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## The maternal healthcare landscape around Grabouw, South Africa: setting the stage for information systems development

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**Background and Purpose:** The purpose of the paper is to depict the most essential aspects of the “landscape” of authorities, organizations and service flows related with maternal healthcare from the viewpoint of the local communities in the small town of Grabouw in Western Cape, South Africa. Understanding the wider landscape is needed for understanding the “close-up” view of the maternal healthcare services and activities in place in Grabouw, which in turn is a prerequisite for co-designing ICT based tools for the caregivers.

**Methods:** The methodology for depicting information systems landscapes was applied in guiding the data collection and in analyzing the data. Data was collected from public sources (government documents, web sites, literature) and from administrators and educators with general knowledge..

**Results:** The geo-political structure around Grabouw consists of municipalities, districts, and the province of Western Cape within the republic of South Africa, all of which have elected structures with overall political authority. The structure of healthcare authority differs from the structure of political authority – the provincial Department of Health and not the local municipality is in charge of all healthcare facilities. The flow of healthcare services beyond Grabouw is defined by the referral system, which in principle is aligned with the political structure but is adjusted to particular geographic factors. Within the Grabouw community the service flow is guided by proximity of care and the preferred services.

**Conclusions:** The results show that it is vital to understand the ‘healthcare landscape’ and the context around maternal care in Grabouw. There is an overlap of geo-political and healthcare authority structures, and information systems developers need to aware in order to develop useful, effective and efficient ICT solutions. The landscape model has proven to be successful in understanding the different elements of a ‘landscape’ around a community.

**Keywords:** Landscape, Maternal healthcare, Community, Service flows, Information flows

### 1 Introduction

Understanding the community and the ‘landscape’ around it are some of the aspects that contribute to the success of Information Systems (IS) projects particularly in the healthcare sector. Often the developers of these information systems and software applications are confronted with a challenge of understanding who the users are and the landscape around them [1]. This goes beyond just naming the users but involves understanding what they do, the environment or the context they operate in and the challenges they are faced with. It is also crucial to understand the services that are available to the community and their flows, authority structures, different organizations around them and the users’ interaction with these.

Over the years maternal and child health has been a concern globally. Maternal and child mortality rates have seen a decline recently; however South Africa and other developing countries still have unacceptably high maternal, newborn and child mortality rates [2]. In order to reduce these problems and

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also to improve maternal healthcare, the South African healthcare sector is introducing, using, and adopting of information and communication technologies (ICTs) [3]. There is a significant number of other ICT for health initiatives currently deployed throughout the country [4]. Mothers and maternal health care personnel use it in their daily lives and in their work contexts [5].

In light of these, the study depicts the ‘maternal healthcare landscape’ which also sets the stage for the developers of information systems in healthcare, particularly in maternal healthcare in the case setting of Grabouw. The question the paper is attempting to answer is: What are the most essential aspects of the maternal healthcare landscape in Grabouw, a mid-sized town in South Africa not far from the Cape Town metropolis [6], which one should understand as the background for an information systems analysis and design project? Secondly, the study also attempts to further develop an existing method for analysing the ‘healthcare landscape’ around a community [1].

The results of the study can be used by the healthcare service providers, governmental and non-governmental structures, local authorities, researchers and IS developers to understand the maternal landscape in Grabouw; the maternal service care flow (from pregnancy, including labour, to first stages of motherhood). This in turn will be useful in deriving ways to better facilitate maternal healthcare work.

## 2 Materials and methods

The methodology for depicting information systems landscapes [1] was applied in guiding the data collection and in analysing the data. The methodology is based on the idea of levels of analysis from individual to societal [7] combined with the concept of human activity [8]. The methodology aims at depicting the most essential aspects of the geo-political “canvas” as well as four layers that deal with 1) the organizations, stakeholders and services, 2) structures of management, 3) financial structures, and 4) information flows around the object under study [1]. In this study, the flows of funding were not investigated.

The data was mostly collected from public sources using document analysis. Document analysis is a qualitative research method used “for reviewing or evaluating documents – both printed and electronic (computer-based and Internet-transmitted) material” [9]. Documents such as government documents, web sites and literature were used to gain understanding, draw meaning and give voice to the phenomenon. Experienced health administrators and educationists were consulted to corroborate the data.

