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Immunisation is one tool for controlling the spread of hepatitis B virus, a worldwide public health problem. In this report our feature article examines the hepatitis B vaccination system operating at Clinic 275, and highlights some of the difficulties associated with administration of vaccine programs.

Audit of a Hepatitis B Vaccination Program

Introduction

Hepatitis B virus (HBV) is a major public health problem worldwide. There are approximately 150 000 chronic carriers in Australia, and sequelae of infection account for 1200 deaths per year¹. Prevention is widely acknowledged to be the most effective approach to the problem^{1,2}. A vaccine has been available since 1982, and the standard immunisation schedule consists of three injections, at zero, one and six months³.

Most sexually transmitted disease (STD) clinics in Australia offer hepatitis B vaccination to groups at high risk of infection⁴. At Clinic 275, consenting new clients are screened for serological markers of HBV exposure. Free immunisation is offered to intravenous drug users (IDU), prostitutes, bisexual and homosexual men (MSM), Aborigines, Asians, regular sexual partners of the above, those with hepatitis C, and household contacts of hepatitis B carriers. Immunisation is also available by client request⁵.

Bhatti et al. note `when a policy to screen and immunise is in place, an exercise in audit... is an essential assessment of clinical performance'⁶, while Barlow identified uptake of the full course of hepatitis B vaccination as an issue worthy of review⁷. Such review is timely, given the decision of the NHMRC to strengthen their policy of targeted vaccination, in addition to expanding immunisation schedules to include vaccination of adolescents, supporting a WHO resolution to eliminate HBV infection⁸.

An audit was conducted to assess the Clinic 275 vaccination program. Delivery of vaccine is acknowledged as a proxy for outcomes such as reductions in morbidity and mortality⁹, so delivery served as the focus for this audit. The primary aims were to estimate the proportion of potentially susceptible patients completing immunisation at the clinic, examine the reasons for non-uptake of vaccination, and review the effectiveness of the reminder system. A secondary objective was to identify substantial differences in uptake and completion between the major sub-groups.

Methods

At Clinic 275, medical records are kept in a standardised format. Staff also maintain a manual register of HBV vaccinations. At the time of first vaccination, clients are given a card indicating the date of their second injection, and the due date of the third is filled in after the second has been given. The register is reviewed approximately once a month, and reminders are sent if the client is more than a fortnight overdue.

Section 1 –New clients eligible for vaccination.

The number of clients presenting for the first time between 1 January and 30 June 98, who reported male-to-male sex or IDU, was used as an estimate of high risk individuals offered vaccination. It was not possible to elicit data on all groups offered immunisation, but these target groups were thought to represent the greatest number eligible for vaccination.

Actual numbers of those undertaking vaccination between 1 January 98 and 27 April 99 were obtained from the ledger. Thus, the minimum period during which vaccination could be commenced, and be counted in this analysis, was ten months. Notes of eligible clients not commencing vaccination within this time were examined to determine the reasons for non-uptake.

Section Two –All clients commencing vaccination.

The second part of the audit was designed to determine the proportion completing the program, as well as supply information about groups of clients undergoing vaccination. Details of all clients having their first vaccination between 1 January and 30 June 98 were collected from ledger extracts, and supplemented by client notes. Results were combined to estimate the proportion of eligible individuals completing vaccination. Finally, the number of reminders was obtained from the ledger.

Results

Section One –New clients eligible for vaccination

Of 259 clients, MSM or IDU, presenting to the clinic for the first time between 1 January and 30 June 98, 79 (31%) had been vaccinated, or were immune as a result of past infection. Six of the former had started vaccination elsewhere and continued it at the clinic, while one received a booster.

In three of the remaining 180 cases it was inappropriate to offer vaccination at the time of presentation, and these were excluded from further consideration. Characteristics of the remaining 177 are summarised in Table 1. Thirteen had at least one other criterion for immunisation.

Table 1. Potentially eligible clients. Sex by risk group.

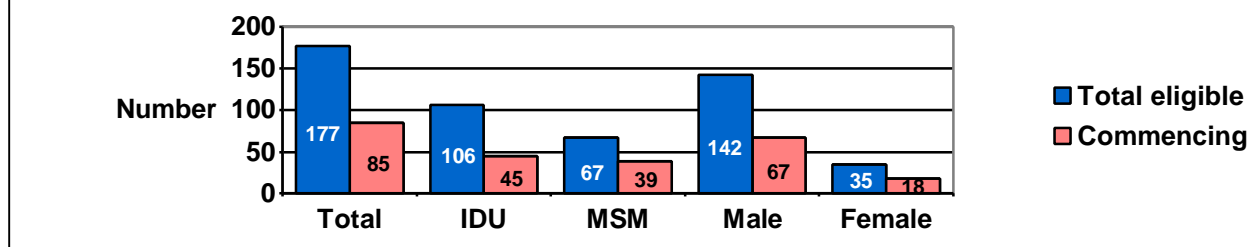
Sex	IDU		MSM		MSM plus IDU	
	No.	%	No.	%	No.	%
Females	35	19.8	0	0	0	0
Males	71	40.1	67	37.9	4	2.3
Total	106	59.9	67	37.9	4	2.3

