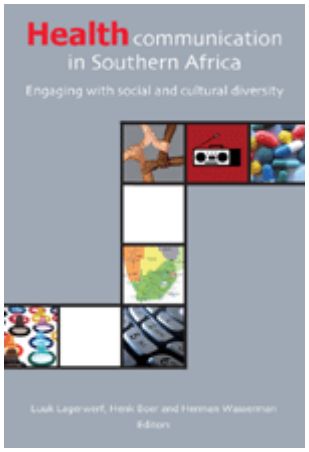
Health Communication In Southern Africa ~ Cell Phones For Health In South Africa



Abstract
There is widespread global use of technology in medicine and health communication, leading to terms such as telemedicine, telehealth and e-health. A wide range of information and communication technologies (ICTs) is used both in the provision of services, as well as for messaging and communication campaigns. In South Africa, limited Internet penetration has led to increased experimentation with cell phones as a tool for social change. This paper provides a discussion of three of such projects: The Teen SMS Helpline of the South African Depression and Anxiety Group (SADAG); SIMPill which assists patients with compliance to their tuberculosis medication; and CellLife's Cell phones for HIV programme. The projects are described, and the paper reflects on the general possibilities for using cell phones in healthcare, weighing advantages and disadvantages, particularly in the local South African context.

Introduction
The global trend of using new technologies in healthcare and health communication has made its way to Africa. A range of healthcare initiatives makes use of palm devices, the Internet, and other information and communication technologies, giving rise to the terms e-health, tele-health, and telemedicine (see Oh, Rizo, Enkin & Jada, 2005, for a literature review on the topic).

While the growing body of literature on this subject explores both the Internet and cell phones as 'new' media in the use of health promotion efforts, it is cell phones that are emerging as most popular, and possibly most effective, in health communication on the continent. Internet penetration in South Africa is increasing steadily, but the numbers of people with access to high-speed Internet connectivity here and elsewhere across Africa are probably still too low to allow the widespread success of Internet based applications, outside of telecentres set

up specifically for this purpose. Recent statistics indicate that only one in 700 Africans has access to the Internet, versus one in four Europeans (Chakraborty, 2008).

On the other hand, the number of mobile subscribers in Africa has increased dramatically over the last few years. In 2007 Africa added over 60 million new
mobile subscribers and mobile phones represented 90 percent of all telephone subscribers (African Telecommunication/ICT Indicators, 2008). Indeed, cellphone penetration in Africa has increased rapidly since the privatisation of telephone monopolies in the mid-1990s (LaFraniere, 2005). Between 2000 and 2006, the total number of subscribers to cellphone services increased from 10 million to 110 million, in the 24 countries of sub-Saharan Africa, and South Africa had more subscribers to cell phones than fixed lines (Buys, Dasgupta, Thomas & Wheeler, 2008). Similarly, an earlier study revealed that the number of mobile subscribers in 30 Sub-Saharan countries rose from zero in 1994 to more than 82 million in late 2004 and the rate of growth for the entire continent has been more than 58 per year (Mbarika & Mbarika, 2006). Clearly, Sub-Saharan Africa is the world's fastestgrowing wireless market and the rate of growth for the entire continent has been more than 58 per year (Mbarika & Mbarika, 2006). In South Africa, cellphone use is widespread, particular with the introduction of pre-paid services; and there are over 30 million users (Shackleton, 2007).

Drawing on Kaplan's (2006) definition of 'intervention' to mean the intentional use of cell phones to achieve a specific health-related outcome, this paper surveys past and present cellphone 'interventions' in South Africa, drawing on an extensive literature search and qualitative interviews with project leaders. There is an extensive array of literature on a range of projects using cell phones in health communication (see McBride& Rimer, 1999, who provide a literature review), but there is little literature documenting such projects in Africa. Furthermore, in South Africa, the idea of cell phones for development (including health) is not new, but while there are some disparate articles on specific projects, there is little scholarly work on the subject.

