

An Environmental Scan of

Best Practices in Public Health Undergraduate Medical Education

An Executive Synthesis

MARCH 2009

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



AN EXECUTIVE SYNTHESIS

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1. INTRODUCTION

Nevis Consulting Group was commissioned earlier this year by the Public Health Task Group of the Association of Faculties of Medicine of Canada to carry out an environmental scan for best practices in undergraduate public health education. The objective of this project has been to identify promising teaching methods with the potential to enhance public health education in Canada.

In the course of carrying out our work, we have interviewed public health course directors (or their representatives) at all 17 Canadian Schools of Medicine, as well as selected PH teaching experts in the US, the UK and Australia. We have carried out quite extensive literature reviews looking for creative teaching and evaluation methods. We have also examined modern educational theory and practices in search of approaches that would work well in teaching PH to medical undergraduates. The outcome of these investigations is reported in five volumes as follows:

Public Health in Undergraduate Medical Education 1: Peer-Reviewed Literature Scan

A scan of peer-reviewed literature on public health undergraduate education from Canada, the US, Australia, New Zealand, the UK and other parts of Europe.

Public Health in Undergraduate Medical Education 2: AFMC-Furnished Existing Literature Review

A review of existing publications/reports on topic areas of interest, including innovations in public health education, results of focus groups conducted with Canadian medical students on public health education and aspects of the integration of public health into the medical education curriculum. A brief discussion of relevant grey literature available from the World Health Organization's website is also included.

Public Health in Undergraduate Medical Education 3: Interviews with Canadian Medical School Representatives

A report detailing opinions gathered from telephone interviews on effective teaching methods and outcome measures, as well as those that have not worked all that well.

Public Health in Undergraduate Medical Education 4: Interviews with International Experts

Opinions gathered on successful PH teaching methods from additional telephone interviews with six selected individuals outside Canada.

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Public Health in Undergraduate Medical Education 5: Strengths, Weaknesses and Applicability of Teaching Methods

An examination of educational theory or practices where pedagogical techniques are reviewed to see how various teaching methods may be applied to public health education. We have also explored how public health concepts can be best taught and integrated within the larger undergraduate medical education curriculum.

This Executive Synthesis document provides an overview of the findings reached in the more detailed reports above, together with a series of recommendations grouped together conveniently for consideration by Teachers of Public Health, Program Directors, Department Chairpersons, Deans, AFMC and PHAC. Volume 5 and additional material on education methods were contributed by Ingrid Tyler. The other reports were written by Mike Rowlands and Bob Spasoff.

Following the terminology in the Request for Proposal, the term “public health, PH” will be used as the generic descriptor here, despite the myriad terms used by the various programs, which include population health, community health, preventive medicine, and epidemiology. It conforms fairly well to the territory covered by the AFMC-PHEN core learning objectives.

2. MAJOR FINDINGS

2.1 REVIEW OF PEER-REVIEWED LITERATURE

Based on a Medline search, 1996-present

1. Students have varied learning styles, and therefore need diverse opportunities for learning. One size does not fit all.
2. Integration of public health into clinical teaching has many benefits. Medical schools interested in increasing the amount of integration of public health teaching with clinical teaching should find valuable guidance in: (1) a 2000 Supplement to *Academic Medicine* on “Teaching Prevention throughout the Curriculum: Multidisciplinary perspectives on enhancing disease prevention and health promotion in undergraduate education” and (2) a 2004 *American Journal of Preventive Medicine* series on the Clinical Prevention and Population Health Curriculum Framework.
3. Logical locations for this integration include community health centres, family physicians’ offices, and clinical epidemiology services. Stone provides a useful matrix and Trevena a tested eight-part checklist of questions that form a simple mental prompt for considering any health problem from a population perspective.
4. In an integrated approach, it is important maintain an inventory of prevention-related topics included in various courses and clerkships, to ensure appropriate emphasis, overlap, and integration (Taylor).
5. The combination of PBL and horizontal integration can create difficulties for public health teaching, because it is difficult to include public health in clinical problems, and also because clinical tutors are often uncomfortable with public health topics (Maudsley).
6. Faculty development should therefore be a high priority, especially training clinical and basic science tutors to be more comfortable with public health topics (Sachdeva).
7. A community orientation is central to public and population health. Students could be assisted in developing this by a short course on community diagnosis (described by Davison) and a much longer one on Health, Illness and the Community (described by Wasylenki and still offered at the University of Toronto).

