering that though surgery might "fix" (and thus cure) that specific problem, it might be to the patients' detriment to undergo surgery if comorbidities or functional status are considered (Kruser et al. 2015; Taylor et al. 2017). This may cause increased suffering, a deterioration of overall health or even hastened death, three outcomes that are directly in conflict with the aims or goals of medical care.

Conceptualisation of the treatment aim of the procedure by the healthcare professional for him or herself before discussion with the patient will aid with the clarification of the intent of the procedure, enabling a healthcare practitioner to assist a patient in making a decision in line with patient preferences.

7.2.4.2 Expectations

As discussed in section 7.2.1.2, undergraduate medical education – to this day – focusses strongly on the cure of disease and the prolonging of life, neglecting to educate students regarding the inevitability of death. Knowledge of palliative care is left mostly to the healthcare provider's own postgraduate efforts (Sercu et al. 2015; Willmott et al. 2016). Extraordinarily little is taught regarding the option of palliative care during primary medical education, with palliative care often seen as a last resort to be implemented only once all other avenues of treatment are exhausted. By 2007, only 15% of the world's 234 countries achieved a measure of integration of palliative care with other mainstream service providers (Clark 2007), reflecting the fact that palliative care is seldom seen as a primary treatment option.

Additionally, recent developments, anticipated advances in medical care and technological innovations as discussed in section 2.1.1, reinforce the belief by healthcare providers that they can and should effect a cure or prolong life. A culture of "*doing everything possible*" to ensure survival (Cardona-Morrell et al. 2016) perpetuates this unrealistic expectation, emphasising the notion that death should be postponed at all cost.

A healthcare provider's expectation of medicine in general and of himself or herself in particular could thus be to fulfil these objectives, heroically fighting to save a life at all cost as he or she was trained to do, without considering whether their own (unrealistic) expectations of medicine is driving treatment decisions (Rivera et al. 2001).

It is important for healthcare professionals to incorporate the concept of *care* into their expectation of medicine, as *cure* may not always be a realistic or ethical objective. The 2002 definition of palliative care by the World Health Organisation includes the wording that it aims to: “*improve quality of life ... through prevention and relief of suffering*” (Clark 2007). Since the aim of medicine – from antiquity to the present – is the relief of suffering, as discussed in section 2.1.2, awareness of the basic concepts of palliative care is imperative to the physician.

Awareness of self-expectations by a healthcare professional is important, as these expectations of self may influence treatment decisions. Care should be taken that patient preferences direct treatment decisions and not unexamined personal stances.

7.2.4.3 Fears

The fear of shirking one’s “duty” by failing to do everything possible to ensure an elderly patient’s survival is tied up in a healthcare professional’s expectations of medicine as discussed in the previous section. This may lead to feelings of guilt (Rivera et al. 2001) should invasive treatment not be attempted.

Fear of being the harbinger of bad news and fear about talking to the patient or the family about death at all (Jox et al. 2012) could also cause a healthcare professional to implement invasive medical procedures without giving due attention to patient preferences.

Fear of conflict with the family is another potential risk factor for increasing treatment intensity at the end of life, as the literature on inappropriate invasive treatment at the end of life confirms that conflict between the treating physician and families in these cases are common (Leland et al. 2017). Hurst et al. (2005) also report that physicians view conflict very negatively, avoiding conflict by putting in extra time and effort (and by looking for assistance).

Finally, healthcare practitioners’ fear of litigation or other legal consequences should they not provide maximal medical care for patients at the end of their lives, feature strongly in the literature (Rivera et al. 2001; Jox et al. 2012; Willmott et al. 2016; Lyu et al. 2017).

In the provision of invasive medical care to elderly patients, healthcare professionals should have the moral courage to honestly acknowledge their own fears. They should be aware of the impact of these fears on treatment decisions. Fear of emotionally difficult consultations, fear of conflict and fear of litigation should be recognised and solutions to these fears should be actively sought.

7.3 The illness and the planned intervention

7.3.1 Characteristics

7.3.1.1 The illness

The type of illness or condition an elderly patient suffers from will influence ethical treatment decisions regarding invasive therapy. In planning for health care of the elderly, chronic illness can be divided into three categories, namely nonfatal chronic illness, serious and eventually fatal chronic illness and frailty (Lynn and Adamson 2003).

