Mobile Health

South Africa Mobile Health Market Opportunity Analysis

Author: Craig Friderichs, Director of Health, GSMA

Contents

Descriptors

Term Used	Descriptor
Clinical Practitioner	Included in the definition are general practitioners, specialist doctors and allied healthcare practitioners (physiotherapist, occupational therapist, etc.).
Healthcare Consumer	Consumers include the total population that access healthcare services in South Africa. Subdivided into two population groups: the medically insured (private); and the medically uninsured (public).
Healthcare Payer	Includes all payers of healthcare services in South Africa: the South African Government; the medical insurance industry; and out-of-pocket payments made by consumers (both insured as a co-payment and uninsured as a fee-for-service type transaction).
Healthcare Producer	Producers are considered to be the medical device and pharmaceutical sectors.
Healthcare Provider	Providers of Total healthcare services in South Africa include private providers, public providers and the NGO sector. The NGO sector was not analysed in this report due to the relatively insignificant contribution to overall services.
Mobile Health	Mobile Health broadly encompasses the use of mobile telecommunication and multimedia technologies as they are integrated within increasingly mobile and wireless healthcare delivery systems (Istepanian & Lacal, 2003). It can be defined as "mobile computing, medical sensor, and communications technologies for health care" (Istepanian, 2004). [1]
Cradle to Grave	Preventive, Promotive, Diagnostic, Therapeutic and Assisted or Remote Living services.
Private Sector	Consumers/Patients are responsible for the payment of private healthcare services.
Public Sector	Government is responsible for the payment of public healthcare services.
Regulated Device	A medical device, regulated by international safety, quality and risk management standards based on the intended use of the device and the risk to the patient. A device with higher risk to a patient is more heavily regulated.

Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ARPU	Average Revenue Per User
ARV	Antiretroviral
DST	Decision Support Toolkit
DOH	Department of Health
GSMA	The GSM Association
HIV	Human Immunodeficiency Virus
HPCSA	Health Professions Council of South Africa
ISP	Internet Service Provider
LIMS	Low Income Medical Insurance
MDCoC	Medical Device Centre of Competence
Md2m	Medical Devices to Market
MET	Market Entry Toolkit
mHealth	Mobile Health
MNO	Mobile Network Operator
MRC	Medical Research Council
MVNO	Mobile Virtual Network Operator
NHI	National Health Insurance
PHC	Primary Healthcare
PPP	Public-Private Partnerships
SA	South Africa
SATMA	South African Telemedicine Association
THE	Total Health Expenditure
TIA	Technology Innovation Agency
WHO	World Health Organization

[1] Towards the Development of an mHealth Strategy: A Literature Review. World Health Organization, 2008.

Scope of the Document

Healthcare stakeholders are increasingly turning their attention to the opportunities that can be enabled through the application of mobile technologies in health. Despite a significant body of research documenting the *potential* benefits of mobile within healthcare, there remain a number of obstacles to *realising* this potential and achieving sustainability.

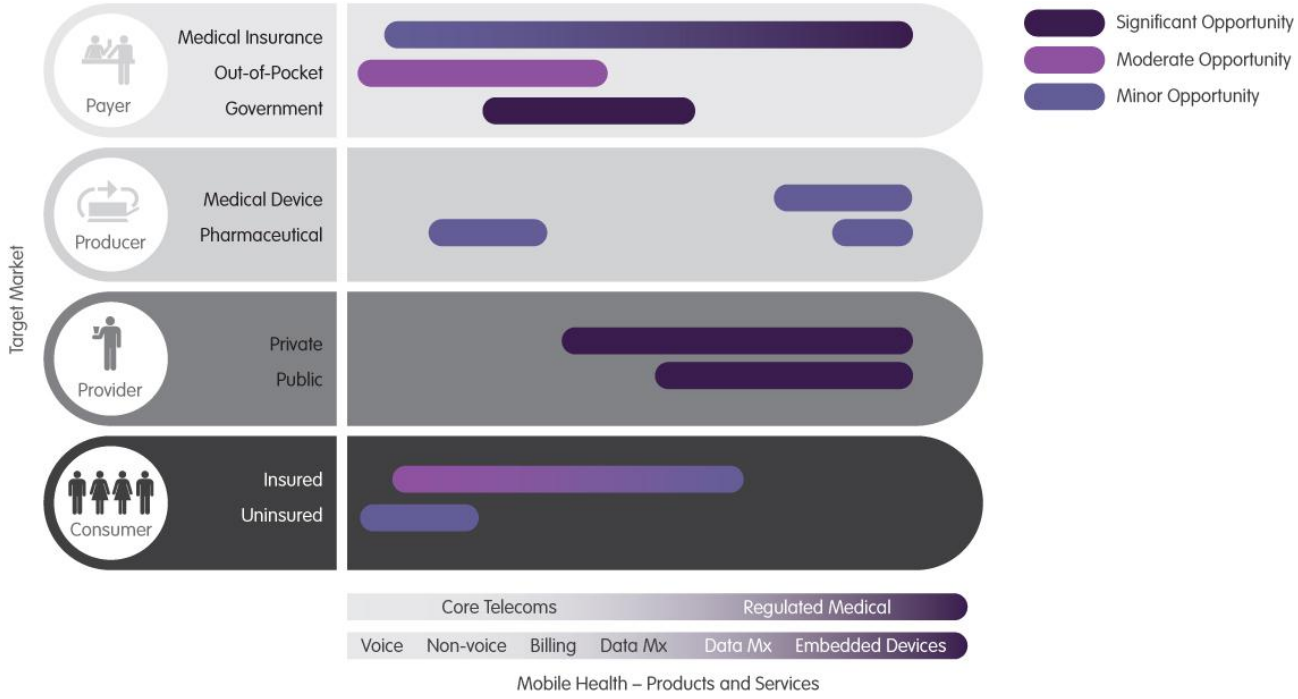
The GSMA is working to address this through catalysing the development of sustainable Mobile Health businesses that reduce costs while extending the reach and quality of healthcare.

The research strategy of this GSMA initiative has been designed to produce a Decision Support Toolkit and a Market Entry Toolkit. The Decision Support Toolkit will provide a country-specific health overview which will identify gaps within that country's health system and assess the possible opportunities that the mobile industry can and should consider. Additionally, the GSMA is in the process of developing a Market Entry Toolkit which will build on the findings from the Decision Support Toolkit and provide a framework for investigating the considerations needed to enter the Mobile Health market. This collection of GSMA thought leadership will include white papers, case studies and best practice guidelines. Together, these tools will enable the mobile industry to analyse Mobile Health business opportunities and identify what is required to build sustainable health businesses.

This Decision Support Toolkit attempts to objectively assess Mobile Health market opportunities in South Africa. A plethora of economic, health and mobile data sets, reports and documents have been analysed, and enhanced with market intelligence gained from industry interviews. The relative size and categorisation of these opportunity areas are based on the extensive desktop and "in-country research" that the GSMA mobile health team has conducted. Figure 1 depicts the opportunity areas that are discussed in detail throughout the report.

The GSMA has chosen to segment the South African healthcare sector into Payer, Producer, Provider and Consumer. These four segments represent the eventual target market for Mobile Health products and services. The products and services that can potentially be offered by Mobile Health stakeholders are presented on the horizontal axis along a continuum of traditional, core telecommunications offerings through to regulated medical devices.

Figure 1: Mobile Health Opportunity Map - South Africa



Executive Summary

The Challenges Facing Healthcare in South Africa

Healthcare in South Africa is at a critical juncture, facing profound inequalities between public and private healthcare, escalation of costs and critical shortages of healthcare professionals. These and other challenges require immediate, innovative and scalable solutions. There must be a renewed and major investment in health if current gaps in provision are to be filled, something the Government is already planning with its introduction of a new National Health Insurance scheme. However, the efforts of the Government and healthcare providers need to extend beyond the immediate problems and look to the future, embracing innovative new system designs which reduce the cost, extend the reach and ultimately improve the health of the South African population.

The Potential of Mobile Health to Deliver Positive Change

The GSMA believes that any drive to tackle these challenges will result in significant opportunities for Mobile Health stakeholders. The only way to reverse rising health costs while simultaneously improving outcomes for patients is by embracing new working methods and technologies. The Government will soon publish its long-awaited eHealth Strategy Document which will be a catalyst to drive the awareness and adoption of information communication and technology in the healthcare community, and provide guidelines for how Mobile Health stakeholders can engage and simultaneously support practitioners, and assist the Government to reduce the healthcare burden.

The potential for Mobile Health to make a real difference is made possible by the fact that South Africa now has a mobile penetration rate of 98%. This near saturation point, coupled with existing infrastructure, brand recognition, billing and data aggregation capabilities enables mobile stakeholders to begin looking at ways of increasing the limited reach of public and private healthcare services. While mobile internet connectivity remains low, it is increasing exponentially, with smart phone imports already rocketing ahead of normal phones. Can the ubiquity of mobile technology be leveraged to help address the inaccessibility and inequality of healthcare in South Africa? The GSMA believes it can and must. The following report explains how.

Despite a handful of solutions already developed and implemented in South Africa, stakeholders have been unable to take a single Mobile Health solution to a sustainable, national scale. In this report, the GSMA assesses some of the stumbling blocks that have delayed the adoption of Mobile Health. The report also provides business-critical guidance for achieving sustainable models for future growth.

The report segments the South African healthcare sector into Payer, Producer, Provider and Consumer and examines the opportunities which exist for Mobile Health in each of these markets, from “Minor” to “Significant”. In developing the report, the GSMA assessed a vast range of economic, health and mobile data sets. We also analysed a significant number of reports, white papers and national documents, and enhanced market intelligence through a series of interviews with key industry players. The following points illustrate some of the opportunities for Mobile Health stakeholders.

Key Opportunities for the Future

1. **Private health expenditure equates to 21 times the total combined revenue of all South African mobile operators.** As well as revealing the huge costs of healthcare provision, this suggests that there is a real opportunity for Mobile Health to access a percentage of this healthcare revenue while simultaneously ensuring that Total Health Expenditure is reduced and outcomes are improved.

2. Under the new National Health Insurance scheme a clear strategy for health system and health information strengthening has been laid out. Monitoring the extent of health coverage; tracking the health status of the population; and producing disease profile data for use in computing capitation models are just three of the many areas where mobile can be used to help leverage this strategy.

3. **14% of the South African population have access to 57% of South Africa’s Total Health Expenditure.** There is evidence to show that Mobile Health products, when created in partnership with the Government or private health care industry, can be used to deliver primary healthcare services and/or low income medical insurance and help to reduce the inequality across public and private healthcare services.

4. Under the planned National Health Insurance scheme it is envisaged that 80% of all services will be delivered through primary healthcare. Current estimates show that **there is a shortfall of at least 80,000 healthcare professionals** within the sector. Mobile Health adds another tier of healthcare delivery to the traditional specialist/doctor/nurse/community worker model through introducing remote monitoring and prevention and promotion strategies.

5. **Annual medical insurance costs are escalating four times faster than inflation**, deterring many from signing up. And with the more than 50% of private health costs being used to cover private hospitals and clinical services, the GSMA believes mobile can be used to extend the traditional healthcare services outside of the hospital and increase a stagnant membership base.

6. 43% of Total Health Expenditure is Government-funded, with an **average $23 cost per patient** when seen at a primary healthcare facility. With health economic analysis beginning to emerge which shows how mobile can reduce this burden, Government, in light of the National Health Insurance scheme needs to consider alternative partnership with the mobile community and provisioning of services.

7. With 26% of Total Health Expenditure being paid Out-of-Pocket by consumers the impact of illness can be financially catastrophic for South African families. Mobile Health must examine how to offer health as a value added service, reducing the burden on the end consumer and ultimately improving access and delivery.