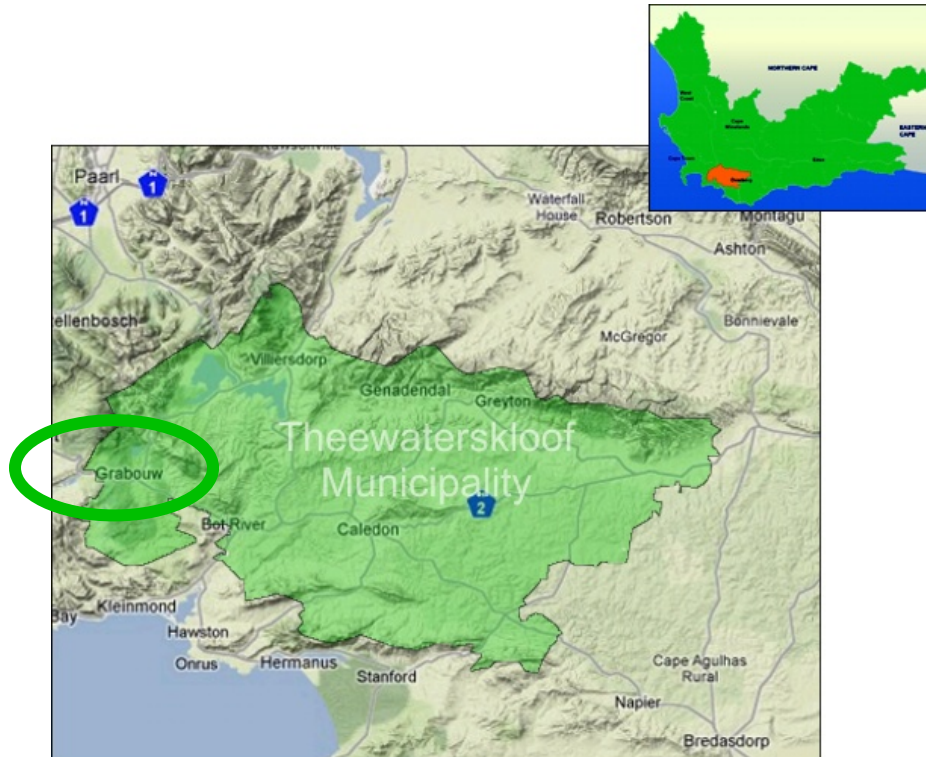
## 3 Results

### 3.1 Background of Grabouw

Grabouw is a mid-sized town located in the Western Cape Province of South Africa (see Figure 1). It is approximately 65 km south-east of Cape Town along the N2 highway, after the Somerset West town, across the Sir Lowry's Pass. It is situated in the vast Elgin Valley, which stretches between the Hottentots-Holland, Kogelberg and Groenland Mountains, with the valley floor still being substantially hilly [6]. The valley is part of the Overberg highlands that is literally “beyond the mountains” from the Cape Town lowlands. Historically, Overberg was a stronghold of the indigenous Khoikhoi herders [10]. Grabouw’s modern history starts from the establishment of a small trading store in the mid-1800s and the introduction of apple farming in the early 1900s. It is the now the commercial centre of the largest single export fruit producing area in Southern Africa [6], [11]. “The Elgin Valley produces up to 60% of the country’s national apple yield” [6].

The documentation on the population of Grabouw varies. According to the 2011 census Grabouw had 7708 households and a population 30 337 covering a total area of 6.65 km<sup>2</sup> [11]. Another source states that Grabouw has a population of about 50 000, mostly farmers and farm workers. Approximately 45 000 of these farm workers live in informal settings. Nearly 5000 are migrants coming from Eastern Cape Province and other countries. [12] The main first languages according to the 2011 census were Afrikaans (about 62%), Xhosa (29%) and Sotho (5%) – it is notable that English was the first language for only about 3% of the population. Ethnicity is still recorded in South Africa according to the apartheid-era categories of “race”. In 2011 the main “race” groups were Coloured (about 56%), Black African (39%)

and White (5%). [11] It can be implied that the main ethnic groups are Afrikaans speaking “Coloured”, Xhosa, Sotho and Afrikaners, in addition to several small ethnic groups.