This chapter thus provides an overview of the area of cell phones for health in South Africa, with brief discussions of three of the largest and/or longest running projects: The Teen SMS Line of the South African Depression and Anxiety Group (SADAG); The Cell phones for HIV project run by CellLife; and

SIMPill, previously known as the TB Compliance Project.

Background: Cell phones in Africa

Before discussing these three projects, first a brief look at how cell phones are currently used in the region, to provide some context to the situation in South Africa.

As a result of widespread penetration, cell phones have been widely used across Africa for a number of applications. In various countries including Kenya, Senegal (Mbarika & Mbarika, 2006) and Sierre Leone (The Economist, 2008), they've been used for political activism, where citizens can report ballot fraud via SMS. Cell phones have also proven useful for isolated communities to participate in the global economy e.g. farmers in Uganda have used cell phones to find out about the latest crop prices (Gray, 2006).

In South Africa, cell phones are already used quite prolifically for a number of applications. Students in their final year of school can access their final school year results by SMS as part of a service offered by the Department of Education. A project called the Mobile Dictionary (MobiDic) allows users to access dictionary entries via their phones, sending definitions of words by return SMS; the Department of Home Affairs department is piloting a system which allows citizens to receive SMS notifications on their cell phones regarding the status of their applications for passports and other documents. The organization Abahlali baseMjondolo has used mobile phones extensively as a way for people in settlements across the city to stay in touch to arrange meetings, share information and mobilise citizens for what they call 'cell phone toyi-toyi', where members SMS an official to request a meeting (Shackleton, 2007). Similarly, the UmNyango Project, in KwaZulu Natal, set up an SMS gateway to distribute messages to rural women and also allowed them to send messages to paralegals if they needed help with incidences of violence or threats to their access to land (Manji, 2008). With widespread access to cell phones and the introduction of more affordable payment options, South Africans already use cell phones widely for a range of applications, from cellphone based online banking, to online chat systems such as MXit (see Bosch, 2008).

The progression to using cell phones for health-related services seems natural given the high saturation of the technology; and the use of cell phones for healthcare applications in the rest of the continent is already widespread. In

Rwanda, the Manyange project uses cell phones for health workers to call up the records of pregnant women from an online database and then tell caregivers what to do in an emergency. Each phone has a training manual on material and childcare with pictures and audio instructions that can be sent to families. Around 143 private and public health centres in Rwanda use Tracnet, a system that uses cell phones to collect information on patients' infections, and to keep track of which medicines are available in each health centre, making shortages of antiretroviral medicines less common (Kimani, 2008; Chakraborty, 2008).

Information about a polio outbreak in Kenya became available because health workers were using hand-held devices to collect survey data (The Economist, 2008). Further, a recent edition of The Soul Beat (2008), a newsletter distributed by the Communication Initiative, profiled several initiatives currently underway in Africa. These include MyQuestion and MyAnswer,a Nigerian project which allows young people to request information on reproductive health and HIV/AIDS via SMS; a cellphone project in the Democratic Republic of Congo (DRC), set up to monitor and report on child rights violations; and the edutainment Freedom HIV/AIDS Game based in India and six African countries, among others.

Most of these applications make use of text messaging or SMS, although, as discussed below, there are other ways to use cell phones in the field of health communication. While text messaging has been slow to rise in some markets (e.g. the United States), Goggin (2006) documents its widespread popularity in Japan and the Nordic countries. Text messaging is similarly popular in South Africa, particularly as it is much cheaper than voice calls. SMS thus has obvious advantages, most importantly its relatively low cost. Moreover, SMS messages can be sent even when a user's cellphone is turned off (and they can then retrieve the message later), SMS messages are private; and sending SMSes is already a widely diffused technology, meaning that there's no need to train participants to use the technology. But there are also some limitations: SMS messages are limited in the number of characters (160), illiterate participants cannot use them, and they do not promote the interactivity or complexity of interpersonal feedback.

