

An Environmental Scan of

# Best Practices in Public Health Undergraduate Medical Education

REPORT 2:

## **Association of Faculties of Medicine of Canada - Furnished Existing Literature Review**

MARCH 2009

Prepared by the Nevis Consulting Group for the  
Association of Faculties of Medicine of Canada (AFMC)  
Public Health Task Group



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## 1. INTRODUCTION

Like other parts of our overall report this targeted literature review is looking for good ideas. It mainly examines a number of reports originating in Canada that have been written recently and which address approaches being made to improve undergraduate (UG) public health (PH) education here and elsewhere. At AFMC's suggestion, it goes on to take a brief look at a number of non-peer reviewed reports published in other parts of the world on public health education, in the hope they will contain detailed descriptions of UG PH teaching methods that not only sound good, but can be shown to work well too.

This is a fruitful time to be looking for new ways of teaching health topics at the undergraduate level - especially public health. As we have noted in other documents delivered under this contract, public health seems to be emerging slowly from under a mound of derision poured upon it by generations of medical students who have been obliged to address the seemingly unimportant principles and practice of PH, when they are trying their best to become physicians. However, the benefits of bringing prevention to bear on disease are becoming more clearly recognized today and at the same time the need to provide really effective and inspiring PH instruction to tomorrow's doctors is being accepted in many of our medical schools and in those overseas too.

Old-style lectures delivered to large numbers of students in unsympathetic classrooms are fading away to be replaced by small group instruction, hands-on experiential learning and "learn as you like" e-learning modules. The purpose of this review is to try and establish which of the numerous new teaching techniques or ideas being introduced to today's medical students look to be winners for the future and ones that will work well in Canada to the benefit of both students and medical faculties.

Whereas all the provided documents illuminate interesting areas of public health education, this review is specifically intended to identify best practices in the teaching of public health to medical undergraduate students and to find techniques that have actually proved successful in animating enthusiasm on the part of these students for the course of study offered. The first paper reviewed below appropriately examines what medical students think about public health and the way that it is taught at a sample of five Canadian universities.

## **2. THE REPORTS**

### **2.1 RESULTS OF FOCUS GROUPS CONDUCTED WITH CANADIAN MEDICAL STUDENTS ON PUBLIC HEALTH EDUCATION <sup>1</sup>**

"Earlier my enthusiasm for PH stemmed from what I learned in a sociology of medicine class in undergraduate studies – [in medical school] this was represented poorly, and when it was done, it was presented in such a mundane, incredibly boring way that I am not surprised that my peers thought it was a waste of time." **A student**

Focus groups were held about two years ago at UBC, the University of Manitoba, the University of Toronto, McMaster University and L'université de Sherbrooke to find out how medical students looked at public health, their education in the subject and how they thought recruitment into the public health medical specialty of Community Medicine could be increased. A total of 57 students volunteered to participate - 35 women, 22 men, with about half coming from the pre-clerkship years of their undergraduate programs. Incidentally, the participants each received a small literary gift in recognition of their assistance, which was approved by the university Ethics Board at each site.

The focus sessions revealed four main themes, all of which speak to the challenges facing UG PH educators today:

- 1. Medical students possess a general understanding of what public health is, but not of what Community Medicine specialists do.**
- 2. Medical students struggle to understand public health within the context of clinical medicine.**
- 3. Students are disillusioned, disengaged and disappointed in their undergraduate medical school's public health curriculum.**
- 4. Misconceptions and lack of incentives lead to poor recruitment into Community Medicine**

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<sup>1</sup> Hau M, Tyler I, et al. *The Current State of Public Health Education: Perspectives of Canadian Medical Students* - October, 2007

**Recommendations:** The report's recommendations were made on the basis of student input and the knowledge of existing curricula available to the research team. They were as follows:

- 1. Expose medical students to the practice of public health, as opposed to only textbook definitions and theoretical knowledge. This should ideally be accomplished through experiential "hands-on" learning.** More contact with CM specialists during the course is suggested along with the establishment of CM mentorship programs similar to those in place for family medicine.
- 2. Practise more effective role modelling in Community Medicine.** Get students to understand the results that CM can achieve (protection, health promotion, nailing outbreaks), as well as the sometimes undramatic methods used to get there (meetings, teleconferences) and the lack of corporate seminars in attractive resort areas. Mention breakthroughs - vaccination, smoking reduction.
- 3. Increase Community Medicine physician resources for undergraduate medical education in public health.** Find CM teachers (possibly including CM residents) and the funds to pay them - especially CM physicians to teach pre-clerkship. Provide more really interesting field assignments and high quality electives.
- 4. Demonstrate the importance of public health to clinical medicine.** Find clinical specialists who understand the importance of PH in their work - have them show students how PH benefits individuals and communities 24/7.
- 5. Increase the understanding and appreciation of Community Medicine as a medical specialty.** Make sure students understand the merits of the Royal College's CM program compared with a post MD Masters in PH.
- 6. Collaborate with the College of Family Physicians of Canada to enhance the education of family doctors as front-line participants in the public health system.** Promote the creation of a PH curriculum in family medicine clerkship and residency programs, so that family doctors can interface effectively with the PH system during emergencies and potential emergencies.
- 7. Integrate the teaching of public health and clinical medicine.** Draw clinical medicine and PH teaching closer together by building PH principles into the core medical curriculum. Include case-based content taught by PH practitioners and CM specialists.
- 8. Content should be delivered and examined with the same rigor as other medical specialties.** Reconsider the means of evaluating of PH education currently in use in medical schools and the MCCQE. Focus evaluation on clinically relevant PH practice.
- 9. Increase visibility and attractiveness of Community Medicine as a specialty.** Go all out to market the RCPSC CM specialty to students. Show what CM specialists actually

do. Provide funding for international PH electives. Pay CM practitioners on same scale as other salaried specialists.

**10. Build capacity for student initiative and leadership in public health.** Continue to support growth of Public Health/CM interest groups among students. Promote student research and summership opportunities along with dedicated elective programs.

**Assessment:** This is a useful paper in that it finds out what students have to say about PH teaching at Canadian medical schools and makes on-target suggestions about what should be done about it. It is also up-to-date.

A number of key points stand out as being very much in line with the views expressed by informants interviewed for our study. In particular, it seems clear that closer integration of the public health and clinical medicine curricula will continue to grow in the years ahead, especially as a number of medical schools have already started to achieve higher levels of integration with the enthusiastic support of Deans of Medicine.

