The socio-economic status, Sign language interpreter utilisation and the cost of providing South African Sign Language Interpreter services in the Cape Metropole District health services

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Dedication

To Mimi and Ntonga for the resilience you showed during my Cape Town stay.

To Nqoe - for standing in the gap for both of us - you are an amazing man.

Abstract

Deafness affects about 15-26% of the world's population with an estimated prevalence of 3.7% in South Africa. Although sign language Interpreters (SLIs) improve the communication challenges in health care they are unaffordable for many Deaf people. On the other hand, there are no legal provisions in place to ensure the provision of SLIs in the health sector in most countries including South Africa. However, to advocate for funding of such initiatives, reliable cost estimates are essential and such data is scarce. To bridge this gap, this study estimated the costs of providing such a service at the District health services level based on estimates obtained from a pilot-project that initiated the first South African Sign Language Interpreter (SASLI) service in health-care. The ingredients method was used to calculate the unit cost per visit at the SASLI Project level from a provider perspective. The average SASLI utilisation rate was calculated from the projects records for 2008-2013. Sensitivity analyses were carried out to determine the effect of changing the discount rate and personnel costs. The unit costs per SASLI-assisted visit were used in estimating the costs of scaling up this service to the District Health Services. Average utilisation rates increased from 1.66 to 3.58 per person per year from 2008-2013 with unmet need falling from 38.8% in 2008 to 10.8% by 2013. The cost per visit was R2074.80 in 2013 whilst the estimated costs of scaling up this service ranged from R143.6million to R775million in the Cape Metropole District. These cost estimates represent 2.4%-12.8% of the budget for the Western Cape District Health Services. The results show that in the presence of SLIs, Deaf SL users utilise health care service to a similar extent as the average population, however this service would requires significant capital investment by government to enable access to healthcare for the Deaf.

Acknowledgements

This work would not have been possible without the efficient supervision of Dr Edina Sinanovic. Special thanks to Dr Marion Heap for making her database of the South African Sign Language Interpreter Project available for analysis. I would also like to thank Prof. Di McIntyre for pointing me in the right direction and special thanks to Prof. Leslie London. Your assistance is appreciated.

Special thanks to the MRC National Health Scholars Program that funded my MPH thesis.

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List of abbreviations and definitions

Abbreviation	Description
SASLI	South African Sign Language Interpreter
SLI	Sign Language Interpreter
DeafSA	Deaf Federation of South Africa
HIV	Human Immune Deficiency Virus
TB	Tuberculosis
USA	United States of America
UK	United Kingdom
UCT	University of Cape Town
XDR TB	Extreme Drug Resistant TB
MDR TB	Multi-Drug Resistant TB
GP	General Practitioner
CEA	Cost-Effectiveness Analyses
QALY	Quality Adjusted Life Year
SASL	South African Sign Language as defined by DeafSA (www.deafSA.org)
deaf	People who have a a hearing loss of any magnitude
Deaf	People who share a common language such as South African Sign Language

Part A: Protocol

1.1 Problem statement

Communication between a health provider and the patient is a pre-requisite for any meaningful intervention to occur in the process of seeking health care. Deaf patients as a linguistic group represent the extreme in the spectrum of communication challenges experienced in health care interactions (Heap & Morgans 2006). Swartz (1998) states that "the conversation between a doctor and patient is the heart of the practice of medicine" This statement articulates the importance of communication as the means by which any clinical outcome is achieved, hence the need for a sign language interpreter who serves as a conduit to drive the conversation in this interaction.

In a survey by the World Federation for the Deaf, sign language had official recognition in 44 out of 93 countries studied and among these, only a few had given sign language legal and official status as a right enshrined in the constitution (Jokinen 2010). The survey also revealed that Deaf organisations felt that despite this type of recognition, not enough effort was put in ensuring availability of sign language services for the deaf. The Deaf Federation of South Africa (DeafSA), the umbrella body that facilitates the services for the Deaf and hard of hearing in South Africa, echoes this sentiment. In their policy statement on the provision and regulation of sign language interpreters in South Africa, DeafSA states that although sign language interpreters are a pivotal human resource, they are currently not available in the numbers required to service the needs of the Deaf community, with a current ratio of one interpreter to more than 99 000 Deaf persons (Deaf Federation of South Africa 2011).

The inability of health systems to accommodate the disabled particularly the Deaf and hard of hearing through provision of sign language interpreters may undermine the role of health systems as forces of social cohesion and weakens the role of patients as "co-producers of health" (Gilson 2012). This is a relevant assertion in communicable diseases such as TB and epidemics

like HIV/AIDS and Ebola where adequate communication and patients' involvement plays an integral part in attaining health systems' goals.

1.2 Literature Review

This short review seeks to put in context the communication barriers faced by Deaf patients in the health care setting. This section also decsribes the importance of cost analysis in health care and the need to provide cost data for financing of Sign language initiatives for the Deaf in order to alleviate these communication barriers. The review also describes the costs of Sign language interpreter services and also sets out how similar initiaves are financed in other countries.

1.2.1 Deaf patients and communication in the health care setting

In South Africa, most health encounters are often conducted in English, which complicates further the health-seeking experience of the non-English speaking Deaf patient who also has limited access to health education as compared to the hearing patient (Heap & Morgans 2006; Harmer 1999). In addition, communication barriers may contribute to Deaf patients' reduced initiative to ask questions whenever in doubt, diminished confidence, and little knowledge on the type of medical care required (Harmer, 1999). This is supported by Steinberg et al. (2006), who found that deaf people in the USA showed a lack of knowledge about health issues and often had negative health care experiences compounded by insensitivity of health care professionals towards them. Consequently, this impacted negatively on their health-seeking behaviour.

On the other hand, having adequate communication structures has been shown to increase health care utilisation and access amongst the Deaf.(Pollard 1994) studied Deaf and Hard of hearing patients' access to different types of psychiatric care in the Rochester area of the New York state in USA. He found that this group of patients was more likely to select programs that were smaller, more supportive and employed sign-fluent staff and also had sign-language interpreters whether or not the selected facilities could provide the particular care needed by the

patient. Therefore having sign-language interpreters in health may actually improve access to needed health care by the Deaf.

Deaf patients perceive the provision of an interpreter for medical consultations as a sign of concern for their welfare by health care providers (O'Hearn 2006). This is backed by Steinberg *et al*'s (2006) study of the experiences of 91 deaf patients in the USA. In this study respondents felt that communication was best achieved in the presence of a certified medical sign language interpreter, although these interpreters were not always available when Deaf patients needed to access health care facilities. Negative experiences were characterised by communication difficulties which were compounded by fear, mistrust and frustration during the communication process. These patients also felt that health providers treated them unfairly when compared to the hearing patients. This perception of unfairness is a potential source of litigation viewed as discrimination by Deaf patients in the delivery of health care. Consequently litigation cases have been heard in US courts with Deaf patients filing a significant number of complaints against providers violating the provisions of the Americans with Disability Act (Moore & Swabey 2007).

A study on access to primary health care in the UK, found that Deaf people had considerably poorer access to care and also faced complications at all stages of the health care seeking process. At the pharmacy consultation, they experienced problems in understanding the purpose and correct use of the medication dispensed by the pharmacist (Reeves et al. 2002). This is an important finding especially in relation to HIV/AIDs and TB treatment. Treatment of these two diseases is often characterised by poly-pharmacy and many multi-stage interventions that require sufficient communication and a thorough understanding on the patient's part towards achieving the goals of therapy.

In Africa, HIV prevalence rates have been shown to be higher amongst the Deaf and hard of hearing than the population average (Hanass-hancock 2009). This is largely due to a lack of knowledge on prevention and poor access to care due to inability to communicate with staff,

marginalisation and the social construction that sees deaf people as asexual (Hanass-Hancock 2009). Other factors associated with this higher chance of contracting HIV are related to the disabled people's physical vulnerability, reliance on care-givers, institutionalised living arrangements, and the belief that they may not be reliable witnesses in a court of law e.g. the blind (Groce 2005).

Alternatives to trained sign language interpreters include the use of hospital staff as *ad hoc* interpreters or family members. Yet this is fraught with difficulties. Barriers to effective communication using a family member as an interpreter in the health care setting include a lack of objectivity, impartiality and unfamiliarity with medical jargon. There is a breach of the patient's privacy, where the patient might not be willing to share their medical problem with the family (Jacobs et al. 2004), particularly important in HIV/AIDS. In the broader lower income categories, the use of a relative to provide interpretation may delay consultation as the affected patient relies on a third party to access care. Catastrophic health expenditure may also result, as the costs of seeking health care on the household increase because of the need for a "double" consultation per family in terms of the indirect cost of accessing care (e.g. transport costs and waiting times).

Training medical staff in in sign language is an option but the drawbacks may be associated with a lack of interest and aptitude. In addition, deaf consultations may not be frequent enough such that the sign language skill may deteriorate over time (Reeves et al. 2002). In South Africa using staff as ad hoc interpreters of spoken languages was found to be associated with a significant organisational burden with nurse interpreters often resenting the extra workload and the clinicians also resented the time wasted hunting down a willing interpreter (Drennan 1996).

Given the shortage of general sign language interpreters and the cost of hiring one (Deaf Federation of South Africa 2011), programs that provide subsidised or free SASLI in healthcare could improve the quality of care experienced by Deaf patients in health facilities.

1.2.2 Costing analysis in health economic evaluation of programs

Costing studies are important in health systems management for decision-making in budgeting, negotiating reimbursement contracts and rates for providers, forecasting costs for expansion of programs and assessing program efficiency amongst other things (Conteh & Walker 2004). In addition, cost analysis is a key component of economic evaluations as it lays the foundation for which comparison of health programs are made through cost-effectiveness and cost-benefit analyses (Walker 2004). Cost estimates also serve to highlight the importance of a condition/disease to society when it is analysed alongside its impact on morbidity and mortality compared with the economic burden of other diseases (Simoens, 2009).

1.2.3 Cost of providing sign language interpreter services in health care

Published data on the costing of sign language interpreter services in health care is relatively scarce. Cost estimates for the provision of sign langauge services was documented for Machester in England by Reeves et al (2002) and for Australia by the Austarlian government in 2004. In addition a report published by Comhairle (2006) estimated hourly rates for Sign-Language Interperetes for Finland, Scotland, England and New Zealand with charges ranging from €18. 45 to €36.83.

Reeves et al. (2002) conducted a costing study in addition to the qualitative exploratory assessment of access to health services outlined above. They estimated the costs of providing a basic package of services for the Deaf which included combined voice & text phone, a visual patient call system, Deaf awareness training of staff, use of British sign language interpreters, written instructions about medication and after-care, and doubling appointment duration for the Deaf. The total cost of implementing the package in an average sized primary care trust for all GP practices was estimated to be around £66,000 in the first year, and £39,000 per annum thereafter, whereas for Emergency units the costs ranged from £4,088 to £9000 for the first year and from £2,588 to £7200 per annum thereafter depending on the size of the unit.

In this study by Reeves et al (2002), the costs of British sign language interpreters were calculated as the financial costs incurred in providing interpreter services. The methodology used excluded the administrative costs of time spent booking and coordinating the interpreters which significantly under-estimates the true costs of running such a service. Interpreters charged a minimum booking time of 2hours, worth between £50 and £60 for the first two hours and between £20 and £30 for each subsequent hour. The mileage was charged at a rate of £0.40 per mile in addition to the hourly rate. Including transport costs however, is critical as transport expenses contribute significantly to the provision of such a service.

The cost for provision of Sign Language Interpreter services was estimated to be Aus $6,3 million for the period 2002-2003 for the 6 500 Deaf signing Australians. Of this amount 9% was spent on interpreting in the public sector while 8% was spent in the private health care sector ((Commonwealth of Australia, 2004)

1.2.4 Financing of deaf initiatives

Although in most countries there is legal provision for interpreters in health care, Harmer (1999) suggests that the resistance to provision of interpreters, in developed countries at least, is due to several factors. These include a lack of understanding of the extent and impact of communication barriers, cost aversion, confidentiality issues, and the fact that interpreters may serve as witnesses should there be litigation. In the lower and middle income countries, the cost of sign language interpreters may be the main stumbling block. On the other hand, Jacobs et al. (2004) attributes this lack of interpreter services generally, and specifically for non-English speakers, to the paucity of data on the costs of provision of language services. It is with this in mind that the study seeks to estimate the costs of providing such a service in the South African context focusing specifically on the Deaf who face extreme difficulties together with their clinicians in terms of communication.

A study in the UK focusing on deafness and ethnicity by (Ahmad et al. 1998) found that most of the community initiatives for the deaf were financed through short term funding models. As

such, their future viability could not be guaranteed. This makes the case for sign language services to be funded possibly through the national fiscus to enhance provision of health services for the Deaf. Such long-term funding models may ensure sustainability in provision of this service.

Reeves *et al* (2002) argue that provision of adequate communication services for the deaf in health care should not be seen as an un unjustified expense but policy makers should consider the unintended effects of not having an interpreter because of the possible ripple effects that may ensue far beyond the patients involved. In light of this, Abraham & Fiola, (2006) see the provision of interpreters to as a risk mitigation strategy because for example, misunderstood instructions on the use of medicines, can have deleterious effects on the patient such as in overdose. In addition, healthcare costs may increase as a result of more frequent return visits by deaf patients because of unaddressed need (Zazove et al. 1993). In the case of an untreated Deaf patient with Ebola or TB of the XDR or MDR variety, a public health crisis may ensue as such conditions spread wildly in the community.

Accredited South African Sign Language Interpreters' fees range from R250 to R350 per hour exclusive of VAT, plus an additional R2.20 per kilometre for transport (Deaf Federation of South Africa 2011). This makes it out of reach of most Deaf patients who are often unemployed and depend on state-sponsored grants (Heap & Morgans 2006). This then validates the need for a study such as this one that seeks to estimate the costs of providing SASLI in health care so as to assist in fiscal projections.

1.3 Justification for the study

There is currently limited information on the use of professional sign-language interpreters in the South African health services context and there is also no published data on the cost of running South African Sign Language interpreting services in health care. However, to advocate for funding of SASLI, policy makers need to know the costs involved in running the service optimally and efficiently. In addition, a cost analysis of a project of this nature is important as it

has health systems relevance in addressing the issue of health care access of the marginalised groups through alleviating communication barriers, particularly in the face of HIV and TB pandemics. The economic analysis is also a prototype for real life economic evaluation of health programs to aid decision making in health care. Further, documenting the socio-economic status of Deaf people around the Cape metropole is important to understand the socio-economic circumstances under which they live. It also assists to gauge the affordability of such a service from the patient's perpective.

The SASLI is an on-going pilot project housed at the UCT's School of Public Health and Family Medicine under the auspices of the Public Health and Human Rights programme. The pilot project provides sign language interpreters for Deaf clients accessing health services within the Cape Metro district as well as training medical sign language interpreters. Deaf clinic assistants are also provided in some clinics to assist Deaf clients at no extra charge.

A recent case-study based on this pilot project highlights the health care experiences of a Deaf patient with and without a sign language Interpreter including the patient's experiences of antiretroviral therapy (Haricharan et al. 2013). The case study's findings highlight a Deaf patient's lack of informational access in health care specifically relating to misinformation regarding access to and adherence to HIV treatment which the South African National AIDS council seeks to address in its national strategic plan.

The National Strategic Plan on HIV, STIs and TB highlights the importance of communication as an enabler to reach its targets for 2012-2016 (South African National AIDS Council 2012). It also states that "suitable funding should be made available to enable communication in multiple languages, including sign language, so as to change risky behaviour, sustain healthy behaviours and afford access to treatment in the key hard to reach populations" including the Deaf. Prioritising communication needs of these special populations determines whether or not they

benefit at all from any HIV/AIDS and TB interventions through their encounter with the health systems hence the need to estimate the costs of providing SASLI services in health care.

It is against this background that the study seeks to quantify the costs and to ascertain the budgetary impact of running this South African Sign Language interpreter project. The aim is to advocate for the up-scaling of the service at district health services level to alleviate these communication barriers.

1.4 Aim and Objectives

Aim: To estimate the cost of providing sign language Interpreters at primary health facilities in the Cape Metro district in order to mitigate communication barriers in access to health care services by Deaf patients.