Cell phones for health in South Africa

Several projects in South Africa have used various aspects of mobile telephony for health communication. Following international trends, most of these began with using cell phones to help patients with adherence to drug routines. The

Perinatal HIV Research Unit (PHRU) in Soweto conducted a pilot project with DocVia.com to provide drug and appointment reminders. Similarly, the Dokoza Project was piloted for six weeks over November and December 2004 at the HIV/AIDS Adult Clinic at the Helen Joseph Hospital and the Paediatric Clinic at Johannesburg General Hospital in Gauteng.

The aim of the piloted system was to fast-track the roll-out of anti-retroviral treatment (ART) in resource poor settings, with its capacity to collect and disseminate real time data (e.g. patient registration, obtaining patient medication history etc) and transaction information for patients receiving ART and TB treatments (White & Patel, 2005); as well as offering hospitals a common interface to the National Laboratory System to allow fast access to blood test results (Spur, 2005). This system was designed to allow for a range of real time updates, and it was anticipated that applications would extend to allow hospitals to use cell phones for national searches to track where patients are registered and when the latest medication was dispensed, or to provide instant feedback about possible duplication of services (White & Patel, 2005).

Similarly, a second pilot project, at Brits Hospital in the North West Province, was set up to manage patient numbers, as a result of the common phenomenon where patients, many of whom travel long distances, are often turned away because there is no mechanism to anticipate demand (White & Patel, 2005). A company called Mohwiti Technologies set up AccessHealth, for the Department of Health, which involves using cell phones to improve patient referrals between local clinics and district hospitals. Similarly, the UWC Project, is an ongoing pilot in the rural Eastern Cape involving the remote Canzibe Hospital and Lwandile Clinic in Libode District. It uses a long-range WiFi network, and WiFi enabled smartphones in addition to mobile applications such as MXit, Skype and Fring, to cheaply allow communication between rural hospital doctors and clinic sisters – e.g. test results can be photographed and sent via the wireless network from the satellite clinics for instant analysis (Shackleton, 2007).

South Africa presents an interesting case study with its simultaneous high levels of diseases like HIV and TB together with high cellphone penetration. And as such, there seem to be some obvious possibilities for drawing links between these two trends. As the project manager of the NGO CellLife, says:

For the first time that I'm aware of, there's now an interactive digital

technology, literally in the hands of the majority. So now most people in a township or remote rural area literally have one, which means you're close to 90 of people who have access to one through a family member neighbour etc and I doubt that's ever been the case before (Benjamin, interview, 14/6/08).

The following projects will be described in further detail below: The SADAG Teen SMS Helpline, SIMPill and CellLife. These cases were selected as they are the oldest and/ or longest running projects using cell phones in the country; and because of their perceived high levels of sustainability i.e. all the other projects found were short-term pilot projects, with limited utility beyond their test period.

SADAG Teen SMS Helpline

The South African Depression and Anxiety Group (SADAG) launched an SMS project in 2000, to provide psychosocial support to distressed teenagers in an
attempt to reduce the high teen suicide statistics. This is a good example of a project that provides a counselling service via cellphone technology. Teenagers send an SMS to the number 31393, and a counsellor replies to the message. According to the project director, Janine Shamos, the centre receives between 30 and 50 SMSes per day, and more during peak periods e.g. during stressful exam periods; and the content ranges quite widely, from teenagers or their parents seeking basic information, to counselling requests for very specific problems.

They ranged from things like "I think my daughter needs help" to "I've tried to kill myself 5 times, I hate my life. I want to die tonight, Please help me". In that kind of a case obviously we would actually phone the person back. But we do get a wide range of different things coming on SMS. But the first point of contact from us would be to say thank you for contacting the centre, we got your message, please give us a call we can help you so much more if you phone us. Very often we'll get someone SMS'ing back and saying I don't have a landline or its too expensive and then we'd say to them would you like us to call you back and we will then, because if someone SMSes and says "Hi I'm looking for the nearest branch of alcoholics anonymous in my area", fine we'll send that to them on SMS, not a problem. But if someone calls and says "I want to kill my 3 children" we're not going to risk it over SMS, we need that proper, face-to-face contact, we need that voice-to-voice contact (interview, Shamos, 23/6/08).

