

Report on

International Workshop on Population Dynamics and Infectious Disease in Asia

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By

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Organized by

Asian MetaCentre for Population and Sustainable Development Analysis,
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Participants

Over 40 scholars from Asia, Europe, Australia and North America joined the Workshop. The papers presented and the participants are listed on the web site. There were 27 speakers from a variety of disciplines including demography, sociology, geography, epidemiology, history, journalism, public health, engineering, and mathematical modelling.

Background and Goal of Workshop

Infectious diseases remain important in Asia. Lethal new infections like HIV, SARS, avian influenza and Nipah virus have emerged. Some infections, including dengue, Japanese B encephalitis and meningococcal meningitis, have re-emerged or spread further than before. Plague, influenza and cholera, problems present since antiquity, still pose an epidemic threat. Although large areas have been freed from the old infections, pockets of transmission persist for malaria, schistosomiasis, tuberculosis, and sexually transmitted diseases.

Trade, transport, travel, migration and climate are changing rapidly in ways that influence infections and their spread. **These issues have not been considered collectively for the Asian region but are of growing importance.** To address these issues of population dynamics and infectious diseases, the Asian Metacentre for Population and Sustainable Development Analysis, together with Australia's National Centre for Epidemiology and Population Health, invited theoretical or empirical submissions on the following themes:

- Mobility, migration and infection – including displacement and pilgrimage
- Environmental effects of human activity, including climate change
- Emerging and imported infection, population dynamics, socio-political responses
- Tuberculosis and population dynamics
- Comparative health policy and system influences
- Infectious diseases and socioeconomic development

Report

The Workshop began with a comprehensive and challenging re-examination of space-time and infection in David Bradley's talk on landscape epidemiology and migration,

which introduced many concepts that were used in subsequent discussions. He described ecological 'edges' or zones of change, known as 'tones'. Examples include spatial 'ecotones' (such as the canopy-to-floor zone within a forest, or a forest-grassland interface) and temporal 'chronotones' (an unstable landscape interposed in time between two stable states, such as a dammed valley filled by water that becomes saturated with nutrients from the rotting vegetation, with the valley previously stable and wooded, and the lake finally stable and with far less nutrients). Ecotones and chronotones are rich sources of human infection and are often in flux due to human activity. The landscape itself is never homogeneous; it is structured ecologically into patches, corridors and matrices which determine the existence and transmissibility of infection. People create and adapt to landscapes. Migrants entering landscapes contact new infections, especially when crossing ecotones or chronotones. They also carry cultural adaptations to their former landscape, and these may become maladaptations and pose new risks. For example, if Africans from malarious areas move to Europe they soon lose their immunity. When travelling back to Africa they may behave as if still immune, and contract malaria.

The Workshop then addressed one emerging feature of the Asian landscape - large dams and their effect on infections. Adrian Sleight identified the dam 'drivers', that is, the motivating forces behind building large dams, particularly in India and China, to be the hydrological cycle and growing problems of water stress, food production, desertification, urbanization, as well as the urge to catch up with western countries. In the 20th century, the global inventory grew to 45,000 large dams, representing a two trillion dollar investment that was often imprudent and of exaggerated benefit. When built in Asia's heavily populated river valleys, the dams cause massive human displacement, much more so than in Western countries. Since 1950, as many as 50 million people have been displaced by large dams in India and China. Infections result, notably schistosomiasis and malaria. Poverty and associated infectious diseases are also exacerbated due to the adverse socioeconomic effects of dams.

The next set of papers covered recent emerging infections – especially SARS. The first paper presented a comprehensive epidemiological history of communicable diseases emerging recently in Singapore, including meningococcal, salmonella, campylobacter, norovirus and Nipah virus infections, cholera, hand, foot and mouth disease, and SARS. The second paper presented an engineering perspective on the special case of SARS in one notorious high-rise building outbreak in densely populated Hong Kong, where evidence of airborne faeco-respiratory transmission raised the issue of high rise building safety. Other paper presentations explored the disturbing sociopolitical consequences of SARS: risk perception and coping responses in Malaysia, stigmatization and 'othering' of infected persons and certain marginal groups in Taiwan, as well as damaging social effects and certain opportunistic authoritarian political responses in Singapore.

