

Application of Epidemiological Principles for Public Health Action

Report of a Regional Meeting
SEARO, New Delhi, 26–27 February 2009

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Organization**

Regional Office for South-East Asia

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Acronyms

AI	avian influenza
AIIMS	All India Institute of Medical Sciences
ARI	acute respiratory infection
ASEAN	Association of Southeast Asian Nations
CD	communicable diseases
CDC	US Centers for Disease Control and Prevention
CM	community medicine
CSR	Communicable Disease Surveillance and Response
cVDPV	circulating vaccine-derived polioviruses
DALY	disability-adjusted life year
ETEC	enterotoxigenic <i>Escherichia coli</i>
FE	field epidemiology
FETP	Field Epidemiology Training Programme
GAP	Global AIDS Programme
GHG	greenhouse gases
HDSS	Health and Demographic Surveillance Systems
HMIS	Health Management Information Systems
HTM	HIV, TB and Malaria
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh
ICMR	Indian Council for Medical Research
ICT	information and communication technology
IDSP	Integrated Disease Surveillance Programme
IEA	International Epidemiological Association

IHR	International Health Regulations
IMCI	Integrated Management of Childhood Illnesses
INCLEN	International Clinical Epidemiology Network
IPCC	Intergovernmental Panel of Climate Change
M&E	monitoring and evaluation
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MDR	multidrug-resistant
MoH	Ministry of Health
MoPH	Ministry of Public Health
NCD	noncommunicable diseases
NICD	National Institute of Communicable Diseases
NIE	National Institute of Epidemiology
NIN	National Institute of Nutrition
NIOH	National Institute of Occupational Health
OPV	oral polio vaccine
ORS	oral rehydration solution
PEPFAR	United States President's Emergency Plan for AIDS Relief
PHC	primary health care
PHFI	Public Health Foundation of India
PMTCT	prevention of mother-to-child transmission (of HIV)
PRRS	porcine reproductive and respiratory syndrome
PSM	Preventive and Social Medicine
SARS	severe acute respiratory syndrome
SEA	South-East Asia

SEARO	Regional Office for South-East Asia (of WHO)
TB	tuberculosis
ToT	training of trainers
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
WHO	World Health Organization

1. Introduction and objectives

Epidemiology can be defined as “the study of the distribution and determinants of health-related states and events in defined populations and the application of this study to the control of health problems”. Epidemiological findings have immediate relevance for the formulation of health policies. The application of several analytical methods of epidemiological study has contributed substantially to the understanding of disease causation, and therefore to the control and prevention of many conditions of great public health importance. In view of the challenges posed by the recent economic crisis, climate change, emergence of new infectious diseases, rising burden of noncommunicable diseases (NCDs), and the continuing problems of high child and maternal mortality, a need was felt to strengthen the culture of epidemiology in the South-East Asia (SEA) Region.

To this end, a meeting on the “Application of epidemiological principles for public health action” was organized by the World Health Organization Regional Office for South-East Asia (WHO/SEARO) on 26–27 February 2009, with the following objectives:

General

- To strengthen national capacity in epidemiology and its application for programme development and management in the SEA Region

Specific

- To review the importance and relevance of epidemiology and its concepts: (a) to better understand the challenges to global health security; (b) for national programme development and management in the SEA Region; and (c) for addressing current crises such as the financial crisis and health impact of climate change;
- To share experiences among countries regarding current training activities, the challenges and potential opportunities for capacity building of the epidemiological workforce in the Region;

- To facilitate networking and collaboration among epidemiological institutions, experts within and outside the Region, and between the epidemiology workforce and national programmes; and
- To agree on the recommendations and follow-up actions for strengthening epidemiological capacities at various levels of the health-care system and for the application of epidemiological concepts as an integral part of programme planning, development and management.

The meeting consisted of presentations, discussions and group work (see Annex 1 for agenda of the meeting) and was attended by representatives from all 11 Member States of the Region, experts from national and international organizations, as well as from WHO HQ and SEARO (see Annex 2 for list of participants). The meeting was chaired by Dr Shiv Lal, Special Director-General Health Services (Public Health), Government of India, and co-chaired by Dr Nyoman Kandun, former Director-General of Communicable Diseases, Indonesia. Dr Virasakdi Chongsuvivatwong, Professor of Epidemiology, Prince Songkhla University, Thailand was the Rapporteur.

2. Opening address

Dr Samlee Plianbangchang, WHO Regional Director for South East Asia, welcomed the participants and said that the meeting was both timely and relevant. Remarkable improvements have taken place over the past century in the quality of life and longevity, and there have been positive outcomes in controlling communicable diseases. Newer antimicrobials and vaccines have been developed and their efficient use has led to a reduction in communicable diseases (CDs). Access to quality health care by the underprivileged has increased manifold. The application of public health tools has been crucial for this success. These achievements are an inspiration to pursue efforts in the quest for better health of people in the world and in the Region.

The fight against disease is far from over. Unknown and re-emerging pathogens pose new challenges. The threat of infectious diseases is a threat to global health, security and socioeconomic progress. With the rapid changes in lifestyle and an ageing population, NCDs are fast emerging as problems of public health importance. Maternal and child mortality is still high in many countries of the Region. Environmental changes and their effects on health are also areas for concern. Through an epidemiological approach, these health problems can be addressed.

The impact of the achievements in controlling diseases has slowed and public health gains may even be reversed. There is a need to strengthen preparedness, surveillance and response to effectively prevent disease outbreaks. In addition, effective implementation of the revised International Health Regulations (IHR), 2005 needs epidemiological back-up.

To ensure increased effectiveness and efficiency of public health interventions, past experience is important. To prepare for emerging threats such as climate change, there is a need to enhance the use of epidemiological tools in health management, and develop the competence to interpret and analyse data. Epidemiologists should not only deal with the physical aspects of disease but also the social, ecological, psychological, economic and political aspects.

While expanding the public health workforce, a critical mass of epidemiologists must be built up. The SEA Region has many years of experience in developing public health interventions; these should be

utilized to the maximum. WHO helps in networking of public health and epidemiological institutes; this promotes coordination and cooperation as well as sharing of expertise. Such networks contribute positively to public health and every opportunity should be taken to promote intercountry capacity building.

Epidemiology is the main thrust of public health and an indispensable tool for public health policies and practices. Epidemiological tools increase analytical capacity. The role of epidemiology in improving health must be recognized and appreciated, the Regional Director added.

3. Epidemiology, its history, concepts and new paradigms

*David Heymann**

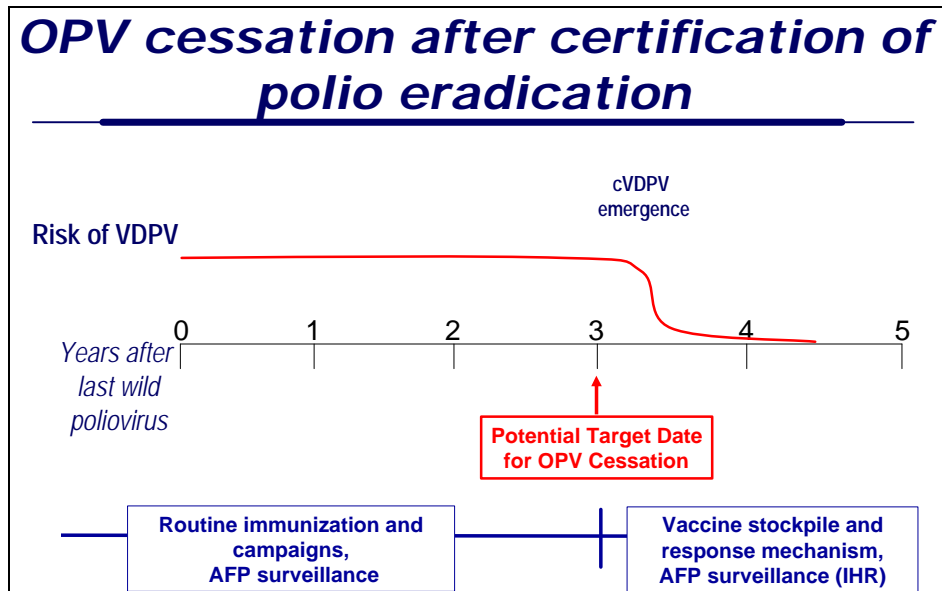
The success of disease eradication and control through the use of epidemiological tools is possible as exemplified by global campaigns against smallpox, polio, Ebola and avian influenza. In 1967, WHO decided to eradicate smallpox after an epidemiological analysis showed that this was feasible. With worldwide commitment, smallpox was finally certified to have been eradicated from the world in 1980. However, three years after the start of the eradication campaign, monkeypox, a disease similar to smallpox, was identified. It had not been recognized till smallpox eradication efforts were launched. Humans vaccinated against smallpox appeared to be protected against human monkeypox infection. Several sporadic cases in West and Central Africa raised the question of whether the epidemiology of human monkeypox was changing as immunity from smallpox vaccination waned. Epidemiological analysis showed that intensified surveillance for monkeypox must continue.