In this instance, the SMS line is used mainly as the first point of contact, and not

for actual counselling. SADAG explained how the idea arose after a school programme they ran called Suicide Shouldn't be a Secret, where informational talks in schools in the Gauteng region were introduced as a response to the rise in teen suicide in South Africa. While teens posed lots of questions to the visiting counsellors after each talk, they seemed hesitant to call the centre's toll-free line afterwards. As a result, the centre then decided to introduce an SMS line, as a potentially easier way to encourage young people to initiate contact.

A lot of people and particular kids – you know teens are so used to SMS'ing, it's so second nature to them they've forgotten how to speak to people – it's a lot easier to SMS a couple of times, get some feedback, get some reassurance that what they're doing is the right thing, and then they're happy to call us in. And we've found that definitely with the teen suicide programme (interview, Shamos, 23/6/08).

While originally started as a service to teens, the SMS line is now open to the general public. The centre drew on the popularity of texting to encourage people who need counselling to make the initial contact with the centre, in a way that is possibly less intimidating than a telephone call. The almost impersonal nature and relative anonymity of the text message could potentially relieve the stress and embarrassment of direct voice contact with a stranger regarding emotional and psychological problems.

Remembering a 5-digit number is very, very easy, and people SMS because it's second nature. You're sitting watching TV, you've got your phone in your hand, it's much quicker. And what people have said back to us is that they want to test the waters a bit and see that someone is really there, so that if they do phone the phone is not going to just ring and ring, there is a human on the other end of the line who is waiting for their call and is going to take them seriously and once they know that that's there, then they're prepared to phone us back (interview, Shamos, 23/6/08).

The SMS line operates between normal toll-free line hours of 8am and 8pm, with counsellors on duty to respond immediately to messages or to call back in urgent cases, or when a potential patient does not have access to a landline. After hours, Shamos can access the SMS system from home via the Internet.
SADAG are also exploring using the South African based instant chat system MXit, as well as online social networking software Facebook, in a similar

way. But Shamos stresses that the function of the SMS is merely to initiate contact; and that similarly, Facebook would only be used to create an online group and to give people enough information about mental illness so that they either feel less isolated or seek help directly from SADAG (or any other similar service providers). As such, text messages are used mainly to make their services more accessible to people who might be afraid to call the centre directly. As Shamos explains,

Ethically we don't do counselling over SMS, it's just far too risky to all parties. But it is something that at least allows people first contact, and that's often the hardest part. Sometimes picking up a phone can be very, very scary for them. So SMS kind of neutralises that fear a little bit, so we're quite happy with how it's working (interview, Shamos, 23/6/08).

SIMPill: Monitoring drug adherence

This second case is a good example of a project that uses cellphone technology for drug adherence, helping or reminding patients to take their medication. Unlike some of the other projects, which are run by NGOs, SIMPill operates purely as a commercial enterprise. The project was set up in 2001 as The Compliance Service, providing support for patients taking TB Treatment through SMS. Based in the Western Cape, it was designed to increase patient compliance with TB drugs, as Cape Town has one of the highest TB infection rates in the world due to socioeconomic and climatic factors; and in addition, a high rate of non-compliance which increases the virus's resistance and renders expensive medicines useless. TB patients must strictly follow a complicated drug regime over an extended period of time, which they often neglect simply because they forget; and this non-compliance with the drug treatment has burdened local health care services (Gray, 2006).

Project director and medical doctor, David Green, partnered with the City of Cape Town to run a pilot project, which tested the use of cell phones to remind patients to take their medication, and which had a very high success rate (only 1 treatment failure out of the 138 participants). He explained that there was such a great demand for the technical capabilities that the company then expanded from being just a compliance project to an larger company called On-Cue (of which the former was a part). Today they form part of an even larger company called Neil Harvey Associates. Green explains that the project arose out of the concern to avoid sending spam or unwanted messages to patients.

