Report of the Multinational Symposium on:

Developing Sustainable African Health Care Delivery Systems for the Millennium

Held at:
The Lord Charles Hotel
in Somerset West,
Cape Town,
South Africa
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Executive summary

The International Medical Exchange, Inc. (IME) has been very active in assisting African nations in developing sustainable quality healthcare system. The ISIS Center at Georgetown University has been a leader in the use of telecommunication and information technology to provide healthcare services in variety of settings around the world. The idea of organizing a conference in Africa with the national healthcare experts was a result of a series of dialogue between the members of IME and the ISIS Center. After initial financial support from the US government was obtained, the Medical Research Council of South Africa agreed to co-sponsor and to host the Symposium, **"Developing Sustainable African Health Care Delivery Systems for the Millennium,"** in Cape Town, South Africa, from 30 September to 2 October 2002.

The Symposium was opened and attended by nearly one hundred delegates from ten countries, including seven African countries. It was preceded by a Pre-Symposium Workshop Day for the Partnership of the African Telehealth Centres of Excellence. The theme of the Workshop was **"The Role of e-Health in the Implementation of the New Partnership for Africa's Development (NEPAD)**." The objective of the Pre-Symposium Workshop was to develop a coordinated programme of action to facilitate the introduction of information and communications technology (ICT) into the healthcare delivery systems in Africa. The delegates agreed that it has a role to play but that it must be applied appropriately and cannot be seen as a panacea to address all the continent's health problems. A particular concern was expressed over the shortage of doctors. More than a quarter of African countries have fewer than 10 doctors per 100,000 of population, compared with countries such as the United States, which has more than 200 per 100,000.

The National Department of Health Telemedicine Coordinators presented an overview of Telemedicine in different provinces of South Africa. An issue that came up for debate on several occasions was the cost–effectiveness of telemedicine. The National School of Public Health's distance education programme was also discussed at some length. Most of its distance education students are in Southern Africa, along with a few from as far away as Papua New Guinea and Kazakstan. Dr. Sam Gulube, from the MRC Telemedicine Research Centre, presented preliminary data which indicated a marked saving in referrals between the Witbank and Pretoria hospitals for closed head injuries due to the use of telemedicine, although this has yet to be quantified. The speakers emphasised that for any cost benefits to be gained from the technology, particularly in Africa, more study would be required to ensure that the telemedicine applications selected meet specific needs of the existing clinical environment. Other concerns expressed, were the low level of medical informatics education and research as well as the low level of IT use and the low (and slow) bandwidth telecommunications infrastructure in Africa.

The following findings and recommendations were adopted by the workshop:

- Noting the projected population increase in Africa over the next 50 years, it is recommended that IT be used to facilitate the development of the continent's medical education needs.
- That a group of "champions" for health informatics in Africa should be established.
- That there should be a strong core of people with medical informatics training in Africa.
- That there is a need to develop research capacity and research centres for medical informatics in Africa.
- That note is taken of current initiatives at the University of Natal, including the introduction of a postgraduate training programme in medical informatics (from 2003) and the implementation of a pilot multi-site project around databases.

- Points to consider in developing programmes for infectious disease in Africa:
  - Content: User needs (knowledge of target market), cultural values and behaviour change.
  - Involvement of users in the development process: Ownership, buy-in and sustainability.
  - Opportunities for collaboration.
  - Programme monitoring and evaluation.
  - Empowerment and capacity development.
- Investigate, develop, demonstrate and validate novel cost effective approaches to fully exploit existing telecommunications infrastructure.
- Develop sophisticated user-friendly evaluation frameworks to effectively match the cost, access and quality characteristics of telemedicine to the precise and detailed clinical, technical and social needs of the proposed utilisation.
- Create mechanisms to develop or acquire, validate and disseminate health-related distance learning and clinical software products that are reflective of a cultural consensus among key stakeholders.

The Symposium, with the theme *Developing Sustainable African Health Care Delivery Systems for the Millennium*, was opened by IME Medical Director, Dr David French. He suggested that the experiences of the Pan American Health Organisation (PAHO), now celebrating its 100th anniversary, might be inspirational. In particular, the activities around vaccines are worthy of note, as most of the benefits and work have accrued principally in the developing world. The plenary keynote address was given by Dr Salah Mandil, a former Director of Health Informatics and Telematics at the World Health Organisation and consultant to the South Africa Department of Health on Health Information Systems and Telemedicine. He stated that there are many examples of telemedicine applications in many parts of the world - by and large, there is solid proof that ICT can and is making a difference to health care services. He also brought some clarity to the jargon – "e-health," reflecting the greater role of the Internet, and "telehealth," reflecting the practice by all health care professionals.

In the session devoted to NEPAD, the participating countries – South Africa, Zambia, Malawi and Mozambique – gave presentations on the priorities and challenges they face. Dr. Shaheen Khotu, Director, National Health Information System, South Africa Department of Health made a presentation on Telemedicine as a contribution to the NEPAD Initiative. Most of the comments of the speakers from the other African counties were on the shortage of trained health professionals, principally due to the "brain drain," the poor state of equipment and disease problems including HIV/AIDS, malaria and TB. This was followed by an application of the technology in action, in the form of a live videoconference presentation by Dr. Seong Mun and Mr. John Scott from the Georgetown University Medical Center, who reviewed the American perspective on telemedicine. Of the examples quoted, the most common failure occurred where there was no mechanism to compensate the consulting physician.

In the concurrent Panel Breakout sessions, it was agreed that partnerships are a key to addressing the health care needs in Africa. The recommendations included strengthening existing partnerships and developing new partnerships, as well as developing tools to assist countries with partnership and related issues, and establishing a repository of projects available on a web. In terms of innovative approaches to providing health care, local solutions incorporating traditional practices need to be found that are appropriate for the settings for which they are intended. A range of new technologies are emerging globally, including PC-based applications for medical readiness and training as well as portable diagnostic packages. These technologies should be monitored and assessed for applicability in the African setting.

Prof. Rashid Bashshur, editor of the *Telemedicine Journal*, presented a paper on *The Role of*

Telemedicine in Meeting Health Needs in Africa. He recommended that one of the future editions of the *Telemedicine Journal* publication should be devoted to the African Telemedicine initiatives. Prof. Felix Konotey-Ahulu from the University of Cape Coast, Ghana presented on *AIDS in Africa: Obstacles to Health Care Delivery*. He cut provocatively through the accepted wisdom. According to his analysis of Africa's sustainable health care delivery, prognosis is 'hopeless' if the focus continues to be 'the symptoms' of the problem, and the principle obstacle to health care delivery for HIV/AIDS is 'rumours' fed by misinformation. The Open Discussion with African Deans of Faculties of Medicine and Public Health discussed the use of health information technology to improve medical education in Africa. The closing remarks and conclusion highlighted the importance of having a follow up meeting to this symposium to focus on action in establishing partnership projects for sustainable delivery of health care in Africa.

Introduction

The 2002 International Medical Exchange Symposium, *Developing Sustainable African Health Care Delivery Systems for the Millennium* was held at the beautiful Lord Charles Hotel in Somerset West, Cape Town, South Africa, from 30 September - 2 October 2002.

The International Medical Exchange has a history of bringing together Ministers of Health from several African nations with health professionals, policy makers, educators, entrepreneurs, and industry leaders to leverage advances in medicine, telecommunication, and information technology. Previous IME conferences/workshops held in South Africa and Kenya respectively, generated significant momentum in the health care arena resulting in requests from the Ministers of Health for IME to provide assistance in improving and expanding their capabilities of providing significant health programmes.

This IME health symposium, the third in the series, was hosted in collaboration with the Medical Research Council of South Africa and co-sponsored by the *U.S. Department of Health and Human Services,* Georgetown University Medical Center, World Health Organisation, National School of Public Health at MEDUNSA, the Africa Telehealth Educational Project, and LifeScan – a Johnson & Johnson Company. The symposium was organized to address the development of Health Initiatives for the Millennium focusing on information communication technologies to combat communicable diseases in Africa through the New Partnership for Africa's Development.

The objectives of the symposium *Developing Sustainable African Health Care Delivery Systems for the Millennium* were:

- To provide a programmatic framework for advancing communication and health information technology that can be used to relieve and reduce the negative influences on the health status of the populace of Africa.

- To review training needs and develop mechanisms for multinational collaboration to meet the stated needs.
- To initiate the development and the production of a cadre of ICT-proficient health care professionals, youth, and students from which Africa can draw trainees in ICT and health.

The symposium was preceded by a one-day Telehealth Workshop. The objective of the Workshop was to bring together African telehealth experts to develop a co-ordinated programme of action of African Telehealth Centres of Excellence to facilitate the introduction of telemedicine as an advanced technological tool to improve the delivery of sustainable health care services in Africa.

Pre-symposium Telehealth workshop day – Monday, 30 September 2002

The theme of this Pre- Symposium Workshop for the Partnership of the African Telehealth Centres of Excellence (PATCE), organised by the Medical Research Council of South Africa and the Africa Telehealth Project, was *The Role of e-Health in the Implementation of NEPAD.* In welcoming the delegates to the Workshop, Dr. Gulube referred to the famous Zulu saying that "Sizophonsa itshe esivivaneni" which can be translated as "We have come to throw a stone for the building of the foundation." He stated that the objective of the workshop was to bring together African Telehealth experts to develop a co-ordinated programme of action to facilitate the introduction of telemedicine as an advanced technological tool to improve the delivery of sustainable health care services in Africa.

Telemedicine in South Africa – A Case Study

Presentations:

Ms. Angie Mokgabudi, South Africa Department of Health, introduced the *South African National Telemedicine System*. South Africa's telemedicine initiative was established in 1998, with the formation of a telemedicine task team, comprising representatives from the Departments of Health and Communications, the MRC and the WHO as technical advisor. The task team, which falls under the National Health Information System committee, was responsible for developing a 5-year strategy for the introduction of telemedicine, comprising telemedicine - a closed health broadcast channel and a Telemedicine Research Center at the MRC. The provincial telemedicine co-ordinators are responsible for the telemedicine initiatives at provincial level. The Technical Working Groups and a committee of representatives from the

medical schools are looking at the areas of ethics and licensing, infrastructure, protocols and tele-education.

Mr. Mbulelo Cabuko, Department of Health, South Africa, highlighted the key challenges facing South Africa. The unequal distribution of health professionals, lack of access to specialist care and the recruitment and retention of skilled staff are problematic. The need is to provide basic health care to all citizens, not as a privilege, but as a right. Telemedicine, which is defined as "The practice of medical care using audio, visual and data communications, and including medical care delivery, diagnosis and treatment, as well as education and the transfer of medical data", was identified as one of the tools to address these challenges. Specifically, it is intended to establish an amalgamation of the medical schools for the purpose of providing cost-effective medical education and facilitate the recruitment and retention of health care providers in rural communities.

The system is based on ISDN lines and video conferencing with plug-in modules. In phase I of implementation (from April 1999 to March 2000), the four practices of tele-radiology, tele-pathology, tele-ophthalmology and tele-ultrasound were selected for introduction, according to choice, at 28 sites. Evaluation found that training aspects were neglected and this has subsequently been addressed. In phase II, connectivity between 71 sites, divided into three networks, including the amalgamation of the medical schools, is being put in place. The satellite-based Health Channel for health promotion and education has also been launched. In phase III, additional primary and secondary networks will be established. The department believes the critical components of telemedicine are the end users, i.e., the health care providers and the patients, and that it is the people rather than the technology that determines its operational success.

Mrs. Tebogo Vundule, Department of Health: North West Province, South Africa, pointed out that in N.W. Province, the concept of teleradiology was first mooted as far back as 1995. Attempts to introduce it to address the issue of the shortage of specialists in the province were unsuccessful. In 1998 it was selected as one of the pilot regions for the national project and three sites (and subsequently two more) were linked to the Klerksdorp Hospital, which was the only hospital with a radiologist (who has subsequently resigned). Prior to implementation, most radiographs were not reported on by a radiologist. For example, in the period April to December 2001, almost 400 studies were submitted. Other achievements have been a small number of ultrasound consultations and video conferencing sessions for continuing professional development. Future developments include registering with an alternative service provider and increasing the number of sites and applications. Challenges include cost effectiveness and resources are required to ensure its sustainability.