Nonfatal conditions include chronic conditions such as arthritis and hearing loss. These conditions seldom pose a threat to life but may impact adversely on quality of life. The use of invasive medical procedures with regards to these conditions, such as joint replacement surgery for severe arthritis and cochlear implants for deafness impact directly on quality of life.

Serious and eventually fatal conditions tend to worsen over time and eventually cause death. Cancers, organ failure, dementia and stroke are the most common of these conditions.

Frailty implies the “*fragility of multiple body systems*” in the elderly (Lynn and Adamson 2003) as was discussed in detail in section 2.3.2.

Lynn and Adamson (2003) described three distinct trajectories of decline for elderly patients until death. These trajectories, namely that of cancer (causing a relatively short period of evident decline), organ failure (causing long-term limitations with intermittent episodes of deterioration) and dementia/frailty (causing prolonged dwindling) are important as it explains differing service needs. In the case of cancer, the last phase of the illness is relatively clear and the need for intensive medical treatment (and invasive therapies) is apparent with treatment often being reported as appropriate (Lynn and Adamson 2003; Bolt et al. 2016). In comparison, the progression of the disease in both patients with organ failure and those with frailty are less predictable with fluctuating service needs, making decisions on invasive medical procedures more complex and resulting in care to be experienced as less appropriate (Bolt et al. 2016).

The type of illness clearly impacts on ethical treatment decisions and the healthcare practitioner should keep the type of illness as well as the trajectory of the illness in mind when contemplating invasive medical procedures in the elderly. Offering an invasive medical procedure to an elderly patient with a well-defined condition that will benefit from the procedure in the long term differs from offering a procedure to a patient with dwindling health

where the procedure might be the final stressor that overwhelms the person's reserves, resulting in disability or death.

7.3.1.2 The Intervention/Procedure

Different invasive medical procedures or interventions (discussed in detail in section 2.2.1) have different characteristics, determined by the means of access to the body (for example surgical incision, skin puncture or natural opening), the type of instrumentation involved (for example scalpel, catheter, endoscope, tube, prosthesis) and the clinical discipline involved (for example gastro-enterology, cardiology, intensive care).

These characteristics of invasive procedures will influence the risk to the patient. To illustrate, inserting a catheter to drain pleural fluid from around the lungs (involving a small chest incision and a drainage tube in the emergency department) does not carry the same risk as cardiac bypass surgery (involving major surgical access and multiple complex devices in a specially equipped operating theatre).

The risk associated with the procedure should be weighed up against the anticipated benefit to the patient in order to assess the appropriateness of the planned procedure.

It is thus important for the healthcare provider to be aware of the characteristics of the planned procedure in order to stratify risk, so that a discussion regarding the appropriateness of the procedure in line with patient preferences can be conducted with the patient or the family.

7.3.2 Purpose

As discussed in section 2.2.3, invasive medical procedures are employed for different purposes. Ethical considerations would differ according to the purpose of the intervention. The first distinction in purpose is that a procedure may be utilised either to diagnose or to treat.

Invasive medical procedures done for diagnostic purposes are used to clarify diagnosis and stratify prognosis for patients. Before commencing with such a procedure, however, the healthcare provider should assess whether the purpose of such a procedure is to gain information that will guide further management of the patient. Utilising an invasive procedure simply to make a definitive diagnosis with an unclear purpose and with little or no anticipated effect on disease management for the elderly patient, would be ethically indefensible. The utilisation of an invasive diagnostic intervention can only be ethically justified if the purpose of this intervention is to gain information that is essential in planning further treatment.

Invasive medical procedures done for therapeutic purposes can either be used with the purpose of preserving or prolonging life, or with the purpose of treating non-fatal conditions. As discussed in section 2.2.3.1, in the case of life-preserving or prolonging interventions, the purpose of the treatment intervention is to treat a fatal condition and may target any one, but often several, of the goals or aims of medicine (discussed in section 2.1.2) at the same time. These aims are, however, often incompatible with each other, as treatment aimed at preserving life may for instance impact negatively on quality of life in the short and in the long term. The healthcare provider should be aware of the tensions existing between these treatment aims, recognising that a compromise will have to be reached in order to reach an ethically sound decision.