One of the things that we discovered in On Cue is that sending people a message at least once a day and in the case of HIV twice or three times a day, irritates people. The novelty very quickly wears off and they develop what I call message fatigue. That is they know what the message is and it irritates them more than is helpful. So then I set about trying to work out how we could send them messages only when they need it, and then I developed SIMPill (interview, David Green, 27/ 06/ 08).

SIMPill provides a special pill bottle that delivers an SMS to a central server when the bottle is opened, sends a message to a central server; and which can be programmed to send a message to the patient or to their support services e.g. family and friends, or community health workers (Verclas, 2007), if they don't open the pill bottle, based on the assumption that the patient has not taken their medication. The service is currently offered to a number of TB and HIV patients around the country, and the project partners with government and a medical scheme. In this case, the costs exceed the price of a simple SMS message.

It's fairly expensive, the SIMPill bottle itself has a full radio frequency module in it, if we put all the screens and buttons on it, it'd be a fully functional cellphone, and there's no other way of doing it. And then there's sending the messages from the bottle and so on (interview, David Green, 27/ 06/ 08).

SIMPill do not send unsolicited SMS messages, but Green says that they often 'flood' for a few days when a patient initiates therapy, as well as sending monthly messages, which include a call-centre number, to remind patients to pick up their medication refills.

If it's a newly diagnosed diabetic, for example, it might be information about why it's important to get eye care or look after your feet or take your medication. Once a week we send out humour, just a random joke, it's got nothing to do with anything, and then a reminder to take your medication; just to try and break the tedium and to try and get people to pick up their phone and look at it (interview, David Green, 27/ 06/ 08).

The messages sent are only in English, a decision made after feedback from focus groups with speakers of other languages, who indicated that they would prefer to receive messages in English. Green believes that the success of the project is directly linked to their expansion as a commercial entity.

I can only reflect on why we've been successful, and this is going to sound really harsh, but it's partly because we shelved the social entrepreneur concept quite early on, and that's almost directly opposite to how CellLife's gone about it. But we said we're going to have to make good amounts of money and employ the right people and for that we have to make sure we can sell our product. So we've pursued a commercial path quite aggressively and that's allowed us to continue doing what we're doing (interview, David Green, 27/ 06/ 08).

CellLife: Cell phones for HIV

The final case is an example of a multi-pronged project that uses cellphone technology to assist with the dispensing of AIDS drugs, to help healthcare workers in the field to gather patient data, and to provide individuals with pro-social messaging aimed at targeting behaviour change. While the commercial product SIMPill was found to be effective in assisting patients with their TB medication, assessment results were inconclusive in the utility of the system for HIV/AIDS projects. On the other hand, the NGO CellLife Project was set up specifically with HIV and AIDS in mind. Set up by researchers at the University of Cape Town, in conjunction with the Peninsula Technikon in 2000, the name comes from the idea that a cellphone or SMS could save your life. Specially tailored cell phones were programmed with a list of questions which counsellors posed to HIV positive patients during home visits. The answers would then be sent via text message to a central database monitored by doctors and health workers, who could respond to urgent requests (Harrison, 2005).

Currently, there are two main elements to the project: Firstly, a software system (called CellLife) is used to assist with the dispensing of anti-retroviral drugs to people with AIDS. As general manager, Peter Benjamin, explains:

It's a software system basically to manage the pharmacists, patients and prescriptions and stock levels and reporting that assists, particularly under-resourced clinics, to be able to dispense the ARVs. And that's currently in about 20 clinics, about 25 000 people get the drugs every month. It's currently in 5 different provinces … (interview, 14/6/08).

The organization, registered as a Section 21 non-profit company or NGO, still develops applications that use cellphone based software to replace paper questionnaires in the field. This is currently being used for an NGO called the Community Health Media Trust, whose trainers in the field use the system to

return information about patients at their workshops.