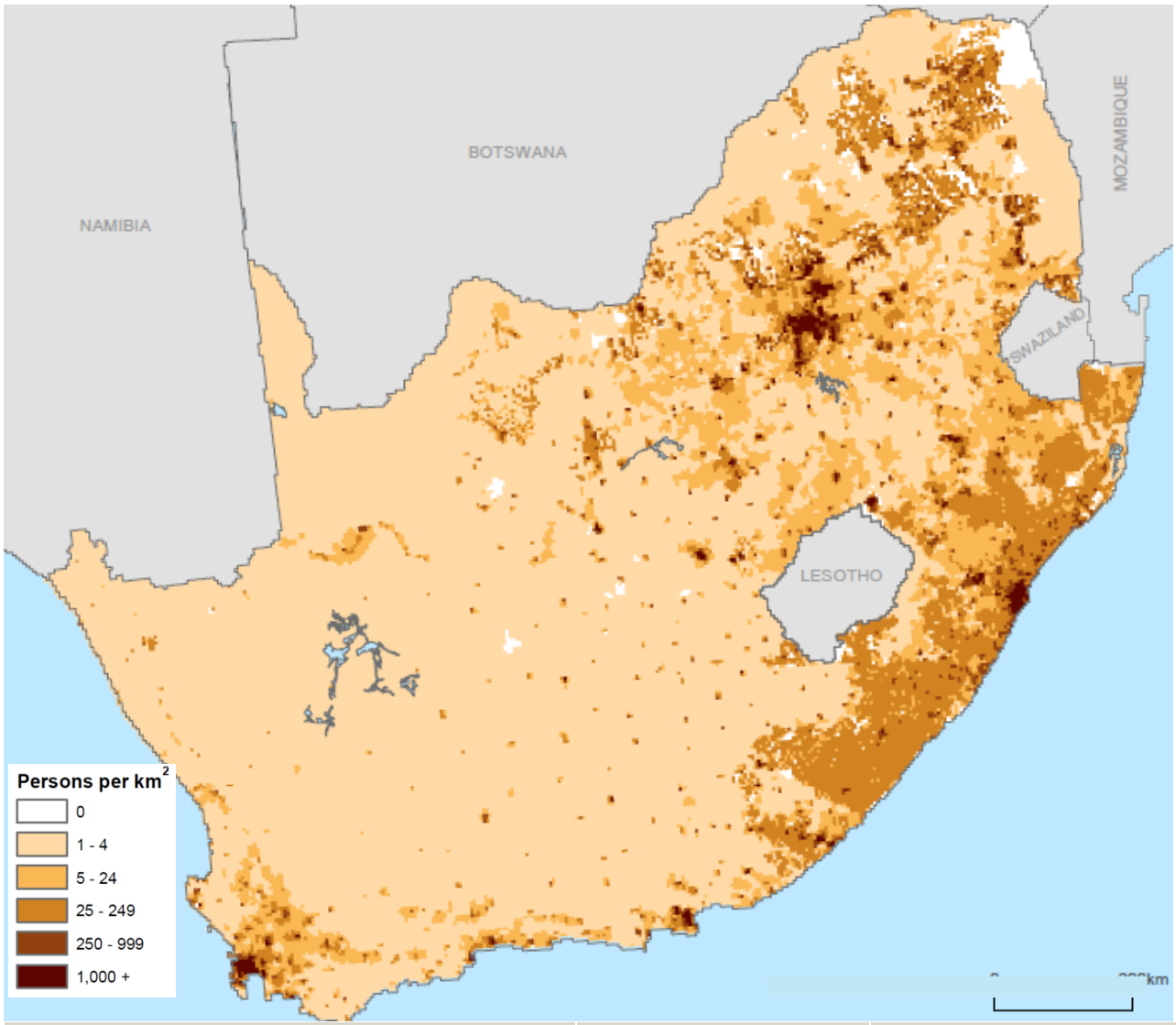
8. Even areas of healthcare which offer less obvious opportunities, such as in pharmaceuticals, could still benefit from a creative use of mobile technology. HIV treatment is likely to remain a top priority for the South African Government, but low adherence to medication regimes undermines the overall strategy. Mobile Health solutions can be used to increase adherence and reduce the burden of counterfeit drugs and stock shortages.

9. Overall, there is a real opportunity to place mobile at the heart of healthcare, delivering cradle to grave offerings which focus on preventive, promotive, diagnostic and therapeutic solutions. Chronic disease and disability monitoring are two of the greatest opportunity areas, able to transform thousands of lives.

All of these opportunities and issues are discussed in greater detail within this report. Additional guidance will be available in the GSMA's Market Entry Toolkit, which will provide support and guidance for mobile stakeholders looking to create sustainable business models to meet pressing healthcare needs. The GSMA believes Mobile Health can make a significant contribution to reducing the cost of healthcare in South Africa, extending its reach and ultimately improving patient outcomes.

Overview of South Africa

Figure 2: South Africa Map and Indicators



Indicator	South Africa[2]	World[3]
Surface Area (Sq. km)	1,221,037	
Total Population	51,745,971	6,909,000,000
Population Living in Rural Areas	57.5%	48.3%
GDP per capita PPP (US$)	11,960	7,880
Life Expectancy at Birth	53.40	68.9
Unemployment	25.30%	8.7%
Human Development Index (1 - 177)	121	
Mobile Penetration Rate	97%	61.1%
Total Expenditure on Health (US$)	$ 16.7 billion	$ 4.1 trillion
Total Mobile Revenue (US$)	$ 440 million	

[2] http://www.statssa.gov.za/keyindicators/CPI/CPIHistory_rebased.pdf
[3] http://data.worldbank.org/topic/health

Introduction to the South African Healthcare Sector

South Africa has a two tiered healthcare system, with a large private sector serving the higher income minority, while the public sector serves the other 86% of the population.[4] The private health sector in South Africa is similar to most developed economies in regards to disease profile, resource capacity and spending. The public sector is experiencing a more critical health situation, reflecting challenges present in least developed and developing economies. These include inadequate access to sufficient funding, resource and infrastructure scarcity, and epidemics of communicable diseases.

Within this context, there is strong justification for a renewed commitment and major investment in healthcare, with the planned implementation of a National Health Insurance (NHI) scheme likely to prove crucial. However, current and future efforts must go beyond addressing the aforementioned challenges and move towards incorporating innovative health system designs and experimental work at scale.

Despite almost 17 years of structural reform and genuine commitment to improving national health outcomes, a series of obstacles continue to limit the realisation of equitable and accessible health for the South African population: As the South African Health Review has observed, "Many of the consequences of the HIV/AIDS epidemic, health worker shortages and inequities in resource distribution can be linked to shortcomings of political, public sector and medical / health leadership and a complex and protracted health transition."[5]

Figure 3: A Summary of South African Healthcare

[4] South African Health Review, 2008. http://www.hst.org.za/generic/29
[5] South African Health Review, 2008. http://www.hst.org.za/generic/29

Opportunities within the Payer System

In this report, payers of healthcare are considered to be the medical insurance industry, Government and the private consumer (usually paying "out-of-pocket"). The non-Governmental and foreign aid sectors were considered but not included because of their relatively small contribution as payers of total healthcare services (less than 1%). [6]

Medical Insurance

Medical insurance is considered a significant opportunity by the GSMA because:

1. The medical insurance industry is well established and controls the flow of a sizeable portion of Total Health Expenditure (THE).
2. A significant percentage of the South African population is not covered by any medical insurance.
3. The emerging middle class are reluctant or unwilling to pay high monthly premiums.
4. There is an opportunity for partnership with the National Government to effectively deliver the NHI.
5. Mobile Health products and services can be used to help reduce hospital costs and clinical services through remote monitoring and diagnostics, to give just one example.

Table 1: Medical Insurance in South Africa[7]

57%	Percentage of THE that is funded privately
21	Private health expenditure equates to 21 times the total combined revenue of all South African MNO's
16%	Percentage of population serviced by private sector
$172	Average gross monthly contribution by principal member (person responsible for medical insurance payment)
67%	Percentage of current members who would support NHI if monthly contributions were less than current expenses

There are currently more than 300 registered medical insurance schemes in South Africa. Only 37 can boast a beneficiary membership of more than 30,000.

The market share of medically insured beneficiaries as a percentage of the total South African population has declined considerably from 17% of the population in 1992, to less than 15% in 2005. There has been a marginal increase in uptake between 2005 and 2010 - largely as a result of the newly instituted Government Employee Medical Scheme - but total percentages of the population who are insured remain at or below 16%. Unsustainable increases in risk contribution (monthly contribution by members) for all schemes (13.7% y/y) have resulted in a market failure to capitalise on the growth of the population and the emerging middle class who are either unable or unwilling to invest in private health insurance. This is unsurprising, given the average annual contribution of $172 per principal member, which remains very high compared to average income.

The medical insurance industry must consider the possible impacts of the impending National Health Insurance Scheme. In a recent survey on health insurance schemes, 67% of respondents said that, "They would support a publicly supported Health Insurance Scheme if monthly contributions were less than for current medical schemes." This suggests that the number of beneficiaries in the private insurance market is likely to decrease even further over time.

The two main drivers of medical insurance costs are payments made to private hospitals and clinical services. Private hospital expenditure increased in real terms by 109.3% to US$3.5 billion between 2000 and 2009. Private hospital expenditure now accounts for 36.7% of all benefits paid by medical insurers in 2009. South African hospital admission rates remain high (7.8% y/y increase) compared to global trends which generally indicate reduced admission rates.

[6] WHO, National Health Accounts. http://www.who.int/nha/en/index.html
[7] Council for Medical Schemes, Annual Report 2009-2010. http://www.medicalschemes.com/Publications.aspx

Clinical services (medical practitioners and specialists) account for a further 22% of total benefits paid. Utilisation rates of beneficiaries visiting general practitioners increased to 3.2 visits per year per beneficiary in 2009, up from 2.6 in 2001. This could be the result of patients having greater access to medical practitioners, or could reflect oversubscription of services. Nursing services - which provide the first point of contact for the majority of patients in the public sector, and help to reduce the number of patients being referred unnecessarily to hospitals - are not being used effectively in the South African private health sector. Improving poor utilisation rates for nursing services would reduce the burden and cost of hospital fees and clinical services.

Escalating costs, erosion of benefits and high admission rates indicate that an opportunity exists to introduce more effective primary healthcare services in the private sector. These factors combine to present a real opportunity for the Mobile Health industry to assist through the introduction of low income medical schemes (LIMS) and other products, supplied in partnership with existing medical insurers.

Out-of-Pocket

Out-of-pocket is considered a moderate opportunity by the GSMA because:

1. The informal sector could potentially be accessed through pay-as-you-go type Mobile Health services.
2. Spend on medicines represents a sizeable portion of out-of-pocket expenses but is unlikely to be accessed or affected through Mobile Health offerings.
3. As mentioned previously, opportunities exist for LIMS – the ARPU giving an indication of spending ability and pointing towards pricing of Mobile Health offerings.

Table 2: Out-of-pocket spend in South Africa

26%	Percentage of THE
$4.3 b	Total out-of-pocket spend in South Africa
34.2%	Percentage of total spend on medicines
19.8%	Percentage of total spend on clinical services (doctors and specialists)
10.1%	Y/y growth of emerging middle class with significant spending power

Escalating out-of-pocket spend on healthcare is a global trend. The recorded $4.3 billion spent in South Africa does not capture healthcare spend in the informal sector which means that this already significant figure is likely to be far higher in reality. Approximately 6.19 million people are thought to be employed through this informal sector, and even further North in Africa. [8]

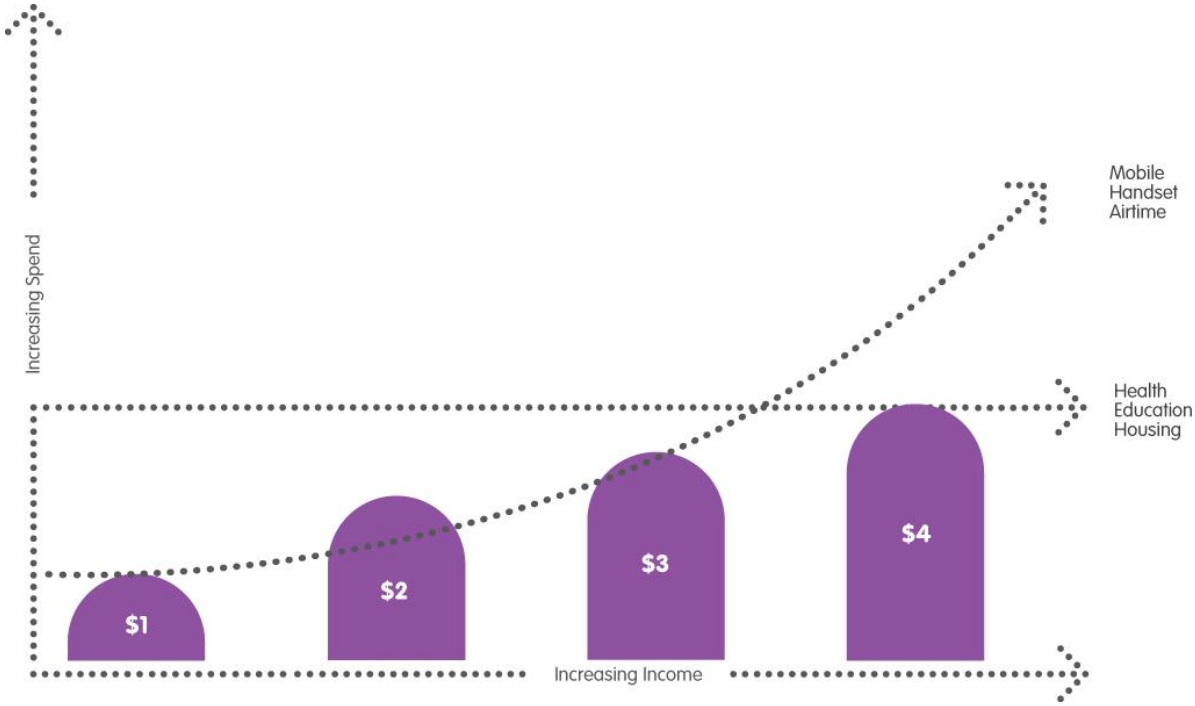
Medicines and clinical services present a combined 54% of out-of-pocket spend. It is not yet envisaged that Mobile Health will be able to assist in reducing the cost of medicines for consumers, but clinical services, and specifically primary healthcare services aimed at low to middle income groups, present notable opportunities.