**Figure 1.** Grabouw in Theewaterskloof municipality in Western Cape. Source: Western Cape Province.

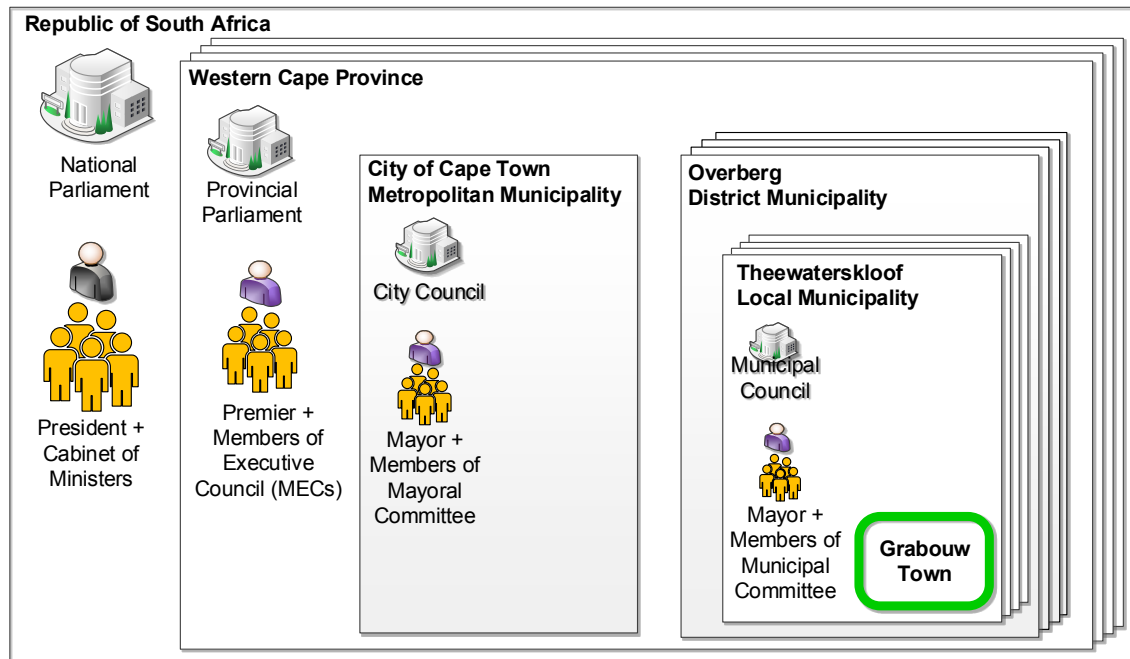
### 3.2 Geo-Political structure

The landscape methodology starts from identifying geographic areas of political authority with “scopes of power” zooming in from national (or international, if needed) to local, around the community in question, as the “canvas” for further layers of analysis [1]. Figure 1 and Figure 2 depict the geographic areas of authority around Grabouw in the form of maps.



**Figure 2.** Overberg District (red) within Western Cape (cream) within South Africa (brown). Source: Wikipedia.

Figure 2 shows South Africa's division into 9 provinces, one of which is Western Cape, and further the division of Western Cape into 6 districts, one of which is Overberg. Figure 1 shows the Theewaterskloof Municipality, within which Grabouw town is located, and the municipality's position in the province. A map of Grabouw itself is omitted for space reasons.