Mr Vuminkosi Magaqa, Department of Health, KwaZulu-Natal, South Africa, stated that the province's telemedicine project has been introduced in conjunction with the University of Natal Medical School and comprises 12 sites providing teleradiology, tele-ultrasound, tele-ophthalmology and tele-education, with the latter being the most used application so far. Staff comprises four systems implementation officers who maintain the system and train users. Challenges include a lack of dedication among staff, the absence of telemedicine from job descriptions, the lack of guidelines for its use and no authority to change sites, and these issues are being addressed.

Prof. Dan C Mwesigwa-Kayongo, University of Transkei, South Africa, informed the workshop that UNITRA has developed a community-based, problem-based curriculum involving the placement of students in remote clinics and hospitals and accordingly it has been obliged to

develop telemedicine and teleducation techniques in order to maintain student contact. Resources include an Intranet and video conferencing facilities at the university and IT facilities at the major hospitals in the region. Analogue connections are being established to other teaching health centres. Applications have included remote tutorials, case discussions and journal club discussions. A telepathology project has been piloted and some attempts have been made at teledermatology. It is clear that the technology works, but it is not yet clear how effective it is in the teaching process. Challenges include limited interest from staff and students, in many cases because of not being "computer literate", the use of different platforms by potential collaborators, the rapidly changing technology, and the development of learning applications. There is a need for a regional network among medical schools for support, to share information and address issues such as standards.

Discussion:

A question was raised about the radiologist shortage in the North West Province and the response was NW currently is relying on radiographers and doctors, but are hoping to secure the services of private radiologists. It was also stated that no incentive mechanism was included in phases I or II. However, since the project was initiated frameworks for remuneration, cross provincial boundary consultations and public-private partnerships have been put in place.

It was pointed out that the US faces similar challenges in the areas of standardisation, evaluation and training, and there may be opportunities for sharing on these. It was stated that South Africa has not shared its telemedicine experiences with colleagues in other parts of the world sufficiently. This meeting is a beginning of such sharing.

On the issue of standardisation, it was pointed out that this shouldn't be driven by vendors or suppliers but rather by clinicians. Open systems are respected and that is leading to a new wave of open source and should stand in good stead for developing countries working together in the future.

Telemedicine makes one doctor's problem that of another doctor and there is a need to be looking at the problem of the shortage of doctors and at innovative ways, such as partnerships, in order to offer telemedicine that does all the things that it should be doing.

The National School of Public Health Distance Education Programme: Success Over Five Years in South Africa and Multiple African Countries

Presentations:

Dr. Kebogile Mokwena, National School of Public Health, South Africa, presented the academic aspects of the programme. The NSPH was established in 1998 and focuses on all the core disciplines of public health, namely health systems management and policy, social and behavioural health science, epidemiology, biostatistics and environmental and occupational health. The education programme comprises masters and doctorates as well as postgraduate and other diplomas. Key features include face-to-face introduction and contact hours requirements during summer/winter schools and on-line participation. The courses are broken down into units, each with a number of lessons, which are presented in identical format with objectives, assigned readings, both web-based and paper, and discussion topics. Evaluation is continuous and in the final grading, the on-line component accounts for 35%. Strengths of the programme include weekly lessons, on-line interaction and adaptation of discussion topics to current events.

Mr. Geoffrey Setswe, National School of Public Health, South Africa presented the sustainability issues of the Programme. The Distance education is an option for working people who do not have

the time to study full-time. The seven 'secrets' for on-line success are 24/7 live technical support, trained faculty, learner convenience, server reliability, mandatory on-line orientation, course conversion and development, and scalability. The on-line instructor also has to fulfil his/her roles, namely developing the model, leading on-line discussions, contributing specialist knowledge and ensuring group cohesion. In addition pedagogical, social, class management and technical skills are required and one of the key techniques is to be non-authoritarian and not to ecture students.

Discussion:

A question was raised about the difficulties in integrating different cultures and the response was that the ability of instructors to speak different languages has helped us to integrate students.

An International Telehealth Project in Tanzania

Presentation:

Dr Jim Katzenstein, Healthspan Africa, USA, presented the *Tanzania Telehealth Project*. It was started as an initiative to develop the framework for international collaboration around which health care capacity in Tanzania could be built. At the outset it involved "collaborative management training" and the concept of working across cultural boundaries. Then, as the Internet became more available, basic computer skills were taught. Individuals from Tanzania were also taken to the US for training in telemedicine hardware development. The first teleconsult was done between an amphitheatre at the Hubert Kairuki Memorial University and a doctor's office in the Mission Mikocheni Hospital.

At the same time content and distance learning training courses were developed. Future plans include a hub site and three fixed spoke sites for diagnosis and treatment. A U.S. army surplus ambulance is to be fitted out for disaster response and public heath education in rural areas.

Evaluation of Telemedicine in South Africa

Presentation:

Dr Sam Gulube, MRC Director, South Africa, presented the *Evaluation of Telemedicine in South Africa*. The Challenges for telemedicine are unequal development and unemployment, poverty as a breeding ground for diseases, limited human resources and peacekeeping missions as part of NEPAD initiatives. An evaluation of the telemedicine system found that access to specialist radiologist reporting was possible within an hour, compared to 5 to 7 days. It improved medical ability to diagnose and manage various medical conditions, particularly those related to trauma and chest diseases, and reduced professional isolation.

Concerning closed head injury referrals between Witbank and Pretoria Hospitals, there were an average of 10 referrals per month in 2001 compared with an average of 48 per month in the absence of telemedicine. This provides evidence of the cost effectiveness of the technology in this environment and is currently being quantified in financial terms. As part of the work of the Telemedicine Research Centre, a telemedicine research Test-bed is being set up between Tonga Hospital and three clinics in Mpumalanga, for clinical research and the development of new telemedicine technology. Preliminary results show that as the use of telemedicine has increased, the number of referrals has dropped.

Discussion:

A challenge is how to measure the value of these technologies. It is interesting that the data that was presented can be quantified, the question was has it been published and the answer was not yet. It was pointed out that the research is carried out by the MRC, but the data is the property of the Department of Health and will be published after verification.

It was noted that seeing figures like this is one of the most important aspects of telemedicine and

the participants were very encouraged by them. An important problem is that legislation for telemedicine is lagging and while there are a lot of operational services, few are classified as such. Perhaps this meeting could seek consensus on how to speed up the legislature aspects.

The role of multimedia services in the delivery of health care education

Presentation:

Mr Dingane Daka, Sentech, South Africa, presented the *Role of Multimedia services in the delivery of health care and education*. Sentech is a parastatal under the Department of Communications and is responsible for distributing signals for broadcasters. In addition it is involved in telecommunications, with licences for multimedia and for international carrying. In terms of telemedicine, it is in partnership with the Department of Health and the MRC to showcase technology in the distribution of telemedicine. Sentech and the Department of Health have established the closed-circuit TV Telehealth Channel, which is currently running in 30 sites and a national rollout to all public hospitals and clinics is being phased. The channel provides educational advancement and professional development of health care workers as the primary faction, as well as edutainment to patients while waiting for treatment. Through its multimedia network a range of services will be offered, including video conferencing and streaming for lectures, case studies and clinical grand rounds, and server-based Internet programmes for access by PC.

Discussion:

A question was raised about contemplating telehelath support on a regional basis and the response was that it was being contemplated for Southern African Development Community countries.

Community Health Care Development: The DevCenter Concept

Presentations:

Mr Tom Wagner, Affordable Medicines for Africa, South Africa presented the Lincos concept. LINCOS (Little Intelligent Communities) is a public-private partnership that was developed by the Costa Rica Foundation for Sustainable Development and may be transferable to Africa. It comprises containers that are fitted out with a range of services including computers, video conferencing, water and soil analysis packages and telemedicine. The containers are solar powered, and are permanently installed in communities. The LINCOS team is keen to for the concept to be used more widely. In order to transfer the concept to Africa it is planned to establish a Section 21 company as an umbrella to enable other partners to come together to provide such services. Current partners are Affordable Medicines for Africa, the University of Cape Town, Potchefstroom University, the Africa Foundation, Soul City and Hollard Insurance.

Mr. Lance Japhet, Hollard Community Development Trust, presented *The 'Love thy neighbour' campaign*. The 'Love thy neigh-bour' campaign is a peer education campaign conducted by Hollard in partnership with the African Children Feeding Scheme to combat the socio-economic effects of HIV/AIDS in the community. It is to eliminate the stigma of AIDS, to enlighten on how to prevent AIDS and to reawaken the 'extended family' culture with a view to encouraging home care for those with AIDS. The methodology is through training township committees and mothers' clubs as trainers in AIDS education and counsellors. Since starting in 2000 more than 700 people have been trained and more

than half a million children and quarter of a million adults have been informed. In evaluation more than 85% of those addressed have had their attitude influenced, 10% need further instruction and 5% still have difficulty with accepting AIDS sufferers.

Discussion:

The participants found LINCOS to be an interesting approach. Question was asked about the costs and the response was that the cost of buying and shipping in fitted containers and staffing and training is estimated at $104,000 over five years. Doing the kitting out locally should reduce the price considerably.

A 'multi-purpose community centre' project has been introduced in South Africa and at least 23 centres are in place already. In addition the government is committed to bridging the digital divide with the implementation of telecoms.

A question was raised about contact with SA government and the response was contacts haven't yet been made but are in the process of doing so.

It was recommended that participants should consider a follow up meeting dealing with the issues of collaborations, evaluation and funding. In the US organisational communication and co-ordination is a major challenge.

It was pointed out that NEPAD is the New Partnership for Africa's Development project and priorities have been identified and a number of donor co-ordination committees are already in place.

To the question about the sustainability of the multi-purpose centers, the response was that in South Africa projects are done 'with' communities rather than 'for' communities, and so these can be involved in making programme sustainable.

While LINCOS appears impressive we still need to know the practical aspects, the costs etc, and this needs to be answered explicitly. What are the differences between LINCOS and the telecentre concept developed by the ITU? And the response was that the time here doesn't permit a full explanation of LINCOS and a document is available.

Concurrent breakout sessions into Panel A, B, and C

Panel A: Telehealth for Human Resources Development and Health Capacity Building in Africa

Presentations:

Prof. Maurice Mars, University of Natal, South Africa presented an overview of Health Human resources in South Africa. Key issues are the growth of HIV/AIDS and the increase in the population, which has been estimated to grow by 2.5 times over the next 50 years. Currently South Africa has 56 doctors per 100,000 of population. More than a quarter of African countries have fewer than 10 doctors per 100,000, compared with for example 279/100,000 in the US. There is thus a critical need for more doctors. In addition the majority of medical schools don't have e-mail. IT can be a solution, provided that its use has a tangible benefit and it is not being used only for the sake of it. The funding put into it should also not be at the expense of people's health. A potential solution is the establishment of a satellite-linked co-operative of medical schools based around regional nodes (north, south, east, west, central) where databases are centralised and materials, such as web-based materials, are packaged for dissemination. High-level technology such as video conferencing is probably not sustainable. This could be realised in conjunction with the Tufts University library database, which enables materials to be 'repackaged' in appropriate format. The first steps for such a node in southern Africa are under way. Another need is to source low cost full text e-services such as journal access. On sustainability the University of Natal is introducing a postgraduate diploma in tele-

medicine and medical informatics, leading on to a Master's in Medical Informatics, starting 2003.

Ms. Nolwazi Mbananga, MRC, South Africa presented a paper on *Health informatics education and research: An African perspective*. A concern is the lack of health informatics education and it should be part of the general training of health professionals. Aims are to develop and promote information and informatics knowledge and skills among health professionals, to reinforce a health informatics science and research culture in Africa, and to develop a cadre of professionals who will enhance ICT in health and raise the quality and efficiency of health care. Challenges are the lack of materials and teachers, and curriculum development and standards. Resolving these will require political will, the commitment of stakeholders, sending individuals for postgraduate training overseas and involving organisations such as the IMIA. Health informatics research also faces challenges, including the lack of scientists and funding, and an ICT methodology. Funding must be provided and research centres established.

Prof. Letitia King, UNISA, South Africa, presented on a collaborative approach by the University of South Africa. Sustainable health care delivery systems require educating and developing human resources, as well as retaining the personnel when trained. This requires the correct institutions and the need to bear in mind that public health is multidisciplinary, comprising doctors, nurses and other personnel. UNISA is a distance education institution and in order to expand its reach into Africa it has started introducing courses in Portuguese and French. It has also started broadening the courses it offers and for example in the nursing department courses for non-nursing students have been developed. From 2003 in conjunction with the ESEATI consortium, its MPH will be offered by UNISA from 2003, opening up a new area of opportunity.

