This training module for public health teaching in undergraduate medical schools has been developed in collaboration with the Department of Preventive and Social Medicine, Faculty of Medicine, Chulalongkorn University, Thailand. It is key study material for the World Health Organization (WHO) Regional Office for South-East Asia Regional Training Programme on Improving Teaching of Public Health in Undergraduate Medical Schools and is organized into six modules to match the first six modules of the Regional Training Programme.

It primarily aims to provide the staff and faculty of medical schools in the South-East Asia Region, particularly those who will be actively involved in the design and implementation of public health teaching in medical schools, with the latest evidence and knowledge on the subject. For example, the medical school faculties and teachers who are responsible or involved in public health teaching, medical education specialists or other medical educators who are in charge of overall medical curricula or academic coordinators and Institutional leaders who are involved in medical education policy, such as the medical school deans or vice deans for academic affairs.

The important contributions of the experts and participants in the Regional Consultative Meeting on Regional Training Programme on Public Health Teaching in Undergraduate Medical Education, 1921 September 2012, Bangkok, Thailand, and the Regional Meeting to Review Progress in Strengthening Teaching of Public Health in Medical Schools, 1113 December 2013, Pattaya, Thailand, in reviewing, updating and finalizing the training modules and guidelines are much appreciated.
Training Modules for Teaching of Public Health in Medical Schools in South-East Asia Region
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Acknowledgement

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The World Health Organization Regional Office for South-East Asia would like to extend its acknowledgement with thanks to all the contributors for their dedication, support and expertise in producing for these training modules on public health teaching in undergraduate medical schools in the South-East Asia Region.
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ASPH</td>
<td>Association of Schools Public Health</td>
</tr>
<tr>
<td>CBE</td>
<td>competency-based education</td>
</tr>
<tr>
<td>CH</td>
<td>community health</td>
</tr>
<tr>
<td>CM</td>
<td>community medicine</td>
</tr>
<tr>
<td>CompHP</td>
<td>Competencies and Professional Standards for Health Promotion Capacity Building in Europe</td>
</tr>
<tr>
<td>DALY</td>
<td>disability-adjusted life year</td>
</tr>
<tr>
<td>DCTA</td>
<td>direct to consumer advertisement</td>
</tr>
<tr>
<td>DOCH</td>
<td>Determinants of Community Health</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>IHR</td>
<td>International Health Regulations</td>
</tr>
<tr>
<td>MCQ</td>
<td>multiple choice question</td>
</tr>
<tr>
<td>MEQ</td>
<td>modified essay question</td>
</tr>
<tr>
<td>NCD</td>
<td>noncommunicable disease</td>
</tr>
<tr>
<td>OSCE</td>
<td>objectively structured clinical examination</td>
</tr>
<tr>
<td>OSPE</td>
<td>objectively structured practical examination</td>
</tr>
<tr>
<td>PBL</td>
<td>problem-based learning</td>
</tr>
<tr>
<td>PSM</td>
<td>preventive and social medicine</td>
</tr>
<tr>
<td>SAQ</td>
<td>short answer question</td>
</tr>
<tr>
<td>UPSoM</td>
<td>University of Pittsburgh School of Medicine</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>WHA</td>
<td>World Health Assembly</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Introduction

This document is produced as a key study material for the World Health Organization (WHO) Regional Office for South-East Asia Regional Training Programme on Improving Teaching of Public Health in Undergraduate Medical Schools. It primarily aims to provide the staff and faculty of medical schools in the South-East Asia Region, particularly those who will be actively involved in the design and implementation of public health teaching in medical schools, with the latest evidence and knowledge on the subject. It is organized into modules for easy access and compatibility with the format of the Regional Training Programme.

The Regional Training Programme will facilitate the understanding of public health and public health competencies that will be necessary for public health teaching and learning. It also proposes several approaches to revise medical curriculum design to ensure that medical graduates obtain adequate public health competencies relevant in local and regional contexts. This document also provides technical input on innovative public health teaching and learning methods, assessment and faculty development. The training programme is expected to include the following participants.

- Medical school faculties and teachers who are responsible or involved in public health teaching are the main targets of this training programme. These should not be limited to teachers of community medicine subjects only. They can include faculty members from clinical departments and other relevant departments where public health can be taught in a multidisciplinary approach. Moreover, the participants can also include clinical staff of hospitals or other health clinics where undergraduate medical field teaching is provided.

- Medical education specialists or other medical educators who are in charge of overall medical curricula or academic coordinators can participate in this training programme.
Institutional leaders who are involved in medical education policy, such as the medical school deans or vice deans for academic affairs, can also be invited to participate.

The document is divided into six modules to match the first six modules of the Regional Training Programme. An introduction to the importance of public health in medical education is provided in Module 1. Module 2 discusses the existing concepts of the core competencies of public health and how these can be developed to suit each institution. Modules 3 and 4 outline how the medical curriculum can be designed to ensure that public health competencies are integrated adequately through community medicine subjects and other subjects. Module 5 provides further information on teaching and learning methods for public health and relevant assessment options. Module 6 covers the area of faculty development to meet the needs of public health core competencies in the medical curriculum.

The Regional Training Programme on Public Health Teaching in Undergraduate Medical Education and the training modules are designed to allow participants to formulate their own training schedule, based on results from training needs assessments. Each module template will include its specific objectives and a module overview, and can be adjusted in each country to match the level of training needs, existing expertise of the participants and available resources. The modules can be used independently of each other; however, adhering to the original sequence is highly recommended. Please consult the Regional Training Programme document for the proposed schedule and other suggestions. In addition, the facilitator’s guidance on the learning process, assessment and evaluation is provided in a separate document.
Module 1: The importance of public health in medical education

**Learning objectives**

By the end of the training on this module, participants are expected to be able to:

1. explain the differences, similarities and linkages between public health and clinical medicine;
2. describe major public health challenges in the South-East Asia Region;
3. demonstrate why public health teaching is essential to medical education in addressing public health challenges.

**Key topics**

1. Introduction to public health and medicine
2. Public health challenges in the South-East Asia Region
3. Public health and medical education

1.1 Introduction to public health and medicine

In order to teach public health effectively, it is necessary to understand the importance of public health in medical education. In this module, there will be a chance to review the definition of public health, the similarities and the differences between public health and medicine, and the linkage between public health and medical education. The ongoing challenges of public health and health systems, especially in the South-East Asia Region, will also be discussed.

Most of us are familiar with the definition of the word health. Health generally refers to a state of an individual. The most commonly cited version of the definition of health is the text written in the Preamble to the Constitution of the World Health Organization (adopted in 1946). In it,
health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”.

Public health is different from health in that it usually refers to a population approach to health. According to WHO (1), public health is “an organized effort by society, primarily through its public institutions, to improve, promote, protect and restore the health of the population through collective action”. Public health is multidisciplinary in nature and includes many types of services from disease prevention and health promotion, to health surveillance, environmental protection and occupational health, among others. Health service administration and health policy and planning are also part of public health. Another common definition of public health is defined by Winslow as “the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals” (2).

In medical education, public health has long been a part of the curriculum. They are similar in their common goal of improving health. However, medicine deals primarily with individuals, while public health focuses more on the collective (that is, the population). Important collective values in public health include a commitment towards equity for social justice and sustainable development, and respect for diversity, people empowerment and community participation. One of the most comprehensive comparative analyses of the difference between medicine and public health was done by Fineberg, as presented in Table 1.1. We can see from the table that, even though they are very much related, public health has a number of differences from medicine (3).

**Table 1.1 Medicine versus public health**

<table>
<thead>
<tr>
<th>Clinical medicine</th>
<th>Public health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary focus on individual</td>
<td>Primary focus on population</td>
</tr>
<tr>
<td>Personal service ethic, conditioned by awareness of social responsibilities</td>
<td>Public service ethic, tempered by concerns for the individual</td>
</tr>
<tr>
<td>Emphasis on diagnosis and treatment, and care for the whole patient</td>
<td>Emphasis on prevention and health promotion for the whole community</td>
</tr>
<tr>
<td>Clinical medicine</td>
<td>Public health</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Medical paradigm places predominant emphasis on medical care</td>
<td>Public health paradigm employs a spectrum of interventions aimed at the</td>
</tr>
<tr>
<td></td>
<td>environment, human behaviour and lifestyle, and medical care</td>
</tr>
<tr>
<td>Well-established profession with sharp public image</td>
<td>Multiple professional identities with diffuse public image</td>
</tr>
<tr>
<td>Uniform system for certifying specialists beyond professional medical degree</td>
<td>Variable certification of specialists beyond professional public health degree</td>
</tr>
<tr>
<td>Biological sciences central, stimulated by needs of patients; move between laboratory and bedside</td>
<td>Biological sciences central, stimulated by major threats to health of populations; move between laboratory and field</td>
</tr>
<tr>
<td>Lines of specialization organized, for example, by: organ system (cardiology, neurology); patient group (obstetrics, paediatrics); etiology and pathophysiology (infectious diseases, oncology); technical skill (radiology, surgery)</td>
<td>Lines of specialization organized, for example, by: analytical method (epidemiology, toxicology); setting and population (occupational health, international health); substantive health problem (environmental health, nutrition)</td>
</tr>
<tr>
<td>Numerical sciences increasing in prominence, although still a relatively minor part of training</td>
<td>Numerical sciences an essential feature of analysis and training</td>
</tr>
<tr>
<td>Social sciences tend to be an elective part of medical education. Engineering and physical sciences are relevant, especially materials science, electronics, imaging and information technology</td>
<td>Social sciences an integral part of public health education. Engineering is relevant, especially systems analysis, operations management, sanitary engineering and information technology</td>
</tr>
<tr>
<td>Clinical sciences an essential part of professional training rooted mainly in the private sector</td>
<td>Clinical sciences peripheral to professional training rooted mainly in the public sector</td>
</tr>
</tbody>
</table>

Source: (3).
Public health is a discipline in which people are placed at the centre of all health-care activities. A good public health practice should be the mainstay of all efforts to develop a better quality of life for the people, especially those who are underprivileged, vulnerable, disadvantaged or marginalized. The fundamental values of the discipline of public health focus on ethics, equity and human rights as imperatives.

Several factors affect the status of health of the population. Education and income are frequently referred to as major determinants of health. Globalization also affects health directly and indirectly through its effect on economic and social inequality and population movement. Even though there are many social, biological and environmental determinants of health, the health system is a primary driver towards health of the population. According to WHO, a health system includes “all organizations, people and actions whose primary intent is to promote, restore or maintain health”. In these endeavours health-care professionals play the crucial mediating role. Much evidence suggests that coverage and numbers of health professionals have a direct effect on health outcomes (4) and there has always been a greater demand for better health professionals to serve for the benefit of the human health. Medical doctors are usually considered one of the leaders of health systems and they should provide leadership in health-care delivery and health system reform to address equity in health.

Hence, medical doctors need to understand the various aspects of the sociodemographic phenomenon to create a bridge between people and health, and so public health knowledge is the key towards such understanding. There is a necessity to ensure that medical graduates are adequately proficient in public health in order to tackle the problems of the community and their country in this rapidly changing world. Linkage and continuum from clinical medicine to public health is necessary for medical students to learn how to cure diseases and prevent illnesses in the community and health systems. Medical practice is not be limited to clinical care and medical graduates need to be competent in various levels of prevention, from primary and secondary to tertiary prevention, for individuals, families, communities and the country at large. They also need to understand the roles of social and political factors that determine health and health equity in the society.

However, there seems to be a mismatch of professional competencies to patient and population priorities in many parts of the world. For example, in many countries, medical graduates do not have adequate
knowledge and skills to address the health problems of the population; these problems are becoming increasingly more complex and continuously changing. Medical graduates may have limited awareness of the ongoing health challenges that their health systems are facing. Likewise there is a lack of effective teamwork and leadership in transforming health systems to address health equity problems. To move forward strongly into the 21st century, it is imperative that the medical education system provides more attention to the development of public health competency for its undergraduate medical students.

1.2 Public health challenges in the South-East Asia Region

A set of key public health challenges important to the South-East Asia Region have been identified at the Regional meeting on The Role of Medical Education to Address the Current Health Challenges, in Bangkok, Thailand, 13–15 June 2012. They include challenges related to diseases, health systems, changing socio-demographics, and vulnerabilities and risks (Table 1.2).

Diseases such as non-communicable diseases and emerging infectious diseases are on the increase. Human health is also increasingly prone to public health emergencies and disasters resulting from climate changes and human-induced tragedies. Several sociodemographic factors are adding pressure to the health and medical care systems; these factors include population ageing, migration and globalization. It is important that health systems are able to cope with these challenges through effective health system function with regard to governance, financing, health workforce, information systems, health products and medical devices, and health service delivery. More details about some of the key challenges and how medical education should address them are provided in Annex 1 at the end of this document.

Table 1.2. Evolving health challenges facing countries in the South-east Asia Region

| Diseases | Many communicable diseases are controlled with preventive, promotive and clinical management programmes; new diseases have also emerged such as severe acute respiratory syndrome (SARS), avian influenza and recently the influenza A H1N1 pandemic; however the largest public health challenge is the rise of noncommunicable diseases which are |
Vulnerabilities and risks

Risks to human life and health from public health emergencies and disasters have also changed; technological disasters have become more common as industries are pervasively present across and within countries.

Sociodemographics

Globalization, urbanization and migration of people due to economics and resources, and an ageing population largely due to advances in medical sciences; and new international treaties and regulations impact health.

Health systems

Ensuring good governance, effective health workforce, accessibility and quality of health products and medical devices, efficient health financing, functional health information system, and quality and accessibility of service delivery.

### 1.3 Public health and medical education

Over a period of time the medical training institutions have evolved with regard to education, information, learning and teaching methods. As discussed above, medical doctors, as leaders of the public health team, need to be trained to have adequate proficiency to meet the demands of health-care systems and the health needs of the people. Therefore, medical schools have the responsibility to produce medical graduates who are proficient in public health competency to deliver preventive, promotive, curative and rehabilitative care to address the public health challenges in the Region.

In the South-East Asia Region, the Regional Meeting on Teaching of Public Health in Medical Schools, in 2009, identified the desired characteristics of medical graduates to include the following (5):

- be proficient in public health;
- be able to work in multisectoral and multidisciplinary environments;
- be able to effectively adapt to the constant change in health paradigm;
be involved in public health education and research including training and supervising community-based health workforce;

- support the functioning of public health facilities, such as public health laboratory and disease surveillance;
- get involved in health activities, beyond the boundary of medical institutions;
- look at their clients in a more holistic manner;
- help medical staff to better understand a client’s needs and their life, before and after institutional care.

However, it was found that many medical faculties have not been successful in achieving these responsibilities in public health. Public health topics may be side-lined or not adequately included in the medical curriculum. Pedagogical skills of teachers are also lacking. Many teaching staff are unable to make their teaching and learning sessions in public health adequately stimulating for the students. A faculty development plan, continuing medical education or continuing professional development programme for different departments is generally not available as compared with clinical areas of the faculty. In most schools, field visits or community placement for acquiring real-life experiences are not organized effectively due to lack of interest from organizers or limited funds.

To overcome those barriers, teaching of public health in undergraduate medical schools needs to be strengthened to ensure that graduates obtain all the public health core competencies. Through competency-based education design, public health teaching and learning should be integrated into the whole medical curriculum. It should not be limited to the responsibility of community medicine, preventive and social medicine or community health departments even though they are unavoidably crucial contributors. It is also recommended that medical institutions be community oriented, be open to flexibility in teaching methods, be student centred and be integrated as much as possible. Emphasis should also be given to comprehensive health-care management.

Opportunities are opening for reform of public health professional education in many countries to ensure that graduates are ready for the 21st century. A movement for health professional education reform has been
launched at the global level and in many countries\textsuperscript{1}. In South-East Asia, WHO has supported several activities to improve public health teaching in medical schools. The Regional Training Programme is one of those activities. We now have a good opportunity to help improve public health teaching in medical schools in our countries as part of the global and regional efforts to address the public health challenges in the world.

Figure 1.1 shows a strategic framework adopted by the WHO Regional Office for South-East Asia for strengthening undergraduate medical education to address the current health challenges. As shown in the framework, many stakeholders must be involved, including the ministry of education, ministry of health, medical councils, professional organizations and civil societies. Five key strategic directions are also proposed including:

1. aligning medical education with needs of health systems;
2. strengthening quality assurance in medical education;
3. emphasizing social accountability;
4. strengthening curricula and the teaching–learning process;
5. promoting an enabling environment.

As a member of academic medical community, it is imperative for us to ensure that our education system produces medical graduates who have necessary competencies to meet health systems' need. Medical education itself needs to be strengthened and the medical curriculum must be updated to ensure those expected outcomes. The capacity of medical faculty needs to be improved and they should be equipped with updated pedagogical tools and techniques. Learning environment and assessment methods can also facilitate such changes.

\textsuperscript{1}For example, a report from a global independent commission of experts in 2010 recommends comprehensive reform in the training of health-care professionals with many follow-up activities in many countries. Their movements are described in \url{http://www.healthprofessionals21.org} (accessed 9 August 2014).
The remaining modules in this Regional Training Programme will be a guide to some key aspects of the development requirements via competency-based education and assessment. Module 2 will address public health core competencies and how these could be adapted and adopted to match local institutions. Module 3 addresses the possible curriculum design, with a focus on community medicine or preventive medicine subjects. Integration of public health teaching outside community medicine or preventive medicine subjects is provided in Module 4. Issues related to teaching and learning methods and assessment are covered in Module 5. Module 6 gives a basic introduction to faculty development for public health teaching.

**Exercise**

(1) Both public health and clinical medicine are interested in improving health. But there are a number of differences between them. Explain the differences with regard to (a) primary focus, (b) emphasis and (c) lines of specialization.

(2) Choose one of the major public health challenges in the South-East Asia Region described in the module. Based on that challenge, discuss the competencies required from medical graduates to address that challenge.
Module 2: Public health core competencies

Learning objectives

By the end of the training on this module, participants are expected to be able to:

(1) explain the meaning of public health core competencies;
(2) analyse the existing models of public health core competencies that have been used in different countries;
(3) develop their own public health core competency and competency statements to fit their country context and resources.

Key topics

(1) Understanding competency and public health competency
(2) Improving public health competency of medical graduates in the South-East Asia Region
(3) Existing models of public health core competencies
(4) Adaptation of public health core competency for local integration into medical education for medical graduates

2.1 Understanding competency and public health competency

Competency can also be defined as “a measurable pattern of knowledge, skills, abilities, behaviours and other characteristics that an individual needs to perform work roles or occupational functions successfully” (5). Another way to define competence or competency is “the acquisition of sufficient knowledge, psychomotor, communication and decision-making skills and attitudes to enable performance of actions and specific tasks to a defined level of proficiency” (WHO, 2011).

Competencies specify the "how" of performing job tasks, or what the person needs in order to perform the job successfully” (6). A number of
terms have been created in relation to competency-based medical education and they are presented in Box 2.1.

