# Surveillance of Viral Hepatitis in Hong Kong - 2009 Update Report

**Special Preventive Programme**
**Centre for Health Protection**
**Department of Health**
**December 2010**

*The information contained in this Report is up to year 2009 for the surveillance data, service statistics and published research findings.*

**Editorial Team:**

Ms Sarah Tse
Ms CF Ho
Dr Ian CT Tse
Dr KH Wong

**Correspondence**

Viral Hepatitis Preventive Service
Integrated Treatment Centre
Special Preventive Programme
8/F, Kowloon Bay Health Centre
9 Kai Yan Street
Kowloon
HONG KONG

Telephone: (852) 2116 2888
Facsimile: (852) 2117 0809

Website: www.hepatitis.gov.hk
E-mail: hepatitis@dh.gov.hk

*pdf version of the report can be downloaded from www.hepatitis.gov.hk.

# CONTENTS

# ACKNOWLEDGEMENTS

The Special Preventive Programme wishes to thank the following agencies for their contributions to the preparation of the 2009 Update Report:

Action for REACH OUT

CHC-Group Medical Practice

Chinese University of Hong Kong

Department of Medicine, Princess Margaret Hospital

Department of Microbiology, Prince of Wales Hospital

Department of Microbiology, Princess Margaret Hospital

Family Health Service, Department of Health

Family Planning Association of Hong Kong

Public Health Laboratory Services Branch, Centre for Health Protection, Department of Health

Health Service of Baptist University of Hong Kong

Hong Kong Red Cross Blood Transfusion Service

Pamela Youde Nethersole Eastern Hospital

Surveillance & Epidemiology Branch, Centre for Health Protection, Department of Health

TB and Chest Service, CHP, DH

University of Hong Kong

# 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 2009, only 64 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. The latest epidemiology of hepatitis A in the local general population can be estimated from a

study conducted in 2001 [2]. In this household study (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 in the general Chinese population (Box 9). 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 2009 (Box 10) and convenient samples of all active HIV/AIDS patients who first attended ITC before Jul 2007 and were <45 years old (Box 11). For the new cases (Box 10), the number of sample tested in the older age group (>40 years old) was smaller than that of the younger age group (<40 years old). However, 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 2009 appeared to be comparable with that of CRPVH in 2001. 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.

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 90 in 2008 (Box 1), becoming the most common viral hepatitis reported to Department of health. Seasonal pattern was observed with the peak season in March (Box 12), indicating that the infection was more common during winter and spring seasons. Of 457 cases reported, 319 (70%, Box 13) were male,

giving male to female ratio of 2.3:1. The majority were adults, with the highest notification rate at 45-54 years age group, followed by 35-44 years old (Box 14). The death rate could be as high as 0.44 per million population (Box 15).

8. 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 16). 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 [5], which could have been contributed by the use of different laboratory assays.

9. 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 [6]. 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 [6].

10. A local study examined the genotype of 57 patients with acute HEV infection who were admitted to Prince of Wales Hospital [PWH] [7]. 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.

**Pattern of Hepatitis B in Various Communities and its Significance**

11. 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 74, 83 and 80 cases reported in 2007, 2008 and 2009 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.

12. 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 2008 was available include blood donors, university students/staff, 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.

13. 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.

14. 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 1.6% in year 2009 (Box 17). There is also a falling trend over the years, albeit less prominent, among university students/ staffs and among antenatal women (Box 19 and Box 21). The HBsAg prevalence among university students/ staff has been relatively low throughout the years and none of the 128 university students/staff was detected HBsAg positive in 2009 (Box 19). 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 [8]. Recent 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 6.9% in 2009 (Box 20). The prevalence in antenatal women however remained stable at 8.2 -9.2% since 2001 (Box 21). While the prevalence in newly recruited female health care workers (Box 26) 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 6.2% in 2009.

15. 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 27).

16. Of 4,682 tuberculosis patients attended TB & Chest Clinics, Department of Health between March and May during 2006 to 2009, 444 (9.5%, Box 28) were detected HBsAg positive, with the highest prevalence rate in the middle age group (40-59 years old; 14.7%) followed by the more elderly group (>= 60 years old; 7.7%). The HBsAg positivity rate was also found to be higher in male clients (10.9%) than in female (6.9%, Box 28). Both the age (Box 29) and gender pattern (Box 30) were

consistently observed over the last four 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 three years was 6.5 -10.4%, which is comparable with 6.8% found in Social Hygiene Service survey a decade ago (Box 35).

17. 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. Furthermore, due to the underlying immunosuppression, HIV/AIDS patients are more prone to becoming chronically infected with HBV after acute infection [9]. Except for wide fluctuation in isolated years, HBsAg was present at 10-17% in these two groups of clients for the last decade, which was substantially higher than the 2-10% in other clients (Box 35). However, caution is needed in interpreting the data for the last few years as the number of drug users tested for HBV markers dropped substantially since 2003 to only 11 in 2009 (Box 32).

**Age Difference in Prevalence of Hepatitis B**

18. 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 24). Similarly, HBsAg positivity appears to be lower in antenatal women aged <19 years but not too different among older subjects (Box 22).

19. 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 [10].

**Gender Difference in Prevalence of Hepatitis B**

20. Male had a higher HBV prevalence than female, as observed in several groups. In 2009, the HBsAg positivity rate among new blood donors was 1.9% in male and 1.3 % in female (Box 18). From 1996 – 2006, the HBsAg rate in male police officer (6.6%) was higher than female police officer (4.0%, Box 23). The 2001 household study also showed that a higher overall HBsAg rate in male.

**Genotypes of Hepatitis B and their Disease Course**

21. 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 [11]. 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 [12]. In addition, 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) [13].

22. The difference between genotype B and C in the natural disease course of HBV infection or the occurrence of complications was controversial and inconclusive.

A local study showed that genotype B patients had earlier HBeAg seroconversion than genotype C patients [11], but no significant reduction in the risk of developing cirrhosis and/or hepatocellular carcinoma (HCC) [14]. However, other local studies found that genotype C chronic HBV infection is an independent risk factor for HCC development in addition to liver cirrhosis [12, 15].

23. Subgenotype Cs appears to be more common in Hong Kong than other parts of China and appears to carry a worse prognosis than other subgenotype. 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 ($P< 0.0001$) [16]. Compared with subgenotype Ce and Ba, patients infected by subgenotype Cs had the lowest serum albumin, highest alanine aminotransferase levels and more severe histological necroinflammation [16].

24. 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 [17].

25. 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 [18]. 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 [19]. 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**

26. 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 [20].

27. 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 [21]. 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 16$^{th}$ year, 610 subjects (54.9%) returned for blood test evaluation. Although the anti-HBs seroconversion rate dropped to 33.3% at the 16$^{th}$ 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 25$^{th}$ year. Although two and three subjects developed anti-HBc seroconversion at the 21$^{st}$ and 25$^{th}$ 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 [22].

28. 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.

29. 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 [23, 24, 25], 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).

30. In the last 10 years, the first dose coverage of the Primary 6 mop-up programme was consistently over 99.5% while that for the third dose is >98% (Box 38). 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**

31. 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. In a local study published in 1992, while 80% of 424 consecutive HCC patients attending a single centre were tested positive for HBsAg, only 7.3% were found to be anti-HCV positive [26]; the figure included 3.5% from HBV-HCV coinfection and 3.8% with HCV infection alone. Among 76 liver transplants done in Queen Mary Hospital due to cirrhosis from 1999 to 2000, 7 and 51 were related to hepatitis B and C respectively [27]. From 1996-2009, only 16 hepatitis C cases were reported to DH under the statutory notification system (Box 1); four of which were first reported in 2002, three and three cases were reported in 2008 and 2009 respectively.

32. 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 2009 being 0.1% (95% confidence interval 0.07% - 0.13%) (Box 39). This is

much lower than the prevalence of HAV, HBV and HEV. Among the new blood donors, anti-HCV was most commonly detected in middle-age group (30-39 year-old group in male; 40-49 year-old group in female; 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 2008, six of 849 (0.7%) 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).

33. Experience of clinicians and virologists has previously confirmed that HCV was common 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 [28]. Another early 1990s 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% [29]. 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). A recent HCV seroprevalence study conducted in methadone clinics targeting IDU echoed the high prevalence rate of HCV in this community [30]. 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.

34. 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 2009, HCV-HIV coinfection among new patients attending ITC ranged from 6% to 23%. 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 - 8 % of HIV/AIDS patients infected due to sexual contact, HCV was nearly universal in patients infected through drug injection (Box

45). The higher HCV prevalence, coupled with the hastened liver disease progression in HIV-infected patients [31], would no doubt result in a unique HCV/HIV coinfection that demands attention.