While several countries have eradicated polio, it is endemic in four countries and spreading. In 2000, there was an outbreak of 22 cases of polio in Hispaniola, which had been certified free from polio for the past 10 years. Between 2000 and 2009, circulating vaccine-derived polioviruses (cVDPV) were found to cause outbreaks in other parts of the world as well. An Expert Consultation on VDPVs held in 2003 in Geneva concluded that after the interruption of wild poliovirus, continued use of oral polio vaccine (OPV) would compromise the goal of a polio-free world. All countries must stop vaccination and destroy all remaining stocks of the vaccine.

Between July 2007 and June 2008, a new disease emerged in the Philippines among swine named porcine reproductive and respiratory syndrome (PRRS). Examination of specimens from sick swine showed the presence of a filiform virus similar to the Ebola Reston virus. At least 25 human cases in contact with sick swine have been reported, most of them asymptomatic. A risk assessment puts the consequences of infection for human health as moderate to high, and highlights the need for long-term monitoring. Nationwide surveillance is being conducted.

* Assistant Director-General, Health Security and Environment, WHO HQ, Geneva

Figure 1. Cessation of oral polio vaccination after polio eradication



Avian influenza (AI), caused by the H5N1 strain of influenza A, is among the most important pandemics of the 20th century. Epidemiological tools were used to identify the causative organism and study the risk factors for the disease. A vaccine has also been developed to protect against the disease. WHO has a network of 124 collaborating centres worldwide to monitor trends and contain infection.

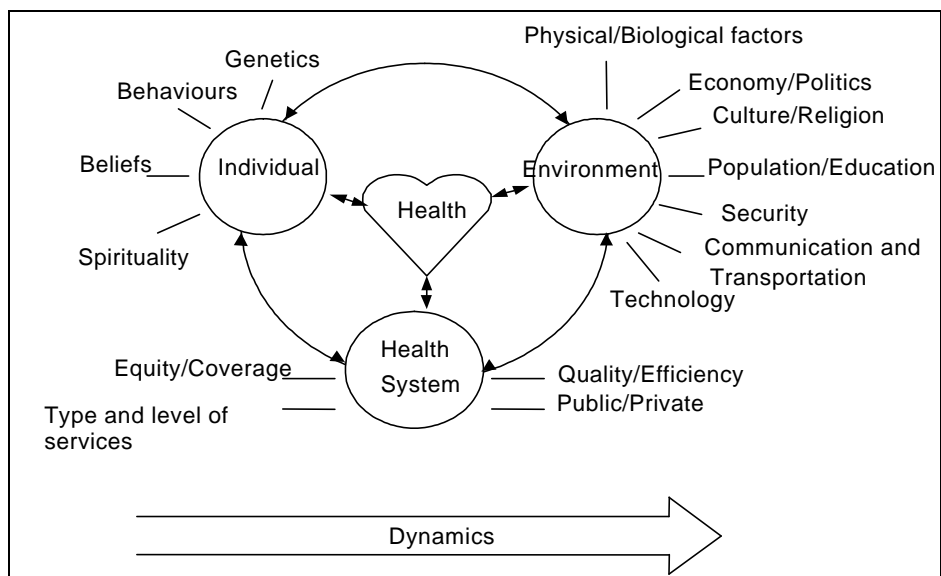
In the future, new infections with uncertain epidemiological potential will continue to emerge. Known infections will continue to re-emerge, sometimes in new and altered forms. The epidemiological questions that arise with emerging and re-emerging infections are: (i) Will there be human illness and, if so, how severe? (ii) Will there be human-to-human transmission? If so, will it be sustained? (iii) Is the pathogen stable? If not, will risks to human illness and human-to-human transmission be altered? Epidemiological skills are needed to assess and manage the risks.

4. Epidemiology in the context of current crises

4.1 The global economic crisis*

The current economic crisis would impact on health in many ways, as the economy and health are linked. Factors that influence health can be grouped into three – those relating to the individual, the environment and the health system. These factors are interconnected as seen in Figure 2.

Figure 2. Interplay of health with other factors



Source: Wibulpolprasert S. *Thailand health profile, 1999–2000*. Bangkok, Ministry of Public Health, Express Transportation Organization, 2002.

In general, economic downturn causes a reduction in household income. This in turn decreases a household's consumption power of food and non-food items. Financial instability and an economic downturn are likely to cause a devaluation of currency. With the increase in price of imported goods and raw materials, the costs of living will rise. Reduction of income and an increase in the prices of goods, especially food and medicines, will change the pattern of consumption and/or reduce the consumption of goods and services.

* Jongkol Lertiendumrong, International Health Policy Programme, Ministry of Public Health, Thailand

In earlier crises, there are many examples of the consequences of economic downturn on health and health systems. Regarding health, a number of reports have noted change in nutrition status, morbidity, mortality, as well as mental health impacts. Regarding health systems, a reduction in health-care utilization and health expenditure have been noted.

The characteristics of the impact depend on the severity of the crisis and the contingency of each country/area. Key points for assessing these impacts are a concrete framework for a particular aspect of assessment and indicators to monitor it, adequacy of data and timeliness of analysis.

Interventions to mitigate health impacts include having a social safety net to ensure income, health care and food. In the long term, universal coverage of health security, provision of primary health care and girl child education are of help.

Thailand has put in place the following to mitigate the impact of the economic crisis:

- (1) A crisis monitoring unit, which monitors macroeconomic indicators, economics of households, health status, health financing information, health provider information, social issues; and
- (2) Active intervention activities such as a booklet of essential information for the unemployed.

4.2 Climate change and its impact on health: role of epidemiology*

The most important cause of climate change is the emission of greenhouse gases (GHG), mainly carbon dioxide, by industry, transport, deforestation. Climate change (global warming) can potentially cause several problems and will cost the world at least 5% of the gross domestic product (GDP) every year.

* Jai P Narain, Director, Communicable Diseases, WHO/SEARO

The fourth report of the Intergovernmental Panel on Climate Change (IPCC) in 2004 provided some key messages based on 70 000 studies:

- Climate change is happening now;
- Health impacts are occurring;
- The impacts will continue for decades after successful control of GHG emissions; and
- The extent of health impacts will depend on our ability to design and implement effective adaptation measures.

Climate change may have a direct impact on health such as extreme weather conditions leading to coastal flooding, migration, displacement of people and social conflicts.

Indirect impact of climate change: Climate change increases health vulnerability. A rise in surface temperature may alter the distribution of vector species, such as those for malaria and dengue. Episodes of diarrhoea and zoonotic diseases are also more common.

WHO has identified five major health risks as a consequence of climate change. These include an increase in

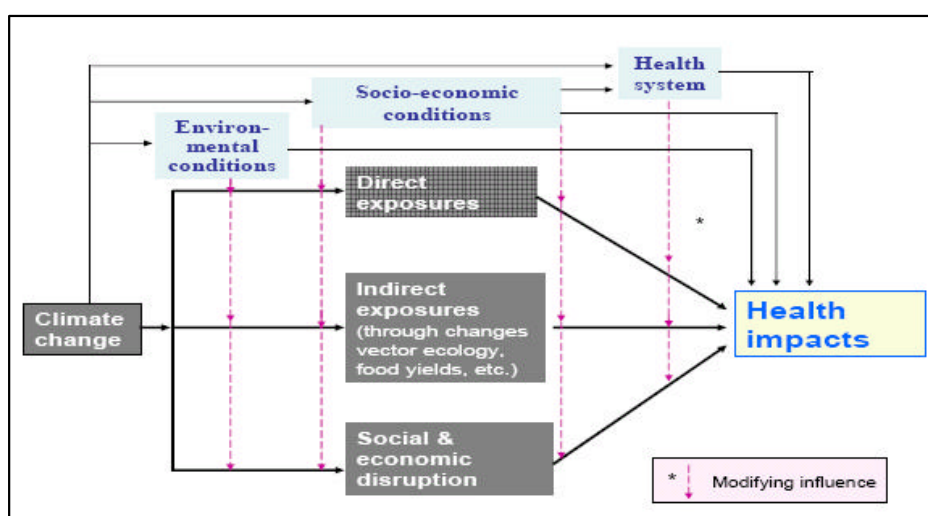
- (1) malnutrition, following frequent droughts and floods that compromise food security.
- (2) Potential acute deaths due to extreme weather events,
- (3) Diarrhoeal diseases including cholera outbreaks contributed both by water scarcity and excess water,
- (4) Cardiovascular and respiratory diseases such as asthma following heat waves, and,
- (5) Vectorborne and rodent-borne diseases such as malaria, dengue and leptospirosis due to changing temperatures and patterns of rainfall that would alter the geographical distribution of vectors and carriers.