**Box 2.1. Proposed definitions of competency and related terms by the International Competency-Based Medical Education Collaborators**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competence</strong></td>
<td>The array of abilities across multiple domains or aspects of physician performance in a certain context. Statements about competence require descriptive qualifiers to define the relevant abilities, context and stage of training. Competence is multidimensional and dynamic. It changes with time, experience and setting.</td>
</tr>
<tr>
<td><strong>Competency</strong></td>
<td>An observable ability of a health professional, integrating multiple components such as knowledge, skills, values and attitudes. Since competencies are observable, they can be measured and assessed to ensure their acquisition. Competencies can be assembled like building blocks to facilitate progressive development.</td>
</tr>
<tr>
<td><strong>Competency-based medical education</strong></td>
<td>An outcomes-based approach to the design, implementation, assessment and evaluation of medical education programme, using an organizing framework of competencies.</td>
</tr>
<tr>
<td><strong>Competent</strong></td>
<td>Possessing the required abilities in all domains in a certain context at a defined stage of medical education or practice.</td>
</tr>
<tr>
<td><strong>Dyscompetence</strong></td>
<td>Possessing relatively less ability in one or more domains of physician competence in a certain context and at a defined stage of medical education or practice.</td>
</tr>
<tr>
<td><strong>Incompetent</strong></td>
<td>Lacking the required abilities in all domains in a certain context at a defined stage of medical education or practice.</td>
</tr>
<tr>
<td><strong>Progression of competence</strong></td>
<td>For each aspect or domain of competence, the spectrum of ability from novice to mastery. The goal of medical education is to facilitate the development of a physician to the level of ability required for optimal practice in each domain. At any given point in time, and in a given context, an individual physician will reflect greater or lesser ability in each domain.</td>
</tr>
</tbody>
</table>

Source: (7)
Public health core competencies are the essential knowledge, skills and attitudes necessary for the practice of public health. They cross the boundaries of specific disciplines and are independent of any kind of programme and topic. They provide the building blocks for public health practice, and the use of an overall public health approach. Public health core competencies are not limited for use by public health schools or public health students and, as discussed in the previous module, they are considered necessary for medical graduates to address current and future health challenges.

Level of competency in the core public health competency set can be at different levels. For example, medical graduates might be expected to be proficient in some of the competencies while being novice in some others. The level of competency development should be agreed upon. The definitions of five levels of competency adapted from the National Institutes of Health Proficiency Scale (United States of America) are provided as an example in Table 2.1.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>Awareness of the core concepts and demonstration of the knowledge or techniques in selected circumstances. Need further learning on the application of the competency to function.</td>
</tr>
<tr>
<td>Basic/novice</td>
<td>Basic understanding of the knowledge, key concepts and ability to carry out routine tasks under guidance or supervision. Further development of skills through practical experience is useful.</td>
</tr>
<tr>
<td>Intermediate/proficient</td>
<td>Good knowledge, understanding and application of the competency independently, with minimal guidance. Capability to address unexpected situations or changes and can help others in similar situation.</td>
</tr>
<tr>
<td>Advanced</td>
<td>Extensive knowledge, understanding and application of the competency (mastery of the competency). Capability to address problems or situations outside the usual scope of practice. Can teach or coach others on the competency and can develop resources and materials for competency development.</td>
</tr>
<tr>
<td>Expert</td>
<td>Recognized authority on the competency with strategic vision and extensive capacity to develop new applications or processes across organizations or systems.</td>
</tr>
</tbody>
</table>

Source: modified from (8)
To ensure that medical graduates have adequate competencies in public health, locally and regionally relevant public health core competencies need to be identified. With a consensus on what should be considered for inclusion, medical schools can use these in their medical curriculum development to support the development of improvement of knowledge, skills and ability among their undergraduate medical students. Additionally, the core competencies can be used for standard setting and curriculum assessment. They also allow development of cultural and organizational support necessary to encourage continuous learning, sharing and knowledge application in the workplace. They can also be used to identify needs for public health capacity building, and to facilitate professional collaboration, mobility and exchange of ideas (9).

2.2 Improving public health competency of medical graduates in the South-East Asia Region

In August 2009, a Regional Office for South-East Asia Expert Group met in New Delhi to review the preventive and social medicine (PSM)/community medicine (CM) /community health (CH) curriculum for undergraduate medical education. The general objective of the meeting was to review and improve the PSM/CM/CH curriculum focusing on the common health problems and contemporary public health issues in the countries of the Region. It was observed that many good practices in the teaching of the subject already existed in the countries, but there was a necessity to focus more on the public health areas (5).

From the discussion of the experts in New Delhi, it was clear that every country is wary and concerned about making undergraduate medical education more evidence based and needs based. Thus, efforts are being made to review the whole undergraduate curriculum. It was agreed that in the South-East Asia Region the undergraduate medical curriculum should be oriented towards training students to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative and rehabilitative aspects of medicine. Reviewing the PSM/CM/CH curriculum of the countries of the Region, it was observed to be mostly theory based where teaching–learning takes place in a nonintegrated manner with no links between departments (5). The Expert Group meeting concluded that, since issues of public health are constantly evolving, it is necessary to adapt the mission and objectives of the
undergraduate curriculum in public health. The changes should not be limited to the PSM/CM/CH subjects and linkages across departments and disciplines are also needed.

Some of the skills that were identified for further strengthening include epidemiological, health management, communication and documentation, and computer skills. Some countries are practising integrated and problem-based teaching. However, preclinical courses such as sociology/anthropology or social sciences, population study, behavioural modification or communication will also provide a good foundation for public health. It was also recommended that global issues such as the International Health Regulations, the impacts of climate change on health, and intellectual property rights should also be included.

A follow-up meeting by a WHO Regional Office for South-East Asia Expert Group was organized in Kathmandu in 2010 to review and finalize the regional guidelines to improve teaching of public health at undergraduate level in medical schools. One major recommendation that emerged from the meeting was that the medical schools in the Region should identify the public health competencies that their students are required to obtain from undergraduate medical education. It is important that these competencies are linked to the diverse needs of society.

2.3 Existing models of public health core competencies

Core competencies in public health can cover several areas of knowledge, skills and other attributes. These competencies should be defined to match the health systems and health needs that are increasingly shaped by emerging challenges from epidemiological and demographic transitions, population demands, professional differentiation and technological innovation (10).

The set of public health core competencies varies between countries. In Canada, the core competencies for public health are organized into seven domains. They include a core public health sciences domain, analysis and assessment domain, policy development and programme planning domain, partnership collaboration and advocacy domain, communication domain, diversity and inclusiveness domain, and leadership and systems approaches domain (11). Individual institutions or regions may also prioritize these domains based on their contexts. For example, the Public
Health Association of British Columbia identified the following as its priorities: community capacity building, leadership, health ethics (equity/social accountability), interprofessional collaboration, the application of new technology, knowledge exchange and health literacy.

In Europe, the Association of Schools of Public Health in the European Region has developed a list of public health core competencies including definitions and concepts that are designed to be appropriate for all types of public health professionals. The European Core Competences for Public Health Professionals can be categorized into six groups.

1. Methods in public health
2. Population health and its social and economic determinants
3. Population health and its material – environmental determinants
4. Health policy; economics, organizational theory and management
5. Health promotion: health education, health protection and disease prevention
6. Ethics.

One useful model for the development of public health core competencies is the framework developed in the United States of America (USA) by the Association of Schools of Public Health (ASPH) (Figures 2.1 and 2.2) (12). It is not specifically designed for a medical school curriculum but the model can serve as a framework for the development of public health core competencies for undergraduate medical studies. These frameworks include two sets of competencies, namely discipline-based core competency and interdisciplinary core competency. Discipline-based public health core competency includes biostatistics, environmental health sciences, epidemiology, health policy and management, and social and behavioural sciences. Interdisciplinary core competency includes diverse areas such as communication, advocacy, diversity and cultural proficiency, leadership, management and policy, professionalism and ethics, programme planning and assessment, critical analysis and systems thinking.
Figure 2.1 ASPH model of public health competency

Source: (12).
These models of public health core competencies can be used as a template for medical schools in the South-East Asia region to develop their own set of public health competencies for medical education. The medical curriculum can then be shaped accordingly to ensure that the medical graduates will have adequate knowledge, skills and other attributes that are necessary for public health practice. The competencies are anticipated to serve as a useful guide for faculty to include, as appropriate, relevant content in their existing courses, and for the medical students to get the opportunity to comprehensively update their understanding.
**Discipline-based public health core competency**

The components of discipline-based public health core competency can be described in more detail as follows (12):

- **Epidemiology**: the study of public health problems in terms of magnitude of the disease, person, time and place. It has multiple components including distributions and determinants of disease, disabilities and deaths in human populations, the characteristics and dynamics of human populations, factors contributing to health promotion and disease prevention, and factors influencing the use of, and decision making about, health services. Social epidemiology studies the linkages between socioeconomic factors and population health, including issues such as social determinants of health.

- **Biostatistics**: the development and application of statistical reasoning and methods in addressing, analyzing and solving problems in public health and health care, and biomedical, clinical and population-based research.

- **Environmental health sciences**: the study of environmental factors including biological, physical and chemical factors that affect the health of a population or community.

- **Health policy and management**: a multidisciplinary field of inquiry and practice concerned with the delivery, quality and costs of health care for individuals and populations. It is possible for medical students to learn the process and outcomes of health services including costs, financing, organization, outcomes and accessibility of care. An example of the components of health policy and management proposed for medical school curriculum in the USA context is shown in Table 2.2.

- **Social and behavioural sciences**: address the behavioural, social and cultural factors related to individual and population health and health disparities over the life courses. Recent public health thinking has emphasized the role of social determinants of health in promoting healthy lives for individuals and populations.
Table 2.2 Proposed components of a USA medical school curriculum in health policy

<table>
<thead>
<tr>
<th>Domain</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems and principles</td>
<td>• USA health-care system, financing, and payment</td>
</tr>
<tr>
<td></td>
<td>• Models of care management and control</td>
</tr>
<tr>
<td></td>
<td>• Health insurance</td>
</tr>
<tr>
<td></td>
<td>• Health-care safety net</td>
</tr>
<tr>
<td></td>
<td>• Health information technology</td>
</tr>
<tr>
<td></td>
<td>• Physician workforce</td>
</tr>
<tr>
<td>Quality and safety</td>
<td>• Quality indicators, measures and outcomes</td>
</tr>
<tr>
<td></td>
<td>• Quality improvement</td>
</tr>
<tr>
<td></td>
<td>• Patient safety</td>
</tr>
<tr>
<td>Value and equity</td>
<td>• Medical economics</td>
</tr>
<tr>
<td></td>
<td>• Medical decision making</td>
</tr>
<tr>
<td></td>
<td>• Comparative effectiveness</td>
</tr>
<tr>
<td></td>
<td>• Health disparities</td>
</tr>
<tr>
<td>Politics and law</td>
<td>• History and consequences of major health-care legislation</td>
</tr>
<tr>
<td></td>
<td>• Adverse events, medical errors and malpractice</td>
</tr>
</tbody>
</table>

Source: (14).

Interdisciplinary core competency

For interdisciplinary core competency, the following components were identified by ASPH as being important for public health practices (12).

- Communication and informatics: the ability to collect, manage and organize data to produce information and meaning that is exchanged by use of signs and symbols. The medical students will know how to gather, process and present information to different audiences, in-person, through information technologies or through media channels. The course will allow strategic
design of the information and a knowledge exchange process to achieve specific objectives.

- Diversity and culture: the ability to interact with both diverse individuals and communities to produce or impact an intended public health outcome.

- Leadership: the ability to create and communicate a shared vision for a changing future, to champion solutions to organizational and community challenges, and to energize commitment to goals. The course would enable the medical students to learn to deal with group dynamics and how to create a rapport with the stakeholders, as an example, in the community to solve the community health issues.

- Professionalism and ethics: the ability to demonstrate ethical choices, values and professional practices implicit in public health decisions. The students can also understand how to consider the effect of choices on community stewardship, equity, social justice and accountability, and to commit to personal and institutional development.

- Programme planning: the ability to plan for the design, development, implementation, and evaluation of strategies to improve individual and community health.

- Systems thinking: the ability to recognize system-level properties that result from dynamic interactions among human and social systems and how they affect the relationships among individuals, groups, organizations, communities and environments.

**Proposed model of public health core competency for the South-East Asia Region**

At the Regional Consultative Meeting on the Regional Training Programme on Public Health Teaching in Undergraduate Medical Education in Bangkok, Thailand, 19 September 2012, a group of medical education and public health experts from South-East Asia agreed upon a set of public health core competencies that would be a model for undergraduate medical education in the Region. This set includes two major components similar to the ASPH framework, namely discipline-based and interdisciplinary core competency (Table 2.3).
Table 2.3 Proposed model of public health core competencies for undergraduate medical education in South-East Asia

<table>
<thead>
<tr>
<th>Discipline-based</th>
<th>Interdisciplinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Biostatistics</td>
<td>1. Communication and information technology</td>
</tr>
<tr>
<td>2. Community medicine</td>
<td>2. Critical appraisal skills</td>
</tr>
<tr>
<td>3. Epidemiology</td>
<td>3. Health promotion</td>
</tr>
<tr>
<td>4. Family medicine</td>
<td>4. Holistic care</td>
</tr>
<tr>
<td>5. Health economics</td>
<td>5. Leadership and teamwork</td>
</tr>
<tr>
<td>6. Health policy and management</td>
<td>6. Oriental medicine</td>
</tr>
<tr>
<td>7. Medical ethics and professional Laws</td>
<td>7. Patient`s right and safety</td>
</tr>
<tr>
<td>8. Occupational and environmental health</td>
<td>8. Professional and personal development</td>
</tr>
<tr>
<td>10. Social and behavioural sciences</td>
<td>10. Social responsibility/accountability</td>
</tr>
</tbody>
</table>

2.4 Adaptation of public health core competency for local integration into medical education

Even though existing models of public health core competency are very similar and there are several common areas of competencies that would be required in almost all contexts, the public health core competencies for one institution may not be the same as for another. Selected sets of competencies with regard to some specific context are necessary to make the medical students more aware of the existing systems and the ongoing and future public health challenges. Medical graduates should have adequate competency to function well in the real situations of health systems that they will work in.

For example, common diseases and conditions that are major causes of morbidity and mortality in the graduates’ community should be the contextual factor to define what public health core competencies are
necessary for the graduates. In some countries, severe diarrhoea and malnutrition may be the important health problems, while severe acute respiratory syndrome and more recently influenza A H1N1 are examples of public health situations faced by medical doctors in some other contexts. Medical students should acquire necessary competencies in order to diagnose and be able to respond better to those diseases and public health conditions in their community.

**Principles for setting up core competencies**

To choose what should be included as the public health core competencies, the following key principles in developing core competencies are recommended.

- Understand the health needs and health system context of the country and verify whether the competencies match them. For example, setting up teaching of public health informatics competency to medical students: it should be well understood whether or not such a competency is an absolute requirement in terms of the country’s resources and necessity. Henceforth, decisions about whether or not it is required should be taken in order to include the competency in the medical curriculum.

- A plan must be implemented to ensure that the core competencies remain current and relevant. This plan will include a process and impact evaluation plan to determine the effect of core competency adoption and application on public health practice and on the system as a whole.

- There will be competencies that reflect general public health competencies; for example, if an institution offers public health education with distinct tracks, it should have a set of competencies common for all medical students, and in addition each track should have its own set of track-specific competencies. Additionally there may be some competencies that are specific to institutions or geographical areas.

- The core competencies to be adopted should rely on a consensus between all the concerned stakeholders.
Steps to be taken for setting up core competencies

The following key steps can be taken in order to set up the core competencies; these steps are based on several study reports.

- It is recommended that an institution or a network of institutions works together to define the roles, responsibilities and functions of medical doctors that are required for the health systems they are in. The process should engage all key stakeholders including academics, health policy makers, professional bodies and potential employers of the future medical graduates. With clear roles, responsibilities and functions, the content (depth and breadth) and the context of each competency could then be defined in the next step.

- A group or groups of core personnel need to be formed to work on the core competencies. For example, it can be one group for one specific core competency such as epidemiology or health policy. Each group may comprise experts in that discipline, public health practitioners and medical educators. For example, in 2004 ASPH established six workgroups in order to carry out discipline-specific competency identification and specification (12).

- Each group should be charged with coming up with a consensual list of 810 discipline-specific competencies. For example, for biostatistics competency, the group should reflect the knowledge, skills and other attributes needed for the students to apply it in other fields of study, such as maternal and child health or social behavioural sciences.

- The level of implementation of the core competencies should be fully understood. This could be at international level, national level, regional level or institutional level. For example, in 2005, the Joint Task Group on Public Health Human Resources of Canada developed a draft set of core competencies (15), and the Public Health Agency of Canada took the initiative for a national process to review and modify or validate these draft core competencies. Likewise, in the development of the Competencies and Professional Standards for Health Promotion
Capacity Building in Europe (CompHP) Project, it was driven by recognition of the need for a coherent competency-based framework that would build on related national and international developments (16).

- A review of the literature on public health competency should be performed. For example, in the CompHP project the domains of core competencies outlined in the Galway Consensus Statement, together with the modifications to the statement suggested in a global consultation process, and the core competencies for health promotion developed in Australia, Canada New Zealand and the UK, were studied extensively (16).

- The draft competency should be considered as a whole. An initial draft framework of core competencies should be made based on findings from the literature review and consultation with relevant partners within each group. For example, while reviewing and revising the competencies of public health in family medicine practice in Canada, a family medicine public health symposium was being held in March 2008 (12). This group included 12 residency directors (six from family medicine and six from community medicine) and 12 residents (six from family medicine and six from community medicine) from across Canada. The presymposium discussion document, which included a proposed set of draft competencies, was distributed to the participants for their review prior to the symposium. Public health educators and family health practitioners discussed and came up with possible competencies that could be used in a proper curriculum setting to enable medical students studying family medicine to also excel in public health skills.

- A consensus needs to be developed across relevant stakeholders to ensure the acceptance of the core competencies. One common tool to help with consensus development is use of the Delphi technique on the draft core competencies. For example, ASPH conducted three rounds of modified Delphi process in each core workgroup to develop a consensus on discipline-specific core competencies. After each survey, core members discussed the results of the survey in order to distil and refine the next list of competencies for further deliberation. Each
workgroup's resource persons were included in the next round of each Delphi process (12).

- Focus groups including health education experts and other key stakeholders are important. Considering the consensus and all other aspects of literature reviews and draft preparations, the experts can then discuss and talk over the views and perspectives of the core competencies and make a decision.

**Integrating public health core competencies into medical education**

The public health core competencies developed need to be adopted and integrated into the medical education system. A common approach is to develop specific competency statements of what would be expected from the graduates when they finish their degree. These competency statements can then be organized and integrated into specific courses and subjects in the medical curriculum or in various activities and in the assessments.

