

Lessons from the field

Training of public health workforce at the National School of Public Health: meeting Africa's needs

Kebogile Mokwena,^a Mathilda Mokgatle-Nthabu,^a Sphiwe Madiba,^b Helen Lewis^a & Busi Ntuli-Ngcobo^a

Problem The inadequate number of trained public health personnel in Africa remains a challenge. In sub-Saharan Africa, the estimated workforce of public health practitioners is 1.3% of the world's health workforce addressing 25% of the world's burden of disease.

Approach To address this gap, the National School of Public Health at the then Medical University of Southern Africa created an innovative approach using distance learning components to deliver its public health programmes. Compulsory classroom teaching is limited to four two-week blocks.

Relevant changes Combining mainly online components with traditional classroom curricula reduced limitations caused by geographical distances. At the same time, the curriculum was structured to contextualize continental health issues in both course work and research specific to students' needs.

Lessons learned The approach used by the National School of Public Health allows for a steady increase in the number of public health personnel in Africa. Because of the flexible e-learning components and African-specific research projects, graduates from 16 African countries could avail of this programme. An evaluation showed that such programmes need to constantly motivate participants to reduce student dropout rates and computer literacy needs to be a pre-requisite for entry into the programme. Short certificate courses in relevant public health areas would be beneficial in the African context. This programme could be replicated in other regions of the continent.

Bulletin of the World Health Organization 2007;85:949–954.

Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction and background

The burden of chronic diseases continues to increase in Africa, and numbers of new skilled health personnel are not keeping pace. Training and increasing the number of health-care personnel, therefore, remains a priority in African countries. In an attempt to meet the human resource challenges, developed countries (e.g. the United States of America) have offered a number of scholarships to help increase the number of personnel; and for a long time the training of public health professionals in the African continent depended on such scholarships. These scholarships required that the students leave their home countries and study public health in foreign settings, where the systems are based on foreign health policies and

under different economic situations. Moreover, the acceptance of scholarships abroad provided its own challenges, like settling in a foreign country (uprooting or disrupting families) and loss of scholarship recipients to permanent resettlement abroad (brain drain).

Despite these challenges, such scholarships provided a significant contribution to the preparation of the public health workforce in Africa, and they continue to offer valuable services. In a way, overseas training was directly instrumental in starting the training programme at the National School of Public Health (NSPH), because the first four founding academics of the school all received their public health training in the USA, three of them having been recipients of overseas scholarships. Additionally, a foundation funded the school to initiate a regional fellowship

programme. Over and above fellows' fees, this funding played a role in advancing the growth and quality of the academic programmes of the school.

The increase in demand for health professionals worldwide has also placed pressure on institutions of higher learning that are engaged in the training of health professionals. The *White paper for the transformation of the health system in South Africa*¹ highlighted the need to not only increase the number of health professionals, but also to reorient their training so that there is a significant shift and expansion of focus from curative measures to disease prevention and health promotion. The AIDS pandemic has also intensified the need for health promotion strategies and qualified health personnel. Meaningful public health training programmes need to accommodate individuals who currently

^a Department of Social and Behavioural Health Sciences, School of Public Health, University of Limpopo, PO Box 215, Pretoria, 0204, South Africa. Correspondence to: Kebogile Mokwena (e-mail: Kebogile_mokwena@embanet.com).

^b Department of Environmental and Occupational Health, University of Limpopo, Medunsa campus, Pretoria, South Africa.

doi: 10.2471/BLT.07.044552

(Submitted: 3 July 2007 – Revised version received: 26 October 2007 – Accepted: 26 October 2007)

work full-time in health and welfare services. This would allow health personnel to implement new skills² in their current positions. Implementing this in Africa has been difficult.

Clearly Africa needs public health professionals with the knowledge and skills to deal with myriad public health challenges. One solution is distance learning. For example, in *Who will keep the public healthy?* distance education is advocated as a method of "... enabling workers to continue in their work responsibilities by completing self-paced coursework ... this approach reduces the burden overworked and understaffed agencies feel as their staff members participate in educational programs".³

In response, the then Medical University of Southern Africa (MEDUNSA) established a Faculty of Public Health, which was called the National School of Public Health. The school set out to develop public health education programmes that would accommodate health-care workers in South Africa who must study while still employed, as well as respond to public health human resource needs in South Africa and the sub-Saharan region. The school accepted the first cohort of master of public health (MPH) students in June 1998.

