For discussion on
16 June 2008

Legislative Council Panel on Health Services
Vaccination Policy

Purpose

This paper briefs Members on the Childhood Immunisation Programme (CIP) and Government Influenza Vaccination Programme (GIVP) in Hong Kong, as well as key considerations in developing our vaccination policy.

Background

2. Immunisation is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease.

3. Immunisation is estimated to avert over two million deaths each year, according to the World Health Organization (WHO). Successful eradication of naturally occurring smallpox was achieved through immunisation campaign led by the WHO from 1967 to 1977. Eradication of poliomyelitis is now within reach. Since the launch of the Global Polio Eradication Initiative by WHO and its partners in 1988, infections have fallen by 99%, and some five million people have avoided paralysis. Nowadays, the regions of America, Europe and Western Pacific (including Hong Kong) have already been certified poliomyelitis-free.

4. The WHO has introduced an Expanded Programme on Immunisation (EPI) on six childhood diseases, namely, poliomyelitis, diphtheria, pertussis, tetanus, measles and tuberculosis since 1974 to provide a framework for immunisation schedule. The objective of the EPI is to encourage WHO member states to adopt the vaccines in the EPI

as a basis for developing their CIP and to provide them with technical support where necessary. Besides, the WHO issues position statements on vaccine application and updates for reference by member states. Apart from the six childhood diseases included in the EPI, member states may include other vaccines in their CIP having regard to the local epidemiological profiles and other factors. The types and numbers of vaccines included in such programmes will differ among different countries and places.

5. Variations in CIP among different countries and places are to be expected because of locality specific epidemiological factors and circumstances. In particular, Asian countries often have a different profile of infectious diseases compared with Western countries; hence their immunisation programmes are understandably different. For example, the United Kingdom, the United States and Canada have included in their CIP vaccines against *Haemophilus Influenzae* type B infection and pneumococcal disease owing to high disease burden in these countries. For Asian countries such as Japan, Republic of Korea and Singapore which are similar to Hong Kong in having lower incidence of these infections, the above vaccines are not included in their CIP. Generally, Hong Kong's immunisation programme is more comparable to those of our Asian neighbours than the Western countries. A comparison of the CIP of Hong Kong and some developed countries in the West and Asia is shown in **Annex A**.

6. In Hong Kong, an Advisory Committee on Immunisation (ACI) was set up in 1992 under the Department of Health (DH). Members of the ACI comprised infectious disease experts in paediatrics, medicine, immunology and public health from the public, private and academic sectors. The ACI was tasked to review strategy on immunisation, advise the Director of Health on the CIP and make recommendations on future directions of other immunisation programmes in Hong Kong.

7. With the establishment of the Centre for Health Protection (CHP) in 2004, the Scientific Committee on Vaccine Preventable Diseases (SCVPD) was set up to succeed the ACI. The SCVPD closely monitors and reviews the latest position of the WHO on immunisation and vaccination, scientific developments and application of new vaccines,

vaccine formulations and cost-effectiveness, changes in the global and local epidemiology of vaccine preventable diseases and the experiences of other health authorities. The SCVPD will then make recommendations to DH on vaccination matters.

8. At the population level, the incorporation of a new vaccine to the CIP requires careful scientific-based considerations as this would affect the whole child population. As elaborated below, this must satisfy a number of criteria to ensure that the new vaccine would lead to more benefits than harm and represent an effective use of valuable public resources on a population-wide scale. At the level of the individuals, parents are free to bring their children to a doctor to get vaccination at their own cost. This is a matter of individual choice on the parents' part for individual protection of their children against an infection which does not warrant population-wide vaccination.

Childhood Immunisation Programme (CIP)

9. Immunisation against various infectious diseases for infants and children in Hong Kong has been introduced since 1950s. Throughout the years, there have been continuous reviews and updates to the local CIP. The current CIP comprises vaccines against nine infectious diseases, namely hepatitis B, mumps and rubella in addition to the six diseases targeted in the EPI. The chronology of introduction of individual vaccines to the local CIP is illustrated in **Annex B**. The CIP in Hong Kong was last updated in 2007 when inactivated poliovirus vaccine (IPV) and acellular pertussis (aP) vaccine replaced oral poliovirus vaccine (OPV) and whole-cell pertussis (wP) vaccine respectively.