Proper examination and marking of PH course content is another important factor noted in both studies as being essential to ensure that PH is accepted by students as an important part of their medical training. And similarly, stressing the practice of PH through hands-on learning, CM specialist mentorships and interesting attachments will help dispel the notion that PH is bookish and relatively boring compared with clinical activities.

On the other hand, our study did not find evidence of the high level of total disillusionment, disengagement and disappointment on the part of students with PH curricula described by Hau M et al, although to be fair we were not talking directly to students. Our interviews with PH representatives at Canadian medical schools indicated a marked improvement in student satisfaction reports across the board - some even revealing enthusiasm for PH course content. So, unless there is an element of self-deception at work, PH courses seem to be experiencing an upswing in popularity.

We felt that Recommendations 2, 3, 5 and 9 covered much the same ground. They could perhaps be combined into a single recommendation, such as "Increase the visibility and attractiveness of CM as a specialty by allocating more CM physician resources for UG medical education in PH". Similarly, Recommendations 4 and 7 could possibly be blended into one, since 4 is the required action and 7 is how to do it.

## **2.2 INTEGRATION OF PUBLIC HEALTH WITH THE MEDICAL EDUCATION CURRICULUM<sup>2</sup>**

This paper consists of a literature review on the aims and objectives of the integration of PH teaching with the medical curriculum and a description of an integration project carried out by the Medical School at Sherbrooke University in the undergraduate medical curriculum.

### **2.2.1 Literature Review**

The review gathered a substantial number of articles generally from the period 1994 to 2000, relating directly or indirectly to the integration of public health teaching with the medical curriculum at medical schools.

**Levels of Integration:** Ten or so selected articles discuss possible levels of PH integration. These include **parallel courses** on public health objectives where a series of apparently separate modules are sprinkled throughout the medical curriculum dealing with different aspects of public health or alternatively a **coordinated approach** in which what is taught during public health modules ties in with what is being taught on the clinical side at about the same time. Or, teaching of public health may be **fully integrated** with medical teaching such that PH and medical learning objectives are addressed simultaneously in the same module and could well be taught by the same person.

**Challenges to implementation:** Change meets with resistance; budgets and perceived departmental power-bases are sensitive to curricular change. Clinical and basic science departments may see integration of public health as a threat to their dominance. If a fully integrated curriculum is envisaged, public health departments may fear the loss of control over their subject matter. At the same time, clinical teachers may see public health as irrelevant. Donovan et al. believe that a change project needs strong central support to be successful.

They also mention Riegelman's suggestion of a RICE model for successful integration of public health with medical education, where skills are **R**elevant to the practice of medicine, teaching methods are **I**nnovative, there is integration in **C**linical teaching and **E**xpectations are high. Learning objectives chosen for their relevance to clinical competencies allow both students and teachers to appreciate the potential contribution of public health. Faculty and licensing examinations that integrate public health and clinical medicine topics provide strong incentives for learning.

### **Evaluating the teaching projects**

Donovan et al. found no models for the evaluation of the integration of public health in the undergraduate medical curriculum. The only examples found dealt with the integration of public

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<sup>2</sup> Donovan D, Xhignesse M, Grand'Maison P: *Integration of public health in undergraduate training in medicine*, Université de Sherbrooke/PAHO, undated - 2002 (?)

health in a community-based educational setting, where there were several references indicating that this type of integration is "compatible with excellent performance in examinations".

### **2.2.2 What happened at Sherbrooke?**

The Faculty of Medicine at Sherbrooke decided to go for full integration of the teaching of public health in their 4 year undergraduate medical course. So public health is now taught by basic science and clinical teachers along with their regular medical instruction. Astutely, these modules are complemented by public health teaching within the medical curriculum provided by PH specialists geared to clarify the integrated content and to concentrate on public health learning objectives.

These sessions take place in public health's own four-week, problem-based learning slot at the end of the first year. It features three workshops on statistics and epidemiology and six problems that deal with the following themes: infectious disease control, environmental health, addictive behaviours, health at work, cancer prevention and social determinants of health.

Later in the curriculum, there is a compulsory four week clerkship in public health during which students spend the first three days in course work before splitting into groups of four or five to work on a public health project under the supervision of a tutor.

#### **Integration plan: Year 1**

Donovan et al. go on to describe how the integration project coordinator worked with tutors and module coordinators to identify the PH concepts that fitted in best with the content of each of the organ system modules being taught at the time in the medical program.

#### **Evaluation: Year 1**

The implementation of the project in the first year was evaluated using questionnaires to survey the tutors and verbal follow-ups with the module coordinators.

It turned out that the number of PH topics included for integration got rather out of hand. Instead of a planned two per module, a much longer list was put together. Most of the integrated PH learning objectives related to frequency of illness and risk factors for it. Learning objectives dealing with preventive interventions were chosen rather less frequently, while those covering the organizational aspects of practice and the social elements of medicine were neglected.

Surprisingly, perhaps, clinical tutors reported being reasonably at ease when teaching PH concepts, especially as the list of topics involved for each concept was long. However, they complained that PH integration was just another addition to their workload in recent years and has had the effect of adding considerably to the teaching effort required for each module.

It was concluded that the process of integration needed to be under tighter control, that learning objectives should be fewer and should be described precisely and in detail so that tutors could be provided with training specific to the objectives being integrated.

### **Integration plan: Year 2**

Drawing on the problems experienced in the Y1 integration process, some changes were made for Y2 implementation:

- Reduced PH concepts to two with clear learning objectives
- PH texts selected and added to students' teaching materials
- Provided tutors with single page summaries of PH concepts
- Prepared questions for inclusion in module exam

### **Sherbrooke's Main Conclusions**

1. The public health learning objectives should relate at all times to the subject matter of the module and the specific issue with which it is integrated.
2. In accordance with pedagogical theory, learning objectives should build as much as possible on previously acquired knowledge. Unfortunately, students do not get any PH specific instruction until the end of the first year at Sherbrooke - so they found it hard to find PH concepts for integration in the first year that built on what students already knew.
3. PH texts should be made available to fill the gap caused by little or no discussion of PH issues in organ-system module text books currently in use.

**Assessment:** This report may well be of value to other universities considering increased integration of their PH program with the overall medical curriculum. An extensive literature review and an account of the challenges faced so far in implementing the first steps in PH integration are both helpful.

