Health Research Symposium 2010: improving health and recognising excellence

The Health Research Symposium 2010 was held on 11 September 2010 at the Hong Kong Academy of Medicine. The symposium was organised by the Food and Health Bureau (FHB) and aimed to (1) disseminate significant findings of research projects supported by its funds to the local research community, (2) facilitate the exchange of ideas between invited overseas experts and local researchers on aspects of health-related research, and (3) acknowledge outstanding local researchers.

The FHB supports health-related research via two funds, namely the *Health and Health Services Research Fund* (HHSRF) and the *Research Fund for the Control of Infectious Diseases* (RFCID). To date, the two funds have supported 334 investigator-initiated research projects.

The HHSRF supports research in public health, health services and Chinese medicine. To date, 81 of 117 HHSRF projects have been completed. The RFCID was established in 2003 after the severe acute respiratory syndrome (SARS) outbreak to fund research related to the control of infectious diseases. The RFCID supports commissioned as well as investigator-initiated research. From 2004 to 2009, four large-scale commissioned studies worth HK$93.2 million were conducted by The University of Hong Kong, the Chinese University of Hong Kong, a consortium led by the Hospital Authority, and the Centre for Health Protection. In total, 105 separate projects were supported in this first phase of commissioning, of which at least 93 have been completed. A second phase of commissioning worth HK$79 million has started to disburse grants to the two universities over 5 years from 2009 to 2014. In addition, 157 of 217 RFCID investigator-initiated projects have been completed. Thus, there is a large body of locally generated and relevant research that will benefit from further dissemination.

The two themes of the symposium were *Application of statistical and mathematical models to understand infectious disease dynamics* (RFCID theme) and *Cost-effectiveness in health services research* (HHSRF theme). To ensure coverage of the wide spectrum of research outcomes, these themes were explored and discussed from the perspectives of multiple stakeholders, including researchers, funders, policy makers, administrative users, and patients.

Morning plenary session

The symposium commenced with a welcome speech from Dr York Chow, the Secretary for Food and Health. He welcomed the more than 500 delegates and presented souvenirs to the keynote speakers. The morning keynote session was moderated by Dr PY Lam, Director of Health. The first keynote presentation was made by Prof Christl Donnelly (Department of Infectious Disease Epidemiology, Imperial College London, UK). Her presentation was titled *Using statistical and mathematical models for infectious diseases at the science – public policy interface*. Prof Donnelly noted that the analysis of a newly identified disease, or a new strain of a familiar one, is particularly challenging as the data are not always sufficient to provide early answers to key scientific and policy questions. Epidemiologists can help public policy makers control disease without too much disruption to society through appropriate risk communication. Risk communication is a key component of the scientist–policy maker interaction as well as an important interactive process which actively involves stakeholder groups from the outset.

The second keynote speaker was Prof Joseph Sung (Vice-Chancellor and President of the Chinese University of Hong Kong). Having played a key role in controlling the spread of SARS in Hong Kong in 2003, Prof Sung's presentation was titled *Research in infectious diseases: past, present and future*. Prof Sung observed that with globalisation and frequent international travel, the spread of infectious disease is much faster and much more difficult to control. As with SARS, the identification of the causative organisms and their natural reservoirs hold the key to the control of infectious disease and its clinical management. International collaboration coordinated by World Health Organization coupled with the use of information technology and molecular biology are essential components for effective outbreak control. Dr PY Lam moderated a question-and-answer session after the presentations.

After the morning keynote session, the delegates attended parallel sessions related to either HHSRF or RFCID topics.

Health and Health Services Research Fund parallel session

Prof Jean Woo (School of Public Health and Primary Care, The Chinese University of Hong Kong) gave a presentation titled *Health services research questions in elder care*. Prof Woo noted that a prime aim of conducting health services research is to use the findings to engage with the general public and policy makers, and also to facilitate debates about

priorities for health service delivery and planning. Important health service issues in the care of the elderly include prevention and management of geriatric syndromes (eg frailty, falls, cognitive and functional decline), service provision models (complex interventions), and patients' perspective of the service provided. Changing patient profiles and service settings generate research questions that contribute to continuous quality improvement, evidence-based practice, provide cost-effectiveness and cost-benefit data to guide service providers to formulate policies.

Prof Kenneth Lee (School of Medicine and Health Sciences, Monash University Sunway campus, Malaysia) gave a presentation titled *Application of health technology assessment to drug evaluation*. Health technology assessment is a form of policy research that examines short- and long-term consequences of the application of a health care technology, including drugs, biologics, devices, procedures, support systems, and health programmes. The goal of health technology assessment is to inform policy makers of policy alternatives. For any given technology, properties and impacts assessed may include technical properties, evidence of safety, efficacy, real-world effectiveness, cost, and cost-effectiveness as well as estimated social, legal, ethical, and political impacts.