35. 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 [32]. 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%) [33]. A significantly greater number of donors infected with type 6a reported a history of drug abuse than those infected with type 1b. In a study of hospitalized patients with HCV testing for clinical indications, similar to the blood donors study, 1b was the commonest type in chronic liver diseases and chronic renal failure patients [34]. Yet, the commonest genotype in intravenous drug users was 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 [35]. 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 [36]. Another local study of renal failure patients and non-renal failure controls also showed the predominance of genotype 1b, followed by 1a and 6a [37].

36. 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 [38]. 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.

37. Since 2003, a surveillance project has been piloted to enhance understanding of the HCV situation in Hong Kong, with the participation of the laboratories of HKRCBTS and PMH Department of Microbiology. Prince of Wales Hospital (PWH) joined the project in 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 0.020% in 2007, 0.025% in 2008 and 0.020% in 2009. The overall anti-HCV prevalence detected in hospital patients tested over the last seven years was 3.5% (Box 46). The highest anti-HCV rate was in drug users, of which 46.2% were found positive. This was followed by patients with history of blood transfusion at about

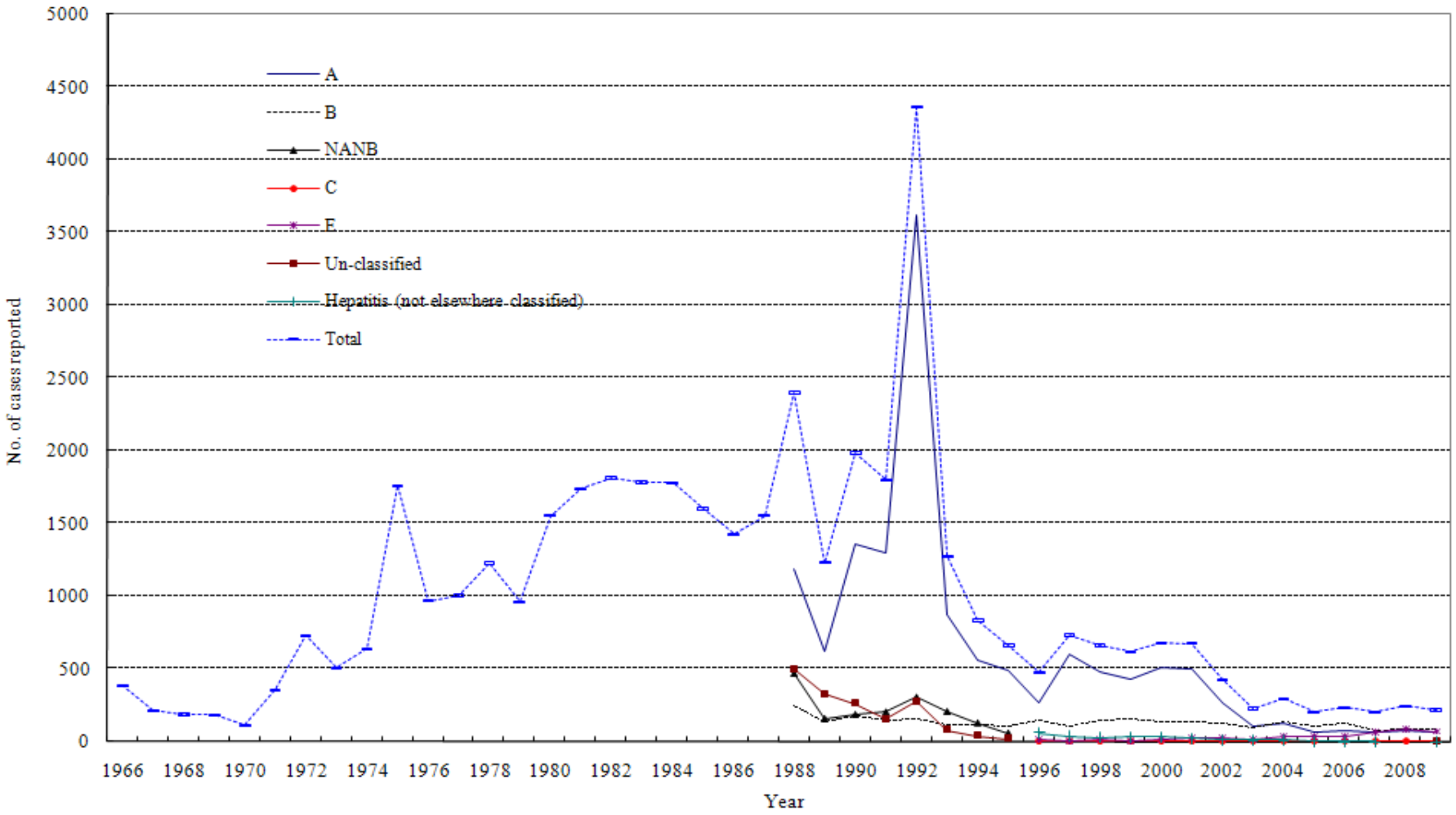
10.5%, and post renal transplant (3.9%) or patients done for clinical indication not falling under the standardised categorisation of screening (3.9%). Overall, the male-to-female ratio of HCV positive subjects was about 2 to 1, with a mean age of 47.5 years old (Box 47).

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

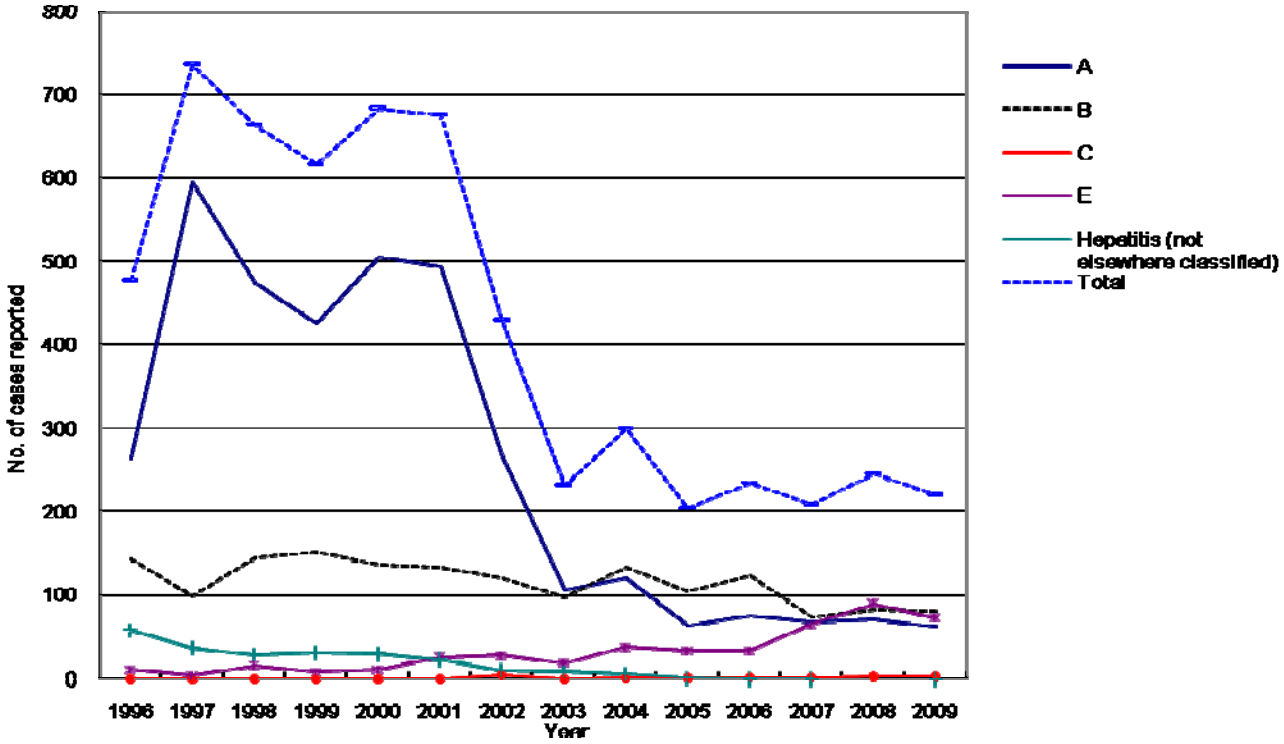
**Box 1. Number of cases of viral hepatitis reported to the Department of Health between 1966 and 2009 (Data source: DH)**

| 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 | - | 0 | 19 | - | 8 | 232 |
| 2004 | 121 | 134 | - | 1 | 38 | - | 6 | 300 |
| 2005 | 64 | 105 | - | 1 | 34 | - | 0 | 204 |
| 2006 | 76 | 123 | - | 2 | 34 | - | 0 | 235 |
| 2007 | 68 | 74 | - | 2 | 65 | - | 0 | 209 |
| 2008 | 71 | 83 | - | 3 | 90 | - | 0 | 247 |
| 2009 | 64 | 80 | | 3 | 73 | | 0 | 220 |