Discussion:

A comment was raised that there are a number of people interested in advancing health in Africa and a challenge is to bring them all together. There's been plenty of talking and now is the time for action. There is no one person, probably in Africa, who has all the competencies to offer a course in medical informatics. The University of Natal's (UN) approach has been to develop partnerships with institutions such as MIT and Harvard. In terms of courseware, some of the business information systems, such as secure banking, face similar security issues as for patient information, so they can also provide input. There are plans at University of Natal (UN) to develop the new medical informatics diploma into a distance format and this will get it out into Africa.

To the questions: who are the students for the Natal course, the response was two students from Zambia are expected. The Department of Health has indicated it wishes to send one person from each province and several others have indicated an interest, the goal is for 10 to 15 in the first year.

A question was asked about why telemedicine has overtaken health informatics. The response was probably because telemedicine is about services whereas health informatics is more intangible. The concept of telemedicine is easier to 'sell' as a new field. It is important to realise that telemedicine is not a new area but an expansion of what already exists within the medical establishment.

The issue of who the teachers of the UN course would be was discussed. A new state-of-the-art 'paperless' hospital is being built in KwaZulu-Natal and those involved in the implementation of informatics there will be drawn in. A concern is that there is no opportunity being created to learn about this new hospital from a research perspective.

Most of telemedicine has been driven by a combination of technology and medicine and to some degree of the structure of content, but

perhaps more important is the systematic addressing of content and how it relates to the social and organisational systems that make it work.

A question was asked about how other African countries could go about sending their staff to learn from the South African experience. It was suggested the opportunities for connections through the Africa Telehealth Project, should be explored to avoid reinventing the wheel.

A problem with people who go overseas on grants is that often they don't return to or stay back in their home country. Also unless individuals are very senior little change is likely to be implemented unless a significant number are sent for training. Not enough African governments appear to understand the magnitude of the health problem that is arising.

To the question what the role of the MRC is in trying to improve the quality of health in Africa, the response was the primary role is research. In addition one of the MRC's major roles is capacity building. Research will inform the development of telemedicine and research is seen as creating knowledge as well as capacity building. A key is to share this knowledge and telemedicine can come in here.

An issue of concern is professional registration and the recognition of qualifications from different countries. One needs flexible courses. In the case of nursing, UNISA is collaborating through the WHO Collaborating Centre with the students' home countries to ensure we meet their requirements. There is also access courses to ensure that students meet the university requirements.

In public health the barriers seem to be getting worse as recruitment is so wide, and plans are being put together to guide and to advise on courses. In South Africa there is a problem as education issues fall under both the Departments of Education and Health. There seems to have been a lack of understanding about distance education in the Education Department. An awareness that it can be offered in different forms is being developed. The other issue is that of 'recognition of prior learning', and Education Department requirements are in conflict with university requirements. The Education Department's policy is now beginning to bear fruit, in that health workers can now obtain qualifications outside their direct career path. For example, a nurse can now get an MPH. However, the problem we now have is that each of the professional boards has different criteria. They need to come together to standardise their systems. One may ask why all the schools of public health haven't come together to develop a single degree that can be delivered in a collaboration? The only collaborative MPH currently available is that from institutions in KwaZulu-Natal.

Panel B: e-Health in the Fight Against Communicable Diseases, Including HIV/AIDS

Presentations:

Ms. Gillian Staniland, MRC, South Africa, presented *An HIV/AIDS information portal for southern Africa.* 'AfroAIDSinfo' is being developed as a southern African web portal for HIV/AIDS. It has its origin in the SAHealthInfo web site comprising a network of local and global knowledge resources of relevance to the local community, with access to quality-controlled and evidence-based information. It has a two-way flow of information, both to and from users, and has been developed from the HIV/AIDS module. The technology strategy has been to establish a robust framework of portal services, using open technology standards. Taking into account the ability of the MRC's Informatics and Knowledge Management Directorate to support the portal in the long term,

the portal has the ability to incorporate additional third-party features as and when required. The content management system is based on the editorial judgment of selected individuals and organisations that have demonstrated extensive knowledge of the subject, objectivity, and openness, and content is reviewed prior to acceptance on the site. The content is wide ranging and covers public information as well as information on policy, education, research and the health professions. The plan is to launch the site on World AIDS Day (1 December 2002), and future developments will include links with existing multi-purpose community centres, libraries, public information terminals and clinics to broaden its reach and an increase in content from other southern African countries.

Ms. Lyn Hanmer, MRC, South Africa, presented the forthcoming *HELINA 2003: ICT in the fight against HIV/AIDS in Africa*. HELINA is a series of conferences on health informatics in Africa under the auspices of the IMIA. It has been proposed that the next event (26 – 29 October 2003), will look at ICT in the fight against HIV/AIDS in Africa. Three areas will be covered: clinical care, public health and clinical trials. The organisers are IMIA in conjunction with SAHIA (South African Health Informatics Association). Supporting organisations (to date) are the MRC, Centres for Disease Control and Prevention, Harvard Medical International and National Library of Medicine. The organising committee is co-chaired by Dr Charles Safran from IMIA and Dr Sedick Isaacs from SAHIA, and will include representatives from participating organisations. The conference may serve as a follow up to the current event.

Dr. James Ingraham, ResourceLinC, USA presented *An HIV/AIDS programme in Botswana.* The ResourceLinC, in conjunction with a team of experts from the University of Pennsylvania Center for AIDS Research and other partners, developed an HIV/AIDS education awareness and prevention programme for the military in Botswana. The scientists were responsible for developing the content while ResourceLinC provided the technology solution. A number of different learning styles were incorporated, including audio, audio-visual, reading and interactivity, to develop, in conjunction with Botswana military trainers, a multimedia programme specifically geared to the country's defence force. The potential education retention rate was estimated at 80%. As a result of this project, the company was invited to become members of the G8 Digital Opportunities Task Force for ICT in Healthcare, the UN ICT Task Force and the Global Business Coalition for HIV/AIDS. Evolving out of it also is another project for a multipurpose, multifunctional teleeducation centre, for which funding is currently being sought. The basis is that ICT must be a component incorporated in any education programme distributing this kind of information.

Discussion:

A question was asked about figures to comment on the sustainability of the Botswana project. About 500 people have been addressed so far. From questionnaires comparing their knowledge before and after the training, almost all of them were getting all the questions correct after the training. Also there has been an increase of about 15% in condom distribution, and for the first time men have even been asking for female condoms.

The prospects of cost of extending the project to the civilian population and to neighbouring countries like Zambia were discussed. The project

is currently being funded by the US Department of Defence in an effort to provide HIV/AIDS support to other militaries in Africa – the HIV rates in militaries are typically two to five times that of the general population. There has been a contact at the University of Zambia on the telehealth project and contact with the Zambian defence force, but no programme was established. However there are plans to establish one in Malawi.

A question was asked about ownership of the copyright on information provided to the AIDS portal. Much of the information being published at present has been developed specially for the portal and the copyright is owned by the author. For some of the information the copyright is held by publishers and in some cases MRC has negotiated with them to publish material. MRC also allows people to have access to other Internet sites via the portal and write a short abstract, so it doesn't just become a series of links. In the case of a university a written permission is required either from the university or the authors, depending on who holds the copyright.

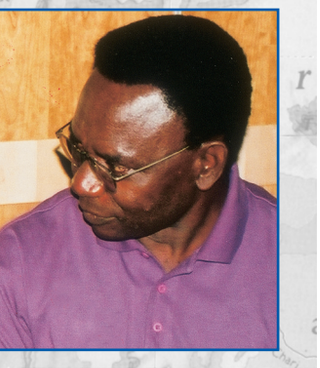
What about advertising? MRC has to be very careful. On the one hand MRC would be keen to have the income but on the other MRC must ensure that it is not going to upset the relationship with the funders. It would look at adverts but would have to be sure that the content is in line with what it want to publish.

More information was requested on the background of the HELINA conference proposal. There has been a proposal for an African region of IMIA (International Medical Informatics Association), but at present there is comparatively little activity and the HELINA conferences are one way of promoting this. The conference itself is intended to link people in informatics activities with those in HIV/AIDS activities to look for areas for working together.

Mr. Albert Hannans, IME, USA, served as moderator of this session. He pointed out that the HELINA conference proposal is similar in some ways to a project he coordinates in the United States, funded by the National Library of Medicine. It is designed to enhance the use of NLM's online resources in the African American communities. The NLM is one of the organizations involved in the HELINA conference.

Panel C: Telehealth Infrastructure and Content Development in Africa

Presentations:



Dr Ndeh Ningo, Ecole Polytechnique, Cameroon, presented an *Overview of the Telehealth infrastructure and content development in Africa*. The number of Internet connections in Africa is a little over 1%, whereas the continent has about 16% of the population. There is less than 1 telephone over 100 people, raising the issue of the problems faced in terms of infrastructure. Cables that were installed for voice do not have the capacity for telemedicine. Investigations were started on digital networks, but these also proved unsatisfactory as the number of users increased. Fibre optics provides a solution and probably represents the future, but has high initial costs. In the meantime a further option is microwave/radio, but this also becomes unsatisfactory as the number of users increases and the use of cyber-cafes for telemedicine or teleeducation is not practical. Other problems are the attitudes of leaders and potential users and a lack of computer literacy. Technical support skills and capacity building are critical. Standards also need to be addressed and world-accepted rather than proprietary standards, are essential.

Prof. Pranlal Manga, University of Ottawa, Canada presented *Economic aspects of telemedicine in developing countries*. The existing literature rarely addresses the issue of the cost effectiveness of telemedicine. What little research

there is, is methodologically weak and results are conflicting. Moreover, research in the west is not applicable to developing countries. In all developing countries there is an acute shortage of human resources, especially specialists. The only way they can diagnose and treat distant patients is by allowing the queues in their own hospitals to get longer - thus in effect telemedicine will shorten one queue at the expense of another. Telemedicine also potentially raises the professional cost of treating patients at a distance because it requires two doctors, one at either end. Savings in travel costs or the opportunity costs of labour are unlikely to offset this, nor will they offset the infrastructure and personnel costs needed to implement, operate and maintain the telemedicine system. On the other hand telehealth in education and public health may well be cost effective, probably because of involving a much larger number of users. All these points beg for careful thought and suggest that countries should be careful and highly selective in their efforts to expand the application of these technologies within their health systems. In addition, care should be exercised with telemedicine across borders - while it opens up potential for developing countries, it can also be abused by doctors treating wealthier patients in other countries.

Mr. Sababu Shabaka, IME, USA, presented the *Content Development Challenges*. Content requires design, development, and then evaluation and revision of that design, so that it can be implemented. Some of the problems associated with that is to make sure that the content is applicable and meaningful to the population that is going to be the recipient of the health care system. Often in evaluating the health care needs of the population, one begins to mechanically implement models that may not necessarily have a beneficial impact on the population that the health care system wishes to serve for financial, cultural or human resource reasons. In addition the goals and objectives may not be sufficiently refined.

Discussion:

The issue of examples of the cost benefits of telemedicine was discussed. A delegate stated that "the Paris telemedicine system is probably one of the best peri-urban systems there is. At the last evaluation, it was saving US$1,400 per patient not transferred." In South Africa the cost benefits of transfer are very clearly available and the potential for cost savings is considerable. Other evaluations in South Africa among newly graduated doctors in rural areas, have also indicated clear benefits of telemedicine. Another offshoot which is significant, but which is not so easily quantified, is that telemedicine can do much to raise the awareness and knowledge of technology.

In KwaZulu-Natal, telemedicine is being found useful for screening patients, as there are only two paediatric surgeons in the province. They find that it is very difficult to get consultants to be on call for consultations or give advice. A change in attitudes is needed, probably through the job description. The example presented by the *Evaluation of Telemedicine in SA* is an example of exploiting the system beneficially and utilising new equipment. Culturally, the biggest problem encountered in the implementation of telemedicine was among white specialists in rural areas. South Africa's analyses show that the cost benefits are to the patient rather than the health service.

Who will develop, review and evaluate the content, and what incentives are there, especially in the academic sphere where publications are important? A formal framework for assessment is required, particularly given the poor state of equipment in developing countries. Is there a possibility of off-the-shelf software for telemedicine? SA has derived different technologies for the delivery of services using a shared infrastructure to spread and reduce costs. There are 15 satellites over Africa that are not being used and they (SA), would like just a quarter of one transponder to do all that they want to do!