The most interesting project that CellLife is currently embarking on is a 3-year pilot programme called Cell phones for HIV. The major premise behind this is quite revolutionary. Benjamin and his colleagues have been exploring ways to provide people with information at as low a cost as possible or free of charge, as well as to develop a system that will work on all handsets. Firstly, people will obviously have to opt-in to avoid sending spam SMS messages. Secondly, Benjamin's idea is that these people can send what's called a "Please Call Me", which is commonly used in South Africa and completely free. By sending a message, free of charge, to another user, the latter receives a text message which reads "Please Call Me". Instead of responding with the limited characters of an SMS, the response will be in the form of a public service announcement (PSA), which the user will retrieve from their voicemail box (retrieving voicemail is also free for South African subscribers).

What I was missing is something blindingly obvious- voicemail. Send it to their mailbox and the person does a normal check their voicemail. So how can you push the sound from here to here [from sender to user]. You can do a normal phone call but that's the normal cost of a phone call. WASP (wireless application service provider) 180 of them in the country – what these Wasps can do is to push via ftp a .wav file from the system to the voicemail and it's 45 cents for one minute. And I've done embarrassing things like stand in front of the bathroom mirror for 45 seconds to see how much you can say…You can get about ten times the amount of information than in a regular SMS. And also as you obviously know you can get so much feeling and information as a text is so boring. (Benjamin, interview, 14/6/08).

One aspect of this is a partnership with the entertainment-education radio and TV programme Soul City, which will allow listeners and viewers to send a 'Please Call Me' at the end of the programmes, to give producers immediate feedback. Moreover, sending a message to a specific number will allow audio to be sent back in the language of your choice. This is particularly useful given that information on prevention is often most effective when it forms part of a larger multimedia campaign (Shackleton, 2007). CellLife will also be using a similar system in another project which will be run in conjunction with the Treatment Action Campaign (TAC) to allow them to communicate more easily with their 18 000 members (of which 16 000 have a cellphone, while only 600 have an email

address).

Despite the concerns raised by SADAG about 'online' counselling, CellLife also plans to tap into the existing and hugely popular South African based instant messaging system, MXit, to provide cellphone based counselling for people living with or affected by AIDS. This would be similar to the Dr Maths service already on MXit, where high school learners can send a MXit message to a maths tutor, and immediately receive feedback for help with their homework. In fact, researchers found that teens using this service often attempted to develop a social relationship with the anonymous Dr Maths, often logging just to say hello, or asking for counselling, even though tutors were prohibited from asking or answering personal questions (Butgereit, 2007). An earlier study among adolescent girls (Bosch, 2008) has shown the prevalence of MXit and how youth use cell phones to navigate and make sense of various aspects of their lives, including peer and parental relations, self-representation and identity formation.

Discussion

What this exploratory discussion shows is that cell phones are on the rise in South Africa, and that they are already being used in interesting ways in the field of health.

While critiques of the so-called 'modernisation' paradigm are well documented, many international agencies (and sometimes local NGOs) continue to promote information and communication technologies (ICTs) in Africa, often seeing these as a solution to development problems. But many authors (see for example Alzouma, 2005) have argued that this techno-centrist approach ignores local social conditions and incorrectly assumes that access to ICTs will leapfrog people into a technological world of economic opportunity.

However, cell phones are often perceived in a different light, and several argue that the increasing penetration of cell phones can promote development, particularly in their use to coordinate and mobilise demonstrations; or to provide information about health issues. As Benjamin argues,

Most of the discourse around these new technologies is assuming that they are almost obviously beneficial. And the whole dynamic is of the digital divide, that the only problem is that people don't enough cell phones or computers or websites and so the problem is to get websites and computers into rural villages. I

don't agree with that at all. The majority of the products I've seen are quite naively just pushing the technology out there (Benjamin, interview, 14/6/08).

Benjamin argues for a different approach to Castell's network society, based on a Freirian approach, for which he has coined the phrase, 'informatics of the oppressed'.

