

A REVIEW OF THE EPIDEMIOLOGY OF HUMAN IMMUNODEFICIENCY VIRUS (HIV) AND SEXUALLY TRANSMITTED INFECTIONS (STI) - GLOBALLY AND IN SINGAPORE

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ABSTRACT

In recent years HIV infections have declined in many parts of the world, however, there are still 35 million persons living with HIV infection and 2.1 million new infections occurred in 2011 worldwide. In many areas HIV continues to affect certain at risk communities viz. men who have sex with men, sex workers, clients of sex workers and injecting drug users. In Singapore the number of newly diagnosed HIV infections appears to have stabilised, however the current trend is that infected individuals are presenting at a late stage of infection and more HIV infections are being diagnosed among MSM and fewer in heterosexuals. The trend for other sexually-transmitted infections is generally stable, with gonorrhea, Chlamydia trachomatis infection and anogenital herpes showing decreases, whilst the incidence of syphilis showed an increase in 2012. Interviews with patients attending the DSC Clinic indicate that most STIs are contracted locally from casual partners. Unregulated sex workers are more frequently cited as primary contacts than are local regulated sex workers, who continue to have very low levels of STIs, underlining the benefits of the programme of routine screening, treatment and condom negotiation skills training provided by the Department of STI Control (DSC) Clinic in Singapore.

Key words: Sexually transmitted infections, Human Immunodeficiency Virus infection, Singapore, epidemiology, mode of transmission, incidence

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INTRODUCTION

This is a review of current epidemiology of HIV and STI from a global as well as local perspective. Global and regional statistics were sourced from the United Nations Joint Programme on AIDS (UNAIDS) and World Health Organisation (WHO) reports, local data were sourced from Ministry of Health and Department of STI Control (DSC) Singapore.

EPIDEMIOLOGY OF HIV INFECTION

Global and Regional

At the end of 2011, it is estimated that globally the total number

of persons living with HIV was 34.0 million. This represents 0.8% of all adults aged 15-49 years worldwide¹. The burden of the HIV epidemic however varies considerably between countries and regions. Sub-Saharan Africa is most severely affected, with nearly 1 in every 20 adults (4.9%) living with HIV and accounting for 69% of all infections worldwide. In Asia although the prevalence of HIV infection is 25 times lower than in sub-Saharan Africa, there are still almost 5 million people living with HIV in South, South-East and East Asia. The number of people newly infected globally in 2011 was 2.1 million, though still huge, this figure is 20% lower when compared with new infections a decade ago in 2001. Of these 280,000 were in South and South-East Asia, and 89,000 were in East Asia. In Asia and the Pacific, an estimated 4.9 million people were living with HIV in 2011, about the same number as five years earlier and signals the message we are seeing the world over that epidemics are halting, and beginning to reverse. However in many parts of the Asia-Pacific region as well as globally HIV infection is increasing among MSM². HIV epidemics in MSM are expanding in countries of all incomes in 2012.

Singapore

In Singapore the number of reported HIV cases has increased from 2 in 1985 to a cumulative total of 5,521 as of end June 2012. The notification rate of newly diagnosed HIV/AIDS infections in 2011 was 122 per million population. The epidemic in Singapore is driven mainly by sexual transmission. Since 2008, the HIV/AIDS notification rate has levelled off at around 120 per million population, an indication that the overall HIV epidemic may be stabilising when compared with the previous decade. However, a closer look at the trends among transmission groups yields a worrying trend. As of end June 2012, 62% of the 5521 cases acquired HIV through heterosexual transmission, and 32% through homosexual and bisexual transmission³. More important than cumulative figures are the current epidemiological trends. The number of newly diagnosed HIV infections among heterosexuals has been declining in recent years, compared with the opposite trend of increasing transmission seen in MSM. Newly diagnosed infections among MSM rose from 166 notifications in 2009, to 204 in 2010 and 237 in 2011, the corresponding numbers for heterosexuals are 284, 228 and 210 notifications respectively. The number of cases infected via intravenous drug use has been low, consistently accounting for less than 2% of all the new cases since 2009. Table 1 below shows the distribution of Singapore residents notified with HIV infection by the various modes of transmission.