Objectives:

1. To assess the annual number of South African Sign Language Interpreter (SASLI)-assisted visits by the Deaf patients over the five year period (2008-2013), and to calculate the average SASLI utilisation rate per patient per year at the SASLI pilot project level
2. To describe the deaf patients' demographic and the socio-economic characteristics
3. To assess the costs of running the SASLI services from the pilot project perspective
4. To estimate the cost of running the SASLI from a district health services perspective

2. Methodology

Intervention: The South African Sign Language interpreter Pilot Project

The SASLI pilot project is based at the School of Public Health at the University of Cape Town. This pilot project implemented the first professional South African Sign Language Interpreter (SASLI) service in health care in Cape Town in 2008. It focuses on Deaf people who use SASL. Marketing of this service is done via presentations at the Deaf community gatherings and distribution of flyers at local clinics. Deaf patients requiring the services of an interpreter contact the project administrator to book an interpreter for a medical appointment. The administrator then allocates an interpreter who then communicates with the patient regarding the logistics and

time of appointment. The interpreter stays with the Deaf patient for the duration of the consultation at the facility. When an SASLI is allocated, this is defined as actual utilisation. In this study however, all requests whether or not an interpreter is assigned reflect the request rate for the service.

The project also runs a cluster service for the Ophthalmology clinic at Groote Schuur Hospital. This subproject commenced in October 2009 and works by 'clustering' Deaf patients once a month. The service is advertised monthly via SMS. A qualified senior interpreter works with Deaf assistants to provide a service to at least four patients on this day. These assistants help patients at the administration desk in the Eye clinic before the patient sees the clinicians where the qualified interpreter takes over.

Delivery mechanism

The pilot project operates on the services of ad hoc senior interpreters, junior and trainee interpreters with the administrator overseeing all operational matters of the project. In the case of the district level SASLI service, it is anticipated that the service will be delivered using permanently employed interpreters to ensure stability and long term sustainability.

Defining the population in need

Estimating the population in need depends entirely on two variables – the country's population and the prevalence or incidence of the disease or condition under study (Kumaranayake et al. 2001). Estimates of Deaf population or SASL users are not easily available although DeafSA gives low estimates of 600 000 and high estimates of 1.5 million SASL users. The assumption is that Deaf people are evenly distributed within the general population hence direct proportion was used to estimate the population in need in the Cape Metropole based on the 2011 census data from Statistics South Africa.

Costing model

In order to estimate the costs of providing sign language Interpreter services at the project intervention level, a costing spread sheet was designed. From this, unit costs per interpreter-

assisted visit were extracted based on the total project costs and number of interpreter-assisted visits for 2013.

Project Utilisation

The total number of visits per person was extracted from the pilot project's database which had data for all requests for interpreters between 2008 and 2013, regardless of whether the interpreter was available on that date of request or not. Actual utilisation was taken to be the total number of visits for which an interpreter was made available. The average utilisation rate per person per year was calculated based on the total number of visits and the actual number of people served in that year. The total number of visits made in each of the five years, and the average utilisation rate per SASL user per year were calculated using Stata software.

Target coverage

This study perceives the provision of sign language interpreters in healthcare as both a human rights issue and a risk mitigation strategy in health care hence advocates for universal coverage in the provision of SASLI within the health care system. Therefore it is anticipated that SASLI would be made available for all the Deaf SASL users and particularly within the District health services.

Perspective

This costing study estimated costs from a health services provider perspective. This study took a provider perspective in order to provide relevant cost information to the government, with a view that this service should be publicly funded. Interpreter fees, as cited by DeafSA (2011), are out of reach of many Deaf patients, and this service is provided free of charge. Consequently a patient perspective was not included in this analysis as the focus of this study is on direct costs incurred by the provider in the provison of the SASL interpreter services in health care.

Identification of resource use

The financial and economic costs of running the pilot SASLI project were estimated using the ingredients approach. Financial costs represent the actual expenditure as recorded in the financial

statements of the program while economic costs include the value of volunteer time and any donated items that the project utilises but does not pay for. Recurrent costs of running a language interpreter service include the salaries and fringe benefits of the interpreters, fees for hiring external interpreters, salaries and benefits of any key administrative staff, and general supplies like stationery and refreshments. Capital costs include training costs, equipment such as computers and phones and office space. Recurrent and capital costs for the pilot project are shown in **table 1.** The costs were estimated for the 2013 period.

Socio-economic and demographic analysis

A secondary data analysis of the socio-economic status of the project's clients was done on the data collected by the project on monthly income, employment status and education level. Written language preference for sms communication with the project was also obtained from this survey data. This analysis was done to ascertain the geographic spread of the Deaf patients currently using the service and to give a picture of the socio-economic status of the population curently using the service.

Table 1.1: **Recurrent and capital costs of the South African Sign Language Interpreters project** (adapted from Sinanovic and Kumaranayake, 2006)

Type of Cost	**Identification**	**Measurement**		**Valuation**	
		Measurement	Sources of data	Valuation method	Sources of Data
Recurrent					
Personnel	Administration and management	Percentage of time spent on different activities	Job description	% time spent per month X salary per month	Program expenditure data
	Interpreters	Amount of time spent with patient	Log book records	Hourly rate X duration of clinic visit in hours	Program expenditure data
Supplies	Stationery Refreshments	Quantity consumed	Program records	Number of units X unit cost	Program expenditure data
Transport costs	Expenditure on transport related expenses	Number of trips	Interviews and log book	Cost per trip X number of trips	Program expenditure records
Office operating and maintenance	Telephone/cell phone costs	Number of calls made	Program records	i) Number of minutes per call X cost per minute ii) Number of smses X cost per sms	Program expenditure
	Internet connectivity (data usage)	Amount of data used		number of units used X cost per unit	Program expenditure data
	Other overheads e.g. electricity, water,	Proportion of total usage utilised by program	Institution records	number of units used X cost per unit	UCT records
Capital					
Building	Office space	Size of office	Observation	replacement value per square metre X number of square metres	UCT Property Department
Equipment	Furniture Computers Cell phones	Quantity	Observation	Replacement value per year X proportion of time used per year	Local suppliers and/or manufactures
Training	Courses attended	Number of trainees	Program records	Cost per trainee per course X number of trainees	Educational institutions

Recurrent costs

a) Personnel costs

Actual gross salaries and benefits paid to the project staff and ad hoc interpreters were used to calculate the personnel costs.

b) Allocation of overheads or shared costs

Overheads are resources or infrastructure shared between the project and other departments within the University. This includes maintenance services, administration, water and electricity. An allocation factor was calculated as follows based on the proportion of space used by the pilot project in the building.

Total Falmouth Building interior space= 8205.12m^2

Amount of space used by the SASLI project=20.926m^2

Allocation factor $= \frac{20.926m2}{8205.12m2}$ x 100%

= 0.26%

Capital costs

There are two proposed methods for the valuation of capital items such as buildings (Hutton & Baltussen 2005; Adam et al. 2004). The first is to annuitise the value of the initial capital outlay, a method that incorporates the replacement costs of the building, its useful life and the opportunity costs of the capital tied up in the building in order to derive the equivalent annual cost. The second method utilises the rental value of a similar space in a building that could provide the same function e.g. a private clinic in the same area, and the rental value includes depreciation and the opportunity costs of the asset. Of the two methods, Hutton & Baltussen (2005) recommend the first method of annuitisation because the rental method depends on a competitive market, which is not always guaranteed. For this study, the first method of annuitisation was therefore used

To estimate the equivalent annual cost of capital items, a discount rate of 3% and varied to 6% in the sensitivity analysis as recommended by the World Helath Organisation's CHOosing Interventions that are Cost-Effective (CHOICE) group, (Baltussen et al, 2003). The useful life of capital items was derived from published studies . For buildings the useful life used was 20 years, 10 years for furniture and 5 years for equipment and staff training. The replacement cost of the office space was calculated based on the replacement value of the building. Replacement values were based on the prevailing 2013 prices. An exmaple for the buildings is shown below:

Falmouth building replacement cost = R 178 998 120, 00

Replacement cost of the SASLI office space = 0.26% X R178 998 120.00

Equivalent annual cost of the building = $\frac{0.26\% \times R178\ 998\ 120}{Annuity\ factor}$

Average Cost per visit for the SASLI pilot project

Recurrent and capital costs were divided by the total number of interpreter assisted visits for 2013 in order to calculate the average unit cost per visit.

Estimating the cost of providing SASLI in the District Health services

To estimate the district level costs, the unit cost per visit calculated from the pilot project data was multiplied by the average number of visits per person and by the estimated population in need. Data on the prevalence of sign language users in South Africa is scant, therefore the study used the low and high estimates of 600 000 and 1.5 million respectively available from the DeafSA.

Sensitivity Analysis

The following parameters were varied in the estimation of costs

i) Average annual utilisation rate using the lowest, median and the highest annual rate as calculated in each of the six years

iii) The discount rate was varied to 6% as recommended by the World Health Organisation (Walker & Beutels 2008) to ascertain the extent to which the costs changed at the higher discount rate.

Sources of data

a) Economic and financial costs were collected from the Pilot Project database to estimate the cost per clinic visit for the year 2013

b) The number of SASL users was taken from the DeafSA policy statement

c) The 2011 Census data from Statistics South Africa was used to estimate the proportion of Deaf people in need of sign language Interpreters in the Cape Metro District

d) Secondary data from the pilot project was used to elicit the demographic and socio-economic profile of the Deaf Patients and the average utilisation rate of services amongst the Pilot Project's clients.

3. Work plan

Activity	September 2013	October 2013	November-April 2014	May-June 2014	July 2014	August 2014
Proposal development	Xx					
Submission and ethical approval		xx				
Data collection			xx			
Data analysis				xx		
Writing up					xx	
Submission						xx

4. Budget

The MPH dissertation was funded from the MRC National Health Scholars Program grant.

5. Ethical Considerations

Ethics approval was sought from the University of Cape Town's ethics committee and approved on reference number HREC 618/2013.

6. Feasibility, Research Impact and Information dissemination

This study is part of the European Union Funded program housed under the Public Health and Human Rights Program at the University of Cape Town's School of Public Health. It is anticipated that the findings of this research will be published in peer reviewed journals, shared in academia and with the Cape Metro district health services.

7. A description of the Cape Metropole District

The Cape Town Metro District is one of six districts in the Western Cape Province and it is sub-divided into eight sub-districts namely the Eastern, Northern, Western, Southern, Tygerberg, Klipfontein, Khayelitsha and the Mitchells Plain sub-districts (**fig. 1.1**) with a population of 3,7million (based on DHIS 2006 data). (Western Cape Provincial Government 2007).

Figure 1.1 The eight sub-districts of the Metro District Health Services

Key	Sub district	Population (2011)
A	Tygerberg	597 732
B	Western	470 541
C	Northern	363 292
D	Klipfontein	384 189
E	Eastern	508 689
F	Khayelitsha	391 748
G	Mitchells Plain	509 237
H	Southern	516 594
	Total	**3742 022**

Management of the District Health Services

The district health services are managed at district level with two sub-districts allocated to one Sub-structure office or Directorate which provides management functions to the allocated sub-districts. Under the directorate, the following managerial functions are provided (Gie et al. 2007).

i) Technical support such as engineering and maintenance service to Primary health care facilities in the sub districts

ii) Pharmaceutical services which oversees the provision of pharmaceutical services in each sub-district

iii) Human resources support through providing advisory and coordinating functions between the institutional Human Resources (HR) department and the central HR chief directorate at the Metropole District level where the main HR functions are done

iv) Finance and general administrative support to assists sound financial management policies at the sub districts level

v) Comprehensive Health Services which provides health programme support in order to facilitate, implement, coordinate and evaluate health programs in each sub-district. The health programs include both the curative such as TB and HIV and the preventative such as immunisations.

Health care utilisation rate per capita in the Cape Metropole

The district health services are comprised of primary health care clinics which have a referral path to a Community Health Centre (CHC) which in turn has a referral path to a district hospital (Western Cape Provincial Department of Health 2008). The population that each CHC serves ranges from ± 30,000 to 120,000 in the Cape Town Metro district and this is determined by the number of clinics to which a CHC is associated (Western Cape Provincial Government 2007). Midwife Obstetric Units (MOUs) provide a 24-hour service and each MOU serves at least one CHC per sub-district. Actual utilisation rate of Primary health Care services per capita for 2012 in the Western Cape was 2.6 with a national average of 2.5 whilst the optimal rate set by the National government is 3.5[1]

Socioeconomic status of the Metropole Sub-Districts

Recent socio economic data for the Cape Metropole is unavailable, however, data from 2007 based on the 2001 census revealed that the Southern planning district was the most well-off based on a calculated socio-economic status (SES) index as shown on **table 1.2** below,(Gie et al. 2007). In the calculation of the SES, the researchers combined the following indices:

a) The percentage of households earning less than R19200 per annum,

b) Percentage of adults older than 20 years, whose highest level of education is less than matric,

[1] www.healthlink.org.za/healthstats/116/data

c) Percentage of economically active population that is unemployed and

d) The proportion of the labour force employed in unskilled occupations.

Therefore the higher the SES index the worse off the planning district. According to this data, Khayelitsha was the poorest with the highest SES index of 54.12.

Table 1.2 Socio-economic status of the Cape Metropole Sub- Districts (Source Gie et al.(2007)

Planning District	% Adults(20+) with highest qualification < matric	% of economicall y active unemployed	% Households earning < R19200 pa	% of labour force in unskilled occupations	S.E.S. Index
Tygerberg	46.68	22.67	34.70	14.61	29.67
Western	54.28	22.11	29.22	15.28	30.22
Northern	46.35	19.26	28.82	17.31	27.94
Klipfontein	62.63	23.19	28.22	15.09	32.28
Eastern	61.67	26.85	38.90	23.42	37.71
Khayelitsha	76.72	45.16	62.44	32.15	54.12
Mitchells Plain	70.52	31.05	40.28	19.86	40.43
Southern	40.60	13.43	22.20	12.39	22.16
Total	**62.03**	**29.38**	**39.00**	**21.46**	**37.97**

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Part B: Structured Literature Review

Introduction

This study sought to estimate the costs of providing sign language interpreters in the public health care sector in order to alleviate the communication challenges faced by Deaf people in accessing health care services. The literature review set out below sought to identify current debates on this and the following topics as they relate to the study aim:

- Deaf people's experiences within the health care sector
- Disability and Health policy
- Methodological literature on the economic evaluation of health care services
- Resource allocation and priority setting
- International best practices on the provision of sign language Interpreters in Health

The principal source of literature was the peer reviewed journals from Google Scholar and Pubmed that were accessible through the University of Cape Town's library website. References cited in the publications reviewed were also followed up while grey literature on Google® was also consulted. The initial search on costing was done on Pubmed using the following search terms for English Language papers published between 1995 and 2014:

("Costs and Cost Analysis"[Mesh] OR "Hospital Costs"[Mesh] OR "Employer Health Costs"[Mesh] OR "Health Care Costs"[Mesh] OR "Direct Service Costs"[Mesh] OR "Cost of Illness"[Mesh] OR "Cost-Benefit Analysis"[Mesh] OR "Economics"[Mesh]) AND ("Persons With Hearing Impairments"[Mesh] OR "Deafness"[Mesh]

The literature review begins with a brief note on the epidemiology of Deafness globally and in South Africa followed by a detailed discussion of communication challenges experienced by the Deaf patients in accessing quality health care services. The second part dwells on the international best practices of the provision of sign language whilst further on; there is a discussion of costing studies on language services. The chapter also discusses in detail the theory of resource allocation and priority setting. The penultimate section of the chapter discusses the

theoretical overview of cost analysis as a component of health economic evaluation. This section outlines the approach to costing of health services with a discussion of how capital and recurrent costs are handled in economic evaluations in order to obtain consistent results across different studies that enable comparability and generalisability. Lastly the conclusion ties up the findings from the review of the literature with a note on the identified gaps that justify the reason for a costing study on South African Sign Language Interpreter services.

2.1 Epidemiology of disability and Deafness in South Africa

Statistics on prevalence of Deafness vary depending on the source and definition. According to Fellinger et al. (2012) hearing loss affects close to 15-26% of the world's population with low income countries having the highest prevalence. On the other hand the World Health Organisation[2] states that at least 5% of the world's population suffers from disabling hearing loss. Population figures of hearing disability in South Africa also vary according to source. The 1997 Community Survey conducted by Statistics South Africa put the prevalence of Deafness in South Africa at 0.4% (Statistics South Africa 2007). However these figures are disputed by the Deaf Federation of South Africa (DeafSA) which estimates the rate to be around 3.7%, a figure much closer to the WHO level[3]. In the 2011 census the disability prevalence was found to be 7.1% (Statistics South Africa , 2013) and it has been estimated that at least 20% of the disabled population in South Africa is made up of the hearing disabled (StatsSA, 2001). South African Sign Language users have been estimated at between 600 000 and 1.5million (Deaf Federation of South Africa 2011).