10. In Hong Kong, the majority of infants are delivered at hospitals. Bacille Calmette-Guérin (BCG) and hepatitis B vaccines (and type 1 oral polio before 2007) are given before discharge. Family Health Service (FHS) of DH provides free vaccination to children under the age of five through 31 Maternal and Child Health Centres (MCHCs). School Immunisation Teams visit all the primary schools in Hong Kong to provide vaccination to primary 1 and 6 students. Some children are vaccinated by their family doctors in the private sector, from whom they

may also receive vaccines not covered by the CIP at their own cost.

11. Data on immunisation coverage is collected at regular intervals from various parties, including public and private hospitals, public clinics, FHS and School Immunisation Teams of DH. The DH also conducts regular surveys to estimate vaccine coverage of children aged 2 to 5. The survey in 2006 showed that the overall vaccination coverage rates of the CIP remain high at over 95%.

Government Influenza Vaccination Programme (GIVP)

12. Based on the recommendation of the then ACI, an annual influenza vaccination programme was launched by DH, targeted at elders living in residential care homes in 1998. This annual influenza vaccination programme subsequently expanded its coverage and became known as the GIVP.

13. Every year, the SCVPD assesses the latest situation and makes a list of population groups recommended to receive influenza vaccination, irrespective of the source of vaccination. Besides taking reference from SCVPD recommendations, the Government determines the target groups eligible for free influenza vaccination provided under the GIVP by considering a number of factors, including the degree of health risks faced by the target groups, preventive and control measures against institutional outbreaks, and affordability of vaccine recipients. Certain groups recommended for influenza vaccination by the SCVPD are not covered by GIVP and they would obtain influenza vaccination from the private sector at a cost.

14. In 2007-08, the GIVP provided free influenza vaccination to institutional elders or disabled persons; health care workers of DH, Hospital Authority, other government departments, elderly homes and institutions for the disabled; poultry workers; persons who have chronic illness and are being followed-up at public clinics; elders aged 65 years or above receiving Comprehensive Social Security Assistance (CSSA); pregnant women receiving CSSA; and children aged 6 to 23 months who come from families receiving CSSA.

15. Medical service providers in the private sector have a major and active role to play in providing influenza vaccinations to other members of the community not covered by the GIVP. Recognizing the importance of joint partnership, the Government works closely with the private sector to promote influenza vaccination for target groups recommended by SCVPD. For example, the CHP issues letters to all doctors in Hong Kong to update them of the latest recommendations of SCVPD every year. The service provided by the private sector is well accepted by the community at large. A collaborative study with the Chinese University of Hong Kong showed that about 40% of community-dwelling elders aged 65 or above received influenza vaccines in the 2004-05 influenza season, 60% of whom were vaccinated in the private sector or non-government organizations.

Main Considerations in Adding New Vaccines to the CIP and other Immunisation Programmes

16. Before introducing a new vaccine into the CIP, there are a number of important public health considerations based on well established scientific criteria, which include:

(i) the overall disease burden to society;
(ii) the efficacy and safety of the vaccine;
(iii) herd immunity/protection introduced by the vaccine;
(iv) the availability of other effective preventive measures;
(v) cost benefit and cost effectiveness; and
(vi) administrative arrangements for vaccination, public acceptance of the vaccine, adequacy of vaccine supply, etc.

(i) Overall disease burden to society

17. The epidemiology of a disease varies from place to place. Higher priority should be given to tackle those diseases that have higher overall disease burden to society locally. Conversely, there is poor justification to vaccinate on a territory-wide basis against diseases which have a low incidence or disease burden locally, as side effects may outstrip vaccine protective benefit and valuable resources may be wasted.

For example, although Japanese encephalitis (JE) has a relatively high incidence in some parts of Asia and the Western Pacific Region, it is very rare in Hong Kong. Hence JE vaccine is not indicated for routine immunisation in Hong Kong except for people travelling to endemic areas for a longer period of time (e.g. 30 days or more). On the other hand, some infectious diseases, e.g. hepatitis B infection, are more prevalent in this locality. Because of its high local disease burden, hepatitis B vaccine was introduced into the local CIP in 1988, even before the recommendation for universal childhood immunisation was made by WHO in 1991.