Donovan et al. accepted that the choice of public health objectives at Sherbrooke and their sequence may appear rather haphazard, but they believed this would be resolved following formal acceptance of the project. As other universities have pointed out, this type of change is a good deal easier to carry out as part of a global renewal of the curriculum rather than using a more gradual and fragmented approach.

It would have been useful if this report had provided some information on how faculty opposition was managed and some actual student feedback on the effectiveness of the integrated modules. A summative evaluation would be welcome now, since a number of years have passed since the initial integration steps described in the report took place.

## **2.3. INNOVATIONS IN PUBLIC HEALTH EDUCATION<sup>3</sup>**

This report was carried out for PHAC by Nevis Consulting in 2005. The mandate was to examine what innovative teaching of public health was taking place at various levels within universities and colleges in Canada, the UK, the US and Australia. The focus of the work was almost exclusively on the teaching of MPH (and similar postgraduate public health degrees), but there are several references to undergraduate PH teaching, three of which are reviewed in this section.

### **2.3.1 PH in Undergraduate Medical Teaching**

The report quotes a personal communication from Monica Hau, prior to the publication of her paper cited above, passing along how some students who had recently graduated from Canada's leading medical schools felt about the public health teaching they received. They recalled a few lectures in the first year that mainly focused on clinical epidemiology and evidence-based medicine. In their view, these were among the most boring subjects on offer at their schools. They added that public health is not real medicine anyway and that to go into PH having gathered all the necessary clinical knowledge to obtain their LMCC would be a real waste.

Nevis suggested that a higher standard of public health teaching in Canada's medical schools would be a useful step in stimulating more students to become public health physicians. It might also ensure that Canada is graduating doctors with a useful knowledge of what community medicine is about and an appreciation of the role that prevention plays in our health system.

The report also points out that according to the Naylor Report<sup>4</sup>, Canada's serious shortage of public health physicians is not only due to shortcomings in the education system, but to a failure to retain community medicine graduates by providing rewarding careers in public health.

A study of PH teaching in UK undergraduate medical programs<sup>5</sup> revealed that Epidemiology and Disease Prevention were taught in all UK medical schools surveyed, while Health Promotion and Health Inequalities were covered in 94 % of them, with Critical Appraisal at 88 % and Statistics at 81 %. In about three-quarters of the medical schools, public health and clinical teaching were integrated to some extent, while 19 % of the courses appeared to be fully integrated.

This looks quite encouraging, but the findings did not record how much time was allocated to these topics during a typical UK undergraduate medical program. Public Health has traditionally

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<sup>3</sup> Nevis Consulting Group: *Innovations in Education for Public Health* - PHAC, August, 2005

<sup>4</sup> *Learning from SARS - Renewal of Public Health in Canada* - A report of the National Advisory Committee on SARS and Public Health: October 2003, Chapter 7.

<sup>5</sup> A. Bagade, S. Gillam: *The State of Undergraduate Medical Education in Public Health in UK Medical Schools* - Institute of Public Health, University of Cambridge, November 2004.

appeared all over the place in this vast curriculum, but it is said to be disappearing because "students don't like it and it has a bad reputation".

Bagade & Gillam recommended that undergraduate public health teaching in UK medical schools would be strengthened by:

- Shared consensus on what constitutes a public health syllabus at this level.  
[Steve Gillam is still looking for this, six years later]
- Further evaluation of problem-based public health learning and attempts to integrate public health with clinical teaching.
- More sharing of teaching materials and experience.
- Ensuring epidemiology and public health are examined at Finals.
- Initial and continuing developmental support for [PH] teachers.
- Appropriate recognition and encouragement of [PH] teaching activities within academic departments.

### **2.3.2 Success of PBL in Medical Teaching**

The Nevis report found that student buy-in seemed to be a persistent problem with PBL<sup>6</sup> - especially at the undergraduate level. Although students tended to agree that they learned well with PBL, they were often uncomfortable with the way it worked. The main reason for this discomfort seemed to be the uncertainty they felt about how to do well in this new (to them) academic environment. They knew how to succeed when the program content is presented before problems have to be solved. In PBL, however, they meet a problem-rich scenario first and are then required to work out the learning objectives and therefore the course content that will allow them to solve the problems involved. This is a particularly unsettling approach for students who like a more passive 'sit quietly, blend with the woodwork' learning technique. Experienced PBL teachers are said to recommend gradual introduction of PBL units at the undergraduate level, followed by more frequent use of the method in graduate programs.

However, the report points out that Simon Fraser is not over-enthusiastic about teaching courses using problem or case-based techniques. Other universities have used them successfully, but SFU has found them to be highly faculty intensive. They say it has proved very demanding to make numerous instructors available to run frequent problem-based scenarios, when the same knowledge could have been effectively delivered more quickly by a single instructor in more conventional ways.

<sup>6</sup> Learning & Teaching Centre - University of Victoria: *Currents*, Vol 2, No 2 - March 2005

On the other hand, the University of Delaware has been an enthusiastic PBL user since the 1990s. Their staff report<sup>7</sup> that "they've seldom felt as energized about their teaching and seldom seen their students so motivated and involved". John Cavanaugh, vice-provost for Academic Programs and Planning at Delaware maintains that "the Lone Ranger has gone - the way the world works now, it's about working together" and that's why PBL's time has come, in his view.

### **2.3.3 Provide More Undergraduate PH Programs**

Undergraduate PH degree programs in the US are common and they are full. US universities, notably Johns Hopkins, believe that more Canadian universities should introduce these. Degrees like Waterloo's four-year B.Sc. in Health Studies and Gerontology provide an all PH (non-clinical) path for students looking to secure an MPH and practise PH in due course. This puts them on the same level at MPH entry as those with undergraduate degrees in PH-related specialties such as social science and nursing. Moreover, the bachelor qualification in itself opens a wide range of public health career options.

**Assessment:** This report was mainly concerned with locating examples of creative postgraduate PH teaching and contains only brief references to the undergraduate situation. However, Bagade & Gillam at Cambridge have some suggestions on how undergraduate PH teaching in UK medical schools could be improved, most of which are still valid today in the Canadian context:

- Get national agreement on an undergraduate PH syllabus
- Keep working on ways to integrate PH with clinical teaching
- Share more PH teaching materials and experience
- Include PH topics in final exams
- Improve PH teaching
- Encourage teaching in academic departments

The study also suggests that those responsible for undergraduate PH programs keep a keen eye on how well PBL is holding up in the longer term. It may be necessary to transfer some courses to CBL or to augment more PBL courses with short lectures to ensure that knowledge can be adequately taught in the time allocated and to help generate deeper learning.

