Surveillance of Viral Hepatitis in Hong Kong - 2010 Update Report

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The information contained in this Report is up to year 2010 for the surveillance data, service statistics and published research findings.

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1. COMMENTARY

Surveillance Mechanisms of Viral Hepatitis in Hong Kong

1. Similar to many other places worldwide, viral hepatitis is a notifiable disease in Hong Kong. Locally, voluntary reporting was started in as early as 1966 and, since 1974, the disease has become notifiable. It was not until 1988 that the reported cases are classified by viral aetiology, namely hepatitis A, hepatitis B, non-A non-B hepatitis and unclassified hepatitis. Since 1996, non-A non-B hepatitis is further categorized into hepatitis C, hepatitis E and hepatitis (not elsewhere classified). Under the current reporting system, hepatitis A and B are defined by the presence of IgM anti-HAV and IgM anti-HBc respectively, whereas hepatitis C and E are diagnosed by positive tests for anti-HCV and anti-HEV.

2. Expectedly, virtually all of the notified cases were acute viral hepatitis. While the figures captured under the local system could be a good reflection of the acute disease burden of viral hepatitis, the extent of chronic infections resulting from some hepatitis, notably hepatitis B and C, has to be determined by other mechanisms. Insight of the epidemiology of various forms of hepatitis in Hong Kong can be gained by an analytical interpretation of regular statistics collected by health care or other institutions, and the information generated from designated studies. This Report presents the latest findings from collation and analysis of viral hepatitis data obtained from the disease notification system, service statistics, seroprevalence studies and other research findings. Much hopeful that the local viral hepatitis picture can be painted accurately and fully, this is certainly limited by the nature and availability of data. The presence of biases in data per se and their interpretation need to be acknowledged in reading this Report.

Changing Epidemiology of HAV and HEV

3. Hepatitis A virus (HAV) and hepatitis E virus (HEV) are both transmitted by faecal-oral route. More local data on hepatitis A relative to hepatitis E was available over the last decades. Hong Kong is of intermediate endemicity for HAV [1]. Since 1988 with the breakdown of reported hepatitis according to aetiologic agents, the largest epidemic of hepatitis A occurred in 1992, with over 3,500 cases reported to the Department of Health (DH) (Box 1). This represents a notification rate of 63 per 100,000 population (Box 4) and since then, a gradual declining trend in HAV incidence has been observed. In 2010, only 65 new cases of hepatitis A were reported (Box 1). Overall, case fatality rates from hepatitis A had been low and ranged between 0 and 0.7% (Box 4). A seasonal pattern of acute hepatitis A is present, with cases more commonly reported between January and May each year. Over the years, there is an overall increase in age, with decrease in proportion of 15-24 age group people but increase in those >25 years old (Box 5). The discernible decline in hepatitis A led to a parallel declining trend in overall reported viral hepatitis since 2002 (Box 3).

4. An analysis was made by the Surveillance and Epidemiology Branch (SEB) of Centre for Health Protection (CHP), DH on the 227 HAV cases notified between 2003 and 2004. The incidence rates were 1.57 per 100,000 in 2003 and 1.78 per 100,000 in 2004, which were lower than the rates in Mainland China (7.4 per 100,000 in 2003 and 6.9 per 100,000 in 2004). The male to female ratio was 1.83 to 1. There were five clusters of hepatitis A infection involving 2 persons in each cluster. No large single source outbreak was identified. During that period, 17 cases were classified as imported cases, with 8 from Mainland China, and the remaining from Asian and South-east Asian countries such as Indonesia, Pakistan and Thailand. One hundred and thirty-three (58.6%) required hospitalization. Patients were hospitalized for an average of 5.5 days, with a range of 1 to 25 days and a median stay of 5 days. Out of the 227 cases, 154 (67.8%) were in the working population. The majority of those affected was plant and machine operators and assemblers (34%) or were working in elementary occupations (26%). One hundred forty-two cases (63%) had history of consumption of marine products, of which 128 had eaten shellfish.

5. From the available data, prevalence of hepatitis A infection has been falling in Hong Kong, which echoes the finding of a higher median age in reported HAV cases that reflects the increased susceptibility of the adult population. In a local household study conducted in 2001, (Community Research Project for Viral Hepatitis 2001,

CRPVH), anti-HAV positivity was less frequent (P<0.001) across all age groups among subjects >21 years [2] than subjects in the same age groups of another study conducted in late 1980s [3]. HAV prevalence has only increased insignificantly in every 10-year age groups of people aged 21-50 [2] when compared with their corresponding 10-year younger age groups [3], signifying an aging cohort effect with no major infections in the last 10 years [2]. Similar conclusions can be drawn when comparing the late 1980s findings with those of a late 1970s study on local HAV seroprevalence [4]. Overall, these 3 studies suggest that age-specific prevalence of HAV has right-shifted locally in the last two decades. As of 2001, anti-HAV was present in about 20% of adults below 30 years old while it was over 80% in people aged >=40 years in the general Chinese population (Box 9). Data from a serosurvey in 2010 on 691 subjects with blood collected for conditions unrelated to hepatitis [unpublished data of DH, Box 10] found that anti-HAV was present in more than 60% of adults aged over 40 years. Besides an increasing prevalence with higher age, people born outside Hong Kong were more likely to test positive for anti-HAV whereas the reverse was true for people of non-labour work [2]. From the telephone interview part of the CRPVH 2001, some 11% of 4,564 subjects reported a history of HAV vaccination, with about 80% of which completed the course. More people less than 40 years old had received the vaccination. Over 98% had the cost paid by them or covered by their employers.

6. Cross-sectional surveys of anti-HAV at Kowloon Bay Integrated Treatment Centre (ITC) have been started since 2007. The subjects consisted of all new HIV/AIDS patients who first attended ITC between Jul 2007 and 2010 and convenient samples of all active HIV/AIDS patients who first attended ITC before Jul 2007 (Box 11). It appeared that the prevalence of anti-HAV increased with age of HIV/AIDS patients. The overall positivity rate among HIV/AIDS patients tested between 2007 and 2010 appeared to be comparable with that of the 2010 serosurvey data. Confounding factors, such as different levels of past infection, immunodeficiency in HIV patients, history of HAV vaccination and difference in years of testing, may have affected the results. As compared with patients infected HIV via other routes, those infected via homosexual or bisexual routes were at the highest risk of hepatitis A infection, as reflected by the lowest level of anti-HAV prevalence in this group of patients (Box 12). Though this could be partially explained by the larger proportion of younger patients aged <40 years infected HIV via homosexual or bisexual routes, this finding may shed light on the clinical management regarding recommendation on hepatits A vaccination in HIV/AIDS patients.

7. Hepatitis E appeared to run an opposite trend to hepatitis A over the last decade. The annual notification of hepatitis E infection jumped from 11 in 1996 to a record high of 118 in 2010 (Box 1), becoming the most common viral hepatitis reported to Department of Health. Seasonal pattern was observed with the peak season in March to April (Box 13), indicating that the infection was more common during winter and spring seasons. Of 575 cases reported, 397 (70%, Box 14) were male, giving male to female ratio of 2.2:1. The majority were adults, with the highest notification rate at 45-54 years age group, followed by 55-64 years old (Box 15). The death rate could be as high as 0.44 per million population (Box 16).

8. Similar rising trend of hepatitis E infection was observed in neighbouring areas including mainland China, Singapore and Japan. According to the Ministry of Health of mainland China, the number of cases of hepatitis E infection increased from 15,965 in 2004 to 20,854 in 2009. Similarly in Singapore, the Ministry of Health recorded 90 cases in 2009, compared to the 5-year median number of 30 cases between 2004 and 2008. In Japan, the Infectious Disease Surveillance Centre reported 56 cases of hepatitis E in 2007, compared with 3 cases in 2000 [5].

9. The Centre for Health Protection reviewed all Hepatitis E cases recorded between 2001 to 2010 [6]. Of the 524 cases, the commonest presentations were tea-coloured urine, jaundice, anorexia, fever, myalgia and nausea. 78.2% were hospitalized with a median stay of 7 days. A total of 12 cases were fatal (9 males and 3 females), age ranged from 53 to 82 (median age 67.5 years). The case fatality rate was 2.3%, which was comparable with reported figures from other countries. None of the fatal cases were pregnant. Most cases (99.4%) were sporadic infection and 87.4% acquired the disease locally. A small family cluster involving 2 males (aged 15 and 44 years) was identified. The 2 victims had shared multiple high-risk food items at home during the incubation period. It proved difficult to determine the exact source of infection of individual sporadic cases as hepatitis E has a long incubation period of 15-64 days. Nonetheless, epidemiological investigation has not identified any outbreak linked to a particular food premises.

10. In the CRPVH study conducted in 2001, 19% of adult subjects were found to have serologic evidence of HEV infection. People in the 40-49 years age group had the highest positivity rate of 24% (Box 17). Unlike HAV infection, a pattern of right shift in HEV seroprevalence was not as prominent when temporal change was analysed. Both the overall and age-specific HEV prevalence were lower in 2001, when compared with the findings of a study done in late 1980s [7], which could have been contributed by the use of different laboratory assays.

11. Another published study identified differences in epidemiology and clinical features between sporadic hepatitis E and hepatitis A cases. Of 105 acute hepatitis A and 24 hepatitis E patients seen at Princess Margaret Hospital (PMH) in 2002, HAV patients were significantly younger (median age of 27 years) and had recent history of shellfish consumption while HEV patients were older (median age = 53 year) and most had a recent travel history [8]. Moreover, whereas hepatitis A was milder and recovery was uneventful, hepatitis E was more severe, associated with significant mortality and frequently complicated by protracted coagulopathy and cholestasis [8].

12. A local study examined the genotype of 57 patients with acute HEV infection who were admitted to Prince of Wales Hospital [PWH] [9]. Fifty-six patients (98%) were Chinese. All cases were sporadic. No fulminant hepatitis was recorded and all patients recovered. Phylogenetic analyses of the open reading frame ORF2 fragments from 46 patients and ORF1 fragments from 33 patients showed complete agreement, with most (n= 45 [98%]) belonging to genotype 4. The remaining isolate was genotype 3 obtained from a woman who had no history of travel. Most of the Hong Kong isolates clustered closely with a swine isolate reported from Guangxi Province, China.

13. Hepatitis E is mainly transmitted through consumption of contaminated water or food. There is evidence suggesting a zoonotic source in overseas studies, and that pigs may be an important reservoir. In light of these observations, the Centre for Food Safety conducted a risk assessment study titled " Hepatitis E Virus in Fresh Pig Livers" [10] to determine the HEV prevalence in fresh pig liver samples obtained in local markets. One hundred fresh pig liver samples were collected from pigs slaughtered between mid-January to May. Sixteen (31%) out of 51 roaster pig (around four months old) liver samples were positive for HEV, while none of the 49 porker pig (around six months old) liver samples tested positive. Partial sequences of some HEV isolates from roaster pigs were identical to those from 7 among 48 local human cases with date of onset from January to July 2009, as well as local cases recorded in the past. The findings suggest the possibility of roaster pigs as one of the sources of local human hepatitis E infections.

Pattern of Hepatitis B in Various Communities and its Significance

14. Parenterally-transmitted viral hepatitis B resulting in chronic infection state is endemic in Hong Kong. The number of reported hepatitis B virus (HBV) infections has been relatively stable over the last decade, with an apparent drop to 83, 80 and

73 cases reported in 2008, 2009 and 2010 respectively (Box 1). In an epidemiologic study of acute HBV by the Department of Health and Hong Kong Red Cross Blood Transfusion Service (HKRCBTS), 149 of 351 eligible subjects recruited from 2000 to 2003 participated in risk factor assessment with or without blood screening. Repeat blood donors who tested positive for HBsAg for the first time and were then confirmed IgM anti-HBc positive were reported as having acute HBV. There were 43 such clients, yielding an incidence rate of HBV seroconversion in repeat donors as 9.4/100,000 (n=148,366), 9.3/100,000 (n=150,420), 4.6/100,000 (n=151,410) and 3.5/100,000 (n=143,230) in 2000, 2001, 2002 and 2003 respectively. Nearly 70% of the study subjects were male; 99% were Chinese and the mean age was 31 years. Over half could not have risk factor of acute HBV determined despite undergoing a standardized questionnaire interview by nurses. Sexual contact was assessed to be the commonest risk (85%) in the rest. Of 124 subjects who had hepatitis B screening at 6 months post-IgM anti-HBc positivity, 50% developed anti-HBs while 9.7% were HBsAg positive. The results suggested a higher rate of HBV chronicity than what was previously reported in the literature. However, these findings have to be interpreted with extreme caution owing to the relative small number of samples, incompleteness of data and potential biases from the subjects sampling and other study design.