The GSMA believes that a percentage of the $4.3 billion out-of-pocket spend could be accessible by Mobile Health stakeholders, while reducing this already significant burden on individuals and households. Trends in South Africa show that the largest volume of out-of-pocket consumers (and hence the largest target market for Mobile Health products and services) exist in the low to middle income population groups and the emerging middle class. Low income earners display an interesting phenomenon: a far greater willingness to pay for airtime and mobile handsets in relation to their spend on health, education and housing (see Figure 4).

With the right incentives, the GSMA believes that these income groups - which represent a large proportion of the South African population - could be encouraged to purchase and/or invest into a variety of Mobile Health products and services built around traditional telecommunication offerings. When considering these solutions, the intended end consumer and the price they would be willing to spend, it is helpful to remember the Wireless Intelligence reports which found that the average South African mobile consumer spends $22.32 per month on mobile (excluding handsets which are often bought separately). [9*]

[8] Adcorp Employment Quarterly. June 2010 – Unemployment. http://www.adcorp.co.za/Industry/Pages/June2010-Unemployment.aspx
[9] Wireless Intelligence © 2004 – 2011 GSM Media LLC. https://www.wirelessintelligence.com/
[*] ARPU figures represent total recurring/contract/prepaid revenue divided by the weighted average number of recurring/contract/prepaid customers during the same period.

Figure 4: Escalation of Spend with Increasing Income [10]



This section should be read in conjunction with **Opportunities within the Consumer System.** Understanding the needs of the consumer and patterns for out-of-pocket spend will help the mobile industry to develop appropriate preventative, promotive, diagnostic, therapeutic and assistive solutions.

Government

Government is considered a significant opportunity by the GSMA because:

1. Stagnation in per capita health expenditure in real terms, and the introduction of the NHI, opens significant doors for public-private partnership.
2. With 98% penetration of mobile phones in South Africa, mobile is ideally positioned to assist with the primary healthcare strategy put forward in the ANC NHI draft.
3. The framework for engagement around the delivery of information services related to health system strengthening can all be effected by mobile offerings.
4. South Africa remains the gateway to other developing economies in Africa and the replication of Mobile Health offerings within those new markets.

Table 3: Government Healthcare in South Africa

Government Healthcare in South Africa	
43%	Percentage of THE that is funded publicly
15	The number of years projected by Government to implement NHI
$276	Per capita health expenditure
2.5	PHC utilisation rate (individual visit to PHC facility/yr)
$23	Estimated cost per PHC visit
80,000	Estimated number of additional healthcare professionals needed to achieve “Health for All”

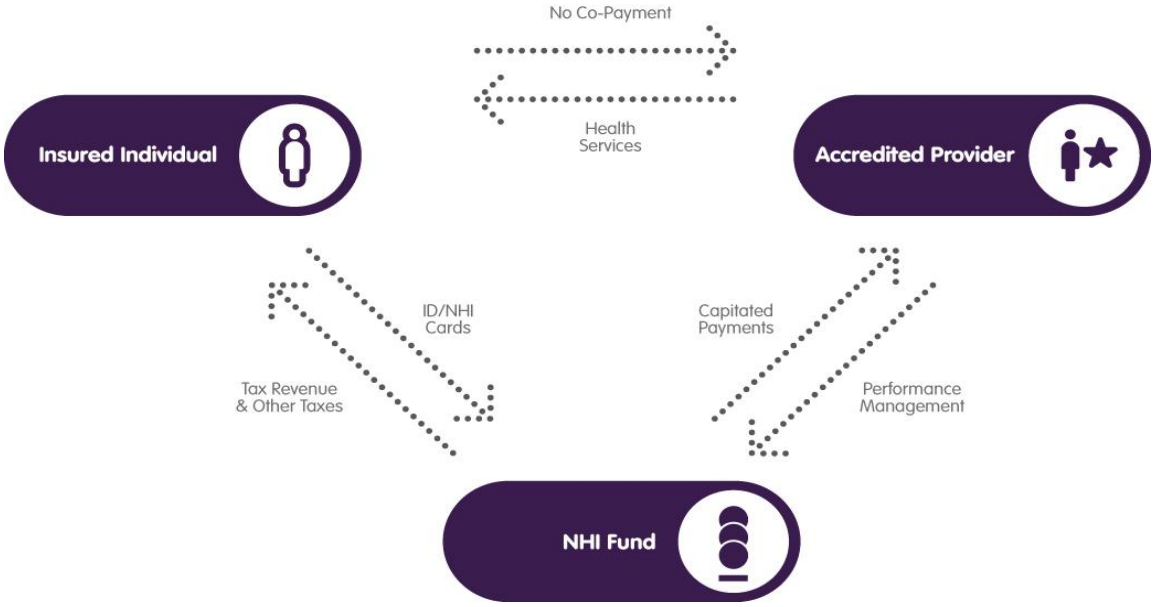
[10] World Resources Institute, 2007

43% of South Africa's THE is funded publicly. However, this 43% is used to provide health services to 86% of South Africa's population, around 45 million people. Within this inequitable split of THE funding, there has also been a stagnation of the Government health budget in real terms between 1995 and 2004, with only a moderate increase since then. Lack of funding, coupled with an increasing disease burden, means that the South African Government is being forced to deliver more services using fewer resources. Of the many negative consequences of this reduced per capita spend, the greatest impact is probably the acute shortage of health professionals, currently estimated at 80,000, whose salaries make up the greatest expense for Government.

43% of South Africa's Total Health Expenditure is funded publicly. However, this 43% is used to provide health services to 86% of South Africa's population, around 45 million people

In an effort to reduce the inequality that exists between public and private healthcare sectors, in 2012 the Government will launch its NHI scheme, to be implemented over a period of 15 years. The GSMA believes that the NHI presents the single largest opportunity for the mobile industry to add value to healthcare throughout South Africa. Through the NHI, health consumers will be able to choose which service provider to use. This reality - coupled with free care made available at the point of service - is expected to allow the NHI to equalise the distribution of health services across the private and public sectors through a process of national cross-subsidisation (Figure 5).

Figure 5: Flow of Funds within NHI



There are real opportunities within the new NHI scheme, particularly in clinical services, allocation of resources and health system strengthening.[11] Opportunities for the mobile industry in clinical services will be discussed in later sections. With reference to the latter two opportunities, the following information systems have been proposed by the Government as necessary to support the NHI. The framework for creation of services and engagement with Government is set out within the ANC NHI policy document: [12]

1. Monitoring the extent of coverage across all population sectors.
2. Tracking the health status of the population and producing disease profile data for use in computing capitation models.
3. All financial and management functions.
4. Utilisation of healthcare benefits by NHI members.
5. Quality assurance programmes for healthcare providers.
6. Production of reports for health facilities and health system management.
7. Research and documentation to support changes as the healthcare needs of the population change.

A robust understanding of Government and a means of effectively working across its various institutions (including policy and regulation, health systems architecture, health informatics and reimbursement) will be crucial to realising these opportunities. The risk for the mobile industry in working with Government institutions to develop Mobile Health solutions may be greater than the provision of products and services aimed at the private sector, but the return - as measured by market size and revenue potential - remains significant and demands further exploration.

It should also be remembered that South Africa remains widely regarded as the "gateway" to Africa. As such, Mobile Health solutions that can be taken to scale within the country can be considered as potentially exportable to other African countries with concomitant access to additional revenue sources.

[11] An overview of Health and Healthcare in South Africa (1994 – 2010). http://www.DoH.gov.za/docs/index.html
[12] The Road to National Health Insurance 2010. http://www.anc.org.za/docs/discus/2010/aditionalo.pdf

Opportunities within the Producer System

Medical Devices

Medical devices are considered a minor opportunity in South Africa by the GSMA because:

1. The industry remains unregulated.
2. Imported products dominate the market and squeeze local producers out of tenders based on pricing structures.
3. Long development lifecycles with significant investment are required.

Table 4: Medical Devices in South Africa

95%	Percentage of total medical devices believed to be imported into South Africa
<30	Number of local producers able to boast annual revenue more than US$5 million
CE/FDA	No regulatory environment for medical devices currently in place

South Africa is not well recognised as a hub for medical device research, development or production. Despite excellent academic and medical personnel, a number of factors continue to hamstring the industry, not least of which is a lack of early stage seed investment and production capacity. However, preliminary research indicates that there are a greater number of companies and NGOs operating in the medical software arena (mobile/electronic health) in South Africa than in the traditional medical device space.

South Africa's medical device industry also remains unregulated. Local producers and foreign imported products are not required by law to carry the safety and quality standards which are mandatory in the US, Europe and other developed economies. This lack of regulation and quality control measures contributes to the fact that imported products constitute an unprecedented 95% of all medical devices. It is unlikely that regulations will be implemented within the next 3 years.

Despite a lack of medical device regulatory controls by the Government, private hospital groups and consumers of medical devices are becoming increasingly aware of international quality and safety standards. Whereas public healthcare tenders are awarded primarily on cost alone, private healthcare consumers are demanding international quality and safety standards, in-country service agents and lengthy guarantees.

This shift by the private healthcare sector over the last few years has stimulated local medical device producers to obtain the international product accreditation they need to access foreign markets. While the international community is still unclear about how to regulate Mobile Health hardware and software, we can expect locally produced solutions to enjoy a certain degree of operating freedom.

In the absence of a regulated market, certain industry organisations have begun establishing ethical guidelines for good practice in Telemedicine and Mobile Health.[13] These organisations have begun establishing these guidelines with the aim of preventing transgression of certain ethical boundaries: doctor-patient relationships, patient confidentiality and informed consent, amongst others.

Another key development will be the eHealth Strategy document that the South African Government intends to release toward the middle of 2011. This should greatly stimulate investment in Mobile Health, which is considered a vital subset of the broader eHealth umbrella.

Finally, given the global positioning of mobile phones not only as a communication tool but as a highly sophisticated piece of hardware and software, we can expect to see more vertical integration, an evolution of revenue streams, exponential growth in open innovation and the monetisation at points of proprietary integration. Given South Africa's well established telecommunications industry, the dichotomy that exists between public and private healthcare sectors, and the unregulated medical device arena, we expect global mobile trends to be even more pronounced.

[13] General Ethical Guidelines for Good Practice in Telemedicine, HPCSA, 2011

Pharmaceuticals

Pharmaceutical is considered a minor opportunity by the GSMA because:

1. Very little (known) scope for Mobile Health outside of stock control, monitoring and adherence to medicines.
2. Although ARV medication access and adherence present opportunities for Mobile Health, this is considered a minor opportunity given the total number of people who are on or will be on medication in the short/mid-term.

Table 5: Pharmaceuticals in South Africa

$ 1.8 billion	Expenditure on medicines dispensed by private pharmacists in 2009
17.4%	Year on year increase in private medicines expenditure (2006 - 2010)
327.3	Private pharmacist utilisation rate per 1,000 private beneficiaries
90,000	Prescriptions dispensed to state facilities through private company in Western Cape / month

South Africa has a relatively well-developed pharmaceutical industry, comprising a complex network of pharmaceutical manufacturers, distributors and dispensers. Recent policy and regulatory shifts within the industry to control pricing have aimed to protect the consumer's already significant out-of-pocket spend on medicines (as highlighted earlier in the report).

Over the past few years, there have been a number of mergers and acquisitions as the pharmaceutical industry has restructured to meet competitive challenges. However, multinational pharmaceutical companies continue to dominate the industry, controlling 93% of the total market.

Although pharmaceutical manufacturing in South Africa is fragmented and there is only limited local production of generic active ingredients, formulation and last step synthesis is common among the local subsidiaries of multinational drug companies. Pharmaceutical distribution occurs through buying groups, dispensing clinical practitioners, pharmacists with wholesale licenses and wholesalers. A number of companies, or associations of companies, have their own distribution divisions. Dispensing occurs via private channels, dispensing doctors, retail pharmacies, retail chains, private and public institutions, industrial clinics, and private and Government hospitals.

Given the prioritisation of primary healthcare services, there is likely to be increased demand for primary healthcare level drugs such as generic antibiotics and over-the-counter drugs.

Pharmaceutical interest within the Mobile Health community has traditionally focused on two key areas:

1. Supply chain services
2. Adherence monitoring and data collection

With reference to supply chain services, Mobile Health products are being trialed around the world that assist in managing stock levels, the governance of stock and the reporting and combating of counterfeit drugs. In an iterative learning process, the GSMA has to date only found information on the quantity of medicines traded in the private health insurance industry.