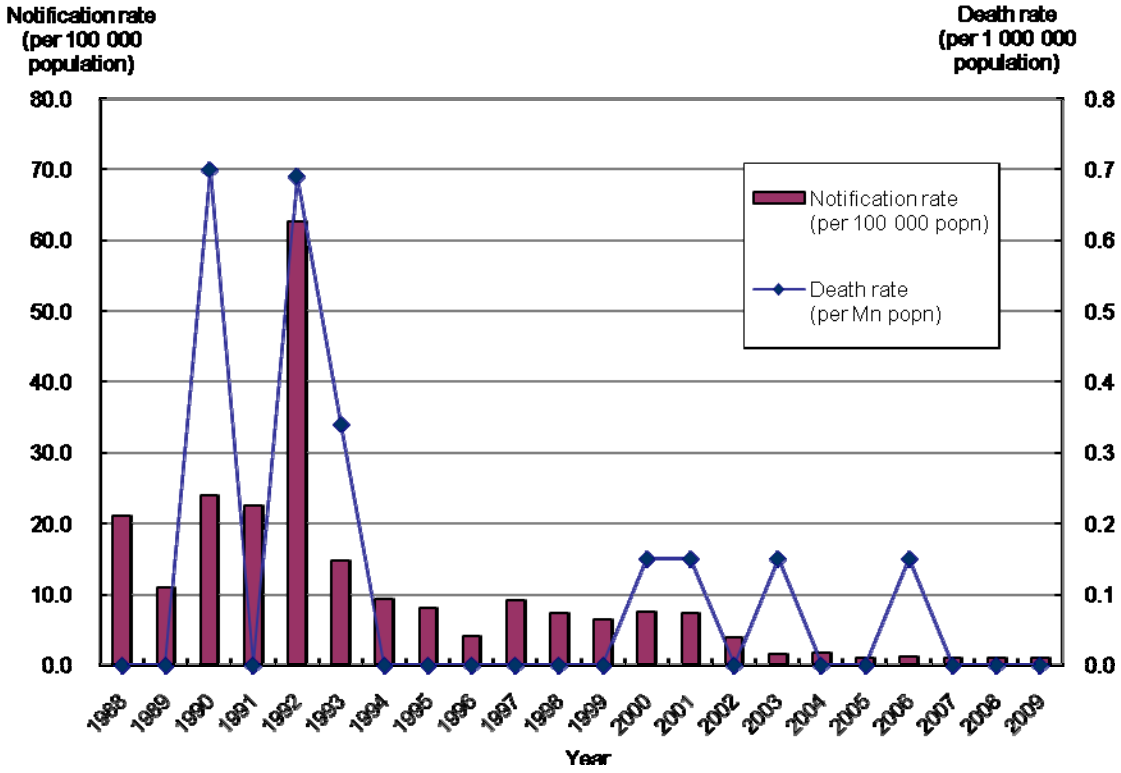
**Box 2. Reported viral hepatitis from 1966 to 2009 (Data source: DH)**



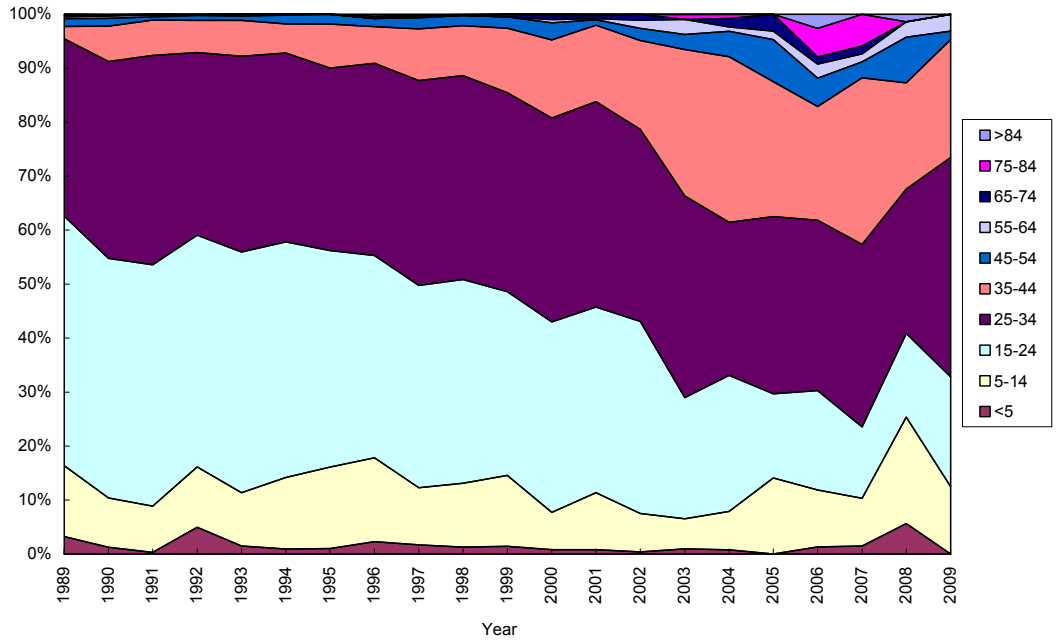
**Box 3. Breakdown of different types of reported viral hepatitis from 1996 to 2009 (Data source: DH)**




**Box 4. Notification rates and death rates of viral hepatitis A, 1988 – 2009 (Data source: DH)**



**Box 5. Age distribution by proportion of total notifications of hepatitis A, 1989-2009 (Data source: DH)**




**Box 6. Sex distribution of hepatitis B cases notified from 1995 to 2009 (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 |
| Total | 1287 | 445 | 1732 |

**Box 7. Age distribution of hepatitis B cases notified from 1995 to 2009 (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 |
| Total | 18 | 450 | 554 | 392 | 201 | 76 | 41 | 1732 |

# 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% |
| | | | 93.9% | | | - | | | | | 97.7% | | | | | | | | |
| >50 | 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. [39]*

*D. Seroprevalence results reported in the press by Lai et al of the University of Hong Kong. [40]*

*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). [41]*

*F. Seroprevalence study in school children by Lee et al of the Chinese University of Hong Kong. [42]*

*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. Serial prevalence of anti-HAV among HIV/AIDS new case patients from 2007 to 2009**

| Year | New case* | | | | |
|---|---|---|---|---|---|
| | No. of patients | Age | No. tested | No. HAV+ | (%) of each group |
| 2007 Jul-Dec | n=108 | <20 | 0 | 0 | -- |
| | | 20-29 | 29 | 17 | 58.6 |
| | | 30-39 | 44 | 21 | 47.7 |
| | | 40-49 | 23 | 13 | 56.5 |
| | | >=50 | 12 | 10 | 83.3 |
| 2008 | n=218 | <20 | 1 | 0 | 0.0 |
| | | 20-29 | 46 | 19 | 41.3 |
| | | 30-39 | 80 | 47 | 58.8 |
| | | 40-49 | 48 | 34 | 70.8 |
| | | >=50 | 43 | 40 | 93.0 |
| 2009 | n=197 | <20 | 2 | 0 | 0.0 |
| | | 20-29 | 49 | 18 | 36.7 |
| | | 30-39 | 74 | 31 | 41.9 |
| | | 40-49 | 46 | 30 | 65.2 |
| | | >=50 | 26 | 24 | 92.3 |