Epidemiology can be used to mitigate the impact of climate change:

- (1) Epidemiology helps to communicate risk and design a response.
- (2) It helps in generating scientific evidence on health impact through research studies and developing adaptive strategies. It also helps in making projections through modelling.

- (3) It helps by strengthening public health systems.
- (4) A national multisectoral plan can be formulated and implemented.
- (5) Epidemiology also helps in reducing vulnerability and protecting the poor by identifying the characteristics of the exposed group and implementing actions to respond to these.

Figure 3. *Impact of various factors on health*



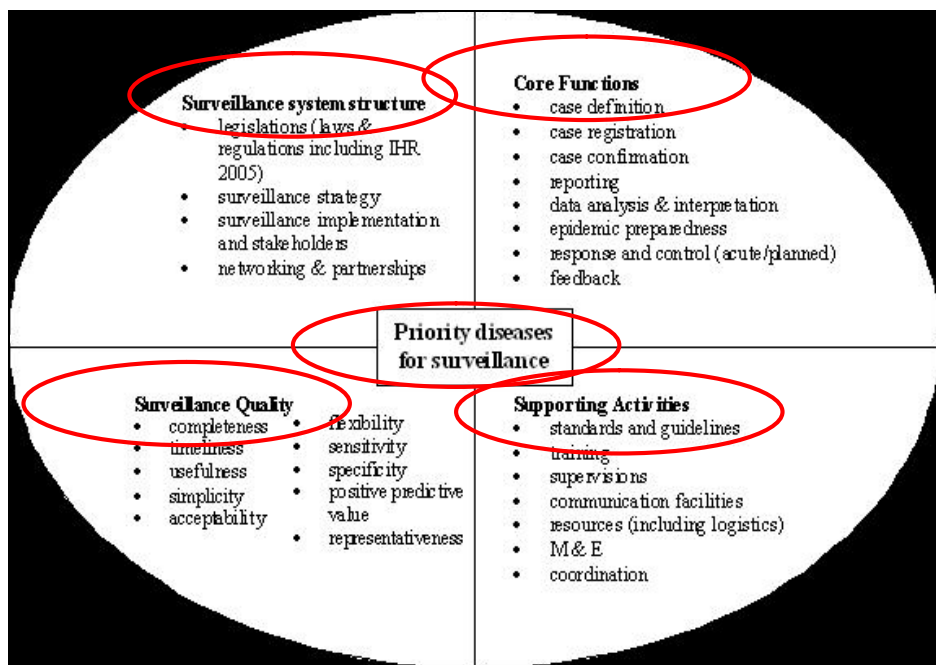
4.3 Emerging infectious diseases and international health security*

The emerging infectious diseases can take a heavy toll in many ways. They can cause epidemics or pandemics, pose a risk for travellers and have trade implications. They can threaten population development and prosperity. They have high case fatality rates as the diseases are unknown and no treatment may be available. Examples of emerging infectious diseases include SARS, Nipah virus, avian influenza (AI) A H5N1 and Hanta virus disease. Other diseases of regional importance include those caused by the chikungunya, Japanese encephalitis and Ebola Reston viruses, as well as multidrug-resistant (MDR) tuberculosis (TB).

* Nyoman Kandun, Former Director-General of Communicable Diseases, Indonesia

The preparedness and capacity to respond to emerging and re-emerging diseases has catalysed the public health world. After the global outbreaks of SARS in 2003, many countries developed national centres for disease control, strengthened capacity for outbreak response through rapid response training, and use of mathematical models to help predict diseases spread based on reproductive rates and other epidemiological factors. This is despite the challenges in many countries of decentralized systems of government and increasing economic turmoil.

Figure 4. Surveillance for emerging and priority diseases



The International Health Regulations (IHR), 2005 define the rights and obligations of countries, and require them to report certain disease outbreaks and public health emergencies of international concern to WHO. WHO guidance suggests that public health systems need to select priority diseases for surveillance, including emerging diseases or animal–human interface activities that may signal new diseases. The key requirements to support surveillance capacity are a structure that can enable national surveillance, and core functions that enable step-by-step collection and feedback of epidemiological data. Social/anthropological factors are also

important for public health action. Outbreak investigations and social research have helped in responding to AI in Indonesia.

While preparedness for emerging infectious diseases is better than it was 10 years ago, the risks to progress are a wavering commitment to the strategies, unreliable funding and donor aid, and mixed messages from national politicians and regional political bodies.

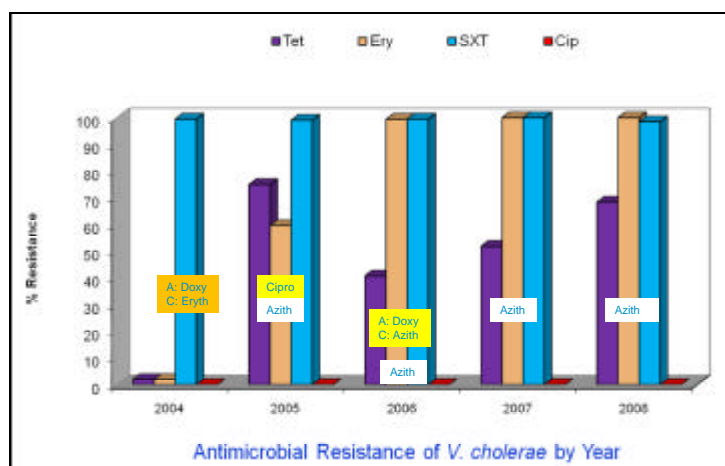
5. Importance of the laboratory in supporting epidemiology for public health action

*Alejandro Cravioto**

The laboratory and epidemiology working closely together can help solve many public health problems in developing countries, for example Bangladesh. Surveillance carried out at ICDDR,B has helped demonstrate that *Vibrio cholerae* had mutated to more virulent types and developed antimicrobial resistance to various antibiotics over the years. By including every 50th person in the surveillance programme at ICDDR,B, it has been possible to detect the seasonality and the interplay of intrinsic and extrinsic factors on cholera outbreaks with global climate cycles (e.g. *El Nino*). Herd immunity conferred by killed cholera vaccine was also confirmed through epidemiological analysis of data.

Health and Demographic Surveillance Systems (HDSS) facilitate analyses of health, socioeconomic and demographic data from well-defined populations. ICDDR,B has several HDSS sites. A variety of environmental and socioeconomic characteristics, disease risk factors, use of health facilities, etc. are being studied at these sites.

Figure 5. Evidence-based antimicrobial therapy for cholera



* Executive Director, International Centre for Diarrhoeal Disease Research Bangladesh (ICDDR,B)

Laboratory surveillance helped to identify arsenic contamination of drinking water, which had caused a 17% increase in infant mortality, and 14% increase in foetal loss. Community-based studies of enterotoxigenic *Escherichia coli* (ETEC) on a birth cohort found that symptomatic initial infection protects against symptomatic reinfection with ETEC. The distribution of rotavirus G-type was studied to assess whether rotavirus vaccine affected the uptake of oral polio vaccine. However, there was no decrease in the seroprotection afforded.

Influenza surveillance in Bangladesh is done for influenza A (A/H1N1, A/H3N2) and B (B/Shanghai B/Hong Kong). Surveillance for AI was set up in April 2007 and aims to identify individuals and clusters of severe infection with influenza, characterize the diversity of circulating strains of the virus, conduct laboratory analysis and identify oseltamivir resistance. So far, all strains have been found to be sensitive to oseltamivir. Resistance to adamantanes was also identified through laboratory analysis.

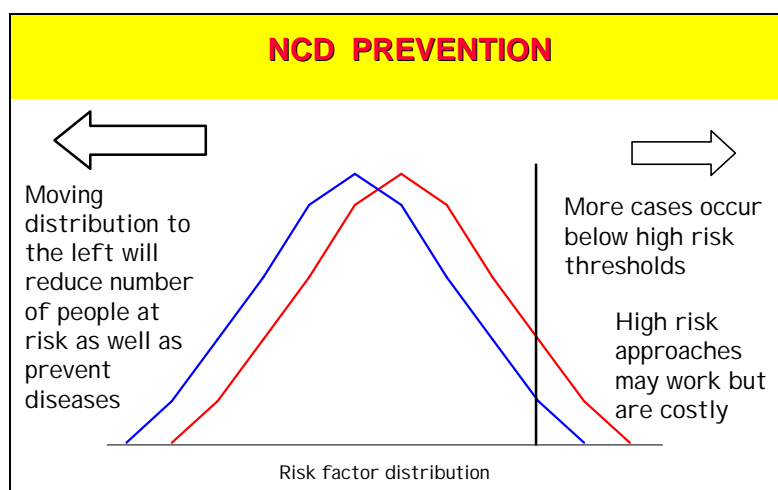
6. Epidemiology and chronic noncommunicable diseases

*U Than Sein**

The emergence of noncommunicable diseases (NCDs) is a major public health challenge in the Region, and epidemiology can help overcome this challenge. As of 2005, according to WHO estimates, NCDs accounted for 54% of all deaths and 44% of the disease burden. NCDs are becoming increasingly common among younger people, the poor and marginalized populations. Premature morbidity and mortality in the most productive phase of life poses a serious challenge to society.