2.2 Deaf people and their interactions with the health care system

The EquitAble consortium states that much of the progress towards achieving the health-related Millennium Development Goals (MDGS) has largely been gained on those who are generally able to access health care whilst the vulnerable and disabled have been left behind, (Maclachlan

[2] *www.who.int/mediacentre/factsheets/fs300/*
[3] www.signGenius.co.za

et al. 2012). This is supported by the fact that the disabled tend to have poorer health, are more vulnerable to diseases and are more likely to have other secondary conditions than the able-bodied population.

In addition, the disabled people tend to underutilise preventative care and use more of the high cost curative services in emergency situations further increasing the cost of health care. (Drainoni et al. 2006). In particular, Deaf people often find it difficult to navigate the health system in order to get adequate and effective assistance. Their attempts at accessing healthcare services are fraught with frustration leading to abandonment of any further attempts to seek care or information (Steinberg et al. 2006; Cristina et al. 2010) . This may also explain the lower utilisation of health care services by the Deaf compared to the hearing population (Harmer 1999; Steinberg et al. 2006; Scheier 2009). Health care access challenges of this nature are likely to lead to serious public health problems in combatting communicable diseases such as TB and epidemics like HIV/AIDS and Ebola. This is particularly important especially given the higher rate of HIV infection amongst the disabled (Hanass-Hancock, 2009).

Negative attitudes displayed by health professionals exacerbate the access barriers of the Deaf compared to the rest of the population. The hearing health professionals have been found to exhibit negative attitudes towards the Deaf with some seeing them as difficult, stubborn and intellectually challenged (Meador & Zazove 2005; Scheier 2009). This often leads to Deaf patients making frequent repeat visits to different providers in the hope of getting satisfactory treatment with increased costs to the health system and to the patients and their families (Abraham & Fiola 2006). These communication difficulties are also prevalent amongst ethnic minority groups.

A study in Canada found that some health care professionals expected the patient to be fluent in the local official language or at least bring their own interpreter for the consultation (Abraham & Fiola 2006). Their argument was that the public service is already burdened with providing

adequate health care services without having to endure the added burden of language services within the health care sector. Such sentiments undermine the role of the population as citizens with rights to healthcare (Gilson, 2012) and goes against the inherent definition of public services which should be accessible to all members of the public (Abraham & Fiola 2003). In view of these negative attitudes, some have advocated for the education and training of healthcare professionals to sensitise them to the needs of the deaf patients, (Scheier 2009).

Disparities in health care access and outcomes between the Deaf and the general population have also been noted in the UK. Reeves et al. (2002) carried out a study to establish the extent to which health services met the stipulations of the Disability Discrimination Act in the UK and found significant access barriers. These included difficulties making appointments, once in the waiting rooms they had problems knowing when they had been called up to see the doctor. Further they experienced problems in understanding and being understood by the health care staff. The Deaf patients interviewed also experienced problems relating to informational access such as understanding treatment follow up plans and discharge plans. At the pharmacy visit they had problems in understanding how to take the prescribed medicines. This is of particular relevance in the treatment of such conditions as HIV/AIDS characterised by poly-pharmacy and require extensive patient consultation with many return visits. For the deaf patient, this may entail significant economic outlays as in many cases they are accompanied by family members which increases the overall direct and indirect costs of care.

Data analysed by Signhealth® in 2009 confirmed the findings by Reeves et al (2002). The analysis also showed that Deaf people had problems accessing their doctors' rooms by telephone, had higher rates of up-referrals to specialist care and more appointments. In addition were less likely to see the doctor they preferred and more likely to have a chronic condition such as psychiatric conditions, blindness and learning disability, than the general population (Nilsson et al. 2013).These indicators of poorer health outcomes are further exacerbated by the fact that the disabled tend to be unemployed and are generally in the lower income categories should they

be employed (Nilsson et al. 2013; Steinberg et al. 2006). In South Africa the socioeconomic situation is similar, with most of the disabled relying on social grants as their sole source of income (Emmett 2006).

Deaf people's healthcare experiences in Africa have been documented in a number of studies, particularly in the field of HIV and AIDS. The main findings are a relative lack of knowledge of HIV/AIDS transmission modes and constrained access to health care services with complaints of discrimination.

In a systematic review of literature on HIV/AIDS and Disability in Africa, Hanass-Hancock (2009) found that the staff working in Voluntary Counselling and Testing programs, healthcare practitioners and police officers were often unable to communicate with deaf people and the issue of confidentiality was subsequently compromised. Hanass-Hancock (2009) attributes this to the social construct that sees disabled people as asexual and therefore may be treated with less respect and sensitivity than the general population. Studies from Nigeria and Swaziland compared the deaf with the general population and found that the Deaf people were more likely to believe in incorrect modes of transmission of HIV such as hugging, kissing and sharing utensils (Groce et al. 2005; Groce et al. 2006). In Kenya HIV/AIDS awareness was found to be high amongst the Deaf, at 87%, however, knowledge about transmission modes was lacking with many still believing in incorrect modes of transmission. This could be explained by the lack of Deaf specific modes of information dissemination (Hanass-hancock 2009; Groce et al. 2006). In Cameron, the HIV prevalence rate amongst the Deaf was found to be double that of the general population whilst the age of sexual debut was a year earlier amongst the Deaf, (Hanass-Hancock 2009).

Experiences of Deaf patients have also been documented in the South African health sector. The study by Kritzinger et al. (2014) highlighted inequalities in access to health care and healthcare information amongst the Deaf. This study found that Deaf patients depended on other people to

assist them in navigating the healthcare institutions. This often led to delayed consultations and a general lack of satisfaction with the communication process between them as patients and their clinicians. Further, the Deaf felt that even though they needed the services of SASLI, the fees charged were exorbitant and far beyond what they could afford. Kritzinger et al. (2014) argue further that using family members as interpreters could exacerbate the communication problems as most of the healthcare interactions are either in English or Afrikaans which is often not the primary language of the accompanying person. Such language barriers have been documented in some South African studies particularly addressing the Western Cape (Saulse 2010). This highlights the need to provide SASLI as a free public service as most of the Deaf patients cannot afford this service out of pocket.

2.3 Sign-language interpreters in health

Provision of SLI in health is not only a human rights or access issue but also a risk mitigation strategy given the hazards associated with inadequate communication such as medication errors with potential lethal consequences (Abraham & Fiola (2003); Drainoni et al. (2006)). This means that even providers and their institutions should take the responsibility to ensure that there is effective and adequate communication (Abraham & Fiola (2006)). This ensures that the expected outcomes from the hearing and the Deaf patients are similar. A case in point that validates the view of SLI as a risk management strategy was documented by Drainoni et al. (2006) whereby a Deaf patient was given an anaesthetic drug he was allergic to resulting in his death. Haricharan et al. (2013) documented another case in South Africa, highlighting HIV treatment adherence challenges experienced by a Deaf patient without the intervention of a SASLI. This case study's findings highlighted a deaf patient's lack of informational access in health care resulting in skipped doses of Post Exposure Prophylaxis which may have prevented the acquisition of the HIV.

Communication has been found to be improved when sign language Interpreters are utilised compared to consultations without an interpreter (Steinberg et al. 2006; Harmer 1999; Groce et

al. 2005; O'Hearn 2006; Haricharan et al. 2013). In addition, Deaf patients expressed higher satisfaction levels where consultation was performed by a sign language competent clinician or a medically certified sign language Interpreter with the added benefit of adherence to preventive instructions given than those who sought treatment in a different setting (Steinberg et al. 2006). However, the availability of interpreters even in countries which legally require that they are availed for medical consultations such as in the USA or the UK is sporadic (Steinberg et al. 2006; Drainoni et al. 2006). This has been largely blamed on the attitudes that view interpreters as a Deaf patient's problem. In the UK study by Reeves et al. (2002), only 17% of general practitioner appointments and 7% of accident and emergency appointments for the Deaf were conducted with the help of an interpreter.

In a survey by the World Federation for the Deaf, sign language had official recognition in 44 out of 93 countries studied and among these, only a few had given the language legal and official status (Jokinen 2010). The survey also revealed that Deaf organisations felt that despite this type of recognition, insufficient effort was put in ensuring the availability of sign language services for the Deaf. The Deaf Federation of South Africa[4] echoes this sentiment. In their policy statement on the provision and regulation of sign language interpreters (SLIs) in South Africa, DeafSA states that although SLIs are a pivotal human resource, they are currently not available in the numbers required to service the needs of the Deaf community, with a current ratio of one interpreter to more than 99 000 Deaf persons (DeafSA, 2011). From a reasonably thorough search of literature, very little data was found on the acceptable ratio of sign language interpreters to sign language users. However, data from the Swedish National Board of Healthcare and Welfare in 1989 estimated an interpreter requirement of 1 per 30 Deaf sign language users with a final goal of 1 per 12 sign language users (Nilsson et al. 2013).

In countries where there is legal provision for interpreters in health care, Harmer (1999) suggests that the resistance to provision of interpreters, in developed countries at least, is due to several

[4]DeafSA is the umbrella body that facilitates the services for the Deaf and hard of hearing in South Africa

factors, chief of which include a lack of understanding of the extent and impact of communication barriers, cost aversion, confidentiality issues, and the fact that interpreters may serve as witnesses should there be litigation. In the lower and middle income countries cost of sign language interpreter services might be the main stumbling block.

Studies in the USA by Steinberg (2002) and O'Hearn (2006) show that the quality of communication between a clinician and the patient has a strong influence on patient satisfaction and the treatment adherence. Steinberg et al (2002) found that Deaf women avoided seeking healthcare due to communication difficulties with their health care providers. In her study of the prenatal experiences of deaf woman Deaf American women who use American sign language, O'Hearn (2006) found lower levels of satisfaction with communication and overall care amongst the Deaf women than their hearing counterparts. In addition, the hearing women reported having received more prenatal care appointments and received more information from their clinicians than the Deaf patients. On the other hand, provision of sign language interpreter services resulted in higher levels of satisfaction among the deaf women as they perceived the provision of an interpreter service to be a sign of concern for their health and welfare by the providers. Although there were no differences in pregnancy outcomes in O'Hearn's (2006) sample which could be due to the small sample size (23 Deaf and 32 Hearing women) and higher levels of education in both groups, as explained by the author, these apparent differences in the standard of care could be interpreted as discrimination and could potentially lead to poorer health outcomes amongst the Deaf. This has been documented in the UK where deaf persons have been found to rate their health status much lower than their hearing counterparts (Nilsson et al. 2013).

Findings from another study in the USA support the assertion that provision of SLI alleviates some of the access barriers experienced by the Deaf in their interactions with the health systems. Steinberg et al. (2006) studied the experiences of 91 Deaf adults in the USA and found that positive experiences of their interactions with the health services were associated with the

availability of medically experienced and certified interpreters, health care professionals with sign language skills, and practitioners who made an attempt to improve communication. Negative experiences were characterised by communication difficulties which were exacerbated by fear, mistrust and frustration during the communication process. Meanwhile health practitioners saw the provision of interpreters as the responsibility of the Deaf patient only with the perception that only the Deaf patient benefitted from interpretation. These patients had problems with written communication and speech reading, and also felt that health providers treated them unfairly when compared to the hearing patients. Consequently, this perception of unfairness is a potential source of litigation as Deaf patients view this as discrimination in the delivery of health care as has been seen in the USA due to the violation of the Americans with Disability Act of 1994 (Moore & Swabey, 2007).

The presence of interpreters however, does not always guarantee that the patient will be understood at all times. It has been noted that the cultural differences between the deaf and the hearing population may pose a communication barrier largely because 'exposure' and practices in the Deaf community may lag behind that of their hearing counterparts with the attendant result of hearing individuals speaking 'above' the deaf patients (Drainoni et al. 2006). Further in the South African study, Kritzinger et al. (2014) argue that other factors specific to the Deaf community interact to hinder communication in the health care arena. These have been described as interpersonal factors such as shyness, insecurity, a lack of independent thought and living in an over-protective environment within the Deaf community as they usually stick together. Further a lack of familial communication and a non-questioning attitude and feelings of disempowerment all work together to hamper communication efforts.

2.4 Interpreting in healthcare in South Africa

Language barriers in health care have been acknowledged and documented in the Western Cape more than in any other province in the country (Haricharan et al. 2013; Drennan 1996; Schlemmer & Mash 2006; Saulse 2010.). The need for interpreters in health care was realised as

early as the 1990s when a non-governmental organisation, the National Languages Project based in Cape Town trained and deployed liaison interpreters in healthcare in 1996 (Saulse 2010). However in some cases some of the interpreters left the institutions they had been deployed to, and those that remained experienced challenges such as remuneration problems, a lack of supervision and lack of general professional development; in addition the NLP closed down. This lends credence to the assertion by Ahmad et al. (1998) non-statutory funding of Deaf initiatives affects their viability resulting in programs being shut down due to a lack of funding. This therefore justifies the call to have SASLI provision being embedded within the health system wherein the government takes ownership of the program. This ensures sustainability, continuity and equity in terms of access to health care services as patients do have to pay out of pocket for this service.

2.5 Problems associated with use of ad hoc interpreters and family members

Due to the sporadic nature of the provision of professional SLIs in many countries, as noted above, many Deaf patients rely on alternative methods for communication (Steinberg et al. 2006). These methods include the use of ad hoc interpreters, family members or friends, other staff members and written communication (Abraham & Fiola 2006; Steinberg et al. 2006). This often results in unintended problems as noted below.

a) Lack of objectivity and difficulties with conceptual understanding of medical terms

Problems with use of family members and friends as interpreters include emotional involvement and difficulties with comprehension that may negatively influence the quality of care rendered to the patient (Abraham & Fiola 2006). Lack of objectivity may result due to the co-existent emotional ties that distort the exchange of information between the patient and the health care provider. Difficulties with conceptual understanding of medically complex terms and the phrasing of words by the ad hoc interpreters may also lead to improper after-care which may inadvertently lead to higher costs due to therapeutic failure or medical errors, costs which could be avoided by use of a trained professional interpreter (Abraham & Fiola 2006; Scheier 2009).

Some of these costs relate to high rates of repeat visits, productivity losses as Deaf patients and/or their escorts take time away from work. Use of Children of Deaf Adults (CODA) to interpret for Deaf adults also imposes unnecessary burdens on children who have to deal with situations that far outweigh their level of psychological and emotional maturity (Harmer 1999; Reeves et al . 2004; Abraham & Fiola 2006). Reliance on relatives/family to provide interpretation may delay consultation as the affected patient is entirely dependent on the third party to access care as seen in the South African study (Kritzinger et al. 2014). In the broader lower income categories, catastrophic health expenditure may also result, as the direct and indirect costs of seeking health care on the household increase because of the need for a "double" consultation per family.

b) Breach of confidentiality

Inclusion of third parties in the consultation process with health care providers inherently creates confidentiality problems, however this is enhanced in the case where the interpreter is known to the Deaf patient and may interact with the interpreter in other circles (Scheier 2009). This is especially relevant in diseases that are associated with stigmatisation e.g. HIV/AIDS and TB. Concerns of breach of confidentiality have been raised in many studies with use of untrained interpreters compounding the problem of stigma (Abraham & Fiola 2006). The issue of confidentiality is also of concern in cases of physical, emotional and sexual abuse where the disabled and minors are victims, (Hanass-hancock 2009; Abraham & Fiola 2006).

c) Workload on ad hoc staff interpreters

Use of other staff members as ad hoc interpreters is not without risk. There has been documented problems relating to workplace stress due to shifts in workload to non-interpreting staff members or the interpreting staff member having to make up for the lost time (Abraham & Fiola 2006). This has been documented in South Africa where a study was carried out to determine the costs of language services in a psychiatric hospital in the Western Cape by Drennan (1996). In this study he found that nursing staff provided 67% of the interpreter

services whilst the cleaners provided 10%. The rest of the interpreting was done by family members, friends, security personnel, strangers to the patient and other patients although the majority of the clinicians preferred qualified nurses to interpret for them. This choice of qualified nurses as interpreters is supported by Ku & Flores (2005) who state that the level of professional training of the interpreting staff member determines the accuracy of the interpreted information with a high risk of errors experienced when using non-medically trained ad hoc interpreters.

Drennan (1996) found that using other hospital staff as ad hoc interpreters caused a significant organisational burden with several problems. Firstly some of the issues related to the nurses often resenting being taken away from their official duties to perform the unofficial duty of interpreting for which they were not trained, rewarded or appreciated in any way. Secondly there seemed to be an 'exploitative' system according to the author that saw a disproportionately higher number of Xhosa-speaking nurses being sent to wards with a higher proportion of Xhosa-speaking patients in an organisational setting in which nurses did not have a voice. Thirdly, clinicians disliked the fact that they had to waste time tracking down a 'willing interpreter' from among the nurses or cleaners resulting in shortened patient consultations or repeat interviews with patients. Finally, some clinicians were uncomfortable imposing on their nursing colleagues. This supports the case for professional language services particularly the sign language Interpreters to be part of the human resources for health in South Africa to bridge the access barriers experienced by the Deaf patients and ensure quality communication within the health sector without over-stretching the staff members.