15. Determining the seroprevalence of HBV sheds light on how common the infection is in different communities, as well as informing its chronic disease burden. The various adult communities can be categorized into 3 groups according to the risk of contracting HBV: those (a) without apparent risk, (b) with undetermined risk, and (c) with apparent risk. Groups without apparent risk for which data in 2010 was available include blood donors, pre-marital screening attendees, antenatal women, police officers, new health care workers (HCW). Clients seeking post-exposure management and tuberculosis patients are those with undetermined risk. Drug users, HIV/AIDS patients and female sex workers are at apparent risk of contracting HBV related to their risk behaviours.

16. A majority of the available seroprevalence data in different populations were limited to overall positivity rate of HBV markers. Still, temporal trend can be discerned as most have yearly data for the past decade or so. For groups with some demographic characteristics available, such as age and gender, further analyses have been made per the aggregate data. Several features on the current pattern of HBV could be observed from the serologic investigations, namely (a) chronic HBV infection is in a general declining trend, (b) HBV prevalence increases with increasing age, and (c) chronic HBV infection is commoner in male than female. A

word of caution in the interpretation of data though, is that HBV testings have been performed for a variety of reasons in different communities, with heterogeneous mix of population characteristics.

17. The temporal decline of hepatitis B markers in most community groups without apparent risk was especially obvious in new blood donors. Its HBsAg prevalence follows a continual falling trend since early 1990s, to a record low of 1.2% in year 2010 (Box 18). There is also a falling trend over the years, albeit less prominent, among university students/ staffs and among antenatal women (Box 20 and Box 22). The HBsAg prevalence in antenatal mothers is higher and is confounded by the place of birth. A study of 2480 pregnant women attending the Maternal and Child Health Centre (MCHC) of DH in 1996 found a 13.1% in those born in Mainland China as compared to 8.4% in local mothers [11]. Data from Virus Unit, Department of Health also showed a higher prevalence of 12.5% and 13.8% in the subset of non-resident expectant mothers versus the overall positivity rate of 8.5% and 8.6% in 2004 and 2005 respectively. The prevalence in pre-marital package service users had increased slightly since 2001, to 6.5% in 2010 (Box 21). The prevalence in antenatal women however remained stable at 7.9-9.2% since 2001 (Box 22). While the prevalence in newly recruited female health care workers (Box 27) as determined at pre-HBV vaccination screening showed a stable level in the last 3 years, the prevalence of HBsAg among newly recruited male health care workers rose from 3.0% in 2008 to 4.9% in 2010.

18. To examine the HBV seroprevalence among children in Hong Kong, CHP, DH conducted a seroprevalence study among junior secondary school students (aged 12 to 15 years) in 2009 [unpublished data of DH]. Twenty-three schools participated in the survey. One class from each school Form was randomly sampled. Of 1913 students who had blood taken for examination, 15 were detected HBsAg positive, giving rise to a seroprevalence of 0.78% (95% confidence interval 0.39 – 1.16%, Box 28).

19. Of 1,022 tuberculosis patients attended TB & Chest Clinics, Department of Health between March and May in 2010, 86 (8.4%, Box 29) were detected HBsAg positive, with the highest prevalence rate in the middle age group (40-59 years old: 12.4%) followed by the more elderly group (>= 60 years old: 7.1%, Box 30). The HBsAg positivity rate was also found to be higher in male clients (9.6%) than in female (6.2%, Box 29). Both the age (Box 30) and gender pattern (Box 29) were consistently observed over the last six years. Among clients attended for post exposure management, HBsAg rate was found higher in non-health care workers

than in health care workers (Box 31), which may be partly explained by the success of pre-employment vaccination programme for health care workers. HBsAg prevalence in female sex workers attending the clinic of Action for REACH OUT in the last four years was 5.0 -10.4%, which is comparable with 6.8% found in Social Hygiene Service survey a decade ago (Box 35).

20. Compared with aforementioned groups, a higher HBsAg prevalence was generally noted in drug users (Box 32) and HIV-infected patients (Box 33), underscoring their infection risk. However, the HBV prevalence in drug users highly fluctuated in recent years due to the small number of subjects tests (Box 32). For HIV/AIDS patients, HBsAg was present at 5.6-15.9% in the last decade, which was substantially higher than the 3-8% in other clients except drug users (Box 35). Furthermore, due to the underlying immunosuppression, HIV/AIDS patients are more prone to becoming chronically infected with HBV after acute infection [12].

Age Difference in Prevalence of Hepatitis B

21. For some groups, evidence supported age as an important correlate of HBV infection, with a higher proportion of the older population having viral markers or being chronically infected. From the 1996 to 2006 data in police officers, the HBsAg rate progressively increased with each 10-year age group, being 4.7% in <=20 years old and 9.1% in 51-60 years old subjects (Box 25). Similarly, HBsAg positivity appears to be lower in antenatal women aged <19 years but not too different among older subjects (Box 23).

22. The age effect was also evident in a screening of convenient samples among persons who underwent virologic investigations in 2001. HBsAg was absent in those below 10 years old, but was found to be >10% in those over 20 years old. Yet, anti-HBc was present, at a rate of 1.3% in subjects 1-4 years of age and rose to 7% in those 5-9 years old. In a similar testing of 573 sera left over from persons up to 19 years old after virologic investigation in 2004, HBsAg rate was found to be 0.5% (1-<5 years old), 0% (5-9 years old), 0% (10-14 years old) and 8% (15-19 years old). Convenient sample testing was repeated in 2006. Of 896 sera left over after virologic investigation, HBsAg rate among persons over 20 years old (n = 300; 14% tested positive in subjects of 20-24 years old, 10% in 25-29 years old, 12% in 30-34 years old, 8% in 35-39 years old, 5% in >39 years old) was found to be substantially higher than persons under 19 years (n = 596; 0-1%). HBsAg rate was consistently low among different age groups below age 20, i.e. 1% (1-4 years old), 0% (5-9 years old), 1% (10 -14 years old) and 1% (15-19 years old). The decrease in HBsAg rate for

persons under 20 years old is likely attributed to the success of newborn HBV vaccination programme launched in 1988. A recently published study conducted in Tuen Mun Hospital (TMH) provided added further evidence in this regard. Of 121 infants borne to HBsAg positive mothers from November 2000 to June 2001 at TMH, only three (2.5%) became chronic HBV carriers at 12 months of age. One (0.8%) was suspected to be infected by the S-mutant [13].

Gender Difference in Prevalence of Hepatitis B

23. Male had a higher HBV prevalence than female, as observed in several groups. In 2010, the HBsAg positivity rate among new blood donors was 1.4% in male and 1.1 % in female (Box 19). Among tuberculosis patients treated at chest clinics, the rate in 2010 was 9.6% in male and 6.2% in female (Box 29). From 1996 – 2006, the HBsAg rate in male police officer (6.6%) was higher than female police officer (4.0%, Box 24). The 2001 household study also showed that a higher overall HBsAg rate in male.

Genotypes of Hepatitis B and their Disease Course

24. Genotyping studies of HBV in Hong Kong became more common in the last decade. A study of 776 chronic hepatitis B patients seen at the University of Hong Kong Liver clinic from 1999 to mid-2003 found that genotype C was the commonest (486, 62.6%), followed by B (252, 32.5%), with a majority of genotype B belonged to subgroup Ba [14]. Similarly, another study of 426 chronic HBV patients recruited consecutively from 1997 to mid 2000 at the Hepatitis clinic of Princess of Wales Hospital (PWH) found a prevalence of 57% (242) and 42% (179) of genotypes C and B respectively [15].

25. A study of 49 HBV genotype C ethnic Chinese patients under the care of PWH Hepatitis clinic identified 2 distinct groups with different epidemiological distribution and virologic characteristics – 80% being genotype “Cs” (found mostly in Southeast Asia) and 20% “Ce” (predominated in Far East) [16]. In addition, subgenotype Cs appears to be more common in Hong Kong than other parts of China. In the recent analysis of a cohort of patients with HBeAg-negative chronic liver disease from three different parts of China (Beijing, Shanghai and Hong Kong), 69% of genotype C patients in Hong Kong belonged to subgenotype Cs whereas 97% of genotype C HBV in Shanghai and Beijing belonged to subgenotype Ce ($P < 0.0001$) [17].

26. Regarding HBV disease course, recent studies found that patients infected with genotype C may have a more aggressive clinical course than those infected with genotype B. It was shown that genotype B patients had earlier HBeAg seroconversion than genotype C patients in an early study[14]. Moreover, local studies have shown a higher risk of cirrhosis and HCC development [15,18], as well as more severe histological fibrosis, with genotype C [19]. Among HBV genotype C, subgenotype Cs appears to carry a worse prognosis than subgenotype Ce [17]. In a local study by the Chinese University of Hong Kong, patients infected by subgenotype Cs had the lowest serum albumin and highest alanine aminotransferase levels compared with subgenotype Ce and Ba. And, patients infected by subgenotype Cs also had more severe histological necroinflammation than subgenotype Ce [17].

27. Nevertheless, in a study of end-stage HBV-related liver disease patients requiring transplantation, those with genotype B had significantly more pre-transplant acute flare and worse liver function while genotype C patients had a greater risk and severity of recurrence due to lamivudine-resistant mutants [20].

28. In a case control study, it was concluded that HCC patients had a significantly higher prevalence of core promoter mutations and genotype C but the association with HCC is mediated via the former [21]. A study of 5080 chronic HBV patients focusing on familial HCC found 22 such families, giving a prevalence of 4.3 families/1000 HBV carriers [22]. Age of onset of HCC is significantly younger in familial HCC than sporadic cases, and it progressively decreased down the generations, suggesting an anticipation phenomenon.

Hepatitis B Vaccination

29. Occurrence of new HBV infection is dependent on the interplay of multiple factors, including size of HBV pool, proportion of susceptible population and chance of exposure to the virus. It is likely that the circulating pool of HBV has reduced over the years in Hong Kong, thereby lessening the risk of exposure which can lead to acute infection. The reduced HBV pool in the community might have resulted from the universal vaccination programme for newborns, increased vaccination coverage in adults, practice of universal precaution in health care settings, predonation blood screening and promotion of safer sex [23].

30. A 16-year follow up study of 1112 neonates born to HBV carrier mothers who received HBV vaccine and hepatitis B immunoglobulin at different schedules

demonstrated the long term protective efficacy of immunization [24]. Upon completion of the vaccination schedules, 92.6% developed antibody against surface antigen (anti-HBs) seroconversion. Only 39 (3.5%) babies were tested positive for HBsAg and had become chronic carriers, 35 of which occurred before one year of age. At the end of the 16th year, 610 subjects (54.9%) returned for blood test evaluation. Although the anti-HBs seroconversion rate dropped to 33.3% at the 16th year and a total of 96 (8.9%) vaccinees developed anti-HBc seroconversion, none was found to have breakthrough infection. Two hundred seventy-eight (25%) vaccinees were subsequently followed up at the 25th year [unpublished data]. The anti-HBs seroconversion rate was maintained at 37.1% at the 25th year. Although two and three subjects developed anti-HBc seroconversion at the 21st and 25th year respectively, no new HBsAg positive subject was detected. This finding suggests that the protective efficacy of immunization can be as long as at least 25 years. In another study of 2/3-doses HBV vaccine regimen without boosters to 318 HBV negative children recruited at age 3 months to 11 years and followed up annually, no subjects became HBsAg up to 18 years of follow up (88 subjects). A total of 88 anamnestic responses with significant increase in anti-HBs titers were documented in 70 subjects; 3 subjects had benign breakthrough HBV infection with isolated anti-HBc seroconversion [25].

31. Universal neonatal HBV vaccination programme has been in place in Hong Kong since 1988, and a supplementary Primary 6 vaccination programme was introduced in 1998. From the statistics collected and maintained by Family Health Services, DH, the coverage rate for first dose HBV vaccine was consistently above 99% over the years. However there is generally a drop of coverage rate in the second or the third dose. The drop in known post-first HBV vaccination coverage rate may be related to the fact that more local-births have returned to Mainland after delivery and did not attend MCHC for services, and also more babies received combined vaccine by private doctors and were not known to MCHC.

32. DH has been conducting immunization coverage surveys (ICS) every two or three years starting from 2001 to determine immunization the coverage rates of all vaccines, including HBV vaccination among children aged 2 to 5 years and attending pre-primary institutions including kindergartens and child care centres. Results from ICS conducted in 2001, 2003 and 2006 confirmed high coverage rates of hepatitis B vaccine [26, 27, 28], including Hong Kong–born and Mainland China-born children. Another round of ICS was conducted in 2009 (unpublished DH data). A total of 6248 children enrolled in 54 pre-primary institutions participated in the survey, reaching an

overall response rate of 77.5%. Similar to previous years, the 2009 survey demonstrated a satisfactorily high coverage rate of HBV vaccination (Box 37).