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8. Virtually everyone agrees that practical experiences are an essential component of learning. We should therefore use teachers and placements in public health agencies (PHAs) very extensively. The literature suggests that medical schools should develop continuing associations with PHAs, in a fashion similar to that of the Teaching Health Units that formerly existed in Ontario (Howe, Wasylenki).
9. Placements in aboriginal communities would do much to sensitize future doctors to the challenges faced by these communities and help them appreciate the need for a population perspective, in addition to broadening their clinical experience (Dowell).
10. There may be a trend away from PBL to CBL.
11. Good cases are available to support case-based learning, e.g., the C-POP cases and Multistation Clinical Teaching Scenarios (Epling, Zimmerman). They may work better in a separate PH curriculum, although this would sacrifice the principle of horizontal integration.
12. The literature contains a number of interesting ideas for undergraduate electives in public health – such as the University of Rochester’s “Health Action” electives and the actual outbreak electives run by some state epidemiologists. (Eckhert, Dannenberg, Melville, Imperato)
13. Based on the experience of CDC, electives at PHAC might well be successful in recruiting students to public health careers (Buffington).
14. There may be a case for using students as tutors, since this can engage them more deeply in the subject matter (Trevena/Clarke, Yano).
15. Web-based courses (Bruce) and the case-discussion approach (Marantz) have been found more successful than lectures for teaching epidemiologic and statistical methods.
16. Structured controversy debates look like a valuable method of getting students to think deeply about controversial topics (D’Eon).
17. US educators have developed some interesting instruments for measuring students’ preventive skills and orientation (Blue, Sutphen).
18. The University of Newcastle-upon-Tyne has developed an impressive framework for evaluating a medical school’s curriculum in public health (White).
19. A survey of the public health program directors in UK medical schools in 2003 had very similar findings to the present study, and made similar recommendations.

2.2 AFMC-FURNISHED GREY LITERATURE REVIEW

1. Selected reports provided by the Task Group

20. Teaching medical students practical PH in the community has proved effective in increasing their engagement with the subject (Hau, Tyler *et al*).
21. Allocating more CM physician resources for UG medical education in PH increases the visibility and attractiveness of CM as a specialty (*ibid*).
22. 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 (*ibid*).
23. 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 (Nevis).
24. 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 (Nevis).
25. Systematic sharing of PH teaching materials and experience between schools can save money and spread the use of successful teaching initiatives (Nevis).
26. It seems clear that more integration of PH and clinical medicine curricula will take place in the years ahead (Donovan *et al*).
27. Undergraduate Public Health programs would benefit if academic departments would do more to encourage teaching (Nevis).
28. Well-structured and delivered lectures still seem to have solid student appeal. Perhaps they should not be thrown out with the didactic bath water (CCME).
29. 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 (CCME).
30. Multimedia PH teaching 24/7 of selected topics using podcasting looks attractive, given efficient module preparation software (CCME).

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31. 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 (CCME).
32. 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 indicate that the systemic neglect of PH teaching afflicts residency training as well. (Tyler *et al*).
33. There seem to be some remaining gaps between schools' UG PH courses and PHEN approved teaching objectives (Donovan/AFMC).
34. Student enthusiasm is creating growing demand for Global PH courses and intercalated degrees in Europe (Shore).

2.3 INTERVIEWS WITH CANADIAN MEDICAL SCHOOLS

Usually with a director of undergraduate education in public health, who was often also a member of the Public Health Educators' Network ¹.