(ii) Efficacy and safety of the vaccine

18. No vaccine is 100% effective. The efficacy and duration of protection of a vaccine are major determinants to its usefulness in the CIP. Some vaccinees may not generate enough immunity after vaccination (primary failure) and others may have waning immunity to below the protective level with time. In some cases, a vaccine may not completely match the disease causing strain and this may reduce its effectiveness.

19. Take quadrivalent meningococcal vaccine as an example. The incidence of invasive meningococcal infections is relatively low in Hong Kong. About half of the meningococcal infections in Hong Kong were caused by *Neisseria meningitidis* serogroup B, which is not protected against by the currently available quadrivalent meningococcal vaccine (which protects against serogroups A, C, Y and W-135 only). Furthermore, the duration of protection of the vaccine is short and it is relatively ineffective in children aged below two. Therefore, the SCVPD is of the view that there is insufficient evidence to justify its inclusion in our CIP. Nevertheless, this vaccine is recommended for persons who travel to areas where outbreaks of the disease caused by the serogroups that are covered by the vaccine are known to occur.

20. Moreover, the safety of a vaccine is another important factor, particularly if it is associated with more serious side effects. Even for serious side effects which are rare, they are likely to occur with routine immunisation where large numbers of people get vaccinated. The vaccine against JE can cause adverse reactions to an extent

(post-vaccination neurological complications such as encephalitis and peripheral neuropathy have been reported in 1 to 2.3 cases per million vaccines) that may outweigh its benefits if it is administered on a population-wide basis (prevent only 0 - 0.7 cases per million population per year in Hong Kong).

21. Sometimes the adverse reactions of a vaccine may outweigh its protective effect when the disease incidence has dropped. For example, oral poliomyelitis vaccine (OPV) carries an inherent risk of vaccine-associated paralytic poliomyelitis (VAPP) at about 0.4 cases per million doses. When poliomyelitis eradication was achieved in the Western Pacific Region in 2000, the risk for VAPP associated with OPV is considered to outweigh its benefits. Consequently in 2007, Hong Kong replaced the OPV with inactivated poliovirus vaccine (IPV) in the CIP to eliminate the risk of VAPP.

(iii) Herd immunity/protection

22. Another consideration for incorporating a vaccine into the government vaccination programme is the indirect protective effect of a vaccine to unimmunised individuals, i.e. an effect known as herd immunity. The herd immunity threshold is the proportion of a population that must be immunised in order to cease an epidemic and impart indirect protection to those without personal immunity, thereby preventing the spread of a disease. For example, the WHO currently employs a target fixed at 95% coverage of vaccines for the herd immunity threshold for avoiding measles outbreaks. Such a high coverage rate can only be achieved by an organized universal vaccination programme, such as CIP.

(iv) Availability of other effective preventive measures

23. The availability of other effective (and more cost-effective) preventive measures also comes into play in considering the justification for vaccination programmes. For many years, regular cervical screening has proved a highly effective measure against cervical cancer. While the Human Papillomavirus (HPV) vaccine can protect individuals against infection of the specific HPV types targeted by the vaccine, it cannot

eliminate the risk of cervical cancer due to infection caused by other HPV types. Hence, regular cervical screening according to the recommended screening programme will still be required to prevent cervical cancer among those who have been vaccinated. Besides, it is also important to promote other effective measures to prevent disease spread or provide protection such as the use of condom. Therefore HPV vaccine is currently recommended by SCVPD for personal protection only.

(v) Cost benefit and cost effectiveness

24. Economic evaluation, including cost-benefit and cost effectiveness analyses, is a tool for comparing alternative courses of action in terms of both the incremental costs and consequences. The results of an economic evaluation provide guidance for governments to assess if a new intervention represents a cost-effective use of resources to the population concerned. The degree of benefit or effectiveness accrued from a universal vaccination programme is an especially pertinent consideration for vaccines that incur a high cost, so as to ensure that valuable public resources are not wasted.