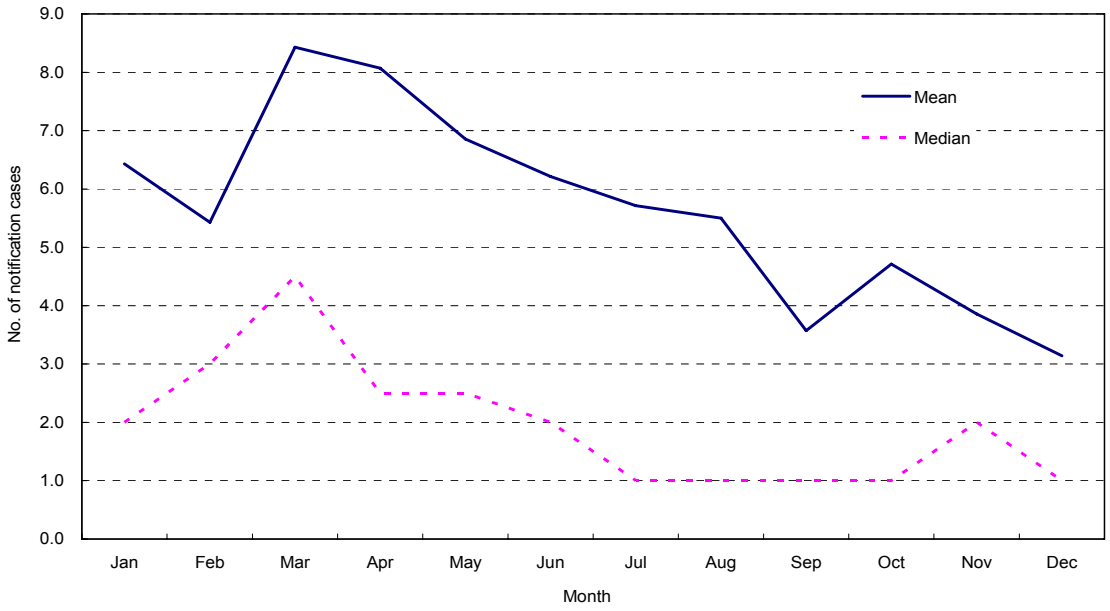
*****new cases refer to HIV/AIDS patients who first attended ITC from July 2007 to 2009.

**Box 11. Serial prevalence of anti-HAV among HIV/AIDS old case patients from 2007 to 2009**

| Year | Old case ** | | | | |
|---|---|---|---|---|---|
| | No. of patients | Age | No. tested | No. HAV+ | (%) of each group |
| 2007 Jul-Dec | n=202 | <20 | 0 | 0 | -- |
| | | 20-29 | 35 | 11 | 31.4 |
| | | 30-39 | 159 | 69 | 43.4 |
| | | 40-45 | 8 | 5 | 62.5 |
| 2008 | n=290 | <20 | 1 | 1 | 100.0 |
| | | 20-29 | 56 | 19 | 33.9 |
| | | 30-39 | 204 | 97 | 47.5 |
| | | 40-45 | 29 | 15 | 51.7 |
| 2009 | n=37 | <20 | 0 | 0 | |
| | | 20-29 | 8 | 4 | 50.0 |
| | | 30-39 | 20 | 15 | 75.0 |
| | | 40-45 | 9 | 3 | 33.3 |

** Old cases refer to convenient samples of all active HV/AIDS patients who first attended ITC before July 2007 and were <45 years old.

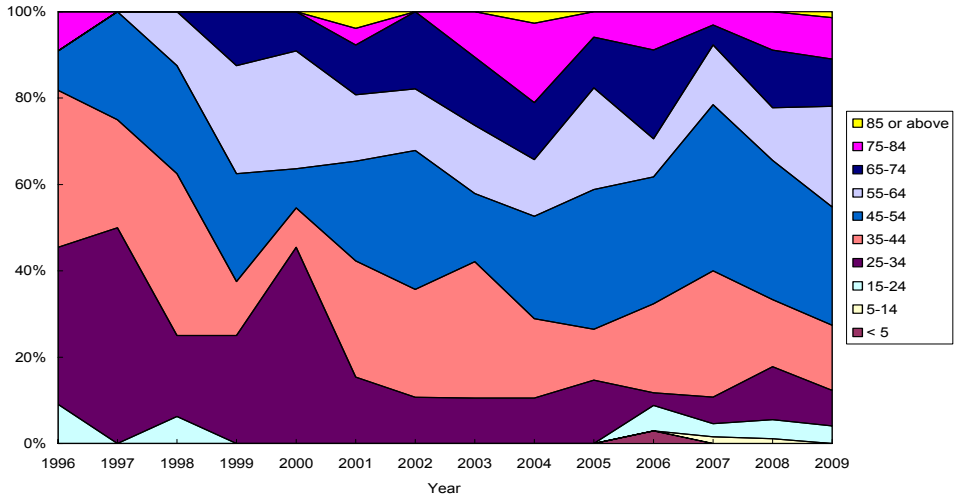
**Box 12. Mean and median plot of notification cases of viral hepatitis E by month from 1996 to 2009 (Data source: PHIS)**




**Box 13. Sex distribution of hepatitis E cases notified from 1996 to 2009 (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 |
| Total | 319 (69.8) | 138 (30.2) | 457 |

**Box 14. Age distribution by proportion of total notifications of hepatitis E from 1996 to 2009 (Data source: PHIS)**




**Box 15. Notification rates and death rates of viral hepatitis E from 1996 to 2009 (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 |

**Box 16. Prevalence of anti-HEV in participants of Community Research Project for Viral Hepatitis (CRPVH) 2001 (Data source: DH)**

| Age group | No. Tested | 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 17. Prevalence of HBsAg in new blood donors from 1990 to 2009 (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 |

**Box 18. HBsAg prevalence and its gender and age breakdown in first time blood donors in 2009 (Data source: HKRCBTS)**

| Age Group | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | No. tested | HBsAg No. positive | % | No. tested | HBsAg No. positive | % |
| 16-19 | 10972 | 87 | 0.8 | 12661 | 90 | 0.7 |
| 20-29 | 4275 | 135 | 3.2 | 4350 | 92 | 2.1 |
| 30-39 | 1479 | 67 | 4.5 | 1939 | 53 | 2.7 |
| 40-49 | 762 | 29 | 3.8 | 1317 | 21 | 1.6 |
| >49 | 542 | 16 | 3.0 | 382 | 11 | 2.9 |
| Total | 18030 | 334 | 1.9 | 20649 | 267 | 1.3 |

**Box 19. HBsAg prevalence among university students/staff (Data source: City University Health Centre (till 2002), Baptist University Health Centre (since 2001) & 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 20. 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 |

**Box 21. HBsAg prevalence in antenatal women from 1990 to 2009 (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 |

**Box 22. HBsAg prevalence and age breakdown of antenatal mothers (Data source: FHS, DH)**

| Year | No. tested (% positive HBsAg) 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) |

**Box 23. 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 | | 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 | | 1.2 | 1544 | 546 | 35.4 | 86 | 5.6 |
| 2001 | 1058 | 399 | 37.7 | 69 | 6.5 | 221 | 84 | 38.0 | | 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 | | 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 24. 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 |

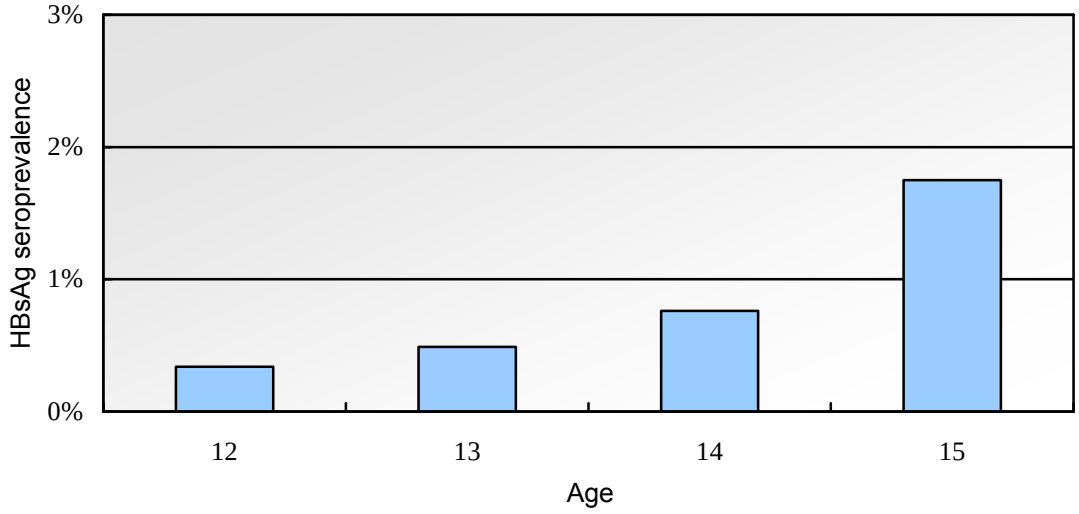
**Box 25. Prevalence of HBsAg from the Community Research Project on Viral Hepatitis (CRPVH) 2001 (Data source: DH)**

| 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 26. Prevalence of hepatitis B markers in newly recruited health care workers from 2001 to 2009 (Data source: DH)**

| Year | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | No. tested | +ve for HBsAg No. | % | No. tested | +ve for HBsAg 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 |