Teaching

35. Among them, the public health departments of Canadian medical schools made 28 nominations of methods as particularly successful ², nearly all on the basis of popularity ratings by students (1):

Plenary sessions	7 (unqualified 1, interactive 2, tag-team 1, with patients/agencies 1, panels 1, with buzz groups 1)
Small-group teaching	7 (unqualified 2, critical appraisal 2, epi & stats methods 1, debates 1, disease control exercise 1)
Combination plenary-small group	4 (in addition to those listed above)
Community visits, projects	3 (2 with related tutorial)
Web-based tutorials	2
Problem-Based Learning	2
Case-Based Learning	2
Short courses	1

¹ Numbers in parentheses indicate the finding's numbering in Report 3.

² For authors' picks, see Annex A

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36. "Students hate anything that they do not see as clinically relevant." It is therefore essential to demonstrate the relevance of public health teaching to clinical practice, the eventual occupation of the vast majority of medical students. (2)
37. Integration with clinical teaching is one route to demonstrating this relevance, but its success is dependent upon the attitudes and performance of the [mainly clinical] tutors. (3)
38. Involving sympathetic clinicians in the teaching of public health sessions is desirable because they are highly credible and can better demonstrate the relevance of public health to clinical practice. (4)
39. Topics more directly relevant to public health practice are best taught by practising public health personnel, especially physicians, who have relevant expertise and field experience, and can serve as role models for students interested in the specialty. (5)
40. Plenary sessions will continue to be needed because of their efficient use of teacher time and space. But heavy reliance on traditional lectures encourages student passivity and is rarely successful. Sessions must be enlivened by making them interactive, using team-teaching, buzz groups, inclusion of patients and their families, guest experts, community agencies, buzz groups, etc. Fortunately, this is happening in most Canadian medical schools. (6)
41. Small-group teaching and on-line tutorials are more successful than lectures for teaching epidemiologic and biostatistical methods. (7)
42. Small-group teaching is widely and successfully used for methods tutorials, critical appraisal, evidence-based medicine, etc. But tutors and sometimes even rooms are hard to come by, and the organizational burden is heavy. It is important to prepare detailed manuals and guides for tutors. (8)
43. One school successfully uses "Structured Controversy", in which teams of students debate a controversial question, with all students taking a turn at each side of the question. They have found that students are more likely to change their opinions after such an experience than after unstructured discussions, suggesting that some deeper consideration has gone on. (9)
44. A combination plenary–small group format is used successfully by several schools, in which a short lecture conveys the main points and subsequent tutorial groups drive them home. The small-group portion can be discussion, debate, exercises, games, etc. (10)

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45. Student projects can be great for involving students in an active fashion, but the resulting reports are a pain for students to write and faculty to mark; one school has successfully replaced them by posters, which can all be evaluated at a single session. Having students prepare a report on health status of a community, and what to do about it, can familiarize them with needs assessment and help them to develop a population perspective. (11)
46. Problem-Based Learning (PBL) and its variations are widespread in Canadian medical curricula, although less used than cases for public health. Where it is used, it is sometimes supplemented by handouts, because PBL does not transmit knowledge well. (12)
47. Introduction of public health topics into mainstream PBL problems has been tried in several schools, but the topics are suspected of being ignored by the tutors (despite efforts at briefing them). (13)
48. There are many advantages to teaching PH in every year of the curriculum. Topics can be introduced at times that are appropriate to student development and concurrent curriculum content, teaching can be built on previously acquired knowledge (PH or clinical) and students' knowledge can be refreshed. And it should remind students that public health is an important topic. (14)
49. Placements in community agencies are valuable and popular, but increasingly difficult with increased enrolments and pressured agencies. They have sometimes been found unsuitable for first years, but more successful when students are more knowledgeable and more mature. There is a heavy administrative burden and a very heavy dependence upon volunteers and community agencies. (15)
50. It was striking that only two respondents mentioned that their program requires that students undertake personal reflection. (16)
51. Student-led initiatives show promise in several schools: community health projects, public health interest groups, recording and pod-cast of lectures, selection of new topics for teaching. (17)
52. Among them, Canadian medical schools have developed a considerable store of exercises, cases and other teaching aids. But there is no forum in which teachers can learn about these and ultimately share them. (18)