<sup>7</sup> National Teaching & Learning Forum - December 1998/ Vol 8, No1.

## **2.4. ANNUAL CANADIAN CONFERENCE ON MEDICAL EDUCATION (CCME)**

AFMC hosts an annual conference on medical education that allows participants to find out about new developments and to explore progress in tackling contemporary themes in the field. Recent meetings have been jointly sponsored by AFMC, the Canadian Association for Medical Education, the College of Family Physicians of Canada, the Medical Council of Canada, and the Royal College of Physicians and Surgeons of Canada.

The list of posters shown at the 2008 conference and the workshops that were held there, include a number that are of particular interest to those involved in public health education for Canada's undergraduate medical students. We have summarized some of these below and provided comments on their potential to influence undergraduate teaching of public health.

### **2.4.1 Posters**

P-06

#### **The Student Perspective on the Value of Lectures**

*James Brawer, McGill University*

Surprisingly, initial research (in 2006) for this poster revealed that first year medical and dental students at McGill were far from dismissive about lectures as a means of knowledge transfer at medical school. In contrast to negative views held by some professional educators, a number of previously unrecognized advantages were identified. The study reported on this poster explores these observations by examining students' opinions in more detail and in a systematic way.

The identified advantages were arranged in a questionnaire. This was sent to 200 first year medical/dental students (2007) who were asked to indicate the extent to which they agreed with each potential benefit using a Likert scale of 1 (strongly disagree) to 5 (strongly agree). The 110 questionnaires that were returned yielded the following results:

Lectures as an auditory modality reinforce learning (4.16),  
Lectures provide focus/emphasis (4.12),  
Lectures provide an overview (4.0),  
Lectures resolve complexities in notes or other readings (3.9),  
Attending lectures encourages discipline (3.8),  
Lectures provide exposure to/interaction with experts (3.7),  
Lectures provide a dynamic, interesting way to learn (3.7),  
Attending lectures reduces anxiety (3.5),  
Lectures are a time-efficient way to learn (3.2).

**Stated Conclusions:** The results substantiate those of the initial investigation, indicating that students see a variety of compelling educational advantages in the lecture format. The author also points out that time-efficiency was rated the lowest of all benefits suggesting that students

value lectures in spite of the fact that they do not see them as an efficient way to acquire factual information.

**Comment:** A number of medical schools in Canada and overseas continue to offer didactic lectures as one of the teaching methods used throughout their UG courses. However, it does seem that very few of today's lectures follow the traditional chalk and blackboard model in front of 200-300 students. No doubt the students above were expressing their views on smaller and shorter lectures than the traditional kind.

Even so, it seems encouraging to have a strongly positive response about lectures from a group of students brought up on PBL, e-learning and Blackberries. At least this suggests there is quite a solid fall back option in case more modern teaching methods are found to have serious weaknesses at some future time.

#### **P-07**

##### **An Examination of Factors Affecting Undergraduate Medical Students' Satisfaction Rating of Courses and Instructors**

*Diana Deacon, Vernon Curran, Alan Goodridge, Memorial University of Newfoundland*

The purpose of this study was to examine how undergraduate medical student course satisfaction ratings responded to various changes in course characteristics of an undergraduate medical education curriculum.

The authors gathered undergraduate medical course evaluation reports for the 2005-2006 and 2006-2007 academic years at Memorial University of Newfoundland and correlated these with changes to teaching/learning formats, length of course, and number of instructors from the corresponding course schedules, etc. Data were analyzed using SPSS<sup>8</sup> and a Pearson correlation was used to examine relationships between the various factors. The results suggested that certain course characteristics, such as duration of course, were related to overall undergraduate medical student course satisfaction.

**Stated Conclusion:** The findings of this study support the importance of being aware of the effects of various course characteristics on student satisfaction ratings of undergraduate medical education courses, especially where these evaluation results are to be used for curriculum monitoring and planning.

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<sup>8</sup> SPSS (originally, Statistical Package for the Social Sciences) is a computer program used for statistical analysis and is also the name of the company (SPSS Inc.) that sells it.

**Comment:** When faculty and program managers want to find out if a new or revised course is working well, student course satisfaction assessment is particularly valuable, especially since it allows useful feedback to be obtained almost immediately. In fact it is generally the only closely-coupled measure available. Steadily improving examination marks can also provide an indication that things are going well overall, but these come later and it can be harder to assign credit for this success - could have been a new teacher, better tutorials, improved teaching materials, availability of podcasting and so on?

**P-68**

**“This Experience Has Changed Me”: Using a Reflective Paper in Teaching  
Community Health to Second Year Medical Students**

*Ian Johnson, Jackie James, Joyce Nyhof-Young, University of Toronto*

This poster describes the introduction of a reflective paper into an undergraduate medical course on research methods. It points out that reflection both on and in action are necessary in the practice of community and public health and that they have already been built-in to nursing practice and training.

The University of Toronto's Determinants of Community Health course calls for students to carry out an independent research project spread over a 12 month period, usually in the community. The students write a reflective paper at the end of the project making use of Schon's theory of the reflective practitioner as a framework. This allows them to describe the difficulties encountered during the research process, what they learned from the experience and how they could have dealt with issues differently. This paper, which is prepared separately from the research report itself, was apparently appreciated by both students and markers.

**Stated Conclusion:** Early signs are that this approach was useful in stimulating reflection among students.

**Comment:** We wonder if - having introduced David Schon's ideas on reflection in/on action - the medical students continue to encounter the reflective approach in other parts of their curriculum? It seems too valuable an innovation to be set aside after one encounter in Y2.

## 2.4.2 Workshops

**W-23**

**Podcasting as a Tool to Enhance Distributed Education**

*Elizabeth Wooster, University of Toronto; Kyle Hunt, University of Waterloo; Douglas Wooster, University of Toronto*

**Background:** Distributed education is becoming an important concept in teaching students, residents and practicing physicians, since it provides flexible course delivery using a variety of teaching methods and technologies. Instruction is also available 24/7, essentially at any location.

This workshop, given by a team from Toronto and Waterloo Universities, showed how podcasting<sup>9</sup> can be used to deliver an enhanced distributed learning experience for both teachers and students. It also demonstrated how readily podcasting can be incorporated into many educational initiatives.