33. In 2009, a HBsAg seroprevalence study was conducted among more than 1900 children aged 12 to 15 years (unpublished DH data). The study found an HBsAg seroprevalence of 0.78% in these children who were born after the implementation of universal neonatal HBV vaccination programme. This result showed that Hong Kong has already achieved a time-bound goal of reducing chronic HBV infection rate to less than 2% among 5 year-old children by the year 2012, as set by the Western Pacific Regional Office (WPRO) of the World Health Organization (WHO). In July 2011, Hong Kong was verified by WPRO as having successfully achieved the goal of HBV control.

34. In the CRPVH 2001 study, about 16% of the telephone-interviewed subjects reported a history of HBV vaccination, with a higher frequency in persons below 50 years of age. Some 83% of them reported having completed the vaccination course. Over 99% had the cost paid by them or borne by their employers. Nonetheless, the persistent high HBsAg prevalence, though declining, means a significant disease burden in the years to come. Continued tracking of the trends of new infections and prevalent cases could inform more of the changing HBV situation in our locality.

Current Situation of Hepatitis C

35. Although HCV shares similar transmission routes with hepatitis B, the two infections may not be of equal prevalence in a locality, as what epidemiological data points to in Hong Kong. While HBV is still prevalent in many populations in Hong Kong, HCV prevails only in isolated communities from available evidence. Conceivably related to the different epidemiology, HCV is of relatively less public health significance regarding chronic liver diseases when compared to HBV in Hong Kong. Local studies showed that while 75-80% of hepatocellular cancers in Hong Kong were related to chronic HBV infection, 3-6% cases were related to chronic HCV infection. HBV and HCV co-infection accounted for another 0.4-3% [29]. Among 76 liver transplants performed in Queen Mary Hospital due to cirrhosis from 1999 to 2000, 51 and 7 were related to hepatitis B and C respectively [30]. From 1996-2010, a total of 27 cases of acute hepatitis C infection were reported to DH under the statutory notification system (Box 1), with one to 11 cases reported annually.

36. Data from new blood donors who were mostly adolescents and young adults in the last decade suggested that HCV infection is around 0.1% locally, with the

figure in 2010 being 0.09% (95% confidence interval 0.07% - 0.13%) (Box 39). Among the new blood donors, anti-HCV was most commonly detected in males aged 50 years or over, and males were more commonly affected than females (Box 40). Findings of the household study of the entire spectrum of adult age groups conducted in 2001 further supported the uncommon scene of HCV infection among general population in Hong Kong; the overall positive rate was 0.3% in 936 subjects (95% confidence interval, 0.07%-0.94%) (Box 41). From 1999 to 2009, six of 1035 (0.6%) clients who attended the Therapeutic Prevention Clinic (TPC) at Integrated Treatment Centre (ITC) of CHP, DH for post-exposure management were tested positive for anti-HCV at 6 months. All 6 cases were non-HCW and already HCV infected at time of injury upon retrospective testing of baseline specimens (Box 42).

37. From the studies published in the early 1990s, it was shown that anti-HCV was more commonly found in injecting drug users (IDU, 66.8%), haemophilia (56%), haemodialysis (4.6%) and other patients requiring frequent blood/blood product transfusions but not persons at risk through sexual contact [31]. Another study conducted for 51 haemodialysis patients found that 8 (16%) were positive for anti-HCV by second generation enzyme immunoassay and 1 (2%) for HCV RNA alone, giving an overall infection rate of 18% [32]. This study also found a new infection rate of 4.9% per patient-year upon longitudinal follow up of 19 months. Results of testing non-random samples from drug users under treatment showed a HCV positive rate of 74% in 1988/1989 and 46% in 2000/2001 (Box 43).

38. A HCV seroprevalence study in 2006 conducted in methadone clinics targeting IDU echoed the high prevalence rate of HCV in this community [33]. Of 567 IDU participants recruited in 2006, 84% were male and 98% were ethnic Chinese. The median age was 49 years and median injection duration was 17 years. Two-thirds (62%) admitted ever sharing injecting equipments. Prevalence of anti-HCV was 85% (95% confidence interval 82.5 – 88.3%). Injection duration, recent injection, ever sharing injecting equipments and concomitant use of other drugs were independent factors associated with HCV infection.

39. HIV/AIDS patients, with a proportion being IDU, is another group with consistent data showing a comparatively high HCV prevalence (Box 44, 45). From 2000 to 2010, HCV-HIV coinfection among patients attending ITC ranged from 7% to 25%. The prevalence rate appears to be higher in male than female patients, likely related to the differential risk of parenteral and blood product exposure (Box 44). While HCV infection is present in 1 - 7 % of HIV/AIDS patients infected due to sexual contact, HCV was nearly universal in patients infected through drug injection (Box

45). It should be noted that, among patients infected due to sexual contact, the relatively high HCV prevalence (7%) in male patients infected via heterosexual route was attributed to a significant proportion (75%) having past history of drug use (Box 45), The overall higher HCV prevalence, coupled with the hastened liver disease progression in HIV-infected patients [34], would no doubt result in a unique HCV/HIV coinfection that demands attention.

40. Since 2003, laboratory surveillance for HCV in Hong Kong was enhanced to monitor the trend of anti-HCV among selected population groups in the local community, including blood donors from HKRCBTS, and selected in-patients from the Princess Margaret Hospital (PMH) and Prince of Wales Hospital (PWH, joined since 2005). Some 180,000-230,000 new and repeat blood donors of HKRCBTS were tested for anti-HCV each year; the prevalence was consistent at 0.025% in 2008, 0.020% in 2009 and 0.020% in 2010. The overall anti-HCV prevalence detected in hospital patients tested over the last eight years was 3.3% (Box 46). The highest anti-HCV rate was in drug users, of which 47.8% were found positive. This was followed by patients with history of blood transfusion at about 10.2%, and post renal transplant (3.8%), and patients done for clinical indication not falling under the standardised categorisation of screening (3.7%). Overall, the male-to-female ratio of HCV positive subjects was about 2 to 1, with a mean age of 48.0 years old (Box 47).

41. Genotypic studies in Hong Kong has identified that 1b and 6a were the prevalent HCV genotypes locally, a scenario different from that in western countries where 1a predominated [35]. In an early study of 212 blood donors tested anti-HCV positive from 1991 to 1994, the commonest genotype found was 1b (58.8%), followed by 6a (27.0%) [36]. In anotherstudy of hospitalized patients with HCV testing for clinical indications 1b was the commonest type found in patients with chronic liver diseases and chronic renal failure[37]. According to a local study of patients on renal replacement therapy, the predominant genotype was 1b, followed by 1a and 6a [38]. Yet, the commonest genotype in intravenous drug users was genotype 6. A retrospective analysis of 106 intravenous drug users and 949 non-drug users with samples collected between December 1998 and May 2004 also confirmed the significant high prevalence of genotype 6a in drug users (58.5%) followed by 1b (33.0%), in contrast to 63.6% for 1b and 23.6% for 6a in non-drug users [39]. Besides intravenous drug use, age and sex were independent factors associated with HCV genotypes in this study. In the methadone clinic-based study in 2006, of 273 IDUs, 52% had genotype 6a, 38% had 1b and 5% 3a while others had genotypes 2a, 3b and 6h [40]. .

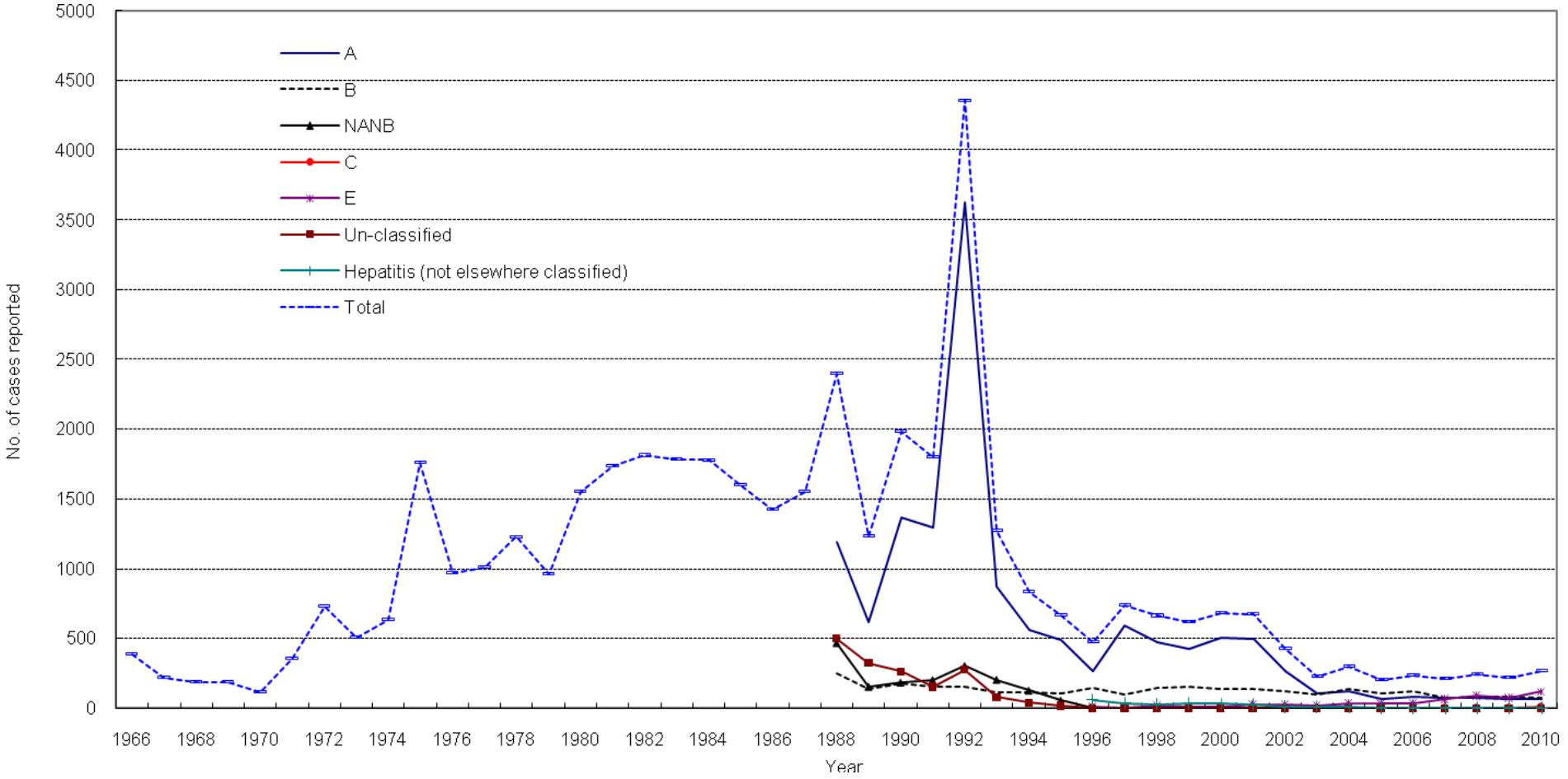
42. The natural history of 138 HCV genotype 1 patients (median age:50 years) was compared with that of 78 HCV genotype 6 patients (median age: 46.5 years) in Queen Mary Hospital [41]. Both genotypes share a similar natural history based on liver biochemistry, HCV viral load, and on probability of cirrhotic complications and mortality after a median follow-up period of over 5 years.