Since then the NSPH has produced the highest number of MPH graduates compared to other MPH programmes in South Africa (Table 1). It is also the only programme in the country that offers the doctor of public health (DrPH) degree. Despite these apparent successes (due largely to distance learning), studies have not been conducted to assess the contribution of this programme to the training of the public health workforce in Africa.

This paper aims to provide some data on the school's effectiveness by showing how public health training programmes at the NSPH contribute to the public health workforce in Africa.

The status of public health education and training in Africa

In sub-Saharan Africa, the estimated health workforce (including public health practitioners, doctors, nurses and allied health workers) is 1.3% of the world's health workforce; these health professionals are responsible for addressing 25% of the world's burden of disease.⁴ Health gains cannot be made

Table 1. Number of MPH graduates in South African universities

Institution	Period	Number of graduates
University of Cape Town	2000–2006	81
University of KwaZulu-Natal	2002–2007	15
University of Limpopo National School of Public Health	2001–2007	202
University of Pretoria	2002–2007	87
University of South Africa	2004–2007	6
University of Venda	2002–2007	20
University of the Western Cape	1997–2006	107
University of the Witwatersrand	2000–2007	85

MPH, master of public health.

under such circumstances. These figures highlight the need for educating and training more public health workers.⁴ Education efforts have been hampered by a shortage of data: until recently there was very little information on public health education and training in Africa, mainly due to lack of a useable database on public health training. It was only in 2003 that AfriHealth published results of a survey of public health institutions across the continent. The survey was conducted in 56 countries and the results showed that only 19 (33%) had schools that offered graduate training in public health; 32 (57%) had no such training and five (9%) did not respond.^{5,6} In South Africa there are Schools of Public Health at the following universities: Limpopo (where the NSPH is housed), KwaZulu-Natal, Witwatersrand, Pretoria, Cape Town, Western Cape, Venda and South Africa.

Effectively targeting public health education and training efforts

The discipline of public health acknowledges that the prevalence of certain diseases is often an indication of where to focus interventions, that the affected individuals are units in an intricate system of health administration, social structures and economy. *The South African National Health Act (2003)*⁷ indicates the need to reorient health-care training so that there is a strong focus on disease prevention and health promotion. This reorientation is best met by public health training programmes. The role of such programmes in health care is therefore an integral part of health service delivery in any country. The training programmes

should therefore address gaps in a comprehensive offering of health care, while at the same time enabling more access to health services.

Online distance education in public health education and training

During the past 10 years the Internet has radically altered the practice of distance education; applying the benefits of information and communication technology (ICT) to higher education has improved the quality and cost-effectiveness of learning experiences.⁸ This includes the area of public health, where "...[t]here is an increasing view among educators and medical practitioners that information and communication technology (ICT) in general has the potential to revolutionize the way health-care professionals are trained, and to boost their performance on the job".⁴

Background of the National School of Public Health

The mission of the NSPH is the improvement of the health of all South Africans through education, research and strategic intervention in public health in partnership with communities, constitutional structures, and a national and international network of teachers, scholars and public health agencies. Early rapid growth has led the school to become an international institution in public health education and research, in part due to the growth of the Internet.

The school was conceptualized before the Internet became popular worldwide, but has utilized it and interest in distance learning fully. The

NSPH is the first school in South Africa to offer all its programmes and courses online. All courses are delivered using a blend of classroom and online learning. The online curricula has steadily expanded, and due to increased ICT needs, the NSPH is now outsourcing the functions related to delivery of its online courses to Embanet Corporation, a Canadian-based company that hosts, maintains and supports the school's computer network.

One of the primary reasons for the increasing interest in the school's programme is the growing need on the part of students (often working health-care professionals) to access instruction whenever and wherever it is convenient for them to do so. This is made possible by the asynchronous nature of the virtual classroom facility, which constitutes a significant part of the programme.