Among the various risks for NCDs, three risk factors – hypertension, use of tobacco (smoking/chewing) and abnormal blood lipids – contribute to a large number of deaths in the Region. Other risk factors are a raised blood glucose level (diabetes), unhealthy diet, physical inactivity, overweight and obesity. Beyond these risk factors, there are social, economic, cultural and political determinants such as rapid globalization and trade liberalization, uncontrolled urbanization, and improved communication and technology. These are largely outside the domain of the health sector.

Figure 6. Prevention of noncommunicable diseases



* Former Director, Department of Noncommunicable Diseases and Mental Health, WHO/SEARO

WHO established a Commission on the Social Determinants of Health in 2005 to study risk factors and their socioeconomic determinants, and develop a global agenda beyond the health sector. An NCD framework for prevention calls for the concomitant application of population-based strategies and approaches that are complementary and interlinked to modify the unhealthy behaviours of individuals, communities and populations in the most cost-effective way. Even a small shift in the average population levels of several risk factors can lead to a large reduction in the burden of chronic disease.

Stopping the global and local epidemic of NCDs can save 36 million lives worldwide. What needs to be done is known and the solutions are inexpensive, cost-effective and easy to apply widely.

Modern epidemiology, which is the study of the dynamics of health problems in a population, is the basic discipline of public health. While there may be different perceptions and definitions of epidemiology, its application, especially in preventing and controlling NCD, needs to be simplified and demystified. The basic definition of epidemiology- the study of the distribution and determinants of health-related states and events in a population and the application of such study to solve health problems, remains valid. In addition, epidemiology can be applied as an effective instrument in designing and evaluating health policies and plans. The common inclination to associate the word epidemiology exclusively with disease causation, epidemics and communicable diseases is no longer valid, and the study of diseases goes beyond the secondary and tertiary levels of causation and, as in the case of NCD, this means the study of risk factors and their determinants.

The major challenge in most countries of the SEA Region is an inadequate number of epidemiologists to handle the prevention and control of NCD. Training programmes on epidemiology largely focus on the epidemiology of communicable diseases. Suitably trained human resources at each level of the national health administration, including health research and education institutions, have remained a constraint to wider-scale application of epidemiology for the prevention and control of NCD. The use of epidemiological principles in public health can ensure a reduction in the disease burden due to NCD in the Region.

7. Role of epidemiology in achieving MDGs 4 and 5: the example of Bangladesh

*Shams El Arifeen**

Achieving the Millennium Development Goals pertaining to child and maternal health (MDGs 4 and 5) is a major challenge in the SEA Region and some countries have made good progress. In this context, Bangladesh has set a target of reducing by two-thirds, between 1990 and 2015, the under-five mortality rate and of reducing the under-five mortality rate from 151 deaths per 1000 live births in 1990 to 50 by 2015. Over the past few years, there has been some decline in child mortality in the country. While the decline has been substantial in the proportion of under-5 deaths due to diarrhoea, this is not so in the case of acute respiratory infections (ARI). Marked improvement has also occurred in child immunization rates. Neonatal deaths constitute almost half of the under-5 deaths in Bangladesh as skilled attendance at birth remains poor. Exclusive breastfeeding rates are also not improving at all.

Bangladesh will most likely achieve the MDG4 targets for under-5 mortality, though there is faltering in many key interventions. Targeting is critical, given the limited resources.

Millennium Development Goal 5: Reduce Maternal Mortality

Target: Reduce by three-fourths, between 1990 and 2015, the maternal mortality ratio.

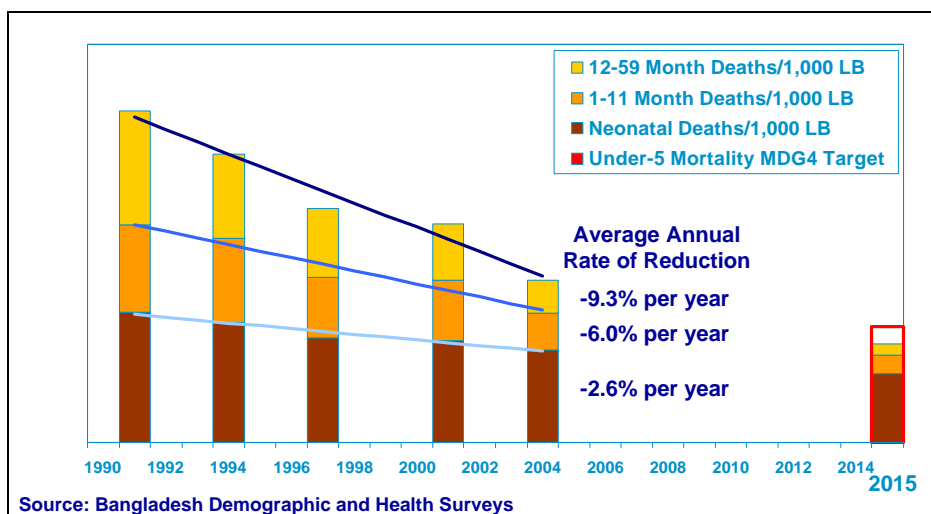
Bangladesh target: Reduce maternal mortality ratio from 570 deaths per 100 000 live births in 1990 to 143 by 2015.

Present status

The projected rate of decline is 3.2% annually, while the rate required to achieve the MDG target is 5.1% annually. The causes for the slow decline include socioeconomic inequity in the use of maternal health-care services, low utilization of skilled care during pregnancy and delivery, and lack of completeness of maternal care.

* International Centre for Diarrhoeal Disease Research Bangladesh (ICDDR,B)

Figure 7.: *Bangladesh is on target for MDG4*



Epidemiology can help in achieving MDGs 4 and 5 by providing data on deaths and ill health, an assessment of evidence-based, cost-effective interventions, and how well these interventions are being scaled up.

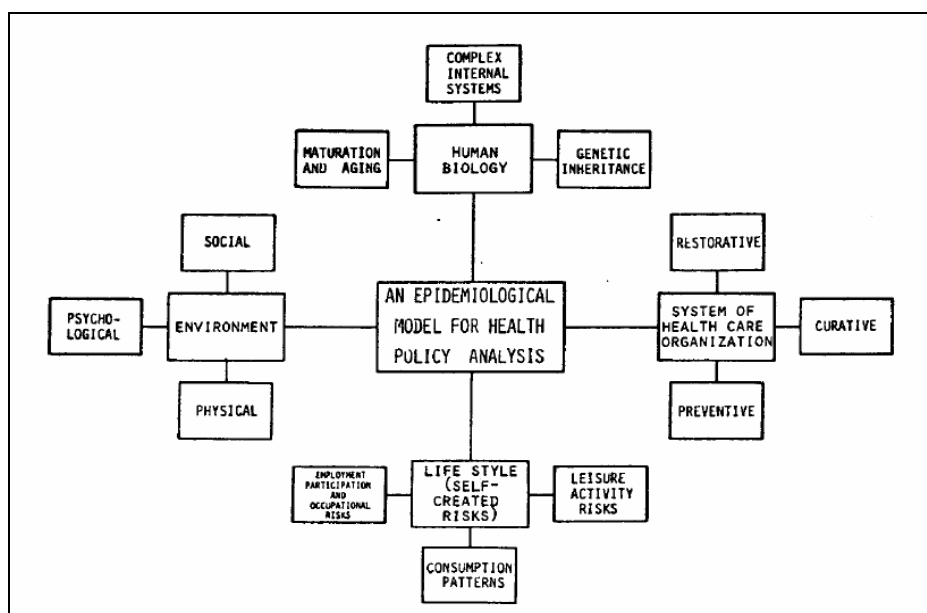
8. Epidemiology and its application in health policy development and programme planning

*N. Kumara Rai**

The population based perspective on epidemiology fits well with the objectives of health care management. The notion of managerial epidemiology has been coined. Managerial epidemiology is thus defined as the use of epidemiology for designing and managing the health care of populations; or the study of the distribution and determinants of health and disease in specified population and the application of this study to the promotion of health, prevention and control of disease, design of health-care services to meet population needs and the elaboration of health policy

There is a close link between epidemiology and health policy development, which is a part of policy analysis as well as the planning cycle. An epidemiological model for health policy analysis is shown in Figure 8.