2.6 Alternatives to interpretation

Alternatives to the use of interpreter services include speech reading, written communication and telephone recording via typewriting (Steinberg et al. 2006). However, these have been found to be inadequate in addressing fully, the communication barriers in healthcare between a Deaf patient and a healthcare provider (Scheier 2009) . Speech reading is fraught with difficulties with only 30-40% of spoken English visible on the lips (Steinberg et al. 2006). Further, speech reading

is not always physically possible in all medical situations e.g. in surgical procedures when face-masks are used or in multi-disciplinary medical teams of more than one clinician.

Written communication assumes that the Deaf patients are able to comprehend and conceptualise medical jargon which may be too complicated for most patients given the low literacy levels amongst the Deaf. In the USA for instance, it was found that written English presented difficulties with the Deaf American high school graduates reading at the level of a fourth Grader (Scheier 2009) . This situation is likely to be heightened in South Africa, particularly because English is not the primary language of communication. Further, the low literacy levels among the poor and specifically amongst the South African Deaf, as found by Kritzinger et al (2014), exacerbate the situation. In the study by Kritzinger et al (2014) there was evidence of low literacy levels and limited vocabulary amongst the Deaf - factors that prevent Deaf patients from partaking fully in their medical consultations. Recommendations from the Deaf participants in this study included improved access to SASLI, displaying of information posters in sign language in all consultation rooms, electronic boards for queue management at health facilities, use of Deaf TV and mobile phone technology for information dissemination including information on providers accessible to Deaf people.

The problems encountered with telephone typewriting are much similar to those seen with written communication such as grammar and vocabulary (Scheier 2009). In addition, use of the technology is fraught with complications. In a study in the USA a lack of technological aptitude in both the patients and the clinicians was a deterrent to the use of this type of communication (Steinberg et al. 2006).

From the above discussion, these alternatives are not effective in bridging the language barrier between the Deaf and their clinicians, hence the call for sign language interpreters in health to alleviate this problem.

2.7 Disability and Health Policy

Abraham & Fiola (2006) argue that language access in health care must not be seen as an individual problem but rather as an organisational goal of health systems to provide equitable and effective delivery of health care services to all patients regardless of disability status. This argument is supported by Heap (2013), Haricharan et al. (2013) and Scheier (2009), who see the lack of sign language interpreters in health as a deficit of the health systems due to the failure to provide equitable access to health care services. Further, the inability of health systems to cater for the population needs undermines their role as citizens with rights and as co-producers of health through their health seeking and health-promoting behaviour (Gilson, 2012). In recognition of this interdependency between the health systems and the populations they serve, policy change has been mandated as the vehicle to integrate language services into the health sector, (Drennan & Swartz 1999; Drennan 1996; Heap 2013; Emmett 2006; Haricharan et al. 2013). However, in order to influence policy change, an estimate of resource requirements is key to any implementation decision; hence the need for research on costing estimates.

In their analysis of health policies in relation to the disabled in four countries - South Africa, Malawi, Namibia and Sudan, the EquitAble Consortium states that although these countries have written documents that appear inclusive of vulnerable groups in health policy, they tend to lack concrete plans on how to achieve the stated goals (Schneider et al. 2013). This is seen to be the case even with international bodies such as the United Nations (UN). Haricharan et al. (2013) argue that although the UN Convention on the Rights of Persons with Disabilities (CRPD) recognises the rights of the Deaf to provision of sign language Interpreters (SLI), it does not state explicitly the obligations and the concrete steps required for the provision of such services and the consequences thereof, of reneging on such obligations.

In South Africa, the constitution through sections 9 and 27, recognises and empowers the disabled with rights to equal treatment as the able bodied South Africans. It specifically prohibits discrimination based on sex, gender, race and language amongst others (Haricharan et al. 2013).

It further states in the National Health Act (61 of 2003) that health care providers should, *where possible* communicate with the patients in a language understandable by the patient giving due cognisance to the level of literacy and comprehension (Emmett 2006; Haricharan et al. 2013). However as argued by Haricharan et al. (2013), the '*where possible phrase*' has become the escape clause as there has not been any concrete plans to institutionalise SLI services in the health sector. They argue further that the lack of language access in health care in South Africa constitutes a violation of a number of rights which include the right to information, the right to health, the right to participate in decisions, to give informed consent, to confidentiality and to be treated with respect and dignity. This is also relevant in clinical research as Deaf people are more likely to be excluded not only because they are a vulnerable group but also due to the inability of researchers to communicate with them. Consequently the Deaf miss out on opportunities to be involved in research that could potentially be beneficial to their community (Harmer, 1999). It is in this light that Haricharan et al. (2013) argue for the use of sign language Interpreters in Health care in South Africa to enhance the protection of human dignity and importantly to improve access to healthcare.

2.8 International best practice on sign language Interpretation service provision

In an analysis commissioned by the Irish Comhairle to find out the international best practice in sign language provision, Finland was found to have a relatively better system of sign language provision for the Deaf among four other countries studied namely, New Zealand, Scotland, Denmark and England (Comhairle, 2006). A summary of the findings of the study are shown on **table 2.1** below.

In another comparative analysis of the provision of sign language services for the deaf between countries, Nilsson et al. (2013) found that the interpreting services in Sweden were much better developed compared to the UK, Poland, Cyprus and Ireland. The number of trained SLI varied per country with approximately 15 in Cyprus, 1000 in the UK, 250 in Poland and an estimated 500-600 trained interpreters in Sweden. In Ireland there were 83 registered interpreters of which

65 were practicing on a regular basis (Nilsson et al.,2013). In Sweden, the services were provided free of charge to both the individual sign language user and the service provider, paid for from central government coffers. In 2010 Sweden had 6200 registered Deaf users of the SLI services with a total of 75 000 interpreting assignments totalling 201 100 hours of which 30% of the assignments (22500) were for health related assignments. This gives a utilisation ratio of SLI services in healthcare of about 3.6 per Deaf person per year. Of the total request made in 2010 only 4.6% were not met.

Table 2.1 Costs and Models of sign language Interpreter provision in Scotland, England, Denmark, New Zealand and Finland (Comhairle 2006)

Country	Entitlement	Funding	Delivery	Remuneration	Cost per hour (2006 Euro)
Finland	Access on the basis of right to linguistic choice. Constitutional obligation for public authorities to ensure SL users have access to SLI	Central government funding to SLI service provider through the Finnish Lottery administered by government. Government pays for a minimum of 120hours of SLI per year per Deaf person.	Strong national approach, 20 regional centres running booking services	Salaried and free lance	18.45
Scotland	Access to services is through disability legislation Responsibility of service provision lies with service providers e.g. hospitals or GPs	Disability living allowance Voluntary organisations Local government authorities as Service providers e.g. health, justice	Mix of private, public and voluntary organisations	Salaried and free lance	34.83 (minimum 2 hours)
England	Access to services is through disability legislation Responsibility of service provision lies with service providers e.g. hospitals or GPs	Local government authorities as Service providers e.g. health, justice etc. Deaf persons pay through the Disability allowance paid by government Voluntary organisations	Well established provision but lack of national coordination with a mix of private, public and voluntary organisations	Salaried and free lance	36.83 (minimum charge - 2 hours)
Denmark	Access to services is through disability legislation	SLI services are provided free by the government to access legal, education and medical events Limited budget for other services	Strong national approach with regional centres. Centre for the deaf administers SLI services in 4 regions	Salaried and free lance	Not available in the public domain
New Zealand	At the time proposed bill to be passed to allow Deaf people access to SLI in legal proceedings	Some government funding to the NZ Deaf association Service providers also obliged through Disability legislation to pay for services	National approach, NZ Deaf Association mainly responsible especially in health.12 regional centres Some provision by other service providers e.g. education	Salaried and free lance	27.74 ((minimum 2 hours)

From the Comhairle (2006) analysis Finland was found to have a more comprehensive form of funding with each individual allocated at least 120hours of interpreter services per year funded by central government compared to other countries where the Deaf where expected to fund SLI from their disability allowances. The key highlights of the analysis by the Irish commission were that a properly funded system owned by a statutory body would be most ideal as it provided a steady stream of funding, (Comhairle, 2006). This is supported by Ahmad et al. (1998) who found that short term funding of deaf initiatives affected their viability.

Where the cost of interpreter services lies on the individual provider there is likely to be resistance to provision of SLI for the Deaf (Abraham & Fiola 2006; Steinberg et al. 2006; Scheier 2009) hence the need for the recognition of sign language Interpreters as part of the Human Resources for Health employed by the state (Heap 2012). This is particularly relevant in SA, for affordability reasons as argued for by Heap & Morgans (2006). According to Deaf Federation of South Africa (2011), interpreter services are charged at between R250 and R350 per hour excluding VAT. This makes it out of reach of most Deaf patients many of whom are unemployed relying on state-sponsored grants (Heap & Morgans 2006). However, in some countries resistance by insurers to pay for SLI has been noted particularly in the USA despite the promulgation of American with Disability Act to protect the disabled (Drainoni et al. 2006).

Among the countries studied by the Irish commission; Denmark, Finland and New Zealand had a top down, centralised type of service provision and management. In these countries sign language services are centrally managed, with regional centres acting as points of contact. This ensures that there is consistency in service provision across the country. Centralising sign language services at national level may also imply that these services are prioritised by the state. However, the disadvantages of such as system is rigidity which might not take due cognisance of the local context differences from region to region. (Comhairle, 2006).

On the other hand some countries have a decentralised, bottom up approach to sign language service provision such as Scotland and England with services provided by local organisations and local authorities. The advantage of such as system is proximity to the population in need and the possibility that services can be tailored to suit local contexts, culture and priorities. The risk is that there may be regional differences in the pace of development of such services with a lack of standardisation in service provision creating programmatic problems in terms of access and coverage. (Comhairle 2006).

Problems relating to decentralised provision of services were noted in Canada by Rodda & Eleweke (2002). They found that some Canadian sign language service providers were cutting back on service provision as a result of funding constraints with better and more stable funding in federal government programmes than in provincial governments. As South Africa has a similar governance system, fiscal federalism may lead to inter-provincial and inter-district disparities in provision of services as has been seen with the disparities in spending on primary health care services among the different districts in South Africa (McIntyre, 2012). Therefore the provision of South African Sign Language interpreter services through a centralised process of the National Department of Health may be a feasible alternative that will ensure stability and consistency in funding and hence the quality of services. In addition, organisations providing sign language interpreter services at commercial rates are not uniformly distributed throughout the country, therefore a bottom up approach would leave other areas under-serviced particularly rural districts. Further, given the initial financial outlays required to set up such a program as seen in Ireland, a centralised approach to program development might be a more sustainable option.

2.9 Cost of language services

There is limited data published on the costing of sign language interpreter services in health care with most of the published literature focusing on spoken language services in developed

countries. Cost estimates for the provision of sign language services was documented for Manchester in England by Reeves et al (2002) and for Australia by the Australian government in 2004. In addition a report published by the Irish Comhairle (2006) estimated hourly rates charged by Sign-Language Interpreters for Finland, Scotland, England and New Zealand. The fees ranged from €18. 45 to €36.83 per hour (table 2.1, page 55 above)

Jacobs et al. (2004) carried out a study on the cost and benefits of interpreter services for non-English speakers in the USA. The cost data collected included the direct costs of providing interpreter services and the costs of the net change in utilisation of health care services as a result of the introduction of the service. Direct costs included interpreter salaries, fringe benefits, and overhead costs. In this study they compared the use of services before and after the introduction of the interpreters' services. They found that the introduction of an interpreter service resulted in the increased delivery of healthcare to patients with limited English proficiency. Further, the patients that used the new interpreter services had significant increases in the uptake of preventive services, physician visits, and prescription drugs, suggesting that interpreter services improved patients' access to primary and preventive care for a moderate increase in cost (Jacobs et al. 2004). This finding could be important for Deaf as they have been found to have reduced access and reduced utilisation of health care services. This is particularly relevant in the special case of HIV/AIDS whereby the Deaf patients and the other disabled patients have been left out of key public health interventions that aim to combat the spread of the disease. Further, the rate of HIV/AIDS amongst the deaf remains higher than that of the average population as noted above. In addition disparities in HIV knowledge and treatment access have been noted amongst the Deaf patients particularly in Africa, compared to the hearing population (Groce et al. 2006; Hanass-Hancock 2009; Mprah 2013).

Reeves et al. (2002) conducted a costing study in addition to the qualitative exploratory assessment of the evaluation of access to health services outlined above. They estimated the

costs of providing a basic package of services for the Deaf which included combined voice & text phone, a visual patient call system, Deaf awareness training of staff, use of British sign language interpreters, using written instructions about medication and after-care, and doubling appointment duration for the Deaf. The total cost of implementing the package in an average sized primary care trust for all GP practices was estimated to be around £66,000 in the first year, and £39,000 per annum thereafter. Costs for Emergency units ranged from £4,030 to £8760 for the first year and from £2,530 to £6960 per annum thereafter depending on the size of the unit (**table 2.2**).

Table 2.2 Typical costs of a basic access package for Deaf people in an Accident and Emergency Unit in (Reeves et al. 2002)

Accident and emergency number of attendances	**40 000**	**60 000**	**80 000**	**100 000**	**120 000**
Estimated number of attendances by people with severe/profound hearing loss[1]	1000	1500	2000	2500	3000
Estimated number of attendances by Deaf people whose main form of communication is sign language[2]	62	92	123	154	185
Costs for first year (2002 British **£)**					
Combined voice and text phone	200	200	200	200	200
Visual patient call system[3]	1300	1300	1300	1300	1300
One- Day Deaf/Disability Awareness Training course for up to 20 staff (2 one day courses for larger A&Es	300	300	600	600	600
Hire of BSL interpreters[4]	2230	3310	4430	5540	6660
Total	4030	5110	6530	7640	8760
Subsequent years					
One day Deaf/Disability Awareness Training Course for up to 20 staff	300	300	600	600	600
Hire of BSL interpreters	2230	3310	4430	5540	6660
Total	2530	6310	4730	5840	6960

[1.] Based on a rate of 1 Deaf person in every 40 attendees [2] Based on a rate of 1 Deaf person in every 650 attendees [3] Single line display of twenty 10cm high characters; includes £200 installation costs [4] Assumes 60% of Deaf people require sign interpreter support (based on Reeves et al empirical data) at an average cost of 60 per attendance

In this study by Reeves at *al* (2002), the costs of British sign language interpreters were calculated as the financial costs incurred in utilising the services of an interpreter. The methodology used

excluded the administrative costs of time spent booking and coordinating the interpreters. Interpreters charged a minimum booking time of 2hours, worth between £50 and £60 for the first two hours and between £20 and £30 for each subsequent hour. The mileage was charged at a rate of £0.40 per mile in addition to the hourly rate.

The Australia government authored a report on supply and demand for Auslan interpreters in which the cost of providing interpreter services to the 6500 Deaf signing Australians was estimated to be Aus $6,3 million for the period 2002-2003, (Australian government, 2004). Of this amount 17% was spent on interpreting in both the private and the public health care sector. This cost includes payments made to interpreters as well as administrative costs. The distribution of the Signing Deaf population, interpreters and cost by region are shown below on table 2.3. The data shows that the average cost per Deaf person differed by geographic location with values ranging from Aus$5.30 to Aus$311.19 However, this should be interpreted with caution as some data was missing from the analysis.

Table 2.3 The cost of interpreting in Australia 2002-2003.

Region	No. of signing Deaf people	No. of Auslan Interpreters	Total cost of Interpreting for all services	% spent on health fraction of total cost	Average Cost per Deaf Individual in healthcare
New South Wales	2102	98	$2,242,000.00	12%	$127.99
Victoria	1536	82	$1,345,000.00	14%	$122.59
Queensland	1320	47	$1,240,000.00	23%	$216.06
Western Australia	563	19	$584,000.00	30%	$311.19
South Australia	528	15	$654,000.00	25%	$309.66
Tasmania	266	30	$176,000.00	20%	$132.33
Australian Capital Territory	119	7	$92,000.00	3%	$23.19
Northern Territory	66	4	$5,000.00	7%	$5.30
Total	**6,500**	**302**	**$6,338,000.00**	**17.66%**	**$172.24**

In a study on interpreting for Xhosa psychiatric patients in South Africa (mentioned above page 49), Drennan (1996) found the average hourly cost of using a general assistant employed by the hospital to be around R5 in 1993 and this cost went up to R10 per hour if a clinical staff was used. Although these figures appear insignificant, it is important to note that these were untrained medical interpreters who had been taken from their normal duties to helpout with interpretation. As noted above on the section on adhoc intrepreters, this study found significant organisational burden associated with the sue of an ad hoc interpreter.