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TABLE 1. DISTRIBUTION OF HIV/AIDS - INFECTED SINGAPORE RESIDENTS BY MODES OF TRANSMISSION (1985 – Jun 2012)

Mode of Transmission	1985 – 2005	2006	2007	2008	2009	2010	2011	2012 Jan-Jun
Sexual Transmission								
Heterosexual	1892	222	255	248	284	228	210	107
Homosexual	420	95	130	151	139	163	195	92
Bisexual	208	14	15	34	27	41	42	9
Intravenous drug use	53	14	7	20	7	4	4	2
Blood Transfusion	2	0	1	0	0	0	0	0
Renal Transplant overseas	5	0	0	0	0	0	0	0
Perinatal (mother to child)	25	2	2	0	0	2	0	0
Uncertain	98	12	13	3	6	3	10	5
Total	2703	359	423	456	463	441	461	215

The prevalence of known HIV cases among Singapore residents (citizens and permanent residents) aged 15 years and above was 0.12% in 2011. Almost half (47%) of all new cases reported in the first six months of 2012 were aged between 30 to 49 years of age. The male to female ratio was 12:1. Approximately 63% were single, 23% were married and 10% were divorced or separated. Among newly diagnosed heterosexual males in 2011, 63% gave a history of sexual exposure to sex workers and 28% reported having casual sexual partners; among MSM 90% reported casual partners and 7% had exposure to sex workers.

The majority of HIV cases in Singapore present at an advanced stage of infection. In the first six months of 2012, half of the all new cases, 65% of heterosexuals and 43% of homosexuals already had late-stage HIV infection at the time of diagnosis.

Such high levels of late-presentation have been the pattern since the 1990s and indicate that significant numbers of persons at risk of HIV infection are not testing early enough. Late diagnosis of HIV infection has 2 major impacts, firstly it reduces the patient's likelihood of achieving satisfactory or optimal response to HIV treatment, and secondly it means that there is a very high aggregate viral load among those at highest risk for HIV infection, which in turn increases the risk of transmission to others in the community. New biomedical approaches to HIV prevention are being studied to improve HIV control, in particular the use of anti-retroviral drugs given early to prevent transmission as well as acquisition of HIV infection have been touted as possible strategies ⁴.

EPIDEMIOLOGY OF SEXUALLY TRANSMITTED INFECTIONS

Global and Regional

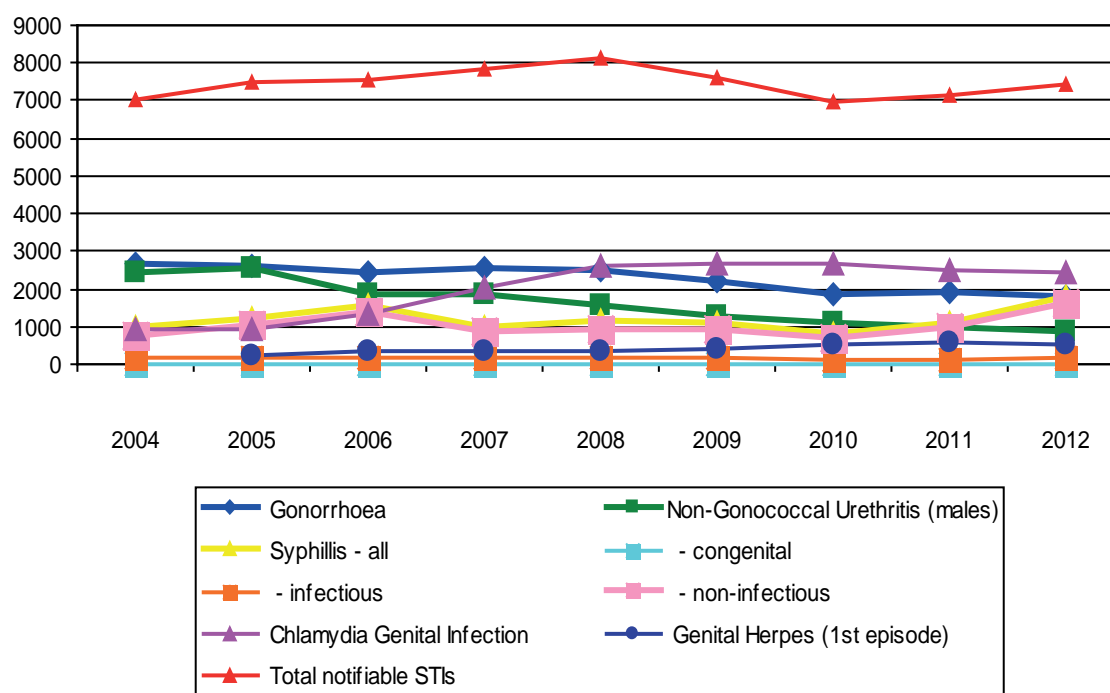
Global estimates of non-HIV sexually-transmitted infections (STI) are less accurate or updated. The most recent estimates

