The importance of data in developing environmental health guidelines – an IMU perspective

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Abstract: The global environment is in a dynamic flux due to rapid development. As a result of this, new diseases are emerging and old diseases are re-emerging in many parts of the world. Therefore there is a constant need for appropriate data for formulation of effective policies to mitigate the adverse effects of environmental degradation on human health. The Kyoto Protocol of 1997 is a milestone that sets the direction for good environmental management initiatives and the success of this depends on good data. Malaysia currently has the Environmental Quality Act 1974 in place to control environment related problems. However good guidelines must be developed to keep the initiatives for good environmental management on course, for this we need good data. The Centre for Environmental and Population Health at IMU, coordinates research activities in specific thrust areas in an endeavour to produce important data that is required for developing appropriate guidelines for environmental health.

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The global environment is in a dynamic flux due to the current climatic conditions and natural disasters. The world is continuously experiencing flash floods, hurricanes, typhoons, tsunamis, earthquakes, extreme heat and volcano eruptions at one time or the other. The impact due to these natural disasters is seen in the reduced productivity of nations leading to economic stress. All these factors are leading to serious public health concerns. New diseases are emerging and old diseases are seen to re-emerge with vengeance in some parts of the world mainly due to armed conflicts, political instability and natural disasters. It is common to identify factors such as poor sanitation, insufficient potable water supply and food contributing to the occurrence of vector-borne, nutritional and gastrointestinal diseases. In many poor countries unstable economic conditions lead to poor infrastructure development again contributing to disease outbreaks. Both developed and under-developed countries are facing the same consequences of adverse climatic conditions. There is no disparity as to the sufferings people endure due to those resulting from natural disasters and the changing climatic conditions.[1]

A report by WHO, 2009[2] says that 6 of the most affected countries by these events are found in Asia. The frequency of these events has increased many fold over the last 20 years mainly due to rapid urbanisation and development in many countries. Therefore climate change is an important global issue and appropriate adaptations and mitigation measures are needed globally to address it. We can initiate concerted actions to strengthen important areas of the health systems. However all initiatives to address these issues should be international policy driven supporting inter-regional cooperation.

The Kyoto Protocol of 1997[3] was a milestone in climate change management. It identifies limits for CO_2 emissions, and makes recommendations for the switching to non-polluting sources of renewable energy and advanced energy efficient production methods. However new economic powers such as China and India continue to have increased emissions. Can we by using a concerted approach arrest this declining trend? To achieve it we will need global commitment with good monitoring and surveillance systems. Along with this there is a need for good sustainable cooperation among neighbours to make the identified initiatives in the Kyoto Protocol a success.

Within the country intergovernmental agencies should participate to formulate workable strategies to control these emissions. There must be adequate human capital to manage these programmes efficiently. To top it all there must be access to relevant data stored in various governmental agencies for researchers and policy makers to draw up pragmatic and implementable strategic programmes. Where there is lack of data, new data banks must be set up and a central depository identified. The WHO has always emphasized on the importance

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of quality data for the implementation of good public health programmes and it is time that all nations take this advice seriously.

Malaysia has good environmental management and governance practices in place.[4] Malaysia's main concern today is the annual haze episodes caused by indiscriminate burning of forests in the region for agricultural purposes. Though appropriate government initiatives are in place there seems to be a problem in achieving control over it due to difficulties in implementation of appropriate initiatives. The 10th Malaysia Plan in Malaysia has given adequate recognition for environmental health initiatives under its Country Health Plan (2011 – 2015).[5] The aim of this plan is to achieve good quality of life for its people as seen in advanced nations. There is currently a technical working group in the Ministry of Health, Malaysia to address issues of health awareness and healthy life style. This initiative comes under the National Health Sector Development Programme (Population Health / Research and Innovation).

Building Related Illnesses (BRI) and Sick Building Syndrome (SBS) are health problems that we face today due to poor indoor air quality (IAQ). To address these issues, we need appropriate standards, good risk assessments tools, sustainable mitigation and adaptation programmes and good guidelines in place. In 2009 the Ministry of Health, Malaysia developed a 'National Environmental Health Action Plan' to be included under the National Framework on Environmental Health so that the country can move forward in a sustainable way to address environmental health concerns. This Plan identifies processes to coordinate the activities of the various government sectors to achieve the environmental health objectives as set in the 5 year Malaysia Plans.