A response was that one would agree on using satellites and IP protocol, but one can't always use this. Secondly, the question of multi-purpose software begs the questions of the interface and literacy. Thirdly, a possible existing technology we could use is Africa-1.

If one only applied cost benefit analyses, one would be very selective in how telemedicine was applied. In Canada with sufficient resources much of telemedicine is based on pushing the frontiers of feasibility rather than on need. Also in Canada, being such a large country, the technology is being used to bring about the objective of 'equal access'.

In content development the person responsible needs to be aware of the political dynamics. Some sort of consensus needs to be reached among the various groups so that they feel it is beneficial to them. Second on the satellites, a concern is the infrastructure required and the cost of access to these. On access to care, Africa should model what it does on the resources that are available rather than follow a countries such as the US. Normally one sees a decrease in cost with a critical mass for any technology and developing countries need to build up that critical mass. One should perhaps be looking at how we can best package the delivery of telemedicine based on the technology in place.

Lecture: *An African Physician's Personal Analysis of His Continent's Sustainable Health Care Delivery Prognosis for the New Millennium*

Presentation:

Prof. F. I. D. Konotey-Ahulu, University of Cape Coast, Ghana, presented his Lecture. Approaches to Africa's health problems have hitherto, by and large, been dealing with symptoms rather than the disease itself. But there is a difference between 'symptoms of a disease' and 'the disease itself' and alleviation of short term symptoms does not always mean correct diagnosis. There is a matrix of error: wrong diagnosis - wrong treatment; right diagnosis - wrong treatment; or a combination of these. An example is Duesberg's hypothesis that 'HIV is not the main cause of AIDS'. Of 13 parameters tested against Prof. Knontey-Ahulu's African findings, Duesberg was found wrong on six parameters.
For health care delivery to be sustainable, we must put more emphasis on tackling 'the disease' (the root of the problem) than on medicating symptoms, helpful though the latter has been proven to be. The three 'P's' health triangle – poverty, population and politics – are rigidly controlled in developed countries and result in healthy nations. In sub-Saharan African they balloon out of control, crushing and stifling any health the nation has. Tinkering with symptoms without political discipline, economic discipline and procreative discipline, may produce temporary benefits for the nation's health but never sustainable ones. Democracy and its absence is a key factor. But there is a fourth 'p' – power, either for good or for evil, such as the WHO with its programmes or financial institutions such as the World Bank, or natural and man-made disasters. What then is sub-Saharan Africa's health prognosis? It is hopeless if we continue to fix our eyes on the symptoms.

Discussion:

Would you say that the revelations, especially by traditional healers, for finding a cure for HIV/AIDS are largely associated with misdiagnosis? Prof. Konotey-Ahulu said that he will cover this in his next talk the following day.

Could you elaborate on the six areas in which you disagree with Duesberg's hypothesis? Prof. Konotey-Ahulu said that he would give copy of the article.

Workshop findings and recommendations

Telehealth for Human Resources Development and Health Capacity Building in Africa:

- Noting the projected population increase in Africa over the next 50 years it is recommended

that IT be used to facilitate the development of the continent's medical education needs.

- That a group of 'champions' for health informatics in Africa should be established.
- That there should be a strong core of people with medical informatics training in Africa.
- That there is a need to develop research capacity and research centres for medical informatics in Africa.
- That note is taken of current initiatives at the University of Natal, including the introduction of a postgraduate training programme in medical informatics (from 2003) and the implementation of a pilot multi-site project around databases.

e-Health in the Fight Against Communicable Diseases, Including HIV/AIDS:

Points to consider in developing programmes for infectious disease in Africa:

- Content: User needs (knowledge of target market), cultural values and behaviour change.
- Involvement of users in the development process: Ownership, buy-in and sustainability.
- Opportunities for collaboration.
- Programme monitoring and evaluation.
- Empowerment and capacity development.

Telehealth Infrastructure and Content Development in Africa:

- Investigate, develop, demonstrate and validate novel cost effective approaches to fully exploit existing telecommunications infrastructure.
- Develop sophisticated user-friendly evaluation frameworks to effectively match the cost, access and quality characteristics of telemedicine to the precise and detailed clinical, technical and social needs of the proposed utilisation.
- Create mechanisms to develop or acquire, validate and disseminate health-related distance learning and clinical software products that are reflective of a cultural consensus among key stakeholders.

Discussion:

Could you elaborate on the issue of 'culture'? It is important to know the target market that material is being developed for and culture and cultural values come into this.

What are the differences between telemedicine, telehealth and distance education? 'Telemedicine' is considered as involving professional health care providers, 'telehealth' is broader, including patient education, and 'ehealth' is a new term aligning itself with the expansion of the use of the Internet, but all these are temporary labels and we're talking about the integration of computers and telecommunications into health care. Distance learning' refers to teacher and learner being in different locations and with some form of communication being used to facilitate instruction. 'Tele' refers to 'distance' so the terms refer to the provision of medicine, health or education at a distance. Terms change with fashion and political correctness and we are also emerging with health care and becoming more inclusive, starting with the terminology.

Was there much discussion of the impacts of economics in panels A and B? That didn't come up and they had a completely different focus.

Given the fact that many countries are at different levels of development and needs in terms of using telehealth, distance learning etc, what would you suggest would be an appropriate entry point and where might the resource be found to begin to use it? A starting point would be to look at some of the projects that are being implemented, and South Africa provides us with a solid example. A needs assessment is also vital before getting into a project. One needs to focus on the 'needs'. Also the experience with the US army telemedicine programme is that by being given the opportunity people have started to work out for themselves what they need, rather than being told. They also lack a credible repository of evaluated projects and need to share data and set criteria for data

collection. We also need to look at mechanisms of evaluation and maintain quality control so that others can utilise the information effectively.

The recommendations were carried with a show of hands.

Developing sustainable African Health Care Delivery Systems for the Millennium – Symposium Day One (1 October 2002)

Opening Remarks:

Dr. Sam Gulube, MRC, South Africa, referred to the words of President Thabo Mbeki: "The New Partnership for Africa's Development (NEPAD) is not a partnership based on a recipient-donor relationship but a partnership between Africa and the international community based on mutual respect, accountability and equality."

Symposium Overview:

Dr. David French, IME, USA, referred to the recent World Summit on Sustainable Development. According to him, it noted the essential need of sustainable health delivery systems for successful development in the new millennium. It is also recognised by the countries of Africa that sustainable development is the key to successfully and competitively joining the world family of nations. This is evident by the reorganisation of the OAU into the new African Union and the creation of the NEPAD programme. It is our purpose in convening this symposium to set the stage for developing the much needed accompanying sustainable health care systems. In looking about for other models of health system evolution, the experiences of the Pan American Health Organisation (PAHO), now celebrating its 100th anniversary, might be inspirational. In particular the activities around vaccines are particularly worthy of note, as most of the benefits and work have accrued in the developing world.

Key note address: Challenges to NEPAD: The Role of ICT in Sustainable Health Care Delivery in Africa

Dr. Salah H. Mandil, WiseKey SA, Switzerland, presented the Symposium Keynote Address on *Challenges to NEPAD: The role of ICT in sustainable health care delivery in Africa*. The NEPAD is around the 40th plan for Africa, but is distinguished by being predominantly put together by African leaders. Its focus is developing the conditions to achieve sustainable development through identifying sectoral priorities. In the health field, these include controlling communicable diseases, reducing the burden of diseases, empowering communities and encouraging co-operation between modern and traditional practices. Other related issues include poverty reduction, bridging the education gap, reversing the 'brain drain' and bridging the digital divide. One of the most important signals in the health sector in recent years has been the admission by governments that they are unable to cope with providing free health care to populations, and this has led to a wave of health sector reform. Information is critical in this, giving rise to expressions such as 'informatics' and 'telematics'. Types of information include clinical care and the associated knowledge bases, training and education, literature, surveillance, and management. ICT provides support to these in the form of telemedicine, tele-education, telesurveillance and telecommunications. Telemedicine is defined as "The practice of medical care using audio, visual and data communications, and including health care delivery, diagnosis, consultation, treatment, education and the transfer of related data." There are many examples of applications in many parts of the world. By and large there is solid proof that that ICT can and is making a difference to health. However, it cannot

be recommended for blanket use and every link needs to be assessed before being implemented. Approximately 80% of telemedicine transactions are off-line/store-and-forward, and only 20% require the more sophisticated technology. Trends include inter-country and regional collaboration and a growth in international trade, mostly north-south. The predominant application is teleradiology, but telepathology is being practiced increasingly and case management is just beginning. Tele-education is also widespread and telesurveillance is common in developing countries. This has evolved from 'EDP (electronic data processing) in medicine' to 'telemedicine', and more recently it has been broadened to 'telehealth' and, with the rise of the Internet, to 'ehealth'. The key challenges are the real problems of health – safe drinking water, basic sanitation and basic nutrition – and to address these, solutions should be conceived widely. It must be implemented according to the priorities and availability of resources. eHealth can play a role and justifications in developing countries include equity in access, improvement in the quality of health services, bridging shortages in human resources and equipment, and continuing education for health professionals.

Discussion:

If a government is already having problems providing health care, where does it find the resources for a new system? The resources need an initial injection of funds, but also there has to be a reorientation of resources.

South Africa Telemedicine: A Contribution to NEPAD

Dr. Shaheeen Khotu, Department of Health, South Africa, presented a paper on *South Africa Telemedicine: A contribution to NEPAD*. The National Health Information System in South Africa (NHIS/SA) was set up to address a lack in the areas of information and research. The strategic objective was to develop a system that begins at the local level and feeds into district, provincial and national levels, and includes the private and public sectors. Key components have included the development of standards and of health goals, objectives and indicators. The priority component systems have included administration and finance and surveillance, including socio-demographic surveillance, environmental surveillance, disease surveillance, health systems surveillance and nutritional surveillance. The national health care/management information system is modular and scalable, and comprises five core modules on patient registration, minimum record, patient billing, appointment scheduling and clinical pharmacy. The enabling tools are based on the national identification number. By integrating all clinics and hospitals, it is intended to provide a national patient database. This now contains a huge mass of data, which now needs to be analysed. The system is based on freeware and is freely available to other interested parties. The telemedicine initiative was developed with the objectives of delivering health care services at a distance to South African rural communities and providing rural communities with access to physicians and specialist expertise. Phase 1, which has been completed, comprised the implementation of teleradiology, telepathology, tele-opthamology and tele-ultrasound in several provinces, as well as the establishment of a research center within the MRC. Phase 2 will focus on developing an effective 'telemedicine connection' between 71-sites divided into 3 networks. Phase 3 will include establishing additional networks of secondary and primary sites and investigations into microwave and mobile radio communications infrastructure. In addition, in conjunction with Sentech, a closed health broadcast channel has been developed, based on Ku band satellite transmission.

NEPAD Country Presentations: Priorities and Challenges

Presentations:

Mrs. Florence Mweemba, Ministry of Health, Zambia, presented an overview of Zambia's priorities and challenges. Zambia has a population of 10.2 million and an adult literacy rate of 67%. Health reform was initiated in 1991, giving rise in 1995 to the National health Services Act and the establishment of a Central Board of Health to implement programmes. Health sector priorities are HIV/AIDS, malaria, acute respiratory infections, diarrhoeal diseases, pre-natal problems, malnutrition and anaemia and maternal complications during pregnancy. The basic health care package comprises health posts and rural health centre/urban centers (1st contact), district hospitals (1st referral), second level hospitals (2nd referral) and third level hospitals (3rd referral). A health information management system has been developed, in which all districts have been connected to Internet. A national database has also been developed. Key challenges are an unequal staff distribution across the country, the 'brain drain', attrition resulting from desertion, death (the HIV/AIDS pandemic), a lack of specialists in the areas of neurosurgery, cardiac surgery etc., inadequate provision of primary health care, inability to retain trained medical staff due to low motivation, and poor infrastructure

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Dr. Ibrahim Idana, Ministry of Health, Malawi, presented the Malawi priorities and challenges. Malawi is one of the poorest countries in the world, and has a population of 11 million. The *Vision 2020* strategy, based on poverty reduction, has been introduced to improve lives. The health care structure comprises health posts at community level, health centres with trained personnel, including medical assistants, nurses and midwives, and district health services. Health care challenges are the scarcity of human resources, principally due to haemorraging to other countries – there are for example no radiologists or pathologists in the public sector. Others are the poor state of all infrastructure such as communication, roads and water, and equipment, much of which is hand-downs from other countries. In terms of diseases, HIV/AIDS is the most serious, followed by TB, malaria and cholera. The priorities are in line with the challenges and include improving maternal and child health, controlling communicable diseases, human resource development, and improving infrastructure. The latter has been hampered by a difficulty in securing funds. A health management information system has been introduced, based on the South African system, and some improvements have been made to the financial base for services.