are from 2005, when the World Health Organisation (WHO) estimated there were 7.39 and 32.69 million cases of *Chlamydia trachomatis* in South-East Asia (SEA) and Western Pacific (WP) regions, respectively ⁵. Estimates for gonorrhoea were 8.37 and 9.43 million cases, for syphilis were 11.77 and 2.54 million cases, and for trichomoniasis were 26.91 and 25.76 million cases for these SEA and WP regions, respectively. The corresponding SEA and WP regional incidence rates for chlamydial infections were 6.6 and 41.6 million, for gonorrhoea were 22.7 and 26.9 million, for syphilis were 2.9 and 1.1 million, and for trichomoniasis were 38.6 and 39.1 million, respectively. The total for these four infections was 70.8 million for the SEA region and 108.7 million for the WP region giving an overall total of 179.5 million. The Asia and Pacific region had by far the greatest number of curable bacterial STIs of all the global regions. Global figures for anogenital warts and herpes are not available but are thought to be highly prevalent.

Singapore

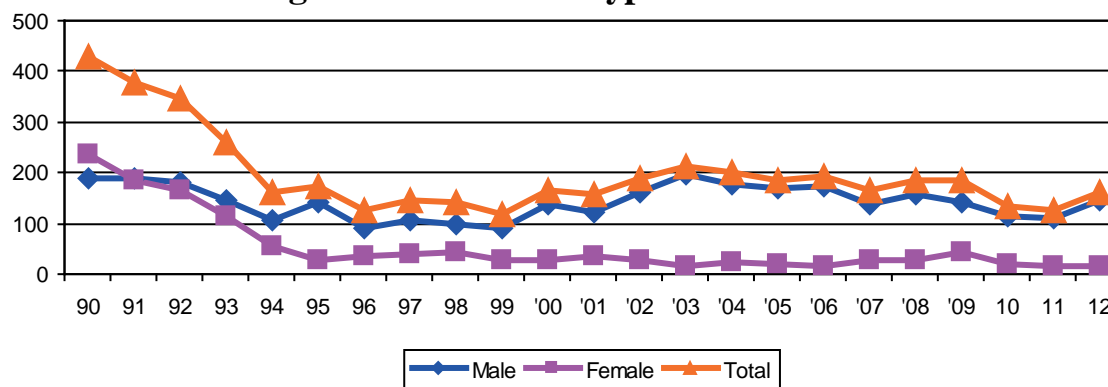
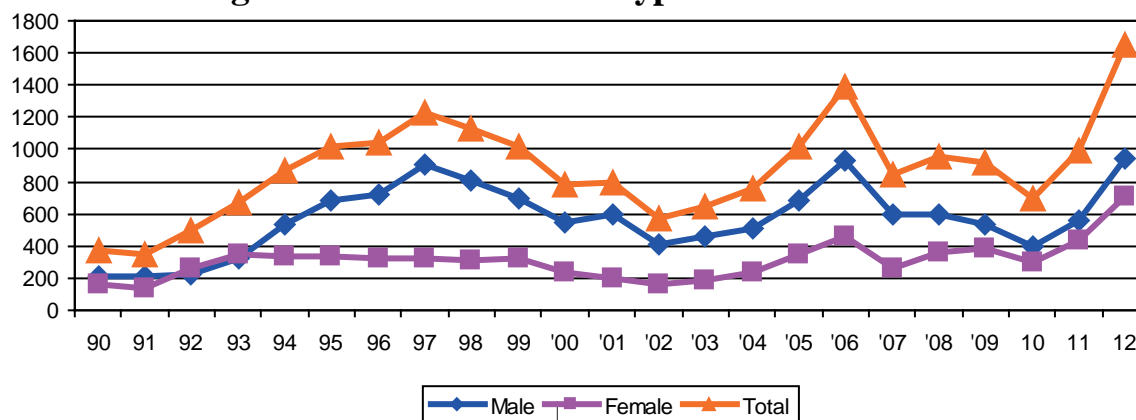
In Singapore in 2012 there was a 4% increase in the number of notifiable STIs, from 7130 in 2011 to 7422 in 2012. The increase registered from 2011 to 2012 was contributed entirely by an increase in the number of cases of syphilis – infections syphilis from 125 to 162, and non-infectious syphilis from 995 to 1648 cases. All the other notifiable STIs registered slight declines in 2012 compared with 2011 (Figure 1). Per 100,000 population trends were similar, all STIs increased by 2%, but infectious syphilis increased from 2.41 to 3.05, and non-infectious syphilis increased from 19.19 to 31.02 cases per 100,000 population; all other notifiable STIs decreased marginally.