What can be seen from Table 6 is who is responsible for dispensing the majority of medicines: private pharmacists are by far the largest group, especially when medicines are paid from a savings account. With a 17.4% y/y increase between 2006 and 2010 it is likely that of the cost of medicines will continue to increase beyond inflation and unlikely that medical insurers will absorb the total increase. The result is that we can expect to see the difference being paid from savings accounts and out-of-pocket spend.

Table 6: Medicine Dispensation in South Africa*

Benefits paid from Risk Pool	
Dispensed in Private hospitals	25.72%
Dispensed by Private Pharmacists	64.81%
Dispensed by Private Practitioners	4.21%
Dispensed by Medical Specialists	5.04%
Dispensed by Support and Allied Health Professionals	0.22%
Dispensed by Other	NA
Benefits Paid from Savings Account	
Dispensed in Private hospitals	0.20%
Dispensed by Private Pharmacists	93.87%
Dispensed by Private Practitioners	5.57%
Dispensed by Medical Specialists	0.22%
Dispensed by Support and Allied Health Professionals	0.10%
Dispensed by Other	0.03%

High pricing and low availability of drugs continue to plague the public sector, a problem exacerbated by under-resourced pharmacies. Essential drug lists have been in place for almost three decades but the availability of these medicines remains inadequate. Medicine pricing remains regulated by the Medicines and Related Substances Act (Act 101 of 1965, as amended).

The private sector remains the source of all procurement for pharmaceutical companies in the public sector. Once the public sector has purchased drugs, distribution is usually effected through state facilities. The Western Cape is the only known province which contracts the services of a private company to collect daily prescriptions and dispense roughly 90,000 per month at an average of 5.1 items per prescription.[14]

With regards to adherence monitoring and data collection via push SMS's, reminders, personal applications and others, the GSMA believes that these products should ideally be incorporated into existing operator loyalty and incentive programmes. Adherence to chronic medicines globally is typically suboptimal.[15] Opportunities therefore exist for Mobile Health solutions to promote adherence, with the most significant being within HIV/AIDS and antiretroviral treatment.

Although South Africa has the largest (ARV) programme in the world, relative access to treatment remains low, providing an opportunity for Mobile Health solutions to improve access to medicines and adherence to drug regimes. An estimated 37% of infected people were receiving treatment for HIV at the end of 2009, and this is expected to increase year on year, given the Government's prioritisation for providing HIV/AIDS treatment.

Current health economic research shows that under current HIV treatment guidelines overall Government spending will increase to US$9.8 billion by 2017, while under newer guidelines that expenditure would increase to US$11 billion.[16,17] There is an opportunity for Mobile Health to improve access, monitoring adherence and collecting national data on cost and impact. There are currently a number of private companies, not-for-profit and multinationals that are providing mobile services to the Government. Impact studies are unavailable at the time of compiling this document.

* Table 6 reflects benefits paid from risk pool and savings accounts (medical insurance). Excluded in Table 6 is any reference to out-of-pocket payments or the informal sector.

[14] South African Health Review, 2008. http://www.hst.org.za/generic/29

[15] Adherence to Drug Treatment, Merck Manual, 2011. http://www.merckmanuals.com/home/sec02/ch016/ch016a.html

[16] Plus/ Irin News (2010, 13th September) 'South Africa: Early HIV treatment may be cheaper than thought'

[17] Meyer-Rath, G et. al (2010) 'Total cost and potential cost savings of the national antiretroviral treatment (ART) programme in South Africa 2010 to 2017' XVIII International AIDS conference 2010

Opportunities within the Provider System

Private Healthcare

Private Healthcare is considered a significant opportunity by the GSMA because:

1. Huge drive by payers of healthcare to keep patients out of hospital gives providers an opportunity to diversify their service offering.
2. NHI presents an opportunity for providers to establish public-private partnerships and extend primary healthcare services in the form of prevention strategies, remote monitoring, data aggregation and real time, community-based responses to health epidemics.
3. Providers have experience with and knowledge of medical devices and would be well positioned as early adopters of regulated Mobile Health solutions.

Table 7: Private Healthcare in South Africa [18]

80%	Percentage of all private healthcare controlled by 3 hospital groups
$6.4 billion	FY 2010 combined revenue between 3 hospital groups
19,872	Private hospital beds amongst 3 hospital groups
65%	Average bed occupancy rate
10,000	Estimated bed oversupply
6.6%	Re-admission rate[19*]
66,000	Health professionals in private practice (general practitioners, specialists, allied, etc.)

The private health market in South Africa is well established, highly competitive and regulated by a number of industry bodies. The landscape is dominated by three large hospital groups that control more than 80% of private health services. The remainder are smaller general practices, associations and organisations.[20] In considering the specific opportunities available to the mobile community within the healthcare provider market, it is important to acknowledge their ties with the payers of healthcare and how mobile solutions can reach both stakeholder groups.

Hospitals across the world are being forced to reduce costs and increase efficiencies. South Africa is no different.

Private providers face a dilemma in reconciling the conflicting objectives of generating revenue through renting hospital beds and services, while at the same time trying to help patients stay healthy and out of hospital. Payers are demanding a reduction in admission and re-admission rates, as well as the number of extended stays. The ultimate goal is a significant reduction in total hospital expenditure, currently measured at 36.7% of total benefits paid out in 2009.

In attempting to improve the efficiency of current practices, hospital groups are more likely to adopt traditional ICT solutions than mobile. The GSMA believes there is limited scope amongst the smaller providers for practice management type tools.

A far more attractive market opportunity for the mobile industry does exist in providing products and services that keep patients out of hospitals, marketed either to the payers of healthcare or the providers themselves in an effort to diversify their current service offering. The GSMA believes mobile can be placed at the heart of healthcare, and providers should consider "cradle to grave" offerings which focus on preventive, promotive, diagnostic, therapeutic and assisted or remote living. Chronic disease and disability monitoring are probably the greatest opportunity areas within this "cradle to grave" framework.

Given their experience with procuring, using and maintaining medical devices, larger providers are also likely to adopt the use of regulated mobile devices and software. GSMA analysis indicates that disruptive business models and ecosystem maturity will be required to drive demand for these types of services.

[18] Council for Medical Schemes, Annual Report 2009-2010. http://www.medicalschemes.com/Publications.aspx

[*] The re-admission indicator is calculated by counting the number of patients re-admitted to hospital within 30 days after discharge. This includes scheduled (planned) as well as unscheduled (unplanned) re-admissions, but it is the latter that are important as they represent late complications of initial admissions

[20] Medpages, 2011. http://www.medpages.co.za/sf/index.php?page=categorysearch

Developing and growing strategic partnerships with South Africa's three dominant hospital groups will be crucial when marketing new products and services. The impending NHI means there are likely to be a growing number of public-private partnerships and an expansion of private services, primarily focused on health infrastructure. Amongst smaller provider groups and practices, it is expected that the industry will see an increase in the number of comprehensive services offered to communities and individuals, and a shift in reimbursement from fee-for-service models to bundled reimbursement. Additionally, the GSMA expects more individual practices to merge in an effort to reduce costs and facilitate registration as a preferred provider for the NHI. Within this context, regulated medical devices and software can be considered a major opportunity for Mobile Health.

Public Healthcare

Public Providers are considered a significant opportunity by the GSMA because:

1. With 49% of public sector posts vacant, mobile can reduce this resource deficit by extending the traditional healthcare delivery pyramid and empowering the general population.
2. The revitalisation programme proposes a clear set of engagement strategies to which mobile stakeholders can contribute greatly.

Table 8: Public Healthcare in South Africa [21]

	Private	Public
Population per general doctor	588	4,193
Population per specialist	470	10,811
Population per nurse	102	616
Population per pharmacist	1,852	22,879
Population per hospital bed	194	399
49%	Vacant medical posts in the public health system	

This section should be read in conjunction with the section discussing the Out-of-Pocket payer as they are considered to be one entity.

Paramount to the South African Government being able to achieve its 1978 primary healthcare declaration of Alma Ata ("health for all") is a desperate need to correct the current resource shortages.[22] The World Health Organization established a health worker threshold that is used globally to measure the coverage of health workers relative to population. The benchmark to achieve "acceptable coverage" levels for essential health services is 2.3 health workers to 1,000, or 23 Doctors, Nurses or midwives per 10,000 people.[23] Not surprisingly, South Africa falls far short of this threshold: the figures above highlight further the gross inequality between public and private provision.

The most recent statistics indicate that 49% of medical posts are currently vacant within the public sector, resulting in a critical shortage of 80,000 doctors.[24] New means of addressing the capacity shortage must be explored urgently.

If healthcare is to improve and become more efficient, it must also extend its services into rural and peripheral areas, and invest in a stronger health system with better public health training and more standardised management.[25] Most of these opportunities can be leveraged or achieved with Mobile Health offerings directed at the consumer of healthcare services, or the payer (in this case, the Government).

[21] Health Systems Trust 2010. http://www.hst.org.za/healthstats/index.php
[22] Declaration of Alma-Ata, 1978. http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf
[23] WHO World Health Report 2010
[24] World Health Statistics 2008
[25] Human Resource Requirements of National Health Insurance

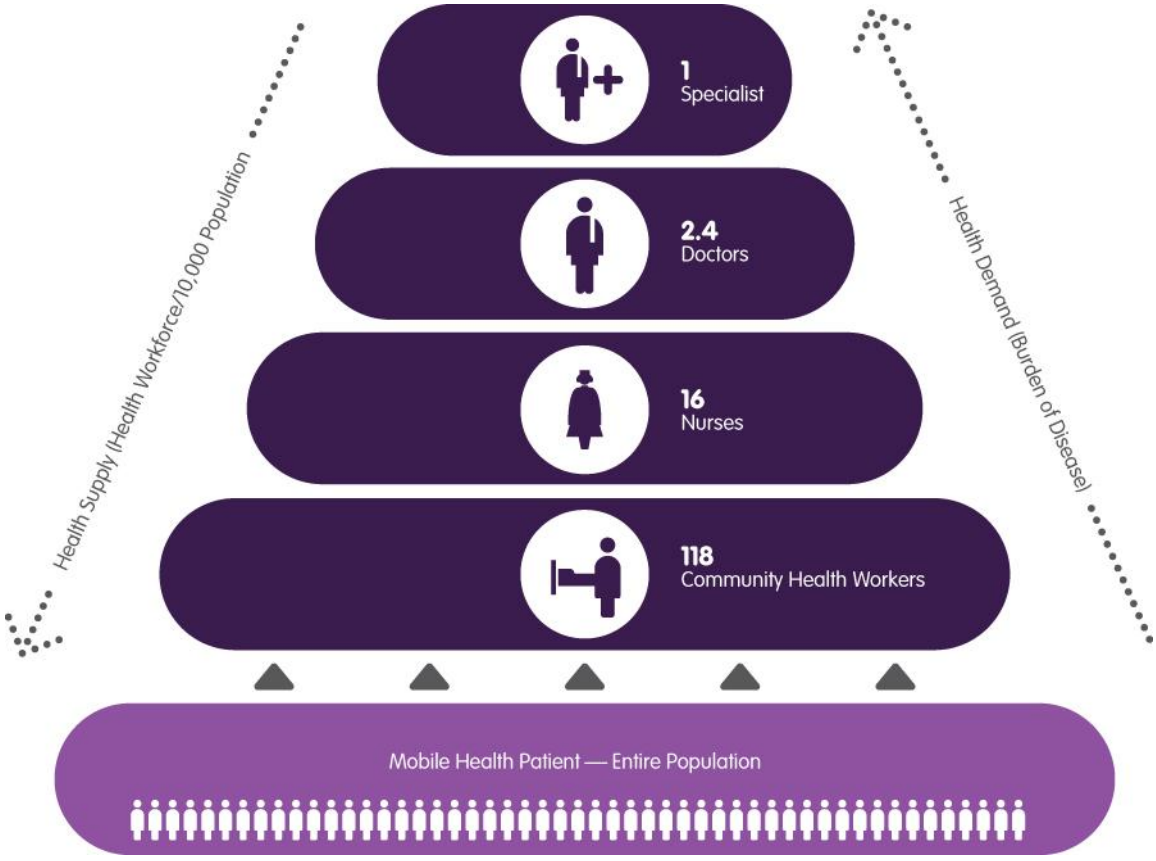
Together with the broad aims of the NHI to strengthen capacity within the country, the DOH has also developed a "Human Resources for Health Strategic Plan" which urges both the private and public sector to develop a national plan to guide the strengthening of management and increase the capacity of the health system. [26] **The most commonly identified benefit that mobile could contribute is in strengthening the health workforce**, as highlighted throughout this report. This can be achieved by empowering the existing workforce through various offerings, and potentially by adding a new tier of health workers in the form of patients. **Patients enabled to use mobile devices and software will ultimately contribute to improved disease prevention and intervention**. Patients can also deliver new diagnostic capabilities, remote monitoring and aggregated data collection, which can be fed into district health information systems to allow real time responses to health problems.

