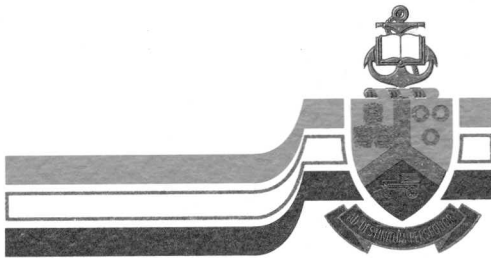


NUWE REEKS Nr 312
ISBN 1-86854-120-7

STARTING FROM SQUARE TWO:
the pursuit of Health for All

PROF C IJSSELMUIDEN



University of Pretoria

CURRICULUM VITAE: PROFESSOR CAREL IJSSELMUIDEN

Carel Ijsselmuiden was born in 1954 in Switzerland. He lived for four years in Curaçao in the Dutch West Indies where his father constructed the first desalination plant on the island. After graduating from high school in Holland in 1973, he enrolled for Chemistry at the Rijks Universitair Centrum in Antwerp, Belgium, and switched to medical school after the first term. He enrolled at the Erasmus university in Rotterdam, Holland, in 1976 where he completed the Arts Examen Nederland in January 1980.

As a result of meeting a registrar in Paediatrics who had worked at the Elim Hospital in the then Northern Transvaal, he reported for duty at the Hospital in September 1980. At Elim Hospital he learnt to administer anaesthesia and was soon familiar with all the prevalent pathology. Before the end of the first year he became intrigued by the phenomenon that roughly two-thirds of all paediatric admissions were due to conditions that are entirely preventable. From then on, he developed a keen interest in the reasons why so many people suffered from preventable conditions and in developing and implementing strategies to remedy this situation. His intended two years at Elim Hospital became almost seven, most of which were spent in community health practice. During this period he obtained the Diploma in Tropical Medicine and Hygiene from Medunsa in 1983 and the Diploma in Public Health from the University of the Witwatersrand in 1984.

The experience of being part of a health care team that covered everything from ophthalmic surgery and thyroidectomies to the development of communal gardens and credit unions focused his professional attention increasingly on health issues rather than on the cure and palliation of disease.

Professor Ijsselmuiden completed his community health specialisation at the University of the Witwatersrand in 1988, and passed the College of Medicine examinations to become a Fellow of the Faculty of Community Health. From 1988 to 1990 he worked as one of two Deputy Medical Officers of Health in Johannesburg and was in charge of epidemiology, informatics and environmental services. From July 1990 he studied at the Johns Hopkins School of Hygiene and Public Health in Baltimore, USA, where he obtained the Master's degree in Public Health in May 1991. Upon his return to South Africa, he was appointed as a senior lecturer in the Department of Community Health at Medunsa where he remained until his appointment as Professor and Head of Department at the University of Pretoria in October 1995.

In pursuing his belief in co-operation as a prerequisite for sound public health, he played a leading role in the establishment of the Transvaal School of Public Health. The School aims among other things to improve education in the field of public health in South Africa and in the subcontinent.

He has received many awards and fellowships and is a member of several research committees, a reviewer for local and international journals, a member of research review committees of the Medical Research Council and a member of a variety of professional bodies in the fields of public health and epidemiology. Also related to his work are his membership of the Board of Directors of the Nokuthula Centre for Mentally Disabled

Children in Alexandria and of the Africa Research and Educational Puppetry Programme, which is well-known for its productions entitled "puppets Against AIDS" and "Puppets Against Violence". He is the holder of several grants for both research and intervention programmes, and considers his most important contributions to public health in South Africa to have been in the fields of regional and national immunisation policy, the quantification of malnutrition as a major child health problem in the Northern Province, stimulation of action to prevent HIV infection at a time when the topic was largely taboo, development of a national policy for vitamin A supplementation, and the development of training in health management and public health. In the international arena his major contribution has been the promotion of the ethical principle of respect for the autonomy of research subjects, specifically the promotion of first-person informed consent, particularly in illiterate populations.

Professor IJsselmuiden has published more than 70 articles in local and international professional journals and chapters in books, and has attended many local and international conferences.

Professor IJsselmuiden and his wife Joëlle have three children.

Prof P Smit

VICE-CHANCELLOR AND PRINCIPAL

STARTING FROM SQUARE TWO:

the pursuit of Health for All

**Inaugural address
Professor Carel IJsselmuiden
Department of Community Health
University of Pretoria**

**Intreerede
Professor Carel IJsselmuiden
Departement Gemeenskapsgesondheid
Universiteit van Pretoria**

10 October 1996

1. Introduction

Professor Smit, Professor du Plessis, friends and colleagues,

It is a privilege to be able to deliver this inaugural lecture, particularly because it concerns the field of public health in South Africa at this moment in time, and at the University of Pretoria, which appointed the first full-time chair in public health in the country in the 1960s. There can be few periods in history that hold more potential to advance health as the next 5 to 10 years, and Public Health, both as a discipline and as a practice, will be an essential part of ensuring the optimisation of health and health care. This, Ladies and Gentlemen, is, in summary, the substance of this lecture.

I am also glad to be able to deliver this address in the presence of colleagues and friends with whom I have, over the years, collaborated and with whom and from whom I have learned. As public health is relatively new to many, I intend taking you on a tour of the discipline. I will highlight a few of the latest developments, in the expectation that it will increase your understanding of its generic expertise, and of the contribution that "the population and system perspective on health" can make to the achievement of health for all, both in South Africa and globally. I will start with a sketch of my own introduction to the field as it will demonstrate the scope and depth of public health in a less abstract manner.

A guideline for this lecture is, however, required. I often use cartoons** in teaching because they can present the essence of an issue often more efficiently than text or speech. Cartoons are also meant to make you laugh and, in spite of the gravity of this evening's occasion, I encourage you to do so: not only is it good for your health, it will also provide a break from the more serious parts of this lecture!

**** Note: Cartoons have not been included in this printed version for copyright reasons.**

2. Introduction to Public Health from a personal perspective

My journey in public health started in September 1980, when my wife and I arrived at Elim Hospital in the far northern Province, serving the then homeland of Gazankulu. We intended to come for two years, as an alternative to military service in Holland, but stayed seven. With six doctors, we provided services for 550 in-patients, 250 daily out-patients, a twice-a-week visit to the 90 kilometres further Malamulele hospital that had no doctors at all, and primary care services through fixed and mobile clinics for another 100 000 inhabitants.

At the end of the first year, I took over the children's ward where the futility of focusing on excellence in clinical care alone became quickly apparent: more than two-thirds of patients suffered from essentially preventable conditions.