A review of literature shows that there is useful environmental health data in Malaysia. These can be harnessed to be used as the building blocks for a probable Indoor Air Quality (IAQ) guidelines. For example, data from studies such as *Legionella* species in cooling towers and indoor environment by Ngeow[6] and Yabuuchi[7] can be used. There are also other studies on children's health such as on lung function[8] and disruptive behaviour.[9] Good guidelines can put appropriate policies in place to help mitigate and control health issues arising from the many environment related causes. In Singapore we see a good indoor air quality guideline in place. It takes into consideration the economic implications a mitigating and control programme may have on the productivity of the country.[10] Similarly in Hong Kong which follows the WHO standards, a survey of buildings has shown a third of its buildings to be having unsatisfactory indoor air quality.[11]

However in Malaysia there is currently only a Code of Practice (COP) for monitoring indoor air quality. The COP was developed in 2005 by the Department of Occupational Safety and Health (DOSH), Ministry of Human Resources. Regular checks are carried by the DOSH on industrial indoor premises to ensure that the COP is in place to achieve the set objectives. The COP is a very critical component of the Environmental Impact Assessment (EIA) process which comes under the purview of the Environmental Quality Act 1974.[12] This helps coordinate studies and produce good validated data for policy formulation including IAQ guidelines.[13] In Malaysia there is need for these data to be placed in a central depository and made accessible to researchers and policy makers. It has been shown by evidence that countries that have good guidelines in place have managed their IAQ well and gained good economic benefits.

The International Medical University (IMU) has actively promoted environmental health studies under its research agenda. These studies have provided valuable data that can be used for the development of IAQ and also Outdoor Air Quality guidelines for Malaysia. Again the setting up of a central depository for environmental health data is a prerequisite here for efficient use of data by researchers and policy makers. The IMU studies have produced data on *Acanthamoeba*

spp in indoor air[14] which are known to cause keratitis in the eye and granulomatous encephalitis in humans. There is also the identification of different species of house dust mites and their relevance to human asthma[15] in another study. This study also shows the development of a PCR-RLFP based molecular technique that can be validated and used for detection of other house dust mites. The development of this diagnostic technique is an important milestone in diagnosis for public health because the dust mites are known to cause severe allergic reactions in humans resulting in asthma and rhinitis.

Another study also identified air-borne algae belonging to the Cynobacteria group in an indoor facility which can be a health concern in an indoor environment.[16] Surveying the quality of air in an office, winery and a factory, researchers at IMU found many organisms that were not pathogenic to normal individuals but a may be a problem in immunocompromised individuals. Five different species of fungi were detected and some of these exceeded the established level of upper threshold not exceeding 500 CFU per m^3 of air.[14,17, 18]

In studies relating to use of biomarkers such as parasites and microbial pathogens in oudoor air, the IMU continues to provide useful data. In one study in Bangsar, Kaula Lumpur on crow (*Corvus* sp.) faeces it was found that there were nine species of bacteria and 5 species parasites that could be a public health concern of people living in that area.[19] In a similar study on different exotic species of birds in the National Zoo in Kuala Lumpur, Malaysia, using molecular methods *Cryptosporidium parvum* was identified as a human parasite of health concern as the birds while flying over Kuala Lumpur can contaminate water sources with their infected faeces.[20] In another study on synanthropic wild birds found in the same area, the researchers found 14 species of yeasts, some of which were resistant to drugs in their faeces. This is a public health concern as some of these drug resistant yeasts can be transmitted to humans.[21]

All the studies discussed above which were carried out by IMU with researchers from other participating universities provide good baseline data for inclusion in the formulation of appropriate guidelines in Malaysia for the management of indoor air and outdoor air quality as currently there is only a Code of Practice for the assessment of indoor air quality in Malaysia.[22] For progression of this initiative it would be good to do a systematic review of publications using meta-analysis on microbes such as bacteria, fungi, viruses and parasites of public health concern found in indoor and outdoor environments. The Centre for Environmental and Population Health at IMU, with its multi-disciplinary team approach will continue to endeavor to promote studies that will produce the necessary data required for the above initiative. A strategic plan is being developed to identify the appropriate core topics to kick start the programme.

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