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Evaluation of Students

53. Most medical schools use fairly traditional methods for evaluating their students: MCQ and SAQ exams, tutor reports, and even attendance. A few schools evaluate project reports (written or poster), despite student resistance to having to produce them. One school includes peer evaluation of these reports, and one assesses reflective journals. (19)
54. We lack empirical evidence on which types of student evaluation work best in terms of predicting future performance. [If our professional organizations ever develop an adequate peer evaluation of clinical performance (that of the College of Family Physicians probably comes closest), it would be very interesting for medical schools to compare their students' performance on undergraduate evaluations with their eventual performance in practice. Although very difficult to control for factors like psychological make-up, post-graduate training and practice environment, this might well enable us to determine the criterion validity of various methods of evaluating students.] (20)
55. Unmarked courses or assignments, or marks that do not count towards passing the year, lead students to dismiss the topics as irrelevant. (21)

Evaluation of Teaching, Courses, Curriculum

56. The vast majority of evaluation of teaching is done by students, and appropriately so. All schools use feedback forms, which seem to be most useful when designed by the Department and completed immediately after a teaching session. But focus groups, student course representatives and informal feedback from individual students seem to be more appreciated. (22)
57. Student popularity is not the only relevant criterion for evaluating teaching: the extent to which students have learned the material is equally important. (23)
58. Relatively few departments have systematic procedures for evaluation of their curricula: usually this is the job of the course director. (24)

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Factors that Facilitate Public Health Teaching

59. Course directors show remarkable commitment, despite often being volunteers (and sometimes not receiving much credit for paid work). They are working hard at selling public health to the students, which can be a thankless job. (25)
60. 60. The formation of the Public Health Agency of Canada (PHAC) and of several provincial public health agencies provides a strong focus for public health, with visible spokespersons. This can only elevate the status of public health among medical students and faculty, and increase its credibility. (26)
61. 61. Formation of the Public Health Task Group and the Public Health Educators' Network, and support of this and other projects, suggest that AFMC (and presumably a majority of Deans) places a high priority on public health. (27)
62. 62. The Public Health Educators' Network (PHEN) is already a great success in bringing educators together to share problems and solutions. It needs to be continued. (28)
63. 63. The AFMC-PHEN learning objectives are immensely valuable for planning course content, resisting incursions from people with their personal hobby-horses, and defending it from criticism from competing disciplines. (29)
64. 64. The Student Interest Groups promoted by PHAC have promise for increasing student awareness and enthusiasm for the discipline, although it is early days for most such programs. (30)
65. 65. The introduction of Schools of Public Health may provide access to additional faculty and courses (but see #72, below). (31)

Challenges for Public Health Teaching

66. As noted above (#36) most students in most schools do not like most of public health. (32)
67. With rare exceptions, medical students do not select public health electives. This would seem to indicate that our teaching fails to interest them in public health. (33)
68. Several Faculties give the impression that public health is unimportant, by not evaluating public health or letting it contribute to overall grades, by degrading comments made by faculty in other disciplines, or by placing public health in low-priority spots in the building, the curriculum, or the week. (34)

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69. A number of medical school departments of public health give low priority to undergraduate medical education—research and graduate teaching have much higher priority. Some departments lack an undergraduate medical education committee and some do not undertake regular evaluation of their undergraduate teaching. (35)
- I. Several coordinators of undergraduate medical education in public health feel isolated within their departments, and describe themselves as one-person bands. It is difficult to see how public health teaching can become respectable within the medical school when it is not even respectable within the department of public health.
70. Perhaps related to the previous point, there are relatively few physicians in our departments, and even fewer physicians with public health experience. (36)
71. Public health practitioners are the most effective teachers, but they cannot be expected to do this on a voluntary basis. We need arrangements that make them available for teaching—part-time appointments, formal affiliations between public health agencies and medical schools, etc. (37)
72. The introduction of Schools of Public Health may provide challenges to the teaching of undergraduate medical students, by drawing away faculty members or other resources (but see #65, above). (38)
73. Finding sufficient tutors is a barrier to introducing more small-group teaching. Paying them helps tremendously. (39)
74. Every medical school should have a curriculum road-map that will show what is being taught, when and by whom. Some do not have it. (40)
75. Our discipline continues to suffer from lack of clarity in its definitions and boundaries. This causes confusion to students, other faculty members, and sometimes ourselves. (41)
- Recent sharp increases in class size have produced significant shortages of space, tutors and placements for many schools. (42)
76. Recent and impending development of satellite schools has produced personnel shortages and accountability issues in some cases. (43)
77. External changes to the public health system can significantly influence the teaching in medical schools, e.g., amalgamations of health departments, changes in their administrative and geographic locations, changes in their level of funding. (44)

2.4. INTERVIEWS WITH INTERNATIONAL EXPERTS

US, UK, Australia - selected by the investigators, as recommended by the Task Group

What Works in Teaching PH in Other Countries?