Main Causes of Mortality: Elim Hospital Children's Ward: 1976-1982

	%
1. Gastro-enteritis	19,5
2. Kwashiorkor	16,6
3. Pneumonia	12,9
4. Measles	12,8
5. Marasmus	11,0
6. Neonatal Tetanus	5,0
7. Meningitis	3,5
8. Burns	2,8
9. Typhoid Fever	1,5
10. Cardiac Dysfunction	1,4

The question that started me on the road to this inaugural lecture was "why was there a need for an entire measles ward when an effective vaccine was available?" A visit to the person responsible for immunisation proved enlightening.

Instead of needles and syringes, he used a jet-injector, injecting large numbers of children without changing vaccine vials very often, and mostly without eliciting cries from the one-year-olds. Duly impressed by this innovation, I checked the dosage required for effective transdermal immunisation and compared it with the vaccine used as entered in his meticulously kept records. A simple calculation showed that he "vaccinated" at least 8 times the maximum possible number of children with each vial. Clearly, something was wrong. Although one could simply say that the problem was the blocked nozzle of the jet-injector, for me, the essence

of the problem was that an intervention was put in place without a mechanism for assuring quality. *This redefinition of health problems will recur throughout this lecture, as it is crucial to understand how public health can provide workable solutions.*

Having come to this conclusion, I became suspicious of other successes, and I have been paranoid ever since. For example, surveys showed that less than 40% of those who required immunisation actually received it. And an assessment of user perceptions showed that people actually wanted "an injection" at the time of sickness, and not before then. It was, therefore, this complex of technical and system failure, of a lack of consumer awareness and demand, and of deficient health education that caused one of medicine's most cost-effective means of promoting health to be wasted.

So far, I have focused on a disease and on its technical and managerial aspects. But there is another critical determinant of health with which health workers are often not comfortable, namely politics. I now want to introduce you to a patient from Elim. Unfortunately, I have forgotten his name. He died from a combination of malnutrition, gastro-enteritis and pneumonia before his second birthday, anonymous and forgotten by all, save perhaps by his mother.

Rates Related to Malnutrition: Elim Hospital Children's Ward, 1976-1983	
Admissions/year (all cases)	2030
Average overall mortality	6%
Admissions/year (malnutrition)	234
	(11.5%)
Average mortality by malnutrition	34
	= 27,6% of all mortality
	= 14,5% Case Fatality Rate

To deal with the large numbers of children with malnutrition, we developed a host of routine procedures and standing orders. Research evidence and expertise were merged into a routine of clinical care that, even now, I consider to be the best in the country at the time. All staff were trained and retrained, a daily and weekly information system provided feedback on ward performance, and appropriate high-tech means were used to increase efficiency and quality.

Yet, suspicion rose again. Given a medical student on his elective, this suspicion resulted in what would now be known as a clinical epidemiological investigation or an audit of the long-term effects of care.

Post-discharge 5-15 months follow up of children admitted for malnutrition. (Gazankulu residents only).

Elim Hospital Children's Ward, 1982.

No. children traced	23
still alive	17
died	6 (26%)

Of those alive (n=17)

above 3rd Percentile (W/A) 7

below 3rd Percentile (W/A) 10

Of 23 children admitted for malnutrition and who were healthy on discharge, only 7 were still healthy, 10 were again malnourished, and 6 had died since their discharge. Some success our superior hospital care was! Although it is patently obvious that diseases caused by the environment are likely to recur once patients are discharged again into the same, unchanged, environment, the enormity of this problem does not become clear until we look for the evidence. *This does not apply to diseases of poverty only, but also equally strongly to diseases of affluence and most if not all conditions treated by general practitioners and seen in hospitals.*

Malnutrition is racially linked because "race" represents differentials in wealth, which, in turn, are intimately linked to political and economic power and privilege. This insight in itself was not enough for me to invoke political activity as a direct intervention, especially because it was difficult to define the specifics of such intervention. This changed in 1982, when an epidemic of poliomyelitis hit the Letaba region of Gazankulu. Not only did this epidemic arise purely because of health service negligence, but the response from the government health departments was so indifferent that even the most apolitical clinician would have turned into a political activist.

With Dr Eric Buch battling to contain the epidemic in the south and me in the north, we tried to provide immunisation in a corridor around Letaba. In the north, we only had 5 000 doses to vaccinate 25 000 children. No additional vaccine was made available because the then "white" health departments were hoarding it in case the epidemic would spread to their areas. To make matters worse, the Pietersburg health department drove 160 kilometres to Gazankulu's capital to vaccinate the children of seconded "white" officials, and left without even bothering to give us the remaining vaccine. When we tried to pressure the health authorities through the media, we were ordered not to speak to the press on the risk of immediate dismissal.

We were neither silenced nor dismissed, but whatever its effect, it was too late for many victims: the epidemic left 40 children dead and a further 280 paralysed for

life. Finally, an attempt on behalf of the children and their parents to bring a "class action suit" against the government for negligence, failed. As the law did not compel the government to provide immunisation, lawyers argued that no case of negligence could exist.

This experience provides just one example of the power of politics to promote health but also to foster ill health and inequity. The current transformation of health services is another example in which political decisions directly affect health and the work of health workers, as many of you experience first hand. As such, politics and political action are a legitimate and essential area of research, education and operation for those seeking to improve health, both now and in future. In fact, the influence of political reality on health is so all-encompassing that the very creation of a democracy is the essential first step towards a healthy nation.

"Nor is this surprising, since the struggle for freedom from ill health for all had necessarily to follow upon the other great battles for universal privileges which now began to be waged - to be free from tyranny, to be equal before the law, to vote; these were necessarily the first objectives, and upon their achievement, in the normal course of history, public health has depended".

From: Hobson W. Theory and Practice of Public Health. 5th Edition. 1979, page 3.

This textbook quote, referring to events in Europe in the early and middle part of the previous century, indicates that South Africa's recent transition to a democracy was the first step towards optimal and equitable health. This is, therefore, the first interpretation of the title of my lecture: we have made it to square two!

3. Public Health: an overview of scope, depth, and contributions to health and health care

Definition of Public Health

It is one of the efforts organized by society to protect, promote, and restore people's health. It is the combination of sciences, skills, and beliefs that is directed to the maintenance and improvement of the health of all people through collective or social action. The programs, services, and institutions involved emphasize prevention of disease and the health needs of the population as a whole. Public Health activities change with changing technology and social values, but the goals remain the same: to reduce the amount of disease, premature death, and disease-produced discomfort and disability in the population. Public Health is thus a social institution, a discipline and a practice.

From: Last JM. A dictionary of epidemiology. 2nd Edition, 1988.

This personal example illustrates the three main components of public health: the measurement of health and health care, the management of changes to promote health, and the study of the environments of people to rearrange these in ways that promote health and well-being. In its most abstract sense, public health is an effort to redefine our health reality in ways that encourage interventions to optimise health. The stereotypical public health interventions such as sanitation, hygiene, and immunisation are tools for achieving health, but these tools are not the essence of the discipline.