Therapeutic interventions used with the purpose to treat non-fatal conditions may be implemented to cure disease or to improve quality of life. Different ethical considerations would apply in these cases, as opposed to the treatment of fatal conditions. Interventions used with the purpose to cure non-fatal disease in an elderly patient who has little to gain from an intervention that may put him or her at risk, would be thoughtless and unethical. Therapeutic interventions used with the purpose to improve quality of life, on the other hand, will generally be proposed in line with patient preferences. Provided that the benefit to the patient in this case outweighs the risk of adverse outcomes, the decision to utilise the invasive procedure would be ethically sound with regards to patient care.

It is important for the healthcare professional to conceptualise and verbalise the purpose of the intervention or procedure for the patient and the family, in order for them to reach a decision that is ethically coherent and in line with patient preferences.

7.3.3 Aim

As noted before, the four goals or aims of medical care as discussed in sections 2.1.2 and 7.1.4.1 are all relevant to invasive medical procedures in the elderly.

The aim of the procedure may be to maintain health, to relieve pain and suffering, to cure maladies or to avoid premature death.

The healthcare professional must be aware of these different aims or goals of invasive procedures in order to clarify these goals for patients during a discussion of treatment options. This would assist the patient with making a decision in line with his or her preferences.

7.3.4 Time constraints

In order to discuss the effect of time constraints, it is important to acknowledge the difference between emergency and elective invasive medical procedures. An emergency procedure is a procedure that is urgently required due to an immediately life-threatening condition. An elective procedure is planned in advance and executed at a time that suits both the patient and the healthcare professional. These procedures were discussed in section 2.2.4.

The ethical considerations regarding emergency and elective procedures are analogous, but there is much less time to make the decision in the former case as compared to the latter. Time constraints compound the difficulty of making an ethical decision in the case of emergency procedures, as there is much less time available to ascertain that choices are made in line with patient preferences than in the case of elective procedures.

Time pressure associated with emergency procedures may have an adverse effect on treatment decisions, from the perspective of both the patient and the healthcare practitioner.

In the case of a patient, lack of time will deprive him or her of the opportunity to deliberate fully on the consequences of the decision. The fact that an immediately life-threatening condition exists for the patient, would often entail that the patient is extremely ill and perhaps less able and competent (as discussed in section 3.3) to make a decision than usual. Additionally, it will deprive the patient of the opportunity to discuss the treatment options with family members and other loved ones or to obtain additional opinions from other clinicians. Time constraints due to emergency healthcare scenarios may thus pressure a patient into making a heedless decision.

In the case of the healthcare practitioner, time constrains may prevent him or her from discussing the case with a multidisciplinary team or an ethics committee. There may also be insufficient time to ascertain the functionality and the frailty of the patient before the health crisis occurred, complicating the ethical decision. Finally, time constraints may also foil attempts by the healthcare professional to communicate with the patient.

Familiarity with published ethical guidelines will enhance the healthcare professional's ability to make an ethical decision in the emergency care of the elderly. A contemporary example of the ethical guidelines that would assist in emergency situations (as discussed in section 4.4) is

the *Guidance for Managing Ethical Issues* published by the South African Medical Association in April 2020 regarding ethical dilemmas related to the COVID-19 pandemic (SAMA 2020).

Awareness of the factors that impact on ethical decisions and the availability of ethical decision aids will also assist the healthcare practitioner in the elective and emergency care of the elderly when invasive medical procedures are contemplated.

7.4 Resources and local service delivery models

7.4.1 Characteristics and availability

The characteristics and availability of both local resources and service delivery models influence choices regarding the utilisation of invasive medical procedures in the elderly. In South Africa, the characteristics and the availability of resources are largely determined by whether the patient receives health care via the public or via the private healthcare sector.

Patients in the private sector are five times more likely to access a hospital (and undergo an invasive medical procedure) than those in the public sector. In addition, the public health sector is focussed on seeing large numbers of outpatients, while private hospitals are focussed on seeing a far higher proportion of surgical cases than public hospitals (Ranchod et al. 2017). Allocation and rationing of resources within each of these sectors were discussed in section 4.4.