**Developing competency statements and competency-based education**

To ensure that the medical graduates obtain all core public health competencies, it is important to define objectives for the study and the competencies expected. Box 2.2 describes common steps undertaken for the translation of core competencies into competency statements.

Competency-based education (CBE) is a recent approach in the education system that changes the paradigm from focus on what academics would like to offer (teacher focused) to what students need to know and be able to do in varying and complex situations (student and/or workplace focused) (17). Adopting CBE results in the decision to adopt a more complex assessment system that focuses on competency development, usually involving many assessment methods. Teaching methods also need to be adjusted and many teaching tools and styles can be employed, such as practice-based learning, field experience, role play, etc. By focusing on the core competencies and the competency statements, the medical school curriculum needs to be adjusted or reformed in order to ensure that these competencies are met for its graduates.
Adopting CBE in medical education has several challenges. The first challenge is to determine which competency statements can be bundled together to provide the optimal groupings. Another challenge is in designing learning experiences that support students as they practice using and applying these competencies in different contexts. Continual refinement of defined competencies is also necessary.

**Competency-based assessment**

In addition to clarifying educational outcomes as they relate to workforce needs and expectations in relation to public health practice, competencies are critical to linking course learning objectives to medical education instructional objectives. Goals must be made, which in turn should be supported by objectives that are more specific measurable statements of what the public health teaching plans to achieve related to research, service and instruction. Competency-based assessment then focuses on measuring the achievement towards the goals related to the competencies.

The following points could be taken into consideration for the assessment of the public core competency learnt by the medical students.

- The skill building of public health into medical education can be directed and ensured through deliberate practice and feedback, as well as reflection on practice. Having periodic assessment of competencies measured by appropriate methods and tools can help to foster the teaching and learning methods to achieve the competency goals.

- Proper curriculum set-up can be followed and monitored to determine the consistency and the progress of the education set-up; this is vital in terms of assessing the students’ potential as medical professionals.

There are several possible tools and methods to use in the assessment of public health competencies. Some of the conventional assessment tools may not be appropriate for public health teaching. This is discussed in more detail in Module 4.
**Box 2.2 Translating core competencies into competency statements: examples from the USA, UK and Canada**

The following six steps are the common approach to develop competency statements from the core competencies.

1. **Start with core public health functions**
   For example, there are five core functions recommended by Advisory Committee on Population Health (assessment, surveillance, prevention, promotion and protection).

2. **Identify the core elements that comprise each of the functions**
   Identify what is actually meant by each of the five functions in order to identify the required competencies.

3. **Map each competency statement from existing core competency sets to the core elements**
   Each of the competency statements from existing sets of core competencies are matched with the most similar core element.

4. **Analyse competencies mapped to common core elements and select/combine competencies to capture key themes**
   Many of the core elements have multiple matched competency statements. It is necessary to assess which statements best describe the necessary knowledge, skills and abilities.

5. **Assess the pool of selected competencies to eliminate duplication**
   Step 4 reduced duplication among competency statements for core elements mapped to a particular function. This step addresses duplication of statements across the five functions.

6. **Identify and label groups of competencies that address a common theme**
   Competency statements reflecting common themes are grouped together to form competency domains.

Source: (15).

In summary, this module discusses the difference between medicine and public health. It demonstrates why public health core competencies are necessary and how the set of core competencies can be developed to match the local health needs and health system context. Several steps can be taken to develop the public health core competencies as well as
competency statements to be used in competency-based medical education and assessment. The next module will provide more details on the integration of the public health competencies into the medical curriculum.

**Exercise**

(1) What is the meaning of competency and why is it important for medical education?

(2) What are the common components public health core competencies that have been adopted in many countries?

(3) Do you agree or disagree with the proposed model of public health competency for undergraduate medical education in the South-East Asia Region? Why?

(4) In your opinion, what would be the critical steps for the development of public health core competency and competency statements for your country or your academic institution?
## Module 3: Curriculum design for community/preventive medicine subjects

### Learning objectives

By the end of the training on this module, participants are expected to be able to:

1. understand horizontal and vertical approaches for integration of public health core competencies into a curriculum;
2. evaluate how public health teaching has been integrated into the prevailing medical curriculum;
3. plan how to integrate further public health teaching effectively into the curriculum under community medicine subjects.

### Key topics

1. Integrating public health competency into the undergraduate medical curriculum
2. Public health teaching within community medicine subjects
3. Evaluation of existing public health competency and planning further integration into community medicine subjects

### 3.1 Integrating public health competency into the undergraduate medical curriculum

The main aim of teaching public health is to facilitate the students’ acquisition of knowledge, skills and attitudes as part of the core competencies in public health, as discussed in Module 2. The public health core competencies and competency statements can provide an integral part the development of the medical curriculum to ensure that medical graduates obtain necessary competencies to adequately provide public health functions when they graduate.

The inclusion of public health teaching in medical education can be done in many ways. It can be integrated in both a horizontal and a vertical
approach. Horizontal integration is the integration of the public health competencies into other curricular content, for example through problem-based or field-based learning methods. Holistic integration allows the faculty to provide a holistic view of public health and health care at the same time. Vertical integration is the sequential integration into various courses over the whole period of medical education. It helps to develop knowledge step by step, from the first year to the final year, thereby reinforcing the concepts of public health and skill building over time. Choosing which public health competency is to be integrated in a horizontal or a vertical approach is dependent on the characteristic of the competency, the nature of the curriculum, the school policy and the readiness of teachers. Nevertheless, the benefits of both approaches should be harnessed in every medical school.

Most medical schools in South-East Asia have a department that has a primary role in teaching public-health-related courses to the medical students. They may have different names, such as department of preventive and social medicine (PSM), department of community medicine (CM), department of community health (CH) or department of public health. The curricula that are the responsibility of these departments include public-health-related subjects to help the students obtain many of the core competencies. However, public health teaching should not be limited to the PSM/CM/CH departments. Public health skills, knowledge and attitudes can also be taught as part of other clinical and preclinical subjects, as well as during the clinical clerkships. Extracurricular activities can also serve as an additional opportunity for public health competency development of medical students.

By integrating public health into different sectors of the medical curriculum, medical students would learn how to address disparity, promote health equity and make a substantial difference in addressing the root of causes of disease. By linking them with clinical subjects or preclinical content, the students would be able to understand a practical approach to public health in clinical and preclinical-related practice. Physicians who understand the tools of both medicine and public health should have the knowledge and skills to improve the health situation in a community.
This module focuses on the integration of public health competencies into community medicine subjects. It demonstrates possible ways to do this by using real experiences from South-East Asia and abroad. The next module will cover integration into other departments and via extracurricular activities.

### 3.2 Public health teaching within community medicine subjects

Community medicine subjects are the primary area in the medical education system where public health competency can be acquired, especially for developing core competency in major public health disciplines. As described in Module 2, the core competencies have been separated into two main categories: one is discipline-based core competency and the other is interdisciplinary core competency. The knowledge and skills specific to discipline-based core competency are frequently the first to be integrated into community medicine subjects.

Students should be able to apply basic epidemiological principles to disease investigation, outbreaks, health promotion and disease prevention. In addition, students need to have an understanding of the population for planning, intervention, monitoring and evaluation. Likewise, medical students need to learn about the health service system and the continuum of care from primary care service to referral systems, continuing care and follow-up. They also have to develop the skills in community-based research while learning about public health ethics and other medicolegal issues in medicine and public health.

Considering these discipline-based public health core competencies, specific courses can be set up and integrated into the medical curriculum. Some of the courses that can be offered within community medicine subjects to match the discipline-based core competencies include: basic and applied epidemiology, social epidemiology, biostatistics, demography, environmental and occupational health, family health, health promotion, community diagnosis and community health research, public health laws and international health regulations, and global health.

Interdisciplinary core competency can also be developed through various learning experience and activities that can be organized within community medicine subjects. For example, using group study and group assignments will require the students to develop leadership and teamwork
skills. Field-based study can promote cultural sensitivity, communication skill, and health equity concerns. It can also be carried out in conjunction with other health-profession schools to foster interprofessional learning and practice.

**Experience from outside the South-East Asia Region**

A survey of medical schools in the UK in 2003 showed that among the 21 schools who responded (75%) certain core public health subjects were taught by most of the schools (Table 3.1). Epidemiology and disease prevention were the common courses while environmental health and health policy were less popular. It was found that more than half of the respondents felt that the time their medical school allocated to public health subjects was not enough.

**Table 3.1 Public health core subjects taught in UK medical schools**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>No. of schools (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiology</td>
<td>16 (100)</td>
</tr>
<tr>
<td>Disease prevention</td>
<td>16 (100)</td>
</tr>
<tr>
<td>Health promotion</td>
<td>15 (94)</td>
</tr>
<tr>
<td>Health inequalities</td>
<td>15 (94)</td>
</tr>
<tr>
<td>Critical appraisal skills</td>
<td>14 (88)</td>
</tr>
<tr>
<td>Literature searching skills</td>
<td>13 (81)</td>
</tr>
<tr>
<td>Statistics</td>
<td>13 (81)</td>
</tr>
<tr>
<td>Communicable disease control</td>
<td>13 (81)</td>
</tr>
<tr>
<td>Health economics/rationing</td>
<td>11 (69)</td>
</tr>
<tr>
<td>Medical sociology</td>
<td>11 (69)</td>
</tr>
<tr>
<td>National Health Service organization</td>
<td>11 (69)</td>
</tr>
<tr>
<td>Occupational health</td>
<td>9 (56)</td>
</tr>
<tr>
<td>Environmental health</td>
<td>9 (56)</td>
</tr>
<tr>
<td>Global public health</td>
<td>9 (56)</td>
</tr>
<tr>
<td>Health policy</td>
<td>9 (56)</td>
</tr>
</tbody>
</table>

Source: (18).
The integration of these subjects into the curriculum needs special consideration in terms of the nature of the medical curriculum, the nature of the public health subjects, the time period of the study and the teaching methods to be used. For example, undergraduate medical education courses can vary from 4 to 6 years or more. How public health subjects are integrated into the medical curriculum therefore varies across countries and across medical education patterns. Some interesting examples from various countries are provided below.

- In Canada, the University of Toronto have introduced a series of courses to integrate public health teaching vertically into undergraduate medical education. These courses form a theme called Determinants of Community Health (DOCH) which spans across all 4 years. The first 2 years offer academic teaching on community health and field experience, and independent research. The DOCH curriculum set-up is shown in Fig. 3.1; a sample list of skills obtained by each topic area in the second year of the DOCH course is given in Table 3.2 (19).

- The University of Pittsburgh School of Medicine (UPSOM) (20) has included public health in the medical curriculum through various courses such as Introduction to Medical Decision Making, Basic Science of Care, and Clinical Experiences. A horizontal approach is more prominent as all of the courses emphasize major population and public health topics throughout their didactic material. Key topics include the national policy on Healthy People 2020, determinants of care, health-care financing, public health preparedness, environmental health, effective patient education, and prevention. The UPSOM has also introduced the integrated curriculum experience, which allows closer links between the medical school, the graduate school of public health and the Pittsburgh City public health department (Figures 3.2 and 3.3). These approaches facilitate learning from real work experience with participation by experts from research (public health school) and practice (public health department). The integrated curriculum experience is highly beneficial for the students, but it can be highly resource intensive.
Table 3.2 Skills to be developed in DOCH-2

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Skills to be developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determinants of health</td>
<td>Analyse relationship between a determinant of health and a health problem \</td>
</tr>
<tr>
<td></td>
<td>Interpret social/physical/economic information in the context of the community and the sponsoring agency \</td>
</tr>
<tr>
<td></td>
<td>Identify and interpret factors as they affect the health of a population \</td>
</tr>
<tr>
<td>Epidemiological/\</td>
<td>Demonstrate the use of technology for appropriate information retrieval and analysis \</td>
</tr>
<tr>
<td>research methods/scholar</td>
<td>Evaluate the scientific literature in order to critically assess research methods and findings presented \</td>
</tr>
<tr>
<td></td>
<td>Be able to describe and apply the following: \</td>
</tr>
<tr>
<td></td>
<td>• quantitative research methods (study designs such as randomized control trial, cohort, case control, cross-sectional, surveys) \</td>
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<tr>
<td></td>
<td>• qualitative research methodology \</td>
</tr>
<tr>
<td></td>
<td>• measurement (error, reliability, distributions, measurement, terminology), measures of central tendency, validity, and measures of health and disease, odds ratios, relative risk, and attributable risk.</td>
</tr>
<tr>
<td></td>
<td>• sampling for surveys \</td>
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<tr>
<td></td>
<td>• concepts of efficacy, effectiveness and efficiency \</td>
</tr>
<tr>
<td></td>
<td>• interpret research findings for population and patients \</td>
</tr>
</tbody>
</table>

Figure 3.1 DOCH curriculum set-up
<table>
<thead>
<tr>
<th>Topic area</th>
<th>Skills to be developed</th>
</tr>
</thead>
</table>
| Community diversity| Appreciate and describe diversity as it relates to populations and individuals  
Apply principles of social justice to research concepts                                                                                                      |
| Professionalism    | Adhere to standards of professional codes and ethics (including research ethics principles)  
Recognize when to seek advice and assistance  
Recognize the complexity of various physician roles (for example, researcher, listener, advocate, healer, etc.) and the appropriate application of each |
| Multiprofessionalism| Continue to develop the capacity to work collaboratively with community agencies and other researchers  
Appreciate the concept of the health care team and be able to collaborate effectively with other professionals in research                                               |
| Communication      | Communicate effectively in written reports and oral presentations                                                                                                                                                    |

**Figure 3.2** Public health area of concentration in 4-year medical school curriculum at UPSOM
Experience from countries in the South-East Asia Region

At the Regional Consultative Meeting on Regional Training Programme on Public Health Teaching in Undergraduate Medical Education on 19–21 September 2012, participants from selected medical education institutions in the South-East Asia Region shared their current practice of public health teaching in the subjects of community medicine or preventive medicine. These practices can be summarized by institution, as follows.

**Thailand**

The Faculty of Medicine, Chulalongkorn University, Thailand, advocates and promotes public health in the undergraduate medical curriculum by having several strategies to include public health teaching in community medicine subjects. Public-health-related courses are offered across all undergraduate medical curricula from the first year to the sixth year (Figure 3.4). In addition, students are encouraged to join multidisciplinary community health camps and health education activities as extracurricular activities. The details of the courses related to public health core competencies that are offered are as follows.
The doctor and society course is offered during the first year and covers many public-health-related subjects including humanity and medicine, health behaviour, family health, health perspectives, holistic approach, health service system, roles of doctor, professional laws and community survey. It also includes literature searching skills, communication skills, team work and leadership, and scientific reasoning.

The principles of preventive medicine course covers public health topics such as prevention and control of diseases, occupational health, environmental health, health promotion, etc.

The community medicine course is a series of two courses over 2 years for fourth and fifth year medical students to learn social determinants of health and community health problem solving. The first year combines lecture and field work to enable students to acquire the skills of questionnaire design and construction for community health problem surveys and diagnosis. The second year focuses on community health problem solving through group field work in a district level community. It is also an opportunity for the students to understand local health service systems.

The epidemiology and biostatistics course covers basic epidemiological methods and biostatistics, as well as public health topics such as investigation of epidemics, surveillance, and prevention and control of communicable and noncommunicable diseases.

The cycle of life course approaches population health from each stage of life from mother and child health, school health, adolescent health, reproductive health, and ageing and health.

The medical ethics course combines group work and lectures to promote knowledge and skills in medical ethics, and professional laws and legal issues related to health and medicine.

The evidence-based medicine course promotes literature searching skills and critical appraisal skills.
The family and community medicine course covers family medicine issues, home health care, occupational medicine, health administration, etc.

The health system course offers an overview of the health system in Thailand, including health legislation, financing, service provision, hospital management, quality control and health leadership.

The oriental medicine course introduces alternative concepts of medicine compared with western medicine, which is practised in the Region. It covers topics such as acupuncture, t’ai chi, yoga, meditation, traditional massage, and aroma and herbal therapy.

At the Faculty of Medicine, Khon Kaen University, the faculty has just reorganized its community medicine teaching from running the course every year for the first five years to running it for third, fourth and fifth year students only (Fig. 3.5). Community medicine field practice is also offered as an interdepartmental learning activity. Public health teaching involves subjects such as family medicine, medical and health social sciences, occupational health and medicine, alternative medicine, health systems and policy, epidemiology and biostatistics. Students also learn about comprehensive health services at home and in the workplace, and health systems research.

Public health teaching at Chonburi medical Education Center, Thailand, is shown in Figure 3.6.

**Nepal**

The B.P. Koirala Institute of Health Sciences in Nepal offers undergraduate medical degree training in its 5-year curricular programme (Fig. 3.7). Many public-health-related courses are offered throughout the first 4 years, including community medicines, family health practice, epidemiology, biostatistics, occupational health and national health strategies. Health service administration, health management, and health economics and financing are included in the national health strategies course. The highlight of public health teaching at the school is in the fifth year when students learn from direct field experience by working for 6 months at zonal or
district hospitals. They are also required to spend 15 days in a district public health office and another 15 days in a primary health centre.

**Bangladesh**

The Faculty of Medicine, Dhaka University, has four consecutive years of community medicine courses for its undergraduate medical students (Fig. 3.8). The subjects included in these courses cover all major public health disciplines including epidemiology, biostatistics, behavioural sciences, health education, maternal and child health, immunization, demography, occupational and environmental health, and primary health care, etc. Medical students in the third and fourth years also undergo field site training, community placement and clinicosocial case study.

**Myanmar**

At the University of Medicine 1 in Myanmar, undergraduate medical students learn about public health in four main courses throughout the 6 years (Fig. 3.9). The courses include preventive and social medicine, community medicine, family medicine and medical ethics.

**Indonesia**

Public health teaching at the Faculty of Medicine, University of Indonesia, includes subjects such as epidemiology, statistics, health promotion, disease prevention and control, literature searching, and occupational and environmental health (Fig. 3.10). They are taught in all years throughout the 6-year curriculum except for the fifth year. Two modules are the responsibility of the Department of Community Medicine, namely community module 1 (6 weeks) in semester 6 and community module 2 in semester 10 (10 weeks). Community module 1 includes 1 week of field practice at a public health centre, with a requirement to do a case study, programme evaluation and community diagnosis. Community medicine module 2 covers holistic and comprehensive care. Topics such as epidemiology, health promotion, and five levels of prevention and evidence-based medicine are included in all modules.
India

In India, community medicine departments are responsible for public health teaching, which is organized in between clinical rotations in small groups in the community. The community medicine rotation happens in the first to third years followed by an internship. Community health problem diagnosis, family health appraisal and social determinants are topics taught during these years. The students also experience routine health care systems and national health programmes during these periods. In the internship year, the students spend 2 months working under supervision at a primary health centre.