The inclusion of Deaf awareness training in costing the package by Reeves et al (2002) is supported by Scheier (2009). She states that many healthcare providers are often unaware of strategies to improve communication with deaf patients in order to provide them with the same level of care as that of the general hearing population. This then points to a need for training of healthcare professionals.

2.10 Resource allocation and priority setting

Given that there are finite resources available to meet the infinite demands on the health care system, some form of priority setting is required in order to determine what will be funded and what will be left out. According to Mitton & Donaldson (2004), there are two main economic principles that govern health care priority setting i.e. opportunity cost and the principle of the margin. The opportunity cost principle takes cognisance of the fact that using resources in one program means there will not be available to fund other programs. On the other hand, the margin principle relates to what changes should be implemented given the mix of available resources. This means that if there is an increase in the budgetary allocation then a decision has to be made as to which programs should be prioritised in the allocation of the extra funds. Conversely, if the budget is reduced, programs should be evaluated in order to determine which will be closed down whereas if the budget remains constant there may be questions raised about shifting funds from the less efficient programs to the more efficient programs. In order to make such decisions the health system managers require tools to assist them in making rational choices (Baltussen & Niessen 2006).

From a literature review of the decision criteria used in resource allocation, Guindo et al. (2012) notes that the healthcare community is increasingly becoming aware of the need to address both the normative and the feasibility criteria in decision making. They note that beyond cost-effectiveness, the health care community understands that other criteria should be explicitly considered in order to come up with consistent and transparent methods of resource allocation.

Their review found that the most frequently cited criteria used were equity and fairness, type of service provided, impact of the disease on the target population, economic impact of the intervention, quality and certainty of evidence, ease of implementation of the intervention among others. These are discussed below.

2.10.1 Equity and fairness

Equity is closely linked to social justice, need and the concept of fairness, in addition it is a value based criteria which is often difficult to operationalise, however it was found to be the most frequently cited criterion used in decision making in the review by Guindo et al., (2012). The notion of the importance of fairness in resource allocation is supported by Mitton & Donaldson, (2004) who postulate that some fair means of resource allocation guided by a good evidence base is important in guiding health system managers. Some evidence base exists in South Africa from equity studies done on health care access. It has been found that the poor in South Africa have worse health outcomes than the rich (Harris et al. 2011) whereas the benefit and incidence analyses by Ataguba & McIntyre (2012) found disparities in access to health services with the richer quintiles benefiting disproportionately more than the poorest quintiles. Given that the Deaf people as part of the disabled population in South Africa are often unemployed and depend on state funded grants (Emmett 2006), they too have poor access to health care; doubly encumbered by their lack of informational access due to the language barriers they encounter. Further it has been found that the Deaf have disproportionately poorer health outcomes than the general population (Fellinger et al. 2012; Groce et al. 2006; Bisol et al. 2008; Witte & Kuzel 2000; Nilsson et al. 2013) hence the criterion of need is important in resource allocation particularly in this case of the Deaf.

The South African National AIDS Council through the National Strategic Plan on HIV, STIs and TB highlights the importance of communication as an enabler to reach targets of the strategic plan for 2012-2016 (South African National AIDS Council 2012). This strategic plan

states that suitable funding should be made available to enable communication in multiple languages, including sign language, so as to change risky behaviour, sustain healthy behaviours and afford access to treatment in the key hard to reach populations including the Deaf. This could point to a realisation by policy makers in South Africa of the need to incorporate the equity criterion in health programs so that the marginalised populations like the Deaf also benefit from public health interventions. However the evidence base in the interventions for the Deaf such as sign language services in health care is limited in many developing countries hence the need for the present economic analysis of sign language Interpreter provisions.

2.10.2 Efficacy and Effectiveness

The review by Guindo et al. (2012) found that efficacy and effectiveness was the second most frequently cited criterion in decision-making with decisions on the value of an intervention being based on comparative benefit of the new intervention over existing policies/services. Efficacy defines the outcomes of an intervention in the ideal setting such as clinical trials and pilot studies whereas effectiveness relates to how the intervention performs in the real life setting (Guindo et al. 2012). This differentiation is important particularly in scaling up of innovations as it has a bearing on overall costs of implementing the innovation at scale. Scaling up is concerned with increasing geographic coverage of a new intervention to serve a greater population than in the pilot setting which leads to an increase in demand for an intervention at the population level (Johns & Torres 2005).

In South Africa, use of spoken language interpreter services have been found to be effective in bridging the communication gap in mental health care (Drennan 1996; Schlemmer & Mash 2006; Drennan & Swartz 1999) while a case study based on the current pilot service of SASLI showed a significant improvement in the health care experience of Deaf people after the introduction of the SASLI (Haricharan et al. 2013). However, data on scaling up of these services is limited hence the need for the present study that seeks to estimate the costs of scaling up SASLI in the

context of district health services. In an analysis of costs of scaling up interventions in public health, Jones and Torres (2005) suggest a few major cost factors to consider when considering the costs of scaling up (**table 2.3**).

Table 2.3: Factors influencing the costs of scaling up (Source Jones and Torres, 2005)

Category	Factors to consider
Geography and infrastructure	i) Higher costs of transport, training and supervision particularly in outlying areas and in rural areas. ii) Some landscapes are more costly to build on or travel in especially by road.
Fixed costs	i) As more patients utilise the service unit costs per patient drop however fixed costs of rural institutions/services may remain much higher per person than in urban centres because they tend to serve fewer people. ii) Costs of mobile facilities may need to be incorporated in rural areas.
Human Resources	i) Inadequate numbers of trained professionals may be a binding constraint to scaling up while expansion to rural areas may require incentives to attract trained and skilled health workers. ii) Task shifting may be an option where there is scarcity of skilled labour and therefore cost of supervision should be factored in.
Managing the process of scaling up	i) There is likely to be increased need for extensive communication in the implementation stages of the program including time spent in stakeholder engagement meetings and canvassing political buy-in. ii) Training of new staff and need for follow up visits may increase costs in the beginning of the scaling up phase. iii) Outreach programs to increase demand for services amongst the population may also require increased resources. iv) Costs of training programmes to improve administrative, supervision and monitoring capacity of managerial staff should also be factored in.

2.10.3 Stakeholder interests and pressures

Decision makers at the macro-level are influenced by many factors particularly public pressure and political influence (Guindo et al. 2012; Baltussen & Niessen 2006). However, the number and strength of political actors involved in policy debate is important as argued by Roberts et al (2008:68) that it is difficult to mobilise support for programs for marginalised groups that are not politically connected. This is because the poorer groups in society tend to be discrete and often un-organised and lack the resources to take their issues to public platforms where they can achieve recognition (Roberts et al, 2008). This is in keeping with Kingdon's three streams model of agenda-setting. This model rests on the power of political entrepreneurs in and outside of

government who take advantage of policy windows of opportunity to move items into the government's official agenda (Buse et al. 2005, p.68). The first stream is the problem stream which is steered by indicators, feedback from existing programmes, pressure groups, and focusing events such as crises etc. The second stream is the policy stream which consists of solutions to problems. For a solution to emerge as worthy of consideration and funding by government, it must be politically palatable, technically and financially feasible within the budget constraint and compatible with the community's social values. The third steam is the political stream which according to Buse et al (2005), operates separately from the other two streams and is driven by swings in political mood, changes in political events such as election of new governments and campaigns by interest groups. It is when the three streams intersect that a window of opportunity is created that paves the way for the astute political entrepreneur to table the issue which is then taken seriously by the policy makers. The political entrepreneurs are likely to be people with credibility and expertise such as specialists in the field such as academics, researchers and consultants working in the field. In the case of Deaf services in South Africa, there exists a community of Deaf advocates in South Africa under the DeafSA umbrella body[5]. In addition there are research units in several academic institutions working on Deaf studies whose collaboration would give a stronger voice to the issues faced by Deaf persons in South Africa.[6]

2.10.4 Cost-effectiveness

In the review by Guindo et al. (2012) they found that efficacy and effectiveness was the second most frequently cited criterion in decision making. The decision on the value of an intervention is based on comparative benefit of the new intervention over existing policies/services. Cost-effectiveness analyses (CEA) have been used in many economic evaluations dealing with

[5] www.deafsa.org.za

[6] a)Center for Deaf Studies at the University of the Witwatersrand www.witc.ac/deaf studies
b)University of Cape Town School of Public Health Human rights www.hhr.uct.ac.za
c)University of KwaZulu-Natal www.heard.org.za

resource allocation mainly because CEA incorporate many criteria (cost, efficacy/effectiveness, safety) in one measure -the QALY. However, many argue that its usefulness is limited by the fact it fails to factor in the important criteria of equity as viewed by society and severity of the specific conditions under review (Guindo et al. 2012; Hauck et al. 2004). Further Guindo et al. (2012) argue that the cost-effectiveness thresholds in cost-effectiveness analyses are mistakenly used as a measure of affordability, yet it is not necessarily the case. This view is supported by Hutubessy et al. (2003) and Donaldson et al. (2002) who add that the cost-effectiveness analysis results may be misleading because oftentimes the new intervention costs more than the current standard of care, yet researchers often leave the question of the associated opportunity costs unexplored. In addition, in the use of league tables the question on the qualification of the QALY is often left unexplored i.e. is a QALY gained in hypertension the same as a QALY gained in juvenile delinquency programs? (Hauck et al. 2004).

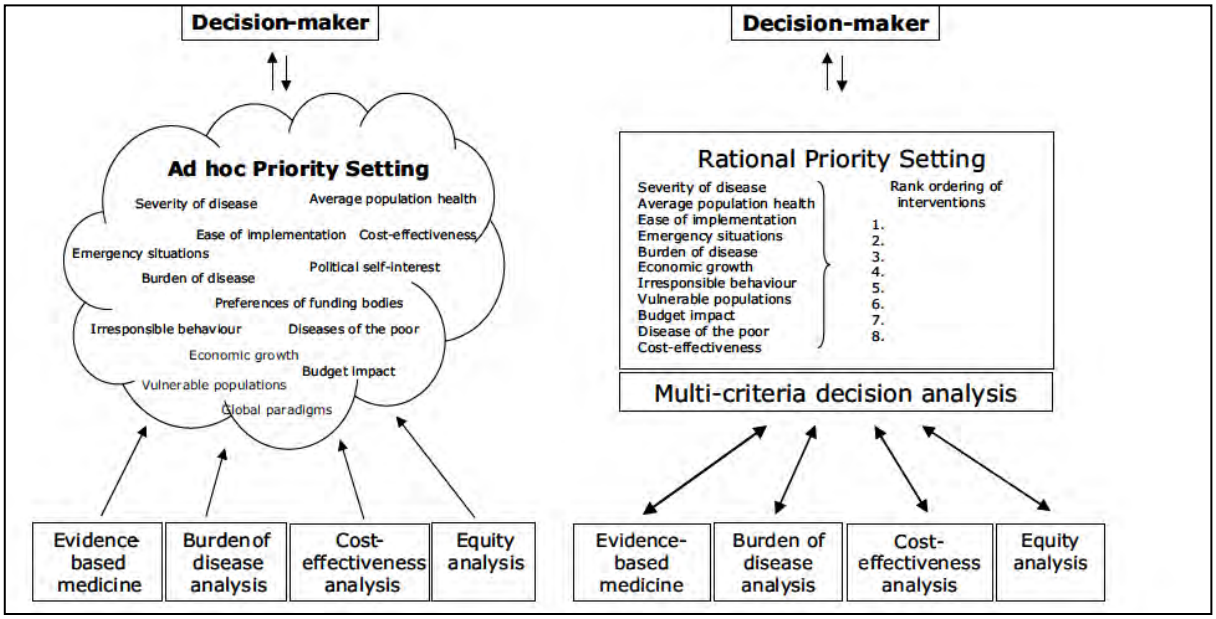
2.10.5 Strength of evidence

Guindo et al's .(2012) review states that the strength of evidence was the fifth most cited criteria used in resource allocation in health care programs. The strength of evidence relates to effectiveness, relevance in the local policy context, whether or not it is value for money, and the feasibility within the given context. This represents the power of indicators to influence the agenda setting process as described by the policy stream in Kingdon's theory of agenda setting, above. However, as Shiffman (2003) discovered through his research on priority setting of safe motherhood programs in Indonesia, the numbers simply do not speak for themselves. There should be advocates and policy elites willing and able to organise focusing events to highlight the issue led by political entrepreneurs who have sufficient power and credibility to earn a hearing amongst the powerful political leaders who drive change.

Although the literature review by Guindo et al. (2012) found that health systems' managers use some of the criteria listed above in combination or in isolation, the complexity of health system

problems means the process of priority setting usually becomes unstructured. This is due to health systems managers' inherent lack of skills in resource allocation (Mitton & Donaldson, (2004)) . They therefore need assistance in setting priorities for what will be funded especially given the fact the historical budgeting processes commonly used by these managers can lead to inefficient use of resources. This notion is further supported by Baltussen & Niessen (2006) who state that often priority setting is done in an ad hoc manner as opposed to following rational decision making processes due to this complexity of health systems (**figure 2. 1)**.

Figure 2.1: **Comparison between Ad hoc priority setting and rational priority setting** (**Source** (Baltussen & Niessen 2006)



2.11 Economic Analysis of Healthcare interventions

Cost analysis is a key component of economic evaluations as it lays the foundation for which comparison of health programs are made through cost-effectiveness and cost-benefit analyses (Walker 2001). In addition costing studies are important in health systems management for decision-making in budgeting, negotiating reimbursement contracts and rates for providers, forecasting costs for expansion of programs and assessing program efficiency amongst other things (Walker 2001)).

2.12 The methodology of costing health care programs

The perspective

In economic evaluation, the perspective is the viewpoint from which the costs or benefits are measured (Drummond et al. 2005). The different perspectives often considered in economic evaluations are the provider perspective, the patient or the societal perspectives. The broadest and usually preferred in welfare economics is the societal perspective because the data collected from a societal perspective is all encompassing and can also be easily disaggregated for analysis from the other viewpoints (**table 2.4**). The selection and definition of the service for costing depends on the perspective of the analysis (Simoens 2009; Drummond et al. 2005). Further it is argued that the gathering of all costs from the outset might be cheaper than the additional cost of collecting supplemental costs at a later stage. (Drummond & Jefferson 1996). Thus according to Drummond and Jefferson (1996) the researchers should identify the key decision makers from the outset and ensure that the objectives of their research answer the relevant questions from the perspective of the identified stakeholders.

The patient perspective includes only the patient related costs of seeking health care, whether direct or indirect, as shown in **table 2.4**. In the case of language services, direct costs for Deaf patients would include all out- of pocket payments incurred in the process of seeking language services for health care related consultations. Examples include payment of interpreters and any health insurance contributions towards such a service, transport and telecommunication costs. Indirect costs would include the equivalent value of wages and time lost in accessing language services and visiting health care institutions.

The public or government sector perspective includes all costs incurred in the provision of public goods in all sectors including the health sector. In the Deaf services this would include the cost incurred in the education sector such as training sign language interpreters and their remuneration in all sectors e.g. justice, social services, health etc. The public health provider is a

subset of the government sector whose perspective looks at the costs of provision of services only within the health services sector such as infrastructure, human resources and recurrent costs of running the health services such as salaries and maintenance of the infrastructure. The health services sector incorporates all costs incurred within the health services arena which encompasses the patients and the provider costs as shown on **table 2.4**.