The most commonly identified benefit that mobile could contribute is in strengthening the health workforce

Patients enabled to use mobile devices and software will ultimately contribute to improved disease prevention and intervention

As mentioned in the previous chapter, Government will have to rely on the private sector to assist in the delivery of the NHI and the proposed strategy of 80% of services being delivered through primary healthcare. However, it should be made clear that 80% of services do not translate into 80% of revenue, and we can expect hospital expenses to continue to form the bulk of THE.

Figure 6: The Potential Role of Mobile in Strengthening the Health Workforce



[26] South Africa Department of Health: Human Resources for Health, A Strategic Plan. Chapter 1

In addition to clinical services, the mobile industry should consider the Government's elaborate target for the improvement, expansion and revitalisation of public healthcare infrastructure and services. In order to ensure the longevity of the revitalisation programme, a parallel "health systems strengthening plan" has been proposed, which includes:

a. Improvement of infrastructure for the provision of health services
b. Improved functioning of district health councils
c. Improved primary healthcare approach
d. Delegation of authority to managers
e. Improved staffing
f. Importing of health workers into South Africa
g. Training of health facility managers

Mobile Health can be used to deliver a number of these outcomes, but the mobile community must first develop a thorough understanding of Government policies and tendering processes, as well as examining the varying levels of autonomy and decision making that exist at district, provincial and national levels in order to begin consultation with all stakeholders on implementing services that are scalable.

Opportunities within the Consumer System

The Insured Patient

Table 9: Insured Statistics

Insured is considered to be a Moderate opportunity	
107.9	Burden of Hypertension in 1,000 population
48.5	Burden of Hyperlipidaemia in 1,000 population
28.9	Burden of Diabetes Mellitus in 1,000 population

It's possible to segment the insured patient market in a number of different ways, such as mobile use patterns, socio-economic demographics and/or disease profile. We are likely to see additional segmentation strategies emerging over the next few months and years as the convergence of mobile, health and other sectors evolve.

Traditional customer segmentation is something that mobile operators understand very well and there is currently much debate amongst the Mobile Health community as to whether or not health offerings will challenge this model or not. What we can tell from looking at disease profiles, disability indicators and health economics is which diseases present the greatest cost burden, ultimately guiding the content of future health products and services.

Looking at these disease indicators we know that the private healthcare sector in South Africa is plagued by similar health burdens to developed economies around the world: an aging population; escalating chronic non-communicable diseases; soaring insurance costs; and relatively little access to primary healthcare services. There is, however, very little publicly available information detailing the willingness of consumers to spend on Mobile Health services.

Of primary concern when developing Mobile Health products is the fact that South Africans, insured or not, are already faced with exorbitant escalation in healthcare costs. Even insured patients often need to pay significantly out-of-pocket, and neither set of patients want to invest further disposable income in healthcare. Mobile Health solutions will have to deliver a significant decrease in overall healthcare expenses if they are going to achieve any significant traction in the market. They must also prove their efficacy and reliability.

The Uninsured Patient

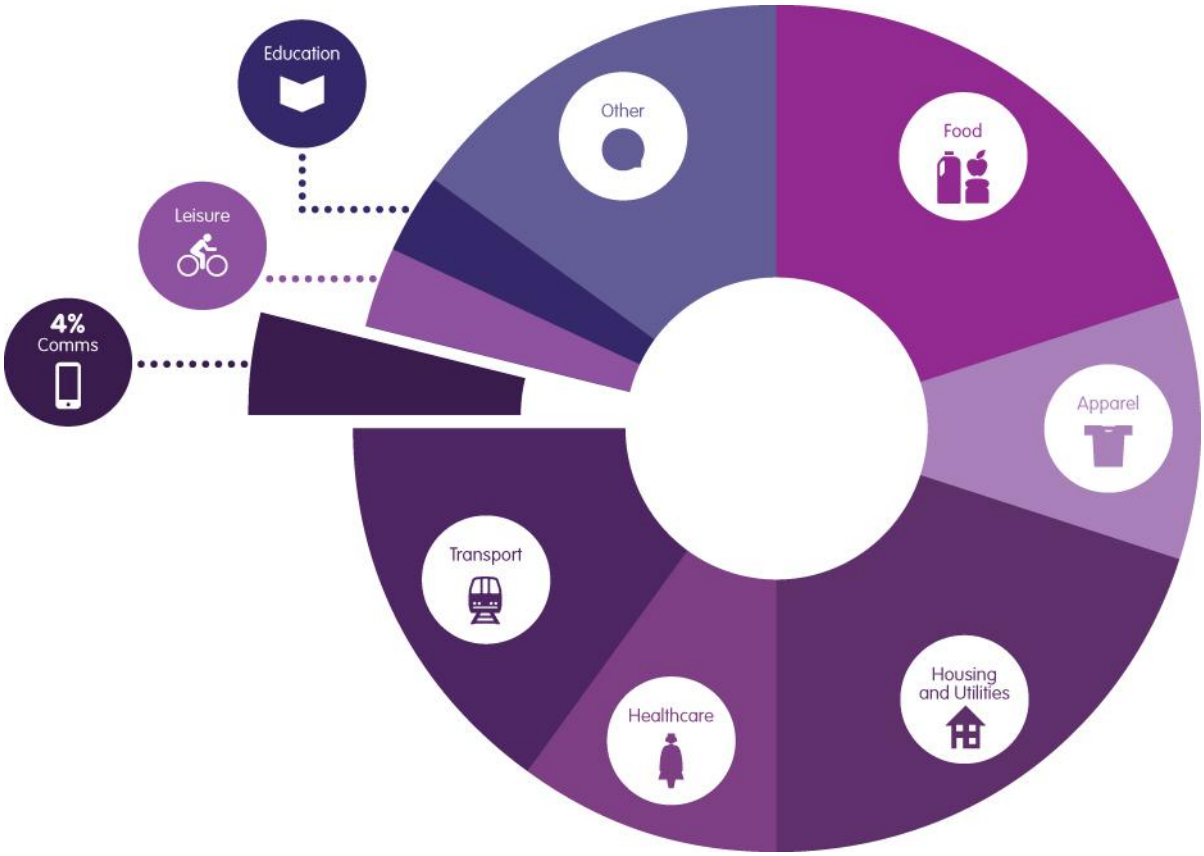
Table 10: Uninsured Statistics

Uninsured is considered a Minor opportunity	
53%	Life expectancy at birth
610	Prevalence of TB per 100,000 population
18.1%	Prevalence of HIV 15-49yrs in total South Africa population
420,000	Number of HIV patients requiring ARV's by 2011
$391 million	Total HIV/AIDS budget allocated by Government in 2008

As mentioned previously 86% of the South African population is uninsured. Although both insured and uninsured patients contribute to out-of-pocket payments, the vast majority of such spending comes from uninsured patients. The same argument applied to the previous chapter can also be reasoned in this chapter with a further caution that uninsured patients are even more price sensitive that the insured patient when it comes to out-of-pocket payments.

It is estimated that the total consumer spend in South Africa is in the region of US$0.21billion. This is distributed across the following segments (Figure 7).

Figure 7: Distribution of Consumer Spend in South Africa [27]



The DoH is prioritising ways to address the inequity in access and care, and the legacy that the imposition of user fees for healthcare has had on population health and epidemiology. Communicable diseases are preventable and it is unacceptable that they continue to lead to national epidemics in the 21st century. To this end, disease prevention and health promotion strategies remain the primary intervention for communicable diseases. These strategies can and should be aimed at at-risk population groups.

Incentivising an individual or communities to make healthy decisions is perhaps the most effective means of preventing diseases. The mobile industry is uniquely positioned to deliver both experience and expertise in cross sectoral interventions that can deliver on this opportunity. Critical to realising both revenue and impact within this space is the careful formulation of disruptive business models and strategic partnerships.

[27] Assessment of economic impact of wireless broadband in South Africa, November 2010. http://www.gsmamobilebroadband.com/upload/resources/files/AnalysisMasonSAReport.pdf

South African Mobile Industry

Market Players

Table 11: Current Market Players[28]

Mobile Operators	■ MTN and Vodacom (both launched in 1994) hold more than 80% of the South African mobile market. They have offered 3G data services since 2005. ■ Cell C launched in 2001, and has only recently launched wireless broadband, while Telkom's mobile division, Heita, entered the market in October 2010. ■ There are a handful of MVNOs in South Africa, notably Virgin Mobile.
Fixed Retail Operators and ISP's	■ Telkom South Africa lost its monopoly on fixed line services in 2002, although competitor Neotel only launched operations in 2006 following years of disputes. ■ Government retains almost 40% ownership of Telkom. ■ ISPs such as MWEB and iBurst offer service over Telkom's network or using their own spectrum.
Wholesale Operators	■ A landmark ruling by the High Court in 2008 meant that hundreds of licensees granted new rights to self-provide telecoms infrastructure, leading to a proliferation of metro and long-distance fibre providers. ■ State-owned operators Sentech (with wireless infrastructure) and Broadband Infraco (with fibre assets) have been mandated to offer wholesale services.

Mobile Cellular Subscribers

South Africa has almost reached saturation point in the number of connections (98%). The following table shows the type of connection in South Africa with relative growth over the last ten years. [29] Prepaid connections dominate the market and in the current socio-economic environment are expected to grow steadily into the next decade, slowly eroding the share of contract connections.

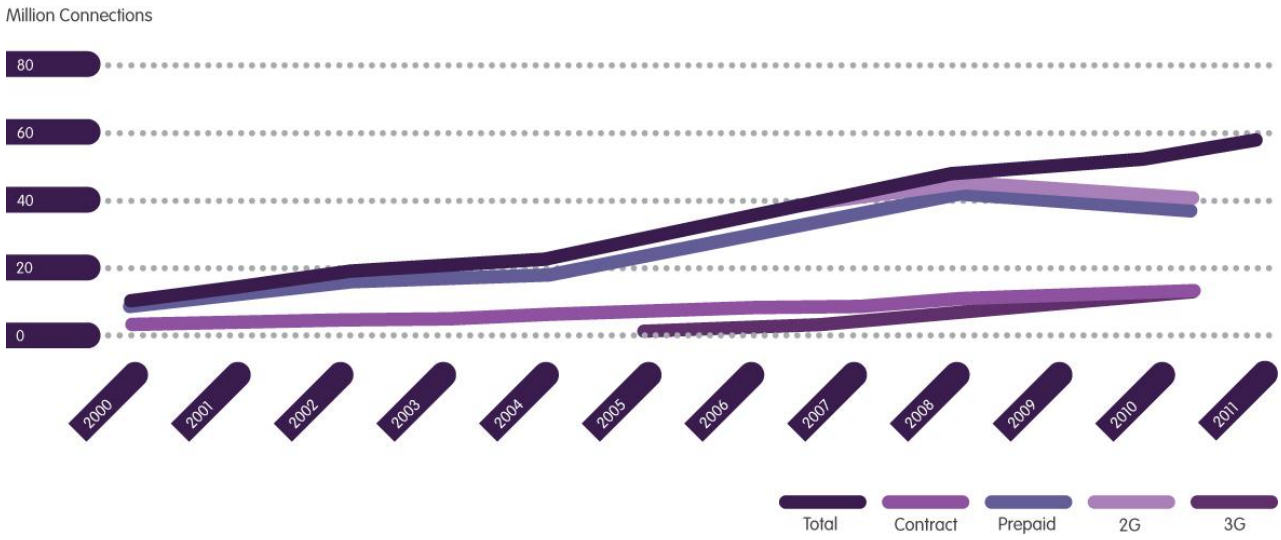
Table 12: Mobile Connections and Growth in South Africa

Total Connections (Q1, 2011)	**52,674,539**
Contract	9,899,279
Prepaid	41,969,662
2G	43,752,718
3G	8,116,224
GSM	43,755,889
CAGR	**1.5%**
Churn (Total)	
Contract	0.86%
Prepaid	3.19%
Minutes of use/user/month	
Contract	202
Prepaid	92
SMS messages/user/month	**22.13**
Average Revenue/user/month	
Total	$ 26.34
Voice	$ 18.40
Non Voice	$ 4.87
Contract	$ 59.70
Prepaid	$ 16.50
Data	$ 3.22
Messaging	$ 1.57
Number of Base Stations	**8,912**

[28] Assessment of economic impact of wireless broadband in South Africa, November 2010. http://www.gsmamobilebroadband.com/upload/resources/files/AnalysisMasonSAReport.pdf

[29] GSMA Wireless Intelligence Reports, 2011

Figure 8: Connection Type in South Africa [30]



Internet connectivity remains low in South Africa, although in line with other developing economies. The number of users - as indicated in Figure 8 - reveals how mobile internet connectivity is far more widespread than the estimated 5 million people with desktop access. A recent World Wide Worx study indicated that 27% of the rural population and a further 39% of the urban population are able to access the Internet via their mobile phones. With smart phone imports into Africa exceeding those of normal phones in 2008 already, South Africa has a current penetration rate of 18% that is growing exponentially. [31]

Mxit, South Africa's largest social networking site, is used by 24% of mobile users aged 16 and above (29% of urban users, 19% in rural areas). Facebook is catching up quickly, reaching 22% of mobile internet users, and passing Mxit in the urban over-16 market, with a 30% reach. Twitter is also poised to become a key mobile application, almost catching up to MXit in the coming year, from a low starting point of 6% of mobile users at the end of 2010.