**Figure 3.** Levels of political authority around Grabouw.

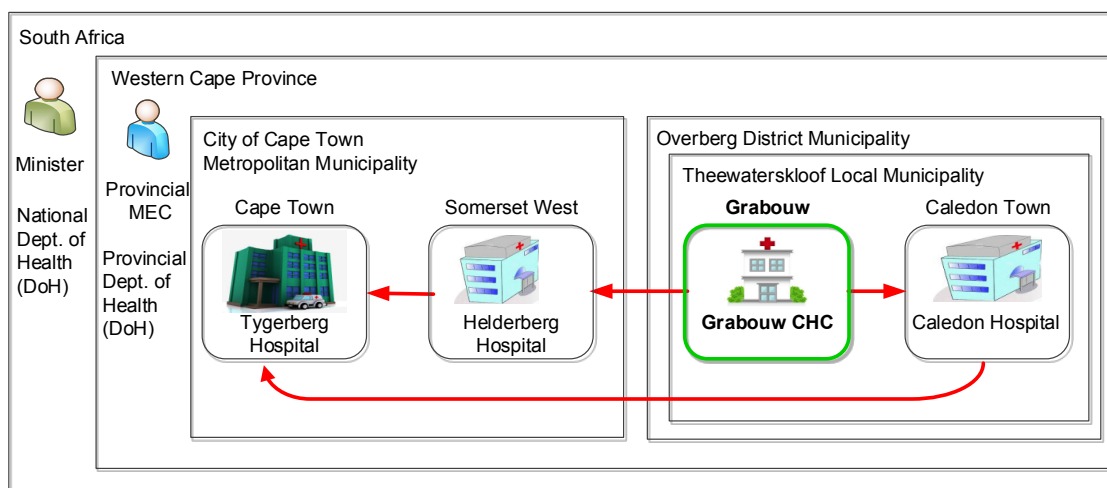
Figure 3 depicts the same information using the notation used in the landscape methodology, and additionally the general structures of authority that belong to layer 2 of the method. There are three levels of political authority in South Africa: national, provincial and municipal. At each level there are elected legislative structures (national parliament, provincial parliament, and municipal council) and executive decision making structures (National Cabinet of ministers headed by the President of the Republic, provincial Executive Committee headed by the Premier, and Municipal Committee headed by Mayor). The democratically elected structures appoint the executive structures. However, there are different types on municipalities. A district municipality (e.g., Overberg) is made up of local municipalities (e.g., Theewaterskloof); municipal elections are held only on the local level, while members of the district councils are appointed proportionally by the local councils. The biggest cities (e.g., Cape Town) are metropolitan municipalities which are at the level of districts but have a directly elected council. [13] Towns (e.g., Grabouw), townships, villages, etc. within municipalities have neither elected nor executive structures of government.

The executive government of a municipality is organized in three ways, that is the plenary, collective and the mayoral systems. In the plenary system (used in Theewaterskloof), authority and managerial powers are vested in the full council, with the mayor as the chairman. In the collective system, authority and managerial powers are vested in an executive committee elected by the council. The members of the executive committee are drawn from all parties in proportion to their representation on the council, and the mayor is chairperson of the executive committee. In the mayoral system (used in City of Cape Town), authority and managerial power are vested in a mayor elected by the council. The mayor may appoint a committee and delegate responsibilities to the members. [13]

### 3.3 Healthcare organisations and services

The next step in the landscape methodology is to describe the organizational context and stakeholders on top of the canvas of geographic-political structures. The structures and flows of authority are described in a further step. [1] However, in this study the general political authority structures were analysed already

in the canvas, and the healthcare structures and authorities are depicted together now in Figure 4. The National Department of Health (DoH) under the leadership of the Minister of Health has the overall power to regulate and direct healthcare in the country. However, the implementation of healthcare services is the responsibility of the provinces. Municipalities have in general no role in providing healthcare service in their areas, with the exception of metropolitan municipalities. Each district has an allocated number of healthcare facilities and the flows of services from one facility to another are determined by the provincial DoH. According to the Western Cape DoH, there were 44 primary health facilities in the Overberg District in 2013, 17 of which in Theewaterskloof [14].



**Figure 4.** Healthcare authorities and referral structure around Grabouw Community Health Centre.

South African Healthcare system is made up of a large public health sector and a smaller private health sector, which however consumes the bulk of the healthcare expenditure [3]. Healthcare varies from the most basic primary healthcare, offered free by the state, to highly specialised hi-tech health services available in the private sector for those who can afford it [15]. Many health initiatives undertaken by non-governmental or not-for-profit organization supplement the healthcare sector.

**Public healthcare.** The public healthcare sector caters for the health needs of most South Africans. The public sector is under-resourced and over-used. The care service provision in the public healthcare sector is hampered by many challenges which include lacking or insufficient facilities which leads to overcrowding, healthcare personnel shortages and long waiting times [16] [17]. Provision of services is generally of poor quality particularly in under-resourced areas. The first point of care is located within communities in community clinics and community health centres. If complications are encountered, patients are referred to a secondary level (district) or tertiary level (teaching or specialist) hospital.