Dr. Benjamin Moiane, Association of Medicine Mozambique, Mozambique, presented the Mozambican priorities and challenges. Mozambique has a population of 18 million. The health care system has around 300 local doctors and 400 foreign doctors, 8,000 nurses and 5,000 technicians, and about 50 doctors graduate per year. The sector comprises the district level for primary health care, provincial level, regional level and at the 4th the capital, Maputo. Health challenges are the virtual total lack of equipment in health centers and the small budget for drugs and other items ($80,000). The main illnesses are malaria, TB/AIDS and stroke. The priorities are to address the human resource and drug needs.

Dr. Tony MBewu, MRC, South Africa, presented his *Summary of the priorities and challenges*. The New Partnership for Africa's Development (NEPAD) is a pledge by African leaders, based on a common vision and a firm and shared conviction, that they have a pressing duty to eradicate poverty and to place their

countries, both individually and collectively, on a path of sustainable growth and development, while at the same time participating actively in the world economy and body politic. Programmes include addressing communicable diseases, in particular HIV/AIDS, malaria and TB, developing information and communications technology, debt reduction and increasing market access. The health problems faced by most countries in Africa are fairly similar, although there are regional differences. Most of the countries face the 'double burden' of disease – principally the diseases of poverty and the communicable diseases, but in addition an emerging pattern of diseases of transition, which is manifested in stroke, usually related to hypertension, and increasingly, particularly in upper-middle income countries, myocardial infarction and cancer. South Africa has a triple burden, the third being violence and injury as a legacy of its history. The NEPAD health objectives are: to strengthen programmes for containing communicable diseases, to develop secure health systems that meets needs, to ensure the necessary support capacity for the development of health care systems, to empower people to improve their own health and achieve health literacy, to successfully reduce the burden of disease in the poorest people, and to encourage co-operation between medical doctors and traditional practitioners. Telemedicine is a good example of a global technology that can be used to benefit in developing countries. There are a lot of opportunities for it to assist in meeting these objectives. NEPAD makes it clear that when looking at health, the biomedical approach is useful in quantifying the problems, but often a determinant approach is more useful in planning interventions. It also relates the issues of human rights, governance, peace and macroeconomic stability with the issues of health, as these affect the determinants of health (socioeconomic status, education, income and occupation). Other determinant of importance are demographic (age, gender, ethnicity and locality), and behavioral (tobacco consumption, dietary habits and exercise). The MRC is involved in a number of NEPAD projects, one of which is the Initiative on Pharmaceutical Technology Transfer, which is intended to develop the capacity, via technology transfer from the developed world, to develop and manufacture pharmaceuticals in African countries.

Discussion:

Is population control a priority? Programmes are on going in Zambia.

A comment was raised that the fact that governments are not faring well in providing health services to their nations was due to lack of political will and commitment and this needs to be addressed. Governments are still involved, but in a different role and for example, novel ways of funding have to be found, such as capitation.

IME should learn from South Africa's achievements in promoting regional projects. How is poverty assessed in South Africa? The October household survey has a methodology that defines poverty, based on a means test, but it is a bigger issue than just the amount of money that goes into a household. Health education is the main challenge in preventing disease. A number of regional integration initiatives are being undertaken, particularly in the SADC.

There is a pharmaceutical operation in Zambia but it doesn't receive tender preferences from the government and this should be a challenge. Competitive bidding is always encouraged.

Could you elaborate on what are diseases of transition and what steps are being taken to identify causes? How is the retention of health professionals being addressed? As countries develop, communicable diseases tend to wane and non-communicable diseases tend to increase. The time to act is now in terms of dealing with the determinants and risk factors of these rather than in the future with expensive surgical and curative strategies. In terms of retention the diaspora can play a role in NEPAD-related projects to assist

Africa, and development is also important. We could use African expertise abroad to support the Africa Telehealth Project.

Could we have a session to discuss the specific issues that the NEPAD countries have raised and ways of contributing to these? Have governments started discussing the implementation of open source code and are there areas in which one could contribute to it? It will depend on the nature of the goods or services, and most countries will have competencies that can be used by others.

Do regulations in telecommunications facilitate the introduction of telehealth, and to what extent is radio being used? The CSIR wireless-Internet project is being used successfully in Maputo.

Georgetown University VTC Presentation: *Telemedicine: An American Perspective*

Presentation:

Dr Seong K. Mun, Georgetown University Medical Centre USA, made a VTC presentation to the symposium from the Georgetown University Imaging Science and Information Systems Centre The Georgetown system was developed around a common workstation and three experiments were undertaken. The first was a new clinical relationship linking two facilities, but this couldn't be sustained as there was little relationship between the two. In addition, each session became more of a 'TV production'. The second was based on an existing relationship, linking a rural hospital with Georgetown. Again this was not sustainable without additional resources as there was no mechanism to compensate the consulting physician's time. The third involved a single physician at two locations and this worked well. The general assessment was that the technology was acceptable, but the logistics were demanding and the technology and staff costs were high, thus technology insertion requires an appropriate operational environment.

The next step was to look at acute versus chronic care options. Acute care is diagnosis demanding and treatment focused and requires a high bandwidth for fast response, whereas with chronic care diagnosis and treatment are known and the bandwidth can then be lower. Three examples of chronic care were initiated. The first was kidney dialysis, linking a physician's office with a dialysis center. The outcome was successful but was not sustainable due to an inability to pay for the physician's time. The second involved an Internet-based diabetes management service and this was successful with HbA1c reductions in all patients. The third is a congestive heart failure home monitoring programme, which is currently under way with the aim of achieving a 6-7% reduction in the management costs. Key lessons include the need to look at the effectiveness, desirability and necessity of the technology, and who will pay for it to ensure its sustainability.

Discussion:

A question was asked about any known projects that are sustainable. And the response was there are a number, particularly in teleradiology, as generally they are reimbursable in the US. It is also sustainable in special areas such as prisons.

What is your comment on the cost effectiveness of telemedicine? It will depend on the environment in which it is implemented, so one cannot make a blanket statement.

Are there any signs in the US of patients demanding preventive care, and are there any signs of the government taking an interest? Patients show an interest when they understand the ability of the technology. I believe there a number of small interest groups that are pushing for preventive care. On the government side the Medicare project is an example.

Given that the cost of the peripheral equipment is up to 80% of the cost of a telemedicine system, this will have to come down to be affordable in developing countries and are there signs of this?

Generally the cost is dropping, but in our experience the operation costs are much higher in the long run. The Internet has brought costs down significantly.

Interactive Panel Discussion: *Developing Sustainable Health Care Delivery Systems in Africa: Setting Priorities and Overcoming Obstacles*

Presentations:

Dr. Doris Browne, IME, USA, introduced the session and state that some of the areas that have been touched upon and can be integrated into the discussion are agriculture, the role of forests in ecosystems, access to drinking water, energy and clean air, and health care. All of these are intertwined.

Maj. General M. Radebe, South African Military Health Service, South Africa, presented a paper on *Health care in military peace missions*. Peace and security are among the preconditions for sustainable development and these are particular challenges (Africa has been afflicted by numerous wars and issues such as population displacement and refugees). These will require sustained and military engagements, including peace missions, of which there currently only four. South Africa is committed to participating in peace missions in Africa. Issues are as follows. Historically non-battle injuries account for the majority of morbidity and mortality of troops, but military health services have focused primarily on emergency medical care, and the SAMHS has collaborated with the NSPH to train public health specialists. Second the UN doctrine for medical support prescribes that this is only for own forces, but the SA white paper states that services must be provided more widely. For example a particular concern in Africa is malaria control and peace missions must become involved in this. In addition a review of the level of care provided for troops is needed, given the shortage of health professionals in Africa. Third the 'health bridges for peace' concept could be appropriate for Africa and needs further investigation.

Dr. Joyce Moon Howard, Columbia University and The Balm In Gilead, Inc., USA, presented a paper on *A faith-based health initiative*. The Balm in Gilead is a faith-based initiative that was started in Harlem to mobilise religious communities to speak out against the stigma of HIV/AIDS and provide support to those living with HIV/AIDS. Based on a programme that was developed in Uganda, the organisation has initiated an initiative in Cote d'Ivoire, Kenya, Nigeria, Tanzania and Zimbabwe, to build sustainable health education and service delivery systems in which African faith communities can operate independently. The goal is to build the capacity of faith communities to become an effective force in the fight against the AIDS pandemic. The initiative is based on partnerships developed with the leadership of the major denominations. To date it was found that church leaders in general didn't feel comfortable in supporting the use of condoms, although this can change with AIDS education and knowledge of correct condom use. AIDS education, resources and campaigns must be developed in the specific spiritual/cultural language of both Christianity and Islam, and that the issue of poverty must be addressed within the context of the initiative.

Dr. Ndeh Ningo, Ecole Polytechnique, Cameroon, presented a paper on *Emerging uses of telecommunications*. The potentials of telemedicine are improved access, improved quality of care and of delivery systems, cost reduction and informed policy and decision-making. Principally it is used for radiology, involving images, but emerging uses of ICT in

other specialties is growing. These areas include: knowledge generation, databases, medical information systems, retention of professionals in rural areas and provision of other services. ICT also facilitates indigenous knowledge generation and conservation. The expert systems improve the competence of providers through continuing education, improving access through helping users to obtain services, improving effectiveness by making health services work better, enhancing appropriateness by helping to improve the relevance of services, improving technical efficiency by getting best results at the lowest cost, enhancing responsiveness by helping to improve the dignity of treatment, autonomy of users and confidentiality, and the inclusion of civil society in the development of innovative approaches in the delivery of health. Technologies are palm or notebook computers and cellular telephony or the Internet. Barriers to the widespread use of telemedicine are technical knowledge, economic viability, organizational support and behaviour modification, but ICT can assist in reducing these and can be used to unite fragmentary health systems. "Scan globally reinvent locally."

Ms. Alice Hamer, Director, African Development Bank, Cote D'Ivoire, presented a paper on *Institutional capacity and sustainable health care*. Several international agreements have placed additional responsibility on public health systems to deliver better health services in terms of both quantity and quality in the developing world. This included particularly the Millennium Summit, which reached consensus on the reduction of poverty according to specific targets, and the Monterrey Consensus on financing for development. The minimum financing needed to achieve the Millennium Development Goal targets has been estimated at $30 – 40 per person per year to cover essential interventions. Actual spending is considerably lower, around $13 per person per year in the least developed countries. This will demand that African public health care delivery systems rapidly become more efficient, yield better results and be held more accountable. Whether or not the health systems can meet this challenge will depend substantially on building their institutional capacity. The key challenges are the political, macroeconomic and civil service environments. Within health sectors themselves, issues of human resource development, budgetary availability, and management and organisational capacity should be addressed. These should be viewed collectively to assess institutional capacity.

Prof. F I D Konotey-Ahulu, University of Cape Coast, Ghana, presented a paper on *AIDS in Africa: Obstacles to health care delivery*. Obstacles to health care delivery are sad and in AIDS they are constrained principally by rumours. Without controlling these rumours, the fight against HIV/AIDS and other diseases will be extremely difficult. In West Africa the consequences of AIDS have affected many families, particularly through the sex trade. "You mean they are going to prick us with needles so we can do what we like?" responded an illiterate to the prospect of a vaccine against HIV/AIDS.

Another example is a recent newspaper article on HIV/AIDS, which stated an 85% AIDS rate in a South African community. How has AIDS gone from 0 to 85% in one community in a period of 15 years? What percentage of those were false positive tests? And what percentages were infected by drug abuse, sexual transmission or other means? For the future, there is an urgent need to change paradigms of thought and action. Communication must be done in meaningful and effective local languages and not foreign slogans. We must cease to medicate the symptoms and tackle the underlying causes and we need sensitive and aware people making policy.