IDU intravenous drug use(r)

MSM men who have sex with men

Of those potentially susceptible clients, 48% undertook vaccination before 27 April 99 (Figure 1). However, 43% of IDU started vaccination, compared with 58% of MSM. One of four men categorised in both groups also commenced vaccination. Among females, 51% undertook vaccination, compared with 47% of men overall, and 38% of males reporting IDU. The difference in uptake between IDU and MSM achieved statistical significance (chi-square test, $p < 0.05$), though that between male and female IDU did not.

Figure 1 - Eligible new clients commencing vaccination within 10 to 16 months of presentation



IDU intravenous drug use(r)
MSM men who have sex with men

Of 92 who did not commence vaccination, 18 (20%) declined serology, and 22 (24%) did not return for results. Thirteen (14%) refused vaccination, while 12 (13%) said they would consider it, but did not return. Five (5%) intended to be vaccinated elsewhere. In 22 (24%) cases it was not recorded whether vaccination was offered.

Section Two –All clients commencing vaccination

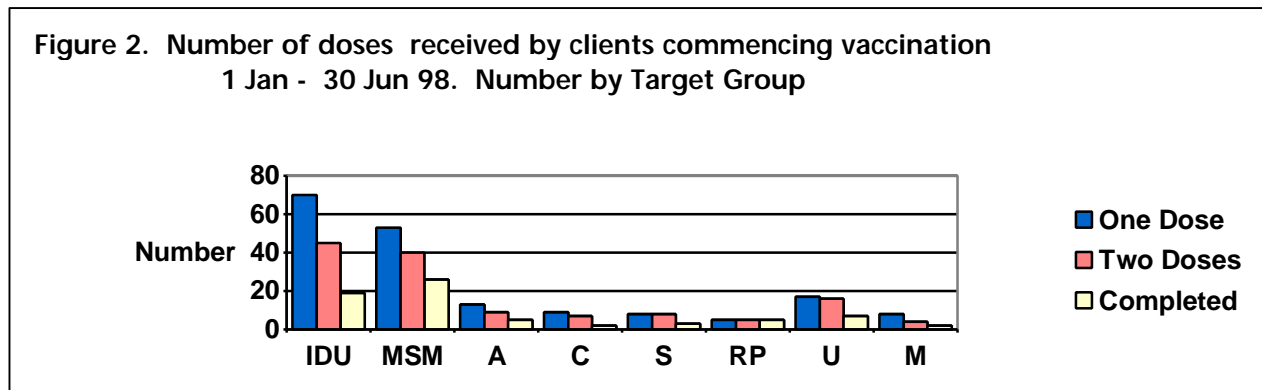
During the period 1 January to 30 June 98, 184 patients undertook vaccination. Among these, 134 (73%) had at least two injections, and 69 (38%) completed the course. Forty four (24%) first presented to the clinic in 1996 or earlier. One client was excluded from consideration because she was not due for her third vaccination at the time of audit, as a result of being late for her second dose (Table 2, Figure 2).

Table 2 Clients commencing HBV vaccination, 1 January- 30 June 1998. Target group and sex by number of doses.

Group	Number of doses		
	One	Two	Three
IDU*	70	45	19
MSM#	53	40	26
Aboriginal or Asian	13	9	5
Multiple risks	8	4	2
Sex worker	8	8	3
Regular partner**	5	5	5
Unknown###	17	16	7
Hepatitis C	9	7	2
Sex			
Female	58	48	24
Male	125	86	45

* intravenous drug use(r)
men who have sex with men
** regular partner of the above, or sex partner or household contact of HBV contact
unclear why vaccination carried out; presumed to be patient request

Within 29 female IDU, 11 (38%) completed the series, compared to eight (20%) of 41 male IDU. MSM were significantly more likely to complete the series than IDU ($p < 0.02$), but the difference between male and female IDU was not significant.