In the case of the South African public sector, withholding of invasive medical procedures in the elderly might be justified on utilitarian grounds. According to Ranchod et al. (2017), care in this sector tends to be explicitly rationed via formularies and care protocols and implicitly rationed via waiting lists and queues. Resources in this sector, however, are inadequate to allow for ethical utilisation of invasive medical procedures in the elderly. Dell, Kahn, and Klopper (2018) conducted an analysis of surgical resources in South Africa against the background of inequitable access to surgical care across public and private healthcare sectors. They state in the *South African Journal of Surgery* (2018, 16):

“Despite the substantial burden of surgical disease, surgical services are inaccessible to many of those who need them most.”

The demand, especially for non-urgent invasive medical procedures, far outstrips the supply in this population. This leads to patients being on waiting lists for procedures like knee and hip

joint replacement surgery for several years whilst being debilitated and in severe pain (Kavalier, Nortje, and Dunn 2017). In summary, the characteristics of the public sector service delivery models combined with the inadequate availability of public sector surgical resources frequently result in insufficient access to care in an elderly patient contemplating an invasive medical procedure.

In the case of the South African private sector, the fee-for-service model as described in section 4.1 is generally used. Normally, this model covers the cost of most high-intensity services (usually situated in hospitals), including invasive medical procedures. There are, however, many complementary services, such as home care aids, that are not covered by medical insurance policies based on this fee-for-service model (Kelley et al. 2010). The literature indicates that service delivery models that promote hospice care often lead to increased intensity of treatment at the end of life (Kelley et al. 2010; Luta et al. 2015; Henson et al. 2016). Ranchod et al. (2017) report that in South Africa care in the private sector continues to be hospice care, focussing on curative services with comparative neglect of preventative and palliative care. These characteristics of South African private health care could result in the inflated utilisation of invasive, hospital-based treatments (as they are covered by the patient's medical insurance and are part of the familiar treatment style in private hospitals) as opposed to more holistic and less invasive home-based treatments that are not covered by medical insurance.

There is a lack of resources in the form of palliative care facilities in both the public and the private healthcare sector in South Africa. There are currently only eight hospital based palliative care services and 150 hospices providing palliative care for a population of 55 million people in South Africa (Drenth et al. 2018). If alternative treatment options such as community care centres, hospices and home care support are either unavailable or poorly funded (meaning that patients will have to pay for these less invasive care services out of their own pockets), patients with serious medical problems will be hospitalised. Hospitals have been designed to provide acute care. If this kind of care is the default pathway, even patients who should ethically receive palliative care will be subjected to unwarranted invasive medical treatments (Willmott et al. 2016).

Care in the South African private sector is also highly fragmented with little co-ordination between healthcare providers (Ranchod et al. 2017). Poorly coordinated, fragmented care causes unethical treatment patterns. The fragmentation of medical care into clinical specialities

and sub-specialities was discussed in section 7.2.1.2. Poor communication and cooperation between these clinical disciplines may lead to duplication of invasive tests and failure to consider the combined effects of treatment interventions by the various disciplines (Willmott et al. 2016). High levels of availability of resources in the private sector may also lead to over-utilisation of invasive medical procedures in the elderly.

Finally, there is a lack of ethical support for clinicians in the form of ethics committees and ethics consultations in private health care in South Africa. This kind of support can make an important contribution to patient management by clarifying concepts and providing suggestions or recommendation to clinicians facing complex ethical challenges regarding treatment decisions (Rasoal et al. 2017). Although research ethics committees are key elements at South African universities (Davies 2020), very few clinical ethics committees are currently functioning in South Africa outside of tertiary (public) hospitals. This forces healthcare professionals to resolve ethical dilemmas ad hoc in an unstructured manner (Larcher 1999).

In summary, the interaction of poorly coordinated, fragmented, hospicecentric care with high availability and easily accessibility of high-intensity services (i.e. the characteristics and availability of resources and service delivery models) in the private healthcare sector in South Africa often cause unethical care of elderly patients by promoting the thoughtless use of invasive medical procedures. Lack of resources in the form of palliative care and clinical ethics committees compounds this problem.

Cognisance of the effect of both the characteristics and availability of resources and local service delivery models on the management of elderly patients, would empower a healthcare professional in his or her endeavour to negotiate an ethical treatment decision, as this would avoid heedless escalation of care.