Tony McMichael then turned up the heat and stretched time and space scales to cover the entire human history and the whole planet. He reviewed the historic transitions that have influenced infectious diseases – the introduction of zoonotic diseases with the beginning of agriculture and domestication of animals 10,000 years ago, the east-west microbial exchange between the Chinese and Roman empires, and the transfer of infectious

diseases, notably smallpox and measles, to vulnerable populations by European navigators and colonialists two to five hundred years ago. Today we are faced with another transition that has numerous effects on the spread of infectious diseases. These effects are global warming due to human activity, shrinkage of space-time and ‘globalization’.

The following presentations examined infections spreading across Asia and beyond due to human mobility. One example is the annual Hajj to Mecca. Not only are pilgrims affected by frequent respiratory infection while in Saudi Arabia but they are often infected by meningococci and carry these organisms back home, where epidemics result. Infections may also spread by development-induced migration, both regional and local. Another example is in Northern Laos, where highland and lowland groups who have not interacted before, come into close social contact through a road-building project. The practice of prevailing local customs in a rapidly changing social environment had dire consequences for sexually transmitted disease. In neighbouring south west China, other migrants provide sexual services with unsafe practices – yet another effect of development and migration in Asia. Migration is also a feature of infection in India and the following paper addressed this topic in the context of urbanization and its adverse effect on TB, malaria and jaundice.

Niels Becker and Katie Glass used mathematical models to explore the impact of quarantine on the importation of infections. This work shows the crucial importance of early isolation and any other measure that reduces human mixing before an epidemic is well established. This has strategic implications whether planning for importation of highly infectious diseases with high levels of local population immunity (like measles) or for newly emerged diseases with low levels of immunity (like SARS).

Vincent Del Casino then tackled the consequences of previous rural-urban migration and infection. He revealed the tensions in NGO-promoted and government–encouraged rural ‘home’ care for people with HIV and AIDS in Thailand. Such a place-based service neglects and excludes those who do not want to go home. Ryuichi Komatsu continued the migration theme and examines its influence on HIV in Japan. He found the national response quite inadequate because a substantial proportion of the ongoing problem arises among lonely, marginalized and underserved transnational migrant workers. Jungwhan Lee reported a similar problem in Korea, because the transnational migrant workers cannot bring their families with them, and they are therefore often involved in or served by the large commercial sex industry. In both the Japanese and Korean settings, there are problems with social discrimination, fear of deportation, language barriers and many other inadequate rights for migrant workers. In both countries, the local populations are increasingly threatened, as HIV infection spreads. Jonathan Mayer expanded the topic of AIDS to include some of his experiences in Africa. He warned that Asia cannot afford to ignore the threat of AIDS and the lessons learnt from the African experience.

The Workshop then turned to the population dynamics of tuberculosis. First, the presentation by Xili Liu and colleagues revealed that a substantial fraction of TB in Henan, China’s most populous province, can be attributed to internal migration for work.

The huge 'floating' population of migrants in China typically lives in crowded quarters, with scarce food and harsh conditions. Infection risks are high, especially for males. The higher rates of migration among males account for the higher rates of TB among them.

Josefina Cabigon then reported the difficulties in controlling TB in the Philippines, where the problems with decentralization and inadequate coverage make control quite inadequate. The situation in India is also problematic; local customs do not impede tribal communities from seeking treatment but the primary care infrastructure is not adequate.

The Workshop finally turned to the importance of health systems. Kai Hong Phua proposed a method to evaluate health systems in terms of their response to emerging infections. Following this, a series of presentations examined the impact of health systems in India and Vietnam. Finally, an examination of changing infection outcomes in China over 20 years, and in Shanghai over 50 years, showed us what can be achieved when a country pays attention to the problems of infection. Life expectancy in Shanghai now approaches the best in the world, although some infections continue to pose challenges, and China and Shanghai still face residual problems with diarrhoea, hepatitis and TB, emerging HIV and re-emerging syphilis and gonorrhoea.

This Workshop covered an array of problems but certain topics were of outstanding importance when considering population dynamics and infectious diseases in Asia. First, the importance of **place**, expressed through the **landscape and the culture**. Place determined the risk of infection and also modified the response. Second, **alteration of the landscape** for economic development with local, national, regional and global effects. Third, **human mobility across the landscape**, driven by spiritual faith, involuntary displacement, and the forces of economic development, including both poverty and affluence. Fourth, the **cumulated legacy of previous changes in place**, with human movement reflecting ties from the past, introduced infections often resulting from the same forces. Finally, the all important effect of **poverty**. This is driving millions of people to change their place, and exposing them to risks they cannot resist and for which the local **place- and culture-based health systems are currently inadequate**.