IDU intravenous drug use(r)
 MSM men who have sex with men
 A Aboriginal or Asian
 C hepatitis C positive
 S sex worker
 RP regular partner of the above, or regular partner or household contact of HBV contact
 U unclear why vaccination carried out; presumed to be patient request
 M more than one risk category

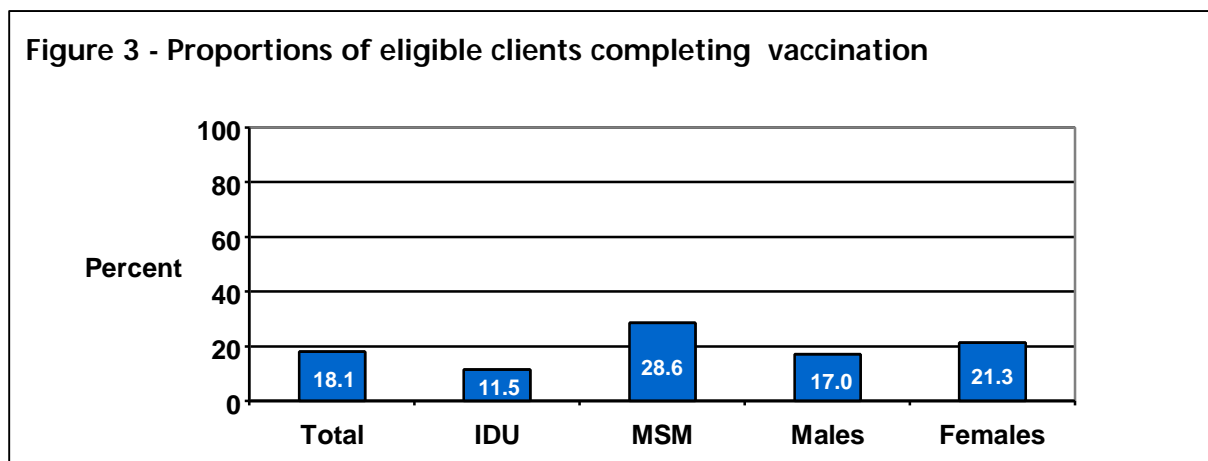
Among clients presenting for second or third vaccinations, 143 presented without requiring a reminder letter. Reminders were sent to 135 clients, resulting in presentation of the client in 40 (30%) of instances. Thus, 51% of doses were administered without reminders, 14% of clients returned after receiving a letter, and in 34% of cases reminders were sent to no avail.

One reminder was not due at the time of audit, and 12 had not yet been sent (recently scheduled). In 17 cases, clients received their first injection elsewhere, so were not included in the reminder system, and in three cases the second dose was also administered elsewhere. Three clients left SA after their first injection and one after the second, these were excluded from the reminder system. In two instances clients received one dose but their vaccination was not recorded in the ledger, hence reminders were not sent. The remaining 44 doses are accounted for by third doses, due to be given, to patients who did not present for their second injection.

Estimates of the proportion of eligible individuals receiving one injection only, two only, and completing the series, are based on the assumption that uptake is the same across all target groups, compared with just IDU and MSM (Table 3). Completion rates by sex and target groups are shown in Figure 3.

Table 3. Estimates of outcome for susceptible new patients, by percentages.

Percentage	Outcome
18	complete vaccination
17	receive two injections only
23	refuse blood tests / fail to attend for results
14	decline immunisation
13	have one injection only
12	no record of offer
3	prefer to have it elsewhere



IDU intravenous drug use(r)
 MSM men who have sex with men

Discussion

Estimated delivery rates in this audit are not substantially different to those reported elsewhere. Uptakes of 48% overall, and 58% among MSM, compare favourably with a UK audit confined to homosexual and bisexual men¹⁰, where Bhatti et al found 42% (207/499) of those susceptible to infection undertook vaccination. However, they also reported that 68% of individuals completed the program within 16 months, a higher proportion than in the current study, where 38% overall, and 49% of MSM, completed the course. The difference may be partially due to the longer follow-up period in the UK study. Their estimated completion rate of 28% among all eligible patients is comparable with 29% for MSM here, and higher than the Clinic 275 rate of 18% for all eligible clients.

Most other reports are prospective studies rather than retrospective audits. One UK audit found similar completion rates among those who commenced the series to Bhatti et al¹¹. Two prospective studies in Canada reported compliance rates somewhat lower than those found at Clinic 275, 29% among all STD clients¹² and 47% among MSM¹³. The reason for these differences is unclear. Self-addressed reminders were sent prior to the next dose in the UK audit. In one Canadian study the majority of defaulters were not contacted¹² while in the other¹³ more strenuous attempts were made to reach patients.

At Clinic 275, reminders increased return rates by 14%, demonstrating the usefulness of a recall system. One likely reason response rates were not higher is the mobile nature of the population served by the clinic.