78. **Monash Health Enhancement Program** - a broadly-based Health Enhancement Program to foster student well-being and to promote self-care. Includes a mindfulness-based stress management program that has been used successfully with nurses, social workers, counsellors and psychotherapists.
79. **Sydney's Famous Eight Essential Questions** - a toolkit of eight questions that provide a simple framework to help students derive a population health perspective in relation to clinical problems, such as a patient with cardiac failure. Have also been used to construct PH teaching curricula that integrate well with corresponding clinical teaching.
80. **Newcastle-upon-Tyne's approach to re-building an undergraduate PH program** - this initiative fundamentally altered the standing of PH at Newcastle, putting it on the same footing as internal medicine, general surgery, and primary health care. It included the introduction of a PH rotation in their UG program – very unusual in those days and seldom found even today.
81. More learning by doing – similar to the clinical approach.
82. Excellence in PH teaching, courses and teachers.
83. Global health teaching modules and international attachments.
84. Computer-based modules that allow students to study when convenient and that can deal with epidemiology and biostatistics efficiently (incl. simulations, for example).
85. Lectures (not too long) plus supporting tutorials. Students can readily understand what needs to be known. Can get knowledgeable answers on the spot, too.
86. Link lists help with self-directed study and lecture follow-up.
87. PBL widely used, but questions about its effectiveness remain.
88. Integration of PH in Clinical teaching generally accepted as the way forward.
89. Five "taster" programs in PH.

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What Doesn't Work all that well?

90. Getting increasingly hard to arrange field trips, attachments and projects with local
 1. public health agencies due to reduced PH staffing.
91. Increasing PH teaching hours is an uphill battle because of the high clinical workload
 2. for UG medical students.
92. PH teaching that fails to show its relevance to clinical practice.
93. Case studies that take too long.
94. Maybe PBL.
95. Lack of a nationally agreed curriculum for PH in UG medical teaching in the UK.
96. Bioterrorism exercises in the US.

Bottom Line

Our PH teaching colleagues in the US, UK and Australia seem to be facing a very similar set of challenges to those found in Canada. They have some novel ideas to offer as well as having adopted a number of solutions already in use here.

2.5 TEACHING METHODS REVIEW

A report prepared by Ingrid Tyler, a resident in community medicine and graduate student in education:

Lectures

98. Lectures are necessary, but should be limited in number and well delivered. It is important to give students opportunities to apply and reflect on lecture material during course time. Buzz groups can be incorporated into lectures in order to promote more active learning.

Small group learning

Small group learning can take many forms:

99. *Problem-Based Learning/Case-based learning/Tutorial/Case study/Case scenario:*
The use of cases and case examples can help make public health principles real. Learners learn best when given the opportunity to integrate their education and experience with opportunities to apply what they have learned. Cases are more often used than problem-based learning *per se*. Cases should be made as relevant as possible to students, either emphasizing the role of the clinician or clearly elucidating the practice of public health physicians. Koh's review could be used to make a case for integrating PH principles into the traditional medical curriculum, which is often based on a PBL format, as PBL appears to be an effective format for teaching many of the concepts often covered in PH courses, including appreciation of social and emotional aspects of health care, appreciation of legal and ethical aspects of health care, and understanding of evidence-based medicine. The fact that Koh found little evidence for competency in preventive health care and health promotion following graduation from a traditional PBL curriculum may be related to the fact that integration is not widespread.
100. *Discussion/Debate:*
The opportunity for discussion is one of the main strengths of small groups. Use of discussion can introduce students to basic PH principles as well as influencing their attitudes. The most effective discussion leaders would have a thorough knowledge of the topic and good facilitation skills.