7.4.2 Impact of district practice patterns

The practice models or patterns adhered to in a specific district will influence the utilisation of invasive medical procedures in the elderly. As discussed in section 7.2.2, most medical practices and referral pathways are structured to follow a hierarchical pattern, both locally and regionally. This hierarchical organisation influences a healthcare professional's individual practice patterns as referrals of and consultations regarding patients are institutionalised around these structures.

Local and regional practice patterns will, among other factors, be determined by the location of the practice (rural or urban), the patient profile of the practice (indigent or affluent) and the level of care provided by the practice (primary, secondary or tertiary care). These factors will influence the ease with which a patient can be referred to the next level of care, resulting in increased intensity of care. To illustrate, an affluent patient living in a city with easy access to secondary or even tertiary specialist care, will be much more vulnerable to an escalating intensity of care than an indigent patient living in a rural area. Kwok et al. (2011) found that the rate at which elderly patients undergo surgery in the last year of their lives varies substantially by region. The authors conclude that, although regions with a higher number of hospital beds and medical aid spending had a higher intensity of surgical end-of-life treatment, the regional variations may also be attributed to regional discretion in healthcare providers' decisions to intervene surgically at the end of life. A "local medical culture" that encourages aggressive treatment patterns and injudicious referral to surgical services can play a major role in escalating intensity of care (Kelley et al. 2010). As noted in section 7.2.2, surgeons hold referring physicians accountable for unwarranted referral practices, but still believe that a surgical consultation by a patient signals an expectation for surgery as the appropriate treatment.

Practices located in districts that shoulder heavy caseloads may also deliver inappropriate patient care due to time constraints. Time pressures related to heavy caseloads may encourage a physician to simply continue with the invasive medical treatment already started (for example the continuation of renal dialysis in a patient with end-stage renal failure), as opposed to taking the responsibility to have a difficult and time-consuming end-of-life conversation with a patient (Willmott et al. 2016).

Practice patterns in South Africa also follow that of most Western countries, where medical care is organised into different clinical specialities. This fragmentation of care into multidisciplinary teams looking after patients in secondary and tertiary hospitals may result in too many specialists being involved in patient care whilst no-one assumes ultimate responsibility (Willmott et al. 2016). Doctors may hope that one of their colleagues will have the difficult end-of-life discussion with the patient that they themselves dread and in the interim continue with their invasive treatment regime, contributing to increased treatment intensity.

In summary, a healthcare professional should be aware of how practice patterns affect the use of invasive procedures in the elderly. Thorough thought should be given to whether a patient

should be referred to secondary care in the first place, by contemplating what value the interventionist will add to the treatment. Although a primary care physician might only need advice regarding further patient management from a surgeon, the surgeon experiences a surgical consultation by a patient as a signal of expectation for surgery. Additionally, the interventionist will have neither the same depth of knowledge of the patients' values and preferences nor the time for discussion the primary care physician has. Therefore, an elderly patient should ideally be referred back to his or her primary care physician for discussion of treatment options, as this would be conducive to making the best ethical treatment decisions.

7.4.3 Healthcare models and reimbursement structures

Healthcare models and reimbursement structures will influence ethical treatment decisions regarding invasive medical procedures in the elderly, both from the side of the patient and from the side of the healthcare provider.

In order to understand how these models and structures might influence decisions, it is important to first understand how they function. Though there are many different healthcare models, T.R. Reid presented a practical approach by a structured comparison of available healthcare models. In his address to the North American Primary Care Research Group in 2013, he outlined four different healthcare models (Wallace 2013). These models, also described by other authors, include the Beveridge model, the Bismarck model, the National Health Insurance model and the out-of-pocket model (Chung 2017).

The Beveridge model is a single-payer national health service. Health care is delivered and paid for by the government. Health staff are mainly government employees and hospitals are run by the state. This serves to eliminate competition and to keep prices low. Funding is done through income taxes, allowing for health care to be free at the point of service (or provided for a nominal fee). Countries that primarily use this model are the United Kingdom, Spain, New Zealand and Cuba. South Africa's public health care is also based on this model.

The Bismarck model uses an insurance system jointly financed by employers and employees. A health insurance fund is created by compulsory payroll deductions. Employed people have access to the funds created with private insurance plans covering every employed person. Countries may have single or multiple insurers, but in each instance the government tightly controls prices while insurers do not make a profit. Doctors and hospitals are mainly private

and not run by government. The Netherlands, Japan, Switzerland, Germany, France and Belgium use this model, as do South Africans with employer-sponsored health insurance.