Discussion:

Are there any signs of technology being assessed beyond the 'hype' for developing countries? The US examples use basic communications infrastructures. These types of initiatives have the potential of raising the quality of health on a low budget. In developing infrastructure and support,

including telemedicine, care should be taken not to disrupt the normal patient referral patterns. Local providers should be involved in the development. A comment was made about mechanisms for reaching out to a distant community to provide primary care services.

What research has been done to see if the Balm of Gilead initiative is having an effect on the AIDS problem? We have collected baseline data and the main focus of our evaluation is on the uptake and replication in the faith communities.

Should we develop a new paradigm in the diagnosis of HIV/AIDS, and what new paradigms are there in education apart from behaviour change modification? One is talking generally – we have the situation where a lot of money has been pushed in but the condition has got worse. We need a new way to look at it, we must look at the tests and the epidemiology, as this changes from country to country.

We need more doctors and has anyone given any thought to a change in the international approach to telemedicine in and from Africa? In terms of equipment maintenance SA has established and has tried to establish a global maintenance system. A US-based company has agreed to give us service from three different time zones so we're dong it with tele-maintenance. But would physicians in the US be willing it give us free services?

A problem in the US was an inability to pay providers, but the mechanism is a workable alternative to the 'brain drain'. The other option is utilising the universities on the continent for training. MEDUNSA has developed an outlying campus system, so the resources of the centre can be spread to other areas.

A question was asked about whether the current geopolitical boundaries in Africa are an impediment to the utilisation of telemedicine? And the response was that some African countries have been reluctant to adopt the Internet because of political security and there may be some resistance to telemedicine.

The issue of providing technology that fits the environment for which it is intended was discussed. If doctors are going to be poached, we should look to training a group of people that aren't going to be poached. It really is a team approach and not just doctors.

We haven't spent enough time identifying priorities and overcoming obstacles, and we also need to identify success factors. The other point is that telemedicine seems rather piecemeal of what needs to be done and there needs to be more discussion on the use of the Internet for information provision.

Another aspect is 'cost' and there is no one solution about how this is going to be covered. The one exception is the combination of the use of poor people in training programmes that are partly public supported. Although sub-Saharan Africa may be poor in global terms, we do have a resource in terms of our clinical material.

When talking of technology appropriateness for a particular circumstance, this is a problem that is common in the US and the EU, and it may be an opportunity for telemedicine advocates to begin to develop a repository of credible telemedicine evaluations.

To reiterate we talk of the most appropriate technology for the most appropriate application, and basic Internet and communications technologies as a mechanism for patient information and distance education is a reasonable approach. Some of the early programmes were expensive because of the support infrastructure. The Internet is attractive because it is broadly based and one can piggy-back on it. Telemedicine evaluation can be expensive and one needs to plan it carefully.

The Internet is available but we are sitting talking about it, when we should be taking advantage of it. One of the most important points is 'power' – power to influence a nation's health, and all of us have some power to influence the health systems on which we are working.

Developing Sustainable African Health Care Delivery Systems for the Millennium – Symposium Day Two (2 October 2002)

South African e-Government Gateway

Dr. Dimakatso McKay Motshabi, State Information Technology Agency, South Africa, presented *The Strategy for South African e-government gateway*. The State Information Technology Agency (SITA) was established in 1998 to provide and implement IT products and services to the government, enabling it to deliver public services. The guiding principles are accelerated service delivery and citizen convenience. Focus areas are interoperability and compatibility of systems, security, economies of scale and the reduction of unnecessary duplication, according to standards that have been defined by the SITA. The e-government gateway is a first step to bridging the digital divide and is intended to provide a single point of entry to all government services to all people, regardless of where they are. Entry points will include toll-free numbers, ATM-like centres, accredited providers such as banks and the Internet. It is being implemented in six phases, starting with non-transactional information and building up to an amalgamation of all government departments. The SITA is collaborating with the Department of Health in the national health information system and will continue to look for other areas of collaboration.

Concurrent breakout sessions into Panel A, B AND C:

Panel A: Strategic partnerships for sustainability

Presentations:

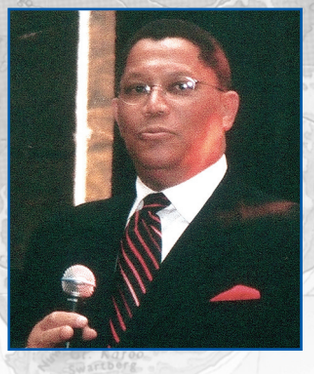
Ms. Mpumie Nqonqoza, Lifescan SA, South Africa, presented on *A private sector-community partnership on substance abuse*. The Lifescan as a private company builds partnerships in communities by identifying a 'problem' and the accompanying 'need'. An example is a partnership that was developed to address substance abuse in the East London area. The initiative was developed around the school speech day and prize giving, and involved other companies, the community, churches and local government leaders. Each pupil was also asked to contribute R2 towards catering as a form of commitment to attend. The event proved successful and it was also decided to follow-up the process on a yearly basis and monitor the children into tertiary education. This has also brought other participants into the project, including the local clinic. Lifescan is also involved in developing another project in one of the academic institutions to train health care workers and educate communities on diabetes, which is on the rise in the black community. It is intended to expand this project nationally and ultimately throughout Africa.

Dr Maureen Levy, Florida 1st Service Administration, USA, presented a paper on *Strategic sustainable partnerships in the US*. The main ingredient for a partnership to be sustainable is 'what is in it' for the partners – who is going to benefit, what is the return on investment and where are the pay-off points. Issues that must be addressed include the barriers that need to be removed, compatibility, cultural differences, management, finances and feedback. An example of a generic project involved training welfare mothers in the Los Angeles area to use ophthalmological equipment to identify retinal diseases in the Afro-American community, in which there is a high prevalence of diabetes and

hypertension. The data was passed on through 'store and forward' to the Drew University for review in order to identify the patients that needed further investigation. A major drawback is that 'store and forward' in ophthalmology is not paid for and financial support has had to be found to sustain the project. A second project involved providing information to health care providers on the need to put in place measures on the confidentiality of patient information. This included industry and government, who were able to promote the project and leverage resources in their own sectors. The concept has subsequently been replicated in a number of states. A third project is the 'healthy family' project involving the provision of health insurance for children, and a foundation was established, which is managed at community level. Businesses in the area have been utilised to support the programme and this has enabled adults to be added to it on a sliding-scale basis.

Dr. Oryema Johnson, Africa Telehealth Project, Canada, presented *Partnerships in telehealth*. In establishing partnerships it is essential to have a clear and common vision of what the partnership is going to do and a clear memorandum of understanding of the roles and responsibilities of each partner.

Most of the examples have revolved around conferences, the most recent of which was held in California in conjunction with the Advanced Telemedicine Research Centre. The Project was responsible for the scientific programme, while ATRC provided the funding and logistical support. An earlier conference involved a partnership with UNECA and UNEP for the Nairobi conference. The project has also been involved in a feasibility study for telehealth in Mali.



Prof. Allen Herman, National School of Public Health, South Africa, presented a paper on *HIV/AIDS in the workplace*. In an approach by the NSPH, the Office of the President agreed to support the development of a strategic framework for an educational response to the issue of HIV/AIDS in the workplace. This resulted in a partnership between the NSPH and the University of Stellenbosch to develop a training programme in this area. Although full funding was not available at the outset, the partners decided that it was in their interests to proceed with the project while funding was sought. A lesson that emerged was the need for a person to identify funding partners who share a commonality of vision. In the private sector the vision can be variable, as the core businesses are often in conflict with those of educational institutions. In this case the private sector recognised the need, but felt the funding duty lay with government. In addition to financial resources, other resources that are essential are human resources as well as intellectual property resources. Other issues that are also important are infrastructure, with facilities appropriate for the context of what is being taught, content, and the definition of relationships, which must be clearly agreed and documented.

Discussion:

It is important to note that public-private partnerships also include other partners such as communities, and possibly also 'north-south' partnerships. A thread in the concept of 'strategic' is being 'selective', e.g. in deciding who one's partner will be.

A delegate expressed a view that 'north-south' partnerships are currently based on an unequal relationship, generally involving developed and developing countries. In the research community one need to make more of an effort to disseminate research outcomes from the south to the north to create a more equal balance of information.

The term 'discipline' should be added to that of 'strategy'. 'Internal' and 'external' relationships need to be developed and it is important to identify a 'champion' for a project.

Many companies have resources that can be pooled, but feedback to funders and other partners is essential. Partnerships need to have some form of detailed signed agreement in place, regardless of any friendships between the partners.

Can you elaborate in your comments on private sector vision? A balance is essential as a business has a mission. There are cultural differences between public and private organisations and these need to be discussed at the outset to avoid the project failing. The private sector could become clever by creating mechanisms within institutions to fund projects as part of their social responsibility.

The Ethekwini Municipality health department is looking for additional external partners to assist in the fight against HIV/AIDS in KwaZulu-Natal. One of the main problems in partnerships is lack of communication. The private sector always wants to know the 'outcome' and that there is something to be gained in a partnership. It seems partnerships are the key to addressing the health care needs in Africa.

A proposal was made to plan a forum to focus specifically on the issue of partnerships, bringing to the table governments, NGOs, corporations, educational institutions, hospitals and clinics, as well as donor organisations, to deliberate the issues identified here and to develop a strategy to address the concerns and needs of the countries that addressed the symposium.

Before moving to new relationships, we should strengthen those we already have. Both these recommendations should be supported. We also need a repository of projects in need of partnerships, e.g. on a web site. There is a need to find out what people really need and then forge the partnerships based on these.

A repository is perhaps a bit ambitious and there is a need first for a tool on how to find partners. There are countries that don't even know how to write a proposal. A number of repositories already exist and a similar one to that proposed is being developed. Some of our partnerships lack agreement on priorities and it is difficult to strengthen these.

Communication is one of the keys to strengthening partnerships and one needs to think of a partner as a customer. On support for partnerships, organisations such as the MRC and IME need to be at the forefront of creating awareness of potential partners. Several tools are needed to address the development of funding proposals and how to think through partnerships.

Albert Hannans, IME, USA, the session moderator offered to chair a committee to develop a plan for the creation of a web site to help facilitate partnerships. The following delegates Alice Hamer, Joyce Moon Howard, James Ingraham, Mpumie Nqonqoza and Maureen Levy agreed to serve on the committee to start developing a repository of tools. Ingraham also committed ResourceLinC to put up a repository on the web.

Panel B: *Innovative Approaches to Health Services Delivery*

Presentations:

Prof. David French, IME, USA, introduced the topic for the session. The discussion will follow the subject areas covered in the series of articles published in PAHO's journal *Perspectives* on the occasion of its centenary. These cover the past achievements of PAHO and what the future might hold for it, as well as discussion of vaccines, the effects of population growth and globalisation, and progress in life sciences in the improvement of health and the quality of life.

Dr Nkaki Matlala, IME, South Africa, made a presentation on *Why has Alma Ata failed?* The goal of Alma Ata of 'Health for all by the year 2000' has not been achieved. It is not for lack of commitment, and the effect of wars and all that

go with them are well known. This, however, is only part of the problem. My premise is that perhaps as a legacy of the colonialism, we tend to look to solutions based on western culture and ignore the local/traditional solutions. This is encapsulated in the NEPAD objectives, which include empowering Africans to improve their own health and achieve health literacy and encouraging co-operation between health care professionals and traditional practitioners. Suggestions are to have compulsory health education in schools, more broadcasting of health education (there is much unutilised space on satellites that could be used), faith-based initiatives covering all public health issues, the use of funerals to educate on disease and death, the recognition of traditional healers as health care providers, greater support for vaccine development and research initiatives, more support for manufacturing and using generic medicines, more research and development of traditional plant medicines, and the development of innovative technology locally. IME can be a vehicle to promote these ideas.

Dr. Wendy Green, Virtual Healthcare Partners, USA, *presented Innovative approaches to improving health care delivery.* The main issues affecting Africa are poverty, health care provider shortages, HIV/AIDS, malaria and TB, and innovative approaches must be directed at these. Initially needs-based priorities should be considered, including water and sanitation, vector control and immunisation. Stakeholders are the patients and health care providers, as well as communities and others and the needs of these must be known. Telehealth can play a role in building capacity and resources can be maximised through strategic partnerships and funding. Recommendations are needs assessments, working together globally for healthy communities, and KISS (keep it simple and sustainable)!