Public Health therefore deals with groups of people rather than with individuals. Its area of operation is large including public, private and non-governmental health sectors rather than the consulting room, ward or laboratory, although each of these may be areas of public health study or intervention too. Its goal is health and well-being of which healing is a part. Its scientific base is a multitude of disciplines rather than medicine alone. And its outcomes are usually not "all or nothing" events such as in clinical medicine (a patient is either cured or not) but are rather expressed in relative terms such as "reduced risk", "improved cost-effectiveness", or "greater equity".

As a discipline, Public Health studies, interacts with and intervenes in the system in which people live and work, one specific sector of which is the health care system, in which public health interventions can improve effectiveness and efficiency through, for example, system design, evaluation, costing, outcome assessment, and management. This applies equally to the public and to the private sector, even though the image of public health is still closely linked to the public sector, a perception that is changing in Western Europe and the United States, and which I intend to change here.

Smoking is a good example of how public health has changed our thinking about disease, and, consequently, has increased our ability to reduce morbidity and mortality. Chronic obstructive airways disease (COAD) is a condition that affects many older persons, most of whom have smoked for years. COAD is a pathologic definition as it describes a pathologic condition of the lung. The solutions following this definition are therefore medical in nature, and include antibiotics, bronchodilators, oxygen and physiotherapy, all without much effect but at great cost.

We can, however, also define COAD by its cause, namely smoking, in which case the condition can be described as tobacco abuse. This redefinition then encourages not only medical interventions but also other, and probably more effective, ones such as youth education, legislation, social engineering and pricing. For example, an increase in the price of tobacco products reduces smoking. Although smoking has not been eliminated, it is the reduction in total consumption of tobacco that constitutes the effect. If the reduced tobacco consumption pattern is stable, then COAD could be reduced over time by, for example, 20%.

This change in understanding health, disease and the limitations of clinical medicine, has resulted in a global campaign to reduce preventable morbidity. The aim has changed from mere prolongation of life, to one of increasing disability-free life, or, in other words, to compressing morbidity as far as possible towards the end of life. Medical technology is necessary but not sufficient to achieve this compression, as many of the factors responsible for disability in later life have their basis early in life, such as athero-sclerosis. And secondly, in most cases the results of prevention are better and potentially less costly than the results of medical intervention, for example calcium supplementation to prevent osteoporosis in post-menopausal women.

The twentieth century will be remembered chiefly, not as an age of political conflicts and astonishing technical inventions, but as an age in which human society dared to think of the health of the whole human race as a practical objective.

Arnold Toynbee

As this slide shows, a redefinition of disease and health has made it possible to think about a healthy world as a realistic objective. Public health has contributed to this shift in thinking through its three major components that are depicted in this slide. In the following sections, I will address some of topics of interest in each of the three areas.

Components of Public Health

- 1. Measurement Sciences**
- 2. Management Sciences**
- 3. Social, Environmental and Developmental Sciences**

3.1. The health measurement group of disciplines

The health measurement sciences group consists of a series of disciplines which includes biostatistics, health informatics, medical decision making, technology assessment, quality control and, as the major generic subject, epidemiology, which I will discuss in more detail.

Definition of Epidemiology:

The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.

From: Last JM. A dictionary of epidemiology. 2nd Edition, 1988.

The basis is descriptive epidemiology, in that it describes the incidence and prevalence of diseases, the distribution of such diseases and their risk factors, and of the interventions aimed at reducing both risk and disease. This started in earnest in the latter half of the previous century with the counting of patients, diseases and deaths, the comparison of disease rates and the mapping of infectious diseases. It is one of the main contributors to the health gains made in the western world by improved sanitation and hygiene. More recently, it was the decisive factor in the eradication of smallpox.

After the Second World War, epidemiology matured into a discipline that was used to determine the causes of ill health. By creating study designs that allowed the demonstration of causal links between collective risk factors and disease, analytic or "modern" epidemiology greatly enriched our understanding of disease causation, and of the effectiveness of different treatment or prevention modalities, and with that, it increased our ability to live healthier lives.

An inherent strength of the epidemiologic method is its capacity to establish causal links between an exposure and an outcome even though not all of the intermediate steps are known. This is known as "risk factor" or "black box" epidemiology, meaning that epidemiologic evidence allows us to intervene without having to wait until all pathologic processes have been clarified. For example, studies in vitamin A deficient children have shown that megadose supplementation reduces mortality by up to 30%. In this country, it was estimated in 1995 that over 5 000 child

deaths could be prevented annually by a similar dosage of vitamin A. In spite of this, there is no clear understanding of how vitamin A achieves this effect.

The gold standard in epidemiological study design is the randomised controlled trial in that it most closely resembles the classical scientific experiment. The major contribution of epidemiology in establishing causality is, however, not the experiment. Instead, most creativity is required to demonstrate causality in situations where experiments are not possible for ethical or logistical reasons. For this reason, epidemiology has also been called an "art of the possible", indicating that sub-optimal information or sources of information are made useful in spite of their deficiencies.

However, risk-factor epidemiology is rapidly reaching its limits as an area of productive research because it is increasingly being realised that health is too complex to be captured in a simple risk-factor analysis. And secondly, the magnitude of the risk factors currently under study is so small that epidemiologic methods are proving too blunt to deliver meaningful and reliable results. For example, 240 risk factors for heart disease have been "discovered so far", and that is, of course, before someone investigates inaugural lectures as yet another risk factor! This abundance makes it impossible to intervene in any except perhaps the major four, and so the value of such research becomes questionable.

In spite of these limitations, however, there are at least two major growth areas: Firstly, in a return to the clinical environment, epidemiology is rapidly becoming an important discipline within clinical medicine and in the basic medical sciences. Its growth and diversification is enormous: virtually any discipline in medicine has developed specific application fields for epidemiologic research, such as genetic or molecular epidemiology, neuro-epidemiology, or pharmaco-epidemiology. The reintroduction of epidemiology in clinical practice will reduce the notion of treatment being selected in terms of the doctor's "best judgement". Clinical epidemiological investigation is making it clear that the doctor's "best judgement" is often not optimal, and that it can be greatly improved if the evidence base for such "best judgements" is increased.

The second growth area is provided by the redefinition of epidemiology as a general quantitative health science that can be adapted to suit any area in the health domain in which accurate quantification or assessment of exposures and effects are needed. As such, epidemiology is expanding into the fields of the social and developmental sciences as social epidemiology (and reciprocally, qualitative and economic research methods are increasingly becoming part of the armamentarium of epidemiologists), and into the health management sciences as health services research, quality assurance management, system re-engineering, cost containment and technology assessment.