In summary, all of the institutions represented at the Regional Consultative Meeting have already included public health teaching under community medicine or preventive medicine subjects. In fact, these subjects organized by community medicine or preventive medicine departments are the main part, if not all, of public health teaching in most of the institutions. Common areas of public health competency covered by these courses are discipline-based public health competencies such as epidemiology, biostatistics, family medicine, environmental health and health service management. Field site or community-based learning experience also happens in many places, and this could provide good opportunities for interdisciplinary core competency.
Figure 3.4 Public health subjects taught in the 6-year medical school curriculum at Chulalongkorn University, Thailand
Figure 3.5 *Public health subjects taught in Khon Kaen University, Thailand*
Figure 3.6 *Public Health Subjects Taught in Chonburi Medical Education Center, Thailand*

**4th year**
- Community medicine 1 (1 week)
  - Family medicine
  - Patient-centred holistic care
- Medicine
  - Preventive medicine. Care of HIV, diabetes mellitus, hypertension, etc.
- Paediatric
  - Vaccination
  - Breast feeding
- Obstetrics and gynaecology
  - Family planning
  - Sexually transmitted diseases

**5th year**
- Community medicine 2 (6 weeks)
  - Thai public health system in urban and rural areas
  - Community diagnosis and problem solving
  - Environmental and occupational health
  - Principles of general administration and management in medicine and public health
  - Interprofessional teamwork
- Care of chronic and terminally ill patient
  - Holistic care
- Trauma
  - System of disaster care
- Evidence-based Medicine
  - Health economy
  - Critical appraisal
  - Medical statistics, etc.

**6th year**
- General practice 1 Subject
  - Working in community hospital and primary health care centre
- Introduction to clinical clerks
  - Patient safety
  - Medical records, diagnosis-related groups
Figure 3.7: Public health subjects taught at B.P. Koirala Institute of Health Sciences, Nepal.

Source: Professor Paras K. Pokharel, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.
Figure 3.8 Public health subjects taught in Dhaka University, Bangladesh

Source: Professor Abdul Wadud Khan, Dhaka University, Bangladesh.
Figure 3.9 Public health subjects taught in University of Medicine 1, Myanmar

Source: Professor Win Myint Oo, University of Medicine 1, Myanmar.
Figure 3.10 *Public health subjects taught in University of Indonesia, Indonesia*

1st year
- Epidemiology
- Health promotion
- Literature searching skills
- Statistics
- Communication
- Cultural competence

2nd year
- Trend epidemiology
- Disease prevention
- Health promotion
- Specific protection
- Health screening
- Communicable and noncommunicable disease control
- Family medicine
- Occupational health
- Environmental health

3rd year
- Trend epidemiology
- Disease prevention
- Health promotion
- Specific protection
- Health screening
- Communicable and noncommunicable disease control
- Family medicine
- Occupational health
- Environmental health

4th year
- Family and community oriented
- Holistic approach (bio-psycho-socio-cultural approach)
- Comprehensive approach (prevention-based approach)
- Integrated approach (multidiscipline and health-care team work)
- Continuum approach (follow-up, monitoring, and good medical records)
- Critical appraisal Skills

5th year
- Family and community oriented
- Periodic approach (bio-psycho-socio-cultural approach)
- Comprehensive approach (prevention-based approach)
- Integrated approach (multidiscipline and health-care team work)
- Continuum approach (follow-up, monitoring, and good medical records)
- Critical appraisal Skills

6th year
- Family and community oriented
- Periodic approach (bio-psycho-socio-cultural approach)
- Comprehensive approach (prevention-based approach)
- Integrated approach (multidiscipline and health-care team work)
- Continuum approach (follow-up, monitoring, and good medical records)
- Critical appraisal Skills

Source: Professor Astrid Widjajati Sulistomo, University of Indonesia.
3.3 Evaluation of existing public health competency in and further integration into community medicine subjects

Though most of the medical schools in the South-East Asia Region have already included public health teaching in community medicine or preventive medicine subjects, it is, however, important for each institution to understand how these courses and subjects address all the core competencies in public health that have been agreed, as specified in Module 2.

It is likely that many of the discipline-based competencies such as epidemiology or biostatistics have been covered. However, some of the discipline-based competencies and interdisciplinary competencies such as health policy and management, social and behavioural sciences, or communication competency may not have been fully developed. Additionally, the contents and the methods of current teaching may not be adequate or appropriate to reach the level of competency desired from medical graduates for health systems.

To better understand the content and the level of competencies currently included in the training courses or subjects, it is recommended that each institution conducts an evaluation of public health content in their existing curriculum, particularly in the community medicine subjects. Many tools and methods can be used in the assessment depending on the context of each institution and the information available. Two examples are proposed here: namely a review approach and a survey approach.

- For the review approach, all course syllabi of all related courses offered by the community medicine department must be retrieved. The contents of each syllabus are then extracted to obtain information on the topics that are covered under each subject and the competency items to which they are related. This information can then be compiled and analysed to identify links, duplications and gaps in the core competency requirements. This method is easy to carry out, but it has limitations depending on the quality of the syllabi. Also, it may not be able to capture the level of competency that is addressed in those courses.
For the survey approach, all faculty members and instructors in the community medicine and related departments are requested to answer predesigned questions to obtain information about the content of their teaching and the competencies they cover. The questionnaire should be designed and the questions grouped together based on the core competency concept, in order to collect information on each competency area and the level of competency. This approach could provide more details and more accurate information beyond what is written in the syllabus documents. However, it may be more time consuming and difficult to involve all persons responsible for producing the questionnaire. One option to make it easier and more sustainable is to integrate these specific questions on type and level of competency into the faculty’s course evaluation form in the routine monitoring and assessment system.

With better understanding of the competency sets and the level of competency being covered, further integration of competency-based training or learning experience can be planned. One common challenge in the integration of additional core competency elements is the competition for student time in the curriculum. However, effective integration may not necessarily require additional class time or teaching hours, but better design of the learning experience. Integration of public health teaching into subjects other than community medicine could also be helpful and this will be discussed in the next module.

How would you improve public health teaching in community medicine or preventive medicine subjects to ensure that medical graduates obtain all public health core competencies?

**Exercise**

1. What are the courses under community medicine or preventive medicine subjects that are being taught at your institution? How are they arranged throughout the undergraduate medical curriculum?

2. What components of public health core competency are already covered by the community medicine or preventive medicine subjects? What components are missing?
Module 4: Teaching public health beyond community/preventive medicine subjects

Learning objectives

By the end of the training on this module, participants are expected to be able to:

1. identify potential contributions of biomedical and clinical teachings to improve public health competencies;
2. integrate public health concepts into clinical settings and other learning objectives;
3. evaluate the integration of public health into the curriculum beyond the community medicine subjects;
4. identify barriers and challenges in integrating public health teaching and plan strategies.

Key topics

1. Integration of public health beyond community medicine subjects
2. Extracurricular activities to increase public health skills

4.1 Integration of public health beyond community medicine subjects

Public health teaching in medical schools should not be limited to community medicine subjects. There are many other opportunities to develop and strengthen the public health competencies of medical students throughout the medical curriculum. The subjects beyond community or preventive medicine that can be included in the medical curriculum may depend on the specific public health core competencies that vary according to health system context and health needs. For example, the subjects may include: gender-based violence, injury prevention, health promotion, substance abuse, rational drug use, climate change, ethics and behavioural
change. Interdisciplinary competencies such as ethics, leadership and communications skills can also be introduced into the courses beyond community medicine. Ideally, public health topics and interdisciplinary competency should be seamlessly integrated as a learning objective of all preclinical and clinical courses offered in the medical curriculum, including clinical clerkships.

There are many opportunities to include public health competency in clinical subjects or other subjects beyond community medicine. The opportunities can be during the teaching or learning processes, as well as by integration into part of the student assessment. Some teaching and learning methods may be more conducive than others to strengthening public health competency. For example, public-health-related topics and issues could be raised during integrated clinical seminars, integrated ward rounds or outreach clinics. It is important that clinical teachers or other faculty members are aware of these opportunities and use them to improve public health core competency whenever feasible. Public health core competency could also be integrated as part of the assessment of clinical and noncommunity medicine subjects using various types of assessment methods such as integrated assessment, structured essay questions, objectively structured clinical examinations (OSCEs) and portfolios. These teaching and assessment methods are discussed further in the next module.

At Chulalongkorn University, several departments include public health topics in their teaching and learning experience.

- Department of Pediatrics. Health promotion issues are regularly integrated into the teaching of paediatric care and in the activities held by the department, such as issues about vaccination, etc. During the fourth year paediatric ward rotation, medical students are required to study social paediatrics, which covers the holistic approach to paediatric care. The study group is formed, and health promotion and prevention skills are part of the study of children patients and their families. Some medical students also have an opportunity to learn about child abuse in the sixth year, together with the paediatric residents. The department also has a family centre that offers eight medical rounds per ward, and also covers the holistic approach during the rounds.
Training Modules for Teaching of Public Health in Medical Schools in South-East Asia Region

- **Department of Obstetrics and Gynecology.** Limited public health teaching in the department covers the issue of reproductive health and prewedding counselling for married couples. Medical students learn about how to give advice on contraception and about the care of menopausal women. Public health issues related to obstetrics and gynaecology that are of significance in the country are included in the departmental meetings attended by the faculty and medical residents, but medical students are not allowed to attend.

- **Department of Medicine.** Every fourth year medical student is required to have a study portfolio for the internal medicine ward that should include the holistic approach to medical care, including how to take care of individual patients and their social environment. The faculty members provide comments on these portfolios. Additionally, for sixth year medical students, the Department offers an elective course on the holistic approach to medical care, and any student can enrol on this course. The department organizes a regular health forum/discussion every Wednesday and Saturday, mainly for medical residents but medical students are allowed to attend. Occasionally public health issues are the main topics of discussion.

- **Department of Surgery.** Disease prevention and promotion is included in the lectures on diseases but there are no specific activities on other public health aspects.

- **Department of Anesthesiology.** Genetics and genetic counselling are included in the training. Care for chronic diseases and older people before hospital discharge is an area that is taught to medical students. This increases awareness about home care and self care. Medical students learn through training patients and relatives to be able to care for themselves at home before they are discharged.

- **Department of Psychiatry.** Fourth and fifth year medical students also learn about interprofessional care during ward rounds when studying psychiatric cases with other doctors, and nurses, psychiatrists and other team members.

- **Department of Rehabilitation Medicine.** This has an elective subject on musculoskeletal pain which covers so-called office
syndrome and also low back pain. This course includes aspects of health promotion and prevention and occupational health.

- **Department of Physiology.** This actively participates in the multidepartmental course known as cycle of life, which covers content related to public health, including physical fitness, health promotion by age group and nutrition across life span.

- **Department of Pharmacology.** This provides teaching on rational drug use and pharmacoconomics to medical students.

- **Department of Laboratory Medicine.** This covers some public health issues in the introduction to clinical pathology course and includes practical laboratory issues when teaching about the point of care test.

- **Department of Pathology.** This includes public health aspects in the principle of pathology course and also covers environmental pathology, such as issues about heat stroke, etc.

- **Department of Biochemistry.** This covers public health issues when teaching about blood lipid parameters. Medical students learn about how to calculate food exchange and exercising as well as nutrigenomics.

- **Department of Microbiology and Department of Parasitology.** These cover the epidemiology of diseases when teaching about infection and infectious disease control. There is an emphasis on considering the possibilities of disease spread between patients and how to protect against it.

At the Chonburi Medical Education Center in Thailand, public health teaching is integrated into courses beyond community medicine subjects. For example, preventive medical care for HIV, diabetes and hypertension is taught in the internal medicine rotation. The paediatric clinical rotation also teaches about vaccination and breastfeeding, while family planning and prevention and care for patients with sexually transmitted diseases are taught in the obstetrics and gynaecology rotation.

Many training institutions in the South-East Asia Region incorporate field or community-based teaching as part of the medical curriculum. This horizontal integration of public health teaching into the clinical care setting allows students to develop the necessary public health competencies,
especially interdisciplinary core competencies such as cultural sensitivity, communication, leadership and management, and systems thinking, in a holistic manner. The competencies developed will also be oriented towards health problems that are common in the students’ settings.

In the UK, a survey of medical schools in 2003 found that 76% of responding medical schools had integrated public health into clinical teaching, with 19% of clinical courses having public health topics fully integrated. Common subjects that were reported to be integrated public health teaching were general practice, primary care, and occupational and child health, where public health topics were included among the learning objectives. Once integrated, the public health components were not easily identified because the teaching was based on case studies, and public health issues were included when covering clinical content.

As part of the transformation from a school of medicine to school of medicine and public health, the University of Wisconsin undertook a process of integrating the public health components into its clerkships (see Table 4.1 for examples).

The examples in Table 4.1 demonstrate that many options exist for the enhancement of public health teaching in medical schools. How much of the total curriculum time should be allocated to public health is at times a contentious issue across various disciplines and departments given the limited time available for study of a medical degree. To introduce such a change requires the active engagement of the faculty responsible for public health teaching as well as a strong commitment from medical education leaders at the top level of the institution. A consensus needs to be developed by all academics and staff to facilitate smooth adoption of such an improvement. The Medical Council of Thailand recently revised their medical graduate certification examination to include public health competencies such as health promotion as part of their evaluation. This inevitably encourages all medical schools in the country to reconsider their undergraduate curriculum to ensure that the public health core competency is covered.
Table 4.1 Examples of public health topics that have been integrated into clinical clerkship

<table>
<thead>
<tr>
<th>Clerkship</th>
<th>Short-term goals</th>
<th>Long-term goals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Didactic</td>
<td>Experimental</td>
</tr>
<tr>
<td>Anaesthetics</td>
<td>Writing assignment addressing perioperative tobacco use</td>
<td>Address smoking cessation in preoperative assessment</td>
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<tr>
<td></td>
<td></td>
<td>Add focus on patient safety</td>
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<tr>
<td>Obstetrics and gynaecology</td>
<td>Add discussion of community resources to orientation</td>
<td>Add training in preventive service guidelines to outpatient gynaecology visits</td>
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<tr>
<td></td>
<td></td>
<td>Add focus on nutrition</td>
</tr>
<tr>
<td>Primary care</td>
<td>Add obesity as a learning topic</td>
<td>Add assessment of BMI and BMI percentile to office visits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transformation of community project to include ongoing partnerships</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>Add elements of access to care to topic discussion</td>
<td>Attend Alcoholics Anonymous meetings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Add focus on substance use and mental health access</td>
</tr>
</tbody>
</table>

Source: (21).

4.2 Extracurricular activities to increase public health skills

At present many medical schools collaborate closely with district health systems in order to provide students and the faculty with exposure to public health practices. The concept of learning has already started to transform from “know all” to “know how”, with an emphasis on active learning rather than passive acquisition of knowledge of information, without context. Students also have more opportunities to engage in extracurricular activities that will enable them to enrich their public health competency.

Considering Chulalongkorn University, public-health-related teaching has already been incorporated into the curriculum in courses led by the Department of Preventive and Social Medicine and courses offered by other departments. However, in this learning process the university ensures that there are more opportunities to perform extracurricular activities, which are very important to get a holistic viewpoint on the health situation in a community. Some extracurricular activities include the following.
“To be physician” camp. This activity is organized by medical students for high school students to introduce them to the nature of medical practice and provide career guidance. To involve themselves in such an activity, the medical students need to obtain a comprehensive understanding of the profession, including the ethics and norms related to the profession.

Chulalongkorn community health camp. This is a multischool extracurricular activity where undergraduate students from medical school join force with other students from dental school, nursing school, pharmacy school and others to visit a rural community and provide health and medical services with a health-care professional team. The experience allows the medical students to better understand community health problems and to work with other health professionals.

**Exercise**

1. In your institution, are there any courses outside community medicine or preventive medicine subjects that include public health teaching? If yes, describe how public health competency can be developed through those courses.

2. How would you improve public health teaching beyond community medicine subjects?

3. Are there extracurricular activities for your medical students that promote public health competency? If not, what activities can you initiate or organize?
Module 5: Teaching and assessment methods

Learning objectives

By the end of the training on this module, participants are expected to be able to:

(1) understand the potential use of various settings for public health teaching;

(2) choose appropriate tools and methods for teaching and assessment based on public health competency.

Key topics

(1) Teaching and learning methods for public health competency development

(2) Assessment methods for public health competency development or teaching

Contents

In order to ensure that medical graduates have the necessary knowledge, skills and attitudes of the public health core competencies, the teaching/learning and assessment methods need to be suitable to the teaching and learning experience in public health. The tools and methods can be similar or different depending on the nature of the public health content. The challenge is to find appropriate methods to motivate students to be interested in public health so that they are able to learn and develop their public health competencies effectively.

5.1 Teaching and learning methods for public health competency development

The conventional teaching/learning method that is still used in many countries in the Region usually involves one-way communication in a large lecture group, with the teacher at the centre of the learning experience. Students learn by listening and memorizing what they note down from the class or from the lecture handouts or textbooks. The process is more passive than active and the opportunity to develop skills and attitudes in problem solving is very limited. The quality of learning is therefore very low.
It is agreed that “public health education should be an active process, student centred, inquiry driven, evidence based and problem solving as well as addressing the needs of the community” (5). Teaching public health therefore requires more active and innovative teaching and learning methods beyond the conventional lecture-style teaching. In order to provide the best outcome for the students, the teachers need to be effective facilitators and dedicate their time for students to learn, receive feedback and reflect on the application of public health in their future role as a medical doctor and a leader of public health professions.

Conventional lectures have been a key instrument for medical school teaching/learning for a long time in many South-East Asia countries (5). However, large or small group learning and problem-based or research-based learning have been gaining popularity in a number of schools, for example in Sri Lanka and Myanmar. Field study and field visits are now incorporated into learning in almost all countries including Bangladesh, India, Myanmar, Nepal, Sri Lanka and Thailand. The length of field training and learning by experience and the year of curriculum in which field training occurs vary across institutions (5). Below are some theoretical views and evidence of the pitfalls of some teaching and learning methods that can be useful for public health teaching and learning in undergraduate medical schools.

**Alternative lecture-oriented methods**

Even though there are several other methods for public health teaching, classroom teaching is still needed occasionally for some learning objectives. However, classroom lectures do not have to necessarily follow a traditional model of teacher- or tutor-centred one-way communication approach.

A flipped-classroom model is an alternative lecture-oriented method proposed recently to match the changing context in the information world (22). In such a model, the students absorb an instructor’s lecture that is made available prior to the class time in a digital format (for example, slide presentation on SlideShare or video on YouTube) as homework. Class time is then freed up so that the teacher and students can focus on applications, including emotion-provoking stimulation exercises and discussion. It has been suggested that using a flipped-classroom model can allow students to learn in a much better way than conventional learning methods. Students would welcome more opportunities for case-based, problem-based and term-based exercise strategies that would activate prior knowledge.
Recent rapid development in the digital media world makes it easier to create videos or interesting animations. It also allows more flexibility for students in their learning schedule, in a much more convenient manner. The challenge is to produce content that is interesting and intellectually stimulating and will bring students to engage in further discussion.