2. Tabulated results of acute viral hepatitis under the disease notification system

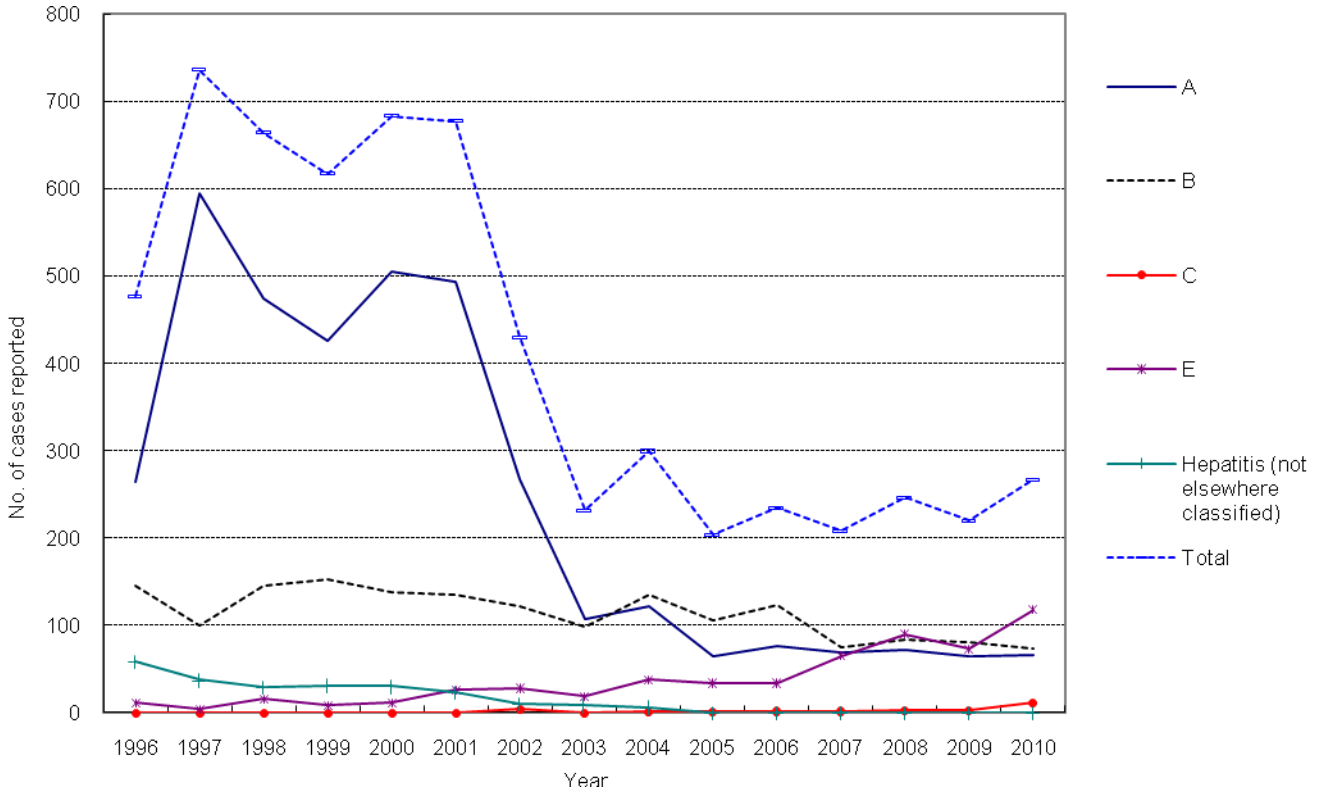
Box 1. Number of cases of viral hepatitis reported to the Department of Health between 1966 and 2010 (Data source: DH)

Year	A	B	NANB	C	E	Un-classified	Hepatitis (not elsewhere classified)	Total
1966		*voluntary reporting since 1966*						386
1967								218
1968								191
1969								188
1970								117
1971								357
1972								729
1973								509
1974		*notifiable since 1974*						639
1975								1761
1976								969
1977								1008
1978								1230
1979								964
1980								1554
1981								1738
1982								1814
1983								1783
1984								1780
1985								1601
1986								1425
1987								1554
1988	1187	250	465			496		2398
1989	618	136	154			324		1232
1990	1362	178	183			261		1984
1991	1297	150	200			154		1801
1992	3626	157	301			273		4357
1993	874	116	203			80		1273
1994	557	112	125			41		835
1995	491	102	55			18		666
1996	264	144	-	-	11	-	58	477
1997	595	100	-	-	4	-	37	736
1998	474	145	-	-	16	-	29	664
1999	426	152	-	-	8	-	31	617
2000	505	137	-	-	11	-	30	683
2001	494	134	-	-	26	-	23	677
2002	267	121	-	4	28	-	10	430
2003	107	98	-	-	19	-	8	232
2004	121	134	-	1	38	-	6	300
2005	64	105	-	1	34	-	-	204
2006	76	123	-	2	34	-	-	235
2007	68	74	-	2	65	-	-	209
2008	71	83	-	3	90	-	-	247
2009	64	80	-	3	73	-	-	220
2010	65	73	-	11	118	-	-	267

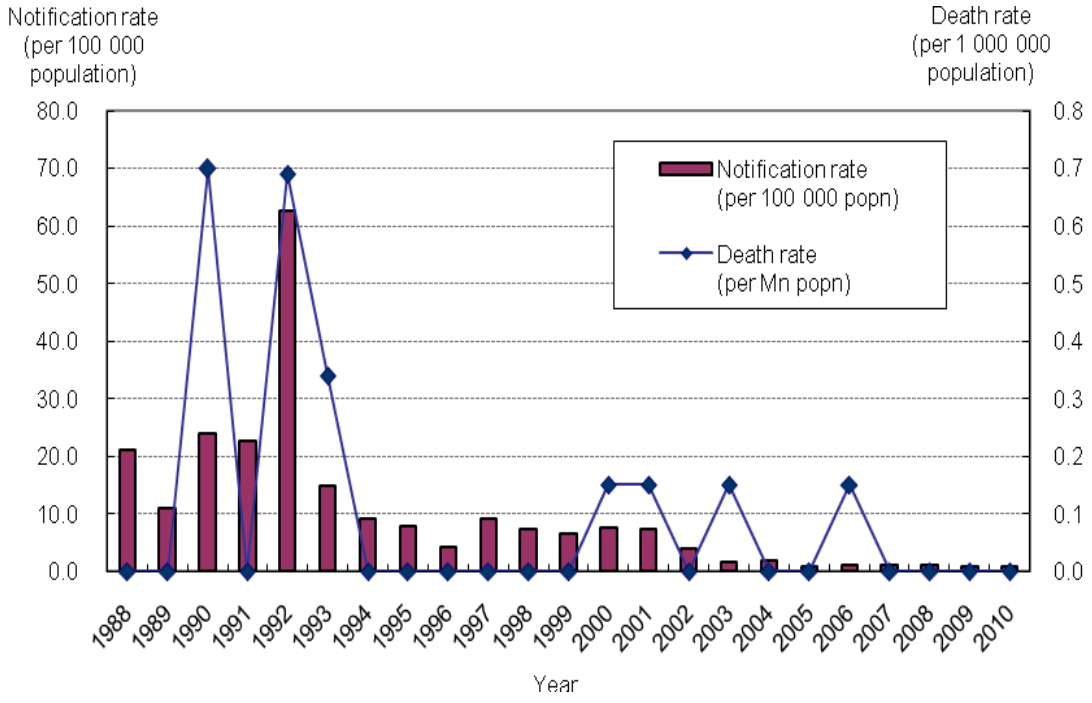
Box 2. Reported viral hepatitis from 1966 to 2010 (Data source: DH)



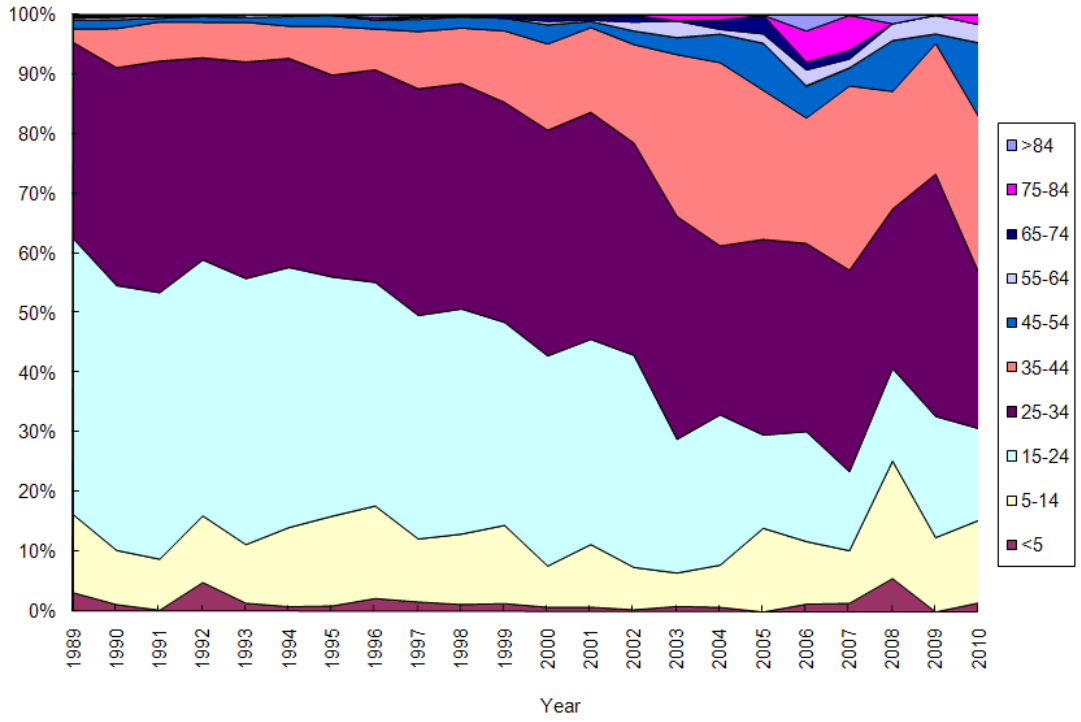
Box 3. Breakdown of different types of reported viral hepatitis from 1996 to 2010 (Data source: DH)



Box 4. Notification rates and death rates of viral hepatitis A, 1988 – 2010 (Data source: DH)



Box 5. Age distribution by proportion of total notifications of hepatitis A, 1989-2010 (Data source: DH)



Box 6. Sex distribution of hepatitis B cases notified from 1995 to 2010 (Data source: DH)

Year	Male	Female	Total
1995	74	28	102
1996	106	38	144
1997	73	27	100
1998	109	36	145
1999	113	39	152
2000	105	32	137
2001	107	27	134
2002	86	35	121
2003	64	34	98
2004	103	31	134
2005	79	26	105
2006	87	36	123
2007	59	15	74
2008	66	17	83
2009	56	24	80
2010	60	13	73
Total	1348	457	1805

Box 7. Age distribution of hepatitis B cases notified from 1995 to 2010 (Data source: DH)

Year	Age group (years)							
	<1-14	15-24	25-34	35-44	45-54	55-64	≥65	Total
1995	1	44	34	13	7	3	0	102
1996	4	48	45	27	13	4	3	144
1997	2	32	31	21	9	3	2	100
1998	4	44	46	32	14	4	1	145
1999	3	44	49	29	18	4	5	152
2000	2	39	48	32	8	5	3	137
2001	1	41	42	30	17	2	1	134
2002	1	37	29	26	17	8	3	121
2003	0	24	32	25	7	6	4	98
2004	0	31	46	34	17	4	2	134
2005	0	22	30	25	14	9	5	105
2006	0	22	45	30	16	6	4	123
2007	0	7	21	23	16	5	2	74
2008	0	6	32	25	14	4	2	83
2009	0	9	24	20	14	9	4	80
2010	0	0	23	25	17	3	5	73
Total	18	450	577	417	218	79	46	1805

3. Tabulated results of seroprevalence of hepatitis A and hepatitis E

Box 8. Prevalence of anti-HAV in a collection of studies/testings between 1978 and 2009 (Data sources: Multiple sources)

Age groups	1978	1987	1989	1993	1995	1996		1998	2000	2001	2001	2002	2003	2004	2005	2006	2007	2008	2009
0 – 10	12.9%	5.3%	6.8%	59.4% (M) 53.3% (F)	8.3%	-	6.1%	5.4%	9.3%	4.58%	-	5.3%	10.3%	14.7%	15.4%	20.0%	14.3%	16.7%	25.0%
11 – 20	44.8%	17.1%	11.2%			7.0%					12.5%								
21 – 30	75.0%	53.8%	58.8%		11.3%	-	11.8%	7.6%	17.5%	13.2%	26.8%	12.6%	13.2%	21.0%	28.2%	25.8%	19.4%	26.3%	30.3%
31 – 40	82.9%	85.1%	83.5%		49.0%	-	37.7%	40.8%	35.0%	41.3%	53.2%	46.7%	52.4%	43.8%	35.7%	50.0%	37.5%	47.4%	36.4%
41 – 50	91.1%	94.7%	91.1%	94.5% (M) 91.0% (F)	70.5%	-	58.6%	66.7%	60.0%	71.1%	88.3%	58.1%	100.0%	50.0%	72.7%	80.0%	62.5%	71.4%	26.7%
>50			93.9%			-					97.7%								
Data source	A	B	C	D	E	F	E	E	E	E	G	E	E	E	E	E	E	E	E

Data sources:

A. Study on left-over sera of 362 subjects, by Tsang et al of the University of Hong Kong [4]

B. Study on stored sera of 702 healthy subjects, by Chin et al of the University of Hong Kong.[3]

C. Study on 1028 serum samples collected from individuals attending a health exhibition, by Lim et al of Department of Health. [42]

D. Seroprevalence results reported in the press by Lai et al of the University of Hong Kong. [43]

E. Pre-vaccination screening on students and staff of City University of Hong Kong: 553 (1995), 669 (1996), 608 (1998), 395 (2000), 592 (2001), 371 (2002), students and staff of Baptist University of Hong Kong 240 (2001), 259 (2002), 153 (2003), 55 (2004), 77 (2005), 53 (2006), 54 (2007), 70(2008),63(2009) and students and staff of Lingnan University 125 (2003), 84 (2004). [44]