For example, driven by financial pressure, health care providers are increasingly aware that treatment modalities, while of similar effectiveness, may differ substantially in cost, especially if long-term outcomes are included in the calculations. This has caused an increase in comparative epidemiologic research for

which insurers and providers overseas have become major financiers. The combined health insurers in the Netherlands, for example, spend over R75 million annually on comparative research. Comparative research is expressed as "DALYs" or "disability adjusted life years", a measure for comparing the costs of interventions in terms of the amount of "DALYs" saved, the price in dollars per year of life saved. Tabulation of the cost and "DALYs" makes it immediately obvious that some interventions are very cheap, such as immunisation and vitamin A supplementation, while others are extremely expensive, such as surgical interventions. This then is another aid to health management decision-making.

3.2. The health management group of sciences

The key issues facing health care managers globally are health care access, quality and cost, of which cost is the major driver of health sector reform globally.

Goals of Health Care Transformation:

- 1. Access**
- 2. Quality**
- 3. Cost**

In South Africa, reform is additionally driven by the will to reduce disparities in health care between advantaged and disadvantaged groups. This is no different from elsewhere in the world, as the reduction of inequity is the major challenge to health services across the globe. What is different in South Africa is the pace of reform and the unpreparedness of health authorities, including academic and research bodies, to deal with it. Arguably, therefore, management is the area in most urgent need of development.

Costs

Cost containment is of concern to all, both in and outside the health sector. According to the Congressional Research Service, the increase in health care costs in the United States can be attributed to the following four factors:

Reasons for Health Care Cost Increases (USA):

- 1. General inflation (42%)**
- 2. Growth and aging of the population (9%)**
- 3. Medical price inflation over general inflation (17%)**
- 4. Increases in volumes and intensity of services, in excess over demographic changes (32%)**

From: Eddy DM. Three battles to watch in the 1990s. JAMA 1993; 270: 520-6.

As the first two items are not influenced by health care reform, the last two issues, particularly item 4, should be tackled to reduce cost increases. In South Africa, the

contribution of the last item to health care cost increase will be even larger given so much "pent-up" demand for health care, making increased efficiency and programmes aimed at demand reduction even more pertinent.

The traditional skills taught at medical schools are not helpful here, as what is needed is new, mostly managerial, competence. This expertise ought to be included in the undergraduate medical curriculum as clinicians control, by their treatment decisions, up to 75% of operating budgets of health programmes and services.

To assist us in identifying the essential management skills, the results of a study done among 94 executives of 14 successful private and public hospitals in the United States, Canada and Britain in 1993 may help. The factors for success that were identified are listed in this slide.

Factors responsible for success in Hospital Management:

1. **An emphasis on formal corporate and strategic planning**
2. **Willingness to continuously improve the quality of care**
3. **The belief that improved people management is critical**
4. **A commitment to organizational flexibility and change**
5. **Delegation of budgetary responsibility**
6. **An uncompromising attitude towards improving information systems**
7. **A belief that competition between hospitals can lead to efficiency**
8. **A focus on continuously reducing costs and improving productivity**

From: Braithwaite J. Defining excellence in health services management: evidence from an international study. Int J Hlth Plan Management 1993;8:56-23

In the light of these reasons for success, it is useful to reflect on the potential of public-private sector co-operation to achieve health for all in South Africa.

Decentralisation

In the 1960s and 1970s, health services planning globally was based on rules and norms, such as the number of beds or the ratio of doctors per 1 000 population. At the end of the 1970s this approach was abandoned in western Europe and the United States with the realisation that central, normative planning led to inefficiency, waste, lowered quality, higher cost and a lack responsiveness to the environment in which hospitals operated. This realisation is, of course, also the foundation for the devolution of health services control to district level.

In practice, however, current health sector reform is centrally and provincially determined, and is essentially normative. The major reason given is the urgency of achieving equity in public health sector expenditure. Ironically, even if good norms were available now, they would be out of date tomorrow. For example, if the Reconstruction and Development Programme succeeds, the spectrum of disease will change drastically until some stability is perhaps reached by 2020 or 2030. Even then, there will still be major differences between regions and localities.

Relation between public and private health sectors

But are norms really the only or best way of achieving equity? The answer to this is no. One option that is receiving increasing attention globally, especially in developing countries, is co-operation between private and public health care providers. Where the public sector is mostly concerned with equity, the private sector emphasises efficiency. Neither of these have the moral high ground, as I would consider it as bad to die from lack of equity as to die from lack of efficiency. The optimisation of both is the true potential of collaboration between private and public health sectors, and its achievement is, in my view, a prerequisite for health for all.

The cautious beginnings of Health Maintenance Organisations or HMOs are a possible start of co-operation. Firstly, because HMOs have to be biased towards prevention, health promotion, rationalised care for chronic disease and rehabilitation, if they want to survive competition.

Secondly, because HMOs and other health care providers in the USA and western Europe are moving from speciality-based health care towards care based on health outcomes. Hospital care is no longer defined in terms of the traditional disciplines. Instead, by being given the responsibility for the health of a defined population, HMOs and other health care organisations have started to outline functional management areas based on health outcomes. The typical hospital superintendent is being replaced by individuals or by teams who manage all professional and support services needed to deal with functional areas such as child health, chronic diseases or geriatric care. No longer are hospitals and number of beds the planning units. Instead, such integrated health systems offer a clinical continuum of care with the ability to intervene at the most cost-effective level, rather than at some "prescribed" level of care. In these "transmural" or "seamless" systems, the distinctions between primary, secondary and tertiary care have become so fuzzy that they are no longer used for planning. The integrated system also places great pressure on the reorientation of doctors towards primary care, and on the more meaningful inclusion of the other health professions, because it makes economic sense.

This bias towards prevention, promotion and primary care, and the cost-effectiveness brought about by the creation of a continuum of care is, of course, exactly what the government wishes to promote here.

The difference between the HMO's and the government's approach is that the HMO achieves cost-effectiveness through outcome-based decisions, good financial management and the use of incentives that are directly relevant to health workers and to individual members, whereas the government's approach, in the absence of good information on health, is based on ideology, on rule-based decision making, and on mostly invalid norms, which create demoralisation and even resistance among health workers whose co-operation is critical for successful reform.

Implications for medical autonomy

Of importance to clinicians is that either of these approaches will further reduce the autonomy of doctors. The "best judgement" of doctors, already under pressure from clinical epidemiological progress, is coming under further pressure from considerations of comparative costs of treatment modalities (leading for example to the use of generic substitutes), from reflections on the optimal intensity of medical intervention (for example, should hypertensive patients really come back every three months to be seen by a doctor, or can this period be lengthened and can the doctor be replaced by a nurse or assistant nurse?), and from arguments opposing "futile care", that is, care that is costly but that is unlikely to substantially prolong life or increase the quality of life. Clinicians' involvement in management decisions about treatment options and about resource allocation will, therefore, become critical to their ability to provide optimal care within their own discipline, and to ensure that health care management does not become driven by economic and managerial decisions in isolation from the prime purpose of medicine, namely healing.