The South African National Broadband Policy was gazetted by government in July 2010, identifying aims and assigning roles to various stakeholders to improve, amongst other things, universal access to broadband to 15% (household penetration), and broadband availability within 2km of any household, to be achieved by 2019.

It is also worth taking into account the recently implemented Regulation of Interception of Communications Act (RICA), which was introduced in an effort to reduce the crime and fraudulent activities associated with mobile. It is hoped that this will also inadvertently reduce the total churn rate of especially prepaid customers.

[30] GSMA Wireless Intelligence Reports, 2011
[31] Mobile Africa, 2011. http://www.mobilemonday.net/reports/MobileAfrica_2011.pdf

South African Mobile Health Industry

Mobile Health Stakeholders

Table 13: Mobile Health Stakeholders

Mobile Operators	■ In October 2010 the Vodacom Foundation launched a 5 year commitment to a consortia partnership. between 4 implementing partners (Geomed, Cell-Life, Praekelt Foundation and the RHRU) to pilot and scale Mobile Health solutions. ■ MTN have partnered with Sanlam, one of South Africa's leading financial services groups, to launch a suite of Mobile Health products in the second quarter of 2011.  ■ At the time of writing this report, the GSMA had not engaged sufficiently with the other mobile operators to be able to comment on their Mobile Health activities.
Developers	■ A plethora of software developers exist at various levels of business and product maturity and commercialisation. ■ Fewer embedded developers and producers. ■ Limited access to early stage seed funding for development of products. ■ A lack of guiding standards and regulations has resulted in a very fragmented delivery of products to the market.
Integration to Telemedicine/ eHealth/other	■ The South African Telemedicine Association (SATMA) was established in August 2010. ■ The inaugural South African Telemedicine Conference was hosted by the Medical Research Council in September, 2010 and attracted, amongst other ministerial delegates and industry experts, the South African Minister of Health.
ICT Capacity, Research & Development	■ The Medical Research Council (MRC) has been nominated by a number of stakeholders as the "home" of the South African Mobile Health working group and is tasked with informing Government on developments, providing a central contact point and leveraging the collective efforts of various stakeholders. ■ The MRC has also recently launched the Medical Device Innovation Platform (MDIP) to act as a convenor between various academic institutions to promote collaboration on the development of medical devices. ■ The Medical Device Centre of Competence (also known as Medical Devices to Market), which was tasked with providing support and funding to the medical device industry, was absorbed into the Technology Innovation Agency in April 2010 . ■ mLabs is an initiative by the World Bank, the Finnish Government and the International Finance Corporation to promote mobile innovation. mLabs was established in South Africa in 2009 to represent Southern Africa and is governed by the CSIR and the Meraka Institute. ■ Samsung have recently launched the Samsung Mobile Innovation Lab with the University of Cape Town.[32] ■ Google has launched Umbono and will provide a platform and support structure for tech entrepreneurs.[33] ■ There are a number of other smaller academic and private organisations focusing on the research and development of Mobile Health solutions.
Health Community	■ The oligopoly of hospital groups has yet to engage in Mobile Health. ■ There is some momentum amongst health insurers, most notably the Sanlam deal with MTN.
Policy and Regulation	■ The Health Professions Council of South Africa (HPCSA) recently released the "General Ethical Guidelines for Good Practice in Telemedicine" aimed at governing a number of ethical concerns around the practice of Telemedicine/eHealth/mHealth. ■ The MRC has been tasked with drafting a National eHealth Strategy and guiding the DoH. ■ The WHO recommends adoption of resolution WHA 58.28 which urges member states to develop long-term strategic plans for eHealth services to promote international, multisectoral collaboration to improve the compatibility of eHealth solutions. In 2010, South Africa began developing this strategy and it is expected to be released for comment by mid-2011.

South Africa – Challenges for Mobile Health

[32] UCT Samsung Mobile Innovation Laboratory (SMILe) http://www.commerce.uct.ac.za/InformationSystems/MediaStream/africatelecomsonline.pdf
[33] Umbono http://www.google.co.za/intl/en/umbono/index.html

The GSMA has identified a number of challenges to the development of a sustainable Mobile Health industry in South Africa.

- Lack of large scale evidence for potential improvements to healthcare processes
- Budgetary constraints
- Lack of leadership (policy makers, local managers)
- Lack of users' (i.e. patients' and/or healthcare professionals') awareness
- Limited users' (i.e. patients' and/or healthcare professionals') skills in using ICT
- Health professionals' acceptance
- Inappropriate legal frameworks and lack of reimbursement schemes
- Lack of interoperability
- Inappropriate organization of the healthcare process
- Access to standards
- Lack of cross-sectoral coordination / integrated healthcare schemas
- Regulation
- Lack of consumer research indicating willingness to pay
- How to increase the level of motivation for mobile health

South Africa – Conclusion

The gap between public and private healthcare in South Africa has placed the country in a unique and challenging position from which to address its health system needs. Roughly 86% of the South African population has access to an inequitable 43% of Total Health Expenditure. As this report has discussed, a number of factors continue to hamstring the accessibility and affordability of both public and private health services.

In this report, the GSMA has presented a systematic overview of the various health target markets (payers, producers, providers and consumers) and suggested opportunity areas where Mobile Health solutions could be used to meet current and forecasted future needs.

The GSMA believes that the impending NHI and the exorbitant costs of private healthcare present significant opportunities for mobile stakeholders to develop truly valuable solutions. These opportunities can be realised through strategic partnerships with Government to deliver primary healthcare services through - for example - national prevention and promotion strategies, remote monitoring, data aggregation and real time community responses to epidemics.

The ubiquity and reach of mobile, combined with the existing ability of operator groups to bill, participate with customers and aggregate data, presents an additional opportunity to engage with health insurers in the development of low income medical schemes and pay-as-you-go type health insurance products. Exorbitant hospital and out-of-pocket expenses also present a significant opportunity to use mobile solutions to introduce more primary healthcare services into the private sector, effectively keeping patients out of hospitals.

Despite a handful of solutions already developed and implemented in South Africa and a growing Mobile Health community, stakeholders have been unable to take a single solution to a national scale that is sustainable. As part of its broader Mobile Health research and advocacy programme, the GSMA will begin to advocate and address the aforementioned stumbling blocks.

The GSMA will play an active role in the following events:

1. Mobile Health Summit (Cape Town, June 2011)
2. The Leadership Forum (Cape Town, June 2011)
3. Mobile World Asia (Hong Kong, November 2011)
4. mHealth Summit (Washington, December 2011)
5. Mobile World Congress (Barcelona, February 2012)
6. Mobile Health Live (www.mobilehealthlive.org)

The identified opportunity areas will be explored further within the GSMA's Market Entry Toolkit, which aims to provide support and guidance for mobile stakeholders wanting to create sustainable business models to meet pressing healthcare needs. Various chapters within the Market Entry Toolkit are designed to address the most pertinent sections of this report.

The ultimate goal of the GSMA Mobile Health programme is to create sustainable businesses that are able to reduce the cost of healthcare, extend the reach and ultimately improve patient outcomes. Given South Africa's unique positioning within Africa and the developing world, the GSMA believes these success stories can be replicated in other appropriate markets.

Appendices

Appendix 1: Payer – Medical Insurance

Payer	
Medical Insurance[34]	
Number of open schemes	174
Number of closed/restricted schemes	158
Number of schemes with >30,000 beneficiaries	37
Total number of insured individuals	8, 068, 505
Growth of no. of insured individuals (2009) - Open - Closed	 ■ - 1.5% ■ 9.0%
CAGR of emerging middle class	14.7%
Average gross monthly contribution by principal member (US$)	$ 172
Average gross monthly contribution by adult dependent (US$)	$ 147
Average gross monthly contribution by child dependent (US$)	$ 52
Average utilisation of services: - Visits to a General Practitioner - Visits to a Dentist - Visits to a Nurse	 ■ 3.2 (per beneficiary per yr) ■ 0.5 ■ 0.0
Average risk contribution increase for all schemes (2010)	13.7% (% increases remained well above inflationary rates for the past decade)
Considerations for mobile industry in relation to private medical insurance industry - Growth of industry skewed by initiation of Government Employees Medical Scheme (GEMS) - Lack of regulatory framework for low-income medical schemes (LIMS) - Cost escalation (private hospitals especially) - Absence of effective supply-chain regulation (esp. among private hospitals resulting in oligopoly of supply) - Ineffective engagement to date by provincial health services to contract with schemes - Current regulatory framework for remuneration of healthcare brokers does not support independent advice to consumers - ANC Governments proposed National Health Insurance Scheme (NHI) expected to result in reduction in number of beneficiaries	

[34] http://www.medicalschemes.com/Publications.aspx - CMS Annual Report 2009-2010

Appendix 2: Payer – Out-of-Pocket

Payer

Out-of-Pocket Payments

Individuals are considered to be both payers and consumers of healthcare (and possibly producers and providers in future disruptive health service models). It must also be stated that a significant volume of products and services are supposedly traded on the informal sector. Therefore, out-of-pocket payments are hypothesised to be far larger than the stated 26% of THE.

Socio-economic: [35]

- Large unemployed population in region of 25.3%
- Large proportion of population (0-16 years) not contributing to GDP
- Large emerging middle class with significant spending capacity
- Inflation of 3.5% y/y with stable expectations
- Prime interest rate of 9.0% expected to remain stable into 2011/2012

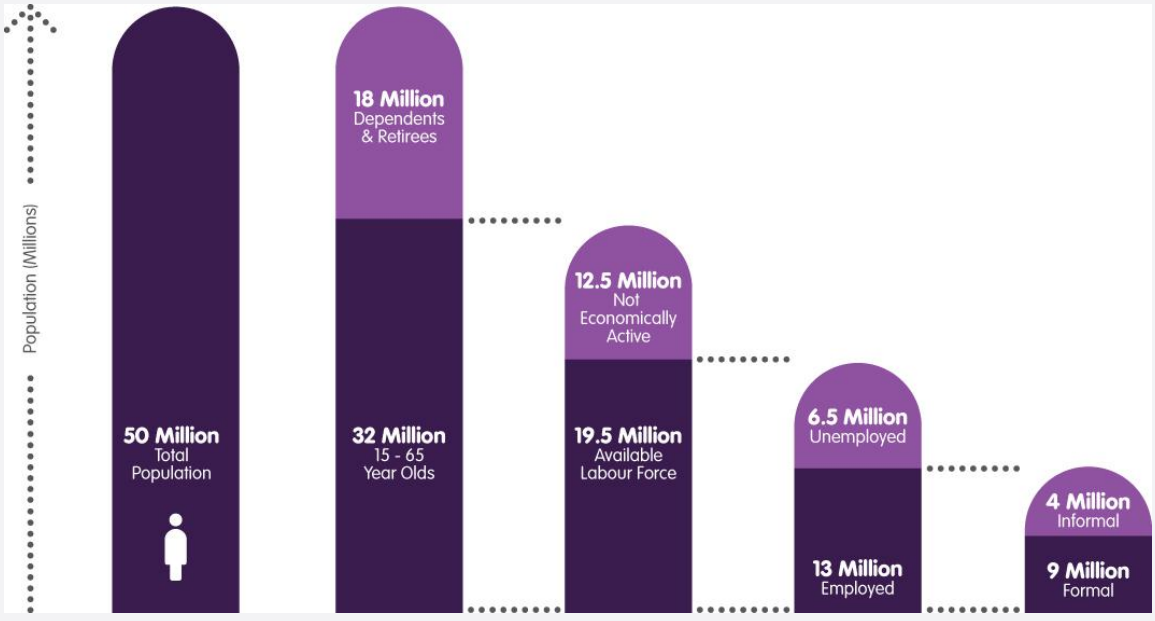
Out-of-pocket expenditure represents: [36]

26% (of THE), or
$4.3 billion, the equivalent of the total SA mobile revenue for 2009

Of the $4.3 billion:

- 34.2% spent on medicines
- 19.8% spent on medical specialists
- 14.9% spent on general practitioners
- 16.9% spent on allied health providers

Employment Figures & Competitors for out-of-pocket spend: [37]



[35] http://www.statssa.gov.za/keyindicators/keyindicators.asp
[36] http://www.medicalschemes.com/Publications.aspx - CMS Annual Report 2009-2010
[37] Adcorp Employment Quarterly. June 2010 – Unemployment

Appendix 3: Payer – Government

Payer	
Government[38]	
Per capita GDP (PPP US$)	$ 11, 960
Per capita health expenditure	$ 276
Primary healthcare (PHC) utilisation rate (individual visit to PHC facility/year)	2.5
Estimated cost per PHC visit/individual	$ 23
Structure of Department of Health[39]	National Health Provincial Health District Health

General Government Expenditure on Health:

Since the 1994 democratic elections there has been stagnation in funding allocations for the public sector which, together with an increasing disease burden, has put the public healthcare system under severe pressure. In real per capita terms, Government expenditure on health declined consistently through the 1990's up to 2004, and only returned to 1996 levels in 2005. Since 2005 there have been some increases in real per capita public health spend above what was spent in 1996, although it is unclear as to whether or not marginal increases will be able to compensate for inflation and population growth.