Table 2.4 Perspectives in economic evaluation (Adapted from the guidelines for the Economic Evaluation of Health Technologies, (Canadian Agency for Drugs and Technologies in Health 2006)

<table>
<tr><th colspan="3">Perspective</th><th>Type of Costs</th><th>Examples</th></tr>
<tr><td rowspan="4">Societal</td><td rowspan="3">Public Sector/Government</td><td></td><td>Direct costs to all publicly funded services (other than health care)</td><td>Social services e.g. counseling by social workers
Education e.g. training of interpreters, school based interventions</td></tr>
<tr><td rowspan="3">Health services Sector</td><td>Public health Provider: Ministry of</td><td>Direct costs to publicly funded health care provider may include contributions from international donors an d similar agencies</td><td>Capital costs
Buildings
Medical Equipment
Vehicles
Recurrent costs
Medical supplies
Laboratory supplies
Medicines
Training materials
Labour costs
Overheads
Utilities (water, electricity, telephone)
Administration,
Buildings and vehicle maintenance
Other central services (e.g. catering or laundry)</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Patients</td><td>Direct costs to patients and their families</td><td>Out- of- pocket expenditure (including co- payments) for Consultation, drugs, treatment etc. Cost of trav el for treatment
Paid caregivers</td></tr>
<tr><td>Indirect costs to patients and families</td><td>Patient’s time spent for travel and receiving treatme nt
Loss of income due to illness.
Lost time at paid and unpaid work (e.g. housework) by
patient and family.
Lost productivity: time costs to patients and their fa milies caring for the patient.</td></tr>
</table>

In most countries where language services are mandatory such as Finland or the UK, patients do not pay out of pocket for language services, but rather these services are covered by the state through various initiatives such as Disability allowances (Comhairle 2006; Nilsson et al. 2013). In the case of South Africa, Deaf patients who are mostly in the lower rungs of the economy are unlikely to afford the services of a sign language interpreter out of pocket (Emmett 2006; Heap & Morgans 2006; Kritzinger et al. 2014). To make the case, the DeafSA lists accredited interpreter service rates at a minimum of R350/hour[7], which takes up a significant portion (28%) of the Disability allowance of R 1 270.00 for a Deaf patient[8]. This level of spending on access to health care before including other direct and indirect costs of seeking health care is likely to push households further into poverty. From the foregoing, it would be ideal to include costs from the patient's perspective however, as this costing exercise is meant to provide cost estimates to the government, a provider perspective was chosen as these services should be publicly funded to enable equitable access to health care for all.

Identification of resource use

Having identified the appropriate perspective in a costing study, the next step is to identify the resources used, measure them and finally value the resources (Drummond et al. 2005). Identification of resource use takes into account those resources that are relevant to the perspective under consideration. In a societal perspective all costs are considered whereas in a provider perspective only those costs pertinent to the provider are considered (**table 2.3**). Jacobs et al.(2007) identified resources used in a language services program as interpreter salaries, fringe benefits, and overhead costs of the program. Studies on sign language provision have identified the resources required as staffing, premises, Information technology and telecommunications infrastructure e.g. video phones and webcams, sign language Interpreters, marketing and

[7] Available from the DeafSA website www.deafsa.org
[8] Taken from the Department of Social Services www.sassa.gov.za

awareness, education and training of interpreters and administration, organisation and booking of services (Comhairle 2006; Reeves et al. 2002).

Measurement of resource use

Precision in resource use varies along a continuum from the most precise which is ingredients or micro-costing to macro-costing at the aggregate level using the average daily cost (Simoens 2009; Drummond 2005), as shown in **table 2.5**. Although the micro-costing method yields the most precise estimates of resources used compared to the rest, this method is costly and time consuming because of its data intensive nature. On the other hand, the macro-costing approaches which measure resources at the aggregate level e.g. diagnostic related groups give less precise estimates. Overall the choice of the costing method will depend largely on the availability of the specified data and the resources to carry out the analysis (Drummond et al. 2005). For the present study, all costs incurred by the pilot project in providing SASLI services for the year were divided by the number of interpreter assisted visits in order to come up with the unit cost per visit.

Table 2.5: Levels of precision in economic evaluation studies Adapted from Drummond et al 2005

Precision	Method	Description
Most Precise  Least precise	Micro-costing	Each component of resource use e.g. laboratory tests, days of stay by ward, drugs, physicians consultation, is estimated and a unit cost calculated for each component. This utilises patient specific data for each episode.
	Case-mix group	Gives the cost for each category of case or hospital pat ient admitted. It takes into account the length of stay for each case. Its precision depends on the level of detail in specifying the type of cases.
	Disease-specific daily cost	Uses costs associated with specific ICD-10 codes and gives the average daily cost of treatment in each disease category e.g. Diabetes nephropathy.
	Average daily cost	This gives the average daily cost for all patients seen in the institution with no regard to the type of patients or case, e.g. the cost per patient day equivalent

Valuation of resource use

Economic costs instead of accounting or financial costs are utilised in the estimation of resource use in economic evaluations. Financial costs represent the actual amount spent on the resources used in a project. On the other hand, economic costs factor in the opportunity costs of goods taking into account the fact that using the services or resources in one way effectively ties them up such that they are not available for any other use. (Walker & Kumaranayake 2002). Given that in most programmatic analyses the major non-market inputs are volunteer time and donations especially in the developing world, all resources should be valued regardless of whether or not any financial outlays were made (Drummond et al. 2005). One way of valuing this is to use market wages e.g. unskilled wage rates for volunteer time. For donated goods, the valuation should include the value of the good on the international market, cost of insurance and freight for imported goods and domestic distribution costs. However, transfer payments (import duties/subsidies) and excess profits of distributors should be excluded in the valuation because they do not represent a change in resources available to society as a whole (Hutton & Baltussen 2005).

Valuation of non-market items

Hutton and Baltussen (2005) make a distinction between traded and non-traded goods in the economic evaluation of health programs. Traded goods are those that can be bought on the international market using international market prices such as equipment, vehicles etc. On the other hand non-traded goods are those that are produced on the domestic market and include labour, buildings and domestic transport. For the non-traded goods Hutton & Baltussen (2005) suggest that they should be valued at international prices similarly to the traded goods taking into account any discrepancies that may exist in the local market. This, they argue, ensures that all costing is done using a common yardstick across studies in different regions. For example, in order to value transport costs, Hutton & Baltussen (2005) suggest that all inputs be categorised as either traded or non-traded and calculated accordingly. The vehicles purchase price would be

classified under capital costs, whereas the fuel and vehicle maintenance costs would be recurrent costs. Labour for vehicle maintenance and driving would be classified as non-traded costs, however in instances where the process of elucidating these costs is difficult, Hutton & Baltussen (2005) suggest the use of the prevailing market prices of transport costs e.g. bus fare or commuter fares. This was used in the current study.

Categorisation of costs

Costs are usually divided into capital and recurrent costs depending on the period of use. Capital items are those items that last for more than one year such as buildings and vehicles whereas recurrent costs represent the expenditure for items used within one year such as electricity and rental expenses (**table 2.6**), (Drummond et al. 2005).

Table 2.6 Categories of costs in cost analysis of Programmes (Source: (Johns et al. 2003))

Recurrent cost	
A.1 Personnel	Staff time allocated to each intervention is netted out from time spent in other activities. The cost of labour is the value of the cost to company paid to the employee including all fringe benefits and tax. This includes per diems and travel allowances. The cost of voluntary labour should be valued at the wage rate of the staff member who would be employed to perform the task under normal circumstances. Where non-skilled labour is used, the value used depends on location. In rural areas where the people would normally be in agricultural or fishing, the value of labour would take into account lost production adjusting for seasonality. In urban centres one can use the annual incomes of the urban informal sector. In cases where minimum wage rates are legislated then one can use those.
A.2 Materials & Supplies	Quantities of all materials and supplies used multiplied by their unit costs are used to calculate the cost of materials and supplies used for the program. Examples are stationery, refreshments.
A.3 Media operating costs	All media costs are incorporated using their unit costs e.g. minutes for radio adverts or number of adverts per size per publication type.
A.4 Transport operating costs	Transport is measured in terms of distance travelled per means of transport or bus fare where appropriate.
A.5 Equipment operating cost	Where rental equipment is used, the quantity and the duration of rental (in months) are multiplied by the rental amount.
A.6 Maintenance	Maintenance costs of all capital items such as equipment, vehicles and buildings are included.
A.7 Utilities	Examples are electricity and water. The allocation of the quantities used by the programme is based on an allocation factor e.g. the surface area in square metres used by the programme.
A.8 Building Rental costs	Where buildings are rented, both the total square meter surface area of the buildings and the duration of rental (in months) are used.
B. Capital Costs	
B.1 Building	The cost of space used by the programme is calculated from the share of the total building surface area allocated to that programme.
B.2 Transport	Includes all means of transport used by the programme. Costs are allocated according to the percentage share of usage by the program.
B.3 Equipment and implements	This represents all costs for storage and distribution, maintenance, cleaning and other capital equipment taking into account the frequency of usage.
B.4 Furniture	The cost of furniture is calculated using the same allocation factor used for equipment or building space

Discounting and annuitisation

There are two proposed methods for the valuation of capital items such as buildings (Hutton & Baltussen 2005; Adam et al. 2004). The first is to annuitise the value of the initial capital outlay, a method that incorporates the replacement costs of the building, its useful life and the opportunity costs of the capital tied up in the building in order to derive the equivalent annual cost. The second method utilises the rental value of a similar space in a building that could provide the same function e.g. a private clinic in the same area, and the rental value includes depreciation and the opportunity costs of the asset. Of the two methods, Hutton & Baltussen (2005) recommend the first method of annuitisation because the rental method depends on a competitive market, which is not always guaranteed. For this study, the first method of annuitisation was therefore used.

In order to allow for time preference in valuing resources, discounting is applied to the value of the asset in order to calculate its present value taking into account when the costs are incurred and their opportunity cost (Walker & Kumaranayake 2002). Capital costs are discounted because people are said to have a positive rate of time preference (Drummond et al. 2005). This is based on the fact that people choose to enjoy benefits now and pay later. The discount rate represents the real rate of return in the private sector (Drummond et al. 2005) however, the choice of the discount rate is critical as it has a bearing on the relative costs when programmes are compared. Walker & Kumaranayake (2002) suggest that the discount rate should be context specific and consistent with the rate used by the finance ministry in the particular setting or if unavailable, the World Bank's discount rate should be utilised. Drummond et al. (2005) suggest that sensitivity analyses should be carried out on the discount rate given the subjectivity of the choice of the discount rate to determine how the results obtained are influenced by the change on the discount rate.

Calculation of the equivalent annual cost

The equation used to derive E, the equivalent annual cost is as follows;

$$E = \frac{K - (S/(1+r)^n}{A(n,r)}$$

Where,

E = equivalent annual cost

K = purchase price / initial outlay

S = resale value

n = the useful life of the asset

r = discount (interest) rate

A (n, r) is the annuity factor which is given by

$$\frac{1-(1+r)^{-n}}{r}$$

For new equipment this formula can be used as is, whereas for old equipment, the replacement cost of the equipment should be used (Mangham 2009) as follows:

$$E = \frac{\text{Replacement value}}{\text{Annuity factor}}$$

Dealing with overhead costs

Overhead costs refer to those costs that are shared by more than one department e.g. administration, laundry services, cleaning etc. and there are various methods of dealing with overhead costs as outlined below,(Drummond et al. 2005).

a) Direct allocation

Each overhead cost such as laundry or cleaning is allocated directly to the final cost centres based on an allocation factor e.g. a medical ward or outpatient's department share of cleaning services would be the area in square meters of the ward (the allocation factor) divided by the total square meters multiplied by the cost of cleaning services. For this study, the method of

direct allocation of costs was used based on the allocation factor calculated from the proportion of the total space occupied by the SASLI project. Other methods of dealing with overheads are step down, step down allocation with iteration, and simultaneous allocation as outlined below. The simple direct allocation method was chosen for this study as there was only one cost centre hence the choice of allocation based on surface area seemed logical.

b) Step-down allocation

This allows for a partial adjustment for the interaction of overhead departments. Each overhead department is allocated in a stepwise manner to all the remaining overhead departments and the final cost centres.

c) Step-down allocation with iteration

This method allows for the full adjustment for the interaction of overhead departments. In this procedure the overheads departments are allocated in a stepwise manner to all the other departments and final cost centres repeatedly until all amounts are allocated.

d) Simultaneous allocation

This procedure is similar to c) in that there is full adjustment for the interaction of overhead departments although it uses a set of simultaneous equations to allocate the costs.

2.13 Conclusion

From the literature review, a lot has been written on the Deaf people's health care experiences and it is clear that the use of SLI bridges the communication gap between the Deaf patients and their healthcare providers. It has also been shown that Deaf patients are generally less likely to be satisfied with their health care experience without an interpreter which has the potential to affect negatively their utilisation of healthcare services. In a country like South Africa grappling with the quadruple burden of diseases, this is likely to hamper any preventative or even curative public health efforts aimed at addressing these challenges especially in the Deaf population

because of the communication hurdles that portend their full and effective participation in the health care consultations. However, in order to institute measures to address this problem, policy makers need to know the resource requirements.

There is currently gap in literature on studies focusing on the costing of the provision of Sign language services in health, particularly in developing countries. It is with this in mind that the present study seeks to evaluate the pilot project of the SASLI in health with a view of informing policy makers on the possible costs of scaling up such a project to the district health care services.

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Part C: Journal Article

Assessing the cost of providing, and socio-economic status of Deaf people utilising, the services of a pilot sign language interpreter service for primary health care services in the Cape Metropole District in South Africa

Abstract

Deafness affects about 15-26% of the world's population with an estimated prevalence of 3.7% in South Africa. Although sign language Interpreters (SLIs) improve the communication challenges in health care they are unaffordable for many Deaf people. On the other hand, there are no legal provisions in place to ensure the provision of SLIs in the health sector in most countries including South Africa. However, to advocate for funding of such initiatives, reliable cost estimates are essential and such data is scarce. To bridge this gap, this study estimated the costs of providing such a service at the District health services level based on estimates obtained from a pilot-project that initiated the first South African Sign Language Interpreter (SASLI) service in health-care. The ingredients method was used to calculate the unit cost per visit at the SASLI Project level from a provider perspective. The average SASLI utilisation rate was calculated from the projects records for 2008-2013. Sensitivity analyses were carried out to determine the effect of changing the discount rate and personnel costs. The unit costs per SASLI-assisted visit were used in estimating the costs of scaling up this service to the District Health Services. Average utilisation rates increased from 1.66 to 3.58 per person per year from 2008-2013 with unmet need falling from 38.8% in 2008 to 10.8% by 2013. The cost per visit was R2074.80 in 2013 whilst the estimated costs of scaling up this service ranged from R143.6million to R775million in the Cape Metropole District. These cost estimates represent 2.4%-12.8% of the budget for the Western Cape District Health Services. The results show that in the presence of SLIs, Deaf SL users utilise health care service to a similar extent as the average population, however this service would requires significant capital investment by government to enable access to healthcare for the Deaf.

Keywords: SLIs, health care, cost, Deaf patients,

Background

Communication between a health provider and the patient is a pre-requisite for any meaningful intervention to occur in the process of seeking health care. Amongst the Deaf however, communication difficulties represent the extreme in the continuum of communication challenges experienced in health care interactions (Harmer 1999). The use of English as the main language of communication in health care further exacerbates this challenge in South Africa, as most Deaf people have limited access to health literacy and low levels of English comprehension (Heap & Morgans 2006; Kritzinger 2014).

Studies have revealed disparities in health outcomes between the hearing and the Deaf population with the Deaf exhibiting poorer health (Nilsson et al. 2013) and reduced informational access in health care (Parks & Parks 2012; Folkins et al. 2005; Ahmad et al. 1998; Witte & Kuzel 2000; Meador & Zazove 2005; Cabral et al. 2012). In Africa, these disparities have been studied in the field of HIV where prevalence rates have been shown to be higher amongst the Deaf and hard of hearing than the population average (Hanass-Hancock, 2009). Hanass-Hancock,(2009) argues that this is largely due to a lack of knowledge on prevention and poor access to care due to inability to communicate with staff, marginalisation and the social construct that sees deaf people as asexual.

Experiences of Deaf patients within the health system also reveal general dissatisfaction with care (O'Hearn 2006; Rodda & Eleweke 2002; Steinberg et al. 2006; Steinberg et al. 2002; Witte & Kuzel 2000). A case in point is the study in the UK by Reeves et al. (2002) who found that Deaf people had problems ascertaining when and if they had been called out from the waiting rooms. At the pharmacy consultation, they experienced problems in understanding the purpose and correct use of the medication dispensed. This is an important finding especially in relation to communicable diseases like TB and HIV/AIDS which are characterised by poly-pharmacy and multi-stage interventions that require a thorough understanding of the patient's role in the goals of therapy. Prioritising communication needs of the Deaf determines whether or not they

benefit from health systems' initiatives designed to curb the spread of diseases .g. HIV/AIDS and TB interventions. This is supported by findings from McKee et al. (2011) who found that adequate communication structures increased preventative health care utilisation and access amongst the Deaf.