Prof Sarah McGhee (School of Public Health, The University of Hong Kong) gave a presentation titled *Cost-effectiveness in diabetic retinopathy care*. Prof McGhee commented that more health service research is needed to help formulate policy and practice in Hong Kong. One example is diabetic retinopathy, a leading cause of blindness in those under 65 years of age. Screening for diabetic retinopathy is usually highly cost-effective, but such screening often involves a co-payment, because of the mixed medical economy incorporating private and public services. Preliminary data indicate that even a low co-payment may deter some from screening and consequently they may be at higher risk. Further work to determine whether existing financial safety nets could avoid inequity is needed.

Prof Tze-wai Wong (School of Public Health and Primary Care, The Chinese University of Hong Kong) gave a presentation titled *Morbidity and mortality attributed to air pollution: evidence and challenges*. The harmful effects of air pollution on health have long been recognised, and associations between air pollution and morbidity/mortality reported. Nonetheless, many questions on air pollution and health remain unanswered. Challenges to future studies include the development of more precise exposure assessment techniques, a better understanding of the joint effects of air pollutants and their interactions with climate, the mechanisms of action of some air pollutants on the cardiovascular and respiratory systems, the fate of inhaled ultrafine particulates (nanoparticles) and their effects on different organs and systems, and the development for more specific indicators and biomarkers of body responses to air pollution.

Dr Irene Wong (School of Public Health, The University of Hong Kong) gave a presentation titled *Cost-effectiveness of mammography screening*. Such screening has been accepted in most western populations. Nonetheless, this may not readily apply to Chinese women who have a much lower breast cancer incidence and different age profile. A state-transition decision model was developed to simulate breast cancer progression and to determine the cost-effectiveness of alternative mammography screening strategies among Hong Kong Chinese women aged 40 years or older. The results suggest that mass biennial screening may not be cost-effective for Hong Kong in terms of allocation of resources.

Prof Samuel Wong (School of Public Health and Primary Care, The Chinese University of Hong Kong) gave a presentation titled *Evaluation of general outpatient clinics using the primary care assessment tool*. In Hong Kong, the main goal of publicly funded general outpatient clinics is to provide primary medical services for the financially vulnerable. In a territory-wide telephone survey comparing primary care experiences of general outpatient clinic users and private general practitioner users, Prof Wong reported that the latter had better primary care experiences. This was largely due to the greater accessibility and better interpersonal relationships offered by private general practitioners.

Research Fund for the Control of Infectious Diseases parallel session

Dr Ben Cowling (School of Public Health, The University of Hong Kong) gave a presentation titled *Clinical effectiveness of seasonal influenza vaccination against pandemic and seasonal influenza*. Vaccination is effective in preventing infection and illness associated with seasonal influenza viruses when circulating strains match the vaccine strains. Dr Cowling described a double-blind randomised trial on 431 individuals belonging to 119 Hong Kong Chinese households. One child aged 6 to 15 from each household was randomised to receive one dose of inactivated trivalent seasonal influenza vaccine or saline placebo. The vaccine recipients had lower rates of serologically confirmed seasonal A/H1N1 infection and A/H3N2 infection but higher rates of serologically confirmed pandemic A/H1N1 infection. These data indicated that vaccination against seasonal influenza protected against strain-matched infection in children. Naturally acquired seasonal influenza infection appeared to confer cross-protection against pandemic influenza. Whether prior seasonal influenza vaccination predisposes to a higher risk of infection with the pandemic strain requires further investigation.

Dr Steven Riley (School of Public Health, The University of Hong Kong) gave a presentation titled *Serological studies and the transmission dynamics of influenza*. During and between pandemics, good knowledge of the transmission dynamics of influenza can help to improve public health decisions. Dr Riley described a paired serological survey of human swine influenza exposure in a largely representative cohort of households in Hong Kong. The survey also gathered data on severe cases from the whole population. The data indicated that the human swine influenza epidemic in Hong Kong infected more children than adults. The rate of infection in older adults was low but the infection was more severe. Dr Riley concluded that predicting the peak of an outbreak of a novel pathogen is difficult without accurate knowledge of the rate of infections in different transmission groups. Surveillance of currently circulating strains of influenza should focus on older individuals, so as to detect any antigenic evolution that renders the pandemic strain more infectious to older adults.