F. Seroprevalence study in school children by Lee et al of the Chinese University of Hong Kong. [45]

G. Community Research Project on Viral Hepatitis 2001. [2]

Box 9. Prevalence of anti-HAV in participants of Community Research Project for Viral Hepatitis (CRPVH) 2001 (Data source: DH)

Age group	No. Tested	Anti-HAV +ve	
		No.	%
18-29	137	27	19.7
30-39	223	116	52.0
40-49	291	248	85.2
50-59	170	161	94.7
60 & over	115	113	98.3
All	936	665	71.0

Box 10. Prevalence of anti-HAV in individuals with blood collected for serological diagnosis of conditions unrelated to hepatitis in 2010 (Data source: PHLSB, CHP, DH)

Age group	No. Tested	Anti-HAV +ve	
		No.	%
0-10	96	15	15.6
11-20	100	22	22.0
21-30	100	37	37.0
31-40	95	51	53.7
41-50	100	64	64.0
51-60	100	91	91.0
>60	100	100	100.0
All	691	380	55.0

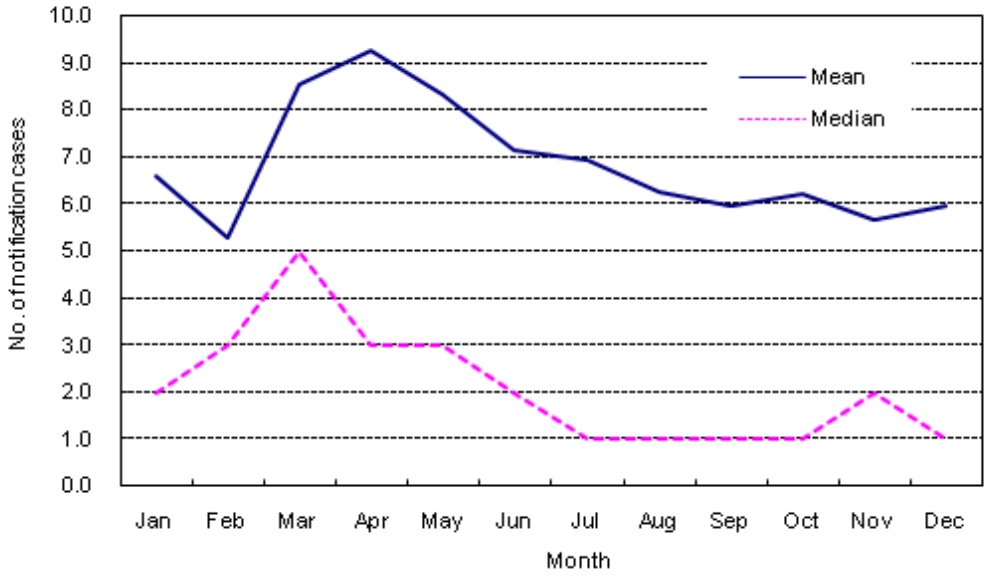
Box 11. Anti-HAV prevalence in HIV/AIDS patients first HAV marker in ITC between Jul 2007 and 2010 (Data source: ITC, CHP, DH)

Year	No. of patients	Age	No. tested	Anti-HAV +ve	
				No.	%
2007 Jul-Dec	n=309	<20	0	0	--
		20-29	64	28	43.8
		30-39	203	90	44.3
		40-49	30	17	56.7
		>=50	12	10	83.3
2008	n=506	<20	2	1	50
		20-29	100	38	38.0
		30-39	283	143	50.5
		40-49	77	49	63.6
		>=50	44	42	95.5
2009	n=228	<20	2	0	0
		20-29	57	22	38.6
		30-39	92	44	47.8
		40-49	52	31	59.6
		>=50	25	23	92.0
2010	n=223	<20	3	0	0
		20-29	41	18	43.9
		30-39	82	49	59.8
		40-49	55	34	61.8
		>=50	42	35	83.3

Box 12. Prevalence of anti-HAV per HIV risk in HIV/AIDS patients first HAV marker in ITC between Jul 2007 and 2010 (Data source: ITC, CHP, DH)

HIV risk	No. tested	Anti-HAV +ve	
		No.	%
Heterosexual male	288	185	64.2
Heterosexual female	205	144	70.2
Homo/Bi-sexual	612	209	34.2
Drug user	139	119	85.6
Blood/blood product recipient	12	8	66.7
Undetermined	10	9	90.0
Total	1266	674	53.2

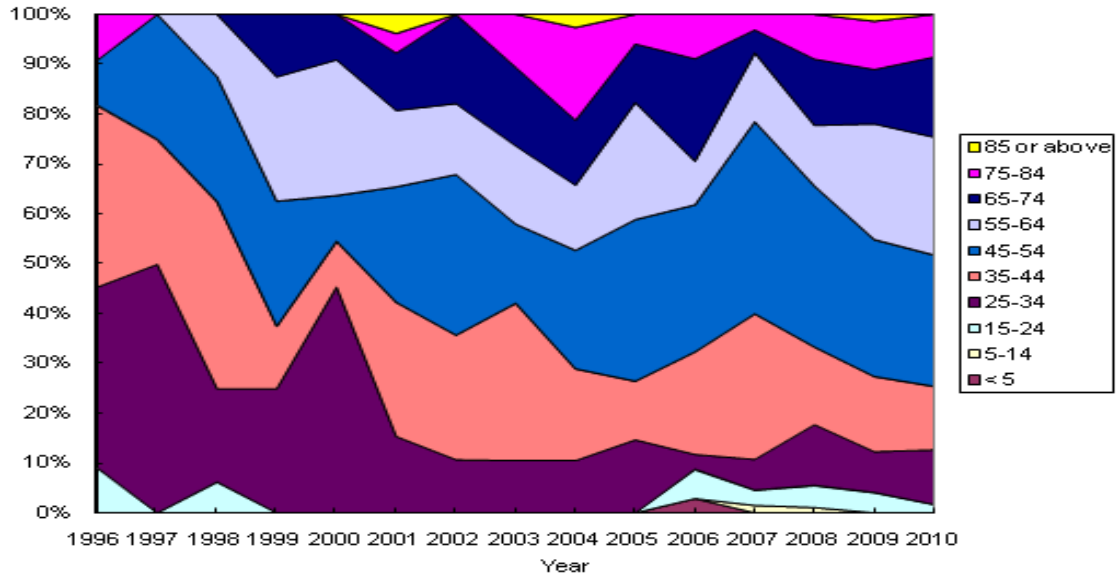
Box 13. Mean and median plot of notification cases of viral hepatitis E by month from 1996 to 2010 (Data source: PHIS)



Box 14. Sex distribution of hepatitis E cases notified from 1996 to 2010 (Data source: PHIS)

Year	Male (%)	Female (%)	Total
1996	11 (100.0)	0 (0.0)	11
1997	3 (75.0)	1 (25.0)	4
1998	15 (93.8)	1 (6.3)	16
1999	8 (100.0)	0 (0.0)	8
2000	8 (72.7)	3 (27.3)	11
2001	19 (73.1)	7 (26.9)	26
2002	17 (60.7)	11 (39.3)	28
2003	14 (73.7)	5 (26.3)	19
2004	27 (71.1)	11 (28.9)	38
2005	29 (85.3)	5 (14.7)	34
2006	19 (55.9)	15 (44.1)	34
2007	45 (69.2)	20 (30.8)	65
2008	61 (67.8)	29 (32.2)	90
2009	43 (58.9)	30 (41.1)	73
2010	78 (66.1)	40(33.9)	118
Total	397 (69.0)	178 (31.0)	575

Box 15. Age distribution by proportion of total notifications of hepatitis E from 1996 to 2010 (Data source: PHIS)



Box 16. Notification rates and death rates of viral hepatitis E from 1996 to 2010 (Data source: CDSIO & PHIS)

Year	Total Cases	Notification Rate (per 100 000 popn)	Total registered deaths	Death rate (per Mn popn)
1996	11	0.17	0	0.00
1997	4	0.06	0	0.00
1998	16	0.24	0	0.00
1999	8	0.12	0	0.00
2000	11	0.17	0	0.00
2001	26	0.39	2	0.30
2002	28	0.42	3	0.44
2003	19	0.28	1	0.15
2004	38	0.56	2	0.29
2005	34	0.50	1	0.15
2006	34	0.50	0	0.00
2007	65	0.94	1	0.14
2008	90	1.29	0	0.00
2009	73	1.04	0	0.00
2010	118	1.67	2	0.28

Box 17. Prevalence of anti-HEV in participants of Community Research Project for Viral Hepatitis (CRPVH) 2001 (Data source: DH)

Age group	No. Tested	Anti-HEV +ve	
		No.	**%**
18-29	137	11	8.0
30-39	222	32	14.4
40-49	290	70	24.1
50-59	170	39	22.9
60 & over	115	24	20.9
All	934	176	18.8

4. Tabulated results of hepatitis B seroprevalence and vaccination coverage

Box 18. Prevalence of HBsAg in new blood donors from 1990 to 2010 (Data source: HKRCBTS)

Year	% HBsAg +ve
1990	8.0
1991	8.0
1992	7.4
1993	6.7
1994	5.9
1995	6.0
1996	5.6
1997	5.2
1998	4.9
1999	4.4
2000	4.2
2001	4.0
2002	3.6
2003	3.2
2004	2.9
2005	2.6
2006	2.2
2007	1.8
2008	1.8
2009	1.6
2010	1.2

Box 19. HBsAg prevalence and its gender and age breakdown in new blood donors in 2010 (Data source: HKRCBTS)

Age Group	Male			Female		
	No. tested	No. HBsAg +ve	%	No. tested	No. HBsAg +ve	%
16-19	11449	64	0.6	13933	74	0.5
20-29	4597	108	2.4	4780	84	1.8
30-39	1569	48	3.1	2200	45	2.1
40-49	829	16	1.9	1572	26	1.7
>49	359	24	6.7	665	17	2.6
Total	18803	260	1.4	23150	246	1.1

Box 20. HBsAg prevalence among university students/staff (Data source: City University Health Centre (till 2002), Baptist University Health Centre (2001 to 2009) & Lingnan University Health Service (2003 and 2004)

Year	Aged below 21			Aged 21 – 30			Aged < 30		
	Total no. of cases	HBsAg+ve		Total no. of cases	HBsAg+ve		Total no. of cases	HBsAg+ve	
		No.	%		No.	%		No.	%
1994	305	7	2.3	830	29	3.5	1135	36	3.2
1995	324	10	3.1	768	33	4.3	1092	43	3.9
1996	348	4	1.1	762	30	3.9	1110	34	3.1
1998	371	5	1.3	608	21	3.5	979	26	2.7
2000	230	7	3.0	391	12	3.1	621	19	3.1
2001	508	13	2.6	814	28	3.4	1322	41	3.1
2002	266	10	3.8	483	13	2.7	749	23	3.1
2003	121	5	4.1	214	8	3.7	335	13	3.9
2004	114	3	2.6	217	4	1.8	331	7	2.1
2005	57	1	1.8	115	0	0.0	172	1	0.6
2006	26	3	11.5	104	1	1.0	130	4	3.1
2007	16	0	0.0	82	1	1.2	98	1	1.0
2008	18	0	0.0	82	1	1.2	100	1	1.0
2009	8	0	0.0	56	0	0.0	64	0	0.0

Box 21. HBsAg prevalence from the Premarital Package Service (Data source: FPA)

Year	Total no. of cases	HBsAg +ve	
		No.	%
1990	17251	1659	9.6
1991	19142	1831	9.6
1992	18445	1708	9.3
1993	19193	1661	8.7
1994	16466	1210	7.3
1995	16798	1320	7.9
1996	19959	1575	7.9
1997	17109	1301	7.6
1998	13163	897	6.8
1999	12686	851	6.7
2000	15348	862	5.6
2001	16611	844	5.1
2002	15077	1033	6.9
2003	13489	957	7.1
2004	13773	1019	7.4
2005	11772	799	6.8
2006	11831	879	7.4
2007	9787	699	7.1
2008	10669	686	6.4
2009	9553	656	6.9
2010	14137	914	6.5

Box 22. HBsAg prevalence in antenatal women from 1990 to 2010 (Data source: FHS and PHLSB, CHP, DH)

Year	No. tested	HBsAg +ve	
		No.	%
1990	31749	3574	11.3
1991	30075	3278	10.9
1992	31394	3391	10.8
1993	34221	3456	10.1
1994	32470	3247	10.0
1995	30962	3016	9.7
1996	31508	3072	9.7
1997	25892	2417	9.3
1998	24678	2223	9.0
1999	23934	2114	8.8
2000	19090	1701	8.9
2001	23373	2142	9.2
2002	22202	2005	9.0
2003	21445	1890	8.8
2004	22119	1883	8.5
2005	21256	1821	8.6
2006	22537	1900	8.4
2007	26541	2252	8.5
2008	27350	2291	8.4
2009	26937	2209	8.2
2010	27762	2193	7.9