The increase in infectious syphilis was seen mainly in males, from 110 to 145 cases, cases in females increased marginally from 15 to 17; the increase in number of infectious syphilis cases returned the trend to pre-2010 levels (Figure 2). Of the

Figure 1 - Notifiable STIs Incidence

145 cases of infectious syphilis, 122 (84%) were seen in the DSC Clinic, 77 (63%) of whom were Singaporeans or permanent residents. There was a sharp rise in the number of notifications of non-infectious syphilis (Figure 3); notifications in males increased by 68.7% (560 in 2011 to 945 in 2012), whereas those in females increased by 61.6% (435 in 2011 to

703 in 2012). Of the 1648 notifications of non infectious syphilis, 863 (52.3%) were seen in the DSC Clinic, 268 (31%) of whom were Singaporeans or permanent residents, 385 (44.6%) were work and employment pass holders (44.6%), and 210 (24.3%) were tourists. There were no cases of congenital syphilis reported in 2012. A sub-analysis of syphilis infections

Figure2 - Infectious Syphilis Incidence**Figure 3 - Non-infectious Syphilis Notifications**

among male DSC Clinic attendees in 2011 showed that cases of infectious syphilis were common among MSM, with 45 cases (31%) diagnosed in this group and 8.6% of all MSM attendees had infectious syphilis. A further 42 MSM were diagnosed with non-infectious syphilis in 2011.⁶ In the analysis of non-infectious syphilis as a proportion of attendances by ethnicity in the DSC clinic, Thais (8% of 226 attendees) and Indonesians (5.6% of 567 attendees) had the highest positivity⁷. The number of gonorrhoea cases dropped from 1933 in 2011 to 1781 in 2012 (1480 in males, 301 in females) (Figure 4). Of the 1781 cases, 834 (47%) were seen in the DSC Clinic; 635 (76%) of whom were Singaporean or permanent residents. No cases of gonococcal ophthalmia neonatorum were notified in 2012 (there were 2 in 2011). In the analysis of gonorrhoea infection as a proportion of attendances by ethnicity in the DSC clinic, Vietnamese (12.8% of 86 attendees) and Malays (10% of 3164 attendees) had the highest infection positivity⁷.

The number of cases of Chlamydia trachomatis infection fell by

0.2%% (from 2502 in 2011 to 2446 in 2012), mainly from fewer notifications in females (Figure 5). Since 2009, more males than females have been diagnosed with chlamydial infection, this is likely because males are more likely to be symptomatic than females and therefore to seek treatment, and also partly due to the increased screening for the infection using nucleic acid amplification tests (NAATS) in the DSC Clinic in recent years. Of the 2446 infections, 1520 (62%) were seen in DSC Clinic, of whom 72% were Singaporeans or permanent residents. In the analysis of chlamydial infection as a proportion of attendances by ethnicity in the DSC clinic, Vietnamese (12.8% of 86 attendees), Nepalese (12.3% of 155), Malays (11.3% of 3164) and Bangladeshis (11.2 of 1033) had the highest infection positivity⁷.