The school's innovative teaching approach

The online programme at the NSPH offers students the opportunity to study all public health disciplines: epidemiology, biostatistics, environmental and occupational health, social and behavioural health sciences, and health systems management. Students are required to complete four semesters over two years and take a total of 10 courses from all the disciplines of public health, seven of which are core and three are track-specific. A main component of the programme is the course on Research Methods in Public Health. It enables students to conduct research using public health methodologies that have a positive impact on the health of African societies.

Compulsory classroom teaching takes place during four two-week on-campus blocks. During the classes, students are introduced to the online teaching system, the discipline of public health, the semester courses offered, and all other activities that require a classroom approach (e.g. computer laboratory sessions for biostatistics). Classroom contact is integral to the teaching of public health at the NSPH, where students and lecturers debate on current public health issues and form networks.

Online teaching forms a significant aspect of the programme (70%) and is based on the principle of continuous learning. For each course offered, students are divided into groups of 10

and online interaction occurs within the group. The online teaching platform consists of the following facilities: an e-mail facility where students and lecturers can communicate freely; a library with journals, books, research documents and other written materials; a notice board with news of public health events (academic meetings, conferences, international gatherings), office hours of lecturers and other school information; and a course area.

The course area has seven components:

- *Course materials* contains specific course content. Courses are divided into several units, each of which consists of several lessons. Each unit focuses on a theme and each lesson focuses on a subunit of the theme.
- *About the course* provides a summary of the course grading requirements, objectives and content.
- *Course schedule* outlines the schedule of the course, including dates for all lessons, assignments and exams. Details of how students are to be evaluated and marked are provided here.
- *News flash* contains relevant subsidiary material, such as copies of printed articles and past (or upcoming) television programmes.
- *Submission area* is where students submit individual assignments, projects and exams.
- *Chat facility* is used for live discussions between students and lecturers and/or other people who have access to the system (e.g. administrators).
- *The virtual lecture room* is where weekly submissions of course work are made and assessed electronically via a platform called the "white board". Discussion submissions to lessons by individual students, as well as comments from the responsible lecturer are posted here, and are accessible by the whole class. This interactive process, which frequently includes group discussions via the customized chat room, enriches the teaching/learning process and allows for continuous evaluation as the lesson discussions are posted weekly.

As the course area illustrates, the design, development and implementation of the programme is based on active learning (social constructivism). Assessment is continuous and integrated.

The relevance of the programme to health issues in Africa

The MPH programme was designed to prepare public health professionals to draw on the knowledge and skills from a variety of disciplines to define, critically assess and resolve the public health problems facing Africa. The NSPH has successfully achieved this objective through the approach of facilitating learning of public health content and teaching research. The programme has enabled professionals from various disciplines to find solutions to public health problems in Africa and apply them in their communities. For example, doctors and nurses jointly running HIV/AIDS services in communities not only utilize skills obtained in their primary professions, but those they learned through the programme: public health approaches that integrate the social aspects of the disease.

The NSPH's contribution to increasing the public health workforce in Africa

The online approach used by the NSPH has resulted in the ability to recruit and train public health professionals from countries other than South Africa, thus increasing the overall public health workforce on the continent. Besides South Africa, graduates are from Botswana, Cameroon, the Democratic Republic of Congo, Eritrea, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Swaziland, Uganda, Zambia and Zimbabwe.

The majority of the graduates come from countries that benefited from a fellowship programme that ran from 1999 to 2003, these being in decreasing numbers: South Africa (68%), Botswana (11%), Namibia (10%), Swaziland (7%) and Lesotho (2%). Students from other countries that make up the remaining 2% were not covered by the fellowship. The high numbers of non-South African students could be initially attributed to the foundation, but when funding ended with the 2003 class, international students continued to enrol because the school was meeting the needs for public health training in Africa. This is shown by the fact that international students constitute 40% of the 2007 MPH class.