The National Health Insurance model has elements of both models already described. Health providers are generally private institutions, but payment comes from an insurance fund contributed to by all citizens by a tax payment. This fund is run by the government. Administrative costs tend to be lower and medical services might be limited. Countries that utilise this model in health care are Canada, Taiwan and South-Korea.

Finally, the out-of-pocket model is utilised in countries too disorganised or too poor to provide any kind of national healthcare system. Those people that have money can access health care by paying for it and those that do not will remain ill or will die. In rural Africa, India, China and South America this is the basic model of health care.

The American Academy of Family Physicians propose an adapted version of the common healthcare finance models discussed above (Casull 2017). The Beveridge National Health Service (with public funding and public service delivery), National Health Insurance (with public funding and private service delivery) as well as the Bismarck model (with mixed funding and private delivery) are acknowledged. The fourth model, however, is seen by the American Academy of Family Physicians as a Multi-Player model with mixed funding and mixed delivery. The out-of-pocket model as described by T.R. Reid would fit into this heterogeneous model, as would private medical insurance funding. South African patients with private health insurance not sponsored by their employers, would belong to this last category.

The type of healthcare model employed would influence a patient's access to invasive medical procedures. This is due to the fact that the procedure's cost to the patient as well as the availability of and accessibility to the procedure would be influenced by the model employed.

In addition to different healthcare models, different reimbursement structures (or payment methods) of healthcare providers may also affect utilisation of invasive medical procedures in the elderly. The three main payment methods for services provided by healthcare professionals are the fee-for-service method, the capitation method and receipt of a salary (Gosden et al. 2006; Rudmik, Wranik, and Rudisill-Michaelsen 2014). The bundled payment (or case-rate) method is also frequently used in urgent care (Ayers 2020), as are various blended or mixed methods of payment.

The healthcare model employed will influence the payment method utilised in each instance. In cases where the healthcare model entails public service delivery, the healthcare provider is employed by the government and usually receives a set salary for services rendered, regardless of the case load. Some flexibility regarding payment includes payment for overtime and after-hour care. This method of reimbursement allows the healthcare professional to focus on the patient as opposed to focussing on billable services (Rudmik, Wranik, and Rudisill-Michaelsen 2014), providing a stable income. The physician is free to act ethically in accordance with the patient's preferences, as decisions regarding the invasive procedure will have an impact only on the patient (and family) and not on the physician's revenue. A healthcare provider working in the South African public healthcare sector would be reimbursed by this method.

In the case where the healthcare model entails private service delivery, various methods of reimbursement exist. Although some clinics offer salaried positions to healthcare providers, the two most common and widely used methods of reimbursement are the fee-for-service method and the capitation method. As already noted, the bundled payment (or case-rate) method is also gaining popularity, especially in urgent medical care (Ayers 2020).

The traditional fee-for-service method entails that a healthcare provider is paid for each individual service rendered to the patient. This method might create an economic incentive to perform unnecessary services (and invasive procedures) as discussed in section 4.1.

The capitation method reimburses a healthcare provider with a flat fee per patient per month, regardless of whether the patient utilises medical care or not. The fee is not increased if the patient should utilise medical care, thus creating the risk that a service provider would withhold an expensive procedure (such as an invasive medical procedure) from a patient as this would have a direct negative impact on the healthcare providers' income. This negative impact may be caused either directly as the healthcare provider will be responsible for the cost of the procedure from his or her pooled resources or indirectly as a time consuming invasive procedure would prevent him or her from seeing a higher volume of patients with less complex problems.

A bundled payment or case-rate model reimburses a healthcare provider with a set fee per illness or condition treated. This model involves a "payment bundle" that covers all services rendered to the patient by all service providers for a specific condition or hospital admission, regardless of the frequency of physician visits or the particular services rendered. In the

instance of invasive medical procedures, a single all-inclusive pre-determined fee would be charged. This fee would cover the cost of the surgeon, physician, anaesthesiologist and facility. This payment model may encourage healthcare teams to see only less complex cases as there is no fair differentiation in fee structure that would make the treatment of more time-consuming and complex cases worthwhile. Healthcare providers must earn a living. A higher volume of less complex cases will increase revenue whereas a low volume of complex cases reimbursed at the same case rate will decrease revenue. If they are reimbursed at the same rate for a difficult lengthy procedure as opposed to a simpler, shorter procedure, more complex and time-consuming invasive medical procedures may be dismissed (even if this procedure might be the better option for the patient).