In the Grabouw area public healthcare services are provided by the Grabouw Community Health Centre (CHC) also known to locals as the day hospital (Figure 4). Cases requiring specialist care are referred to either the district hospital in Caledon in the same municipality and district as Grabouw but further away from Cape Town, or to the Helderberg Hospital in Somerset West which is closer and bigger but belongs to the Cape Metropolitan Municipality (see the referral arrows in Figure 4). The administrative hierarchy is thus bypassed when needed. The highest level of care for the Grabouw residents is provided by the tertiary level Tygerberg Hospital in Cape Town, associated with the Stellenbosch University.

**Private healthcare.** The private healthcare sector plays a pivotal role of providing quality healthcare services to South Africans. Over half of the national health expenditure in South Africa is spent in the private healthcare sector, with a GDP of 8.2% towards the country's economy [16]. The rapidly increasing private sector, runs largely on commercial lines, only caters for the elite, predominantly white, middle- and high-income earners who tend to be members of medical schemes (18% of the population), and to foreigners looking for top-quality surgical procedures at reasonably affordable prices [18] [19]. A large number of the country's citizens who cannot afford these services rely on the public healthcare sector. About 512 facilities are dedicated to maternal and child care countrywide [19].

In Grabouw only a small percentage of the population such as the farm owners and their families can afford the private healthcare services. Due to the size, Grabouw does not have a private hospital but there are smaller private health facilities such as general practitioners, dentists and pharmacies (not included in Figure 4). Private maternal healthcare services are also available to those who can afford them.

**NGOs.** There are several non-governmental (NGO) or not for profit (NPO) organizations that provide healthcare related services in Grabouw [20] (not included in Figure 4). Most of these organizations work with government and department of health facilities to provide home-based healthcare and maternal healthcare services in the area. According to the caregivers most of the work they do around maternal healthcare is advocacy where they provide support and information for people who need it. Elgin Learning Foundation is one of the most active NGOs in the Grabouw area. The work they do ranges from training, home based healthcare, health promotion and TB directly observed treatments (DOTs).

### 3.4 Maternal healthcare services in South Africa and in Grabouw

Maternal healthcare services provided by healthcare facilities are categorized into antenatal (pre-birth), labour (birth) and postnatal (after birth).

**Antenatal (pre-birth) services.** According to the Western Cape Government, “pregnant girls and women are referred to maternity services or Midwife Obstetric Units (MOUs) in urban areas and satellite or fixed clinics in the rural areas” [18]. MOUs are units where pregnant women give birth and these units are run by midwives in the community for primary healthcare patients. Expectant mothers are advised to book their first visit to the clinic before 20 weeks or immediately hereafter. [18]

When the expectant mother comes for the first visit (referred to as the booking visit), a full assessment and counselling is given. She will be weighed, her blood pressure taken and urine tested. The pregnancy and the mother's health are closely monitored through regular follow-up visits. If there are no complications, she is advised to return for her first follow-up visit after two weeks for the results of the tests taken during the booking visit. After this, she is expected to return to the clinic every six weeks until up to 28 weeks, then at 34 weeks, thereafter as indicated by the clinic/MOU staff. [18]

The Western Cape Government further states that the expectant mothers should be screened for possible risks to their health and the health of the foetus. Both teenage girls and women over 35 years old who are pregnant are regarded as risk cases. This means that they are more likely to have complications during pregnancy and birth. Pregnant women may also be seen to be in risk if they have elevated blood pressure, a history of genetic disorders, multiple pregnancies and if they have had previous surgery such as a caesarean section. Mothers who are diagnosed as risk cases are referred up the line to outpatient antenatal clinics at the secondary or tertiary level hospitals, where further investigations and screening tests are carried out. Mothers with risk pregnancies are advised to attend outpatient antenatal clinics as often as necessary. Low-risk pregnancies are managed at the MOUs. Risk pregnancies are managed at outpatient clinics at urban and rural regional hospitals and tertiary hospitals. [18]