Box 23. HBsAg prevalence and age breakdown of antenatal mothers (Data source: FHS, DH)

Year	No. tested (% HBsAg +ve) according to age group				
	15-19	20-24	25-29	30-34	>34
1990	1044 (10.3)	4671 (13.4)	15228 (10.7)	7639 (12.6)	2780 (12.9)
1991	987 (10.7)	4620 (10.7)	13151(10.4)	8168 (11.5)	3063 (11.8)
1992	928 (9.6)	5065 (11.4)	13093 (10.6)	8788 (10.6)	3470 (11.7)
1993	984 (9.0)	5589 (10.5)	12345 (10.3)	9395 (11.6)	3798 (11.0)
1994	951 (7.8)	5723 (9.8)	11590 (9.7)	10158 (10.6)	3998 (10.4)
1995	922 (8.4)	4979 (9.7)	10619 (9.6)	10112 (9.8)	4283 (10.3)
1996	842 (7.8)	4765 (10.3)	10137(9.5)	9759 (9.5)	5908 (10.6)
1997	902 (7.1)	4207 (9.3)	8895 (9.6)	7982 (9.3)	3897 (9.3)
1998	911 (5.8)	3887 (9.2)	8507(9.3)	7418 (8.8)	3851 (9.3)
1999	794 (7.7)	3777 (8.6)	8068 (9.3)	7196 (8.2)	3975 (9.3)
2000	618 (6.8)	2974 (10.1)	6466 (9.5)	5818 (8.0)	3192 (8.7)
2001	659 (7.3)	3516 (9.5)	8330 (10.1)	6936 (8.3)	3915 (9.0)
2002	484 (5.0)	2829 (9.7)	9120 (9.7)	6351 (8.5)	3414 (8.1)
2003	548 (4.9)	2880 (9.9)	7614 (9.4)	6789 (8.3)	3602 (8.2)
2004	510 (6.1)	2854 (8.4)	7161 (8.9)	7732 (8.6)	3856 (8.1)
2005	445 (3.4)	2753 (8.9)	6063 (9.5)	7869 (8.6)	4114 (7.4)
2006	516 (4.8)	2590 (8.0)	6271 (8.7)	8637 (8.6)	4514 (8.4)
2007	520 (4.0)	2929 (8.4)	7301 (9.3)	10232 (8.7)	5551 (7.5)
2008	533 (3.2)	2968 (8.0)	7652 (8.6)	10354 (8.8)	5838 (8.0)
2009	434 (3.2)	2830 (8.7)	7444 (9.3)	10156 (7.9)	6071 (7.7)
2010	442 (2.2)	2903 (8.0)	7817 (8.5)	10211 (7.9)	6385 (7.6)

Box 24. Prevalence of hepatitis B markers in police officers, by sex from 1996 to 2006 (Data source: DH)

Year	Male					Female					All				
	No. tested	+ve for HBV markers		+ve for HBsAg markers		No. tested	+ve for HBV markers		+ve for HBsAg markers		No. tested	+ve for HBV markers		+ve for HBsAg markers	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
1996	2080	878	42.2	138	6.6	413	128	31.0	15	3.6	2493	1006	40.4	153	6.1
1997	4227	1836	43.4	346	8.2	472	178	37.7	26	5.5	4699	2014	42.9	372	7.9
1998	2316	855	36.9	177	7.6	284	90	31.7	16	5.6	2600	945	36.3	193	7.4
1999	1399	517	37.0	93	6.6	322	108	33.5	17	5.3	1721	625	36.3	110	6.4
2000	1300	478	36.8	83	6.4	244	68	27.9	3	1.2	1544	546	35.4	86	5.6
2001	1058	399	37.7	69	6.5	221	84	38.0	6	2.7	1279	483	37.8	75	5.9
2002	1374	493	35.9	77	5.6	270	91	33.7	10	3.7	1644	584	35.5	87	5.3
2003	1415	458	32.4	69	4.9	259	79	30.5	8	3.1	1674	537	32.1	77	4.6
2004	1105	419	37.9	58	5.2	188	84	44.7	5	2.7	1293	503	38.9	63	4.9
2005	1613	630	39.1	68	4.2	323	150	46.4	13	4.0	1936	780	40.3	81	4.2
2006	195	83	42.6	9	4.6	44	22	50.0	2	4.5	239	105	43.9	11	4.6
1996-2006	18082	7046	39.0	1187	6.6	3040	1082	35.6	121	4.0	21122	8128	38.5	1308	6.2

Box 25. Prevalence of hepatitis B markers in police officers, by age from 1996 to 2006 (Data source: DH)

Year	Age group														
	≤20			21-30			31-40			41-50			51-60		
	No. tested	% +ve for HBV markers	% +ve for HBsAg markers	No. tested	% +ve for HBV markers	% +ve for HBsAg markers	No. tested	% +ve for HBV markers	% +ve for HBsAg markers	No. tested	% +ve for HBV markers	% +ve for HBsAg markers	No. tested	% +ve for HBV markers	% +ve for HBsAg markers
1996	9	33.3	0.0	741	29.3	4.7	1155	39.7	6.8	544	55.5	5.9	44	59.1	18.2
1997	9	55.6	11.1	1500	31.5	6.1	2081	42.2	7.3	999	58.2	11.4	110	69.1	13.6
1998	225	24.9	5.8	1131	30.2	5.6	828	39.1	8.3	356	52.8	12.4	60	58.3	6.7
1999	149	30.9	5.4	920	32.6	5.8	428	38.6	6.8	202	51.0	8.9	22	50.0	9.1
2000	29	31.0	6.9	789	30.3	6.2	460	35.7	4.3	242	50.4	5.8	24	50.0	4.2
2001	31	35.5	6.5	639	34.3	5.6	339	36.3	5.6	225	46.2	6.2	45	57.8	8.9
2002	63	39.7	6.3	779	30.2	4.7	443	33.2	3.6	307	46.6	9.1	52	65.4	3.8
2003	72	18.1	1.4	702	27.8	4.8	505	31.1	4.6	357	43.1	5.0	38	47.4	2.6
2004	8	37.5	0.0	466	40.8	5.2	441	32.0	3.4	321	45.5	5.9	57	40.4	8.8
2005	80	53.8	1.3	791	36.5	3.8	533	35.3	4.3	427	47.5	4.2	105	54.3	8.6
2006	0	-	-	39	51.3	0.0	86	41.9	5.8	90	41.1	4.4	24	50.0	8.3
1996-2006	675	31.7	4.7	8497	32.0	5.3	7299	38.1	6.1	4070	51.2	7.9	581	56.8	9.1

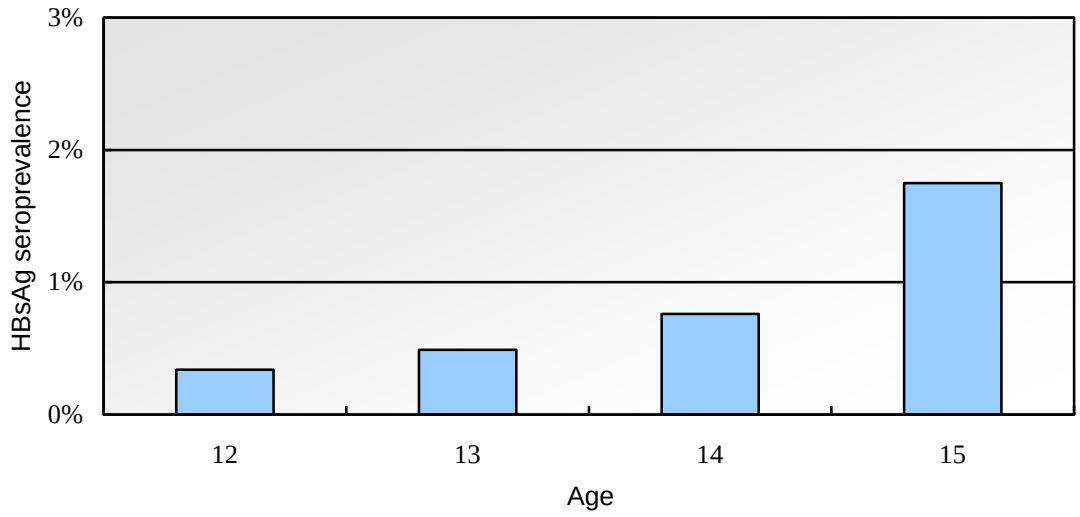
Box 26. Prevalence of HBsAg from the Community Research Project on Viral Hepatitis (CRPVH) 2001 (Data source: DH)

Age Group	Male			Female			Total		
	No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve	
		No.	%		No.	%		No.	%
18-30	72	6	8.3	87	6	6.9	159	12	7.5
31-40	93	5	5.4	144	20	13.9	237	25	10.5
41-50	100	20	20.0	183	10	5.5	283	30	10.6
51 & Over	111	8	7.2	146	7	4.8	257	15	5.8
Total	376	39	10.4	560	43	7.7	936	82	8.8

Box 27. Prevalence of hepatitis B markers in newly recruited health care workers from 2001 to 2010 (Data source: DH)

Year	Male			Female		
	No. tested	HBsAg +ve		No. tested	HBsAg +ve	
		No.	%		No.	%
2001	440	27	6.1	613	36	5.9
2002	499	23	4.6	730	38	5.2
2003	373	20	5.4	531	27	5.1
2004	307	13	4.2	644	37	5.7
2005	396	22	5.6	956	51	5.3
2006	220	8	3.6	449	25	5.6
2007	204	8	3.9	102	4	3.9
2008	232	7	3.0	187	9	4.8
2009	226	14	6.2	328	14	4.3
2010	307	15	4.9	239	10	4.2

Box 28. HBsAg seroprevalence by age among children aged 12 to 15 years in 2009 (Data source: unpublished data of DH)



Box 29. HBsAg prevalence, stratified by gender and by years, among tuberculosis patients treated at chest clinics from 2005 to 2010 (March to May) (Data source: TB and Chest Service, CHP, DH)

Year	Male			Female			Total		
	No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve	
		No.	%		No.	%		No.	%
2005	442	52	11.8	242	17	7.0	684	69	10.1
2006	821	97	11.8	446	27	6.1	1267	124	9.8
2007	768	96	12.5	420	29	6.9	1188	125	10.5
2008	648	62	9.6	382	30	7.9	1030	92	8.9
2009	759	73	9.6	438	30	6.8	1197	103	8.6
2010	669	64	9.6	353	22	6.2	1022	86	8.4

Box 30. HBsAg prevalence, stratified by age and by years, among tuberculosis patients treated at chest clinics from 2005 to 2010 (March to May) (Data source: TB and Chest Service, CHP, DH)

Age Group	2005			2006			2007			2008			2009			2010		
	No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve	
		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%
0-19	31	1	3.2	47	2	4.3	57	1	1.8	26	1	3.8	45	0	0.0	34	0	0.0
20-39	168	11	6.5	314	21	6.7	287	20	7.0	256	14	5.5	275	22	8.0	224	15	6.7
40-59	204	34	16.7	402	57	14.2	374	60	16.0	316	42	13.3	370	56	15.1	315	39	12.4
≥60	281	23	8.2	504	44	8.7	470	44	9.4	432	35	8.1	507	25	4.9	449	32	7.1
Total	684	69	10.1	1267	124	9.8	1188	125	10.5	1030	92	8.9	1197	103	8.6	1022	86	8.4

Box 31. Prevalence of hepatitis B markers in persons attending Therapeutic Prevention Clinic of Integrated Treatment Centre (ITC) for post-exposure management, from July 1999 to 2009 (Data source: ITC, CHP, DH)

Year	Health care workers					Non- Health care workers					Total				
	No. tested	HBsAg +ve		Anti-HBs +ve		No. tested	HBsAg +ve		Anti-HBs +ve		No. tested	HBsAg +ve		Anti-HBs +ve	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
Jul-Dec 1999	23	2	8.7	11	47.8	87	13	14.9	41	47.1	110	15	13.6	52	47.3
2000	77	5	6.5	56	72.7	217	20	9.2	91	41.9	294	25	8.5	147	50.0
2001	102	2	2.0	77	75.5	313	20	6.4	143	45.7	415	22	5.3	220	53.0
2002	99	9	9.1	62	62.6	252	22	8.7	133	52.8	351	31	8.8	195	55.6
2003	96	6	6.3	66	68.8	201	24	11.9	81	40.3	297	30	10.1	147	49.5
2004	66	4	6.1	41	62.1	182	15	8.2	97	53.3	248	19	7.7	138	55.6
2005	49	3	6.1	31	63.3	206	13	6.3	99	48.1	255	16	6.3	130	51.0
2006	54	6	11.1	33	61.1	289	15	5.2	151	52.2	343	21	6.1	184	53.6
2007	54	1	1.9	45	83.3	228	18	7.9	88	38.6	282	19	6.7	133	47.2
2008	54	2	3.7	39	72.2	235	20	8.5	111	47.2	289	22	7.6	150	51.9
2009	56	1	1.8	41	73.2	297	22	7.4	138	46.5	353	23	6.5	179	50.7
Total	730	41	5.6	502	68.8	2507	202	8.1	1173	46.8	3237	243	7.5	1675	51.7