Both the healthcare model and the reimbursement structure of medical care clearly have an effect on ethical decisions regarding the utilisation of invasive medical procedures in the elderly. A salaried healthcare practitioner may become complacent, neglecting to offer complex, tiring and time-consuming procedures to patients as he or she is assured of their income regardless of their clinical performance. A healthcare worker that is reimbursed by a fee-for-service method may excessively increase the volume or intensity of invasive procedures due to financial incentives. Both capitation and bundled payment methods may entice a healthcare provider into performing either inappropriately fewer or inappropriately less complex procedures as both these payment methods reward managing a larger quantity of patients as opposed to delivering a high quality of service. The healthcare provider should be aware of key attributes of the models and payment structures described, as certain features of each of these may inadvertently tempt a healthcare provider into unethical conduct.

8. Conclusion

The focus of this thesis is the development of a standard of due care by conceptualising a framework of factors that will aid ethical decision making when considering invasive medical procedures in the elderly.

The standard of due care, recognised by both law and morality, is an important specification of the principle of nonmaleficence as discussed in section 3.1. Due care is defined as taking appropriate care to avoid causing harm (as circumstances would demand of a reasonable person or healthcare practitioner). This standard of due care demands that the goals of the treatment pursued must justify the risks taken in the attempt to attain the goal.

Negligence, also discussed in section 3.1, is the absence of due care. Both advertent (intentionally imposing unreasonable risks of harm) and inadvertent negligence (unintentionally, but carelessly imposing unreasonable risks of harm) are morally blameworthy. As already noted, inadvertent negligence may play a central role in the inappropriate utilisation of invasive medical procedures in the elderly.

A healthcare practitioner has a duty to discuss the relative risks and benefits of any contemplated procedure with his or her patient. Thorough knowledge of the risks and benefits of an invasive medical procedure implies that the healthcare practitioner is aware of factors regarding the patient and his or her family, the disease entity, the procedure contemplated, as well as factors regarding the healthcare practitioner him or herself and the service delivery system he or she is working in. If the healthcare practitioner is unaware of these complex and interacting factors influencing treatment decisions, he or she would be unable to discuss and evaluate relevant relative risks and benefits with a patient (and would thus be in breach of his or her duty). This breach of duty might then cause harm to the elderly patient. Ignorance of the factors that influence ethical treatment decisions regarding invasive medical procedures in the elderly therefore represents inadvertent negligence.

A unified framework of factors was conceptualised to function as an ethical decision aid when contemplating invasive medical procedures in the elderly. This framework represents a standard of due care.

The factors incorporated in the framework represent those that have an impact on ethical decision making regarding the use of invasive medical procedures in the elderly as discussed

in this thesis. The factors were identified by considering the current ethical landscape, with adherence to the principlist approach as set out by Tom Beauchamp and James Childress in *Principles of Biomedical Ethics* (Beauchamp and Childress 2013). The validity of these factors was substantiated by perusal of the relevant literature.

Healthcare professionals have an ethical duty to assist their elderly patients with the decision-making process when considering the feasibility of utilising invasive medical procedures. This duty is beautifully articulated by Sir William Osler:

“The practice of medicine is an art, not a trade; a calling, not a business; a calling in which your heart will be exercised equally with your head. Often the best part of your work will have nothing to do with potions and powders ...” (Osler 1910)

A healthcare professional needs to employ both his or her heart (knowledge of ethics) and head (knowledge of medicine) when engaging with elderly patients regarding invasive medical procedures. As there is considerable complexity in reaching an ethically sound decision, reference to the ethical decision aid developed in this thesis is helpful in the course of patient-physician deliberation and collaboration. Cognisance of the framework developed in this thesis will promote recognition and logical contemplation of the different facets involved in a specific scenario. It will also reduce the risk of decisions being unwittingly influenced by external factors.

Familiarity with this framework of factors will ensure more appropriate care for patients, consistent with the principles of respect for autonomy, beneficence and nonmaleficence, whilst simultaneously promoting the principle of justice.

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