Figure 8. Epidemiological model for health policy analysis



* Ag Director, Health Systems Development, WHO/SEARO

Application of the model involves the following:

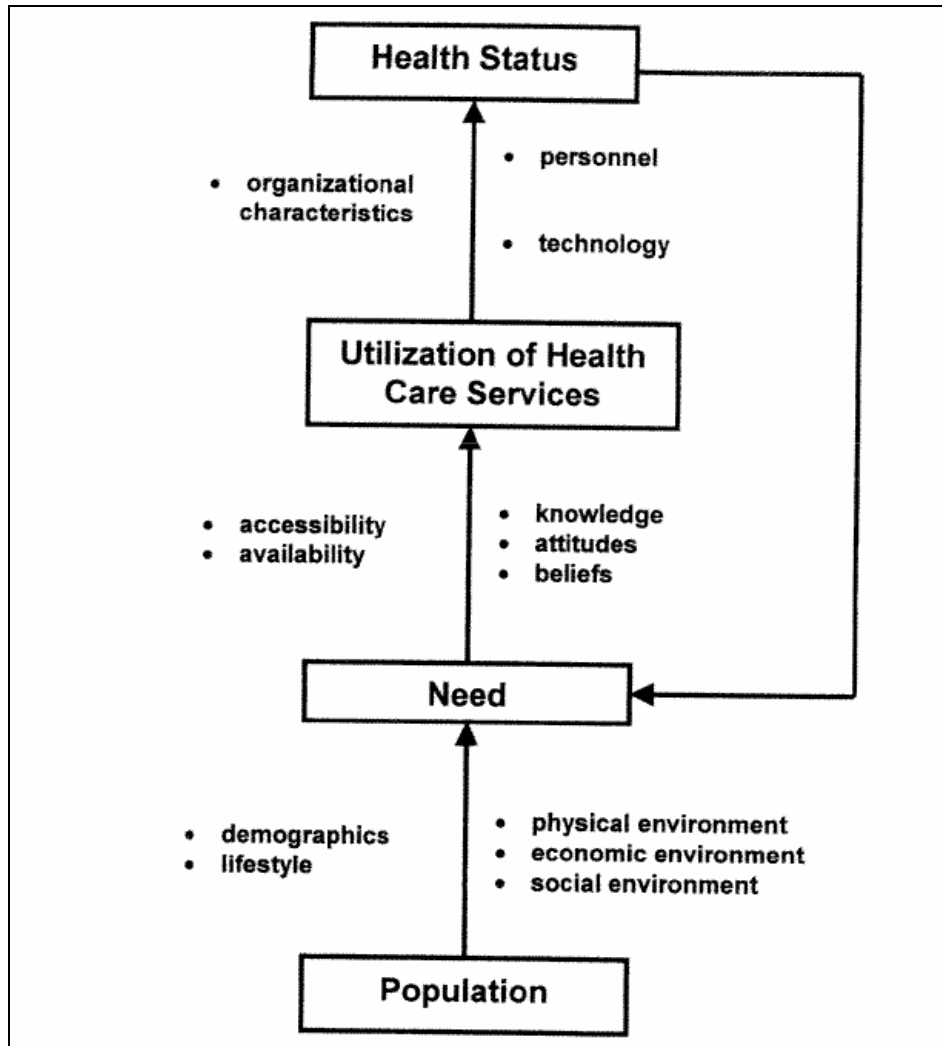
- (1) Select diseases that contribute substantially to the overall mortality and morbidity or burden of disease, usually measured in disability-adjusted life years (DALYs).
- (2) Proportionately allocate the contributing factors of the disease to the four divisions of the epidemiological model.
- (3) Proportionately allocate total health expenditures to the four divisions of the model.
- (4) Determine the difference in proportions between 2 and 3 above.

However, he cautioned that epidemiology should be complemented by other quantitative approaches from the social sciences, as well as qualitative and historical studies.

An epidemiological model can also be used for the delivery of health-care services. Epidemiological techniques can be used to monitor the health system, and organizational and programme performance. There is a continuous need to reform the health-care system to fit the changing physical, economic and social environment.

An epidemiological model for the delivery of health-care services as illustrated in Figure 2 can be used. Programme planning can be initiated once policy statement is available. In reality, policy guides the manner in which programmes and projects are planned. Each step in the model uses epidemiology to a lesser or greater extent.

Figure 2. *Epidemiological Model for the delivery of health care services*



From the epidemiological model described above, it should be clear that a *basic knowledge of epidemiology is essential* for delivering health care services that cover:

- Monitoring population size
- Distribution of health needs in a population using epidemiological measures by asking “**Who** is affected? **When**? **Where**?”

- How the health-care system and organizational characteristics impact the health status
- Monitoring of the health system, organizational and programme performance with *epidemiological techniques*
- The continuous need to reform the health care system, organization and processes to fit the changing physical, economic and social environment
- *Development* and evaluation of public *policy* affecting health-care delivery

9. Building capacity of the epidemiology workforce in the South-East Asia Region (Panel discussion)

9.1 Field epidemiology training programme (FETP): lessons learnt and plans

*FETP in Thailand**

Thailand established an FETP programme in 1980 as a special project in collaboration with the Ministry of Public Health (MoPH), WHO and the US Centers for Disease Control and Prevention (CDC) to respond to the needs of public health services in the country. An international training programme was developed in 1997 and it became a WHO-designated Collaborating Centre in 2001. As of 2008, the course has produced 140 graduates.

The FETP has helped to strengthen disease surveillance in countries belonging to the Association of Southeast Asian Nations (ASEAN) and a Mekong Basin Disease Surveillance Network has been established. Hepatitis B and measles vaccines have been introduced into the national immunization programme. The nervous tissue derived rabies vaccine that was associated with severe adverse effects has been replaced with safer tissue culture vaccines. Guidelines for surveillance and training of hospital personnel to prevent hospital-acquired infections have also been developed.

HIV sentinel serosurveillance and HIV risk behaviour surveillance have been initiated, and a national programme for the prevention of mother-to-child transmission (PMTCT) of HIV has been established. The FETP has also been participating in AI case investigation.

Future plans include networking among epidemiology training institutions in the Region, developing a database of centres of excellence and experts, and identifying six centres in the Region with the potential to start FETPs and providing technical support to them.

* Khanchit Limpakarnjanarat, DSE/CDS, WHO/SEARO

FETP in India: National Institute of Epidemiology*

At the National Institute of Epidemiology (NIE), the FETP programme at present accepts only in-service candidates sponsored by the health system for training. Candidates spend 75% of the course duration on field assignments in the district. They work on priority health issues in the district which benefit the health system. However, states need to identify career pathways for them. Many of them become part of the Integrated Disease Surveillance Programme (IDSP).

NIE collaborates with the National Institute of Communicable Diseases (NICD) and has video-audio links with NICD and the CSR Unit of WHO/SEARO. There are plans to open the programme to candidates from other countries in the Region, and those from disciplines other than medicine, e.g. veterinarians and non-sponsored candidates. Short one–two weeks' courses are also planned. In addition, on-site training of medical officers and skills-oriented training are in the pipeline.

FETP in India: National Institute of Communicable Diseases (NICD)**

The NICD has been a WHO Collaborating Centre for Epidemiology and Training since 1996. NICD offers both short- and long-term courses. Training has evolved gradually from a three-month national FETP course in 1963-64 to a two-year Master's degree in Public Health (FE) in 2006. AN MPH course is also conducted. Several other need-based training programmes are also offered. Core capacity development for the IDSP is under way.

About 50 laboratories have been identified and strengthened. Reference laboratories have also been identified at the district level and a network of 11 laboratories identified for the surveillance of AI.

NICD is called upon to conduct extramural programmes in field epidemiology in SEAR countries such as Bhutan, Myanmar and the Maldives. Future plans include cooperation with other FETPs in SEAR, holding more extramural training in SEAR countries, conducting an EPI-Week in collaboration with NIE and WHO, and upgrading to a national Centres for Disease Control (CDC), India.

* V Kumaraswami, National Institute of Epidemiology (Indian Council for Medical Research), Chennai

** Shiv Lal, Special DGHS (PH) and Director, NICD, Delhi

FETP in Indonesia*

The FETP programme in Indonesia began as a two-year, full-time programme in 1982. The first five batches did not get a degree. From the sixth batch, a Master's degree is awarded.