Communication methods currently being utilised in the health services include ad hoc interpreters such as family or friends and the use of written instructions. Barriers to effective communication using a family member include a lack of objectivity and impartiality, unfamiliarity with medical jargon, and a breach of the patient's privacy where the patient might not be willing to share their medical problem with the family Abraham & Fiola (2006), particularly important in HIV/AIDS. In the broader lower income categories, the use of a relative to provide interpretation may delay consultation as the patient relies on the availability of third parties to access care. Catastrophic health expenditure may also arise, as the indirect costs of seeking health care on the household increase because of the need for a "double" consultation per family. Using written communication is not effective given the low literacy levels amongst Deaf patients (Scheier 2009).

In view of the above, SLIs have been identified as an important human resource in health care in order to afford better health care access and improve the health care experiences of the Deaf. However, provision of SLIs is sporadic in most countries and is often seen as the responsibility of the Deaf patient more than of the health systems (Jokinen 2010; Nilsson et al. 2013).

Published data on the costing of sign language interpreter services in health care is relatively scarce. Cost estimates for the provision of sign language services was documented for Manchester in England by Reeves et al (2002) and for Australia by the Australian government in 2004. In addition a report published by the Irish Comhairle (2006) estimated hourly rates charged by Sign-Language Interpreters for Finland, Scotland, England and New Zealand. The fees ranged from €18. 45 to €36.83 per hour.

Reeves et al (2002) estimated costs for all GP practices in Manchester, England.to be around £66,000 in the first year, and £39,000 per annum thereafter. Costs for Emergency units ranged from £4,030 to £8760 for the first year and from £2,530 to £6960 per annum thereafter depending on the size of the unit.

In Australia, the cost of providing Sign Language Interpreter services was estimated to be Aus $6,3 million for the period 2002-2003 for the 6500 Deaf signing Australians.

In South Africa data is available for fees charged by South African Sign Language interpreters. Accredited South African Sign Language Interpreters' fees range from R250 to R350 per hour exclusive of VAT, plus an additional R2.20 per kilometre for transport (Deaf Federation of South Africa 2011).

Deaf people as part of the disabled community tend to be unemployed and are generally in the lower income categories should they be employed (Nilsson et al. 2013; Steinberg et al. 2006). In South Africa the socioeconomic situation is similar, with most of the disabled people relying on social grants as their sole source of income (Emmett 2006). This makes South African Sign Langauge Interpreter fees out of reach of many Deaf South Africans. Further it has been shown that non-statutory funding of Deaf initiatives is unsustainable and also results in inequity (Ahmad et al 1998), hence the need for a tax-funded SASLI program. Documenting the socio-economic status of Deaf people around the Cape metropole is important to understand the socio-economic circumstances under which they live. It also assists to gauge the affordability of such a service from the patient's perpective.

Deaf patients experience fear and mistrust when they are unable to communicate with clinicians which has a negative impact on health care utilisation, Steinberg et al. (2006). In Steinberg et al's study, the respondents felt that communication was best achieved in the presence of a certified medical SLI, although these interpreters were not always available when Deaf patients needed to

access health care facilities. This inability of health systems to accommodate the Deaf and hard of hearing through provision of SLIs undermines the role of health systems as forces of social cohesion and weakens the role of patients as "co-producers of health" (Gilson 2012). Consequently, Abraham & Fiola, (2006) argue that provision of SLIs should be viewed not only from a human rights perspective but also as a risk mitigation strategy given the deleterious effects of miscommunication between health care providers and patients such as adverse reactions and over dosage.

In South Africa communication in health has been identified as warranting attention with the South African National AIDS Council stating that suitable funding should be made available to enable communication in multiple languages, including sign language. This they postulate, will change risky behaviour, sustain healthy behaviours and improve access to treatment in the key hard to reach populations including the Deaf (South African National AIDS Council 2012). However, in order to realise the goals of SLI provision, policy makers require cost estimates hence the present study.

There is currently limited information on the use of professional sign-language interpreters in the South African health services context. Although data on intrepreter fees is available, published data on the cost of running SASLI services in health care is lacking. However to advocate for funding of SASLI, planners need to know the costs involved in running the service optimally and efficiently. In addition, a cost analysis of a project of this nature has health systems relevance in addressing the issue of health care access of the marginalised groups through alleviating communication barriers, particularly in the face of HIV and TB pandemics. It is against this background that the study seeks to quantify the costs and to ascertain the budgetary impact and affordability of running the South African SLI project, with the aim of advocating for the up-scaling of the service to district health services to alleviate these communication barriers.

Description of the Pilot project

The SASLI pilot project is based at the School of Public Health at the University of Cape Town. This pilot project implemented the first professional South African Sign Language Interpreter (SASLI) service in health care in Cape Town in 2008. It focuses on Deaf people who use SASL and utilise health care services in the Cape Metropole District. The Metropole subdistrict is made up of Tygerberg, Western, Northern, Klipfontein, Eastern, Khayelitsha ,Mitchells Plain and the Southern subdistricts. Marketing of this service is done via presentations at the Deaf community gatherings and distribution of flyers at local clinics.

The pilot project provides SLIs for Deaf Clients accessing health services within the health facilities in each of the sub- districts in the Cape Metro as well as training medical SLIs. Deaf clinic assistants are also provided at the Eye Clinic to assist Deaf clients at no extra charge to the clients[9]. Given the current shortage of general SLIs and the cost of hiring one (Deaf Federation of South Africa (DeafSA) 2011), programs such as these could improve Deaf people's access and the quality thereof in the health sector.

Methods

Study design and setting

This is a retrospective costing analysis done using both financial and economic costs at the project level from a provider perspective to calculate unit costs per interpreter-assisted visit for 2013. An ingredients approach was utilised taking into account all inputs that go into making a single SASLI –assisted visit possible. The unit costs calculated from the project level were then used to estimate the costs of scaling up the service to the Cape Metropole District Health Services. Capital and recurrent costs data was obtained from the Pilot Project database. Interviews were conducted with a field expert on training of interpreters in order to obtain the

[9] Heap, M. 2013. South African SLI project 2008-2010 (personal communication 27 March 2013)

true cost of training a sign language interpeter[10]. All costs are reflected in 2013 South African rands.

Capital costs considered were office space, furniture, equipment and training costs. The replacement cost of the furniture and equipment was used with a lifespan of 10 years and 5 years respectively as recommended by Drummond et al. (2005). Recurrent costs included personnel, operating costs such as rent, water and electricity, transport and office consummables. Overhead costs were calculated using the allocation factor based on the proportion of the buidling occcupied by the SASLI Project.

Socioeconomic and demographic data

A secondary data analysis was done on the socio-economic profile of 136 Deaf respondents who had previously used the project or were likely clients for the project. The data extracted included average monthly income, employment status, gender and the highest level of education reached. For all SASLI assisted visits, data on the type and location of health care facility visited was also extracted.

Data analysis

The costing data was analysed on Microsoft Excel 2010 whilst the utilisation data was analysed on Stata. The total costs at the project level were added up and divided by the total number of interpreter-assisted visits for 2013.

Estimating the costs of scaling up

In order to calculate the costs of providing the SASLI service per annum at the district level the following variables were utilised:-

a) Average utilisation rate of the SASLI service per person per year-this was calculated at the pilot project level based on utilisation data from 2008 to 2013.

[10] Trudy Theunissen UCT via email communication

b) Estimated population in need i.e. the number of SASL users- based on the DeafSA statistics

c) The cost per SASLI assisted visit- This was calculated at the pilot project level.

As part of the recommendations for the Comhairle (2006) enquiry regarding best practices in Sign Language provision, research and development costs were included in the costing of a sign language service in Ireland. In its findings, Comhairle recommended the setting up of a research and development unit within the Sign Language Agency to enable research into and development of SLI models of best practice and to advice the public sector accordingly. There was also a need to formulate a research strategy into advancements in SLI services such as remote interpreting. In the case of this pilot study research costs incurred by the pilot project in the 2013 financial year were included in the costing analysis guided by these recommendations.

Sensitivity Analysis

Sensitivity analysis was carried out on the personnel and discount rate variables. The calculations were done using permanently employed full-time interpreters as opposed to the ad hoc contracting. The discount rate was also changed to 6% to ascertain the impact on the costs per visit.

Ethics

Ethics clearance was obtained from the University Of Cape Town Faculty Of Health Sciences (HREC 618/2013).

Results

Utilisation of SASLI

There were 1000 requests from 2008-2013 from 292 individual clients. The average number of requests per Deaf person ranged from 2.6 ± 2.2 to 4.02 ± 4.44 requests per year while actual mean utilisation per person ranged from 1.66± 1.32 to 3.58± 3.61 year between 2008 and 2013. Of the total number of requests between 2008 and 2013, 159 (15.9%) did not get an interpreter

however this proportion has declined steadily over the years from 31.8% in 2008 to 10% by 2013, largely due to training of more interpreters and hiring of more ad hoc interpreters.

Geographic distribution of the SASLI users (2008-2013)

The Southern District primary health care facilities had the highest number of visits of all the districts whilst tertiary hospitals of Groote Schuur, Red Cross Children's Hospital had the majority of the requests. This includes the monthly cluster clinics run at the Groote Schuur Ophthalmology unit. A few of the regional hospitals were visited namely False Bay, Hottentots Holland Strand, GF Jooste and Karl Bremer Hospitals. The district hospital facilities visited were mainly the Maternity and Obstetric Units which included Mowbray MOU, Mitchells Plain MOU etc. (**figure 1**).

Demographic characteristics of the Deaf respondents

The total Sample size was 136. The average age of the respondents was 40.5 ± 11.3 years with an age range of 20 to 70 years. 62% (n=84) of the respondents were female. The most preferred language for sms communication with the pilot project was English (72.8%, n=99) followed by Afrikaans (16.9%, n=23) and Xhosa (10.3%, n=14).

Socio-economic characteristics of the Deaf in the Cape Metropole

a) Education

From the analysis 92% (n=125) of the respondents had not acquired matric level certification and of these 38% (n=47) had not finished primary education .Two people did not know the level of education they had reached shown on **figure 2.**

b) Income

Although 3 of the respondents declined to reveal their level of income, there was a significant proportion of people who did not have an income (16.22%, n=22) and 23% (n=31) relied on state sponsored grants. The majority (59.6%, n=82) of the respondents were employed

compared to the 40% (n=54) that were unemployed. The vast majority (74%, n=61) of the employed earn less than R4000 per month and only one person earned more than R10 000.

Figure 1 Proportion of requests by Metropole sub-district and type of facility (2008-2013)

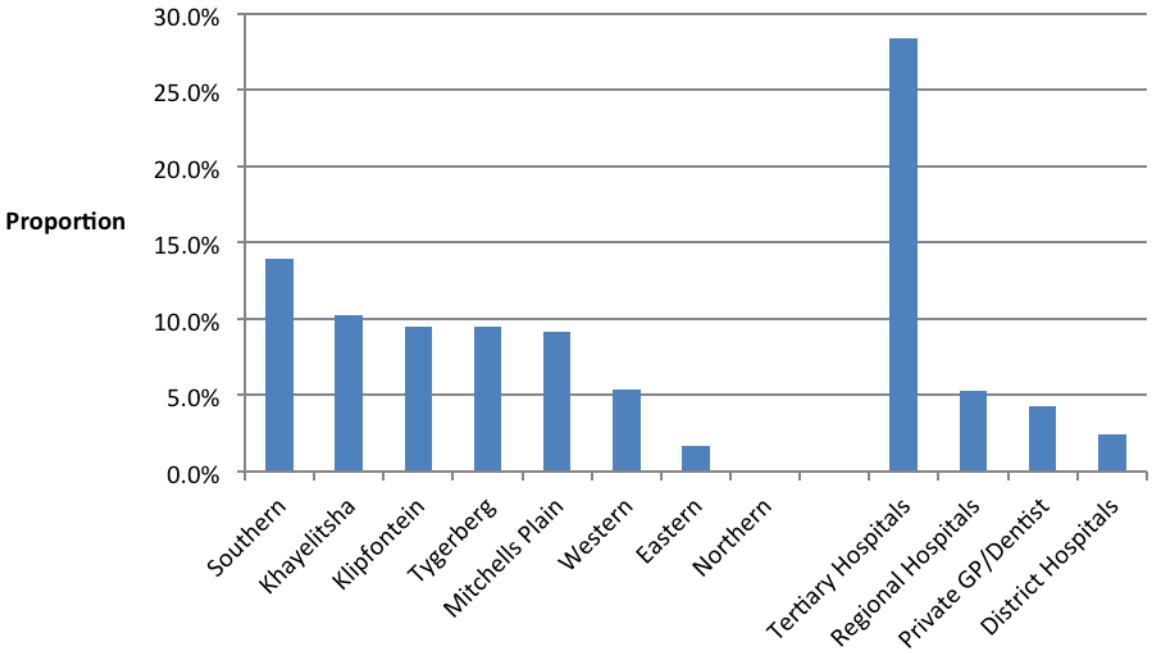
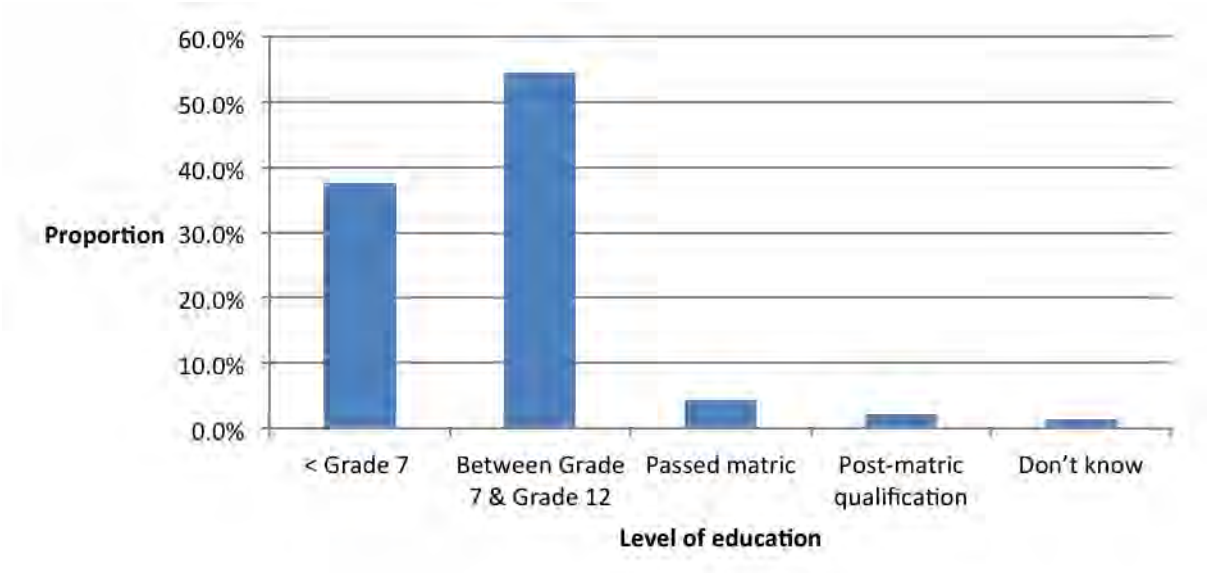


Figure 2: Categories of education level of the Deaf respondents



Costs of running the SASLI services from the pilot project perspective

The average cost per visit was R2074.80 of which personnel costs were 65%, capital costs 21% and operating costs 14%. A detailed breakdown of each component is shown on table **1.**

Average cost per visit (2013) $= \frac{\text{total project costs}}{\text{number of SASLI assisted visits}}$

$= \frac{R674\,306.12}{326}$

=R 2 074.80 per visit

Table 1: A breakdown of costs by category

Personnel	Unit cost/visit	Proportion of costs
Interpreting	R 697,91	51%
Teaching	R 77,60	6%
Research	R 116,40	9%
Admin/Organisation	R 368,63	27%
Social Responsiveness	R 97,00	7%
Total personnel costs per visit	R 1 357,54	
Operating costs		
Transport / Travel	R 123,61	57%
Water and lights	R 30,08	14%
PC consumables	R 30,08	14%
Refreshments	R 13,99	6%
Telecommunication	R 10,16	5%
Printing & Stationery	R 9,53	4%
Total operating costs per visit	R 217,45	
Capital Costs		
Training	R 284,00	65%
Building	R 100,89	23%
Equipment	R 45,45	10%
Furniture	R 8,01	2%
Total capital cost per visit	R 438,35	

Estimating the cost of scaling up to the District level

Table 2 below shows the variables used in the estimation of the population in need of SASL interpreters services in the Cape Metropole District.