Since its inception, the school has produced 202 MPH graduates and 76

Table 2. Graduates of the NSPH master of public health programme, by nationality

Academic year	Total number of graduates	Number of South African graduates	South African graduates (%)	Number of international graduates	International graduates (%)
2001	31	31	100	0	0
2002	22	22	100	0	0
2003	25	14	56	11	44
2004	38	21	55	17	45
2005	33	17	52	16	48
2006	25	16	64	9	36
2007	28	17	61	11	39
Total	202	138	68	64	32

graduates in the postgraduate diploma in public health (Tables 2 and 3). Of the total number of MPH graduates, 68% ($n = 138$) are from South Africa and 32% ($n = 64$) are international. The increase in the number of graduating international graduates in 2003 was made possible by fellowship grants.

Evaluation of the programme

In 2005, a major supporter of the MPH programme commissioned and sponsored an evaluation among the 56 students who it had funded. The 52 students who responded (93%) rated the academic programme good to excellent; and most appreciated the ability to contact lecturers electronically.

Most students responding to the survey also appreciated the e-learning approach. Twenty-seven (48%) rated their experience with the e-learning approach excellent; and 21 (38%) rated it good. Students also felt that the e-learning approach had an added benefit of increasing their computer skills which they could utilize in their everyday life.

When lecturers were specifically asked about e-learning, eight of the 10 expressed the view that for public health training, e-learning was better than traditional forms of instruction for

several reasons: interaction between lecturer and students, and among students increased; information was constantly available; students had constant access to online tools such as libraries and journals; and flexibility, as students learned course material and completed coursework in their own settings and according to their own daily schedules; for example, while working full-time.

Challenges

A persistent challenge to the programme is student dropout, which comes about for various reasons, including inadequate social support for students and time constraints due to busy lives. Given the nature of e-learning programmes and programmes involving students raising families or working full-time, this challenge is to be expected to some degree. The dropout rates at NSPH, which ranged from 14% to 28% per group of students between 2001 and 2005,⁹ were lower than the rates of up to 70% worldwide reported by Brown.¹⁰

The lack of computer skills, especially in the first year of study, was the biggest challenge at NSPH. This is being resolved in two ways: computer literacy is now a pre-requisite for admission into the programme, and students are tested prior to entrance; also, as the use of technology spreads, computer

skills are increasing among the general population and among NSPH students as well.

Poor time management remains a challenge because most of the students have not been engaged in formal studies for some years prior to enrolment. For some students building and maintaining adequate levels of motivation remains a challenge.

Another challenge is the demand of the programme on academic staff; they are required to work harder because the online feedback and assessment process requires individual attention to each student's contribution.

Conclusion, lessons learned and recommendations

The NSPH is unique; its online courses allow students to study at their own pace, in their own homes and countries. Moreover the programme is structured in a way that they can apply what they learn to the solutions of health problems in their communities. The research development and implementation is also contextualized, and students conduct research that is relevant to health issues in Africa and in their communities. This innovative approach in South Africa has been successful in delivering human resources to meet the needs of the continent. Challenges such as

Table 3. Graduates of the NSPH postgraduate diploma in public health programme, by nationality

Academic year	Total number of graduates	Number of South African graduates	South African graduates (%)	Number of international graduates	International graduates (%)
2001	15	10	67	5	33
2002	28	14	50	14	50
2003	33	10	30	23	70
Total	76	34	45	42	55

NSPH, National School of Public Health.

Kebogile Mokwena et al.

dropouts and computer literacy are being addressed.

It is therefore recommended that this programme be replicated in other African countries and that regional collaboration be strengthened in the

establishment of such programmes. The NSPH should also develop short certificate courses online to respond to specific needs (e.g. evaluations of health programmes, use of antiretroviral drugs to manage HIV, implementation

of health promotion programmes in schools), and other postgraduate programmes that target specific groups of health professionals. ■

Competing interests: None declared.

Résumé

Formation du personnel au service de la santé des populations par l'École nationale de santé publique d'Afrique du Sud : une réponse aux besoins de l'Afrique

Problématique Le manque de personnel formé à la santé publique demeure un grand problème en Afrique. Dans la partie sub-saharienne de ce continent, on estime que l'effectif du personnel travaillant pour la santé publique représente 1,3 % de la main-d'œuvre mondiale au service de la santé et doit cependant faire face à 25 % de la charge de morbidité mondiale.