For example, at the Stanford Medical School, the flipped-classroom model has been implemented (22). Rather than a standard lecture-based format, the instructor provides a short online presentation. Class time is then used for interactive discussions of clinical matters on the topic being presented. One immediate outcome has been the rise in class attendance from 30% to 80% even though it is an optional class.

Several activities can be introduced during class time to stimulate an interactive learning experience. For example, students can be asked to prepare to come to class and participate in a debate on a topic related to public health competency that is hot in the news media. The students will have an opportunity to review what they have learned and try to apply the relevant competencies to address the problems or issues in the chosen topic. A topic that is controversial or does not have a clear technical solution could also be used to stimulate critical thinking and communication skills. Role play is another possible teaching method that can be used in the class. It can be useful in building skills necessary for public health practices, including communication skills.

**Case-based and problem-based teaching and team learning**

Another teaching approach that has been well-known over the past few decades is problem-based teaching. It involves presentation of a clinical or public health case with subsequent elucidation of learning needs by the student group so that the solutions to the problems can be reached. The problem-based learning (PBL) model can be ideally integrated into a complete curriculum, allowing for self-directed learning by the student (23). Moreover, the clinical case data can be derived from recent local clinical and public health events in the community to provide a closer link between health needs and education experience. Public health teaching can also be undertaken during clinical ward rounds when clinical problems can be linked to underlying public health and social determinant issues.
The benefit of case-based or problem-based teaching and learning is from its basis of using actual clinical or public scenarios that involve real patient and population data. It helps students to develop their skills in the management and processing of case information for problem solving based on a constructivist approach. It also better reflects the future clinical and public health practices that they will face and provides a more enjoyable learning experience (24, 25). Moreover, case-based or problem-based teaching and learning can use the presence of role playing, which will benefit from a facilitator who is an expert in that particular topic. However, there are also disadvantages of using problem-based teaching, especially if the teachers or facilitators are not capable or do not understand the concepts behind its use (Table 5.1). This can be overcome through an effective faculty development programme and adequate support from the education management team. Nevertheless, problem-based teaching generally consumes more resources both in term of staff time and other learning materials and they should be supported accordingly.

**Table 5.1 Advantages and disadvantages of problem-based learning**

<table>
<thead>
<tr>
<th>Advantages of PBL</th>
<th>Disadvantages of PBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Student centred PBL: fosters active learning, improved understanding, and retention and development of lifelong learning skills</td>
<td>• Tutors who can’t teach PBL: tutors enjoy passing on their own knowledge and understanding so may find PBL facilitation difficult and frustrating</td>
</tr>
<tr>
<td>• Generic competencies: PBL allows students to develop generic skills and attitudes desirable in their future practice</td>
<td>• Human resources: more staff have to take part in the tutoring process</td>
</tr>
<tr>
<td>• Integration: PBL facilitates an integrated core curriculum</td>
<td>• Other resources: large numbers of students need access to the same library and computer resources simultaneously</td>
</tr>
<tr>
<td>• Motivation: PBL is fun for students and tutors, and the process requires all students to be engaged in the learning process</td>
<td>• Role models: students may be deprived access to a particular inspirational teacher who in a traditional curriculum would deliver lectures to a large group</td>
</tr>
<tr>
<td>• Deep learning: PBL fosters so-called deep learning (students interact with learning materials, relate concepts to everyday activities and improve their understanding)</td>
<td>• Information overload: students may be unsure how much self-directed study to do and what information is relevant and useful</td>
</tr>
<tr>
<td>• Constructivist approach: students activate prior knowledge and build on existing conceptual knowledge frameworks</td>
<td></td>
</tr>
</tbody>
</table>

Source: (26).
Case-based or problem-based teaching can also be done as group work or team learning. Like problem-based teaching, team learning “emphasizes the application of knowledge to address real world problems in autonomous teams”. The problems are assigned in advance and the students are required to be prepared before coming to the class. They contribute to the class learning experience through their sharing of knowledge and their discussion of solutions to the given problems, first within a group and then as a group. Team learning facilitates improvement in interdisciplinary competency such as critical thinking, communications, leadership, etc.

**Practice-based teaching**

Practice-based teaching is an “interdisciplinary, multidisciplinary and multi-dimensional approach to teaching style” (27). It provides “a meaningful way in which students can learn which imitates actual public health practice” (27). Considering the challenges of having multiple learning approaches has become more common in public health teaching. Many public-health-related courses, especially those in the community medicine subjects, use practice-based teaching as part of the curriculum to enrich the students’ knowledge and skills for public health practice. Public health teaching can also be integrated into students’ experience at clinical outreach clinics where public- and community-health-related factors can be analysed while addressing patients’ clinical issues.

Practice-based teaching/learning enhances the development and employment of critical thinking and problem-solving skills to enable students to make sound judgements that adapt public health services for a diverse population. Practice-based teaching has been shown to be useful in public health teaching as it provides a learning environment that is conducive for the acquisition of public-health-related skills, such as community health diagnosis or investigation of epidemics. It is particularly useful for acquiring public health management skills such as planning, implementation, monitoring and supervision, management of data, and problem solving and communication skills (27). The teaching and acquisition of critical thinking and analytical skills will go far beyond the memorization of information related to a topic.
**Field practice**

The public health teaching and learning experience should also involve learning from a community or field practice area. Each medical school should foster close links with an area that has a community health centre or subdivisional hospital and primary health centres, so that their students have a field site for practice (27). It will provide an opportunity to train the students in all aspects of the operation of the health services, ranging from administrative management to independently providing primary health-care services, as well as community health work.

Most medical schools in Thailand require their undergraduate medical students to undertake a few weeks of field work in a small group in rural health facilities. At Chulalongkorn University, every fifth year medical student will spend 2–3 weeks in a district hospital with 10–15 classmates. They observe provision of health-care service as well as hospital management. The student group is also required to conduct community health diagnosis and health improvement in one subdistrict area. Students learn how to identify community health problems, how to set priorities, how to engage stakeholders, and develop their leadership and communication skills. Teachers are able to teach the medical students about different public health aspects, such as immunization procedures, diagnosis and prevention of common health conditions, etc.

In summary, various teaching and learning methods exist and they can be useful tools for the teachers and educators to use innovatively. In the B.P. Koirala Institute of Health Sciences, several innovative methods have been employed to facilitate the teaching and learning experience (Box 5.1). The teaching and learning methods should be oriented towards a student-centred/active learning style. The contents should be contextual, outcome based and evidence based in order to promote the competency of the learners. For public health competency, it seems that problem-based or team learning with field practice experience is a very attractive learning mode as it can promote competency development that includes both discipline-based and interdisciplinary competency.
Box 5.1 Innovative tools and methods for public health teaching at the B.P. Koirala Institute of Health Sciences

By Professor Paras Pokhrel

Community diagnosis programme

The community diagnosis programme is a residential programme of 2 weeks for MBBS, BDS and BSc Nursing students in a rural community of Nepal during the initial months after joining the institute. This programme has been kept early in the first year of the undergraduate course in order to provide early exposure to the community, a better understanding to the student about health problems and the impact of socioeconomic status and culture on health, and to familiarize the student with a team approach, which is vital in medical learning. This is an example of multiprofessional education that is now recognized as the cornerstone of community-based education programmes. Interaction between health professions during the formative years is more likely to encourage students to develop a team spirit and appreciate the role of each other. The major objectives fulfilled by students during this posting are interaction with village leaders, description of the demographic and social structure of the community, calculation of basic demographic indicators, understanding the customs and belief with reference to health and disease including oral health, organizing focus group discussion on relevant topics, imparting health education and conducting free health camps, and collection, analysis and interpretation of data with final presentation. This programme provides the students with a comprehensive picture of the health problems, and socioeconomic and environmental factors and health needs of the community they will be serving in the near future.

Family health exercise

Family health exercise is a learning approach for the MBBS students during their third year undergraduate training programme. The objective of this programme is to enable the students to understand that family is a basic unit of health care in the community. This exercise helps them obtain valuable practical experience in health promotion, specific protection, early diagnosis, treatment, disability limitation and rehabilitation. During this period, students learn to appreciate how socioeconomic, psychological, cultural and environmental factors influence health and disease in a family; recognize the effects of illness on an individual, on other members of the family and community; demonstrate effective communication, clinical diagnosis, diet survey and health education; and identify available family/community resources and utilize them to solve community health problems.

In this programme, each student is assigned a family to whom he or she will be a friend and a health advisor during the entire period of the posting. They are taken to the family fortnightly for 6 months. Students maintain a missionary spirit and a humane approach but do not involve themselves in conflict within the family. They obtain information from their families, keeping it confidential, and they focus on family welfare.
A drawback of the current schedule of this programme is that the student completely loses contact with his/her family after the 6-month period of the posting. Thus, the student who has been playing the role of a family doctor loses track of the recent developments in the family allotted to him/her for the rest of the undergraduate years, although it is expected that the student maintain personal contact, which is rarely feasible. A potential improvement to solve this issue would be to incorporate family visits in the remaining years of the curriculum, for shorter durations. In this way, the student will be in touch with the family until the time of graduation and prove to be of further help thereafter.

**Epidemiological skills for health management (EPID-MAN)**

This is a 2-week residential field-based posting for MBBS sixth semester students where the entire batch is divided into different groups and they plan and conduct a community-based study on a topic of public health importance in the eastern developmental region of Nepal. During this posting the students appreciate the importance of designing scientific studies, understand the methodology of different epidemiological study designs, develop the practical skill to plan, conduct and report a community-based epidemiological study, and acquire the skill to work as a team in the field. The students receive theoretical training in various epidemiological study designs and development of protocols and questionnaires; and get actively involved in data collection, analysis, interpretation and presentation. Students are supervised by the faculties and postgraduate residents. This posting has proved to be an important aspect in the public health teaching of undergraduates, as research skills are developed early and students get the opportunity to present the papers in conferences and even publish them in scientific journals.

**Management skills for health services (HEALTH-MAN)**

It is important to be familiar with the managerial skills in health-care delivery services, as the students are destined to be a part of the health-care delivery system of the country. This is a residential posting of 2-week duration for MBBS eighth semester students where they become familiar with the activities at all levels of the health-care system in Nepal. The students learn the mechanism of monitoring and supervision, understand the Health Management Information System (HMIS) and closely observe all activities of zonal hospital and district public health systems. Students, divided in groups, observe the medical records, laboratory services, district public health office, regional medical store and community drug programme, and primary-health-care outreach clinics and become familiar with the various public health programmes conducted in the district. Students also visit the primary-health-care centre, health posts and subhealth posts that are the pillars of health-care delivery service in Nepal.

### 5.2 Assessment methods for public health teaching

The use of assessment is not limited to the measurement of the performance of previous learning experience (summative assessment). It can also play an important role in helping the learners improve further by
identifying existing weaknesses and areas that can be improved (formative assessment). A good assessment system should be competency based, such that the evaluation focuses on the level of competency being achieved. Having an effective competency-based assessment system is necessary to improve public health teaching in medical education.

A popular and conventional assessment method is the use of written examination. Assessment can be done using an open-ended approach, for example, short answer questions (SAQs), modified essay questions (MEQs), or closed-ended, for example, multiple choice questions (MCQs). Written exams are a popular assessment method because they are easier to grade. However, it is difficult to measure the level of competency especially in the areas of public health competencies that include more than knowledge (that is, skills and attitudes). In the South-East Asia Region, undergraduate medical education generally relies on written and oral examinations as the common form of assessment, such as in Myanmar, Thailand, India and Bangladesh (5). Bangladesh also uses objectively structured practical examination (OSPE), structured oral examination and written tools for assessment (5). In India, the PSG Institute of Medical Sciences and Research\(^2\) employs self-assessment by students as a method for programme evaluation and further training needs assessment. It assesses students’ improvement in 18–20 subcompetencies based on a modified Dreyfus scale.

Several other assessment methods have been used in medical education assessment and can be applied to public health teaching (28). These include assessments by supervising clinicians, direct observation or video review, clinical simulations, multisource (360 degree) assessments and portfolios. There are strengths and weaknesses in each of these methods. Therefore, multiple methods may be preferable and assessments should be organized to balance complex assessments with simplified focus assessments. Some key principles of assessment in medical education have been proposed by Epstein, as shown in a Table 5.2 (28).

\(^2\)Excerpt from Professor Thomas Chacko, Head, Community Medicine and Medical Education, PSG Institute of Medical Sciences and Research, India.
Table 5.2 Principles of assessment in medical education

<table>
<thead>
<tr>
<th>Goals of assessment</th>
<th>Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide direction and motivation for future learning, including knowledge, skills and professionalism</td>
<td></td>
</tr>
<tr>
<td>• Protect the public by upholding high professional standards and screening out trainees and physicians who are incompetent</td>
<td></td>
</tr>
<tr>
<td>• Meet public expectations of self-regulation</td>
<td></td>
</tr>
<tr>
<td>• Choose among applicants for advanced training</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What to assess</th>
<th>Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Habits of mind and behaviour</td>
<td></td>
</tr>
<tr>
<td>• Acquisition and application of knowledge and skills</td>
<td></td>
</tr>
<tr>
<td>• Communication</td>
<td></td>
</tr>
<tr>
<td>• Professionalism</td>
<td></td>
</tr>
<tr>
<td>• Clinical reasoning and judgement in uncertain situations</td>
<td></td>
</tr>
<tr>
<td>• Teamwork</td>
<td></td>
</tr>
<tr>
<td>• Practice-based learning and improvement</td>
<td></td>
</tr>
<tr>
<td>• Systems-based practice</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How to assess</th>
<th>Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use multiple methods and a variety of environments and contexts to capture different aspects of performance</td>
<td></td>
</tr>
<tr>
<td>• Organize assessments into repeated, ongoing, contextual and developmental programmes</td>
<td></td>
</tr>
<tr>
<td>• Balance the use of complex, ambiguous real-life situations requiring reasoning and judgement with structured, simplified and focused assessments of knowledge, skills and behaviour</td>
<td></td>
</tr>
<tr>
<td>• Include directly observed behaviour</td>
<td></td>
</tr>
<tr>
<td>• Use experts to test expert judgement</td>
<td></td>
</tr>
<tr>
<td>• Use pass–fail standards that reflect appropriate developmental levels</td>
<td></td>
</tr>
<tr>
<td>• Provide timely feedback and mentoring</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cautions</th>
<th>Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Be aware of the unintended effects of testing</td>
<td></td>
</tr>
<tr>
<td>• Avoid punishing expert physicians who use shortcuts</td>
<td></td>
</tr>
<tr>
<td>• Do not assume that quantitative data are more reliable, valid, or useful than qualitative data</td>
<td></td>
</tr>
</tbody>
</table>

Source: (28).
For the assessment of public health core competencies, several methods have been used. For example, in the UK it was found that most medical schools employ multiple methods for assessments including written examinations (MCQs, MEQs, SAQs and essays), project work, presentation and OSCEs (Table 5.3). These assessments happen mostly at the end of a module or a term.

**Table 5.3 Methods used for assessing public health education in UK medical schools**

<table>
<thead>
<tr>
<th>Method of assessment</th>
<th>No. of schools (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple choice questions</td>
<td>13 (68)</td>
</tr>
<tr>
<td>Objectively structured clinical examinations</td>
<td>9 (47)</td>
</tr>
<tr>
<td>Short answer questions</td>
<td>13 (68)</td>
</tr>
<tr>
<td>Modified essay questions</td>
<td>6 (32)</td>
</tr>
<tr>
<td>Essays</td>
<td>11 (58)</td>
</tr>
<tr>
<td>Project work</td>
<td>13 (68)</td>
</tr>
<tr>
<td>Presentation</td>
<td>13 (68)</td>
</tr>
</tbody>
</table>

Source: (18).

Portfolio is one useful tool for learning assessment that can be applied for both formative and summative evaluation. Portfolio is a collection of material that records key events and process of a student’s work and his or her reflections on them (29). Self-reflection is a key component as it will facilitate systematic thinking and critical analyses of the work that has been done. Portfolio is useful for public health teaching because it can capture multiple dimensions of public health competency better than other types of examination.

In South-East Asia, the PSG Institute of Medical Sciences and Research in India uses student’s log-book and portfolio for routine formative assessment of a student’s posting experience. The Institute also organizes viva voce examination as a summative evaluation approach using the student’s log-book/portfolio as the main input of the exam. This exam

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3Excerpt from Professor Thomas Chacko, Head, Community Medicine and Medical Education, PSG Institute of Medical Sciences and Research, India.
happens at the end of each posting to assess what the students have learned and recorded.

Other methods of assessment also exist, such as problem-solving exercise, OSPE, epidemiological and field training exercises, records review, checklist, peer evaluation, group research project reports and structured oral examination. The principles mentioned in Table 5.2 should be able to modify to public health competency assessment to improve public health teaching and learning in medical schools.

One interesting event related to public health competency assessment is the national Olympiad on managerial reasoning and decision-making, held in Iran (30). It was organized at Isfahan University of Medical Sciences in 2009. Over 100 medical sciences students from all over the country participated in individual and team competitions in three areas of competency: clinical reasoning, scientific thinking and health system management. The event was held over 2 days with four components of assessment, as described in Table 5.4. It was found that over 80% of participants had not learned the skills to address these tests but the majority believed these skills would be useful for their professional life. This national Olympiad in Iran provides a good example of multiple methods that can be used to assess interdisciplinary skills related to public health competency in undergraduate medical education. The national competition format can also be an approach to stimulate medical students to be more interested in public health competency and to increase the profile of public health in medical education in various institutions.

In addition to the evaluation of the core competency, the public health teaching programme can also benefit from teaching assessments. Several methods exist and can be employed for formative and summative evaluation of the curriculum and teaching quality. A list of methods used in the UK is presented in Table 5.5. Student evaluation forms are the most common assessment method because of their ease of application. Peer review and teaching session observation are less common but they can be very useful for continuing improvement. The next module provides further discussion on various aspects of faculty development to improve public health teaching and learning in medical schools.
**Table 5.4** Individual exams at the national Olympiad on managerial reasoning and decision-making

<table>
<thead>
<tr>
<th>Time of exam</th>
<th>Area of assessment</th>
<th>Exam type</th>
</tr>
</thead>
<tbody>
<tr>
<td>First day, morning</td>
<td>Managerial deduction</td>
<td>Written exam to discuss findings of a study when 16 other related abstracts are provided</td>
</tr>
<tr>
<td>First day, afternoon</td>
<td>Reasoning and problem solving</td>
<td>40 multiple choice questions on managerial reasoning problems, script concordance, extended matching and key features tests</td>
</tr>
<tr>
<td>Second day, morning</td>
<td>Decision-making capabilities from different viewpoints</td>
<td>Written exam to discuss challenges and provide suggestions on a topic after watching a video and reading a paper and an abstract on that topic. Answers must be given for each of the following four viewpoints: (1) health equity activist, (2) pharmaceutical industry representative, (3) biomedical researcher, and (4) minister of health</td>
</tr>
<tr>
<td>Second day, afternoon</td>
<td>Decision-making capabilities under multiple feasible alternatives</td>
<td>Short answer to questions with multiple parts and multiple options in each part, similar to the patient management problem tests. The situation in the later parts depends on the answers given in the prior parts</td>
</tr>
</tbody>
</table>

Source: (30).