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Web-based medical education/e-learning/Computer-assisted instruction

101. These approaches are not superior to traditional methods; their effectiveness depends on the quality of an educational program's design rather than the computer-based tools being used. But the move to more education being offered on-line may be inevitable. Exciting opportunities for public health education exist using instructional methods unique to computer technology, such as interactive models or games that allow students to apply public health principles and experience public health practice in real life simulations. Computer technology can also assist in sharing materials and improving student access to public health information.

Self-instruction modules/Exercises

102. These can be an effective way to teach basic public health knowledge. Discussion and application of this knowledge in small group exercises could students further integrate their learning.

Site visit, Community placement/rotation, Public Health rotation/elective

103. Experiential learning is the keystone to adult education. The more opportunity students have to experience and reflect on public health, the deeper their learning will be. It is unrealistic to expect more than "technical training" to occur at an undergraduate medical education level, and administrative and public health human resource issues must be considered in order to plan good experiential learning opportunities.

Personal Reflection

104. An essential component of adult education. All curricula should allow time for students to reflect on their public health experiences and on how these experiences relate to their medical training. Easily incorporated reflection methods include some journaling after small group discussions, the opportunity for debrief or reflective discussions and reflective course assignments.

Self-directed learning

105. Self-directed learning projects can give students the opportunity to explore areas of specific interest to them which may not otherwise be covered in the curriculum. This category is not the same as self-instruction.

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3. RECOMMENDATIONS

Columns at right indicate the report(s) and Major Finding(s) upon which the recommendations are based (PL = peer-reviewed literature, GL = grey literature, IS = interviews with medical schools, IE = interviews with experts, ER = educational report).

Recommendations for Teachers of Public Health	PL	GL	IS	IE	ER
1.1 Emphasize applications in all teaching, using many examples			36	80	103
1.2 Emphasize clinical applications where they are present. Ideally, find a sympathetic clinical colleague with whom you can co-teach (enhances credibility, provides clinical applications)	2	26	36	89	
	3	32	37	93	
			38		
			66		
1.3 Emphasize population applications where they are present. Ideally, find a public health practitioner to teach or co-teach this material	8	20	39		
1.4 Don't just stand there and talk at them! If you must lecture, make it interactive, invite guests from the community, use props (with moderation), and provide an abundance of examples		28	40	86	98
1.5 Consider the teaching methods that your colleagues in other medical schools have found successful for use in your own teaching, e.g., computer-assisted learning, debates, self-instruction	7	25	35		
	14	30	41		
	15		43		
	16		45		
			52		



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Recommendations for Program Directors					
2.1 Use the AFMC-PHEN Population Health Learning Objectives as the starting and reference point in course planning (ensures relevance, staves off interlopers)		23 33	63	96	
2.2 Where possible, provide a variety ways for students to achieve the learning objectives. For example, one school allows some students to undertake personal projects instead of attending tutorials during their second year	1				102 105
2.3 Consider using some of the teaching methods identified by the medical schools as particularly successful in their programs. CF 1.5	7 14 15 16	25 30	35 41 43 45 52		
2.4 If using Problem-Based Learning, provide strong support to the tutors (manuals, training) and consider providing supplementary fact sheets to the students.	5		46 47	88 95	99
2.5 If using Case-Based Learning, consider using the C-POP or MCTS series	2 10 11			94	99
2.6 Use small-group teaching as much as personnel and space permit, with practitioners as tutors wherever possible (engages students, provides practical examples)			41 42 43 44		100
2.7 Offer as many opportunities for experiential learning as possible, e.g., placements in public health units, projects.	7 8		49	82	103
2.8 Cultivate community agencies with a view to increasing opportunities for community placements	8	20	39		103