**Workshop Learning Objectives:**

The workshop was designed to enable attendees to:

1. Describe the merits and limitations of podcasting in educational activities
2. Conduct a needs assessment to determine whether the addition of podcasting will be beneficial to their educational activity
3. Design a podcast template that will support their educational activity (appropriate length, material, focus, integration with other learning strategies, etc.)
4. Identify metrics that reflect the educational uptake related to a podcast (time during the activity, type of activity, enhanced knowledge, skills, attitudes, etc.)

**Comment:** A timely introduction to an effective and convenient multimedia teaching tool. Especially as increasing numbers of today's students and practitioners are equipped to use the podcasting.

**W-29**

**Factors Influencing Specialty Career Choice in Undergraduate Medical Students:  
Implications for Medical Education and Career Counseling**

*Shaheed Merani, University of Alberta; Sonya Abdulla, University of Ottawa; Ian Johnson, University of Toronto*

**Background:** National trends in career choice among medical students have yet to be examined across all years of study. In addition, the factors driving specialty career choice in undergraduate medical students need to be determined as they have important influence on the planning of effective undergraduate curricula and valuable career counseling. National data on these topics through post-match surveying of Canadian medical graduates are available, but there have been only limited formal data on medical students during pre-clinical or clerkship undergraduate training.

The National Medical Student Survey 2007 consisted of a web-based survey sent to all medical students in Canada (n=8834) and included questions of demographic nature as well as self-reported career choice, rank order and graded importance on an array of potential factors influencing their decisions. The 3924 participants contained within the dataset represent the most current and thorough examination of medical students in Canada.

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<sup>9</sup> Podcasting is the use of portable electronic devices to view and listen to multimedia material on the Internet.

Results of this survey were used to direct participant discussion surrounding the evolution of undergraduate student specialty career choice by medical students during the progression through training. The factors driving these decisions were examined in detail, and medical students' understanding of the residency match process and the gaps in this knowledge were also addressed.

**Workshop Learning Objectives:**

This workshop provided a valuable opportunity for students and faculty to discuss the results of the 2007 National Medical Student Survey and its implications on medical student career choice and counseling. Following the workshop, participants will be able to:

1. Identify career choice trends of undergraduate medical students during various years of study
2. Identify importance of intrinsic and extrinsic factors influencing such choices
3. Discuss potential implications of these factors on medical school curriculum and career counselling

**Comment:** Important information for planning future strategies aimed at encouraging more physicians to choose careers in public health.

**W-30**

**An Interactive e-Learning Format for Effective Small Group Learning**

*Amy Allcock, Queen's University*

**Background:** Queen's University recently introduced an innovative and interactive means of delivering a CME e-Learning intervention to Family Health Teams in their catchment region. The intervention and format was extremely well received in this environment. The skills and knowledge are transferable and applicable in a broad and varied range of contexts. This was the first introduction of the model in a workshop setting and the Queen's team promised that participants would go away with ideas for applications elsewhere.

**Workshop Learning Objectives:**

After the workshop, participants will be able to:

1. Transfer skills and knowledge to their own environment
2. Implement this methodology by meeting the specific criteria relevant to A/V equipment & technologies
3. Experience hands-on an on-line format that delivers a high level of interaction and engagement
4. Describe and evaluate the potential re-use of presentations with various small groups while facilitating convenient scheduling in convenient settings

**Comment:** We believe that they use PowerPoint authoring, but convert the files to Flash format for high speed download on the Internet using Articulate Presenter software.

## 2.5. PUBLIC HEALTH KNOWLEDGE, EDUCATION AND PRACTICE: A SURVEY OF CANADIAN FAMILY MEDICINE RESIDENTS<sup>10</sup>

**Objective:** This study explored the education, knowledge and practice of PH as demonstrated by a self-administered web-based questionnaire sent to 1170 family medicine (FM) residents in 14 English-speaking medical schools in Canada. In particular, the survey sought to evaluate the residents' education in PH, their understanding of PH roles, their attitude towards common PH interventions and their knowledge of routine PH issues.

**Results:** Close to 57% of the respondents reckoned that their knowledge of PH was "good" or better, while 95% judged PH to be an important part of their residency training. However, 63% believed that an inadequate amount of time was allocated to PH teaching in their residency program. Moreover, a number of important clinically-related PH topics like injury prevention, exercise counselling, toxicology and environmental medicine were poorly covered in residency teaching and seldom practised by FM residents.

**Conclusions:** Tyler I. et al. concluded that "primary prevention counselling, environmental medicine/toxicology and communicable disease control are areas in which Canadian FM residents lack knowledge, education and/or practice". They go on to propose that increased PH instruction during FM residency - especially in clinical settings - could well result in more population-oriented and community-responsive physicians on the front line of clinical medicine.

**Assessment:** Canadian Family Medicine residents surveyed in 2007 believed they were poorly equipped to discharge the PH part of their duties on starting their practice. This could imply that their knowledge would have been better if there had been more or better PH content in their UG curriculum. Alternatively, it could be another symptom of systemic neglect of PH teaching.

## 2.6. A PAN-CANADIAN STRATEGY FOR PUBLIC HEALTH WORKFORCE EDUCATION<sup>11</sup>

**Background:** Dr. Spasoff's paper introduces consideration of a PH workforce strategy for Canada by reviewing recent events that have impacted the national profile of public health. As he points out, funding for PH has traditionally hovered in the region of 3% of total government expenditure on health services - mainly because cures are more dramatic than prevention and because PH costs are borne by provincial budgets that are constantly under pressure. So the

<sup>10</sup> Tyler I, et al.: *Public Health Knowledge, Education and Practice: A Survey of Canadian Family Medicine Residents* - Date unknown (2007?)

<sup>11</sup> Dr. Robert Spasoff: *A Pan-Canadian Strategy for Public Health Workforce Education* - September, 2005

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diet of neglect carried on into the late 1990s with morale sinking on the part of PH professionals and with good people leaving the service.

The paper goes on to discuss how the subsequent impact of Walkerton, West Nile, SARS and 9-11 made a big difference, leading to the establishment of PHAC and a Chief Public Health Officer for Canada. This in turn stimulated the production of numerous reports on public health resources and on how the new demands being made on PH could be met within a reasonable timescale. Without exception they recommended strengthening the PH workforce.