(vi) Practical considerations and administrative arrangements

25. The infrastructure for the delivery of a vaccine is important in the development of an organized vaccination programme, which is essential for sustaining high coverage. Different vaccines may require different vaccination schedules. Currently most vaccines under the CIP are administered by the MCHCs. From the baby's birth through the age of 18 months, parents will make at least six visits (1, 2, 4, 6, 12 and 18 months after birth) to MCHCs for routine immunisation.

26. The WHO has recommended that whenever a new vaccine is to be added to a national programme, it is better to fit it into the existing vaccination schedule in order to facilitate parental visit and therefore attaining a better coverage. A new vaccine with a schedule different from the existing ones may require additional visits which may affect its acceptance and coverage, thereby hampering the usefulness and effectiveness of the vaccination programme.

Latest Position of the Administration's Work to Update the Childhood Immunisation Programme and Government Influenza Vaccination Programme

Childhood Immunisation Programme

27. The CIP in Hong Kong has been effective in reducing the incidence of many important childhood infections in the territory at a low level. In keeping with recent developments in childhood vaccines not covered by the CIP, the CHP has commissioned in 2006, via the Research Council of the Research Fund for the Control of Infectious Diseases (RFCID), a local university to carry out a study to investigate the cost-benefit and cost-effectiveness of incorporating four childhood vaccines (pneumococcal conjugate vaccine, chickenpox vaccine, *Haemophilus influenzae* b vaccine, and hepatitis A vaccine) into the CIP. The results of the study will assist the SCVPD to make recommendations on the CIP.

28. The university has submitted the results of the study which are now being reviewed by the Research Council of the RFCID. Having regard to the findings of the study and the recommendations of the SCVPD, the Government will determine whether changes should be made to the CIP in the near future.

Government Influenza Vaccination Programme

29. The SCVPD has reviewed the latest data and will very soon finalize its influenza vaccination recommendation for 2008-09. Upon receipt of the formal recommendation of the SCVPD, the Government will consider how best to enable those in the target groups recommended by the SCVPD to receive influenza vaccination. Our decision will be based on scientific evidence as well as the safety and efficacy, side effects, cost-effectiveness and supply of the vaccine, the acceptance of injection of the vaccine among the public, the administrative arrangements for vaccination, etc.

30. We note that if the influenza vaccination recommendation is extended to other age groups this year, for example, to the 219 000

children aged from 2 to 5 years, careful planning would be necessary to ensure that we have enough capacity to vaccinate all people in the additional target groups. While the infrastructure under GIVP will continue to provide free vaccination services to the eligible target groups through hospitals and clinics under DH and the Hospital Authority (HA), we are prepared to consider other options to ensure that those who should receive flu vaccination would get the necessary services. Possible options that we may explore include provision of subsidy to the target groups for getting the vaccination services and contracting with private doctors to provide the vaccination. Any such options should be based on the principles that the pricing of private vaccination services should be transparent and reasonable, having regard to the cost of the vaccine and a fair price for the inoculation service, thus enabling the public to make an informed choice. Besides, private doctors should keep proper record of vaccination statistics and share them with the Government for surveillance purpose. We will also consider DH and HA providing the inoculation service.

31. A decision will be made when the SCVPD's recommendation is available. The Administration will not underestimate the complexity of the logistic arrangements concerned should there be a significant extension of the recommendation to other target groups.

Food and Health Bureau
Department of Health
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Annex A

A comparison of the childhood immunisation programmes of Hong Kong and some developed countries in the West and Asia

		Hong Kong	Japan	Republic of Korea	Singapore	The United States	Canada	The United Kingdom	Australia
Tuberculosis		√	√	√	√	-	-	*	-
Poliomyelitis	**OPV**		√		√				
	IPV	√		√		√	√	√	√
Diphtheria		√	√	√	√	√	√	√	√
Pertussis		√	√	√	√	√	√	√	√
Tetanus		√	√	√	√	√	√	√	√
Measles		√	√	√	√	√	√	√	√
Hepatitis B		√	-	√	√	√	√	*	√
Mumps		√	-	√	√	√	√	√	√
Rubella		√	√	√	√	√	√	√	√
Rotavirus infection		-	-	-	-	√	-	-	√
Pneumococcal infection		-	-	-	-	√	√	√	√
Influenza		#	-	*	-	√	√	*	-
Chickenpox		-	-	√	-	√	√	-	√
Hepatitis A		-	-	-	-	√	-	-	*
Meningococcal infection		-	-	-	-	*	√	√	√
Japanese encephalitis		-	@	√	-	-	-	-	-
Haemophilus influenzae type B infection		-	-	-	-	√	√	√	√