**Labour (birth) services.** Mothers can deliver at fixed clinics or MOUs, with the assistance of midwives in the community health centres for primary healthcare patients. If complications arise during birth then they are transferred to a hospital a level up. Mothers who are HIV positive can join the Prevention of Mother to Child Transmission (PMTCP) service. [18]

The Western Cape Government website (2013) states that expectant mothers are encouraged to bring a birthing partner (husband/friend/relative), known in the service as a “doula”, to assist with the birthing process. It has been found that mothers accompanied by a doula need less pain medication because they feel supported. [18]

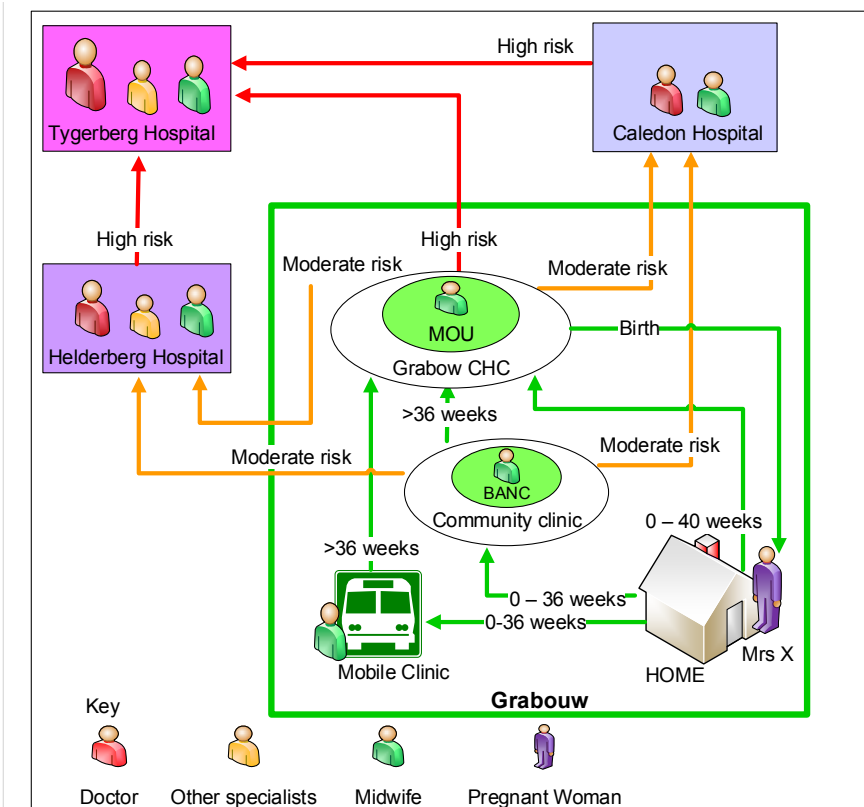
**Postnatal (after birth) services.** Postnatal services become available after the mother and her newborn have been discharged from the MOU or clinic. This usually happens six hours after the birth if both mother and baby are in good health. Following the birth, the infant's umbilical cord is checked at follow-up visits to the clinic every day for three days to make sure it does not become infected. Clinical personnel assist mothers with breastfeeding or other feeding options to ensure that the baby is getting enough milk. If the baby has a low birth weight, mothers are trained in Kangaroo Mother Care (KMC). [18]

The mother's health is regarded to be as important as that of the newborn. Mothers are examined at the clinic on follow-up visits to check that the uterus (womb) has returned to its original position. The clinic personnel also offer mothers counselling on available contraception /family planning options. Some

women struggle with the demands of being new mothers and clinic staff are trained to assess them to see if they are suffering from the “baby blues” – Post Natal Depression or Post Natal Psychosis. If there is a problem, the mother may be counselled, given medication or referred to secondary or tertiary hospitals for further assessment or treatment. [18]

**Maternal care service in Grabouw.** Maternal health care services are offered at the primary, secondary and tertiary level depending on the required level of care (Figure 5). Grabouw has accessible community clinics for maternal care where pregnant woman are reviewed during pregnancy from the first visit every six weeks until 36 weeks gestation. The community clinics have basic antenatal care services (BANC) which are 8 hour services for 5 days a week. Some of the BANC services are offered at satellite or mobile clinics set within communities for accessibility of the services. The community health centre offers the satellite services one day a week where new pregnant women are booked and follow up care is done up to 36 weeks.