**Results:** The paper reviews 13 of these reports as well as summarizing similar developments in other parts of the world and puts forward a series of objectives to be pursued in order to develop a PH workforce able to meet population health needs:

- Develop a skills/competencies-based approach to PHHR
- Gain a better understanding of the PH education system and how it can support Public Health Human Resources (PHHR) planning
- Identify best practices in PH education and professional development
- Increase capacity to train PH workers with appropriate competencies
- Increase the number of practice placements available in the PH sector
- Increase the capacity for PH research and education

In addition, a number of recommendations for action by PHAC in FY2005-06 were made to help implement these objectives:

**Recommendation 1:** Develop a Steering Committee on Public Health Workforce Education representing PHAC, F/P/Ts, CPHA, CIHR-IPPH, and universities and colleges offering educational programs in public health, which will meet regularly to review the progress made on implementing the recommendations of the various reports and identify additional actions that may be needed.

**Recommendation 2:** Evaluate the relevance of the Public Health Skills Audit Tool and similar tools (if available) to Canada.

**Recommendation 3:** Ensure that current and proposed MPH programs conform to guidelines regarding content and educational methods, that the number and distribution of such programs is appropriate to Canada's needs, and that the programs within each region collaborate where appropriate.

**Recommendation 4:** Establish five Schools of Public Health, one per region, offering at least MPH, MSc and PhD degrees, continuing education programs, and contributing to residency programs in community medicine.

**Recommendation 5:** In general, Schools of Public Health should be either free-standing Faculties or should be located in a Faculty of Health Sciences, rather than within a health professional school or faculty.

**Recommendation 6:** Provide grants or other incentives to education programs to work collaboratively with other programs. These might take the form of Academic Chairs in Public Health and grants-in-aid or contracts.

**Recommendation 7:** PHAC, CPHA, CIHR-IPPH and university representatives should name a work group to identify suitable approaches for identifying best practices in public health education and encouraging educators to use them.

**Recommendation 8:** Establish an accreditation system for public health education programs, probably through CEPH or ASPHER.

**Recommendation 9:** Commission a study on the desirability of creating undergraduate programs in public health.

**Assessment:** The objectives set out in this report seem to be standing up well more than two years after they were published. Progress has been made on most of them, with the possible exception of achieving significant increases in available PH practice placements.

## 2.7 REPOSITORY OF PUBLIC HEALTH LEARNING RESOURCES <sup>12</sup>

**Objectives:** This work was carried out for PHEN under a contract from AFMC. The objective was to establish by gap analysis the extent to which the learning resources being used in PH teaching by Canada's 17 medical schools matched the learning objectives that were approved by PHEN. The study was also required examine how well those same learning objectives were covered by the PH course outlines provided by the medical schools. A draft outline of the contents of an undergraduate medical student Primer on Public Health was another deliverable.

**Results:** The outcome of two grids were described

- Medical School Characteristics
- Map of Course Outlines and Public Health Objectives

### **A. Medical School Characteristics Undergraduate Program**

- All require full-time university experience or CEGEP course completion for admission.

<sup>12</sup> Donovan D: *Repository of Public Health Learning Resources*. AFMC - March 2008

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- Most have 4 year UG programs, two offer 3 year courses, while one university allows students up to 5 years to complete the program.
- Five offer balanced teaching methods, five are case/problem-based and five don't say.

**When is PH taught**

- 10 teach PH only in pre-clinical years
- 3 teach in the clinical years
- 4 have pre-clinical and clinical phases
- One lets students apply PH principles to clerkship rotations in family/community medicine and to a multiple speciality rotation

Integration: PH teaching is entirely separate from clinical teaching at 9 universities - although PH is sometimes grouped with clinical ethics and legal aspects of practice or can be found in family health and rural medicine modules.

**PH Teaching Methods**

Lectures, PH problems, clinical problems, site visits, community placements, project work.

**Educational Materials Used**

- Shah's: *Public Health and Preventive Medicine in Canada*
- 7 other texts, mainly biostatistics & epidemiology.
- Grey literature, including PHAC/Health Canada publications.
- Internet, CDC courses , etc.
- Quizzes, videos, vignettes, etc.

**B. Map of Course Outlines and Public Health Teaching Objectives**

(teaching objectives form the paragraph headings below)

**Concept of Health and its determinants**

All outlines include determinants of health in one form or another. A number of specified determinants are missing, such as working conditions, health services, healthy child development, biology and genetics, as well as gender and culture. Concepts of health appear in four outlines.

**Assessing and measuring health status at the population level**

All schools have objectives under this heading. Not much about the sources and reliability of health data and a physician's role in producing them.

**Interventions at the population level**

Primary and secondary prevention and the role of physicians are well covered, with some schools also dealing with tertiary prevention and chronic disease management. Only one school mentioned ethics in this context.

### **Administration of effective health programs at the population level**

The Canadian health care system and provincial systems were included in almost all outlines. Regulation of the health professions appeared frequently while ten schools specified the organization of the Public Health system.

### **Outbreak management**

Frequent mention is made of outbreak management, but even more attention is paid to outbreak prevention and infectious disease control.

### **Environment**

Common environmental illnesses and their causes were included in most course outlines. Four schools teach students how to take an environmental history. Particular simple interventions were not mentioned at all.

### **Health of special populations**

These objectives seem poorly covered, although some topics are covered under determinants of health.

Seven schools point out that their public health teaching discussed aboriginal peoples. Only one school mentioned people with disabilities and homeless persons as vulnerable populations, while three schools identified sexuality and sexual orientation as a source of vulnerability. One school covers the vulnerability of substance abusers and of remote/rural populations.

### **Other objectives**

A number of objectives mentioned the course outlines failed to line up clearly with the Public Health objectives. These were listed in a separate section of the map.

**Conclusion:** The author noted how the diversity of courses stood out in this review. This could be because schools write their course outlines differently or because of different teaching methods being used or due to variations in PH teaching resources on hand. Or it might well be a combination of the above factors.

There could also be different philosophies of teaching PH at work. The review suggests that two axes are apparent - one running from the application of the principles of Public Health in one-on-one clinical situations to their application in large populations. The other sets out at the mechanisms aimed at health promotion and winds up at the organization of therapeutic health services. It is suggested that this bidirectional concept could be useful in determining the contents of the future PH primer and helping to steer on-going discussions on future PH objectives.

**Assessment:** This is a useful piece of work that provides a high level view in one place of how our medical schools are tackling the teaching of public health. It shows clearly where a number of Public Health objectives are fully covered by the schools' outlines and where some are not covered at all. Of course, some of these apparent blanks may actually be dealt with in the courses under different headings or the terminology used to describe the objective may have led to its being overlooked.