The number of cases of NGU continued to decrease, from 1985 in 2010, 977 in 2011, to 864 in 2012. This is the expected trend and reflects the increasing proportion of NGU now classified as chlamydia. The number of cases of primary anogenital herpes notified fell from 595 in 2011 to 521 in 2012. It is very likely

Figure 4 - Gonorrhoea Incidence

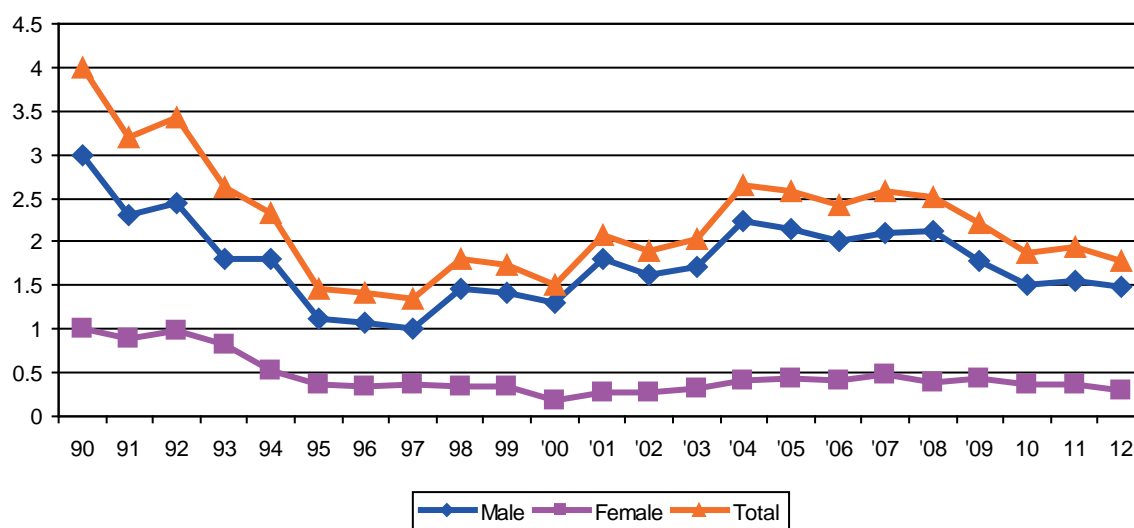
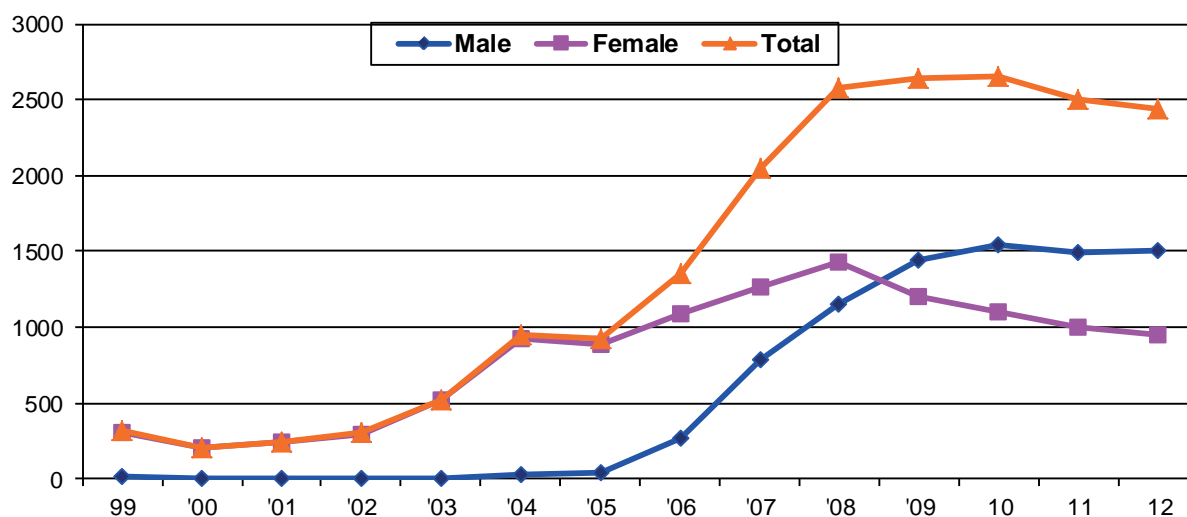