Démarche Pour remédier à cette insuffisance, l'École nationale de santé publique de la Faculté médicale d'Afrique du Sud a mis au point une démarche innovante, utilisant des modules d'enseignement à distance, pour délivrer son programme de santé publique. L'enseignement magistral obligatoire est limité à quatre unités de deux semaines.

Modifications pertinentes La combinaison de modules d'apprentissage principalement en ligne avec des programmes d'enseignement magistral traditionnel permet de réduire les obstacles dus aux distances géographiques. Dans le même temps,

le programme d'enseignement a été structuré de manière à contextualiser les problèmes de santé du continent africain dans des cours et des travaux de recherche répondant aux besoins spécifiques des étudiants.

Enseignements tirés L'approche adoptée par l'École nationale de santé publique permet un accroissement constant des effectifs au service de la santé publique en Afrique. Grâce aux modules flexibles d'enseignement en ligne et aux projets de recherche consacrés spécifiquement à l'Afrique, des diplômés de 16 pays africains ont pu bénéficier de ce programme. Une évaluation a montré que des programmes de ce type devaient constamment motiver leurs participants pour limiter le taux d'abandon et que pour être admis dans le cursus, les étudiants devaient avoir au préalable des connaissances en informatique. Dans le contexte africain, des formations courtes, sanctionnées par un certificat, seraient utiles. Le programme présenté pourrait être reproduit dans d'autres régions du continent.

Resumen

Formación de los trabajadores de salud pública en la Escuela Nacional de Salud Pública: atender las necesidades de África.

Problema La falta de personal de salud pública capacitado en África sigue siendo un problema. En el África subsahariana, la fuerza laboral estimada de profesionales de la salud pública equivale a un 1,3% de toda la fuerza laboral sanitaria mundial, que debe hacer frente a un 25% de la carga mundial de morbilidad.

Enfoque A fin de corregir ese déficit, la Escuela Nacional de Salud Pública de la entonces denominada Universidad Médica del África Austral creó un enfoque innovador basado en componentes de aprendizaje a distancia para llevar a cabo sus programas de salud pública. La enseñanza obligatoria en las aulas se limita a cuatro bloques de dos semanas.

Cambios destacables La combinación de esos componentes en línea como elemento principal y de los tradicionales programas de estudios teóricos redujo las limitaciones debidas a las distancias geográficas. Al mismo tiempo, el programa de estudios se estructuró de manera que los temas de salud continentales se

contextualizaron tanto en las actividades de los cursos como en investigaciones específicas para las necesidades de los estudiantes.

Enseñanzas extraídas El enfoque utilizado por la Escuela Nacional de Salud Pública permite aumentar de forma constante el número de trabajadores de salud pública en África. Gracias a los componentes flexibles de aprendizaje electrónico y a los proyectos de investigación específicos para África, graduados de 16 países africanos pudieron beneficiarse de ese programa. Una evaluación mostró que dichos programas tienen que motivar constantemente a los participantes para reducir sus tasas de deserción, y que la alfabetización informática debe ser un requisito para participar en ellos. La implantación de cursos breves para obtener títulos en áreas pertinentes de la salud pública sería beneficiosa en el contexto africano. Este programa podría reproducirse en otras regiones del continente.

ملخص

تدريب العاملين بالصحة العمومية في الكلية الوطنية للصحة العمومية: تلبية احتياجات أفريقيا