How does this bring us to a productive co-operation between public and private health sectors, and what does it do to districts? In a first level of integration of the two sectors, the public services should be rearranged so that all care in geographical areas achieves management and governance structures that cover the entire spectrum of care in that area. District autonomy therefore has to be redefined: while districts are now responsible for primary care only, they must become co-decision makers in all levels of care. At a second level of integration, public hospitals should compete with private hospital care in terms of district budget expenditure, as was achieved in New Zealand over the last 4 to 5 years. And at a third level, both private and public sector health services could be integrated as differences in terms of access, quality, and cost-effectiveness may have been reduced to such an extent that distinction becomes artificial, as is the status of health services in the Netherlands, where there is neither a public health sector nor a private health sector.

What concerns me most is not whether this route is the "right" one, but that there are preciously few forums where one can discuss, weigh, research or experiment with alternatives. Not only is the academic and other evaluative capacity very limited, there is also a tendency for rule-based decision-making and conformity. Conformity could perhaps be justifiable if we were sure the product was good, but

how can we be sure given the complexity of the health system? Why not consider Gauteng's 48 hospitals as 48 experiments rather than as a monolith?

Not only will this lead to more responsive decision-making, but instead of putting the onus on technical task teams to obtain data to support further rules, it will place the onus for finding evidence to substantiate budget allocations on hospital managements. This may release substantial energy and innovation that are not available now, because of demoralisation and resistance. It may also free provincial staff to focus on core tasks instead of being overwhelmed by the routine managerial needs of the services.

3.3. The social and developmental sciences group

The last group of disciplines is becoming increasingly more important, but as a group in public health they have not yet been fully developed. The disciplines involved include sociology and anthropology, psychology, political sciences, communication, economics, ethics and the environmental sciences, including occupational health. These disciplines represent the realisation that environmental and social characteristics can be important risk factors for disease and protective factors for health in their own right, and that their study can offer new ways to promote health and well-being.

The physical and biological environment has been studied most extensively, and improvements in health in the past century were to a large extent due to research in these areas and to health action following the research. In South Africa, of course, these health actions still need to reach a majority of the population, and in this sense, civil engineers will be the most important public health practitioners in the next few years. Because this field is generally well known, I will not elaborate on it, save to say that environmental health as a discipline studying health risks of environmental exposure is still grossly underdeveloped in South Africa. Environmental risk assessments done for new infrastructural developments largely exclude direct health- risk assessment, and, in any case, the term "environmental health" still evokes pictures of the Kruger National Park rather than highveld air-pollution.

As a useful interaction between sociology, epidemiology and clinical neurology, for example, studies in the 1970s began to demonstrate that social support networks were positive predictors of length of life. With the increasing sophistication of technology, it is now possible to extend this link from social networks to changes in neurotransmitters. The immediate relevance of this is still vague, but these links are beginning to convince even the most biomedically minded that social characteristics are important agents of disease, which require new interventions. Clearly, there are many other contributions of the social sciences, including the integration of qualitative research methods in health research, our improved understanding of social factors as causes of diseases and as promoters of health and reflections on the meaning of causality in health.

In the field of economics and health, health economics has developed as a strong discipline overseas but not yet here. At the micro-level, a specialisation called clinical economics is emerging, the essence of which is the standardisation of efficiency and cost-effectiveness calculations in the clinical setting using a combination of economic and clinical epidemiologic methods.

The field of medical ethics grew tremendously, especially in the United States, after a historic paper by Beecher in 1963 in which he exposed medical practices that were clearly malpractices. The field of bio-ethics has concentrated on clinical medicine, while its application to public health has not (yet) had similar debate and

resolution. For example, in contrast to clinical practice, it is not unambiguously clear what "autonomy" means in public health research.

The Council for International Organisations of Medical Sciences in its ethical guidelines for epidemiological studies makes the issue of autonomy soft. It suggests that if cultures traditionally give heads of households or village leaders the right to decide on behalf of others, then an outside researcher should respect or, at least, should consider respecting this. Following this to its logical conclusion, one consequence would be that in traditional African cultures men will virtually always decide whether or not women can participate in research, a consequence which is clearly unacceptable. Another area of contention in which there has been insufficient debate is paternalism in public health. While in medical care there is no doubt about the duty of health personnel to respect the decision of a patient, there is confusion about the application of this same principle to public health practice. It is one thing to discover that smoking is a health risk, it is quite another to decide how far public health agencies and governments can go to reduce smoking. Should they stop at the provision of information, equivalent to providing information prior to consent or refusal to accept treatment, or could they include legislation, increased pricing, school education and other aspects of social engineering, equivalent, perhaps, to coercion in accepting medical treatment ?

Communication is yet another area in which public health and medicine in general are severely deficient. Examples include the fact that new research findings may take between 20-30 years before being incorporated in medical textbooks, our relative inability to communicate risk and the ineffective use of mass communication in health. These examples indicate that substantial health gains can be expected from increasing our ability to communicate about health with the population.

Equity

Lastly, a concern to the entire group of sciences is the concept of equity in health, which is the aim of health care reform in South Africa and elsewhere. Although we have an intuitive understanding of equity, it is difficult to define, more difficult to measure and it may be impossible to achieve. For example, in the UK, differentials between social classes 1 and 5 have not decreased in spite of over 40 years of national health service. In fact, the gap between the social classes has widened. In the United States, where unfortunately "race" is used as the main population characteristic, there is also ample evidence for an increasing gap in health indices between black and white. And, globally, the health differentials between poor and wealthy nations are also growing. A major threat to achieving equity in South Africa may be the development of a new elite who do not wish to part with their new-found privileges. This situation is not peculiar to South Africa, but to the whole of Africa, as was described in a recent article in the World Health Forum.

**"In the world's wealthiest nations,
millions of children go without
basic health insurance and
without access to basic health
services".**

Children's Defense Fund, 1991

The signs of this new inequity are, of course, already present. Equity is for the poor who use the public health services, not for those employed to organise equity, as we use private care. This is obviously not equity, and equity will not be achieved, no matter what its definition or its indicators, unless society moves towards a culture of solidarity. The academic contribution can be made through helping to define equity, develop and measure indicators, conduct research into the causes of inequity and by advocating change.

4. The current and future status of public health and of the Department of Community Health: potentials and obstacles

What about the future?

My vision of public health differs from that of my predecessors who subscribed to a more classical view based on epidemiology, environmental health and health service administration. The differences are mainly extensions of those three concepts: towards the measurement sciences as opposed to epidemiology per se, towards the entire environment in which health occurs as opposed to merely the physical and biological determinants of health, and from health services administration with a public service bias towards health and health care management without a bias for the public health sector. Ideally all three components should develop in the same environment to ensure optimal interaction. Future development of the discipline and of the department must be in such a way that this interaction can be realised.