**Box 27. HBsAg seroprevalence by age among children aged 12 to 15 years (Data source: unpublished data of DH)**



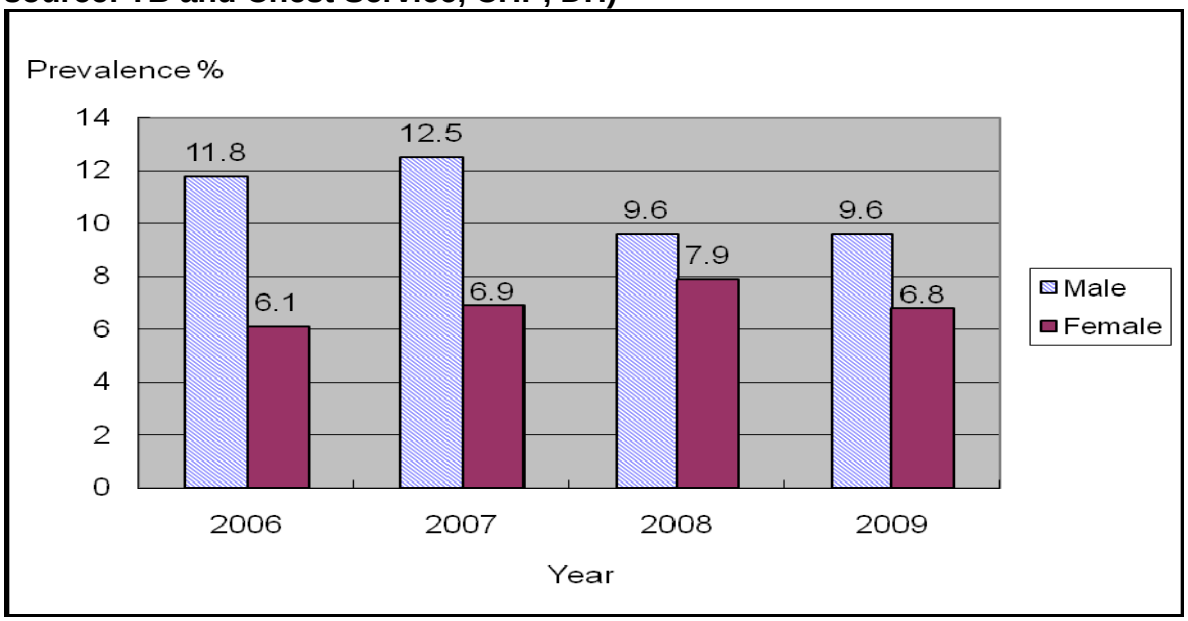
**Box 28. HBsAg prevalence with gender and age breakdown among tuberculosis patients treated at chest clinics from 2006 to 2009 (March to May): (Data source: TB and Chest Service, CHP, DH)**

| Age Group | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. tested | HBsAg +ve | | No. tested | HBsAg +ve | | No. tested | HBsAg +ve | |
| | | No. | % | | No. | % | | No. | % |
| 0-19 | 85 | 2 | 2.4 | 90 | 2 | 2.2 | 175 | 4 | 2.3 |
| 20-39 | 532 | 42 | 7.9 | 600 | 35 | 5.8 | 1132 | 77 | 6.8 |
| 40-59 | 968 | 168 | 17.4 | 494 | 47 | 9.5 | 1462 | 215 | 14.7 |
| ≥60 | 1411 | 116 | 8.2 | 502 | 32 | 6.4 | 1913 | 148 | 7.7 |
| Total | 2996 | 328 | 10.9 | 1686 | 116 | 6.9 | 4682 | 444 | 9.5 |

**Box 29. HBsAg prevalence, stratified by age and by years, among tuberculosis patients treated at chest clinics from 2006 to 2009 (March to May) (Data source: TB and Chest Service, CHP, DH)**

| Age Group | 2006 | | | 2007 | | | 2008 | | | 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. tested | HBsAg +ve | | No. tested | HBsAg +ve | | No. tested | HBsAg +ve | | No. tested | HBsAg +ve | |
| | | No. | % | | No. | % | | No. | % | | No. | % |
| 0-19 | 47 | 2 | 4.3 | 57 | 1 | 1.8 | 26 | 1 | 3.8 | 45 | 0 | 0.0 |
| 20-39 | 314 | 21 | 6.7 | 287 | 20 | 7.0 | 256 | 14 | 5.5 | 275 | 22 | 8.0 |
| 40-59 | 402 | 57 | 14.2 | 374 | 60 | 16.0 | 316 | 42 | 13.3 | 370 | 56 | 15.1 |
| ≥60 | 504 | 44 | 8.7 | 470 | 44 | 9.4 | 432 | 35 | 8.1 | 507 | 25 | 4.9 |
| Total | 1267 | 124 | 9.8 | 1188 | 125 | 10.5 | 1030 | 92 | 8.9 | 1197 | 103 | 8.6 |

**Box 30. Gender difference in prevalence of HBsAg among tuberculosis patients treated at chest clinics from 2006 to 2009 (March to May) (Data source: TB and Chest Service, CHP, DH)**



**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 2008 (Data source: ITC, CHP, DH)**

| | Health care workers | | | | | Non- Health care workers | | | | | Total | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. tested | +ve for HBsAg | | +ve for anti-HBs | | No. tested | +ve for HBsAg | | +ve for anti-HBs | | No. tested | +ve for HBsAg | | +ve for anti-HBs | |
| | | 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 | | 53.0 |
| 2002 | 99 | 9 | 9.1 | 62 | 62.6 | 252 | 22 | 8.7 | 133 | 52.8 | 351 | 31 | 8.8 | 220 | 55.6 |
| 2003 | 96 | 6 | 6.3 | 66 | 68.8 | 201 | 24 | 11.9 | 81 | 40.3 | 297 | 30 | 10.1 | 195 147 | 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 | | 53.6 |
| 2007 | 54 | 1 | 1.9 | 45 | 83.3 | 228 | 18 | 7.9 | 88 | 38.6 | 282 | 19 | 6.7 | 184 133 | 47.2 |
| 2008 | 54 | 2 | 3.7 | 39 | 72.2 | 235 | 20 | 8.5 | 111 | 47.2 | 289 | 22 | 7.6 | | 51.9 |
| Total | 674 | 40 | 5.9 | 461 | 68.4 | 2210 | 180 | 8.1 | 1035 | 46.8 | 2884 | 220 | 7.6 | 150 1496 | 51.9 |

**Box 32. Prevalence of hepatitis B markers in drug users from 1990 to 2009 (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 |

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

**Box 33. HBsAg prevalence in HIV/AIDS patients first attended ITC between 2000 and 2009 (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 | 64 | 6 | 9.4 | 17 | 1 | 5.9 | 81 | 7 | 8.6 |
| 2001 | 71 | 10 | 14.1 | 24 | 1 | 4.2 | 95 | 11 | 11.6 |
| 2002 | 119 | 14 | 11.8 | 23 | 1 | 4.3 | 142 | 15 | 10.6 |
| 2003 | 90 | 12 | 13.3 | 15 | 2 | 13.3 | 105 | 14 | 13.3 |
| 2004 | 111 | 19 | 17.1 | 25 | 2 | 8.0 | 136 | 21 | 15.4 |
| 2005 | 135 | 7 | 5.2 | 30 | 1 | 3.3 | 165 | 8 | 4.8 |
| 2006 | 194 | 26 | 13.4 | 22 | 3 | 13.6 | 216 | 29 | 13.4 |
| 2007 | 214 | 26 | 12.1 | 26 | 1 | 3.8 | 240 | 27 | 11.3 |
| 2008 | 205 | 20 | 9.8 | 33 | 1 | 3.0 | 238 | 21 | 8.8 |
| 2009 | 159 | 16 | 10.1 | 25 | 1 | 4.0 | 184 | 17 | 9.2 |

**Box 34. Prevalence of HBV infection per HIV risk in HIV/AIDS patients first attended ITC between 2000 and 2009 (Data source: ITC, CHP, DH)**