Furthermore, the Grabouw Community Health centre (CHC) has a 24-hour service running for pregnant women who need emergency care and for those in labour (Figure 5). The antenatal clinic at the CHC attends to pregnant women living within the area of the CHC from when they come to the clinic for the first time until after delivery. Likewise the pregnant women from the BANC and the satellite/mobile clinics receive continuation of care after the 36 weeks gestation in the CHC where there is a MOU. The care is provided from 36 weeks through labour, birth, the postnatal periods and follow-ups until 10 days during the motherhood.



**Figure 5.** The main maternal healthcare service flows in and around Grabouw.

Caregivers in the home-based services advise the ladies that are still in the early months of the pregnancy to visit a clinic. This is done so that the expectant mothers may be examined to ensure healthy pregnancy from initial stages. Some people in the Grabouw area live close to the Grabouw CHC and therefore prefer to go the hospital as it caters for early pregnancy as well as other stages until the child is born. Expectant mothers who are considered potential risk cases can be referred from the mobile clinics to Grabouw CHC as well as to Caledon or Helderberg hospitals (Figure 5). Helderberg Hospital seems to be a preferred choice among the people of Grabouw as it is closer with a less limited numbers of beds, but sometimes

expectant mothers are referred to the Caledon Hospital. The CHC likewise refers moderate risk cases to Caledon or Helderberg Hospitals, but high risk cases directly to Tygerberg Hospital (Figure 5).

### 3.5 Flow of maternal healthcare information

The final step in the landscape methodology deals with analysing the flows of information [1]. In this study the analysis was done in a cursory way only, based on how it was presented in official guidelines [18].

First time visitors to a maternal health facility are asked to complete a form, based on which a folder known as the Maternal Case Record will be opened afterwards. The expectant mothers are required to have their Identity Document (ID) book (a passport in the case of foreigners). Patient history and also the medication they are taking are recorded. If the expectant mothers were previously registered at another facility, a clinic or hospital card is required. After the tests and assessments have been carried out the results are recorded. The expectant mothers are required to have their Maternal Case Records with them for every visit thereafter until they give birth. The health facility gives all mothers a Road to Health Chart (RTHC) when the baby is born. This card is kept at home and must be given to the sister on follow-up visits to the clinic. The card is an ongoing record of the child's health from birth to five years of age.

## 4 Discussion

The results show that it is vital to understand the 'healthcare landscape' in order to contextualize the findings. South Africa has many structures, such as the geo-political and healthcare authority structures that sometimes overlap and therefore the need to create awareness of the landscape. Various services are offered at different levels of care in the Western Cape. According to the findings, although a structure is set and referral protocols need to be followed, patient preference for services takes precedence during referral. The community clinics and the community health centers are both within the reach of the clients but the community prefers to visit centers where they receive more comprehensive services. The mobile and satellite services are offered by the community health centers in order to meet the need for accessibility of maternal health services by skilled birth attendants. However the services are limited to low risk patients and can only be offered until up to 36 weeks gestation.

However the clients come for services even after 36 weeks gestation, during labour and delivery. The fact that they cannot be turned away for these services means that the services are offered even with minimum preparedness by the skilled birth attendants. These services being one day a week are accessed by as many clients as possible. The community health centre which offers 24 hour services makes it possible for women in labour and in emergency situations to access the services whenever necessary. The categories of patients managed in the community health centre are the low risk patients with moderate risk patients being referred to the secondary level of care in hospitals. All high risk patients are managed in the tertiary hospital where the specialists and specialized equipment is available.

This study was conducted to set the stage for information systems analysis and design for maternal care, focusing on the community level. The results show that it is feasible to conduct a study on the "landscape" using publicly available information, mainly government documents, at least in South Africa. Wikipedia was often the best starting point for searching for the original sources of information. However, guidance by experienced health administrators and educationists significantly speeded up the enquiry.

The purpose of a landscape study is to provide a broader picture *around* the community and healthcare service in question. Participatory, collaborative methods are then needed to proceed *into* the concrete situation in the community and healthcare service in question.

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