Box 32. Prevalence of hepatitis B markers in drug users from 1990 to 2010 (Data source: PHLSB, CHP, DH)

Year	No. tested	% +ve			
		HBsAg	Anti-HBs	Anti-HBc*	Any marker
1990	1067	13.4	59.0	15.7	90.8
1991	1517	14.4	54.4	20.5	89.3
1992	832	13.9	49.0	21.4	84.4
1993	744	14.4	43.4	16.4	69.2
1994	607	12.9	38.1	13.5	64.1
1995	190	10.5	36.8	12.1	58.9
1996	358	8.7	43.0	12.6	62.8
1997	290	6.6	36.2	15.9	53.4
1998	290	10.0	43.4	7.9	59.3
1999	725	11.2	44.8	13.8	67.2
2000	892	11.4	42.5	15.8	67.8
2001	654	11.6	41.3	17.3	70.2
2002	553	12.7	43.0	16.6	72.3
2003	198	10.1	42.4	12.6	65.2
2004	45	11.1	57.8	4.4	73.3
2005	26	11.5	46.2	11.5	69.2
2006	6	33.3	50.0	16.7	100.0
2007	11	0.0	81.8	9.1	90.9
2008	7	28.6	28.6	14.3	71.4
2009	11	9.1	72.7	9.1	100.0
2010	12	8.3	58.3	8.3	100.0

** Anti-HBc was not tested in specimens that were HBsAg positive*

Box 33. HBsAg prevalence in HIV/AIDS patients first HBV marker in ITC between 2000 and 2010 (Data source: ITC, CHP, DH)

Year	Male			Female			Total		
	No. tested	HBsAg +ve		No. tested	HBsAg +ve		No. tested	HBsAg +ve	
		No.	%		No.	%		No.	%
2000	57	6	10.5	17	1	5.9	74	7	9.5
2001	75	11	14.7	23	1	4.3	98	12	12.2
2002	112	14	12.5	22	1	4.5	134	15	11.2
2003	93	12	12.9	15	2	13.3	108	14	13.0
2004	115	20	17.4	23	2	8.7	138	22	15.9
2005	132	8	6.1	29	1	3.4	161	9	5.6
2006	188	26	13.8	22	3	13.6	210	29	13.8
2007	216	27	12.5	27	1	3.7	243	28	11.5
2008	203	22	10.8	33	1	3.0	236	23	9.7
2009	170	16	9.4	27	1	3.7	197	17	8.6
2010	160	20	12.5	34	2	5.9	194	22	11.3

Box 34. Prevalence of HBV infection per HIV risk in HIV/AIDS patients first HBV marker in ITC between 2000 and 2010 (Data source: ITC, CHP, DH)

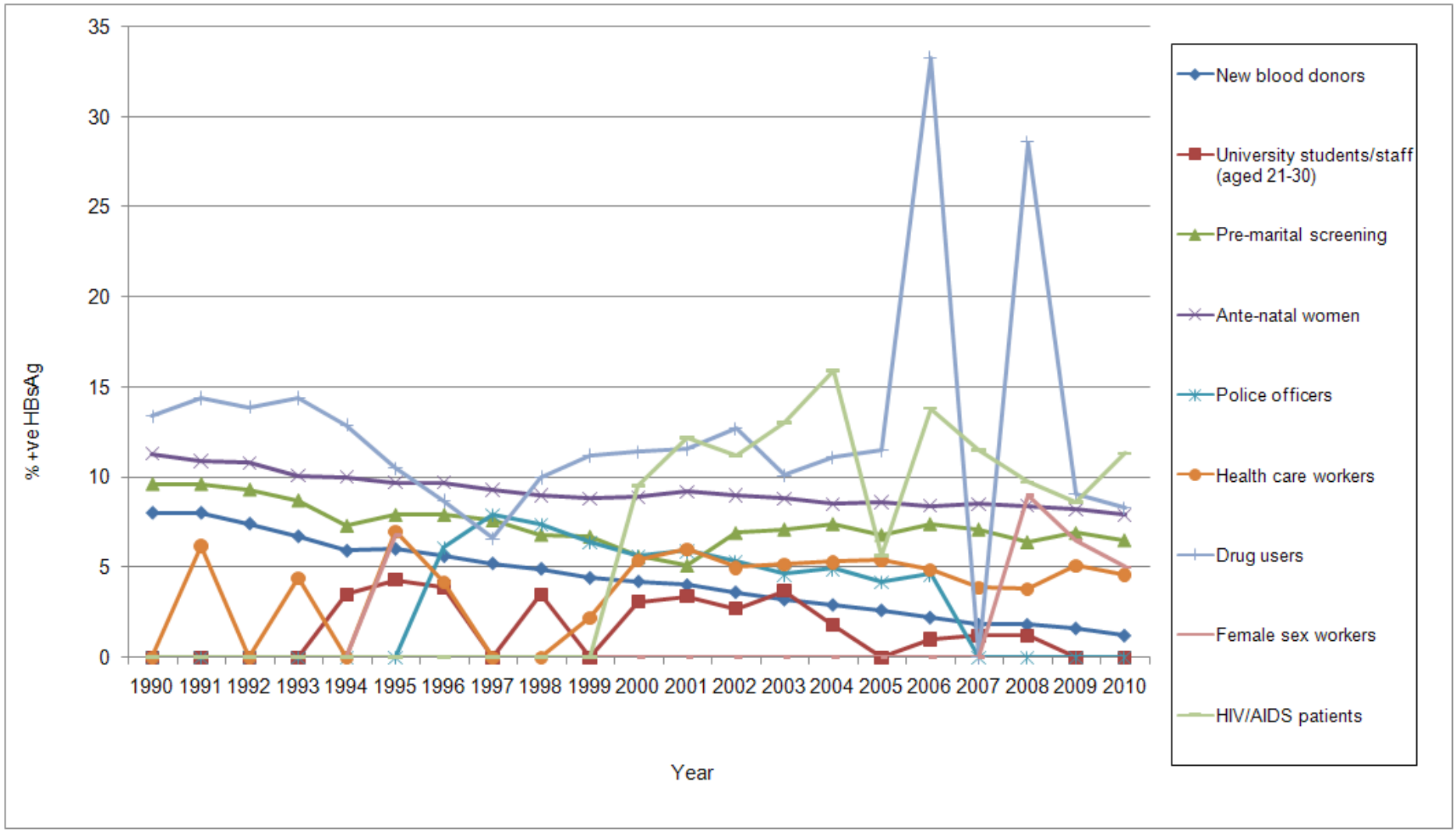
HIV risk	No. tested	HBsAg +ve		Anti-HBs +ve	
		No.	%	No.	%
Heterosexual male	521	59	11.3	236	45.3
Heterosexual female	257	16	6.2	110	42.8
Homo/Bi-sexual	779	84	10.8	401	51.5
Drug user	214	37	17.3	104	48.6
Blood/blood product recipient	7	0	0.0	3	42.9
Undetermined	15	2	13.3	7	46.7
Total	1793	198	11.0	861	48.0

Box 35. HBsAg prevalence in different population groups from 1990 to 2010 (Data source: multiple sources)

Year	% HBsAg +ve										
	New blood donors	University students/staff (aged 21-30)	Pre-marital screening	Ante-natal women	Police officers	Health care workers	Drug users	Female sex workers	HIV/AIDS patients	Tuberculosis patients	TPC patients
1990	8.0	-	9.6	11.3	-	-	13.4	-	-	-	-
1991	8.0	-	9.6	10.9	-	6.2	14.4	-	-	-	-
1992	7.4	-	9.3	10.8	-	-	13.9	-	-	-	-
1993	6.7	-	8.7	10.1	-	4.4	14.4	-	-	-	-
1994	5.9	3.5	7.3	10.0	-	-	12.9	-	-	-	-
1995	6.0	4.3	7.9	9.7	-	7.0	10.5	6.8	-	-	-
1996	5.6	3.9	7.9	9.7	6.1	4.2	8.7		-	-	-
1997	5.2	-	7.6	9.3	7.9	-	6.6		-	-	-
1998	4.9	3.5	6.8	9.0	7.4	-	10.0		-	-	-
1999	4.4	-	6.7	8.8	6.4	2.2	11.2	-	-	-	13.6*
2000	4.2	3.1	5.6	8.9	5.6	5.4	11.4	-	9.5	-	8.5
2001	4.0	3.4	5.1	9.2	5.9	6.0	11.6	-	12.2	-	5.3
2002	3.6	2.7	6.9	9.0	5.3	5.0	12.7	-	11.2	-	8.8
2003	3.2	3.7	7.1	8.8	4.6	5.2	10.1	-	13.0	-	10.1
2004	2.9	1.8	7.4	8.5	4.9	5.3	11.1	-	15.9	-	7.7
2005	2.6	-	6.8	8.6	4.2	5.4	11.5	-	5.6	10.1	6.3
2006	2.2	1.0	7.4	8.4	4.6	4.9	33.3	-	13.8	9.8	6.1
2007	1.8	1.2	7.1	8.5	-	3.9	0.0	10.4**	11.5	10.5	6.7
2008	1.8	1.2	6.4	8.4	-	3.8	28.6	9.0	9.7	8.9	7.6
2009	1.6	-	6.9	8.2	-	5.1	9.1	6.5	8.6	8.6	6.5
2010	1.2	-	6.5	7.9	-	4.6	8.3	5.0	11.3	8.4	-

*For a period between Jul-Dec 1999; **For a period between Aug-Dec 2007

Box 36. Trends of HBsAg in selected population groups from 1990 to 2010 (Data source: multiple sources)



Box 37. Hepatitis B immunisation coverage rates among children aged 2 to 5 by year of birth (Data source: ref 26, 27, 28 & unpublished DH data)

Year of Survey	Year of Birth	Coverage Rate (%)		
		All Children		
		First dose	Second dose	Third dose
2001	1995	99.5	99.5	99.1
	1996	99.1	99.0	98.6
2003	1997	99.5	99.3	99.1
	1998	99.9	99.9	99.6
	1999	100.0	100.0	99.7
2006	2000	99.9	99.8	99.6
	2001	99.9	99.9	99.6
	2002	99.9	99.8	99.5
2009	2003	99.9	99.8	99.5
	2004	99.9	99.9	99.8
	2005	99.7	99.7	99.5
	2006	100.0	100.0	99.7

Box 38. Cumulative statistics (as of September) of the supplementary hepatitis B vaccination programme for Primary 6 students from the school years 1998 to 2010 (Data source: DH)

	School Year											
	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Cumulative no. of Primary 6 students	79641	86481	85612	86052	86515	86208	83974	83164	81818	77273	73757	67310
First Dose												
Cumulative no. eligible for vaccination	26624	25813	17171	15479	14245	10625	8433	6648	6351	6204	5165	4698
Cumulative no. administered	26248	25511	16985	15333	14084	10519	8313	6591	6262	6095	5043	4520
Acceptance rate (at the present campaign)	98.6%	98.8%	98.9%	99.1%	98.9%	99.0%	98.6%	99.1%	98.6%	98.2%	97.6%	96.2%
Coverage rate (for the whole Primary 6 population)	99.5%	99.7%	99.8%	99.8%	99.8%	99.9%	99.8%	99.9%	99.9%	99.9%	99.8%	99.7%
Second Dose												
Cumulative no. eligible for vaccination	26626	25829	17182	15485	14250	10626	8545	6710	6392	6243	5165	4698
Cumulative no. administered	26096	25361	16890	15206	13800	10341	8185	6573	6278	6068	4969	4397
Acceptance rate (at the present campaign)	98.0%	98.2%	98.3%	98.2%	96.8%	97.3%	95.8%	98.0%	98.2%	97.2%	96.2%	93.6%
Coverage rate (for the whole Primary 6 population)	99.3%	99.5%	99.7%	99.7%	99.5%	99.7%	99.6%	99.8%	99.8%	99.8%	99.7%	99.5%
Third Dose												
Cumulative no. eligible for vaccination	26647	25845	17771	16119	14918	11222	9300	7397	6986	6741	5575	5032
Cumulative no. administered	25420	24559	16741	14947	13999	10069	8478	6965	6607	6273	4817	4407
Acceptance rate (at the present campaign)	95.4%	95.0%	94.2%	92.7%	93.8%	89.7%	91.2%	94.2%	94.6%	93.1%	86.4%	87.6%
Coverage rate (for the whole Primary 6 population)	98.5%	98.5%	98.8%	98.6%	98.9%	98.7%	99.0%	99.5%	99.5%	99.4%	99.0%	99.1%