Prof. Felix Konotey-Ahulu, University of Cape Coast, Ghana, presented on *AIDS in Africa: Obstacles to health care delivery*. Four issues are of concern. Firstly, too many good ideas fail to get pushed into action. One example is a herb from the Congo which was found useful in the treatment of HIV/AIDS. Another is of research in herbal medicine for HIV/AIDS at a traditional hospital in Ghana that failed to get started. Yet another is research of a tree product for malaria that also failed. Secondly, there are the contradictions of aims and objectives and who gets to decide these? Thirdly, there needs to be an ethical dimension to programmes. For example, how is the contradiction between officialdom and personal opinion resolved? Fourthly, from empirical observation the best health programmes are those that are developed at ground roots and not top downwards, particularly where there is political instability.

Discussion:

The bulk of the problems of Africa can be traced to an inappropriate mix of human resources. What about categories of physician assistant, nurse practitioner, nurse anaesthetist or nurse midwife, all of which could have a far bigger impact on the health care problems than could doctors?

The major achievements of public health – the eradication of smallpox and the onchocerciasis control programme – combined local solutions with western technologies. Innovation is important but the basics must not be forgotten. At educational level, policy is important in initiating actions.

What is the recommendation for the human resource mix? Africa needs an appropriate mix of human resources and technologies. For example a dental hygienist can be trained in about half the time of a dentist and is better for prevention and promotion programmes, but there is a shortage of these. These lower trained people do better work and they drive the economy.

Technology must be appropriate and relevant: keep it simple and sustainable (KISS). The essential health technology package (EHTP), which was developed in South Africa, has been

taken up as a global project under the WHO (as part of a broader framework for health intervention resource management, FHIRM) and seeks to address the problems described. It starts with a population, for which an epidemiological profile is developed and health planners then specify what services should be provided. Specific interventions are then identified, and for each a technology package is specified. These are then combined to provide lists of equipment, human resources, drugs and physical infrastructure, which can be further fine-tuned according to the budget. It also needs to be supported by effective health technology assessment and management.

Some of these issues can be addressed with a needs assessment, which is a whole template of things that should be addressed before any programme is implemented. People are here with their suits on, but which one of us is willing to go to the rural areas and get our feet wet and begin to implement solutions? How do we do it? We need interventions that are known to work in our communities. Take faith-based interventions - on average about 23 million of South Africa's 40-million population are in church on a Sunday and they are a captive audience. Secondly, funerals are important, and most of us go to these. Thirdly, traditional healers are not being utilised.

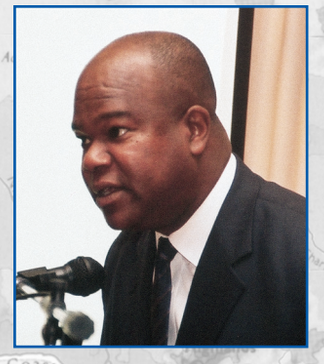
There is an assumption that initiatives are not working, but quite a number are. One answer is to look at communities and see what is working and whether it can be replicated. One's experience is that tribal midwives were playing an important role. When we gave them some training they were thrilled to be recognised, but we got 'blasted' by the Nursing Council and then dropped the project. I was also involved with a family planning clinic, which got funds for a motivational film on population control, and one person said how sorry he was for the person who only had two children. How does one get the message across?

One needs to start with the basics and get people involved. With involvement at both ends, at Council level as well as individual nurse level, one is more likely to be successful.

Our failure is because we ignore local solutions, like the midwives. One of the recommendations must be that NEPAD has a project that goes to local solutions. The other recommendation is about gardens and where I grew up we eliminated kwashiorkor just by planting vegetables. On financial issues we need to find a way to utilise African assets, such as cattle and land.

Panel C: Emerging Technologies for Health Information and Case Management

Presentation:



Mr. Conrad A. Clyburn, Telemedicine & Advanced Technology Research Center (TATRC), USA, presented an *Overview of the Emerging Technologies for the health information and case management*. The US Army telemedicine programme has been organised around the three areas of medical readiness, medical awareness and effective employment of medical forces. It includes over 200 projects aimed at developing technology that will allow for the five 'P's' of precision health care into the future – 'predictive', 'preventive', 'point of care', 'parametric' and 'personalised'. The key emerging technologies currently are directed energy, robotics, nanotechnology, immersive environments, and biotechnology. Over the next 20 years or so these will allow for the emergence of a new area of biointelligence, combining the biological domain of science with the physical domain of engineering and the information domain of computers. This will lead to the emergence of new technologies where biology and engineering overlap (such as biosensors, biochips, biomaterials and biomimetics), where biology and information overlap (genomics, proteomics, bioinformatics and biocomputation), and where engineering and information overlap (medical robotics, microelectromechanical systems, nanotechnology, microarrays and molecular imaging). In terms of

specifics, in medical readiness/training the emerging technologies include PC-based simulations, digitally enhanced mannequins, virtual workbenches combining computers and devices and virtual reality. In medical awareness, technologies include portable ultrasound, portable digital X-ray, portable digital radiology, real-time biochemical assays, and data information systems. In effective employment they include portable medical digital assistants, digital medical treatment facilities, special response packages, VSAT augmentation and digital vehicle-based emergency medical services.

Discussion:

Much of this technology is super-sophisticated. A possible recommendation is to set up a mechanism to utilise older doctors in underserved areas. This works well in a project in which one is involved, in which take doctors from the US to central America for periods of a month or two at a time.

We should continue with research and development and the assessment of affordability, cost effectiveness, clinical appropriateness and applicability to the African environment of all the technologies that have been identified. We also recommend that the partnership model be utilised in the assessment process.

What is the process for the commercialisation of these technologies? TATRC is beginning to work with venture capitalists and businesses to make them more aware of the technological advances that are available. There is an opportunity to bring them into Africa as some of them were developed in and for Africa.

The idea of bringing mature doctors to Africa is excellent and they should also teach as well as provide medical services.

The smart card idea for patient records is excellent, but how often are these updated? In the military environment, frequently. The card is worn as 'dog tag'. In choosing cards one needs to consider the support infrastructure that is required and we are moving towards USB memory sticks.

Telemedicine would be very useful for the University of Zambia School of Medicine to link up the three teaching hospitals. Does the new technology eliminate paperwork? Is the portable ultrasound available? With the emphasis on human resource development, tele-education is a good match. The new technology eliminates paperwork to some extent, but our experience is that the more computers one has the more paperwork is generated as one prints out more. The portable ultrasound is available from Sonosite.

Lecture: *The Role of Telemedicine in Meeting Health Needs in Africa*

Presentation:

Prof. Rashid Bashshur, University of Michigan, USA, presented his lecture on *The role of telemedicine in meeting needs in Africa*. The basic premises are substantial unmet health needs, limited resources to meet these needs and the need to develop systems to promote efficiency, effectiveness and equity. The basic objective of a health care system is to produce health, which is achieved by assessing needs (e.g. morbidity and mortality), estimating services (e.g. preventive, therapeutic, rehabilitative and palliative), and estimating resources (e.g. human resources, health facilities and health technology). An appropriate level of investment in IT is around 5% of the health care budget and obsolescence must be planned for. Telemedicine has a role and its components are on-line health information (including support groups, lay referral and professional services), but mostly unfiltered, telediagnosis, (including radiology, pathology and cardiology), telecon-sultation (including psychiatry, dermatology and other clinical applications), telesurgery (including telementoring, telemonitoring and telesurgery), and tele-education for consumers and providers. Its economic merit is based on substitutions in health manpower and health facilities, and it also provides consumer empowerment and clinical decision-making and knowledge.

Discussion:

What are the costs of, for example, teleradiology? It depends on the requirements and can range from a low level to a high level. Cost benefit studies have been done and in the US this is greatest in applications where the payer is responsible for all aspects of care, such as in prisons.

The approach of the Essential Health Technology Project (EHTP) is similar to the approach you described. One has a lot to learn from other countries if one is open-minded. Technology such as the Internet and video conferencing now provides a medium for exchange.

Is there anything reported that has been done better by teleconsultation than face-to-face – I am thinking of telepsychiatry? Telepsychiatry becomes an equaliser between the therapist and patient and the treatment has been found to be more effective. But it is not true in all cases and the 'gold standard' is personal care.

How much has the nursing profession been targeted in the South African implementation? In Sweden up to 12 surgical specialists are present for surgery on maxillofacial cancers and through telemedicine the patient had already been exposed to them prior to entry in the hospital, and that seems to be an improvement at the patient level.

At University of Michigan they are starting to develop the concept of comprehensive treatment and it is proving successful, particularly 'tumour boards' which provide diagnosis and treatment of cancers at remote sites. We could discuss having tumour boards with you.

One of the most remarkable advances of the 'tele' revolution has been access to information for health care providers, making it possible to access patient record and options for treatment without leaving the chair. However, it is often difficult to judge the quality of that information. The key in the next step is communication and 'filtering' of information. This should enable health services to be distributed more widely by using different classes of health workers more efficiently. The final point is that new software technology might be more important than upgrading existing infrastructure.

Open Discussion With African Deans of Faculties of Medicine and Public Health: *How to Use Health Information Technology to Improve the Quality of Medical Education in Africa and Developing Networks with the Developed World Medical Schools*

Presentations:

Prof. Maurice Mars, University of Natal, South Africa, presented the University of Natal's perspectives. Key issues are the growth of HIV/AIDS and the increase in the population (this has been estimated will grow by 2.5 times over the next 50 years). Currently, South Africa has 56 doctors per 100,000 of population. More than a quarter of African countries have fewer than 10 doctors per 100,000, compared with for example 279/100,000 in the US. There is thus a critical need for more doctors. In addition the majority of medical schools don't have e-mail. IT can be a solution, provided that its use has a tangible benefit and it is not being used solely for the sake of it. The funding put into it should also not be used at the expense of people's health. UN is already using IT and aspects of telemedicine extensively, and it is setting itself up as the central node of five new off-site campuses. A solution proposed for the African continent is the establishment of a satellite-linked co-operative of medical schools based around regional nodes (north, south, east, west, central) where databases are centralised and shared teaching materials (such as generic web-based materials), are developed and packaged for dissemination. This could be realised in conjunction with the Tufts University library database, which enables materials to be 'repackaged' in appropriate format.

Prof. Dan C Mwesigwa-Kayongo, University of Transkei, South Africa, presented the University of Transkei's perspectives. There is a need to look at the 'usage' of new technology as most Africans have little exposure to IT, and this can only be effected with a major shift in the approach to teaching. The teacher is no longer the custodian and source of knowledge but more a manager of student learning and a role model. This may demand a shift from traditional disciplines such as anatomy and genetics to new areas such as normal and abnormal structure and functioning, clinical skills and medical informatics, also covering computer literacy and the use of IT in financial and practice management. Some strategies that could be adopted include creating formal opportunities for curriculum evaluation for relevance and review,providing formal oppor-tunities for staff to participate by organising, preparing and delivering lessons by computer, and sharing resources such as journals. Many students are technologically sophisticated and the more experienced can be opinion leaders among their colleagues. They can also contribute to the teaching of peers and the development of software through part-time jobs and internships.

Dr. Sello Mokoena, University of Durban-Westville, South Africa, presented the University of Durban-Westville's perspectives. The sustainable health care delivery model hinges on interrelationships between poverty alleviation, proper nutrition, job creation and economic development. Government's responsibilities include the delivery of health and social services and infrastructure development. The responsibilities of educational institutions include relevant training, development and research. Those of service providers include the provision of human and physical resources. The UDW model is a tripartite one involving the health and other faculties within the University, the Valley Trust as service provider and the Kwadedangendlale community to develop a Community Studies module comprising teaching on a community site, experiential learning and University ownership of the module. Topics covered include principles of primary health care, district health services, community development through rehabilitation and the world as a global village. For the Valley Trust, benefits were a move from service delivery to more of a rehab model. For the community, benefits were taking ownership for their own health and economic development, participation in the experiential learning of the students and skills transfer.

Dr. Shaheeen Khotu, Department of Health, South Africa, presented the Department of Health's perspectives. The DoH project is a simple one linking the eight medical schools and NSPH using existing technology and infrastructure. Each facility has a 'driver' and MEDUNSA has been targeted as the potential central hub for a repository of teaching materials, to which all the medical schools should contribute. The vision is to provide health education to providers and to citizens in the SADC. Needs are a call for infrastructure (which will vary across the region), a clear commitment to share strategies and resources, the input of content specialists in the development of teaching materials, and the development of standards for infrastructure and practice.