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			49		
2.9 Consider arranging placements in aboriginal settlements	9				103
2.10 Try to get curriculum time in as many years as possible (ability to introduce topics at most appropriate time, and to reinforce concepts)			48	92	
2.11 Try to arrange joint teaching with clinical departments (gains credibility, demonstrates clinical applications)	3	26	36 38		
2.12 Share your successful educational innovations with other centres	25		52		
2.13 Consider using on-line courses for epidemiologic and biostatistical methods	15		41	85	101
2.14 Provide students personal reflection opportunities.		29	50		104
2.15 Provide an attractive list of public health electives, and market them to the students. Perhaps try the practice of one Canadian medical school, which offers face-to-face two week elective sessions and "Students Pick the Topic" weekends	12	34	67	90	103
2.16 Capitalize on students' interest in global health by arranging international electives, which should increase their enthusiasm for public health	12			84	
2.17 When evaluating students, consider using a range of tested evaluative methods	17		53		
2.18 Make sure that all student assignments are marked and that they count toward promotion		22	55		
2.19 Consider obtaining "flash" feedback at the end of each teaching session, and providing immediate feedback to instructors			56		
2.20 When evaluating teaching, consider student learning as well as its popularity with students		22	57		

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2.21 Seek informal input from students and their representatives on teaching methods, recommendations for new topics, etc.			51		
2.22 Arrange faculty development, especially population health concepts for clinical tutors	6				
To Department Chairpersons					
3.1 Make undergraduate education an important part of the department's activities: form an Undergraduate Medical Education Committee and have it report and be discussed at Departmental meetings		24	69	81	
3.2 Undertake a regular and systematic assessment of your undergraduate medical curriculum	18	24	58	81	
3.3 Hire a public health physician, full or part-time, to plan and coordinate the public health teaching		21	70 71		
3.4 Recognize the contribution of your director of undergraduate education			59		
3.5 Support Student Public Health Interest Groups			64		
3.6 Engage chairpersons in other medical schools in discussions aimed at reaching consensus on a uniform name for departments of public health			75		
3.7 Closely monitor the public health environment so that changes that can affect participation in teaching can be spotted early and appropriate adjustments made			78		

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To Deans					
4.1 Consider commitment to undergraduate medical education when selecting chairpersons and other important positions for departments of public health (and presumably for other departments, as well)			69		
4.2 Find funding for community personnel, especially those from public health departments, who participate in teaching—at the very least their expenses, ideally a realistic stipend		21	39 71 73		
4.3 Acknowledge the contributions made by course directors when considering promotions		27	59		
4.4 Ensure that quality and quantity of teaching are important factors in promotion of faculty members		27		83	
4.5 Encourage the development of affiliations with public health units, similar to those with teaching hospitals.	8		71		
4.6 Ensure that public health is well treated in the medical school, in terms of curriculum time and place, inclusion of its marks in student grades, etc.		22	61 68		
4.7 Lobby provincial governments to include teaching as a funded activity of public health departments			71	91	
4.8 Ensure that your school has a curriculum information system that will indicate who is teaching what and when	4		74		
4.9 Agree to increased enrolment and establishment of satellite schools only if they come with appropriate funding, and pass the money on to the Departments to permit them to cope with the increased demands			76 77		
4.10 Encourage faculty members to undertake research on teaching and evaluation methods		31	54		

AN EXECUTIVE SYNTHESIS

To PHAC/AFMC					
5.1 Support the Public Health Educational Network, possibly helping it to become a permanent organization		23	62	96	
5.2 Continue to support Student Public Health Interest Groups			64		
To PHAC					
6.1 Offer electives and summer employment to medical undergraduates.	13				
6.2 Support the adaptation of your professional development on-line courses for use in undergraduate medical teaching	15		41 60		

ANNEX A

SELECTED TEACHING METHODS

The authors were particularly impressed by the following teaching methods, nominated by the medical schools:

At the three-star-level ***

- Alberta's first-year public health course
- Memorial's Case Studies
- Western's lectures/plenary sessions

At the two-star level **

- Ottawa's varied Plenary Sessions (patients, agencies, panels, theatre, buzz groups, etc.)
- Saskatchewan's Structured Controversy debates
- Toronto's Spiral Curriculum
- Toronto's Community Visits
- Toronto's Web-based modules
- UBC's "Doctor, Patient and Society" course

At the one-star level *

- Memorial's exercise on emerging diseases