5. Tabulated results of seroprevalence of hepatitis C

Box 39. Anti-HCV prevalence in new blood donors, 1991 to 2010 (Data source: HKRCBTS)

Year	No. of new donors	Anti-HCV+ve	
		No.	%
1991	48769	17	0.04
1992	43674	28	0.06
1993	36146	36	0.10
1994	38077	24	0.06
1995	39778	28	0.07
1996	40875	24	0.06
1997	40419	35	0.09
1998	43756	29	0.07
1999	40960	40	0.10
2000	41166	24	0.06
2001	43415	30	0.07
2002	42292	34	0.08
2003	36732	25	0.07
2004	41679	37	0.09
2005	42643	41	0.10
2006	40029	33	0.08
2007	40287	40	0.10
2008	40909	44	0.11
2009	38679	40	0.10
2010	41953	40	0.09

Box 40. Anti-HCV prevalence and its gender and age breakdown in new blood donors in 2010 (Data source: HKRCBTS)

Age Group	Male			Female		
	No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve	
		No.	%		No.	%
16-19	11449	7	0.06	13933	7	0.05
20-29	4597	6	0.13	4780	7	0.15
30-39	1569	5	0.32	2200	1	0.05
40-49	829	2	0.24	1572	2	0.13
>49	359	2	0.56	665	1	0.15
Total	18803	22	0.12	23150	18	0.08

Box 41. Prevalence of anti-HCV in participants of Community Research Project on Viral Hepatitis (CRPVH) 2001 (Data source: DH)

Age group	No. Tested	Anti-HCV +ve	
		No.	%
18-29	137	0	0.0
30-39	223	1	0.4
40-49	291	0	0.0
50-59	170	2	1.2
60 & over	115	0	0.0
All	936	3	0.3

Box 42. Prevalence of anti-HCV at baseline screening of injured persons attending Therapeutic Prevention Clinic of Integrated Treatment Centre (ITC), from July 1999 to 2009 (Data source: ITC, CHP, DH)

Year	Health care workers			Non- Health care workers			Total		
	No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve	
		No.	%		No.	%		No.	%
Jul-Dec 1999	2	0	0.0	3	0	0.0	5	0	0.0
2000	15	0	0.0	20	1	5.0	35	1	2.9
2001	22	0	0.0	50	1	2.0	72	1	1.4
2002	27	0	0.0	50	1	2.0	77	1	1.3
2003	18	0	0.0	43	0	0.0	61	0	0.0
2004	17	0	0.0	40	0	0.0	57	0	0.0
2005	10	0	0.0	57	0	0.0	67	0	0.0
2006	33	0	0.0	139	0	0.0	172	0	0.0
2007	36	0	0.0	118	0	0.0	154	0	0.0
2008	23	0	0.0	126	3	2.4	149	3	2.0
2009	25	0	0.0	161	0	0.0	186	0	0.0
Total	228	0	0.0	807	6	0.7	1035	6	0.6

Box 43. Anti-HCV prevalence in drug users on rehabilitation (Data source: PHLSB, CHP, DH)

Year	No. tested	Anti-HCV +ve	
		No.	%
1988/1989	134	99	73.9
2000/2001	210	97	46.2

Box 44. Anti-HCV prevalence in HIV/AIDS patients first HCV marker in ITC between 2000 and 2010 (Data source: ITC, CHP, DH)

Year	Male			Female			Total		
	No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve	
		No.	%		No.	%		No.	%
2000	54	5	9.3	15	0	0.0	69	5	7.2
2001	72	9	12.5	22	1	4.5	94	10	10.6
2002	118	9	7.6	23	1	4.3	141	10	7.1
2003	89	13	14.6	14	0	0.0	103	13	12.6
2004	108	21	19.4	21	3	14.3	129	24	18.6
2005	137	19	13.9	31	1	3.2	168	20	11.9
2006	186	49	26.3	23	3	13.0	209	52	24.9
2007	215	41	19.1	27	1	3.7	242	42	17.4
2008	201	40	19.9	33	3	9.1	234	43	18.4
2009	168	33	19.6	27	1	3.7	195	34	17.4
2010	164	15	9.1	33	0	0.0	197	15	7.6

Box 45. Prevalence of HCV infection per HIV risk in HIV/AIDS patients first HCV marker in ITC between 2000 and 2010 (Data source: ITC, CHP, DH)

HIV risk	No. tested	Anti-HCV +ve	
		No.	%
Heterosexual male	516	36	7.0
Heterosexual female	254	4	1.6
Homo/Bi-sexual	777	14	1.8
Drug user	212	210	99.1
Blood/blood product recipient	7	3	42.9
Undetermined	15	1	6.7
Total	1781	268	15.0

Box 46. Prevalence of hepatitis C from screening of blood donors and clinical testing of patients in 2 major public hospitals from 2003 to 2010 (Data source: HKRCBTS, PMH Microbiology Laboratory, PWH Microbiology Laboratory (since 2005))

CATEGORY		2003			2004			2005			2006			2007			2008			2009			2010			Overall		
		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve		No. tested	Anti-HCV +ve	
			No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%
1. BLOOD DONATION		178188	28	< 0.1	197426	42	< 0.1	197975	50	< 0.1	196353	35	< 0.1	205682	42	< 0.1	211963	52	< 0.1	231375	47	< 0.1	226775	40	< 0.1	1645737	336	< 0.1
2. SCREENING	Pre-transplant	7	0	0.0	20	0	0.0	18	2	11.1	17	0	0.0	31	1	3.2	18	0	0.0	48	1	2.1	68	2	2.9	227	6	2.6
	Drug users	167	87	52.1	202	100	49.5	298	144	48.3	177	59	33.3	118	29	24.6	134	66	49.3	154	93	60.4	116	75	64.7	1366	653	47.8
	Needlestick injuries	90	1	1.1	130	1	0.8	438	8	1.8	478	7	1.5	546	6	1.1	542	6	1.1	574	5	0.9	550	5	0.9	3348	39	1.2
	Haemodialysis/ peritoneal dialysis	508	5	1.0	463	13	2.8	1527	40	2.6	1762	35	2.0	1706	37	2.2	1656	31	1.9	1936	34	1.8	2016	36	1.8	11574	231	2.0
	Post-renal transplant	36	2	5.6	48	0	0.0	401	17	4.2	446	18	4.0	413	19	4.6	470	21	4.5	650	19	2.9	680	25	3.7	3144	121	3.8
	Haematology (pre-chemotherapy)	36	1	2.8	43	0	0.0	118	3	2.5	208	1	0.5	223	0	0.0	260	5	1.9	262	2	0.8	344	6	1.7	1494	18	1.2
	Rheumatology (pre-methotrexate)	55	0	0.0	56	1	1.8	149	1	0.7	207	1	0.5	210	1	0.5	332	1	0.3	396	5	1.3	430	1	0.2	1835	11	0.6
	History of blood transfusion	35	2	5.7	46	7	15.2	132	12	9.1	95	11	11.6	125	12	9.6	197	18	9.1	263	32	12.2	239	21	8.8	1132	115	10.2
	Pre-vaccination	1	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	1	0	0.0	1	0	0.0	5	0	0.0	0	0	0.0	8	0	0.0
	TOTAL (2)	935	98	10.5	1008	122	12.1	3081	227	7.4	3390	132	3.9	3373	105	3.1	3610	148	4.1	4288	191	4.5	4443	171	3.8	24128	1194	4.9
3. *CLINICAL INDICATION		501	30	6.0	710	51	7.2	3147	155	4.9	3499	170	4.9	4054	179	4.4	5984	215	3.6	7971	216	2.7	8661	262	3.0	34527	1278	3.7
4. OTHERS OR UNKNOWN		193	10	5.2	567	23	4.1	6365	192	3.0	6752	205	3.0	8131	229	2.8	8297	128	1.5	7472	131	1.8	8269	102	1.2	46046	1020	2.2
TOTAL (2+3+4)		1629	138	8.5	2285	196	8.6	12593	574	4.6	13641	507	3.7	15558	513	3.0	17891	491	2.7	19731	538	2.7	21373	535	2.5	104701	3492	3.3

**includes suspected hepatitis, work up for liver function derangement and others*

Box 47. Characteristics of anti-HCV positive subjects detected at HKRCBTS and 2 major public hospitals from 2003 to 2010 (Data source: HKRCBTS, PMH Microbiology Laboratory, PWH Microbiology Laboratory (since 2005))

		2003 (n=166)		2004 (n=238)		2005 (n=624)		2006 (n=542)		2007 (n=555)		2008 (n=543)		2009 (n=585)		2010 (n=575)		Overall (n=3828)	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lab	HKRCBTS	28	16.9	41	17.2	49	7.9	35	6.5	40	7.2	49	9.0	43	7.4	38	6.6	323	8.4
	PMH	138	83.1	197	82.8	229	36.7	142	26.2	89	16.0	208	38.3	273	46.7	271	47.1	1547	40.4
	PWH	-		-		346	55.4	365	67.3	426	76.8	286	52.7	269	46.0	266	46.3	1958	51.1
Sex	Male	115	69.3	157	66.0	413	66.2	390	72.0	377	67.9	378	69.6	415	70.9	405	70.4	2650	69.2
	Female	51	30.7	81	34.0	211	33.8	152	28.0	178	32.1	165	30.4	170	29.1	170	29.6	1178	30.8
	Unknown	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Age at diagnosis	Mean	41.6		44		46.8		47.4		50.3		49.8		52.9		51.2		48.0	
	S.D.	14.6		14.7		15.9		16.6		16.3		17.9		16.9		17.0		16.2	
	Range	17 – 83		11 - 86		0-87		0 - 101		0-94		0-88		1-102		0-90		0 - 102	
Category	Blood donation	28	16.9	42	17.6	50	8.0	35	6.5	42	7.6	52	9.6	47	8.0	40	7.0	336	8.8
	Pre-transplant	0	0.0	0	0.0	2	0.3	0	0.0	1	0.2	0	0.0	0	0.0	2	0.3	5	0.1
	Drug users	87	52.4	100	42.0	144	23.1	59	10.9	29	5.2	66	12.2	93	15.9	75	13.0	653	17.1
	Needlestick injuries	1	0.6	1	0.4	8	1.3	7	1.3	6	1.1	4	0.7	5	0.9	5	0.9	37	1.0
	Haematology	1	0.6	0	0.0	3	0.5	1	0.2	0	0.0	5	0.9	7	1.2	6	1.0	23	0.6
	Pre-haemodialysis/ peritoneal dialysis	5	3.0	13	5.5	40	6.4	35	6.5	37	6.7	31	5.7	29	5.0	36	6.3	226	5.9
	Post-renal transplant	2	1.2	0	0.0	17	2.7	18	3.3	19	3.4	21	3.9	20	3.4	25	4.3	122	3.2
	Pre-methotrexate	0	0.0	1	0.4	1	0.2	1	0.2	1	0.2	1	0.2	5	0.9	1	0.2	11	0.3
	History of blood transfusion	2	1.2	7	2.9	12	1.9	11	2.0	12	2.2	20	3.7	32	5.5	21	3.7	117	3.1
	Clinical Indication	30	18.1	51	21.4	155	24.8	170	31.4	179	32.3	215	39.6	216	36.9	262	45.6	1278	33.4
	Others or unknown	10	6.0	23	9.7	192	30.8	205	37.8	229	41.3	128	23.6	131	22.4	102	17.7	1020	26.6

ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
Anti-HAV	Antibody against hepatitis A virus
Anti-HBc	Antibody against hepatitis B core antigen
Anti-HBs	Antibody against hepatitis B surface antigen
Anti-HCV	Antibody against hepatitis C virus
Anti-HEV	Antibody against hepatitis E virus
BUHC	Baptist University Health Centre
CDSIO	Communicable Disease Surveillance and Intelligence Office
CHP	Centre for Health Protection
CRPVH	Community Research Project on Viral Hepatitis
CUHC	City University Health Centre
CUHK	Chinese University of Hong Kong
DH	Department of Health
FHS	Family Health Service
FPA	Family Planning Association
HBsAg	Hepatitis B surface antigen
HAV	Hepatitis A virus
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HCW	Health care worker
HEV	Hepatitis E virus
HIV	Human immunodeficiency virus
HKRCBTS	Hong Kong Red Cross Blood Transfusion Service
IgM	Immunoglobulin M
IDU	Injecting drug users
ITC	Integrated Treatment Centre
LUHC	Lingnan University Health Centre
MCHC	Maternal and Child Health Centre
PHIS	Public Health Information System
PHLSB	Public Health Laboratory Services Branch
PMH	Princess Margaret Hospital
PWH`	Prince of Wales Hospital
SEB	Surveillance and Epidemiology Branch
TMH	Tuen Mun Hospital
TPC	Therapeutic Prevention Clinic

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