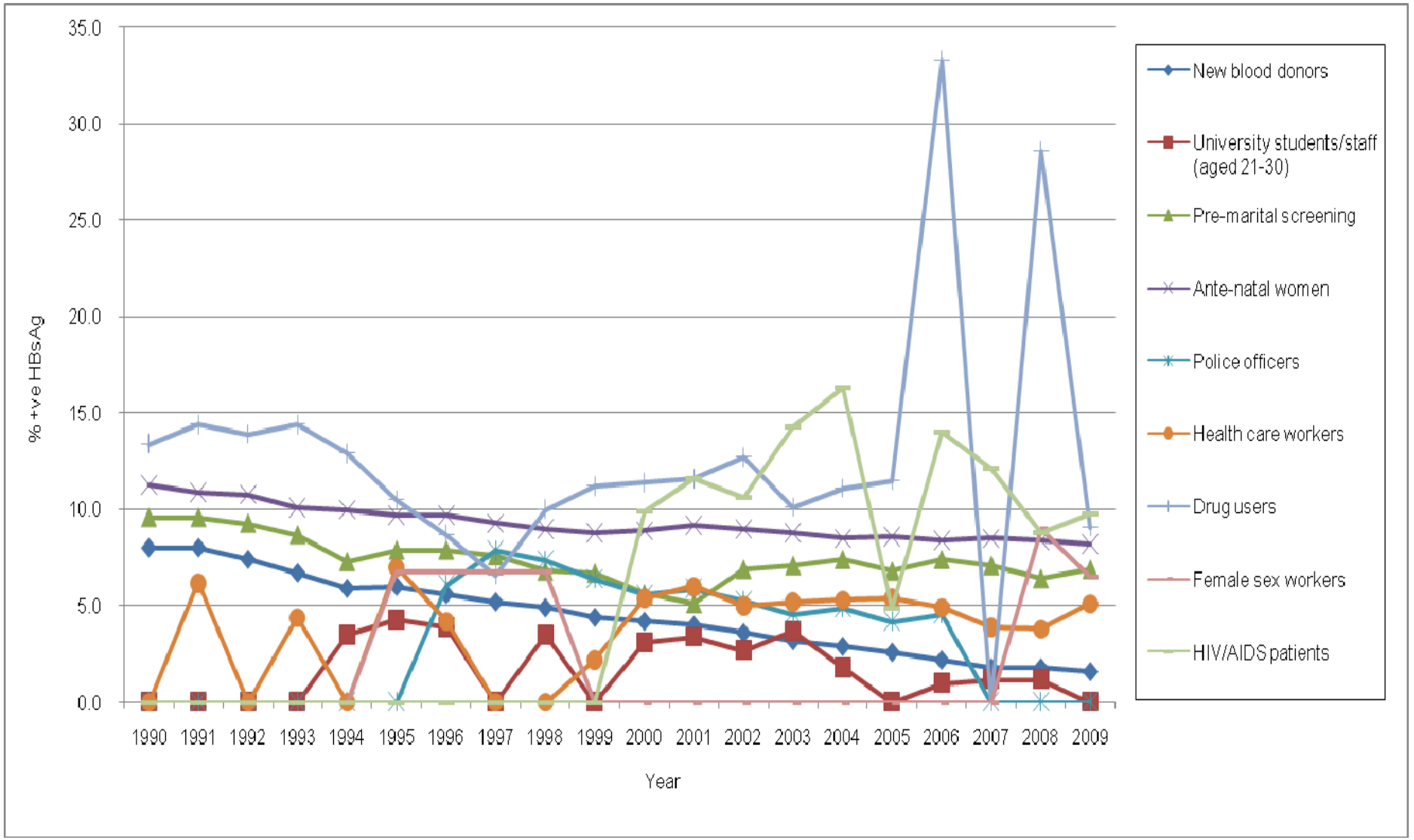
| HIV risk | No. tested | HBsAg/anti-HBs | | | |
|---|---|---|---|---|---|
| | | +/ | | -/+ | |
| | | No. | % | No. | % |
| Heterosexual male | 485 | 50 | 10.3 | 210 | 43.3 |
| Heterosexual female | 225 | 14 | 6.2 | 91 | 40.4 |
| Homo/Bi-sexual | 672 | 71 | 10.6 | 328 | 48.8 |
| Drug user | 200 | 33 | 16.5 | 87 | 43.5 |
| Blood/blood product recipient | 7 | 0 | 0.0 | 3 | 42.9 |
| Undetermined | 13 | 2 | 15.4 | 4 | 30.8 |
| Total | 1602 | 170 | 10.6 | 723 | 45.1 |

**Box 35. HBsAg prevalence in different population groups from 1990 to 2009 (Data source: multiple sources)**

| Year | % HBsAg+ | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | 10.5 | | - | - | - |
| 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 | 6.8 | - | - | - |
| 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 | - | 9.9 | - | 8.5 |
| 2001 | 4.0 | 3.4 | 5.1 | 9.2 | 5.9 | 6.0 | 11.6 | - | 11.6 | - | 5.3 |
| 2002 | 3.6 | 2.7 | 6.9 | 9.0 | 5.3 | 5.0 | 12.7 | - | 10.6 | - | 8.8 |
| 2003 | 3.2 | 3.7 | 7.1 | 8.8 | 4.6 | 5.2 | 10.1 | - | 14.3 | - | 10.1 |
| 2004 | 2.9 | 1.8 | 7.4 | 8.5 | 4.9 | 5.3 | 11.1 | - | 16.3 | - | 7.7 |
| 2005 | 2.6 | 0.0 | 6.8 | 8.6 | 4.2 | 5.4 | 11.5 | - | 4.9 | 10.1 | 6.3 |
| 2006 | 2.2 | 1.0 | 7.4 | 8.4 | 4.6 | 4.9 | 33.3 | - | 14.0 | 9.8 | 6.1 |
| 2007 | 1.8 | 1.2 | 7.1 | 8.5 | - | 3.9 | 0.0 | 10.4** | 12.1 | 10.5 | 6.7 |
| 2008 | 1.8 | 1.2 | 6.4 | 8.4 | - | 3.8 | 28.6 | 9.0 | 8.8 | 8.9 | 7.6 |
| 2009 | 1.6 | 0.0 | 6.9 | 8.2 | - | 5.1 | 9.1 | 6.5 | 9.8 | 8.6 | - |

*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 2009 (Data source: multiple sources)**



**Box 37. Hepatitis B immunisation coverage rates among children aged 2 to 5 by year of birth (Data source: ref 23, 24, 25 & 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 2009 (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 |
| Cumulative no. of Primary 6 students | 79641 | 86481 | 85612 | 86052 | 86515 | 86208 | 83974 | 83164 | 81818 | 77273 | 73757 |
| *First Dose* | | | | | | | | | | | |
| Cumulative no. eligible for vaccination | 26624 | 25873 | 17172 | 15504 | 14245 | 10625 | 8449 | 6648 | 6351 | 6204 | 5165 |
| Cumulative no. administered | 26248 | 25505 | 16986 | 15351 | 14079 | 10519 | 8329 | 6591 | 6262 | 6095 | 5043 |
| Acceptance rate (at the present campaign) | 98.6% | 98.6% | 98.9% | 99.0% | 98.8% | 99.0% | 98.6% | 99.1% | 98.6% | 98.2% | 97.6% |
| Coverage rate (for the whole Primary 6 population) | 99.5% | 99.6% | 99.8% | 99.8% | 99.8% | 99.9% | 99.9% | 99.9% | 99.9% | 99.9% | 99.8% |
| *Second Dose* | | | | | | | | | | | |
| Cumulative no. eligible for vaccination | 26626 | 25889 | 17183 | 15510 | 14250 | 10626 | 8561 | 6710 | 6392 | 6243 | 5165 |
| Cumulative no. administered | 26096 | 25334 | 16889 | 15215 | 13800 | 10338 | 8191 | 6573 | 6277 | 6068 | 4969 |
| Acceptance rate (at the present campaign) | 98.0% | 97.9% | 98.3% | 98.1% | 96.8% | 97.3% | 95.7% | 98.0% | 98.2% | 97.2% | 96.2% |
| Coverage rate (for the whole Primary 6 population) | 99.3% | 99.4% | 99.7% | 99.7% | 99.5% | 99.7% | 99.6% | 99.8% | 99.9% | 99.8% | 99.7% |
| *Third Dose* | | | | | | | | | | | |
| Cumulative no. eligible for vaccination | 26647 | 25905 | 17772 | 16144 | 14918 | 11222 | 9316 | 7397 | 6986 | 6741 | 5575 |
| Cumulative no. administered | 25420 | 24205 | 16664 | 14719 | 13912 | 10036 | 8348 | 6957 | 6602 | 6269 | 4815 |
| Acceptance rate (at the present campaign) | 95.4% | 93.4% | 93.8% | 91.2% | 93.3% | 89.4% | 89.6% | 94.1% | 94.5% | 93.0% | 86.4% |
| Coverage rate (for the whole Primary 6 population) | 98.5% | 98.0% | 98.7% | 98.3% | 98.8% | 98.6% | 98.8% | 99.5% | 99.5% | 99.4% | 99.0% |