The greatest impact in the declining per capita spending is best seen by looking at staffing levels in the public sector. Staff salaries are the single greatest expense for the public healthcare sector, and as real financial resources declined over the last 15 years, so too did the number of staff employed.

80, 000 The estimated number of additional staff required to meet the need of the growing disease burden.

Principal Accomplishments and Shortcomings (1994-2010): [40]

Accomplishments	Shortcomings
Legislation and gazetted policy 1. Free primary healthcare 2. Essential drugs programme me 3. Choice on termination of pregnancy 4. Anti-tobacco legislation 5. Community service for graduating health professionals **Better health systems management** 6. Greater parity in district expenditure 7. Clinic expansion and improvement 8. Hospital revitalisation programme 9. Improved immunisation programme 10. Improved malaria control	**Insufficient prevention and control of epidemics** 1. Limited effort to curtail HIV/AIDS 2. Emergence of MDR-TB and XDR-TB 3. Lack of attention to the epidemic of alcohol abuse **Persistently skewed allocation of resources between public & private sectors** 4. Inequitable spending patterns compared to health needs 5. Insufficient health professionals in public sector **Weaknesses in health systems management** 6. Poor quality of care in key programme 7. Operational inefficiencies 8. Insufficient delegation of authority 9. Persistently low health worker morale 10. Insufficient leadership and innovation

Policy & Regulation pertinent to Mobile Health:

[38] Health Systems Trust. http://hst.org.za/statistics /
[39] The National Health Act. Government Gazette. Vol. 469. Cape Town 23rd July, 2004.
[40] An overview of Health and Health Care in South Africa (1994 – 2010). http://www.DoH.gov.za/docs/index.html -

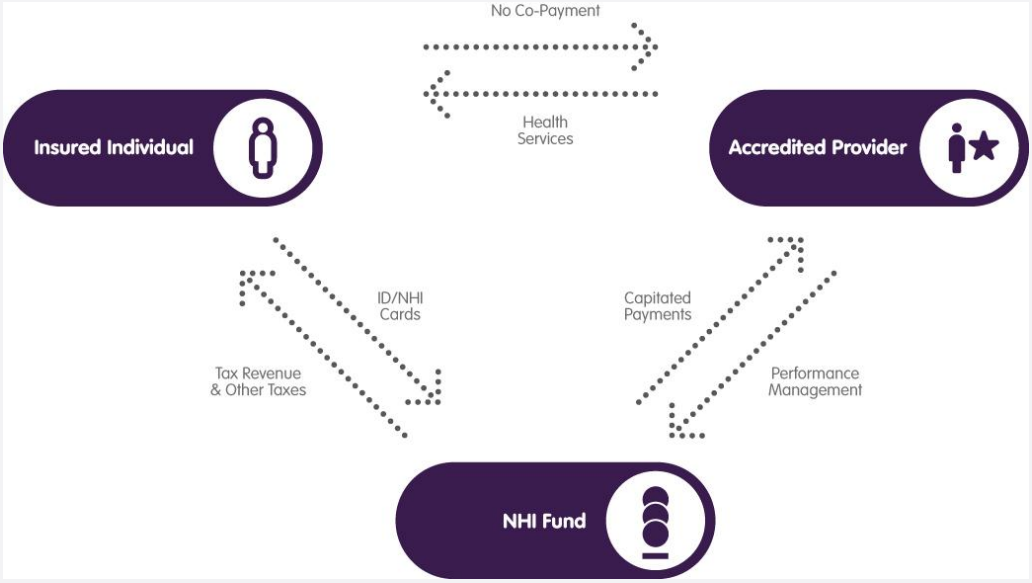
- The Health Act of 1977 has been replaced by the National Health Act, Act 61 of 2003.
- Draft eHealth National Strategic Objectives being circulated for comments and then release.
- The National Health Amendment Bill, released for public comment on 30th January, 2011, paves the way for the introduction of the NHI and proposes an amendment to the existing National Health Act through the establishment of the Office of Health Standards Compliance.

National Health Insurance: [41]

The manifesto states that Government will: "introduce the NHI, which will be phased in over the next fifteen years. NHI will be publicly funded and publicly administered and will provide the right of all to acess quality healthcare, which will be free at the point of service. People will have a choice of which service provider to use within a district."

The rationale for introducing a NHI system is that it would provide a mechanism for improving cross subsidisation in the overall health system, whereby funding contributions would be linked to an individuals ability to pay while benefits would be in line with an individuals need for care. Health services would be accessible to all on an equitable basis, on the principle of non-discrimination. It should be noted that increases in contribution rates in a NHI are subject to changes in the implementing regulations of the core legislation. In essence, it is hoped that public spending will act as a break for overall spending: public spending will aim to "crowd out" private spending and prevent rapid cost escalation from continuing.

Flow of Funds under the NHI:



Information Systems to be developed to support NHI:

1. Monitoring of the extension of coverage in all population sectors
2. Tracking the health status of the population and production of disease profile data for use in computing capitation
3. All financial and management functions
4. Utilisation of healthcare benefits by the NHI members
5. Quality assurance programmes for the healthcare providers
6. Production of reports for health facilities and health system management
7. Reserach and documentation to support changes as the healthcare needs of hte population change

[41] National Health Insurance Scheme. ANC National General Council. 2010

Appendix 4: Producer – Medical Devices

Two producers are considered in the research of this paper: the medical device and the pharmaceutical industry.

Producer

Medical Devices

Medical devices represent disposable products such as bandages all the way up to capital equipment and infrastructure like CT and MRI machines.

The South African medical device industry is well established in terms of the number of companies registered to sell medical devices, revenue generation and technology uptake - especially in the private sector. The wide diversity of product availability does not match local manufacturing and R&D capacity. More than 90% of medical devices are imported, dominated by disposable products and there is little evidence that this will change in the near future.

Less than 10 local medical device producers are able to boast revenues of over US$ 5 million per annum. Local producers lack both incentive from Government to invest in production capacity and regulatory control to root out a large number of defunct products finding their way onto public hospital tender lists.

While the level of uptake of medical devices in the private sector can be clearly measured against international standards, there has been no formal audit of medical devices in the public sector. Constrained by cost, the public sector has also allowed cheaper imports onto tender lists and into hospitals and care facilities without considering training and after sales service. There are signs that this is changing although tender irregularities and corruption still hamstring more effective procurement processes.

Medical Device Regulation:

South Africa remains an unregulated market, and, some would argue, an easy market in which to distribute low grade products. Having said that, private hospital groups and consumers are becoming more astute and tend not to invest in products which do not carry either the CE mark of Europe or FDA approval from the US.

Apart from late stage clinical trials, hospital groups and certain medical insurance companies are now entertaining conditional reimbursement – a methodology whereby medical products and interventions will be paid for at discounted prices over a period of time to prove, amongst other things, safety, efficacy and patient impacts, cost implications and uptake by medical professionals.

Globally, medical device software regulation (which includes stand alone medical device software and will incorporate mobile products and services depending on their intended use and potential risk to patient) is being given increased attention. Already, ISO 62304, a quality management standard specific to medical device software, is in use and we can expect stricter regulation of future products and services. South Africa, however, with no regulatory laws, is unlikely to implement this in the near future.

Perceived Barriers to entry into medical device industry:

1) No regulatory framework imposed at country or regional level;
2) No testing body able to test to certain international standards;
3) No incentive, in line with other developing economies, to stimulate local manufacturing;
4) Low appetite for risk and early seed investment among private investors; *

* The Government has recently launched the Technology Innovation Agency (TIA) with significant investment potential in an effort to stimulate innovation, including medical devices and biotechnology.

Appendix 5: Producer – Pharmaceuticals

Producer
Pharmaceutical
Please see the resourced material within the report for further reading on the pharmaceutical sector in South Africa.

Appendix 6: Provider – Private

Provider

Private healthcare

Private healthcare providers are represented by a plethora of businesses, ranging from one-man practices to multinational hospital groups. This market is well established, highly competitive and regulated by a number of industry bodies at each service level. Having said this, health providers are dominated by three large hospital groups, who together, control more than 80% of private healthcare services in South Africa.

The Medi-Clinic Group have operations in South Africa, Namibia, Switzerland and the UAE, boast more than 8500 beds and employee almost 15,000 staff. Revenue for the Group showed strong growth despite the economic recession to US$ 2, 5 billion (FY2010).

Netcare Limited have operations in South Africa and the United Kingdom, and have also shown growth to US$ 2, 8 billion (FY 2010).

Life Health Care operates in South Africa and Botswana, have more than 7500 beds and FY 2010 revenue grew to more than US$ 1.1 billion (FY 2010).

65% bed occupancy rate & **10, 000** estimated bed oversupply

Private Healthcare – Market size by number of registered professionals[42]	
Healthcare professionals	
Medical (General Practitioners, Specialists, etc.)	22, 848
Allied (Physiotherapists, Nurses, Acupuncturists, etc.)	43,767
Dental	4,804
Non-Practitioners (CEOs, Administrators, matrons, etc.)	21,015
Practices and Organisations	
Hospitals & Clinics	9,465
Pharmaceutical (Manufacturer, Distributor, Pharmacies, ...)	4,440
Social (Association's, Info, Support, ...)	6,407
Healthcare Suppliers	10,276
Medical Aid (Administrators, MHC, ...)	2,769
Medical Practices (GP, Specialist, ...)	18,898
Allied Practices (Physiotherapist, Acupuncturist, ...)	24,386
Dental Practices	4,480

[42] Medpages. Last accessed 9th February 2010. http://medpages.co.za/index.php?module=publicstats

Interesting to note is a trend in many developed economies of decreasing admission rates. [43] South African private hospitals show the opposite trend. The below table illustrates the high rates of extended stay cases.

Extended stay cases as a percentage of hospital admissions (2010)

Extended Stay	2010	2009
Medical		
Acute Myocardial Infarct	10.3%	10.4%
Asthma	10.0%	10.6%
Cardiac Failure	10.3%	10.1%
Neonatal Disorders	9.7%	10.0%
Pneumonia	10.1%	10.3%
Surgical		
Coronary Artery Bypass Graft	10.8%	10.0%
Cardiac Catheterization	10.3%	10.1%
Cholecystectomy	9.5%	10.2%
Hysterectomy (abdominal)	10.6%	9.9%
Hip Replacement	10.1%	9.4%
Knee Replacement	9.0%	10.2%
Resection Large Bowel	9.0%	9.5%
Obstetrics		
Caesarean Section	9.4%	9.9%
Normal Vertex Delivery	9.4%	9.8%

Re-admission Rate: [44] *6.6%*

(The re-admission indicator is calculated by counting the number of patients re-admitted to hospital within 30 days after discharge. This includes scheduled (planned) as well as unscheduled (unplanned) re-admissions, but it is the latter that are important as they represent late complications of initial admissions)

Health reform dominates national agendas, most notably:

1. National Reference Price Lists (RPL) – declared invalid by the courts and set aside in July 2010, although correct cost benchmarking welcomed and encouraged by all.
2. National Standards for Health Establishments – to be established by the SA Government
3. National Health Insurance – discussion documents stipulate that individuals can chose to purchase private medical insurance after contributing to the NHI Fund
4. Proposal to create a public price determination authority – dependent on exemption from the Competition Act

[43] Germishuizen, J. (2009): Does the private health care sector display oligopolistic characteristics in South Africa? https://scholar.sun.ac.za/bitstream/handle/10019.1/996/germishuizen_health_2009.pdf?sequence=3

[44] Medi Clinic Annual Report 2010. http://media.corporate-ir.net/media_files/irol/14/145797/AR2010.pdf

Appendix 7: Provider – Public

Provider

Public Healthcare

Ranked 179 out of 191 countries surveyed in 2001 by the World Health Organization for expenditure versus outcomes in health, South Africa - although making huge strides towards "Health for All" - is still plagued by preventable epidemics, poor leadership and inequitable access to health services. [45]

Interestingly, 95% of all South Africans now have access to health services within a 5 kilometre radius of their homes. Tragically, this has not translated into equally impressive improvements in health outcomes.