While the review recognises that a student could theoretically cover all the PH learning objectives using the many resources in the database lists - it would be a pretty laborious exercise. The development of a PH Primer for undergraduate medical students would be a more elegant solution. The actual content of the primer seems still to be open for some discussion within PHEN, such as whether it should start with clinical settings and go on to discuss PH concepts or vice versa.

## 2.8 GLOBAL HEALTH IN THE UNDERGRADUATE MEDICAL TRAINING

13

**Background:** Canadians do not need to be told that we live in a globalized society. The growth of international travel, the Internet and migration of individuals and populations only serve to underline this. Medicine in general and undergraduate medical education in particular are also becoming increasingly global in outlook.

As we noticed during the course of our interviews in Canada and overseas, teachers are reporting growing enthusiasm for global health on the part of students themselves. Medical schools are waking up to the fact that international health education and related concepts deserve a more prominent place in the undergraduate curriculum.

Clearly the traditional components and skills required for a thorough medical education are no less essential, and cynics will argue that the average patient is more concerned that junior doctors are able to deal with their medical complaint effectively rather than understand another country's health system. All the same, doctors with insight into global health systems and overseas cultures have broader skills and are often better able to relate to patients from different parts of the world. They may also be more alert to illnesses that may have migrated to Europe or North America from their traditional breeding grounds in Africa and Asia, for example.

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<sup>13</sup> Anna Shore: *Global Health in the Medical Curriculum..* The Lancet - Student January, 2008.

### **2.8.1 Representation of international health on the medical curriculum**

At present, medical schools have different ways of introducing students to this subject. Some offer International Health "taster days" as part of the public health course, others have student selected components with an international flavour, or even offer the chance to work abroad. Many students gain their first taste of clinical medicine overseas during their elective. Some medical schools offer BScs in International Health, usually giving students the chance to take a year out from normal medical study to pursue their interest in the field in greater depth.

### **2.8.2 Useful in the future?**

So how does a BSc in international health contribute to a medical student's future career? Physicians who have gone this route say it offered them the opportunity to interrogate social policy, health care systems and development in a setting which encourages learning and challenges thought processes. An International Health BSc is not essential for future work in lower income countries, but the point of global health education is to deepen understanding of healthcare systems, as well as the nature and definition of health. This is useful for doctors working in their own country - part of a globalized system - as well as abroad, and it provides the basis to build upon knowledge later in a medical career or to put towards study on one of the growing numbers of International Health Masters degrees or Tropical Medicine diplomas that are offered worldwide.

**Assessment:** There's no doubt that intercalated degrees in Global and International Health, as well as courses covering this field within UG medical training, are likely to increase substantially in the years ahead. As reported among our international interviews, UK universities find their students are keen on Global PH (GPH) - via electives. They note that climate change has become a good driver.

It is worth bearing in mind, however, that adding significant amounts of global health training to existing undergraduate medical programs would put even greater pressure on the limited number of teaching hours available per semester. Perhaps summer schools in house or at overseas locations would be a good way of accommodating increased demand for Global Health teaching and experience.

### 3. WHAT DID WE UNCOVER?

We started this paper with the objective of locating good ideas that might lead to ways of improving the teaching of public health to undergraduates at our medical schools. Our findings are summarized below<sup>14</sup>:

- Teaching medical students practical PH in the community has proved effective in increasing their engagement with the subject. (20)
- Allocating more CM physician resources for UG medical education in PH increases the visibility and attractiveness of CM as a specialty. (21)
- Proper examination and marking of PH course content ensures that students accept PH as an important part of medical training. Faculty and licensing examinations that integrate PH and clinical medicine topics also provide strong incentives for learning. (22)
- The UK continues to work towards agreement on a national undergraduate PH syllabus - a step that may well be achieved in Canada when we have the PH Primer to go with the PHEN teaching objectives. (23)
- The Newcastle upon Tyne University PH total curriculum rebuild shows how student enthusiasm for PH can grow in response to an unremitting commitment to high quality teaching. (24)
- Systematic sharing of PH teaching materials and experience between schools can save money and spread the use of successful teaching initiatives. (25)
- It seems clear that more integration of PH and clinical medicine curricula will take place in the years ahead. (26)
- Undergraduate Public Health programs would benefit if academic departments would do more to encourage teaching. (27)
- Well-structured and delivered lectures still seem to have solid student appeal. Perhaps they should not be thrown out with the didactic bath water. (28)
- Training students in the use of reflection techniques as part of their PH program can pay dividends in their ability to handle challenges in their future practice. (29)

<sup>14</sup> The numbers in parentheses indicate the reference number of each finding in the Executive Synthesis Report.

- Multimedia PH teaching of selected topics 24/7 using podcasting looks attractive, given efficient module preparation software and techniques. (30)
- The National Medical Student Survey in 2007 studied career choice trends of undergraduate medical students in Canada during various years of study. Identification of the factors driving these trends can help undergraduate curricula planning and career counseling. (31)
- Canadian Family Medicine residents surveyed in 2007 believed they were poorly equipped to discharge the PH part of their duties on starting their practice. This could imply that their knowledge would have been better if there had been more or better PH content in their UG curriculum. Alternatively, it could be another symptom of systemic neglect of PH teaching. (32)
- There seem to be some remaining gaps between schools' UG PH courses and PHEN approved teaching objectives. (33)
- Student enthusiasm is creating growing demand for Global PH courses and intercalated degrees in Europe. (34)

## ANNEX 1: NOTES ON UNDERGRADUATE PH TEACHING FROM WHO GREY ARTICLES

**Background:** The WHO publishes a wide range of articles dealing with health issues in third world countries. Public health is quite well covered, as the development of an effective PH workforce is a major priority in Africa, Asia and other parts of the developing world.

Teaching of PH in these regions, however, is generally carried out at the graduate level at Schools of Public Health. In fact the US has been active in supporting the creation of such schools and by providing teachers on loan in the early stages. Examples include the James P. Grant School of Public Health in Dhaka, Bangladesh (first MPH graduate 2005) where courses are given in partnership with Johns Hopkins and Harvard universities and the Arkangelsk International School of Public Health in the Russian Federation founded in 2006 with funding and academic support from a number of northern European universities. They have about 50 MPH students enrolled at present.