صُمِّمَ المقرَّر الدراسي بحيث يعكس القضايا الصحية القارية ضمن الأعمال الدراسية والبحوث ذات الصلة باحتياجات الطلاب. **الدروس المستفادة:** يتيح الأسلوب الذي تستخدمه الكلية الوطنية للصحة العمومية حدوث زيادة مطردة في عدد العاملين في مجال الصحة العمومية في أفريقيا. وفي ضوء مرونة عناصر التعلم الإلكتروني ومشروعات الأبحاث ذات الطبيعة الأفريقية الخاصة، أمكن لخريجين من 16 بلداً أفريقياً الاستفادة من هذا البرنامج. وقد أظهر أحد التقييمات أنه ينبغي لمثل هذه البرامج أن تحفز المشاركين، بشكل دائم، على خفض معدلات تسرب الطلاب من الدراسة، كما ينبغي أن يمثّل الإلمام باستخدامات الحاسوب شرطاً أساسياً للاتحاق بهذا البرنامج. ويمكن أن تكون الدورات التعليمية القصيرة التي تمنح شهادة في مجالات الصحة العمومية ذات الصلة، مفيدة في السياق الأفريقي. ويمكن تكرار تقديم هذا البرنامج في مناطق أخرى من القارة.

المشكلة: يظل النقص في أعداد العاملين المدربين في مجال الصحة العمومية يمثّل أحد التحديات. وتقدر نسبة الممارسين في مجال الصحة العمومية في أفريقيا جنوب الصحراء بـ 1.3% من مجموع قوة العمل الصحية في العالم، يتحملون وحدهم ربع العبء المرضي العالمي. **الأسلوب:** بُغية سد هذه الفجوة، وضعت الكلية الوطنية للصحة العمومية، في ما كان يطلق عليه الجامعة الطبية في أفريقيا الجنوبية، أسلوباً مبتكراً، باستخدام عناصر التعلم عن بُعد، من أجل تقديم برامج الصحة العمومية الخاصة بها. وتقتصر الدراسة الإلزامية داخل الفصول الدراسية على أربع مجموعات، مدة كل منها أسبوعان. **التغيرات ذات الصلة:** أمكن من خلال جمع العناصر التي تقدّم إلكترونياً بشكل مباشر، مع المناهج التقليدية التي تقدّم داخل الفصول الدراسية، تقليص أوجه القصور الناجمة عن بُعد المناطق جغرافياً. وفي ذات الوقت،

References

1. White paper for the transformation of the health system in South Africa. South African Department of Health: 1997. Available at: <http://www.info.gov.za/whitepapers/1997/health.htm>
2. Beaglehole R, Sanders D, Dal Poz M. The public health workforce in Sub-Saharan Africa: challenges and opportunities. *Ethnicity and Disease*, 2003, 13[suppl. 2]:S24–30.
3. Institute of Medicine Committee on Educating Public Health Professionals for the 21st Century. Gebbie K, Rosenstock L and Hernandez LM, eds. *Who will keep the public healthy? Educating public health professionals for the 21st century*. The National Academies Press; 2003. Available at: <http://www.nap.edu/catalog/10542.html>
4. *Addressing Africa's health workforce crisis. An avenue for action*. High-level Forum on the Health Millennium Development Goals; 2004. Available at: <http://www.hlfhealthmdgs.org/Documents/AfricasWorkforce-Final.pdf>
5. Ijsselmuiden C. *AfriHealth: increasing public health capacity in Africa*. University of Pretoria: South Africa; 2002. Available at: http://www.globalforumhealth.org/forum_6/sessions/3Thursday/7Plenary6MonitoringIjsselmuiden.pdf
6. Ijsselmuiden C. *Mapping public health education in and for Africa*. 2003. Available at: <http://afrihealth.up.ac.za/database/database.htm>
7. *South African National Health Act, No. 61 of 2003*. Available at: http://www.polity.org.za/attachment.php?aa_id=1359
8. Anderson T, Elloumi F et al. *Theory and practice of online learning*. Athabasca University; 2004. Available at: http://cde.athabasca.ca/online_book/
9. Rosenberg A and Mokwena K. *e-Learning for the expansion of public health education in southern Africa: an evaluation of the Secure the Future fellowship program at MEDUNSA* [unpublished study]. Poster presented at the 8th AIDS Science Day Conference, 16 April 2007 in New Haven, CT, USA.
10. Brown E. *Online learning: retention is everyone's issue*. Available at: <http://weirdblog.wordpress.com/2007/05/01/online-learning-retention-is-everyones-issue>