It is ironic that as health care is shifting towards primary care, preventive and promotive services, health information and better management, Departments of Community Health are unable to provide substantial assistance, not so much because of a lack of expertise but mostly because of a lack of personnel. The reasons are threefold: firstly, we, ourselves, have not marketed the discipline of public health very competently. Secondly, the biomedical model of disease has only recently been complemented by a social-economic and biomedical model which encourages the development of public health.

And thirdly, in the past the government had little need for a speciality that measures inequity and attempts to reduce it, as the creation and maintenance of inequity was the very purpose of the system. Consequently, the discipline of community health is roughly only 15 years old and has less than 90 people on the national specialist register. Public Health should be considered a "historically disadvantaged discipline", in need of support whether or not it is based at a historically advantaged institution.

Fortunately, there is hope. Although there are no simple solutions, let me highlight some opportunities.

1. **Collaboration** is the first route forward and its effects can be immediate and meaningful. Examples of initiatives that have already been started are:
 - 1.1. The Transvaal School of Public Health (or TSPH) which is a co-operative effort, currently involving five universities: Pretoria, Witwatersrand, Venda, Potchefstroom and the University of the North. My vision is for much wider participation including research, service, public and private sector institutions.

The TSPH has received substantial international endorsement, partly because it is seen as structure within which expertise is shared between historically advantaged and disadvantaged institutions without compromising excellence and relevance, and because it meets a need: more than 150 enquiries to enrol in its MPH programme were received after just one advertisement two months ago.

1.2. At a second level, collaboration is taking place within the university. Jointly with the Department of Systems and Industrial Engineering, we assist in the restructuring of health services in Mpumalanga, as part of the medical faculty's involvement there. The Departments of Community Health, Community Dentistry and Veterinary Public Health are discussing ways to rationalise activities. And, within the medical faculty, the departments of Community Health and Internal Medicine are giving content and shape to a clinical epidemiology unit, that is now well on the road to becoming a serious effort in comparative research and in clinical guideline development.

To support these initiatives, the University itself also needs to adapt. All the problems of centralised and rule-based decision-making outlined in the context of health care apply *mutatis mutandis* to the University as well. Instead, academic entrepreneurship must become, dare I say it, the norm.

1.3. The third route for capacity expansion is the addition of posts. Gauteng has committed itself to trebling the number of posts in departments of community health, including non-medical posts. Under the agreement between the University of Pretoria and Mpumalanga, there will be joint posts in health management, health informatics, and occupational and environmental health. Furthermore, I expect several posts to be funded directly or indirectly by the private sector.

A specific mode of expansion that I will pursue is that of part-time appointments of senior public health practitioners from private and public services to ensure that as academics we remain in touch with the practice of public health.

2. A second area is **training in public health**, in which two developments are particularly innovative and worth mentioning:

2.1. The Master of Public Health degree is a new development in South Africa, which I pioneered from my previous base at MEDUNSA, and which will be offered in 1998 or perhaps even next year. The entire course is modular, and maximally 25% of the course work consists of compulsory courses. For the remainder, the student can select those modules from a large pool of short courses that are relevant to his or her experience and

career. This makes the MPH a very flexible degree, allowing students to sub-track into any major area of public health, and to take the course full-time or part-time.

It is my hope and expectation that the MPH will become the minimum qualification for mid- and senior level management positions in the health sector. In addition, it would be wise of the government to insist that those new appointees who bring political legitimacy to their positions but who lack in managerial and public health expertise use the MPH to obtain management legitimacy as well. The flexibility of the MPH does encourage this.

2.2. Another application of the title of my lecture is the change of the medical curriculum at the University of Pretoria from a traditional to a problem-oriented curriculum.

Health Systems and Population Health: Competencies expected at the end of 6 years

1. Use, interpret and apply evidence-based decision-making in medical practice
2. Use, interpret and apply total quality management in medical practice
3. Use, interpret and apply cost and economic assessments in health care and in medical practice
4. Understand, use and intervene in the link between socio-economic environment and health
5. Understand, use and intervene in the link between occupation and health
6. Understand, use and intervene in the link between the environment and health
7. Manage yourself and others (up to ward or district level)
8. Function productively with and within the health team
9. Conduct timely and appropriate clinical research
10. Identify, access and use sources of health information and of further professional learning
11. Contribute to and use relevant health databases
12. Fulfil with interest medico-legal obligations
13. Understand and function productively in the health system, both private and public
14. Communicate effectively
15. Think independently and innovatively
16. Display leadership and advocacy in matters related to health and equity in health

The opportunity that this offers for the integration of public health in the curriculum is any professor's dream. In the old curriculum, community health had its typical slot of 50 lectures in the fourth year, which is a recipe for hypnosis.

In the new curriculum, community health is represented in all six years. We can now provide students with the opportunity of learning those public health competencies that are relevant to their medical development. From taking students to stay and live in Hammanskraal for a full week so that they will be immersed in the social and economic context of health, we will take them through epidemiology in their second and third years, occupational and environmental health and health systems in their fourth and fifth years, and complete the programme with practical work in clinical epidemiology and clinical economics in their final year, to end up with the list of competencies shown in this slide. Square one was completed by my colleagues who invested three years of hard work in this innovation. Finding myself on square two, all I have to do is use the opportunity!

If we can overcome our staff shortage, we can realise the potential of this innovation to the full, and I believe that Tukkies' doctors will become the best on the continent as they will be competent in both clinical and population-based health sciences.

In summary, the Department of Community Health will look entirely different in 10 years time. Not only will it be larger, but much of this increase in staff will come through part-time and contract appointments, through joint appointments or through the establishment of multidisciplinary teams. Staff will come from a variety of professional backgrounds, funding will be coming to a larger extent from sources external to the government, and we will have developed a significant capacity in service development, in local and international consultancy, and in research. I foresee that the department will have centres of activity focusing on occupational and environmental health, health informatics, epidemiology and biostatistics, management, quality assurance, communication and health, rehabilitation research, tropical disease control, society and health, and we may even have the start of a medical demography unit as well.

**Synonyms for Community
Health:**

**Community Medicine
Public Health
Community Health Medicine
Public Health Medicine
Social Medicine
Preventive Medicine**

To ensure that this new range of activities will be reflected by the name of the department, we are in the process of changing the name from "Community Health" to something more reflective of the new public health, such as a "Department of Health Systems and Population Health".