Figure 5 – Chlamydia trachomatis Incidence



that there is significant under reporting of anogenital herpes in Singapore. The number of anogenital warts was stable at 1125 cases; anogenital warts are not notifiable infections and these figures represent cases seen in DSC Clinic, actual incidence and prevalence of anogenital warts are likely to be much higher.

Figure 6 shows the incidence of STIs by age groups per 100,000 population. Infections were found mostly among those in age groups 30 to 39 and 20 to 29. For persons between the ages of 10 to 19, there was a 20% drop in number of STIs notified, falling from 608 in 2011 to 489 in 2012 (Figure 7). Female cases decreased by 27% (401 to 291) and male cases decreased by 4% (207 to 198). This decline may be attributed to the enhanced sex education programmes introduced in schools in 2007. Chlamydia was the most common STI diagnosed in this age group.

In 2012 most of the primary contacts of the notifiable STIs managed in DSC Clinic were in Singapore, this was true for over three-quarters of primary contacts of gonorrhoea (83%), *Chlamydia trachomatis* (83%), infectious syphilis (76%) and NGU (80%). This was lower for non-infectious syphilis at 42%. Surrounding countries were the source of notifiable infections in a small number of cases each. When asked for the type of contact, casual contacts were the main type of primary contacts for cases of gonorrhoea (40.9%), *Chlamydia trachomatis* (38.6%), infectious syphilis (44.9%) and NGU (29.6%) seen in DSC Clinic. The second largest group were boyfriend / girlfriend which accounted for the following percentages of cases of gonorrhoea (21.5%), *Chlamydia trachomatis* (29.7%), infectious syphilis (23.6%) and NGU (29.6%) seen in DSC Clinic. Unregulated sex workers in Singapore were thought to be the source of infection for in 12.6% of cases of gonorrhoea, 12.3% of *Chlamydia trachomatis*, and 15.9% of NGU. These