**Table 5.5** Methods of assessing quality of public health teaching in UK medical schools

<table>
<thead>
<tr>
<th>Method of assessment</th>
<th>No. of schools (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student evaluation forms</td>
<td>19 (95)</td>
</tr>
<tr>
<td>Discussion with students</td>
<td>17 (85)</td>
</tr>
<tr>
<td>Analysis of examination results</td>
<td>15 (75)</td>
</tr>
<tr>
<td>Peer review</td>
<td>10 (50)</td>
</tr>
<tr>
<td>Third-party observation in teaching sessions</td>
<td>8 (40)</td>
</tr>
</tbody>
</table>
Exercise

(1) Describe the most common teaching methods used in your institution: (a) for clinical teaching, (b) for public health teaching.

(2) Discuss at least two alternative teaching methods that can be employed to facilitate the teaching and learning experience to improve public health competency in your institution.

(3) What methods could be used to assess public health competency of undergraduate medical students in your institution? What is your most preferred method? Why?
Module 6: Faculty development

Learning objectives
By the end of the training on this module, participants are expected to be able to:

1. explain the importance of faculty development in relation to public health competency in undergraduate medical education;
2. describe general principles and potential strategies for faculty development to improve competency-based public health teaching in medical education;
3. assess and evaluate the progress of faculty development with the help of health experts and other educators.

Key topics
1. Development of public health teaching skills and attitude among the medical school faculty
2. Faculty development experience from the South-East Asia Region to improve public health teaching in medical schools
3. Involving public health specialists in public health teaching and learning

Contents
Faculty development, or staff development as it is often called, is an integral part of academic development that may not receive adequate support in medical education institutions. In order to cope with the development in teaching and learning and the changing context and goals of medical education, it is important for the faculty to be aware of the desired competency of medical graduates, and the latest development in teaching and learning concepts and practices, and newly available pedagogical tools and techniques. Many activities can be introduced in order to make the faculty develop the skills and be more effective in their communication, teaching and mentoring.
Getting the medical faculty to be more receptive to public health teaching is also important because faculty members are role models for the students. They can exert direct and indirect influence on the students’ perception of public health in medicine. With our interest in integrating public health teaching into various aspects of medical education, the medical faculty should be aware of such opportunities and be able to contribute to public health competency development among medical graduates.

In addition to developing the skills of existing medical school staff in public health competency and teaching, faculty development can also involve additional resources from outside the medical institutions. Involving public health specialists in public health teaching and learning is one strategy to improve links between academic programmes and professional practice in health systems.

This module suggests some principles to help develop the medical faculty, with a particular focus on possible tools to help improve the teaching skills in public health. Examples of faculty development in public health teaching and learning in selected countries of the WHO South-East Asia Region are provided. The module also proposes faculty development through active involvement of practising public health experts in some parts of the public health curriculum.

6.1 Development of public health teaching skills and attitude among the medical school faculty

Faculty development is an important function of any education system. The capacity of the instructors is an important determinant of the success of educational effort. The support of faculty members is also necessary for any successful educational reform for effective teaching and learning. Faculty development may have different meanings to different people. It can be defined as “the broad range of activities that institutions use to renew or assist faculty in their roles” (31) or “planned program to prepare institutions and faculty members for their academic roles including teaching, research, administration, writing/scholarship, and career management” (32) Faculty development is not limited to individual instructors but includes organizational level policies and interventions to help improve academic activities in the institution.
The Association of American Medical Colleges recommends that faculty development includes four key components: professional development, instructional development, leadership development and organizational development. Faculty members should be aware of their academic responsibilities and the promotion process for professional development. They must have competency for effective teaching with adequate knowledge of modern learning theories and skills in the application of instructional tools. They are also expected to have leadership skills in order to lead the change in curriculum development and scholarly programme evaluation. The faculty development programme should also include organizational development efforts to develop policies and systems to encourage and reward good teaching and mentoring. In this module, we focus on the instructional development component, but the other components of faculty development are also important.

The medical school faculty is the primary target for the faculty development programme. The programme should facilitate lifelong learning skills and promote the mastery of learner-centred teaching. Many studies have suggested that the need for medical faculty development requires improvements in areas of teaching skills and self-awareness. Integrating the elements of skill mastery, personal awareness and relationship formation will help the faculty to feel more connected within the medical schools and become more student centred; this can provide a role model for the students to use these elements with patients and the community in the future.

In order make a proper faculty development programme it is useful to start by performing a review on teaching progress and need for staff development. Likewise, it is also necessary that faculty members get the opportunity to voice their ideas and expectations before the process begins. This can be done through a survey or an assessment of training needs before the start of the programme, with a particular focus on public health competency. The faculty development programme should then be shaped by faculty needs and should match faculty teaching experience (33). Based on adult learning theory (see Box 6.1), the faculty development programme will be more successful if learners are involved from the start and then engaged in every step of the development plan.
Box 6.1 Adult learning theory

One of the frequently cited theories about successful learning and development is Malcolm Knowles’s adult learning theory. Knowles proposed seven key principles towards the success of learning, as summarized in (34):

- establish an effective learning climate, where learners feel safe and comfortable expressing themselves;
- involve learners in mutual planning of relevant methods and curricular content;
- involve learners in diagnosing their own needs – this will help to trigger internal motivation;
- encourage learners to formulate their own learning objectives – this gives them more control of their learning;
- encourage learners to identify resources and devise strategies for using the resources to achieve their objectives;
- support learners in carrying out their learning plans;
- involve learners in evaluating their own learning – this can develop their skills of critical reflection.

The programme should emphasize the importance of continuous faculty development particularly for instructional development and teaching skills (35). Skills on assessment are also important. Public health teaching and learning requires knowledge and skills that are relevant to the changing health systems and contexts. Instructional tools and methods are also changing quickly, with new and innovative methods regularly available for teaching improvement. The faculty skill development process should therefore be lifelong and continuous. This should be taken into account during the design of the faculty development programme.

Target groups for faculty development activities can range from established faculty members to new staff and teaching assistants. Faculty development should include all these groups and be designed to match their needs, as described above. However, the faculty should not be limited to staff in community medicine or preventive medicine departments. Public health teaching should be the interest of all departments, so training to improve public health teaching should form a part of overall faculty
development for all medical faculties. For the noncommunity medicine staff, the initial focus can be on building a positive attitude towards public health teaching, as this may currently be viewed by some clinicians as an extra burden on their current task overload.

Below are some suggestions on the design of a faculty development programme for public health competency based on recent reviews of a number of key characteristics of effective development of a faculty programme (36, 37).

- Focus on overall goals to build public health and instructional competency of faculty members that is relevant to public health teaching and learning for undergraduate medical students.

- Include the general principle of teaching and learning, the application of useful instructional tools or techniques, teaching assessment, and the importance of public health in medical education.

- Early involvement and active engagement of faculty members in the design and the evaluation of the faculty development programme is necessary.

- Faculty development in public health teaching and learning should be provided for new staff during the staff induction or orientation programme. It should also be available for all existing teaching staff.

- The faculty development programme should contain diverse training experiences, with experiential learning as a primary approach. Examples of experiential learning include case-based problem solving, teaching practice, role play, etc.

- Allow flexible periods for programme that match the faculty schedule.

- Provide adequate and regular feedback to programme participants.

- Facilitate interactions among programme participants and use their activities to model teaching behaviours.
➢ Provide the opportunity to apply skills and technologies that were adopted or developed during the programme or in the actual teaching classes soon after the programme ends.

➢ Provide access to additional resources that will help in continuing professional development, including online and facility-based resources for instructional development, and other innovative tools for educational improvement; for example, an online course management system, social networking tools, etc.

Staff development can take several approaches and could be different for different types of faculty (new, mid-career, senior faculty members or teaching assistants). It could be a continuous process that expands over several years (37). An example of a faculty development 5-year plan has been proposed by Diaz et al. (37) (Table 6.1).

**Table 6.1 Faculty development 5-year plan**

<table>
<thead>
<tr>
<th>Year</th>
<th>Target audience</th>
<th>Services and/or areas of support offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Graduate students, teaching assistants</td>
<td>Basic instructional strategies and methodologies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduction to learning technologies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teaching course or certificate to complement graduate degree</td>
</tr>
<tr>
<td>1</td>
<td>New faculty members</td>
<td>Mentoring with senior faculty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exposure to institutional policies, culture and expectations</td>
</tr>
<tr>
<td>2–5</td>
<td>Established faculty members</td>
<td>Institutional orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ongoing support for new instructional delivery models, technologies and pedagogies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advanced course management system support</td>
</tr>
</tbody>
</table>

The faculty development programme can provide a combination or a mix of activities, including faculty mentorship, co-teaching and collaborative teaching, specific training workshops, or online and technology-facilitated self-development courses. One-on-one counselling and coaching techniques could be used to motivate the participants (38) beyond the mentoring process. Reverse mentoring is an interesting programme for collaborative work between new and senior members, when more technologically proficient staff members assist senior faculty members with new educational technology and tools while developing teaching and other professional skills.
6.2 Special examples of the faculty development programme

Most faculty development programmes are designed to include several components to improve the staff competency. They may not be specifically designed for public health competency training, but the importance of public health competence and some specific tools and methods can be integrated into the programme. This section provides some examples of faculty development programmes and specific public-health-related faculty development experiences from a country in the South-East Asia Region.

Johns Hopkins Faculty Development Program for clinician educators

The Johns Hopkins Faculty Development Program for clinician educators is an example of an interesting medical faculty development programme for effective faculty improvement. Although it is not specific to public health teaching skills, its general approach can be useful for other universities to follow. The primary focus of the programme is on teaching skills and curriculum development (39). In such programmes participants are directed towards: (1) facilitating self-directed learning and self-discovery; and (2) creating a collaborative, supportive, yet challenging, learning environment. The participants can be directed through the following steps of specific learning objectives:

- adult learning concepts
- time management
- feedback provision and elicitation
- communication skills
- perception in clinical settings
- leadership and management of work teams.

Specific training activities to improve the learning objectives may vary. Through the process of reflection and self-disclosure with facilitation by staff development experts, staff can improve their capacity by using the concepts of new learning and applying them slowly in the system of teaching. This can allow them to understand the progress of the teaching and the modifications that can be made for the students to feel more encouraged to attend the classes. The skills and techniques of teaching team members can also be improved through peer-supported activities. For example, co-
teaching a class can be a quick approach to strengthen the skills of the participating teaching faculty (see Box 6.2). A collaborative teaching approach (Box 6.3) is also another interesting model of faculty development.

**Box 6.2 Co-teaching**

Co-teaching could be a promising approach towards the faculty development process. It can be exemplified in the following ways. There are basically four different co-teaching methods to enhance the student learning process, to make it more in-depth and thorough.

**Supportive teaching**

One teacher has the primary responsibility for leading the instruction while the other team member supports the instruction by adding questions, clarifying information, prompting students, etc.

**Station teaching**

The co-teachers divide the instructional content and each takes responsibility for planning and teaching part of it. Students move from station to station according to a predetermined schedule.

**Parallel teaching**

In this type of co-teaching, the teachers jointly plan the instruction, but each delivers it to a heterogeneous group comprising half of the students in the class. Teachers do not change groups. All students receive essentially the same instruction.

**Team teaching or duet**

Both teachers collaboratively share the instruction of all students. This involves shared planning and a high level of mutual trust.

Source: (40).
Collaborative teaching is a proactive educational approach in which general and special educators and related service providers work in a coactive and coordinated fashion to jointly assess, plan for, teach and evaluate academically and behaviourally heterogeneous groups of students in an educationally integrated setting (that is, a regular classroom). Collaborative teaching may involve the following activities.

- To jointly identify desired learning outcomes: identify the learning objectives for the activity and consider how these will be communicated to students.
- To develop a strategy for setting up the activity, for example, pre-work, team building required and so forth – what work might students be asked to do so that they are prepared to begin the collaborative activity (reading, quiz, writing)? What tools can the instructor use to determine if students are ready?
- To develop a strategy for assessing the activity – how will student work be assessed: individually, by team, by role, by work product?
- Anticipate issues or challenges – what difficulties might the instructor or students encounter while working on a collaborative project: workload issues, meeting deadlines, combining their individual pieces into one, work distribution and so forth? What can be done to address these issues proactively?

To conclude this activity, the participants can be asked to share on each of the areas above or to share in groups of two to three. Depending on the size of the group, the group can share ideas, teaching strategies and solutions.

Source: (41).

**Experience from the South-East Asia Region on improving public health teaching in medical schools**

Evidence on faculty development for public health teaching specifically from the South-East Asia Region is very limited. From a quick survey of selected institutions in the Region, most available information is mainly about general faculty development. However, one notable example is at the PSG Institute of Medical Sciences and Research, Coimbatore, India,
where a three-pronged approach has been implemented. First, there are special training programmes to build the capacity of the public health teaching programme of the faculty. Second, capacity building of the faculty is promoted through its participation in public health projects. Third, the faculty participates in general faculty development programmes. The details of these activities are provided in Box 6.4.

**Box 6.4 Faculty development approaches to improve public health teaching in undergraduate medical education at the PSG Institute of Medical Sciences and Research, Coimbatore, India**

By Professor Thomas Chacko

Members of the Department of Community Medicine learn many of the public health teaching tools and methods while undergoing their postgraduate training programme. In addition, we have used a specific public health teaching programme for capacity building of faculty, participation in public health programmes as a strategy for faculty development, as well as using opportunities for general faculty development within the institution to improve teaching of public health in undergraduate medical education.

**Approach 1. Public health teaching programme capacity building of faculty through special training programmes.** We either send faculty to other centres or invite the resource persons to our institution to build capacity of our faculty. Examples of such efforts are listed below.

- **Participatory rural appraisal.** This is a good tool for orienting the students to the health and development needs of people in the community as well as introducing them to the principle of community participation in health and development. Key/senior faculty were sent to the National Institute of Health and Family Welfare, New Delhi, to undergo this training. Upon return, they trained the remaining faculty in the department. When many new faculty joined, we invited experts from another national institute to come and conduct a workshop for our faculty and staff. Now our faculty can impart this programme to faculty from other institutions.

- **Problem solving for better health.** The capacity development for this programme was initiated through an external group of experts who had experience in this programme for students. Now the faculty members from our institution are able to impart this programme to faculty from other institutions.
Training Modules for Teaching of Public Health in Medical Schools in South-East Asia Region

- **Short course in epidemiology, SPSS and biostatistics, and health economics.** Although faculty are trained in these fields during their masters degree programme, they are encouraged to attend special training programmes offered by institutions in the country. After capacity building, our faculty is now conducting workshops for faculty as well as postgraduate students from other institutions in the country.

**Approach 2. Capacity building of faculty through participation in public health projects.**

We have found this approach to faculty development a very practical and fulfilling experience. When any government or nongovernmental/international funding agency trusts us with public health programme implementation, we entrust faculty members to take up leadership in specific programmes. Examples of such programmes and benefits to faculty in terms of capacity building are listed below.

- **International Planned Parenthood Federation/Family Planning Association of India community participation in family planning project.** This helped the faculty in programme planning, monitoring and evaluation in addition to providing an opportunity to organize women’s self-help groups through microfinance. This enabled the faculty to teach students the relationship between development and health, health economics and community organization.

- **United States Agency for International Development/Voluntary Health Services training of health-care providers in sexually transmitted diseases/AIDS prevention in Tamil Nadu state.** This provided an opportunity for faculty capacity building in participatory training methods, as well as for designing training modules for home-based care of HIV/AIDS.

- **National Institute of Public Cooperation and Child Development/Integrated Child Development Services programme monitoring and evaluation in Tamil Nadu state.** This provided faculty and postgraduates an opportunity to sharpen their programme monitoring and evaluation skills and thus be in a position to teach undergraduates with more confidence, emerging from first-hand experience in the community.

- **WHO-Indian Council of Medical Research cardiovascular risk factor surveillance at the workplace project.** This helped the faculty to build their capacity in disease and risk factor surveillance as well as in delivering educational interventions. This enables the faculty to guide undergraduate (and postgraduate) students to do their projects successfully and efficiently.
Business for Social Responsibility HERproject (Health Enables Returns project) for health cum educational intervention among factory-workers. This has helped the faculty develop their capacity to develop tailor-made educational material and carry out educational intervention and measure the impact in the form of return on investment and other principles of health economics. This has helped them to guide students with their educational intervention projects and explain concepts in health economics more succinctly through personal experience examples.

United Nations Population Fund-Royal Institute of Health Services Bhutan project for competency-based training of basic health unit staff for primary health care. This project has helped build to capacity in the field of training needs assessment, develop self-learning modules and set up a system of continuous professional development. This will be useful when the curriculum transitions from a knowledge-based to competency-based medical education in the country, and it can be used to train faculty from other Institutions in these competencies.

Approach 3. Capacity building of faculty through participation in general faculty development programmes. When members of the Department of Community Medicine attend other faculty development initiatives, it increases their capacity to train undergraduates students in public health.

FAIMER Regional Institute Fellowship Program at the PSG Institute of Medical Sciences and Research. This is a two-year faculty development fellowship programme for faculty members of all departments. Most faculty in the Department of Community Medicine at PSG have undergone this faculty development opportunity and this has resulted in improved teaching of public health since this fellowship requires fellows to choose a project for experiential learning that is based on the work they do in their respective departments. Faculty undergoing this fellowship programme learn about teaching/assessment programme planning, implementation and evaluation of its effectiveness. Thus various aspects of public health training are evaluated and interventions are introduced to make student learning better.

Workshop for identifying faculty training needs. Using appreciative inquiry and time travel, faculty were taken through a so-called time travel experience 5–10 years in the future to visualize the ways in which students were learning and were being assessed. This helped the teachers to identify the skills they would need so that they can meet the training needs of their students in the future. Having realized this, it motivates
them to participate in faculty development activities that are directed towards their capacity building to meet the needs of the future.

- **Workshop on Curriculum Planning for Community-Based Medical Education.** This workshop is being conducted by the Department faculty for faculty members from other institutions during national conferences. It thus helps to meet faculty development needs of new faculty as well as faculty from other institutions for designing public health training that is tailored to the competencies required for public health and primary health care.

### 6.3 Involving public health specialists and nonacademic persons in public health teaching improvement

In many areas of public health core competencies, it is useful to involve public health experts or practitioners in teaching. By integrating direct practical experience into the teaching, the students’ learning experience can be enriched. The host faculty members can also benefit from learning about real world practice first hand. Medical schools can involve public health specialists working in the health system in the teaching and training of undergraduate medical students, both in school and in the field. However, it is also useful for these visiting faculty staff be equipped with the necessary teaching skills so that the teaching and learning process can be effective and interesting.