# 5. Tabulated results of seroprevalence of hepatitis C

**Box 39. Anti-HCV prevalence in new blood donors, 1991 to 2009 (Data source: HKRCBTS)**

| Year | No. of new donors | Anti-HCV+ | |
|---|---|---|---|
| | | 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 |

**Box 40. Anti-HCV prevalence and its gender and age breakdown in new blood donors in 2009 (Data source: HKRCBTS)**

| Age Group | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | No. tested | Anti-HCV No. Positive | % | No. tested | Anti-HCV No. Positive | % |
| 16-19 | 10972 | 15 | 0.14 | 12661 | 7 | 0.06 |
| 20-29 | 4275 | 1 | 0.02 | 4350 | 3 | 0.07 |
| 30-39 | 1479 | 6 | 0.41 | 1939 | 3 | 0.15 |
| 40-49 | 762 | 1 | 0.13 | 1317 | 3 | 0.23 |
| >49 | 542 | 1 | 0.18 | 382 | 0 | 0.00 |
| Total | 18030 | 24 | 0.13 | 20649 | 16 | 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 2008 (Data source: ITC, CHP, DH)**

| | Health care workers | | | Non- Health care workers | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. tested | Anti-HCV + | | No. tested | Anti-HCV + | | No. tested | Anti-HCV + | |
| | | 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 |
| Total | 203 | 0 | 0.0 | 646 | 6 | 0.9 | 849 | 6 | 0.7 |

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

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

**Box 44. Anti-HCV prevalence in HIV/AIDS patients first attended ITC between 2000 and 2009 (Data source: ITC, CHP, DH)**

| Year | Male | | | Female | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. tested | No. Anti-HCV + | % | No. tested | No. Anti-HCV + | % | No. tested | No. Anti-HCV + | % |
| 2000 | 62 | 5 | 8.1 | 17 | 0 | 0.0 | 79 | 5 | 6.3 |
| 2001 | 71 | 7 | 9.9 | 23 | 1 | 4.3 | 94 | 8 | 8.5 |
| 2002 | 118 | 9 | 7.6 | 23 | 1 | 4.3 | 141 | 10 | 7.1 |
| 2003 | 90 | 12 | 13.3 | 15 | 0 | 0.0 | 105 | 12 | 11.4 |
| 2004 | 110 | 19 | 17.3 | 24 | 3 | 12.5 | 134 | 22 | 16.4 |
| 2005 | 135 | 17 | 12.6 | 30 | 1 | 3.3 | 165 | 18 | 10.9 |
| 2006 | 192 | 47 | 24.4 | 22 | 2 | 9.1 | 215 | 49 | 22.8 |
| 2007 | 212 | 36 | 17.0 | 26 | 1 | 3.8 | 238 | 37 | 15.5 |
| 2008 | 203 | 37 | 18.2 | 33 | 2 | 6.1 | 236 | 39 | 16.5 |
| 2009 | 159 | 29 | 18.2 | 25 | 1 | 4.0 | 184 | 30 | 16.3 |

**Box 45. Prevalence of HCV infection per HIV risk in HIV/AIDS patients first attended ITC between 2000 and 2009 (Data source: ITC, CHP, DH)**

| HIV risk | No. tested | No. Anti-HCV + | % |
|---|---|---|---|
| Heterosexual male | 480 | 35 | 7.3 |
| Heterosexual female | 223 | 2 | 0.9 |
| Homo/Bi-sexual | 670 | 9 | 1.3 |
| Drug user | 198 | 181 | 91.4 |
| Blood/blood product recipient | 7 | 3 | 42.9 |
| Undetermined | 13 | 0 | 0.0 |
| Total | 1591 | 230 | 14.5 |

**Box 46. Prevalence of hepatitis C from screening of blood donors and clinical testing of patients in 2 major public hospitals from 2003 to 2009 (Data source: HKRCBTS, PMH Microbiology Laboratory, PWH Microbiology Laboratory (since 2005))**

| Category | | 2003 | | | 2004 | | | 2005 | | | 2006 | | | 2007 | | | 2008 | | | 2009 | | | Overall | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. tested | HCV +ve | | No. tested | HCV +ve | | No. tested | HCV +ve | | No. tested | HCV +ve | | No. tested | HCV +ve | | No. tested | HCV +ve | | No. tested | HCV +ve | | HCV +ve | HCV +ve | |
| | | | 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 | 231,375 | 47 | < 0.1 | 1418962 | 296 | <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 | 159 | 4 | 2.5 |
| | 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 | 1250 | 578 | 46.2 |
| | 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 | 2798 | 34 | 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 | 9558 | 195 | 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 | 2464 | 96 | 3.9 |
| | 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 | 1150 | 12 | 1.0 |
| | 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 | 1405 | 10 | 0.7 |
| | 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 | 893 | 94 | 10.5 |
| | 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 | 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 | 19685 | 1023 | 5.2 |
| 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 | 25866 | 1016 | 3.9 |
| 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 | 37777 | 918 | 2.4 |
| 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 | 83328 | 2957 | 3.5 |

**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 2009 (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) | | Overall (n=3253) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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 | 285 | 8.8 |
| | PMH | 138 | 83.1 | 197 | 82.8 | 229 | 36.7 | 142 | 26.2 | 89 | 16.0 | 208 | 38.3 | 273 | 46.7 | 1276 | 39.2 |
| | PWH | - | | - | | 346 | 55.4 | 365 | 67.3 | 426 | 76.8 | 286 | 52.7 | 269 | 46.0 | 1692 | 52.0 |
| | | | | | | | | | | | | | | | | | |
| Sex | Male | 115 | 69.3 | 157 | 66.0 | 413 | 66.2 | 390 | 72.0 | 377 | 67.9 | 378 | 69.6 | 415 | 70.9 | 2245 | 69.0 |
| | Female | 51 | 30.7 | 81 | 34.0 | 211 | 33.8 | 152 | 28.0 | 178 | 32.1 | 165 | 30.4 | 170 | 29.1 | 1008 | 31.0 |
| | 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 |
| | | | | | | | | | | | | | | | | | |
| Age at diagnosis | Mean | 41.6 | | 44 | | 46.8 | | 47.4 | | 50.3 | | 49.8 | | 52.9 | | 47.5 | |
| | S.D. | 14.6 | | 14.7 | | 15.9 | | 16.6 | | 16.3 | | 17.9 | | 16.9 | | 16.1 | |
| | | 17 – 83 | | 11 - 86 | | 0 - 87 | | 0 - 101 | | 0 - 94 | | 0 - 88 | | 1 - 102 | | 0 - 102 | |
| | | | | | | | | | | | | | | | | | |
| Category Range | Blood donation | 28 | 16.9 | 42 | 17.6 | 50 | 8.0 | 35 | 6.5 | 42 | 7.6 | 52 | 9.6 | 47 | 8.0 | 296 | 9.1 |
| | Pre-transplant | 0 | 0.0 | 0 | 0.0 | 2 | 0.3 | 0 | 0.0 | 1 | 0.2 | 0 | 0.0 | 0 | 0.0 | 3 | 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 | 578 | 17.8 |
| | Needlestick injuries | 1 | 0.6 | 1 | 0.4 | 8 | 1.3 | 7 | 1.3 | 6 | 1.1 | 4 | 0.7 | 5 | 0.9 | 32 | 1.0 |
| | Haematology | 1 | 0.6 | 0 | 0.0 | 3 | 0.5 | 1 | 0.2 | 0 | 0.0 | 5 | 0.9 | 7 | 1.2 | 17 | 0.5 |
| | 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 | 190 | 5.8 |
| | Post-renal transplant | 2 | 1.2 | 0 | 0.0 | 17 | 2.7 | 18 | 3.3 | 19 | 3.4 | 21 | 3.9 | 20 | 3.4 | 97 | 3.0 |
| | Pre-methotrexate | 0 | 0.0 | 1 | 0.4 | 1 | 0.2 | 1 | 0.2 | 1 | 0.2 | 1 | 0.2 | 5 | 0.9 | 10 | 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 | 96 | 3.0 |
| | Clinical Indication | 30 | 18.1 | 51 | 21.4 | 155 | 24.8 | 170 | 31.4 | 179 | 32.3 | 215 | 39.6 | 216 | 36.9 | 1016 | 31.2 |
| | Others or unknown | 10 | 6.0 | 23 | 9.7 | 192 | 30.8 | 205 | 37.8 | 229 | 41.3 | 128 | 23.6 | 131 | 22.4 | 918 | 28.2 |

# 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 |

# REFERENCES

1. Gust ID. 1984. The epidemiology of viral hepatitis. In: Vyas GN, Dienstag JL, Hoofnagle JH, editors: Viral Hepatitis and Liver Disease. Grune & Stratton, Orlando. p 415-421.