Initially, 75% of the training was in the field and 25% in the classroom, but later this proportion was reversed. Due to lack of funding, the course is becoming shorter and other programmes that supplement epidemiological skills such as the Nurse ETP (NETP) have been stopped altogether. To revitalize the course, joint training by the Ministry of Health (MoH) Indonesia, participating universities and a select group of universities is planned. A secretariat will be established at the MoH for overall management of the FETP. The programme will revert to the original proportion of 75% field work and 25% classroom work.

In future, it is hoped that there will be at least one FETP graduate in every district.

9.2 Epidemiology training in medical schools/schools of public health

India: All India Institute of Medical Sciences (AIIMS), New Delhi**

Training in epidemiology in India is available as a part of the MBBS course, as a diploma in Public Health/Community Medicine as well as in other courses such as Master of Science (Epidemiology/Clinical Epi.), MPH in schools of Public Health, MPH in different universities, MD Community Medicine, MPhil/DSc/PhD in Public Health as well as in short course/workshops in epidemiology, and as part of the curriculum in courses in allied sciences, e.g. Masters in Nutrition. The undergraduate epidemiology training in India is provided as a part of Community Medicine training through 269 Departments of Preventive and Social Medicine (PSM)/Community Medicine (CM), of which 90 are in private institutions.

There are at least 15 medical schools or institutions in India which are offering post-graduate epidemiology courses such as the All India Institute

* I. Nyoman Kandun, former Director-General Communicable Diseases, Indonesia

** Chandrakant S. Pandav, Centre for Community Medicine, All India Institute of Medical Sciences, New Delhi

of Health and Public Hygiene, Kolkata, All India Institute of Medical Sciences, New Delhi, Post -Graduate Institute of Medical and Research, Chandigarh, Indian Council for Medical Research, New Delhi – satellite institutes (National Institute of Nutrition [NIN], National Institute of Occupational Health [NIOH], NIE, etc.) (FETP in Chennai and New Delhi), National Institute of Communicable Diseases, New Delhi, National Institute of Health and Family Welfare, New Delhi, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Achutha Menon Centre for Health Sciences Thiruvananthapuram, Kerala, School of Health Sciences, Pune, Institute of Health Systems, Hyderabad, Gandhigram Institute of Rural Health and Family Welfare Trust, Manipal Academy of Health Education, National Environmental Engineering Research Institute, Nagpur, Lions Aravind Institute of Community Ophthalmology, Madurai, and the Indian Institute of Health Management Research, Jaipur.

The All India Institute of Medical Sciences (AIIMS) which was set up in 1956 has both the rural health programme and the urban health programme. Residential rural health posting is a part of the curriculum for PSM for undergraduates and postgraduates. Undergraduates are required to do 110 hours of Family Health Advisory Services, and 150 hours each in the rural and urban health programmes. While the urban posting comprises didactic lectures and epidemiological exercises, the rural posting comprises field visits to various levels and types of health facilities, epidemiological exercises, as well as domiciliary visits to patients' homes. Students are required to publish a paper at the end of their training and participate in conferences. The Institute runs its rural programme in Ballabgarh near Delhi. The objective of the rural posting is to orient the undergraduate to community health so that students are able to delineate the various sociocultural, demographic and economic factors influencing a health problem at community level, and plan and execute a relevant intervention programme.

Postgraduate training in PSM at AIIMS is for a duration of 36 months and also comprises an urban and a rural posting. During the rural posting, they are guided by an expert who stays on-site.

*Integrating field epidemiology training with MD community medicine programmes: an example from India**

An innovative experiment on integrating field epidemiology training into the MD Community Programme was initiated in BJ Medical College,

* Yvan J. Hutin, WHO India Country Office

Ahmedabad as a part of the residency in MD community medicine which is the gold standard for public health training in India. Residents already know the basics of epidemiology but have not learned to apply them to outbreaks. The use of an incremental approach to add only what is missing in the classical training was attempted by the WHO India Country Office in a three-step pilot at the BJ Medical College, Ahmedabad to give MD students training in outbreak investigation.

In Step 1, a one-week induction course was held in June 2008, which comprised 50% lectures and 50% case studies. In Step 2, four teams of about four students each were trained in outbreak field work. A one-day workshop was held in Step 3 and students were evaluated using checklists (October 2008). The quality of their work was comparable to those who had done two-year FETPs. It was concluded that a one-week course with field work and post-assignment evaluation was successful in training MD residents in epidemiological principles and in outbreak investigations.

Next steps include institutionalizing the course in BJ Medical College followed by scaling up in Gujarat initially and countrywide later.

*Epidemiology training in Myanmar**

Training in epidemiology in Myanmar is provided at the undergraduate and postgraduate levels. Courses offered are the MBBS and Bachelor in Community Health programmes. Postgraduate public health education is offered through various courses. An MPH course is also available. The first batch of training of trainers (ToT) for FETP was held in 2008. The MoH plans to run a three-month FETP course which is expected to be expanded to diploma and master's courses.

Department of Preventive and Social Medicine introduce principles and concepts of epidemiology in fourth year curriculum of medical students. Epidemiology is taught as a tool for defining and identifying community and its needs, health status and problems. Health screening, surveillance, investigation of outbreaks, immunizations, prevention and control of diseases – both communicable and non-communicable diseases, etc. are the major content of the curriculum

* Myo Oo, Director, Department of Epidemiology, University of Public Health, Yangon, Myanmar

Apart from medical schools, universities and schools for allied health personnel such as health assistants, public health nurse, public health supervisors, lady health visitors, mid-wives provide competency-based epidemiological training in their curriculum activities.

For the MPH program, foundation courses in epidemiology are offered by Department of Epidemiology. The curriculum covers the following:

- (1) Principles of epidemiology: introduction on epidemiology, natural history of disease in man and levels of prevention, measures of disease frequency, epidemiological study designs (descriptive study, cross-sectional study, cohort study, case-control study, experimental study and randomized control trial), bias, confounding and interaction, surveillance, investigation of epidemics, screening, causal inference;
- (2) Epidemiological methods: measuring reliability and validity, matching and restriction, fundamentals of epidemiological analysis, stratification and adjustment, multiple regression methods for adjustment, quality assurance and control, communicating research findings, ethics in epidemiologic research, critical appraisal of published articles.

Challenges and opportunities for Myanmar include strengthening the public health workforce, capacity building of faculty, surveillance of diseases particularly NCDs, developing a database and networking, and developing communication skills.

9.3 Roadmap for the future*

Since the Calcutta Declaration of 1999, a number of new public health initiatives have been taken in Bhutan, Indonesia, Myanmar, Nepal and Sri Lanka. India has started the Public Health Foundation of India (PHFI) and FETP has been expanded in the Region. The SEAIPHEN network has also been established.

Specific actions to further strengthen epidemiology include:

* P Abeykoon, Acting Director, Department of Noncommunicable Diseases and Mental Health, WHO SEARO

- Advocating the need for quality epidemiology services and competent health personnel;
- Developing education and training plans in epidemiology for all health personnel to match the needs of service and research;
- Developing a cadre of good epidemiology teachers;
- Building the capacity of institutions, and creating a network of institutions;
- Using research/evidence for educational and training needs;
- Monitoring the progress and making corrections; and
- Keeping the momentum going.

10. Application of epidemiology for public health action: key action points

Overall policy and programme issues

The existing gaps

At present, use of epidemiology is not mainstreamed into the national programmes. Often, there is no public health presence in the department or ministries at higher levels.

The divide between providers (academic/researchers) and users (policy-makers/service providers) has not been bridged. Current programmes use data in the initial planning and action evolution process but not for mid-course correction or on an ongoing basis in the planning cycle. Data collectors do not communicate findings/conclusions to help decision-making; they do not transfer intelligence into information for action. There is a need for greater links between ministries and health systems and schools of public health/training centres/colleges at the level of problem analysis, problem formulation and solution.

What needs to be done to fill these gaps?

- Strengthen and promote a “culture of epidemiology” (evidence-based decision-making).
- Change pedagogy to strengthen this culture of questioning, thinking and analysis (interactive, participatory, practical field-oriented teaching).
- Allocate funds for health management information systems (HMIS) and operations research in programme planning to strengthen the basis for epidemiological capacity.
- Strengthen capacity at all levels – regional, national, state, district and local.
- Improve dialogue between trainers and policy-makers and the health system.

- Evolve country plans for the epidemiological competence needed at each level and generate action to create that competence.
- Ensure more planned policies and programmes.
- Increase capacity to use data at all levels by public health practitioners/providers.
- Integrate training and capacity-building resources, and efforts between programmes and funders for better sectorwide, integrated capacity building.
- Create a demand among health decision-makers by providing more knowledge of public health, and more access to information and the implications for action.
- Strengthen capacity for information and communications technology (ICT) at all levels.
- Advocate for a stronger level of public health thinking/culture/capacity at all levels.
- Enhance capacity building in epidemiological skills at all levels.
- Increase open access, web-based models/IT orientation and capacity in existing training programmes.
- Monitor the quality of all programme data and HMIS to strengthen the basis for epidemiological action.
- Strengthen epidemiological skills and use of data at all levels including for enhancing communication with the community.
- Promote disaggregation of all datasets to strengthen decentralized analysis and decision-making.