If the overwhelming ideology is that you plug in and absorb other people's content, CNN, Hollywood, BBC … then in exactly the same way that Freire said, the answer isn't rejecting information networking, but is to base it on knowledge, experience and values of the people. So what we're trying to do is seeing if we can get people using these systems to exactly the principles of conscientization, to reflect upon their experiences, reflect their views and link to people with similar views to together develop knowledge, rather than just knowledge absorbing what the latest Hollywood film is (Benjamin, interview, 14/6/08).

Certainly, the rise of cellphone activism in South Africa demonstrates the potential usefulness of the technology, as an expression of Benjamin's informatics of the oppressed. During the recent xenophobic attacks around the country, an SMS line was set up by a coalition of NGOs to allow South Africans to express opposition to the attacks, donate money or to report an attack. Community activist, Mark Weinberg who was involved in this project, explains, they were receiving a lot of SMS messages and calls from cell phones during this period, and the "Say no to xenophobia" SMS line was a natural extension of this cellphone communication.

Cell phones are an immensely popular medium of communication amongst the working class and the poor. There are two contradictory tendencies. One is that it's by far the most democratic form of communication we've ever had – everyone owns and controls one [a cellphone] … while at the same time we've got this crazy monopoly situation with 3 or 4 countries that control the infrastructure and make these outrageous prices. Cell phones at the moment are prohibitively expensive to make them your primary means of communicating and accessing information.

One might assume that the use of cell phones in health may become an extension of these kinds of mobile community activism, particularly as convergence allows for increasingly interesting and useful applications, which might include using cell phones to access radio signals or even the Internet. In addition, cell phones

offer relative privacy within the context of high stigma associated with diseases such as HIV and AIDS, they have already diffused widely among the population; they are relatively cheap and accessible, and they are already being used informally for support and information sharing.

However, what is missing from the debate is the notion that the 'medium' might not be the 'message' (to paraphrase McLuhan's famous conjecture). The major challenges for health communication in Africa remain the same, which might be reduced to the so-called KAP gap, or the gap between knowledge, attitudes and behaviour. And as such, there appears to be little empirical evidence to demonstrate the utility of technology, cell phones included, in health communication. At a basic level, the main challenges in the field are increasing knowledge about a specific health issue, changing a target audience's attitude towards a positive orientation, and adopting a specific practice or changing behaviour and adopting the desired practice, which could be anything from using a condom to learning how to correctly treat water for drinking. While cell phones are certainly useful in providing information about health issues to populations who might not be reached through traditional means, the long- term challenge in the field is closing the gap between knowledge and attitude. Whatever the chosen medium, the communication challenges will remain the same. As Benjamin says,

Cell phones, in particular automated systems, SMS or others, are pathetic at behaviour change, they just can't do it. It's close to laughable to think that someone will choose not to have unprotected sex if they're slightly drunk or under pressure on a Friday night because they get a beep and see 160 characters, that just doesn't happen. Particularly the automated systems are useful if people already want the information. So if people are requesting the information for example "I need a test, where do I go", or "I'm worried about this symptom, could it be AIDS". If people are requesting information, cell phones are great. If you're talking about behaviour change, they're pathetic (interview, 14/6/08).

Of course, these kinds of interventions are useful for providing information and increasing knowledge, a critical step in the behaviour change process. However, there are no clear indicators as to whether the delivery medium has any impact on health outcomes or audience responses. Kaplan (2006) has argued that the overall lack of well designed, randomised clinical trials with economic evaluation to confirm or refute clinical and economic benefits with mobile phone/healthcare interventions is an evidence gap that should be addressed in a

systematic way. In other words, the message is still most important. Some research also seems to indicate that the mass media is not the primary factor in behaviour change, but that it is rather opinion leaders (who consume mass media messages), who are most instrumental in placing health issues on communities' agendas and thus endorsing or promoting behaviour change. As Manji (2008) similarly argues, while cell phones offer many new opportunities and tools, people are the resource most central to development, and cell phones should thus be seen useful as only one part of a strategy in which people are prioritised, a sentiment echoed by Green.