And lastly, I have dealt with public health in a rather impersonal and technical manner. I feel, however, that as a department we should also reflect those values that we think are important. In our case, these include a bias towards equity, an emphasis on the relevant application of expertise and skills, an emphasis on the practice base needed for good public health education and research which includes a firm linkage to medical activities, an emphasis on international acceptance of work and methods, and an emphasis on forming partnerships with both public and private sectors in the belief that the combination of these holds the answer to health for all in South Africa.

Ladies and gentlemen, as this has been a long and serious evening, I would like to close on a lighter note. As you know, the University of Pretoria is struggling with transformation like any other tertiary institution. An added difficulty is finding the right balance between emphasising a language or developing its international status. I don't believe that these are mutually exclusive, indeed, I think I have found, at least in the field of public health, the perfect merger between the two, as this last slide shows !

Public Health is *LEKKER*

References used

Section 3: Public Health, and overview of scope, depth and contributions to health and health care

1. Evans CA. Public Health: vision and reality. *Am J Publ Hlth* 1996; **86**: 476-9.
2. Weber I. Public Health - Studiengänge in Deutschland. Die Hochschulen beackern Neuland. *Deutsches Ärzteblatt* 1995; **92**: A-1503-6.
3. Magnani RJ, Rice JC, Mock NB, Abdoh AA, Mercer DM, Tankari K. The impact of primary health care services on under-five mortality in rural Niger. *Int J Epidemiol* 1996; **25**: 568-77.
4. Freymann JG. Medicine's Great Schism: Prevention vs. Cure: An historical interpretation. *Med Care* 1975; **13**: 525-36.

Section 3.1: The Health Measurement group of disciplines

5. Lane JC. Social Epidemiology: directions for the future in academic and "shoe-leather" risk analysis. *J Comm Hlth* 1987; **12**: 133-8.
6. Shapiro S. Epidemiology and public policy. *Am J Epidemiol* 1991; **134**: 1057-61.
7. Terris M. The Society for Epidemiologic Research (SER) and the future of epidemiology. *Am J Epidemiol* 1992; **136**: 909-15.
8. Rose G. Sick individuals and sick populations. *Int J Epidemiol* 1985; **14**: 32-8.
9. Buekens F, Ceusters W, De Moor G. The explanatory role of events in causal and temporal reasoning in medicine. *Meth Inform Med* 1993; **32**: 274-8.
10. Taubes G. Epidemiology faces its limits. *Science* 1995; **269**: 164-9.
11. Evans AS. Causation and disease: a chronological journey. *Am J Epidemiol* 1995; **142**: 1126-35.
12. Holland WW. The hazards of epidemiology. (Editorial) *Am J Publ Hlth* 1995; **85**: 616-7. (Plus comments: *Am J Publ Hlth* 1996; **86**: 267).
13. Terris M. The epidemiologic tradition. *Publ Hlth Rep* 1979; **94**: 203-9.
14. Nakajime H. Epidemiology and the future of world health. *Int J Epidemiol* 1991; **20**: 589-94.

15. Susser M, Susser E. Choosing a future for epidemiology: I. Eras and paradigms. *Am J Publ Hlth* 1996; **86**: 668-73.
16. Susser M, Susser E. Choosing a future for epidemiology: II. From black box to Chinese boxes and eco-epidemiology. *Am J Publ Hlth* 1996; **86**: 674-7.
17. Pearce N. Traditional epidemiology, modern epidemiology, and public health. *Am J Publ Hlth* 1996; **86**: 678-83.
18. Wynder EL. Invited commentary: response to *Science* article "Epidemiology faces its limits". *Am J Epidemiol* 1996; **143**: 747-9.
19. Winkelstein W. Eras, paradigms, and the future of epidemiology. *Am J Epidemiol* 1996; **86**: 621-2.
20. Bergman AB, Stamm SJ. The morbidity of cardiac nondisease in schoolchildren. *N Engl J Med* 1967; **276**: 1008-13.
21. Meador CK. The art and science of nondisease. *N Engl J Med* 1965; **272**: 92-5.
22. Trichopoulos D. Accomplishments and prospects of Epidemiology. *Prev Med* 1996; **25**: 4-6.
23. Dean K. Integrating theory and methods in population health research. In: Dean K, Ed. *Population Health Research: Linking theory and methods*. London, Sage: 1993, Chapter 1: 9-36.
24. Charlton BG. The scope and nature of epidemiology. *J Clin Epidemiol* 1996; **49**: 623-6.

Section 3.2: The Health Management group of disciplines

25. Veliotis G, Hanekom H. *A strategy for health care reform in South Africa*. Pretoria, Medical Association of South Africa: 1995.
26. Bos JM. (Ed.) *Het model-theoretische concept: enkele toepassingen in die gezondheidszorg*. Enschede (The Netherlands), Universiteit Twente (Faculteit Bestuurskunde; Centrum Onderzoek Gezondheidszorg), 1996.
27. Bencheikh T. The changing roles of providers, consumers and governments. In: *A call for new public health action*. Geneva, World Health Organisation, 1992, 121-7. (WHO/HRH/92.1).
28. Frenk J. The public/private mix and human resources for health. In: *A call for new public health action*. Geneva, World Health Organisation, 1992, 128-41.

(WHO/HRH/92.1).

29. Moon G. (Re)placing research on health and health care. (Editorial). *Health & Place* 1995; **1**: 1-4.
30. Jones K, Duncan C. Individuals and their ecologies: analysing the geography of chronic illness within a multilevel modelling framework. *Health & Place* 1995; **1**: 27-40.
31. Miranda E, Scarpaci JL, Irrarázaval I. A decade of HMOs in Chile: market behavior, consumer choice and the state. *Health & Place* 1995; **1**: 51-60.
32. Eddy DM. Three battles to watch in the 1990s. *JAMA* 1993; **270**: 520-6.
33. Fierlbeck K. Policy and ideology: the politics of post-reform health policy in the United Kingdom. *Int J Hlth Serv* 1996; **26**: 529-46.
34. Musgrove P. *Cost-effectiveness and health sector reform*. Working Paper. Washington, World Bank, 1994 (HROWP 32).
35. Callahan D. Controlling the costs of health care for the elderly - fair means and foul. *N Engl J Med* 1996; **335**: 744-6.
36. Braithwaite J. Defining excellence in health service management: evidence from an international study. *Int J Hlth Plan Management* 1993; **8**: 5-23.
37. Shortell SM, Gillies RR, Devers KJ. Reinventing the American Hospital. *Milbank Quarterly* 1995; **73**: 131-60.
38. Burns H. Disease management and the drug industry: carve out or carve up? *Lancet* 1996; **347**: 1021-3.
39. Robbins D. Roll on the time when medical aids protect us all. Johannesburg, *The Star*; 30 January 1996: 15.
40. Closson TR, Catt M. Funding system incentives and the restructuring of health care. *Can J Publ Hlth* 1996; **87**: 86-9.
41. Deppe H. Health and society in times of change. *World Health Forum* 1996; **17**: 194-6.
42. Department of Health. *National Drug Policy for South Africa*. Pretoria, Department of Health: 1996.