2. Wong KH, Liu YM, Ng PS, Young BW, Lee SS. Epidemiology of hepatitis A and hepatitis E infection and their determinants in adult Chinese community in Hong Kong. J Med Virol 2004;72:538-44.

3. Chin KP, Lok ASF, Wong LSK, Lai CL, Wu PC. Current seroepidemiology of hepatitis A in Hong Kong. J Med Virol 1991;34:191-3.

4. Tsang CW, Chan CL. 1987. Epidemiology of viral hepatitis in Hong Kong. In: New trends in peptic ulcer and chronic hepatitis-Part II. Chronic Hepatitis. Excerpta Medica. p 43-50.

5. Lok ASF, Kan WK, Moechli R, et al. Seroepidemiological survey of hepatitis E in Hong Kong by recombinant-based enzyme immunoassays. Lancet 1992;340:1205-8.

6. Chau TN, Lai ST, Tse C, et al. Epidemiology and clinical features of sporadic hepatitis E as compared with hepatitis A. Am J Gastroenterol 2006;101:292-6.

7. Lam WY, Chan RCW, Sung JJY, Chan PKS. Genotype distribution and sequence variation of hepatitis E virus, Hong Kong. Emerging Infectious Diseases 2009;15:792-4

8. Kwan LC, Ho YY, Lee SS. The declining HBsAg carriage rate in pregnant women in Hong Kong. Epidemiol Infect 1997;119:281-3.

9. Cooley L, Sasadeusz J. Clinical and virological aspects of hepatitis B co-infection in individuals infected with human immunodeficiency virus type-1. J Clin Virol 2003;26:185-93.

10. Tse K, Siu SL, Yip KT, et al. Immuno-prophylaxis of babies borne to hepatitis B carrier mothers. Hong Kong Med J 2006;12:368-74.

11. Yuen MF, Sablon E, Tanaka Y, et al. Epidemiological study of hepatitis B virus genotypes, core promoter and precore mutations of chronic hepatitis B infection in Hong Kong. J Hepatol 2004;41:119-25.

12. Chan HL, Hui AY, Wong ML, et al. Genotype C hepatitis B virus infection is associated with an increased risk of hepatocellular carcinoma. Gut 2004;53:1494-8.

13. Chan HL, Tsui SK, Tse CH, et al. Epidemiological and virological characteristics of 2 subgroups of hepatitis B virus genotype C. J Infect Dis 2005;191:2022-32.

14. Yuen MF, Sablon E, Yuan HJ, et al. Significance of hepatitis B genotype in acute exacerbation, HBeAg seroconversion, cirrhosis-related complications, and hepatocellular carcinoma. Hepatology 2003;37:562-7.

15. Chan HL, Tse CH, Mo G, et al. High viral load and hepatitis B virus subgenotype Ce are associated with increased risk of hepatocellular carcinoma. J Clin Oncol 2008;26:177-82

16. Zhu L, Tse CH, Wong VSW, et al. A complete genomic analysis of hepatitis B virus genotypes and mutations in HbeAg-negative chronic hepatitis B in China. J Viral Hepat 2008;15:449-58

17. Lo CM, Cheung CK, Lau GK, et al. Significance of hepatitis B virus genotype in liver transplantation for chronic hepatitis B. Am J Transplant 2005;5:1893-900.

18. Yuen MF, Tanaka Y, Mizokami M, et al. Role of hepatitis B virus genotypes Ba and C, core promoter and precore mutations on hepatocellular carcinoma: a case control study. Carcinogenesis 2004;25:1593-8.

19. Chan AO, Yuen MF, Lam CM, Fong CY, Wong BC, Lai CL. Prevalence and characteristics of familial hepatocellular carcinoma caused by chronic hepatitis B infection in Hong Kong. Aliment Pharmacol Ther 2004;19:401-6.

20. CF Ho, KH Wong, CW Chan, et al. Current pattern and course of acute hepatitis B virus infection in Hong Kong. J Gastroenterol Hepatol. 2003;19:602-3.

21. Young BWY, Lee SS, Lim WL, Yeoh EK. The long-term efficacy of plasma-derived hepatitis B vaccine in babies born to carrier mothers. J Viral Hepat 2003;10:23-30.

22. Yuen MF, Lim WL, Chan AO, Wong DK, Sum SS, Lai CL. 18-year follow-up study of a prospective randomized trial of hepatitis B vaccinations without booster doses in children. Clin Gastroenterol Hepatol 2004;2:941-5.

23. Tse W, Mok T. Survey on Immunisatino coverage among children aged two to five. Public Health and Epidemiology Bulletin 2002;11(2):13-18

24. Tse WKM, Yeung SWT. Immunisation coverage among children aged two to five: an update. Public Health Epidemiology Bulletin. Feb 2004, pp 7-15.

25. Wu T, Chan SK, Kung KH, et al. Immunization coverage among chilfen aged two to five: findings of the 2006 survey. Public Health Epidemiology Bulletin. Dec 2007, pp 57-68

26. Leung NW, Tam JS, Lai JY, et al. Does hepatitis C virus infection contribute to hepatocellular carcinoma in Hong Kong? Cancer 1992;70:40-4.

27. Lo CM, Fan ST, Liu CL, et al. Ten-year experience with liver transplantation at Queen Mary Hospital: retrospective study. Hong Kong Med J 2002;8:240-4.

28. Chan GCB, Lim WL, Yeoh EK. Prevalence of hepatitis C infection in Hong Kong. J Gastroen Hepatol 1992;7:117-20.

29. Chan TM, Lok AS, Cheng IK, Chan RT. Prevalence of hepatitis C virus infection in hemodialysis patients: a longitudinal study comparing the results of RNA and antibody assays. Hepatology 1993;17:5-8.

30. Lee KCK, Lim WWL, Lee SS. High prevalence of HCV in a cohort of injectors on methadone substitution treatment. J Clin Virol. 2008; 41:297-300.

31. Monga HK, Rodriguez-Barradas MC, Breaux K, et al. Hepatitis C virus infection-related morbidity and mortality among patients with human immunodeficiency virus infection. Clin Infect Dis 2001;33:240-7.

32. Alter MJ, Kruszon-Moran D, Nainan OV, et al. The prevalence of hepatitis C virus infection in the United States, 1988 through 1994. N Engl J Med 1999;341:556-62.

33. Prescott LE, Simmonds P, Lai CL, et al. Detection and clinical features of hepatitis C virus type 6 infections in blood donors from Hong Kong. J Med Virol 1996;50:168-75.

34. Wong DA, Tong LK, Lim W. High prevalence of hepatitis C virus genotype 6 among certain risk groups in Hong Kong. Eur J Epidemiol 1998;14:421-6.

35. Zhou DX, Tang JW, Chu IM, et al. Hepatitis C virus genotype distribution among intravenous drug user and the general population in Hong Kong. J Med Virol 2006;78:574-81.

36. K Lee, D Chan, SS Lee. Molecular epidemiology of HCV genotypes in injecting drug users in Hong Kong. 13th International Congress on Infectious Diseas, June 19-22, 2008. Kuala Lumpur, Malaysia.

37. Chan TM, Lau JYN, Wu PC, Lai CL, Lok ASF, Cheng IKP. Hepatitis C virus genotypes in patients on renal replacement therapy. Nephrol Dial Transplant 1998;13:731-4.

38. Seto WK, Lai CL, Fung J, et al. Natural history of chronic hepatitis C: genotype 1 versus genotype 6. J Hepatol. 2010:53:444-8

39. Lim WL, Yeoh EK. Hepatitis A vaccination. Lancet 1992;339:304.

40. Lai CL. Hepatitis A risk heightened. Data quoted in United Daily News dated 10 June 1994.

41. Data from CHC-Group Medical Practice, 1995, 1996, 1998, 2000-2009.

42. Lee A, Cheng F, Lau L, et al. Changing hepatitis A epidemiology among Hong Kong Chinese adolescents: what are the implications? Public Health 1999; 113:185-8.