In addition, engaging authorities and professional bodies for networking and collective development can be very useful. In some countries improvement requires the active involvement of the medical council and line ministries such as the ministry of education and ministry of health, as well as leaders of medical education institutions. This is to ensure that there is strong support for policy, engagement and commitment to improvement (42). In the USA, the Council on Linkages between Academia and Public Health Practice (43) promotes stronger links between academic health departments and public health authorities to allow better experience of linking teaching, public health services and research.
Possible policy support to increase interest in public health teaching improvement may include:

- required or compulsory training courses on public health teaching for all new staff or as a required refresher course (similar to the requirement on clinical teaching skills by some medical schools);
- requirement for enrolment in a public health teaching development course that is linked to academic or career promotion;
- establishment of a network or society of public health faculty members in medical schools and other public health medical teachers to work together to improve the front line of public health teaching; this includes learning from each other and possibly conducting joint research on new teaching methods and techniques;
- involvement of a regional and country level public health education institution network or a medical education network; for example, involvement of the South-East Asian Regional Association for Medical Education, the South-East Asian Public Health Education Institutes Network, etc. could be one approach to strengthen such development.

**Exercise**

(1) Do you have a faculty development programme in your medical institution? If yes, does it include public health teaching skills and techniques in the training programme?

(2) What area(s) of faculty development do you think are most important for public health teaching?

(3) Discuss how can we involve clinicians and other faculty members from noncommunity medicine departments to be more engaged in public health teaching.

(4) Design a faculty development plan for your institution with a focus on public health core competency for medical education.
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Annex 1

Public health challenges in the South-East Asia Region

The contents of this annex are from information documents from the Small Group Expert Meeting to plan for the Regional Meeting on Role of Medical Education in Light of the Current Health Challenges, 1–2 March 2012, WHO Regional Office for South-East Asia, New Delhi, India.
Annex 1.1

Health challenges of increasing ageing population

Nature/scope of the challenges

Ageing is a natural and inevitable process. For the past century mankind has been adding years to life. More people now survive the challenges of childbirth and childhood to reach old age. This trend is not restricted to the resource-rich countries but has become a global phenomenon including the countries of South-East Asia. It has been estimated that around 142 million people or 8% of the population of the WHO's South-East Asia Region are above the age of 60 years. This number will continue to increase and, by 2025, the estimated proportion of the population over 60 years will be twice that of 2000, and by 2050 it will have further increased to three times the proportion of 2000. In India for example, the elderly population will increase to 160 million by 2025 and to over 300 million by 2050, translating to 19% of the total population. Similarly, in Sri Lanka, the elderly population is projected to be over 4 million by 2025 and 6 million or around 27% of the total population by 2050. In Thailand, the total number of people over the age of 60 years will be around 15 million by 2025 and over 22 million by 2050, corresponding to over 30% of the total population. There is an urgent need to focus attention on the ageing population because of the increasing share of elderly persons in the total population.

The journey to old age begins before birth, from the fetal stage. As such, the optimal health and nutrition status of mothers leads to optimal fetal development and successful pregnancy outcome. Adequate health and nutrition in infancy, childhood and adolescence lead to healthy ageing. However, attention to these needs during the life course is not always available and a number of maladies affect the elderly population.

Old age has several social and economic needs. With the gradual tendency towards nuclear families and rural to urban migration and emigration, the elderly population is often left to fend for itself, which then results in poverty or lack of resources, loneliness, feeling of abandonment and depression, and exposure to criminal and malicious elements. Ageing is
also associated with poor vision, poor appetite and poor hearing. Bone and joint disorders and muscle weakness lead to disability and limitation of movements. Chronic diseases, such as endocrinological, cardiovascular, circulatory and excretory diseases are present in old age along with the problems of dementia and Alzheimer’s disease.

**Expected roles of the medical doctor to deal with the challenges**

Healthy ageing requires a significant paradigm shift in the way care is provided to the elderly population. An age-friendly primary health care minimizes the consequences of noncommunicable or chronic diseases through early detection, prevention and quality of care, and provides long-term palliative care for those with advanced disease. Such interventions would need to be supplemented by affordable long-term care for those who can no longer retain their independence. With increasing life-expectancies among women, more will survive to old age with the attendant unique health problems of elderly women. Longer life expectancies across the sexes will result in an increasing proportion of older persons requiring long-term care either at health facilities or at home.

The field of geriatrics is almost nonexistent in most Member States. Training received as part of general medicine in medical school is used by most physicians when treating the elderly population. Such knowledge is inadequate and this gap gains further importance where long-term care of very old persons is concerned.

Training in aspects of gerontology (areas covering social, economic and physical aspects) are not addressed when training undergraduates in public health.
Annex 1.2

Challenges of human resources development for resilience to health impacts of climate change

Nature of the challenge

Between 1960 and 2007, extreme temperature events had increased 25-fold; floods increased by 10-fold; storms increased by fourfold; and droughts increased by twofold. Approximately 83% of all people affected by droughts, 97% of all people affected by floods and 92% of all people affected by storms resided in the East Asia and Pacific and South Asia regions. The economic losses from flooding in the South and South-East Asia were estimated to exceed US$300 billion (1960–2008). In Sri Lanka 62% of the industrial units are located on the coast, more than 70% of tourist infrastructure is coastal and the coastal zone accounts for 43% gross domestic product (GDP).

Climate change has already increased the number of cases of malaria, dengue, chikungunya, diarrhoea, malnutrition and mental health problems due to migration and natural devastation. Climate change also affects health through migration and poverty directly and indirectly.

The effects described above are all due to global warming, which has increased by 0.74°C globally on average since recording of temperature started in 1850. Every decade the rise is about 0.1–0.2°C, and higher at high altitudes and in the northern part of the hemisphere: for example, 1°C in the Himalayas and 3°C in Antarctica. Climate change manifests through weather extremes, food insecurity, poor food safety, environmental degradation, social disruption, population displacement, loss and change in livelihood, loss of property, mental health problems, malnutrition, and communicable and noncommunicable diseases.

There are possibilities that climate-sensitive marine biotoxins will cause poisoning of consumers through contaminated scombroid fish and shellfish and ciguatera toxin. A correlation has been found between annual rainfall and number of rainy days with the incidence of malaria and dengue.
and waterborne diseases; these are also influenced by El Niño, which is becoming more frequent and stronger in effect. Climate change will affect the global geological, geographical and topographic environment; for example, it will reduce or make excessive the following: soil drought and air moisture, soil surface and crusting, and sea level rise and sea water expansion due to acidity and dilution from the pouring of melted ice.

In 2000, climate change caused an additional 2.4% of worldwide diarrhoea and 6% of malaria in some middle-income countries. Children under 5 years make up 85% of people who die as a result of climate change. Climate change will cause the emergence of new strains of pathogens and also changes in the incidence, range, intensity and seasonality of existing health disorders.

Urban outdoor air pollution is the 10th leading cause of premature death. Air pollution causes 530 000 premature deaths per year in South-East Asia cities from respiratory problems (including cardiovascular problems). In 2000, out of the estimated 2.3 million deaths due to respiratory infections in the South-East Asia Region, close to 750 000 (33%) were due to air pollution. More than 1.45 million people, mostly children, die prematurely each year from household air pollution due to inefficient biomass combustion.

These environmental changes will influence epidemiological scenarios. Twenty-four per cent of global disease burden and 23% of all deaths can be attributed to environmental factors now; and children <5 years of age bear >40% of the burden. Approximately 443 million school days per year are lost from water-related illness, leading to poverty in adulthood.

It is estimated that between 2000 and 2030 malnutrition-related deaths will increase from 80 000 to 110 000 with disability-adjusted life years (DALYs) of 2.3 million to 8.0 million respectively. For diarrhoea the estimates are: 60 000 deaths in 2030 in comparison with about 45 000 in 2000, with DALYs of 1.6 million in 2000, to 1.8 million in 2030. The number of deaths from malaria, approximately 20 000 in 2000, will be about 25 000 in 2030, with DALYs remaining around 1.0 million for both years.
Expected role of the medical doctor to deal with the challenges

For developing an adaptive plan, the level of vulnerability and resilience of the vulnerable population need to be assessed, and effective monitoring and review of implementation of the plan are necessary. Skills to assess, develop and implement the plan, and manage, monitor and evaluate implementation, will be necessary. Assessment of vulnerability should be directed at present and future vulnerability. Present vulnerability includes prevalent diseases and hence the skill to conduct surveillance and diagnosis for these diseases and the management of at least the most commonly prevalent diseases. There will be a surge of some uncommon diseases, resurgence of not-so-prevalent diseases and the advent of some new diseases. Skill to diagnose these diseases, which also require skill in conducting original research work, will be warranted. The level of information, experience, skill, capacity and strength to adapt measures to deal with the health impacts of climate change need to be known. National policies, political economy and cultural norms need to be understood. Collection and processing of this information require skill in research. Many of the Regional countries lack this skill of managing knowledge; therefore training in this area will be necessary.

Risks of and vulnerability to the impacts of climate change also have to be forward looking, for example, prediction of future vulnerability. There are some models to predict the future climate based on the global climate models. Training is also necessary to predict endemicity, epidemicity and pandemicity of climate-sensitive vectors, and water and air dynamics and related diseases.

Developing plans to strengthen the resilience of the people and the health systems based on research information needs development of skills to do so. Development of skills is also necessary to manage implementation of the plan, including the skill to develop and conduct programme/project monitoring and review systems. This is required particularly since there are examples of adaptive measures against the impact of climate change going wrong.

Implementation of interventions against the impacts of climate change is in effect a joint intersector collaboration through a coordinated mechanism. Skill to negotiate with other relevant sectors and lead the interventions so that health is not only at the centre of climate-change-relevant interventions but at the centre of development has to be
inculcated; at present these skills are in short supply. Skill to negotiate with the development partners is also pertinent; this needs negotiation skill, which depends on sharing of information and experience.

Management of climate-change and health-oriented projects/interventions also needs some knowledge and understanding of the policies, strategies, plans and activities of other related sectors, how these will affect the health of the people and the health sector, and the co-benefits that may be derived from joint efforts.
Annex 1.3

Health challenges of globalization

Nature of the challenges

Globalization is a phenomenon where international measures are becoming critical in national decision making. The effects of globalization have accelerated in recent times due to greater movement of persons across international borders and also due to the impact of information and communication technologies. The Internet, the World Wide Web and mobile phones are contributing to globalization of medical products and services such as medicines, diagnostics and vaccines, and consultation services. In view of the consequences of international and national trade on public health, and the challenges faced due to new technological developments, we should consider the introduction into the medical curriculum, in an appropriate manner, certain topics under the rubric globalization and public health. Medical education curricula need to reflect the reality that is a result of international trade, intellectual property and technology developments, and take into account changes in the practice of medicine and health care.

The medical curriculum would need to reflect the public health issues related to globalization at the national level. The issues that are relevant for medical curricula in this context are as follows.

(a) International treaties in public health such as the International Health Regulations 2005 are important for pandemic preparedness, and the Framework Convention on Tobacco control is unique in the regulation of the public health impact of tobacco.

(b) Trade issues related to medical tourism are trade in health services (involving both movement of health personnel and patients for health care), Web-based Internet health services including the implementation of e-health and outsourcing; these are expanding areas in our Region. The Internet reduces traditional barriers to trade and commerce, allowing small
businesses to sell products directly to the consumers. This may result in availability of counterfeit or substandard medicines and medical devices, impacting negatively on public health; there is a need to generate awareness of this.

(c) Food safety and public health To protect consumers’ health and to ensure fair practices in food trade, and to introduce the origins of food and need for development of food standards, it is necessary to understand the impact of these measures on consumer health and safety. In this context the importance of labelling, food standards and food content has important consequences for public health.

(d) Advertising of medical products Direct to consumer advertisement (DTCA) of medical products involves both doctors and patients as consumers. The pharmaceutical industry claims that one of the main benefits of DTCA is patient education. Although there is the potential for DTCA to be educational, the primary benefit is for the manufacturer in the form of increased market share and profits, and it may result in conflict of interest issues.

(e) Data protection provision that relates to the legal protection of databases in patient records. This is related to transmission of data by physicians, patient identification (when testing for HIV, etc.), maintenance of sick leave records, intellectual property, and enforcement on data from clinical trials, etc. Patients have always had the right to confidentiality. Medical practitioners have been said to misappropriate this right to shield medical records. It was inevitable in this age of computerized data that the question of using health information for public and societal benefit would arise.

(f) Research on patients by the pharmaceutical industry. This is especially relevant in clinical trials and in the scope of patient shop rights (intellectual property rights) in cell-line inventions. Developing countries are a major destination for clinical trials where it is cheaper to conduct these trials. In today’s growing

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4 The Codex Alimentarius Commission was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and nongovernmental organizations. (http://www.codexalimentarius.net/web/index_en.jsp, accessed 12 August 2014).
biotechnology market even a limited shop right in a patented cell-line is a potentially lucrative intellectual property holding.

World Health Assembly (WHA) resolutions have emphasized that there are trade issues that require a public health perspective and that public health interests are paramount in pharmaceutical and health policies for local manufacturing, access and prices of drugs, and to ensure regular availability of essential drugs at affordable prices (WHA52.19, 9th July 1999). It was also decided in the WHA to cooperate in monitoring and analysing the pharmaceutical and public health implications of relevant international agreements, including trade agreements, so that the countries can assess and subsequently develop pharmaceutical and health policies and trade, and promote coordination of all food regulatory measures that address their concerns and priorities, and are able to maximize the positive and mitigate the negative impact of those agreements (WHA53.14, 20 May 2000).

There is a need to inform medical personnel of these developments and for the introduction of globalization- and trade-related current topics in the medical curriculum. In order to do this it would be necessary to:

- develop appropriate curricula and teaching materials on intellectual property and trade and health, taking into consideration the educational level and background of students;
- consider the relation between medical educational and trade and intellectual property systems in a particular country.

**Expected roles of medical doctor to deal with the challenges**

Medical doctors should be aware of:

- the evolving interface of trade, intellectual property and public health, particularly in the context of e-health and use of information technology, the Internet and mobile phones for public health.
- using trade, intellectual property and public health information for health promotion and community empowerment.
Annex 1.4

Health challenges of acute public health emergencies and International Health Regulations 2005

Nature of the challenges

The International Health Regulations (IHR) 2005 came into force in 2007 and required all signatory countries to establish core capacities to detect, assess and respond to potential health threats by 15 June 2012. The regulations also obliged countries to report certain types of events to WHO and require WHO to provide support for risk assessment, verification and public health interventions when requested.

The acute public health events that concern the IHR vary in type, frequency and magnitude/impact. Five types of hazard are described (infectious, zoonotic, food safety related, chemical and radionuclear). It is also important to highlight that when a significant event is initially recognized the cause may be unknown, but prompt reporting is essential to ensure timely recognition, risk assessment and the application of appropriate interventions, allowing an associated reduction in morbidity, mortality and public concern; this is sometimes referred to as "getting ahead of the (epidemic) curve".

Expected roles of the medical doctor to deal with the challenges:

All medical practitioners should be expected to be aware of the basic legal requirements of the IHR as well as the national legislative framework for the application of public health measures.

Medical practitioners should also be aware of the crucial role they play in the recognition of acute public health events, including the emergence of new, previously unrecognized, syndromes and diseases. For example, practising clinicians may be faster than a surveillance system in noticing an upsurge in cases or clusters of cases with unusual signs and symptoms. Equally, it may involve laboratory staff noticing an upsurge in
cases with no diagnosis, a radiographer noticing cases presenting with unusual chest radiographs, or a pathologist noticing a new pattern of postmortem changes.

Doctors should also be aware of the importance of and the mechanism for reporting both acute events and routine surveillance information to public health colleagues. It is also desirable that they should understand in broad terms how this information is handled at local, district, regional and national levels.

Medical practitioners may also become involved in the local response to events, requiring knowledge of the basics of outbreak investigation including data collection and interpretation, collection of specimens and the measures required to protect themselves and local populations against a wide range of infectious and other hazards. They should also know the basics of good communication, including communication to communities and to the media. The ability to work in a team is crucial and leadership skills may be extremely valuable.

Medical practitioners working near international borders or airports should also be aware of the basics of the technical and legislative issues associated with border health and points of entry, such as any legal requirements for vaccination or the use (or otherwise) of entry/exit screening.

Lastly, it is possible that health practitioners from a variety of disciplines may become involved in contingency planning for, and sometimes implementing the responses to, large outbreaks and natural/man-made disasters. This could involve planning at a macro level for how a hospital would continue to function in a crisis, as well as at a more technical level; for example, criteria for triage of patients, enhancing measures for infection prevention and control, and providing surge capacity for laboratory testing.
Annex 1.5

Health challenges of the growing crisis of noncommunicable diseases in the South-East Asia Region

Nature of the challenges

Noncommunicable diseases (NCDs) are commonly known as chronic diseases or lifestyle-related diseases. Worldwide, NCDs are the leading cause of death, killing more people than all other diseases and conditions combined. In the South-East Asia Region, NCDs have emerged as the leading cause of death and disability, although communicable diseases remain an unfinished agenda in some countries. Each year, an estimated 7.9 million lives are lost due to NCDs, accounting for 55% of all deaths in the Region. NCDs claim lives at a younger age in the South-East Asia Region compared with the rest of the world; the proportion of deaths due to NCDs below the age of 60 years was 34% in the South-East Asia Region, compared with 23% in the rest of the world. In addition to an enormous health burden, NCDs have serious socioeconomic consequences and impede development efforts in low- and middle-income countries. The NCD epidemic creates serious socioeconomic consequences by increasing individual and household impoverishment and thwarting human and economic development. The macroeconomic impact of NCDs is as profound, resulting in lost productivity and gross domestic product. The health and economic burden of NCDs is only going to get worse in the future. As shown in Figure 1, the proportional mortality due to NCDs will increase from 50% to 74% from 2004 to 2030, while the proportional mortality due to communicable diseases is likely to decrease substantially over the same period.
Figure 1 *Projected trends in mortality by cause, South-East Asia Region, 2004–2030*

![Projected trends in mortality by cause, South-East Asia Region, 2004–2030](image)

**Expected role of the medical doctor to deal with the challenges**

The medical colleges can contribute in the following ways to deal with the emerging challenge of NCDs.

1. Revise the medical curriculum for undergraduate teaching. The textbooks of medicine and community medicine (preventive medicine) should be appropriately revised to reflect the changing demographic and epidemiological transition as well as the need to prioritize primary prevention and use population-based approaches rather than specialized individual-based treatment approaches only.

2. Expand the scope of the existing community outreach projects from just maternal and child health and communicable diseases to include NCD prevention and management.