Distribution of Healthcare Services between Public and Private Sector: [46]

	Private Sector	Public Sector
Population per general doctor	588	4, 193
Population per specialist	470	10, 811
Population per nurse	102	616
Population per pharmacist	1, 852	22, 879
Population per hospital bed	194	399

The World Health Organization established a health worker threshold that is used globally to measure the coverage of health workers relative to the population. The benchmark to achieve acceptable coverage levels for essential health services is 2.3 health workers/1,000 population, or 23 Doctors, Nurses or midwives per 10,000 people. 47 Not surprisingly, South Africa falls far short of these figures. Health system strengthening, including "task shifting," the standardization of management and increasing public health training, coupled with an extension of services into rural and peripheral areas48 are identified as critical areas of opportunity to improve both health outcomes and efficiencies of the health system.

Health Reform dominates the national agenda:

National Health Insurance

The Government has set out an elaborate target for the improvement, expansion and revitalization of public healthcare infrastructure and services. In order to ensure the longevity of the revitalization programme, a parallel health systems strengthening plan has been proposed, which includes:

a. Improvement of infrastructure for the provision of health services;
b. Improved functioning of district health councils;
c. The primary healthcare approach;
d. Delegation of authority to managers;
e. Improved staffing;
f. Importing of health workers into South Africa;
g. Training of health facility managers.

Off these seven, the primary healthcare approach is considered most pertinent to the mobile community. There are two reasons. Firstly, the expected number of health workforce likely to be included in the healthcare delivery model and secondly, the additional percentage of the population that are likely to be serviced by these additional workforce.

80% of ALL care projected to be delivered by PHC services under NHI

The primary healthcare approach:

Under the new NHI public and private healthcare providers will be accredited according to a defined set of criteria which will specify the minimum set of services provided by primary, secondary, tertiary and quaternary healthcare facilities. The Government has stipulated that apart from resource constrained areas where negotiations will be entered into, health providers must operate within multi-disciplinary teams to deliver comprehensive health services. This is important for the mobile industry when deciding on the level of the health value chain that they want to be control and points towards more strategic partnerships within existing health stakeholder groups.

Specific to primary healthcare, the NHI aims to provide 1 team of doctor or clinical assistant, a nurse and 3-4 community health workers (CHW's) per population of 10, 000. With the current number of CHW's (60, 000), the number of CHW's per team can be at least doubled. These teams will be supported by health professionals operating in fixed health facilities as well as a network of group practices contracted into the NHI system.

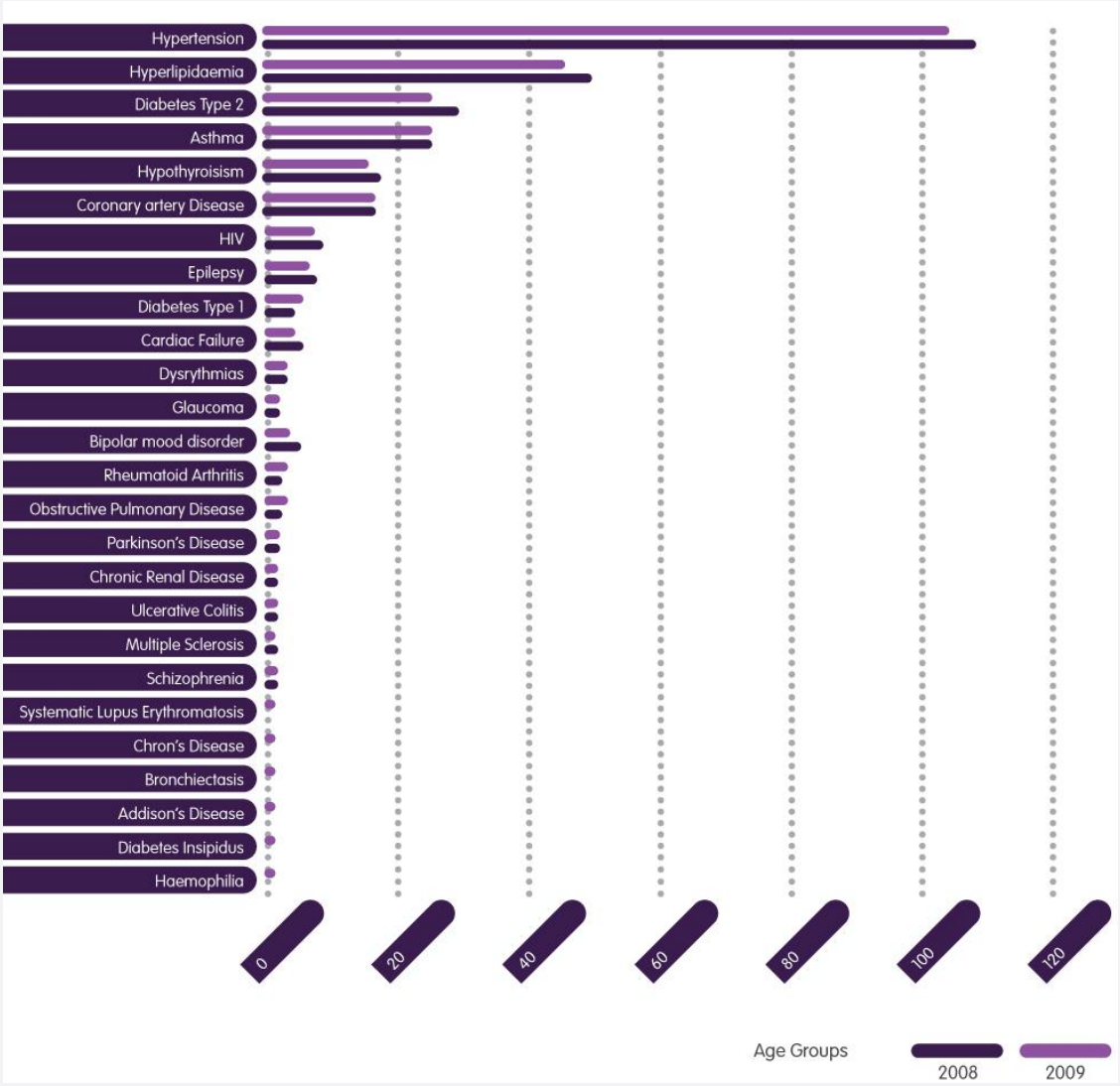
[45] Measuring Overall Health System Expenditure for 191 Countries (2001). http://www.who.int/healthinfo/paper30.pdf
[46] Health Systems Trust. South African Health Review (2004/2005)
[47] WHO World Health Report 2010
[48] Human Resource Requirements of National Health Insurance

Appendix 8: Consumer – Insured

Consumer

Insured Individual

For the insured individual, the disease burdens follow those of developed economies: the table below represents the burden of disease amongst 1000 beneficiaries. Non-communicable diseases far outweigh communicable diseases.

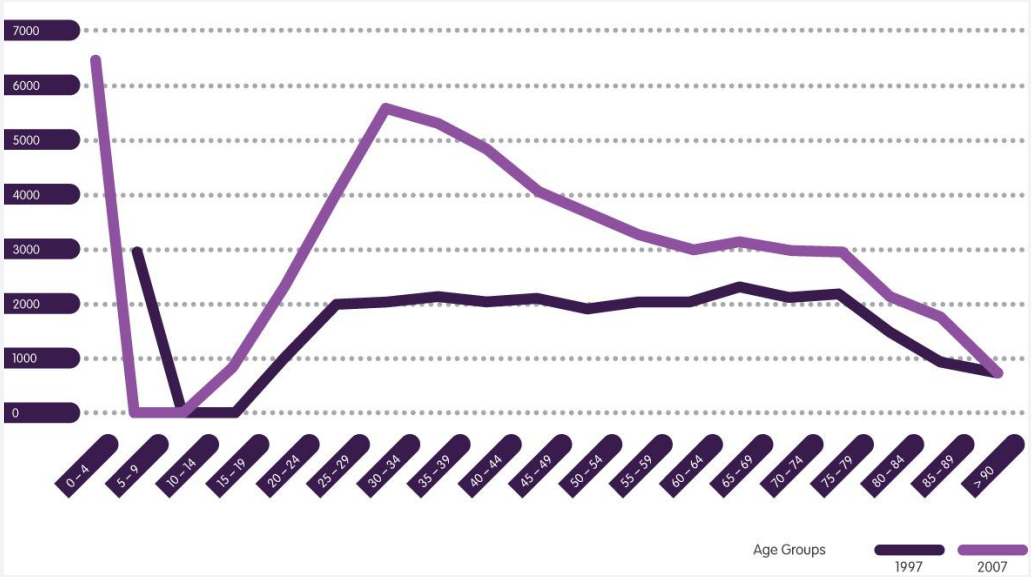


Appendix 9: Consumer – Uninsured

Consumer

Uninsured Individual

The health needs of a consumer are best expressed in terms of their burden of disease. Although this differs remarkably between the insured and uninsured populations, the burden of disease facing South Africa as a country is best represented in the following graph. The huge increase in 2007 amongst 20 – 54 year olds is largely due to the HIV/AIDS and TB epidemics which have ravaged the country. [49]



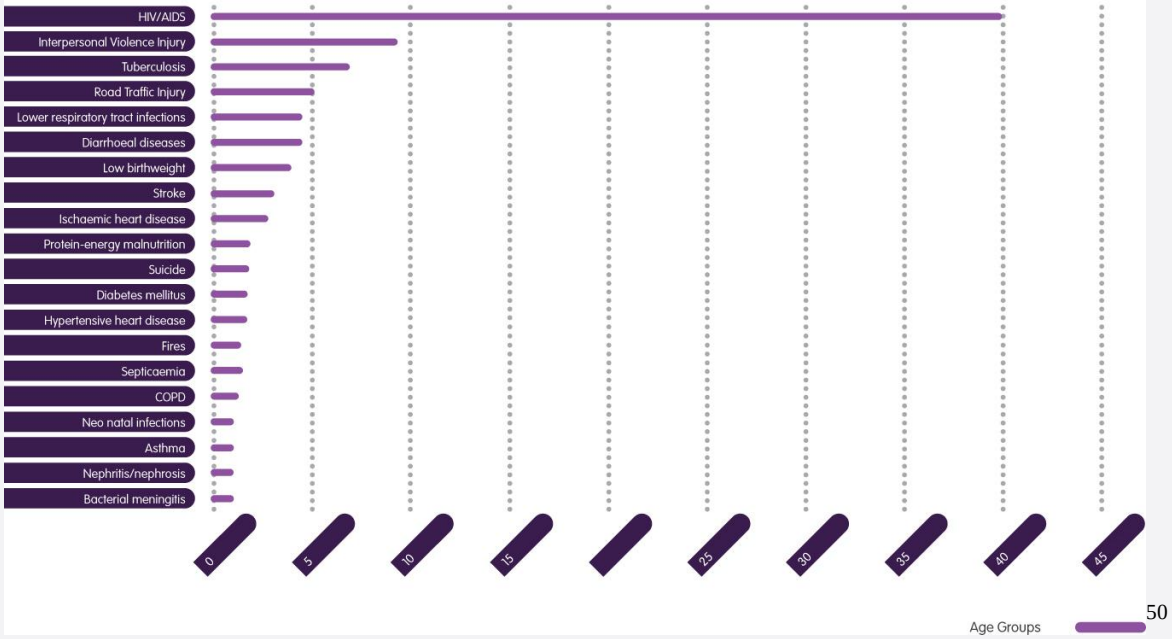
The table below shows the burden of disease amongst the uninsured population. Although data represents disease conditions in 2000, it is estimated that the burden has not changed significantly. Worth mentioning is the fact that hypertension and ischemic heart disease, similar to the insured population, are creating a greater burden in 2010 than one decade previously.

South Africa continues to have one of the highest HIV/AIDS infection rates in the world. Of the two million people who are in need of anti-retroviral medicines, only 30% of patients are currently receiving medicines. The DOH has launched a national HIV counselling and testing campaign (HCT) aimed at testing over fifteen million people and providing treatment for a significant proportion of those who clinically require ARV's. Current Mobile Health projects in this area are discussed in more detail in following sections.

Domestic violence, drug and alcohol abuse remain a threat to communities and families. Tuberculosis and the recent multi-drug resistant TB outbreak throughout the country once again highlight the futile efforts of current intervention strategies.

Four of the top six burdens of disease can be regarded as communicable diseases – preventable through effective individual accountability, community support and national promotion strategies. Even more startling is that six of the top seven are diseases which affect women and children. In line with millennium development goals 4 & 5 (child mortality rate and maternal health), South Africa is being forced to consider more comprehensive, effective and efficient interventions able to improve these indicators.

[49] South African Health Review, 2008. http://www.hst.org.za/generic/29



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[50] Bradshaw, D. (2003). Initial burden of disease estimates for South Africa, 2000. South African Medical Journal (9): 682-88.