Discussion:

One needs to get on the bandwagon at some point and one can negotiate the technology as one goes along. In the NSPH's case, the technological solution has followed the decision on the direction to be followed. We are also strong believers in developing our own materials and have a growing database of public health material. A major problem that has arisen is the issue of intellectual property rights and restrictions on the use of journal material for teaching purposes. A solution is to write new text books but this demands new skills that need to be developed in Africa.

Telemedicine could help deal with the challenges in Zambia.

Doctors have to learn more and more but they don't have the time. Curricula must be examined to ensure they are relevant to the needs. In relation to the question about the involvement of nurses in telemedicine, the SA Nursing Council is working on that.

Sufficient work has been done in South Africa and now the commitments need to be made and expanded. On the issue of a regional co-operative, this has been discussed for several years and we now need to make the commitment to make the vision a reality.

Much of the discussion has centred on physicians and we need to remember that there are other health care providers. Nurses are an integral part of the local telemedicine initiative and the University of Natal is also looking at the continuing professional development for nurses, which is set to become compulsory. In introducing education in the SADC countries, materials must be relevant for the specific regions in which they will be used.

A model to look at from the US is the physician-assistant nurse practitioner. The terms 'ehealth' and 'telehealth' are more inclusive, and include nurses, than 'telemedicine', and should be preferred. The national telemedicine system has never been slated as for doctors only.

Panel Discussion: *Case Studies of Telemedicine, Medical Education and Distance Learning in Africa*

Presentations:

Dr. Sam Gulube, MRC, South Africa, presented *Telemedicine research and evaluation in Africa*. In Africa the differentiation between a good and a bad telemedicine practitioner is going to be the knowledge of when and when not to use telemedicine. There are many emerging technologies and there are differences of opinion on their cost effectiveness. The response is that one must be selective in using telemedicine. One must know the needs and what applications can be used to address those needs. Research and development is critical for this in Africa. The slow development in the region is probably because people are not convinced that it is a tool that should be adopted. The evaluation of the impact of telemedicine on access to care and the quality of care is extremely difficult, and is currently 'work in progress' in South Africa.

Dr. Salah Mandil, WiseKey SA, Switzerland, presented *Examples of telemedicine: Lessons drawn*. There are many examples of the successful implementation of telemedicine. The first was the development of a link to the low-earth orbit satellite, Satelife, at the University of Zambia. Within two years, 22 hospitals and the Department of Health were linked. This then formed the basis for what amounts to a national health network, which was developed with the explosion of the Internet. In this case the model was starting to use basic tools, which then 'bootstrapped' the need for more tools and services. The second example concerns the provision of health services in the impoverished Chiapas region of Mexico. Telemedicine was selected as an interim solution, and gave rise to a 70% reduction in referrals to a hospital in Mexico City over four years. The third example is of a teleradiology solution that was developed in Mozambique between the Beira and Maputo hospitals. Initially this worked smoothly but problems emerged with the telecommunications links, as these covered a mixed terrain, and overloading of the radiologist expertise in Maputo. The lesson is that telemedicine can be a solution for certain well identified problems but it will not work in every situation.

Dr. Jim Katzenstein, Africa Telehealth Project, USA, presented *Medical education and distance learning: The case of Tanzania*. The project was

started some five years ago with the goal of increasing health care capacity in Tanzania. This gave rise to a collaborative management model, the client consultant system infrastructure (CCSI), which is based on a system involving a group of equals, who work together to identify the problems and the issues to be addressed. It also established partnerships in the US and in Tanzania, thereby providing access in both directions to resources. The technology infrastructure for the project is based on a hub and spoke model – delivering diagnosis and treatment between hub (Mission Mikocheni Hospital) and spokes within Tanzania.

Outcomes of the project are an expanding human infrastructure, a unique collaborative consulting model, an appropriate technology infrastructure, a growing level of expertise and access to content and connections by culturally appropriate linkages.

Prof. Allen Herman, National School of Public Health, South Africa, presented *Public health education using distance learning in South Africa.* The mission of the NSPH is to improve the health of all South Africans and prevent disease and disability. Distance education is used, as the majority of students are in employment and in addition it is necessary to educate individuals in critical public health positions. The development is being phased, starting with the establishment of an intranet and then the provision of on-campus classrooms. An on-campus telemedicine infrastructure and a provincial distance education and telemedicine infrastructure are still to come. Key considerations were to get on-line quickly, use minimal resources in-house, and provide a user friendly and cost effective system. Features of the system include a fully integrated e-mail with a send/unsend capability, workgroup communication and asynchronous/synchronous communication. The NSPH started with 42 students in 1998; currently 189 students are registered, the majority in southern Africa and the most remote in Papua New Guinea and Kazakstan.

Discussion:

What is the gender breakdown of students at the NSPH? Approximately 60% are female – the student body is beginning to look like the countries they come from – and about 70% are non-physician health professionals.

What are the sensitivity and specificity of the Witbank, Pretoria telemedicine evaluation? They are still looking into this.

Summation of findings and recommendations of breakout sessions A, B AND C

Panel A: Strategic Partnerships for Sustainability

- To have a clear and common vision of what the partnership is going to achieve.
- Developing a clear memorandum of understanding and defining the roles and responsibilities of each partner.
- Documenting Partnerships in the form of signed agreements.
- Building partnerships in communities by identifying problems and the accompanying needs. Such partnerships can address substance and drug abuse.
- The involvement and participation of private companies, the community, churches and local government leaders, governments, NGOs, corporations, educational institutions, hospitals and clinics, as well as donor organisations.
- The need for follow up and yearly monitoring to measure the success rates.
- Removing cultural barriers and differences,
- Training compatible staff that would work locally and in a community level basis.
- Proper management, finances and continuous feedback.
- The development of a strategic framework for an educational response to the issue of HIV/AIDS.
- Identify funding partners who share common visions both in the private sector and the government as well supplying them with feedback.

- Other factors for successful partnerships are human resources as well as intellectual property resources.
- The importance of developing and sustaining North–South, Internal and external relationships.
- Communication is essential for networking, identifying potential partnerships and through putting repositories on the web.

Panel B: Innovative Approaches To Health Services Delivery

The panel discussions focused on subject areas covered in the series of articles published in PAHO's (PAN American Health Organisation) journal *Perspectives*. These covered achievements of PAHO and its future, discussion of vaccines, the effects of population growth and globalisation, and progress in life sciences in the improvement of health and the quality of life.

- Needs assessments and working together locally and globally for healthy communities.
- Simplicity and sustainability are important key factors in delivering health services.
- Empowering Africans to improve their own health and achieve health literacy rather than look upon solutions based on Western culture.
- Co-operation between health care professionals and traditional practitioners as well as recognising them as health care providers.
- Adoptions of programs with incentives to avoid brain drain and ensure the availability of human resources.
- Compulsory health education in schools.
- Adopting and utilising the benefits of faith-based initiatives.
- Support for vaccine development and manufacturing generic medicines.
- Adopting and recognising bodies Like the IME that would promote and implement these ideas into actions.
- Adopting the NEPAD initiatives, and beginning with what has worked in the past – on a local level - rather than adopting new initiatives.

Panel C: Emerging Technologies for Health Information and Case Management

- The key emerging technologies currently are directed energy, robotics, nanotechnology, immersive environments, and biotechnology, most of which is highly sophisticated.
- Continue with research and development and the assessment of affordability.
- Partnership models should be utilized in the assessment process.
- Raising awareness of the technological advances present by working with venture capitalists and businesses and future partners. The aim would be implementing such projects in Africa as some of them were developed in and for Africa.

Closing remarks: *Conclusions and Next Steps*

Prof. Rashid Bashshur, University of Michigan, USA, made his closing remarks. The majority of people in the US know, or want to know, little about Africa, and the perception is that it does not represent a big market. The emerging ideology is that the US is the biggest and best in the world but this is a new form of paternalism. In terms of health the US spends the most on health care but its health status is not the highest and therefore it is not the best example. However, its other face is that it is a source of science and technology, with a forward-looking approach to addressing problems, and there is a reservoir of goodwill towards Africa as well as a growing movement among the Afro-American population promoting 'black pride'. Sustainable health systems require building resource capacity, targeted programmes and efficient and effective use of IT as a tool. Telemedicine has a role to play. A lot of good ideas have emerged and we need a process in place to follow this meeting. One element would be to have more of these meetings, each building on the previous one. Secondly, there should be an organisation to organise these meetings and carry the ideas forward. Thirdly there should be an agenda to ensure that the discussion is focused

and the relevant expertise is brought in. I also plan to dedicate a special issue of the *Telemedicine Journal* to Africa, with presentations and research findings by Africans for the world, and contributions are invited. This will also create a trend of continuity from this meeting.

Dr. Henry Musenge, IME, Zambia, presented closing remarks. On behalf of the IME this has been a worthwhile endeavour, with a high level of presentations and positive and spontaneous participation. But what has been achieved is just the first step. The immediate outcomes are the conclusions, recommendations and resolutions, and these will help in formulating a framework for developing projects aimed at maximizing the utilisation of IT in the advancement of health care delivery on the African continent. This is in line with the IME's objectives for this symposium and the health objectives of NEPAD. However, if we are not serious this symposium will end up as just another debating forum. This should be the starting point of the next phase, in which we should form a committee/task force to link the resolutions with the needs of Africa's health care that can benefit from ICT. This should take into account observations from this symposium on project formulation, including consulting and involving end users, aiming at empowerment and capacity development, galvanising political will and overall acceptance of the project and its outcomes, and establishing a framework and indicators for project appraisal to ensure that project goals are met. All the steps in project formulation are important but the next one of lobbying for funding is critical. It needs concerted efforts by the IME and its sponsors and stakeholders to ensure that funds are secured. Thus a strategy to maximize resource utilisation should be formulated. In some cases stakeholders themselves complete project formulation and submit and pursue funding and this is why we aim to maximise participation by African countries at our conferences. Through the formulation of projects the IME would be achieving some of its objectives, including establishing medical partnerships and collaborative programmes in Africa and improving the health care delivery systems on the continent. These objectives are also expounded by NEPAD. Finally thanks are expressed to all the participants, and all the sponsors, co-partners and supporters, of this event.

Dr. Sam Gulube, MRC, South Africa, made his closing remarks by referring to the words of President Mbeki of South Africa. "This new partnership [NEPAD] is designed to radically change the paradigm that has driven international African development programmes. To indicate that change, we reaffirm now that Africans are the architects of the NEPAD renewal plan. As Africans we now own Africa's development agenda. The conceptual basis of the vision and programmes is partnerships – partnerships between all sectors of our society, between governments and civil society, between African countries and regions, and between Africa and other international partners ... All of us have a critical role to play in this process." The critical test of the success of our discussions will depend on what we do to transform those words into actions. The Symposium has produced findings and recommendations and all of us must see how we use these, individually and collectively, to act.

Enjoying the conference are (fltr) Dr Henry Musenge (IMC), Prof. Taole Mokoena (Chairman of the MRC Board), Dr Felix Konontey-Ahulu (University of Cape Coast, Ghana), Dr Henry Eddington (MeDoctor) and Dr Sam Gulube (Director of MRC's Telemedicine Lead Programme).

Discussing forthcoming items on the programme are (fltr) Dr Dingane Daka (sentech), Dr Shaheeen Khotu (Director of the National Health Information System, National Department of Health), and Ms Angie Mokgabudi (National Telemedicine Project Manager, Department of Health).

The conference attracted representatives from various African Ministries of Health. Fltr are Dr Ebrahim Idana (Ministry of Health, Malawi), Dr Benjamin Moiane (Ministry of Health, Mozambique), Dr Florence Mweemba (Ministry of Health, Zambia), Dr Tony MBewu (MRC's Executive Director of Research), and Dr Radebe (Deputy Surgeon General, South African Military Health services).

Some of the Organisers

Front Row (Left to Right)
Mr Basil Olisa, Dr Doris Browne, Mr Albert Hannans, Maj. General M. Radebe, Dr Allen A. Herman, Dr Ndeh Ningo,
Back Row (Left to Right)
Dr David M. French, Mr Sababu Shabaka, Mr. Conrad A. Clyburn, Dr Henry M. Musenge, Dr Nkaki S. Matlala,

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