Figure 6 - STI by Age Groups

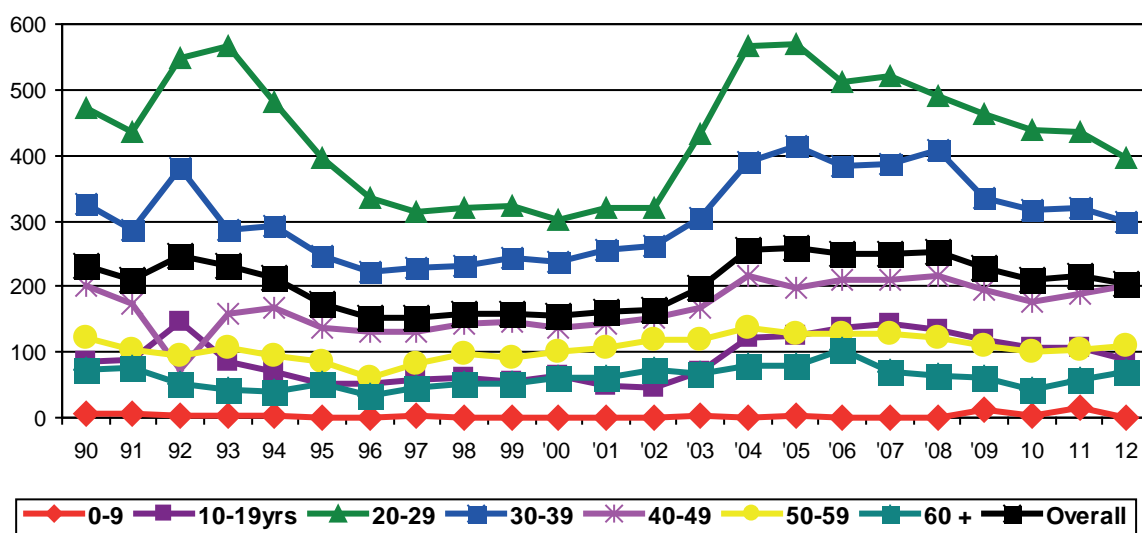
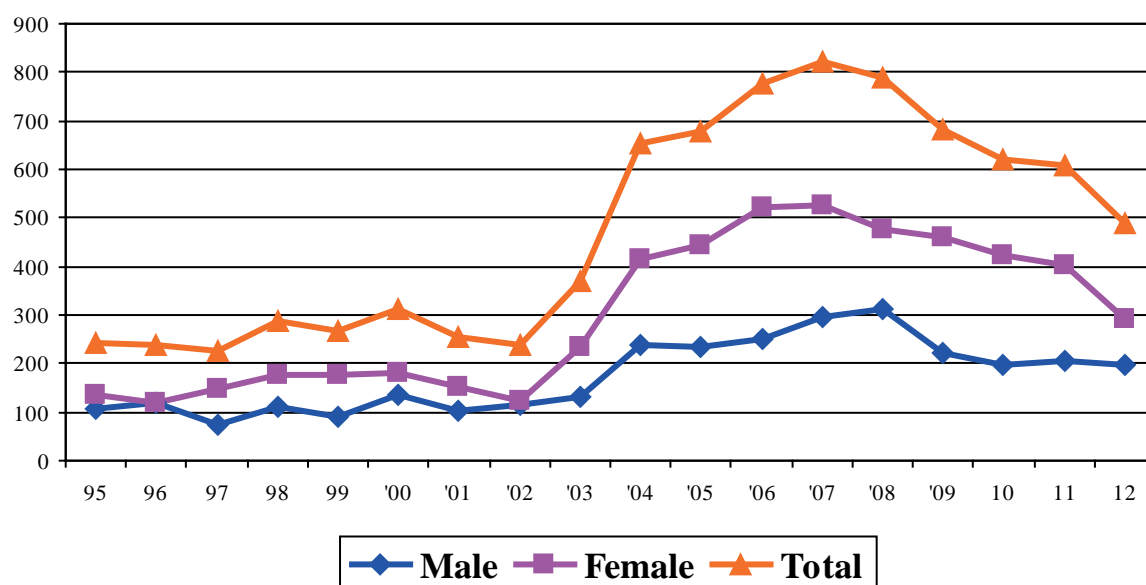


Figure 7 – STIs in 10 to 19 years



were all higher than the number of primary contacts who were either overseas sex workers or local regulated brothel-based sex workers for cases of gonorrhoea (7.1% overseas and 2.4% regulated sex workers), *Chlamydia trachomatis* (4.2% and 2% respectively) and NGU (8% and 3.9% respectively) ⁸.

SUMMARY

HIV infection and STI are important causes of mortality and morbidity both globally and in Singapore and are a important public health concerns. Infections continue to spread and disproportionately affect certain groups, most notably MSM and clients of non brothel based sex workers in Singapore. New and creative strategies are needed to for effective prevention and control programmes in the coming years. New ideas and approaches should be studied and tried out if found to be useful, an enabling environment that may necessitate changes to existing laws and regulations that stand in the way of effective prevention and control programmes is also needed.

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LEARNING POINTS

- In Singapore the current trend is that HIV infected individuals are presenting at a late stage of infection and more HIV infections are being diagnosed among MSM and fewer in heterosexuals.
- Gonorrhea, Chlamydia trachomatis infection and anogenital herpes are showing decreases.
- Incidence of syphilis in Singapore showed an increase in 2012.
- Most STIs in Singapore are contracted locally from casual partners and unregulated sex workers.
- Local regulated sex workers in Singapore continue to have very low levels of STIs, underlining the benefits of the programme of routine screening, treatment and condom negotiation skills training provided by the Department of STI Control (DSC) Clinic in Singapore.