So WHO articles tend not to discuss the issues involved in teaching PH as part of a undergraduate medical program - although medical schools in LMICs<sup>15</sup> quite often include some public health in their curricula. However, a brief summary is given below of a few WHO publications to give an idea of the challenges being faced and the methods being used to train a viable PH workforce under very demanding conditions in most places.

One of the problems is that there are not enough schools of public health to meet global workforce demands, with many of the less-developed countries having none. A lack of common standards for PH education also makes the situation more difficult. Existing offerings range from short six-month courses in public health to specialized post-graduate programs including MPH, MSc and PhD degrees. Not uncommonly, course content reflects the requirements of developed countries and not those of the local situation. Lower income countries have reacted in some parts of the world by establishing nation-wide distance learning networks that are able to deliver PH training at a variety of levels to suit local conditions. An example is described below.

### 1. Training of PH workforce at the National School of Public Health [NSPH]<sup>16</sup> : meeting Africa's needs Mokwena, et al WHO December 2007

Africa is very short of public health personnel, so training the workforce is a major priority. They say that the estimated PH practitioner workforce in sub-Saharan Africa is 1.3% of the world's health workforce, facing 25% of the global burden of disease. Traditionally the US and other developed countries have offered scholarships to suitable African candidates to study overseas.

<sup>15</sup> Low and Middle Income Countries

<sup>16</sup> Located at Medunsa, South Africa

These initiatives have helped kick start PH workforce training in Africa itself, even if some of the scholarship recipients chose to stay abroad as brain drainers.

The NSPH is unique. Its online courses allow students to study at their own pace, in their own homes and countries. Moreover the program is structured in a way that allows them to apply what they learn to solving health problems in their own communities. The research, development and implementation is also contextualized so that 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. Management say that challenges such as relatively high dropout rates and limited computer literacy are being addressed.

This paper recommended that NSPH-type programs be replicated in other African countries and suggests that regional PH collaboration will be strengthened through this implementation. It was also proposed that NSPH develop short certificate courses online to respond to specific needs (such as evaluation of health programs, use of antiretroviral drugs to manage HIV, implementation of health promotion programs in schools) and other postgraduate programs that target particular groups of health professionals.

Note: The White Paper for the transformation of the health system in South Africa<sup>17</sup> pointed out the need not only to increase the number of health professionals, but also to modify their training so as to create a significant shift from a focus on curative measures to disease prevention and health promotion.

## **2. WHO Health Ministers Meeting – South-East Asia Region, September 2005**

The ministers concluded that medical graduates who enter the specialty of Public Health face major handicaps compared with those selecting other specialties. Public Health is generally regarded as a drop-out specialty in SE Asia which is thought to be easy to get into when a graduate has failed to secure admission to other (preferable) medical careers. The meeting agreed that this was radically different from the situation in most developed countries where "competition to gain entry into training programs in public health is intense and where the specialty attracts many of the best young graduates". They go on to add that many of their regional PH institutes are handicapped by poor facilities, outdated curricula that do not address current challenges and disinterested staff. Moreover, these institutes are said to produce inadequately trained professionals who do nothing to elevate the status of the specialty. While some exceptions to this picture do exist, they are few in number apparently. This in spite of postgraduate courses in public health being provided in 8 out of the 11 countries of the region.

## **3. University of Ilorin, Nigeria**

The Faculty of Health Sciences at Ilorin was established in 1997, becoming a College of Medicine in 2004. Their undergraduate medical curriculum was put together with consulting help from the WHO and McMaster University. The result is a student-centred program featuring PBL-based learning together with integrated teaching of PH and clinical medicine. The program

<sup>17</sup> *White Paper for the transformation of the health system in South Africa*. South African Department of Health: 1997

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is also strongly oriented towards community health through their Community Based Experiences and Services (COBES) initiative, during which students are assigned to local community health clinics to learn the real challenges faced in day to day public health practice.

**COBES** : Students are required to take part in four COBES postings during their five year<sup>18</sup> medical program at Ilorin. The objective is to ensure that medical education keeps in step with community needs and that students become knowledgeable about those needs early in their training and as they develop through the overall program. The postings are outlined below:

Year	Duration	Activities
Y1	4 weeks	Demographic survey, community survey of health facilities and utilisation patterns, common health problems. Written reports
Y2	4 weeks	Varies according to theme for the year
Y4	4 weeks	Survey and prioritize specific health problems, community diagnosis, assist in the management of maternal and child problems in the clinics, immunisation.
Y5	8 weeks	Assist in running clinics, involved in health education and home visits.

During pre-clinical postings (Y1/Y2), students are graded on the basis of staff assessment (30%), an oral presentation (20%) and a written exam (50%). Clinical postings call for individual assessment of students and passing is a pre-requisite for graduation.

This type of longitudinal community attachment is included in the medical programs at other Nigerian universities, such as the Obafemi Awolowo College of Health Sciences at Ogun State University.

#### 4. Public Health Teaching in Brazil <sup>19</sup>

Brazil built its public health education system through the work of the renowned Oswaldo Cruz Foundation, which established short six-month public health courses in each of Brazil's 27 states and employed teachers from the local university, professionals from the local health services and specialists from ENSP<sup>20</sup>-FIOCRUZ<sup>21</sup>. After about five years these courses became the core curriculum for small schools and now Brazil boasts 40 small schools of public health. Later, the schools were expanded and upgraded to offer Master's and even PhD degrees. As a result the country now has a ratio of 0.97 public health officers per 1000 inhabitants.<sup>22</sup>

Observers believe that the future of public health education in Brazil must be extended to cover all levels of health workers, looking particularly at creating improved managerial skills across the

<sup>18</sup> Assuming passes in three specified GCE A levels.

<sup>19</sup> WHO Bulletin: *How Brazil turned one public health school into 40* - December 2007

<sup>20</sup> National School of Public Health

<sup>21</sup> Oswaldo Cruz Foundation

<sup>22</sup> This compares with the state of Wisconsin that reported public health workers at 1.58/1000 in 2000.

board. This effort would include in-service training, as well as specialist post-graduate programs.

Brazil is also **considering the possibility of setting up an undergraduate public health course**. Senior PH planners in Brazil point out that much of what is taught in medical degree courses (a pre-requisite to study public health in many parts of the world) is not necessary for someone intending to pursue a career in public health. In fact, in LMICs, they believe it is a waste to invest in training doctors for PH positions when the bulk of their medical knowledge is not required to be effective public health practitioners. It certainly would make more sense, they feel, to prepare the majority of public health workers at the technical or professional level in undergraduate courses.