Prof Shui-shan Lee (School of Public Health and Primary Care, The Chinese University of Hong Kong) gave a presentation titled *Exploratory research in infectious disease epidemiology - the HIV example*. Epidemiology has assumed a central role in HIV research. Prof Lee identified three key characteristics of epidemiological studies of HIV. First, cohort studies have assumed an important position in describing epidemiology, as exemplified by the Multicentre AIDS Cohort Study. There are more than 200 HIV/AIDS cohorts globally, which continue to generate new knowledge that informs clinical and public health interventions. Second, public health surveillance has become an expanded concept in epidemiology, which covers not just clinical HIV disease but infection and behaviour. Third, methodological exploration has led to the widespread use of molecular approaches, spatial studies, and social network analysis, which have advanced our understanding of the transmission dynamics of the virus and its determinants at individual, social and population levels.

Dr Joseph Wu (School of Public Health, The University of Hong Kong) gave a presentation titled *Cost-effectiveness of HPV vaccination*. Cervical cancer causes significant morbidity and mortality among women worldwide. Human papillomavirus (HPV) infection of the cervix is the cause of cervical cancer. In addition to cervical screening for early detection, vaccines that prevent infection of the two most prevalent HPV types (16 and 18) have been developed and are commercially available in Hong Kong. Mathematical models were built to perform cost-effectiveness analyses to evaluate the public health impact of large-scale HPV vaccination. In addition, surveys were conducted to investigate knowledge and receptiveness of HPV vaccination among females. Of 2254 adolescent girls and 1023 women who had daughters under 18 years of age, 33% of adolescent girls and 45% of women would consider vaccinating themselves and their daughters. Age of vaccination was the main factor influencing tendency to vaccinate. Both groups expressed that the most suitable age for vaccination was 15 to 16 years, which was older than that recommended by vaccine manufacturers (9-12 years). Such vaccination costs US$150 000, 94 000 and 77 000 per life-year after vaccination has begun for 20, 40 and 60 years, respectively. This suggested that adding a long-term HPV vaccination programme to current screening practice may be cost effective in reducing the burden of cervical cancer in Hong Kong.

Prof David Hui (School of Public Health and Primary Care, The Chinese University of Hong Kong) gave a presentation titled *Exhaled air dispersion during application of common respiratory therapies*. Viral pneumonia such as SARS and influenza may be spread by airborne transmission. Prof Hui used laser smoke visualisation techniques to examine exhaled air dispersion during application of common respiratory therapies in a hospital setting. Substantial exposure to exhaled air occurs within 0.4 m and 0.8 m in patients receiving oxygen via a simple mask and treatment via a jet nebuliser, respectively. Nasal positive pressure ventilation provided via a range of equipment also poses a risk of infection as exhaled air may be dispersed in excess of 0.95 m in some circumstances. In addition, substantial exposure to exhaled air occurs within 1 m from the end of the bed in patients receiving oxygen via nasal cannula in large isolation rooms with efficient air exchange, whereas diffuse room contamination occurs in smaller isolation rooms with less efficient air exchange in specific hospital settings. Health care workers may need to take extra infection-control precautions when managing patients with pneumonia and respiratory failure in these small isolation room settings.

Prof Yu-guo Li (Department of Mechanical Engineering, The University of Hong Kong) gave a presentation titled *Modelling infectious diseases from an engineering perspective*. Engineering control measures such as air cleaning and ventilation play an important part in infection control and should be considered together with administrative measures and use of personal protective equipment. Prof Li described his studies on the fundamental properties and behaviour of airborne infectious droplets. Respiratory droplets are commonly between 35 and 100 microns in diameter (range, 0.1-1000 microns). Droplets larger than 60 microns are involved in large droplet transmission of diseases. Sneezing expels air at a velocity of 50 m/s, and potentially infectious droplets can be carried more than 6 m. In contrast, coughing and breathing can expel air at a velocity of 10 m/s and 1 m/s and carry droplets up to 2 m and 1 m, respectively. Large droplets are removed by deposition on to exposed surfaces, whereas fine droplet nuclei are removed by ventilation. Properly designed natural ventilation is an accepted measure for infection control. The size and ventilation properties of isolation

rooms are therefore important parameters to the control of respiratory infectious diseases.