* Provision of vaccinations to children in high-risk groups only

\# Provision of free influenza vaccinations to children aged from 6 to 23 months from families receiving Comprehensive Social Security Assistance (CSSA)

@ Ceased to be in the "actively recommended" category with effect from May 30, 2005

Annex B

Chronology of introduction of different vaccines in Hong Kong

Year	Introduction of immunisation programme	Target group
1952	B.C.G.	Newborns (Revaccinate primary school children if they show a negative reaction on tuberculin skin testing)
1956	Diphtheria, Tetanus & Pertussis (Triple Vaccine)	Primary series of triple vaccine targeted at children aged 2-4 months, 3-5 months, 4-6 months; booster at 1 1/2 years. Combined vaccine to be given at primary 1.
1963	Poliomyelitis (Trivalent Oral Vaccine for the anti-polio campaign)	Massive immunisation for the public
1966	Poliomyelitis (Polio Vaccine Type 1)	Modified to give only Type 1 vaccine to newborns, followed by two doses of balanced trivalent vaccine at 3-7 months
1967	Poliomyelitis (Trivalent Oral Vaccine)	1st booster dose added for age 1 ½ children
1967	Measles (Anti-measles Vaccine)	Children in the 6 months to 3 years age group
1978	Rubella (Rubella Vaccination Programme)	Primary 6 schoolgirls (later expanded to cover postpartum mothers and women of child bearing age)
1979	Poliomyelitis (Trivalent Oral Vaccine)	2nd and 3rd booster doses added for primary school entrants (6 years) and leavers (12 years) respectively
1981	Diphtheria & Tetanus (Combine Vaccine)	Further booster of given to primary 6 students

Year	Introduction of immunisation programme	Target group
1983	Hepatitis B	Government healthcare staff
1984	Hepatitis B	Newborn babies of 1st parity born to HBsAg+ve mothers in public hospitals. Schedule 0, 1, 3-5 months after birth
1986	Hepatitis B	Newborn babies of all parity born to HbsAg+ve mothers in public hospitals
1988	Hepatitis B	All newborns and all healthcare workers in sub-vented hospitals
1989	Measles (mop-up immunisation)	Primary 1 school children
1990	Measles, Mumps & Rubella (MMR vaccine)	Children at age one
1992* (lasted for one year)	Hepatitis B*	Children born between 1986 & 1988 who have not received hepatitis B vaccination
1996	Measles, Mumps & Rubella (MMR vaccine)	Second dose of MMR given to all primary six school children (in addition to 1st dose given at age one)
1997	Measles, Mumps & Rubella	Second dose of MMR brought forward from primary 6 to primary 1
1997	Measles (Annual "mop-up" exercise)	Primary 6 students
1997*	Measles* (Special measles vaccination campaign)	Persons aged 1 to 19 who have never had measles vaccination before or who have only received one dose of measles vaccine
1998	Influenza (Annual vaccination)	Residents of elderly homes

Year	Introduction of immunisation programme	Target group
2000	B.C.G.	To discontinue BCG revaccination programme for primary school children. For children under the age of 15 and have never received BCG vaccination, direct BCG vaccination will be given without prior tuberculin test
2000	Hepatitis B	Vaccination schedule standardized to 0, 1, 6 months after birth
2007	Diphtheria, Tetanus & acellular Pertussis and Inactivated Poliovirus Vaccine	Replacement of OPV and wP vaccine by IPV and aP vaccine by the combined DTaP-IPV/dTap-IPV. Vaccination Schedule: DTaP-IPV: 2, 4, 6, 18months, Primary 1 dTap-IPV: Primary 6

*One-off programme