Table 2: Data used in the calculation of District costs*

Variable	Quantity	Sources of data
Total South African Population (2011 census)	51 800 000	Statistics South Africa
Cape Metro District population (2011 census)	3 740 026	Statistics South Africa
High estimate of SASL users in South Africa	1 500 000	DeafSA
High estimate of SASL users in the Cape Metro District	108 302	Proportion based on DeafSA and StatisticsSA census data
Low estimates of SASL users in South Africa	600 000	DeafSA
Low estimates of SASL users in the Cape Metro District	43 321	DeafSA
Western Cape Provincial Health Budget (2013/2014)	R 15, 872 billion	www.westerncape.gov.za
District Health Services Allocation (2013/2014)	R 6, 037 billion	www.westerncape.gov.za
Average utilisation rate per person per year (lowest)	1.66	Calculated from study
Median utilisation rate per person per year	2	Calculated from study
Average utilisation rate per year per person (highest)	3.58	Calculated from study

*Census data available from www.statssa.gov.za. Budget vote available from www.westerncape.gov.za › News and Speeches › 2013

Tables 3 below shows the estimated total cost of providing SASLI services at the district health services level as a proportion of the 2013/2014 provincial and district health budget allocations respectively[11]. The estimates were calculated based on the minimum, median and maximum mean utilisation rates from 2008-2013 calculated from the pilot projects database. From the estimated calculations, the budget for SASLI in health in the Cape Metro District is expected to consume between 0.9% and 4.9% of the province's health care budget. From the district health

[11]Budget speech available from www.westerncape.gov.za>NewsandSpecches>2013

services perspective, this service would take up between 2.4% and 12.8% of the District health services budget.

Table 3: Estimated costs as a proportion of the DHS and Provincial Health budget

Annual Utilisation rate	Low estimates of pop. In need			High estimates of pop. In need		
	Amount (in RMillion)	% of DHS Budget	% of Prov. Health Budget	Amount (RMillion)	% of DHS budget	% of Prov. Health Budget
1.66	**143.624**	2.4	0.9	**359.060**	5.9	2.3
2	**173.041**	2.9	1.1	**432.603**	7.2	2.7
3.58	**309.952**	5.1	2.0	**774.881**	12.8	4.9

Sensitivity analysis

1. Using permanently employed full time interpreters instead of ad hoc interpreters

Using permanently employed fulltime senior interpreters and junior interpreters increases the cost per SASLI assisted visit by 74% at the project level from R2074.80 to R3615.06. In addition personnel costs take up at least 80% of the total cost per visit. Using the low estimate of the SASL users in the Cape Metro the estimate of costs come up to between R249.022 million and R537.047million. Using the higher estimates of the costs the estimated costs are even higher at between R622.552 million and R1.34billion per annum. This represents between 1.6-8.5% of the provincial budget and 4.1-22.2% of the district budget respectively (**table 4**).

Table 4: Sensitivity analysis: Personnel costs

Annual Utilisation rate	Low estimates of pop. In need			High estimates of pop. In need		
	Amount (in million)	% of DHS Budget	% of Prov. Health Budget	Amount (million)	% of DHS budget	% of Prov. Health Budget
1.66	**249.022**	4.1	1.6	**622.552**	10.3	3.9
2	**300.026**	5.0	1.9	**750.063**	12.4	4.7
3.58	**537.047**	8.9	3.4	**1 342.613**	22.2	8.5

2. Using the discount rate of 6%

Using a discount rate of 6% increases the cost per interpreter assisted visit at the project level marginally to R 2 131.60 from R 2074.80 per visit. At the district level the estimated costs of providing SASLI services is between R150.6 and R812 million. These costs represent between 0.9% and 5.1% of the 2013 Provincial health budget and between 2.5% and 13.5% of the District Health Services budgetary allocation for the Western Cape DHS budget respectively (**table 5**).

Table 5: Sensitivity Analysis: Discount rate of 6%

Annual Utilisation rate	Low estimates of pop. In need			High estimates of pop. In need		
	Amount (Rmillion)	% of DHS Budget	% of Prov. Health Budget	Amount (Rmillion)	% of DHS budget	% of Prov. Health Budget
1.66	**147.708**	2.4	0.9	**369.270**	6.1	2.3
2	**177.962**	2.9	1.1	**444.904**	7.4	2.8
3.58	**318.551**	5.3	2.0	**796.378**	5.0	13.2

Discussion

The results indicate that the pilot project has been able to mitigate the health care access needs of the Deaf in a significant way. Average utilisation rates of interpreters as a proxy for health care utilisation from this study are closer to the targeted national average of 3.5 and higher than the actual Western Cape Provincial Department of health utilisation rate of 2.6 visits per capita[12]. This validates the fact that health care needs and utilisation of healthcare services of the Deaf are no different from the hearing population given adequate access to SLI.

The average utilisation rate of 3.58 per person per year is also similar to that seen in Sweden (3.6) which has a comparatively well-developed SLI service as documented by Nilsson et al. (2013). Admittedly, this increased utilisation of health care services by the Deaf in the presence of an interpreter will lead to an increase in health care costs in the Cape Metropole of between 2.4 and 13% of district health services budget depending on the estimates used. However this increase should be seen in the context of equity, i.e. serving populations that were previously not benefitting from health services to the same extent as the hearing population and hence a system that could be seen as having been inequitable (Machlachlan et al 2012). To offset these costs particularly the administrative costs of running such a service, a recommendation could be the incorporation of this service within the already established administrative structures in the sub districts.

There were instances where an interpreter could not be provided due to shortages. This situation is not unique to the project and neither is it unique to South Africa. The DeafSA has argued that the current interpreter ratio is not adequate to meet the needs of the Deaf population in South Africa (Deaf Federation of South Africa (DeafSA) 2011). In general proficient SLIs are not available in sufficient numbers and in particular the SLI proficient in medical interpreting are even fewer if at all they are available (Nilsson et al. 2013), also seen in Ireland (Comhairle 2006),

[12] Data from Health Systems Trust www.healthlink.org,za/116/data

and in the UK (Reeves et al. 2002) and in the USA (Steinberg et al. 2006) etc. However to bridge this gap the pilot project started the SASLI training programme which led to the steady decline in unmet need as shown in this analysis. This is one way of solving this problem in the context of district health services.

Most of the requests for a SASLI were for primary healthcare visits. SASLI could be a critical part of the district health services as primary health care clinics are often the first point of contact and thus serve as the gate way to health care for many patients. It is also concerning that no interpreter-assisted visits were recorded in facilities in the Northern subdistrict. This could be due to limited marketing of the interpreter services in that subditrict.

The results from this study show that most of the Deaf respondents had chosen English as the chosen language for sms communication with the pilot project. This could be due to English being the "lingua franca or language of wider communication" in South Africa for historical and political reasons (Drennan & Swartz 1999). In addition, English is the language mostly seen by the Deaf particularly in written form through the internet, print and electronic media. However it should be borne in mind that although most had chosen English it does not always imply competency as illustrated in the review by (Scheier 2009) and supported by (Kritzinger et al. (2014) in the case of the South African Deaf people.

In this study, the proportion of respondents without a matric level of education was higher than that found in the study by Gie et al (2007). This is not surprising as has been reported elsewhere that the Deaf have higher levels of educational illiteracy (Harmer 1999; Scheier 2009; Rodda & Eleweke 2002). However, the low literacy levels are also a concern given that the average age of these respondents was 40.5 years, a group of people in the prime of their economic productivity. Therefore, these low levels of education are likely to impact negatively on the Deaf people's meaningful and productive participation in the economy through formal employment.

It is worth noting that there were two people amongst the respondents who did not know their level of education. As discussed by Kritzinger et al., (2014), some of this lack of knowledge could be explained by growing up and living in an overprotective environment whereby the parents of the Deaf often speak for and on behalf of their Deaf children and consequently may not share any information with the Deaf children. This is also a significant issue where the Deaf may not be aware of their medical history, as discussed by Harmer (1999) which makes the consultation with a health professional less satisfactory if all the relevant medical history cannot be extracted from a patient.

The income and employment characteristics of this Deaf population illustrate a population that is materially better off than what may be expected. As Harmer (1999) postulates, the Deaf who eventually become part of any study are usually more educated and are materially better off than the average Deaf individual. She states further that the poorer members of society are difficult to reach in surveys which might be the case in this study.

Income was collected as an indicator of socio-economic status in this study and based on these findings; the Deaf people interviewed may not be able to afford the services of an interpreter out of pocket without incurring significant catastrophic expenditure as most of them had monthly incomes of less than R4000. It should also be borne in mind that income earned by the individual person may be shared by the entire household; however there are challenges in collecting income data such as monthly fluctuations, informal work and reporting biases hence these results may suffer from such biases.

The results show that the inclusion of the SASLI within the health services in the Cape Metro district is likely to consume 1-5% of the Provincial health budget, and between 2-13% of the budget allocation for District Health services. Although this appears somewhat low it should be borne in mind that this amount only represents the cost for up scaling this service in only one of 6 districts of the Western Cape Province. However in order to reduce the upward trajectory of

costs, alternatives could include sharing of costs between the department of social services and the department of health. In addition, capital costs may be reduced by utilising the already set up infrastructure within the District health services. Currently, two sub districts are assigned to a single directorate for the management functions; this may potentially reduce the administrative costs.

Limitations

Using a fixed average cost per patient to extrapolate to the district level may have produced inaccurate estimates because at the district level the service delivery format may be different from that seen in the pilot. Costs may change as a result of providers substituting one input for another, changing the scale and scope of operations or the the eligibility criteria or through task shifting.

The sample on which the secondary data analysis was done is a non-randomised sample of Deaf respondents which limits the external validity of the findings. This is due to using a fortuitous sample of respondents who had previously used the service or were likely to use the service to whom project marketing was done in their social gatherings. This means that the people getting the information about SASLI project are likely to be similar and move in similar social circles much to the exclusion of those that are not associated with the organisations that convene these meetings. As such the sampling technique used here is likely to underrepresent the poorer, less educated individuals. However this is not unique to this study as Harmer (1999) concurs that it is difficult to obtain a random sample of a homogenous group of Deaf people due to issues related to researcher bias, communication challenges and mistrust between the Deaf community and the hearing individuals.

Data on the number of Deaf people or sign language users is hard to come by. In this study, estimates from the DeafSA were used which gave a wide range of 600 000 and 1.5million SASL

users. Using these estimates in calculating the costs may have under or overestimated the true population in need which similarly influences the estimated costs of providing such a service.

The study is housed at the University of Cape Town with full access to the amenities thereof. This could mask some of the true costs a project of this nature could have such as office space; printers etc. were it in a commercial space. Further, including research costs may have inflated the average costs of sign language intrepretr provison at the project level. However these were included based on recommendations form the Irish Comhairle (2006).

The average number of interpreter-assisted visits was taken to approximate the average utilisation rate of health services per person. However, this underestimates the true number of visits because it assumes the patient would not utilise the health services if an interpreter is unavailable from the pilot project.

Conclusion

Most interpreter assisted visits were for primary health care facilities. The results show that the use of SASLI in health care has the potential to improve access to health care services for the Deaf as shown by the steady increase in SASLI-assisted utilisation of health services between 2008 and 2013. The cost per SASLI-assisted visit in 2013 was R 2074.80 at the pilot project level of which capital costs contributed 14%, operating costs 21% and personnel costs 65%. Analysis of socio-economic data shows that this may be unaffordable for most Deaf people out of pocket hence the need for significant capital commitment from the government. Extrapolating to the district level using the estimates of the population in need from DeafSA and the utilisation rate calculated from the pilot project gave cost estimates of between R143.6million and R774.9million in 2013. This represents between 2.4% and 12.8% of the entire DHS budget for the Western Cape Province as presented in 2013 and between 0.9% and 4.9% of the provincial health budget vote for the 2013/2014 financial year.

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Part D: Policy Brief

An assessment of the ujtilisation rates and the cost of providing sign language

Interpreter services in the Cape Metropole District Health Services

Key messages

- Most healthcare visits by Deaf patients were for primary health care services
- Sign language interpreter -assisted utilisation of health care services improved from 1.66 per person per year in 2008 to 3.58 by 2013, hence provision of SASLI free of charge at the point of care can improve health care utilisation and potentially health status of many Deaf patients
- The cost per SASLI assisted visit was R2074 in 2013 and the estimated costs of scaling up to the Cape Metro District Health services range from R143 to R774 million in 2013. This represents between 1-5% of the 2013 Provincial Health budget.

Introduction

Communication between a health professional and the patient is pivotal in health care interactions for it is through which the patient and the clinician understand each other. In South Africa, most health encounters are conducted in English, which poses a further challenge in the health-seeking experience of the non-English speaking Deaf patient who also has limited access to health education as compared to the hearing patient (Heap & Morgans 2006; Harmer 1999). Sign language Interpreters are seen as a pivotal human resource whose presence in the health sector has the potential to improve the experiences of the deaf people in health care and ultimately their utilisation of health care services. However as DeafSA argues, the sign language Interpreters are not available in sufficient numbers to make this a reality (Deaf Federation of South Africa 2011), further the fees charged by Sign-Language Interpreters are far beyond the reach of many. Prioritising communication needs of these special populations determines whether or not they benefit at all from any healthcare interventions including HIV/AIDS and TB interventions through their encounter with the health systems. This validates the need to

avail this service both as an extension of the right to health and as a risk mitigation strategy in public health. Therefore, the provision of SASLI should not be left up to the patient but should be the responsibility of the health system.

Alternatives to trained sign language interpreters include the use of hospital staff as ad hoc interpreters or family members but this is fraught with difficulties. Challenges include a lack of objectivity and impartiality, unfamiliarity with medical jargon, and a breach of the patient's privacy where the patient might not be willing to share their medical problem with the family (Abraham & Fiola 2006) particularly important in HIV/AIDS. Further, the use of a relative to provide interpretation may delay consultation as the affected patient relies on a third party to access care. Catastrophic health expenditure may also result, as the indirect costs of seeking health care on the household increase because of the need for a "double" consultation per family. Further as argued by Kritzinger et al. (2014), the use of family members in the South African context may compromise the quality of the interpretation because often the family members speak a different language from the health care professional.

Using staff members creates complexities relating to increased work load, a lack of interest and aptitude (Drennan 1996). In addition, deaf consultations may not be frequent enough such that the sign language skill may deteriorate over time (Reeves et al. 2002). Therefore in order for Deaf people to have full access to health care services, they need to have full access to interpreter services. However in order to provide this service efficiently and equitably, cost estimate are required hence the present study. This research utilised data from the South African Sign Language Interpreter (SASLI) pilot project based at the University of Cape Town. The pilot project provides sign language interpreters free of charge for Deaf Clients accessing health services within the Cape Metro district as well as training medical sign language interpreters. Deaf clinic assistants are also provided in some clinics to assist Deaf clients at no extra charge to the clients.

Objectives

The main aim of the study was to estimate the costs of scaling up the SASLI pilot project to the Cape Metropole District health services through analysing the average utilisation rates and the average cost per interpreter assisted visit at the pilot project level. This study also analysed the socio-economic status of 136 Deaf people who had used or were likely to use the pilot project's service so as to better understand the economic circumstances of, and hence the affordability of such a service to Deaf people.

Methods

A costing analysis was done to elicit the average cost per interpreter-assisted visit at the project level. To estimate the costs of scaling-up to the district health services, the cost per visit was then multiplied by the population in need at the District level based on estimates of SASL users from DeafSA and the average health care services utilisation from the project data. The study also analysed the socio-economic circumstances of 136 Deaf people in the Cape Metro to better understand the affordability of those service for this group of patients. Further the study also looked at the type of facilities visited by the Deaf to understand the health care utilisation patterns of the Deaf.

Findings

- ✓ Average SASLI-assisted health care utilisation rate increased from 1.66 in 2008 to 3.58 visits per person per year by 2013, closer to the national target of 3.5 visits per person per year and higher than 2.6 visits per person per year as seen in the Western Cape[13] in 2012.
- ✓ The average cost per visit was R2074.80 in 2013, of this, personnel costs were 65%, capital costs were 21% and operating costs were 14%. In extrapolating the costs to the District based on the population in need; the costs were between R140 and R775 million in 2013. This represents 1-5% of the provincial health budget.

[13] www.healthlink.org.za/healthstats/116/data

- ✓ Most of the requests were for primary health care services.
- ✓ Of the 136 Deaf people, 92% of the respondents did not complete a matric education and of these 38% did not have primary education.

Policy Implications

- ✓ Using SASLI in health care has the potential to improve access and utilisation of health care services amongst the Deaf hence targeted efforts at the Deaf especially HIV/AIDS prevention and treatment efforts are likely to have a higher uptake in the presence of SASLI in health care.
- ✓ Funding of this service would require government to make a significant investment as the Deaf cannot afford out of pocket given their socio-economic circumstances.

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