Final plenary session

After the parallel sessions, the delegates reassembled for the final plenary session moderated by Prof Sian Griffiths (Professor and Director of the School of Public Health and Primary Care, the Chinese University of Hong Kong) and Prof TH Lam (Chair Professor and Head of the School of Public Health, The University of Hong Kong). The third keynote speaker was Prof Karen Kuntz (Division of Health Policy and Management, School of Public Health, University of Minnesota, USA), whose presentation was titled *The role of economic evaluation for the allocation of healthcare resources*. Prof Kuntz noted that in an environment of escalating health care costs, relying on evidence of quality, safety, and efficacy of an intervention may not be sufficient for determining coverage decisions. Economic evaluations provide a framework for maximising the level of health care that can be achieved within a population, thus providing a measure of 'value for money' associated with health care interventions. Economic evaluations, which include cost-effectiveness and cost-utility analyses, provide an explicit, quantitative, and systematic approach to synthesising information on the clinical benefits of an intervention or programme, the associated risks and harms, and the economic costs. Prof Kuntz gave an overview of the methods used to conduct economic evaluations and discussed the role and implications of the perspective of the analysis (eg government, societal) and how results may differ by perspective.

The final keynote speaker was Prof KY Yuen (Department of Microbiology, The University of Hong Kong), whose presentation was titled *Emerging microbial agents in humans and animals in Hong Kong and Southern China*. Prof Yuen noted that emerging infections originating in Mainland China may actually be first detected in Hong Kong, because of its better surveillance and laboratory infrastructure. This places Hong Kong in a leading position in the discovery of novel microbes associated with human or animal diseases. Prof Yuen described the wide range of novel or emerging pathogens that have been discovered in recent years in Hong Kong, including viruses (eg human, civet and bat SARS-coronaviruses) and bacteria (eg *Laribacter hongkongensis*, *Streptococcus sinensis*). Most of these microbes were originally found in clinical specimens such as blood or pus before some were traced back to an animal source. In some cases, clinical findings enhance health policy, as was seen in the SARS epidemic, where ecological and epidemiological investigations helped to prevent re-emergence of SARS by encouraging the banning of game food in live animal markets in southern China.

Award ceremony

After a question-and-answer session moderated by Prof Griffiths and Prof Lam, the symposium ended with an award ceremony to acknowledge outstanding investigators whose research findings have influenced health policy and practice in Hong Kong.

Best Poster (HHSRF) was awarded to Dr Simon SM Ng (Department of Surgery, The Chinese University of Hong Kong) for his work titled *Electroacupuncture for postoperative ileus after laparoscopic colorectal surgery: a randomized sham-controlled study.*

Best Poster (RFCID) was awarded to Prof Annie NY Cheung (Department of Pathology, The University of Hong Kong) for her work titled *Integrated human papilloma virus analysis as adjunct for triage of atypical cervical cytology.*

Most Promising Young Researcher Award was given to Prof Nelson Lee Lai-shun (Department of Medicine and Therapeutics, The Chinese University of Hong Kong) for his work titled *Influenza virus load in hospitalised patients*.

Excellent Research Award in Health and Health Services Research was given to Dr Irene Wong Oi-ling (School of Public Health, The University of Hong Kong) for her work titled *A cost-effectiveness analysis of mammography screening in Hong Kong Chinese using state-transition Markov modeling*.

Excellent Research Award in Public Health was given to Dr Benjamin Cowling (School of Public Health, The University of Hong Kong) for his work titled *Comparison of statistical algorithms for early detection of the start of the annual influenza peak season in Hong Kong using sentinel surveillance data*.

Excellent Research Award in Clinical Studies was given to Prof Henry Lik-yuen Chan (Department of Medicine and Therapeutics, The Chinese University of Hong Kong) for his work titled *Role of hepatitis B virus covalently closed circular DNA in determination of treatment outcome*.

Excellent Research in Basic and Laboratory Science was awarded to Prof Guan Yi (Department of Microbiology, The

University of Hong Kong) for his work titled *Genetic characterisation of H5N1 influenza viruses isolated from different regions of southern China.*

Excellent Research in Basic and Laboratory Science was awarded to Prof Yuen Kwok-Yung (Department of Microbiology, The University of Hong Kong) for his work titled *Wild animal surveillance for coronavirus HKU1, a novel coronavirus associated with pneumonia in patients in Hong Kong, and potential variants of other coronaviruses that infect humans.*

Closing remarks

Prof Gabriel Leung, Under Secretary for Food and Health, made the closing remarks. He thanked all the delegates for attending and outlined areas for consideration of future research. These included the four ongoing 'epidemics' of emerging infectious diseases, chronic disease, environmental insults, and social inequality. He also noted the existence of methodological gaps including the lack of robust decision analytic models and health economic studies and the need for more community-based studies.

The Food and Health Bureau is committed to supporting local research to provide evidence-based information for health policy formulation and to enhance public health through continuous improvement in health care practices.