Maternal and Child Health (MCH) area

The existing gaps

There is inadequate capacity among programme managers for analysis and use of epidemiological data (routine reports, surveys, vital statistics and research studies). There is a lack of understanding of the social epidemiology of MCH issues such as malnutrition and mortality.

What can be done to fill these gaps?

- Develop a skills profile for national and sub-national programme managers.
- Conduct short-term training programmes to provide the necessary skills.
- Prepare materials for induction and in-service training.
- Strengthen the pre-service curriculum.
- Strengthen capacity to interpret research studies.
- Establish/identify technical resource centres/units to conduct programme evaluation.

Noncommunicable Diseases (NCDs)

The existing gaps

Gaps include a lack of an epidemiological basis for disease burden. There is a gap between analysis and translation of data for policy-making. Interventions are disease specific and not aimed at reorientation of the primary health care (PHC) approach, and promoting a healthy life based on risk factor prevention. Lack of a proper surveillance system and poor data management and dissemination are other gaps. NCDs such as cancers and environment-related diseases do not receive sufficient attention.

What can be done to fill these gaps?

These gaps can be filled by strengthening multidisciplinary research work, providing in-service training/continuing education programmes and reorienting epidemiologists. Revitalization of public health policy are additional ways of bridging the gaps. In addition, there is a need to:

- Develop standard protocols and combine evidence on disease burden, risk factors and health-seeking behaviour.
- Establish a surveillance system for NCDs (and the risk factors).
- Introduce intervention packages and promote health through behaviour change communication.

- Train health personnel.
- Support the role of civil society groups and the media in the prevention and management of NCDs.

HIV, TB, Malaria (HTM)

The existing gaps

Not enough is being done to streamline the use of epidemiology into programme development and implementation. Control of HIV, TB, and malaria is done through vertical programmes in most countries and there is centralization of epidemiology expertise. No feedback of data is provided from the central levels to the implementation level. The private sector is also excluded.

In addition, the quality of data is poor and data flow is not streamlined. Programme managers and policy-makers do not use data to identify and solve problems. Mapping and assessment of epidemiology needs for programmes is not done. There is a shortage of well-trained epidemiologists and career paths are not well-defined. There is not enough training at the decentralized level (implementers) and not enough interaction between epidemiologists and programme managers/policy-makers. A multidisciplinary approach is usually not followed or used in methodologies. In addition, funds invested in epidemiology are inadequate.

What can be done to fill these gaps?

Immediate actions include:

- Assessing human resource needs in epidemiology, and training and retaining an adequate number of epidemiologists through career planning.
- Coordinating exchange of information on research activities among different programmes by the MoH.
- Ensuring adequate funding (5–10% of the total programme budget).
- Sensitizing policy-makers in using epidemiological information for decision-making.

- Using the opportunity provided by the Global Fund for AIDS, Malaria and Tuberculosis to build health information systems/epidemiology capacity in the public and private sectors.
- Simplifying data collection so that they are used in a timely manner.
- Providing national fora to exchange information and promote translation of research into policy.

Medium-term actions include:

- Providing operational epidemiological tools/guidelines/job aids for health workers at different levels.
- Ensuring that the research agenda is driven by programme needs and priorities.
- Defining career paths for epidemiologists.
- Expanding outbreak epidemiological training modules to include HIV, TB and malaria.
- Meeting specific programme needs.
- Training epidemiologists to communicate well with policy-makers, programme managers, media, civil society.

Communicable disease surveillance and response (CSR)

The existing gaps

Although the use of epidemiology is more or less streamlined, and CSR is well versed in the use of epidemiological methods compared with other disciplines, there are many gaps. For example, trained staff needs to be recognized and used. There are too few qualified epidemiologists. Public health laboratories need strengthening. The quality of training needs to be ensured. Epidemiology should become more multidisciplinary. Training of trainers is needed to address the shortage of faculty. Finally, the power of information technology is not optimized. An overall regional strategy is needed. This would be better than a training- course-by-training-course approach. Cross-sharing of resources between various countries in the Region should be facilitated.

What can be done to fill these gaps?

- Develop a framework for quality assurance and monitoring and evaluation (M&E).
- Provide effective mechanisms to network epidemiologists with recognized status.
- Identify mechanisms to use FETP methods outside of the classical FETP programmes. This may require involving regional centres of excellence outside the public sector.
- Document and share the experiences acquired.

11. Networking, intercountry collaboraton and partnerships for epidemiology – challenges and opportunities ahead (Panel discussion)

*Public Health Foundation of India (PHFI)**

The Public Health Foundation of India was conceptualized as a response to the growing concern over the emerging public health challenges in India. It aims to meet the shortfall of health professionals to mount a sustained and holistic response to the public health needs of the country.

PHFI receives support through public–private partnerships. The mandate is (i) to establish eight institutes of public health in India; (ii) establish strong national networks and international partnerships for research; (iii) generate policy recommendations and develop a vigorous advocacy platform; (iv) facilitate the establishment of an independent accreditation body for degrees in public health; and (v) assist the growth of existing public health training institutions.

PHFI runs several short-term courses as well as postgraduate diplomas in Public Health Management; Biostatistics and Data Management; and Health Economics, Financing and Policy. A two-year MPH course with substream specialties will start in July 2009.

The Institute is now developing its faculty and 56 people have been placed abroad for further training. PHFI offered to share its teaching resources and have exchange programmes for closer collaboration.

*The new public health paradigm in partnerships and action***

In the new and emerging public health paradigm, the alternative sector has an important role to play. Ways in which collaboration can be established with the alternative sector include:

- (1) learning from experiments in training with a socio-epidemiological approach;
- (2) introducing socio-epidemiological modules into mainstream courses;

* K Srinath Reddy, President, Public Health Foundation of India

** Ravi Narayan, Community Health Advisor, Centre for Public Health and Equity, Society for Community Health Awareness Research and Action, Bangalore

- (3) strengthening community participation in public health action; and
- (4) evolving guidelines for public health action with socio-epidemiological principles and focusing on social determinants.

Challenges ahead for SEARO include building partnerships between the mainstream and alternative sectors to make health for all a reality.

*The role of the International Epidemiology Association**

The International Epidemiological Association (IEA) is dedicated to the global development of epidemiology and its mission is to facilitate communication among those engaged in research and teaching of epidemiology throughout the world. IEA also facilitates the development and use of epidemiological principles/methods in all fields of health including social, community and preventive medicine, and health services administration. Members include epidemiologists, biostatisticians, medical teachers and public health specialists worldwide.

Through networking, intercountry collaboration and partnerships, IEA hopes to further improve epidemiological applications in public health.

*SEAR epidemiological capacity development: CDC-WHO collaboration***

The US CDC supports global health policies; funds, implements and evaluates programmes; and provides technical assistance to strengthen and apply data to improve public health practice. CDC has a wide array of international partners, including WHO. It provides grants to support polio, influenza, TB, and emerging and re-emerging infectious diseases. The United States ***President's Emergency Plan for AIDS Relief*** (PEPFAR)/Global AIDS Programme (GAP) provides surveillance and builds laboratory capacity in India, Viet Nam, Cambodia, Thailand, PNG and Mongolia. CDC also conducts FETPs and has networks in India (2), Thailand (national and regional), Viet Nam, Cambodia and South China. About 25% of staff is assigned abroad to WHO and other international organizations, and one staff is funded by CDC to directly support epidemiology capacity development through FETPs.

* Babu Lal Verma, Professor of Biostatistics, SEA Regional Councillor (1999–2008) and Global INCLEN Liaison in the Council of International Epidemiology Association, Maharani Laxmi Bai Medical College & Hospital, Jhansi, India

** Rubina Imtiaz, CDC Country Representative in India

Challenges are vertical funding streams, a narrow focus, weak laboratory linkages, use of unclear indicators and poor collaboration. However, at present, the availability of local resources has increased and there is greater focus on decentralized implementation. Donor-level coordination is improving and laboratories can take this opportunity to strengthen linkages.

In future, CDC plans to identify core areas and key partners; build capacity at district level; adopt a matrix approach to human capacity development in epidemiology; and identify core indicators and standard evaluation strategies.

*Key systemic challenges in the health sector: The World Bank approach**

The approach of the World Bank to human development with a specific focus on investments in health follows the Bank's broad strategy: to enable countries to achieve the MDGs; improve health outcomes for the poor; take a whole-system view that embraces all actors; and intensify knowledge activities.