3. Promote and undertake research in the area of prevention and control of NCDs.

4. Set up preventive clinics for NCDs, such as for preventive cardiology, smoking cessation, etc.

5. Advocate implementing so-called healthy public policies to policy makers.
Annex 1.6

Challenges of inequity in health and social development

Nature of the challenges

Social, political and economic conditions around the world change dramatically. Health is universally valued, but unfairness of living conditions and life chances lead to different levels of health conditions among individuals and among group populations across continents. Traditionally, the health sector was concerned with health and diseases only; however in today's societies, complex problems contribute to the burden of diseases, including poverty, unequal living conditions, maldistribution of health care, etc. Daily living conditions are a result of structural drivers operating within countries under the authority of the government, and between countries under the effects of globalization. The poorest of the poor around the world have the worst health. These people are generally marginalized and excluded within countries and are disadvantaged by historical exploitation and persistent inequity. Social gradients in health affect people in rich and poor countries alike. The implication is that health inequity is caused by the unequal distribution of income, goods and services, and of the consequent chance of having a healthy life style.

Health sectors and health services can no longer work with so-called business as usual. Health practitioners need to understand the social determinants of health that are beyond the control of the individual. To tackle the health of individuals, the health profession needs to address health behaviour, and also emotional and social well-being, as well as the environment where people live, work, and spend their time. Poor working conditions and unsafe neighbourhoods are examples of determinants of health that put people into vulnerable situations and at a disadvantage for their health. Working conditions have powerful effects on health and health equity. Adverse conditions expose individuals to physical and mental health hazards, particularly in lower-status occupations. Stress at work is associated with a 50% excess risk of coronary heart disease (Marmot, 2004; Kivimaki, 2006). Loss of income and unemployment increase the risk of poor health behaviour and loss of social protection to access health services. Unequal
treatment in society leads to women, the elderly and people with special needs having delayed access to health services, or they do not have chance to access the quality of care they need.

Urbanization is reshaping population health problems, particularly among the urban poor, towards NCDs, injuries, alcohol abuse and substance abuse, and impact from ecological disaster. These emerging health problems in countries with different levels of infrastructures and health system preparedness pose significant health equity challenges in the 21st century.

Expected roles of medical doctor to deal with the challenges

**Reintegrate the primary-health-care model in the health-care system**

Health-care systems and health professions can do more than treat illness. They can protect against sickness, generating a sense of life security, and they can promote health equity through attention to the needs of socially disadvantaged and marginalized groups. The health-care system contributes most to improving health around the principle of universal coverage and where the system as a whole is organized around primary health care. Combining the primary-health-care model of action on the social determinants of health and emphasis on the primary level of care, with effective upwards referral implies comprehensive, integrated and appropriate care, emphasizing disease prevention and health promotion.

Research shows that a significant proportion of the global burden of communicable and NCD could be reduced through improved preventive action (Lopez et al., 2006). Medical and health practitioners have a powerful influence on the way society thinks about health. In collaboration with other political, social, economic and cultural sectors and activists, they can advocate for change with evidence-based action on the social causes of exposure and vulnerability to risk of poor health.

**Emphasize community participation and social empowerment in primary health care**

The primary-health-care model also emphasizes community participation and social empowerment. Social empowerment strategies can increase
social awareness of health and the health-care system, strengthen health literacy among people, and mobilize health actions with multistakeholders. Public awareness of health needs and partnership between local government and civil society will support effective design and management of care for marginalized groups.

**Increase awareness of health inequities among medical and health professions**

To further reorient the health sector towards reducing health inequities, medical and health professionals, including physicians, nurses, auxiliary personnel and community workers, need to be aware of health inequities as an important public health problem. They need to understand the importance of social factors in influencing the level and distribution of population health. (Note: further actions with regard to this appeared in the Rio Political Declaration on Social Determinants of Health, October 2011.)

**Include social determinants of health in medical and health curricula**

Therefore, ministries of health and education, in collaboration with medical, nursing, public health and health management schools, need to make the social determinants of health a standard and compulsory part of the curricula taught to medical and health practitioners. All health professionals require such training at a basic level as a minimum.

**Establish a knowledge hub on social determinants of health**

Making social determinants of health a standard and compulsory part of medical training and training of other health professionals requires textbooks and teaching materials. A virtual repository of teaching and training materials on a broad range of social determinants needs to be developed and made accessible for interdisciplinary professionals to exchange ideas and knowledge.

**Increase capacity on intersectoral actions and advocacy skills**

The health sector plays an important stewardship role in intersectoral action for health equity. Health professions need to understand how the health-care sector can exacerbate or ameliorate health inequities, particularly in
the role in the equitable provision of quality care. Health workers and professionals need to be trained in good communication and listening skills and in how to tailor their communication to meet their patients’ needs. They also need to be aware of how gender influences health outcomes and health-seeking behaviours.

*Expand cross-disciplinary learning to strengthen intersectoral actions*

Training and education on the social determinants of health need to be extended to other practitioners, policy makers and stakeholders, such as urban planners, teachers, economists, etc., to increase intersectoral actions and effective collaboration in the future.

*Enhance knowledge and skills on disease prevention and health promotion*

The reorientation of health should result in increasing the importance of prevention and health promotion, requiring specific skills, knowledge and experience of health personnel. Prevention and health promotion should be given a more prominent place in the medical curriculum.

*Strengthen capacity to improve health literacy among the population*

Raising awareness of social determinants of health among the public needs so-called health literacy, which is the ability to access, understand, evaluate and communicate information in a way to promote, maintain and improve health in various settings across the life course. It is a critical empowerment strategy to increase people’s control over their health, and their ability to seek out health information and take responsibility. The health sector plays an important role in facilitating the process and improving health literacy among the public.
Annex 1.7

Health challenges of urbanization

Nature of the challenges

1. Introduction

Urban areas in developing countries are witnessing explosive growth. Around 3 million people are added to the urban population of developing countries every week. By the year 2030, 60% of the world population will live in towns or cities. Most of this growth will take place in Asia and Africa.

The fast pace of urbanization has had adverse effects on the health of the urban population, especially on the poor. It causes tremendous pressure on all public services including health-care services, transport systems, water supply, sanitation and electricity. Consequently, basic human needs such as clean air, water, food and housing are becoming difficult to meet. Inadequate water supply and sanitation is a fertile ground for disease transmission. Nonsegregated domestic, marketplace and industrial solid waste and untreated sewage pose grave risks to urban health. Insect and rodent pests abound, enhancing the incidence of vector-borne diseases, and respiratory and skin infections. The problem is compounded by the deficiencies of the urban built environment, particularly in plumbing and paving.

The rapid pace of urban life leads to neglect of nutrition; sedentary jobs invite lethargy and provide little physical stimulation; crowded living conditions lead to social tensions and stress; and heavy road traffic, a part and parcel of the city’s bustling life, increases the risk of communicable, noncommunicable and chronic diseases, accidents and injuries, especially among the urban poor. The consequences of poverty and ill health, including mental health, are significant in a city setting. They are detrimental to all city dwellers. Urban poverty and squalor are strongly linked to social unrest, mental disorders, crime, violence and outbreaks of disease associated with crowding and filth. These threats can easily spread beyond a single neighbourhood or district to endanger all citizens.
2. Urbanization and health of the urban poor in the South-East Asia Region

South-East Asia is home to more than 1.6 billion people, 32% of which or 600 million people live in urban areas. Of this number, 25% are poor. Poverty is conventionally defined in terms of incomes that are inadequate to permit the purchase of necessities, including food and safe water in sufficient quantity. India, alone, is home to 80 million urbanites living below the poverty line, while 27 million people and 11 million people in Indonesia and Bangladesh, respectively, are urban poor. It has been well documented that the poor, including those living in urban areas, are socially, economically, physically, politically, environmentally and psychologically disadvantaged. This has adverse consequences on maternal and child health, nutrition, and communicable diseases and NCDs.

3. Availability and accessibility of the urban poor to health-care services

In most countries of the Region a well-structured rural health-care infrastructure has been developed. In contrast, the public health system in urban areas has many gaps and weaknesses. Most cities in the region have a thriving private health sector. The urban poor encounter difficulties in access to quality health-care services due to economic, social, psychological and geographic factors.

The urban poor face lack of access to health-care services despite reasonable or good availability of health-care facilities in towns and cities. Economic, social and geographic factors adversely impact the access of the urban poor to these facilities.

Public health facilities are generally available in the centre of the city; hence the poor living in the peripheral areas find it time consuming to travel to these public health facilities for services. They might find it extremely difficult to take time out or take a day off from their daily work when it is linked to daily food and existence. Lack of public health services is further compounded by lack of cheap public transport and unfavourable timing.

One of the reasons cited for nonutilization of public health facilities is the poor quality of services. A large proportion of people resort to using private health-care services. Not surprisingly, the South-East Asia Region has the highest rate of out-of-pocket expenditure for health in the world.
It is evident that health service utilization among the urban poor is low compared with the non poor. It has been observed that immunization and use of antenatal care services are low in the slum populations.

**Expected roles of the medical doctor in dealing with the challenges**

Medical doctors are expected to:

- be aware of the evolving epidemiology of disease in urban areas vis-à-vis epidemiology in rural areas;
- understand the effect of social determinants of health on health status of the urban population, particularly the urban poor;
- develop a public health perspective while managing patients, with particular reference to addressing the social determinants; this implies a public health role, as for example playing a role in disease surveillance or working with relevant authorities to improve water and sanitation;
- develop effective communication skills to act with empathy while managing individual patients;
- develop leadership qualities to become a credible vehicle for health promotion, disease prevention and community empowerment for health when dealing with individuals, families and communities.
Annex 1.8

Health challenges of vulnerability to emergencies of various hazards

Nature/scope of the challenges

1. Vulnerability of countries in South-East Asia

The South-East Asia Region is particularly prone to disasters caused by natural hazards, usually of a hydrometeorological and seismic nature. In fact in the decade from 2000 to 2009, the total number of people killed in natural disasters from the 11 member countries of the South-East Asia Region comprised 62% of the total deaths globally (Figure 2) and 44% of disasters from natural hazards occurred in the 11 countries of the South East Asia Region.5

Figure 2 Total number of people killed in natural disasters (2000–2009)

2. Health facilities and health workers at risk

Health facilities represent an intensive capital investment and also a substantial investment is required to maintain them. However at the point of an emergency, public health and curative services are delivered through health facilities. Health systems fail to provide what is required when health facilities collapse or become nonfunctional. The events described below and the key statistics of how health facilities have been destroyed and damaged at a time when they are needed most illustrate the issue.

2001, Gujarat (India) earthquake

A total of 3812 health facilities were destroyed during the earthquake. The cost of reconstruction for the health sector alone was estimated at US$ 60 million.6

Earthquakes and Tsunami of 26 December 20047

- Aceh province (Indonesia), Indian Ocean Tsunami
  Of the 240 health clinics, 30 were destroyed while 77 were damaged seriously. Forty clinics suffered minor damages. As many as 700 health workers (of an estimated 9800 in the province) died or were reported missing.

- Sri Lanka
  Ninety two health facilities were destroyed. This included 35 hospitals.

- Maldives

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One regular hospital, two atoll hospitals and 20 health centres were destroyed. As many as 5000 people had to be evacuated from 13 islands.

- **India**

Seven district hospitals, 13 primary health centres and 80 subcentres were damaged in the southern Indian states of Tamil Nadu, Andhra Pradesh, Kerala, the Union Territory of Pondicherry and the Andaman and Nicobar Islands.

**2007 November, cyclone Sidr, Bangladesh**

Seven of 16 district hospitals in Khulna and Barisal division were mildly damaged. Sixty-nine of 247 Upazila health complexes were mildly damaged.

**2008 May, cyclone Nargis, Myanmar**

Fifty-seven per cent of public health facilities in the affected areas, largely confined to Ayeyarwady and Yangon divisions, were destroyed or damaged. It is estimated that 10% to 15% of these facilities were totally damaged.

**Kosi River Floods, Nepal and India**

The floods have damaged countless health facilities and their equipment and made them inaccessible.

**2009 7.6 Earthquake West Sumatra, Indonesia**

Damage to 10 hospitals, 53 community health centres and 137 support health centres
Complex emergency, Sri Lanka

The conflict has lead to lack of health human resources in various areas and specialties.

3. New risks due to unplanned development and urbanization

Overlying this public health issue is the fact that rapid urbanization is happening in the Region. In 2007, for the first time in history, half of the world’s population was living in urban areas. By 2030, six out of every 10 people will be urban dwellers and this rapid urbanization is more pronounced in the low- to middle-income countries of Asia and Africa. By 2050, the figure will be seven out of every 10 people. At the same time, urban disparities continue to grow with more than one billion people, or one-third of the urban population, living in slums. With this sociodemographic profile/phenomenon it is not surprising that the major emergencies of the past decade have affected urban and peri-urban areas. Below is a list8 (Table 1) of the top 10 disasters that have affected urban and peri-urban areas; four (marked in bold) have occurred in the Region, with two in Indonesia and one in Myanmar, while the South Asian tsunami affected countries that are all within the WHO Regional Office for South-East Asia purview of work. In addition, the floods in Thailand, which severely affected the capital Bangkok and its peripheral areas, were an event that highlighted the need for safe health facilities in the urban context.

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Table 1 Top 10 disasters that have affected urban and peri-urban areas of the world

<table>
<thead>
<tr>
<th>Current name</th>
<th>Main countries affected</th>
<th>Date of event</th>
<th>Type of hazard</th>
<th>Main cities affected</th>
<th>Total number of deaths</th>
<th>Total number of affected</th>
<th>Total damages (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Japan earthquake</td>
<td>Japan</td>
<td>11 March 2011</td>
<td>Earthquake and tsunami</td>
<td>Sendai, Ichihara, Fukushima, Minamisanriku, Onagawa, Rikuzentakata, Ofunato, Kesennuma</td>
<td>15 824: 4664 in Iwate, 9490 in Miyagi, and 1604 in Fukushima</td>
<td>386 739 (number of evacuated people)</td>
<td>16–25 trillion yen (US$ 169–250 billion) as 3.3–5.2% of Japanese GDP</td>
</tr>
<tr>
<td>2. Haiti earthquake</td>
<td>Haiti</td>
<td>12 January 2010</td>
<td>Earthquake</td>
<td>Port-au-Prince</td>
<td>222 570</td>
<td>3 400 000</td>
<td>No data available</td>
</tr>
<tr>
<td>3. Sichuan earthquake</td>
<td>China</td>
<td>12 May 2008</td>
<td>Earthquake</td>
<td>Beichuan, Dujiangyan, Shifang, Mianzhu, Luyuan, Jiangyou, Mianyang, Chengdu, Qionglai, Deyang</td>
<td>87 476</td>
<td>45 976 596</td>
<td>85 billion</td>
</tr>
<tr>
<td>4. Cyclone Nargis</td>
<td>Myanmar</td>
<td>2 May 2008</td>
<td>Tropical cyclone</td>
<td>Yangon</td>
<td>138 366</td>
<td>2 420 000</td>
<td>4 billion</td>
</tr>
<tr>
<td>5. Java earthquake</td>
<td>Indonesia</td>
<td>27 May 2006</td>
<td>Earthquake</td>
<td>Yogyakarta</td>
<td>5778</td>
<td>3 177 923</td>
<td>3.1 billion</td>
</tr>
<tr>
<td>6. Kashmir earthquake</td>
<td>Pakistan</td>
<td>8 October 2005</td>
<td>Earthquake</td>
<td>Muzaffarabad</td>
<td>73 338</td>
<td>5 128 000</td>
<td>5.2 billion</td>
</tr>
<tr>
<td>7. Hurricane Katrina</td>
<td>USA</td>
<td>29 August 2005</td>
<td>Tropical cyclone</td>
<td>New Orleans</td>
<td>1833</td>
<td>500 000</td>
<td>125 billion</td>
</tr>
<tr>
<td>8. Mumbai floods</td>
<td>India</td>
<td>26 July 2005</td>
<td>Flood</td>
<td>Mumbai</td>
<td>1200</td>
<td>20 000 055</td>
<td>3.3 billion</td>
</tr>
<tr>
<td>9. South Asian tsunami</td>
<td>Indonesia, Sri Lanka, India, Thailand, Malaysia, Maldives, Myanmar</td>
<td>26 December 2004</td>
<td>Earthquake and tsunami</td>
<td>Banda Aceh, Chennai (some damage)</td>
<td>226 408</td>
<td>2 321 700</td>
<td>9.2 billion</td>
</tr>
</tbody>
</table>

4. **Climate change has a humanitarian impact**

Climate change adds a new dimension to risks to populations; there is evidence through climatological science that climate change effects can result in extreme weather events requiring a humanitarian response.

The Intergovernmental Panel on Climate Change has examined the published results from many different models and on the basis of the evidence has estimated that by 2100 the following will have happened.
Global average surface warming (surface air temperature change) will increase by 1.1–6.4°C.

The sea level will rise between 18 and 59 cm.

The oceans will become more acidic.

**Note:**

- It is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent.
- It is very likely that there will be more precipitation at higher latitudes and it is likely that there will be less precipitation in most subtropical land areas.
- It is likely that tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and more heavy precipitation associated with ongoing increases of tropical sea temperature.

The outlook for disasters in a changing climate can worsen, as proven by scientific studies.

As such, there is a humanitarian impact on various climate change effects.

**Expected roles of medical doctor to deal with the challenges**

As medical doctors, the following are possible roles and responsibilities in emergencies, irrespective of hazards that cause them:

1. treating patients in a health facility/mobile clinic using proper national protocols;
2. treating patients in another country if the doctor is part of a medical team sent to a disaster, with emphasis on use of protocols of the affected country;
3. reporting clustering of cases/events for surveillance purposes;
4. advocate preventive measures so that diseases will not turn into outbreaks or epidemics;
(5) planning for preparedness to disasters and drills in their health facility.

Item 1 is a natural role and is part of clinical training.

Item 2 is a role that is assumed depending on the medical graduates career track.

Items 3, 4 and 5 are roles that are assumed depending on where the doctor is in the health system and usually assumed if they are part of the public health services; those in the private sector do not perform these roles. These are areas of emphasis, as they are not usually taught in medical school.
This training module for public health teaching in undergraduate medical schools has been developed in collaboration with the Department of Preventive and Social Medicine, Faculty of Medicine, Chulalongkorn University, Thailand. It is key study material for the World Health Organization (WHO) Regional Office for South-East Asia Regional Training Programme on Improving Teaching of Public Health in Undergraduate Medical Schools and is organized into six modules to match the first six modules of the Regional Training Programme.

It primarily aims to provide the staff and faculty of medical schools in the South-East Asia Region, particularly those who will be actively involved in the design and implementation of public health teaching in medical schools, with the latest evidence and knowledge on the subject. For example, the medical school faculties and teachers who are responsible or involved in public health teaching, medical education specialists or other medical educators who are in charge of overall medical curricula or academic coordinators and Institutional leaders who are involved in medical education policy, such as the medical school deans or vice deans for academic affairs.

The important contributions of the experts and participants in the Regional Consultative Meeting on Regional Training Programme on Public Health Teaching in Undergraduate Medical Education, 1921 September 2012, Bangkok, Thailand, and the Regional Meeting to Review Progress in Strengthening Teaching of Public Health in Medical Schools, 1113 December 2013, Pattaya, Thailand, in reviewing, updating and finalizing the training modules and guidelines are much appreciated.