It's not about the technology … it's about the people sitting at our call centre, those DOTS [Directly Observed Treatment for TB] workers. If we send a text message from the SIMPill system to a DOTS worker, who's a very poorly paid community worker; if they take the message and they delete it then we've failed. If they take the message and say someone that I'm getting my R390 a month or whatever is in trouble, and goes to that person's house, the system works. So the weakest link is always the people and not the technology (interview, David Green, 27/ 06/ 08).

Another area that needs further research is the cultural implications of cellphone usage. As Kaplan (2006) aptly points out, the premise of cell phones for development is based on the developed world model of personal cellphone ownership, which may not be culturally transferable to the developing world where shared mobile telephone use is important. But in South Africa, the popularity and wide penetration of cell phones (and individual uses thereof) seems a clear indicator that it may be the new mass medium through which to reach potential audiences with health related information and messages targeted at pro-social behaviour.

The successful rise of online banking via cell phones for sectors of the population unable to access the Internet, is only one indicator of a new cellphone culture here. There will always be financial and regulatory barriers, with buy-in needed from government and regulatory reforms required for proper operation of basic and valueadded telecommunications services, if mobile telecommunications are to be used for healthcare initiatives (Kaplan 2006). But without championing the modernisation paradigm, it is clear that cell phones could be one way to reach large numbers of people, particularly youth. While inter-personal communication is probably still most effective in the arena of persuasion, cell phones can play a

key role in increasing knowledge and awareness of health issues and desired behaviour.

But there are obviously still several disadvantages, the major one being that those who will receive any kind of cellphone messages will need to opt-in and subscribe, which might mean that those who really need the information are bypassed, with those already on the steps to behaviour change the only ones receiving the information. There are also still some technical challenges, the main of these being that people often can't charge their cell phones in rural areas. While the technology exists in the form of solar powered chargers, these are not freely available in Africa. Some have found ways around this, such as using car batteries to charge their phones, but this is still fairly limited. There also appears to be a trend of single and limited pilot projects in the field of cell phones for health, and more extensive piloting is required, together with economic modelling, in order to determine the benefits of the health sector embarking on larger implementation (Spur, 2005). The main reason for these short-term projects is that while there is government policy to roll out pilot projects, once a project is tested, an often lengthy and expensive tender process is followed (Shackleton, 2007).

Other infrastructural challenges include lack of consistency in the national health arena, with health information systems varying widely between provinces and health institutions. As a result, even though the Department of Health's National Antiretroviral Treatment guidelines call for the use of technology to promote adherence (Shackleton, 2007), South Africa public sector institutions largely engage with mobile solutions in an isolated and case-specific manner. There is no comprehensive strategy guiding choice around the use of mobile technology, which results in these limited full-scale implementations (White & Patel, 2005).

Moreover, these kinds of interventions, while relatively cheap or free to the user, can be costly to the NGO or service provider. More work is needed to persuade cellphone service providers and networks to partner existing projects.

I know first hand … that the incremental costs of carrying an SMS on the networks is zero cents. So every single cent that the network charges you to carry an SMS is, after overhead, pure profit … they're making millions and I certainly believe there's an opportunity for them as well as government to come to the

party. I'm currently paying 22 cents per message and internationally we send out a million per day" (interview, David Green, 27/06/08).

Despite the challenges, cell phones in South Africa are a widespread and popular technology; and so it seems likely that they might be successfully applied both in the provision of healthcare, as well as in messaging and communication campaigns. Cellphone based services may not necessarily be more successful on their own, but together with other media, may help in the provision of more effective multimedia campaigns. The problematic nature of persuasion with regard to changing attitudes and behaviour will always remain, but cellphone technology may be a key element in the chain of knowledge provision and dissemination of information, both as part of communication campaigns and between health workers.

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