The key challenges in the health sector include:

- Human resource constraints in terms of both supply and quality;
- Ineffective targeting and inadequate emphasis on "core public health" functions;
- Very weak information environment, including deficient M&E and impact evaluation;
- General absence of accountability arrangements and incentives for performance, including deficient public management and fiduciary processes; and
- Insufficient and ineffective engagement with the nongovernmental sector.

The Bank plans to improve epidemiology through strengthening field epidemiology training for high-quality outbreak response, including prevention of global pandemics, and to improve the system's abilities to deal with NCDs.

* GNV Ramana, Senior Public Health Officer, World Bank, New Delhi

12. Conclusions and recommendations*

The participants of the Regional Meeting on Application of Epidemiological Principles for Public Health Action, held in the WHO Regional Office for South-East Asia in New Delhi from 26 to 27 February 2009, recognized that in view of the challenges posed by the recent economic crisis, climate change, emergence of new infectious diseases, rising burden of NCDs, and the continuing problems of high child and maternal mortality, there is a need to strengthen the culture of epidemiology in the South-East Asia Region.

The scope and reach of epidemiology, which is an integral part of public health, must be expanded to include the study of social, cultural, economic, environmental, ecological and political determinants of health, and constitute the keystone for use of evidence for development of public health policy. It must be used not only to plan, but also manage and evaluate public health programmes. In order to address the old as well as the new challenges to public health, epidemiological surveillance and response capacity must be further strengthened in Member States, with a sufficient number of trained epidemiologists, the support of public health laboratories and use of information technology (e.g. open source software that provides a common language).

A greater level of interaction is needed between epidemiologists and social scientists including for development of new methodologies in a multidisciplinary manner and to bring in the concept of socio-epidemiology. Such an approach will help in moving beyond health problems per se to new complex social and human developmental challenges such as the current crisis and threat to public health posed by the global financial meltdown and climate change.

Training in epidemiology in medical and public health schools should be skills-oriented or field-based, with teaching-learning methodologies based on learning by doing. Imparting epidemiological skills and an analytical approach to problem-solving is imperative at all levels of the health services—from national to state/province to district and primary care levels. Epidemiological capacity, however, does not lie in medical schools and schools of public health alone but also in so-called alternate sectors such as management and social science institutions, professional

* Rapporteur - Virasakdi Chongsuvivatwong, Professor of Epidemiology, Prince of Songkla University, Thailand

associations and civil society, which also need to be tapped in a spirit of partnership in order to address the various health dimensions.

Recommendations

Member States should:

- Promote and strengthen the use of principles of epidemiology and of quality epidemiological data for formulating national policies/strategies and managing health programmes;
- Invest in and establish a recognized career path for epidemiologists and public health specialists with a skills/competency profile at all levels of health services;
- Build capacity of the national health staff at all levels of health service delivery including those working in national disease control programmes in effective application of epidemiological principles for evidence-based public health action;
- Develop and/or further strengthen networking among national institutes and centres active in epidemiology, and harness their expertise for promoting and protecting public health and for sharing information for action;
- Enhance teaching and training of epidemiology in the undergraduate medical/nursing/dental/laboratory/veterinary courses, with emphasis on quality, in order to instil epidemiological thinking in students;
- Foster better collaboration with environmental, ecological and social scientists to understand the influence of these factors on diseases and to apply this knowledge for planning, programme implementation, monitoring and evaluation; conducting special surveys such as demographic health surveys at regular intervals could help in generating data relevant for this purpose;
- Collaborate and support utilization of existing epidemiology-related capacity available in each country, not only in medical schools and schools of public health but also in the so-called alternate sector such as civil society, professional associations, and management and social science institutions. Similarly, use

laboratory inputs and information technology in improving epidemiological analysis; and

- Consider organizing annually a national epidemiology seminar to share information on and experiences in epidemiological research and training initiatives under way in the country.

WHO should:

- Organize, in collaboration with interested partners and stakeholders, a regional conference to enhance the visibility and relevance of epidemiology in the South-East Asia Region and advocate with policy-makers on the critical role of evidence for public health action, at all levels of the health services;
- Provide technical support to Member States in building the capacity of national programme staff in epidemiology and application of its principles for programme development and management;
- Continue to facilitate networking and partnerships among institutes active in conducting epidemiological training or research both in medical schools and schools of public health, and in the so-called alternate sector, and provide a forum for sharing of information and expertise within the Region;
- Prepare and share with Member States standard/uniform epidemiology training materials, and protocols developed based on consensus;
- Assist Member States in the formulation and implementation of research that could determine the influence of social, cultural, economic, environmental, ecological and political factors on disease epidemiology and delivery of and access to health interventions, and in better translation of such epidemiological evidence to the policy and programme context;
- Develop various short (1–2-week) epidemiology training courses that are participatory, interactive and field practice-oriented for:
 - health programme managers so that epidemiological data are used to plan, monitor and evaluate public health programmes;

- medical/public health school students through FETP-type training methods to engage them in the application of epidemiological principles to field investigations;
- laboratory specialists to enhance a stronger involvement and constant collaboration between public health laboratories and epidemiologists;
- nongovernmental organizations to encourage them to use epidemiological principles in their programmes; and
- journalists and community organizations on communicating epidemiological information/data as an evidence base for public health action.

13. Closing session

Dr Jai Narain thanked participants for making the meeting so interesting and interactive, and for sharing their experiences and knowledge. He hoped that countries would exchange information and experiences. A good beginning had been made to look at epidemiology holistically. He thanked the Working Group on Epidemiology in SEARO, the administrative staff for organizing the meeting, and all speakers for their valuable inputs. He concluded by saying that the Region had the necessary resources and, with collaboration, needed capacity could be built.

Annex 1

Agenda of the meeting

Thursday, 26 February 2009

0830–0900	Registration
0900–1000	Opening session
	Inaugural address <i>Dr Samlee Plianbangchang, Regional Director, WHO/SEARO</i>
	Remarks <i>Dr David Heymann, ADG/HSE/HQ</i>
	Objectives of the meeting <i>Dr Jai P. Narain, Director, Communicable Diseases, WHO/SEARO</i>
	Introduction of participants
	Group photograph
1000–1045	Epidemiology: history, concepts, and new paradigms <i>Dr David Heymann</i>
1045–1230	Epidemiology in the context of current crises: Financial crisis and global health <i>Dr Jongkol Lertiendumrong</i> Climate change and adaptation strategies <i>Dr Jai P Narain</i> Emerging infections and international health security <i>Dr Nyoman Kandun</i>
1330–1415	Role of laboratory in support of epidemiology for public health action <i>Dr Alejandro Cravioto</i>
1415–1500	Application of epidemiology in addressing chronic non-communicable diseases <i>Dr U Than Sein</i>

1530–1615	Epidemiology and MDGs 4 and 5: how can epidemiological concepts help <i>Dr Shams El Arifeen</i>
1615–1700	Role of epidemiology in health policy development and programme planning at national level <i>Dr N Kumara Rai</i>
1700–1830	Reception

Friday, 27 February 2009

	Panel Discussion: Building the capacity of the epidemiology workforce in the South-East Asia Region
0830–1030	Field Epidemiology Training Programme: lessons learnt and plans <i>Dr Khanchit Limpakarnjanarat</i> <i>Dr V Kumaraswami</i> <i>Dr Shiv Lal / Dr Nyoman Kandun</i> Epidemiology training in medical schools/schools of Public Health <i>Dr C S Pandav Dr Y Hutin/Dr Myo Oo</i> Road map for the future <i>Dr P Abeykoon</i>
1100–1230	Group work: to identify practical ways of applying epidemiological concepts in various programmes and capacity building
1330–1500	Panel discussion: Networking, inter-country collaboration and partnerships for epidemiology: challenges and opportunities ahead <i>Dr Ravi Narayan, CHE</i> <i>Dr Srinath K. Reddy, PHAI</i> <i>Dr B L Verma, IEA</i> <i>Dr N K Arora, INCLEN</i> <i>Dr Rubina Imtiaz, CDC</i> <i>Dr GNV Ramana, World Bank</i>
1530–1630	Group work presentations and discussions
1630–1700	Conclusion and recommendations
1700	Closing

Annex 2

List of participants

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The application of epidemiological methods have contributed substantially to the understanding of disease causation, and therefore to the control and prevention of many conditions of great public health importance. Under the present scenario of economic crisis, climate change, emergence of new infectious diseases, rising burden of noncommunicable diseases, and the continuing problems of high child and maternal mortality. This document provides a roadmap to strengthen the culture of epidemiology in the South-East Asia (SEA) Region.



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