Section 3.2: The social and developmental group of disciplines

43. Tiefu S, Habicht J, Ying C. Effect of economic reforms on child growth in urban and rural areas of China. *N Engl J Med* 1996; **335**: 400-6.
44. Hsiao WCL, Liu Y. Economic reform and health - lessons from China. (Editorial). *N Eng J Med* 1996; **335**: 430-2.
45. Einterz E. Reorienting health care in Africa - can the élite believe in equity? *World Health Forum* 1996; **17**: 261-5.
46. Krieger N, Fee E. Measuring social inequalities in health in the United States: a historical review, 1900-1950. *Int J Hlth Services* 1996; **26**: 391-418.
47. Kaplan GA. People and places: contrasting perspectives on the association between social class and health. *Int J Hlth Services* 1996; **26**: 507-19.
48. Krieger N. Recommendations of the conference "Measuring social inequalities in health". *Int J Hlth Services* 1996; **26**: 521-7.
49. Kawachi I, Colditz GA, Ascherio A, *et al.* A prospective study of social networks in relation to total mortality and cardiovascular disease in men in the USA. *J Epidemiol Comm Hlth* 1996; **50**: 245-51.
50. Link BG, Phelan JC. Understanding sociodemographic differences in health - the role of fundamental social causes. (Editorial). *Am J Publ Hlth* 1996; **86**: 471-3.
51. Vandenbroucke JP. Social explanations of illness won't go away. *Brit Med J (SA Edition)* 1994; **2**: 481.
52. Bankowski Z. Ethics and human values in health policy. *World Health Forum* 1996; **17**: 146-9.
53. Anonymous. Ethics and health in a changing world. *World Health Forum* 1996; **17**: 150-5.
54. IJsselmuiden CB, Faden RR. Medical research and the principle of respect for persons in non-western cultures. In: Vanderpool HY. (Ed). *The ethics of research involving human subjects: facing the 21st century*. Frederick (Maryland, USA), University Publishing Group, 1996: 281-301.

Section 4: The social and developmental group of disciplines

55. Glatthaar E. Gemeenskapsgesondheid: Gesondheidsrealiteite en die

verantwoordelikhede van 'n universiteit. Intreerede, 31 Julie 1986. Pretoria, University of Pretoria, 1986.

56. Coetsee AM. Gemeenskapsgesondheid - 'n nuwe naam en 'n nuwe benadering. Intreerede, 7 Oktober 1982. Pretoria, University of Pretoria, 1982.
57. Bruce NG. Epidemiology and the new public health; implications for training. *Soc Sci Med* 1991; **32**: 103-6.
58. ZiekenfondsRaad. Ontwikkelingsgeneeskunde 1995. *Jaarverslag van de Commissie Ontwikkelingsgeneeskunde 1995*. Amstelveen (The Netherlands), Ziekenfonds Raad, 1995.
59. ZiekenfondsRaad. Ontwikkelingsgeneeskunde 1996. *Advies van de Commissie Ontwikkelingsgeneeskunde 1996*. Amstelveen (The Netherlands), Ziekenfonds Raad, 1996.
60. ZiekenfondsRaad. Ontwikkelingsgeneeskunde 1997. *Informatie subsidieaanvraag ontwikkelingsgeneeskunde 1997*. Amstelveen (The Netherlands), Ziekenfonds Raad, 1997.
61. Stocking B. Why research findings are not used by commissions - and what can be done about it. *J Publ Hlth Med* 1995; **17**: 380-2.
62. Council on Health Research for Development. *Research capacity strengthening for essential national health research (ENHR)*. Geneva (Switzerland), Council on Health Research for Development, 1994.
63. Commission on Health Research for Development. *Health research: essential link to equity in development*. Oxford, Oxford University Press, 1990.
64. Rosenblatt RA, Whitcomb ME, Cullen TJ, Lishner DM, Hart LG. Which medical schools produce rural physicians? *JAMA* 1992; **268**: 1559-65.
65. Stimmel B. The crisis in primary care and the role of medical schools. *JAMA* 1992; **268**: 2060-5.
66. McManus IC. How will medical education change? *Lancet* 1991; **337**: 1519-21.
67. Kaufman A, Galbraith P, Alfero C, *et al*. Fostering the health of communities: a unifying mission for the University of New Mexico Health Sciences Center. *Acad Med* 1996; **71**: 432-40.
68. Moja T. *Perspectives on the future of higher education in South Africa*. Pretoria, University of Pretoria (Public Relations Department), 1995.
69. Coetzer PWW. *Die Departement Gemeenskapsgesondheid*. Universiteit van Pretoria,

70. Macleod SM. The future of medical schools. Transition and turmoil: the work of a medical school dean. *Education for Health* 1996; **9**: 13-24.
71. Maurana CA, Goldenberg K. A successful academic - community partnership to improve the public's health. *Acad Med* 1996; **71**: 425-31.
72. Showstack J, Fein O, Ford D, *et al.* Health of the public: the academic response. *JAMA* 1992; **267**: 2497-502.
73. Boelen C, Heck JE. *Defining and measuring the social accountability of medical schools*. Geneva, World Health Organization, 1995.
74. Bacon J. Occupational health: what's in store for the next 50 years? *Safety Management* 1996; January: 39-45.
75. Roemer MI. The need for professional Doctors of Public Health. *Publ Hlth Rep* 1986; **101**: 21-9.
76. Roemer MI. More Schools of Public Health: a worldwide need. *Int J Hlth Services* 1984; **14**: 491-503.
77. Kane RL, Weisbuch JB. The MPH: postgraduate training or remedial medical education? *J Med Educ* 1971; **46**: 652-7.
78. Legnini MW. Developing leaders vs training administrators in the health services. *Am J Publ Hlth* 1994; **84**: 1569-72.
79. Anonymous. Reinventing US public health education. (Editorial). *Lancet* 1994; **344**: 141-2.
80. Lee PR. Reinventing Public Health. Shattuck Lecture delivered to the Massachusetts Medical Society 1994 Annual Meeting. Boston, Massachusetts Medical Society, 1994.
81. World Health Organization. Training and research in public health. Policy perspectives for a "new public health". *Training and research in public health dialogue series No 1*. Geneva, World Health Organization, 1994.
82. White KL. *Healing the schism. Epidemiology, medicine, and the public's health*. New York, Springer-Verlag, 1991.
83. Ermakov V. Reform of the World Health Organization. *Lancet* 1996; **347**: 1536-7.
84. Slack R. Back to the future. *Publ Hlth* 1995; **109**: 225-6.
85. Ebrahim GJ. The new public health. *J Trop Pediatr* 1996; **42**: 126-8.