In the above mentioned studies, numbers of IDU were insufficient to make comparisons between these and MSM, two groups identified by the Centers for Disease Control as among those at highest risk of infection¹⁴. A survey of clients at a Sydney STD clinic found 7% of IDU had been immunised compared with 28% of MSM¹⁵. At Clinic 275 an estimated 12% of eligible IDU completed vaccination, compared with 29% of MSM. These differences may reflect greater health seeking behaviour among MSM compared with IDU. Within the IDU there were higher uptake and completion rates among females, though the differences were not significant. Numbers within other groups were too small to make valid comparisons.

Limitations

The audit period was chosen to allow time for patients commencing vaccination at the end of the period to complete the program, with a margin of nearly four months. However, the assumption that this would be enough time was too optimistic, as injections were administered up to seven months after the due date. Clinical experience suggests some doses are given up to two years late, often opportunistically, when patients present for other reasons. Therefore the rates for completion and response to reminders are underestimates. Fortunately, delays in administration of later doses do not impair the immune response to the vaccine¹⁶. In addition, some clients may have been ineligible for vaccination, due to past infection, on the basis of serology results. It was not possible to estimate the number who commenced vaccination at the clinic and completed it elsewhere, or how many of those who indicated that they would undertake vaccination elsewhere actually did so.

It was surprising that about a quarter of the clients commencing vaccination in the first half of 1998 had presented to the clinic for the first time at least a year earlier, and up to ten years previously. While some would have commenced the high risk behaviour (such as IDU), after the first visit, others may have been vaccinated after consideration of an earlier offer, so the actual number eventually undertaking immunisation is probably higher than estimated. In retrospect, it may have been useful to choose an earlier period for the audit. However, a disadvantage would have been inaccurate reflection of current practices.

It was not determined whether uptake across all target groups is similar to that by MSM and IDU. However, given the relatively small proportions of other groups, even large variations would be unlikely to make a difference overall.

Recommendations

Several factors may contribute to poor immunisation rates, particularly the need for multiple doses at lengthy intervals. An accelerated program might lead to improved completion rates. Although such a schedule, with injections at zero, one, and two months, is approved, a booster dose at 12 months is required⁸. There are conflicting reports about whether it actually increases compliance^{17,18,19} but it may be worth testing, particularly among IDU.

Lack of knowledge has been identified as a barrier to vaccination, and a recent survey found the reasons most frequently cited by MSM for not being immunised was lack of awareness of the vaccine, and the belief that the respondents were not at risk²⁰. There have been suggestions that with the emphasis on education about HIV/AIDS, the perceived importance of other STDs has declined^{15,21}. Behavioural changes in response to this education seem to have had an impact on the prevalence of HBV infection among MSM^{15,22}, though not IDU²². However, there is a higher prevalence of HBV and it is more infectious than HIV, so some activities considered safe in terms of HIV transmission have a relatively high chance of spreading HBV²¹. Increased education about hepatitis B should improve both uptake and completion of vaccination amongst people at high risk of infection. On an individual level, the clinic's education pamphlet is a useful tool for reinforcing the benefits of vaccination.

In at least four cases in which no record of offer was made, the last occurrence of high risk activity (mainly IDU) was between two and ten years earlier. Because the vaccination policy specifies past as well as current IDU or male-to-male sex⁵, these cases were included in the audit. Realistically, the perception of risk, by both doctor and client in such cases, would have been lower than with current high-risk activity, which is the priority of the program²³. During 1998, the pertinent section of the casenotes was changed so information on such behaviour in the past 12 months is recorded, which enables easy identification of those most at risk. It is important that visiting staff and students are reminded of the need to offer vaccination and record its refusal or otherwise.

Finally, plans to semi-automate the reminder system in the near future should reduce the associated workload and facilitate prompt forwarding of letters.

Many other recommendations suggested in the literature are already in place at Clinic 275. These include a printed reminder of the screening and immunisation policy for clinicians¹⁰, patient-held cards documenting the schedule¹¹, free vaccination¹⁵, and administration of injections¹⁹.

Conclusion

While uptake rates are greater than some reported elsewhere, the figures presented here are underestimates. The low overall completion rate lends weight to the belief that universal vaccination will be more effective than targeting of high risk groups², especially given that many measures for enhancing completion have already been implemented at Clinic 275. However, the selective strategy will be required for some years, while the cohorts of vaccinated children grow older.

The leading cause of failure to complete vaccination was lack of compliance with the dosing schedule, followed by the combination of refusal of blood tests and failure to attend for results. An accelerated schedule is worth considering, particularly for IDU. Emphasis on education regarding HBV, and the importance of immunisation, might improve uptake and completion rates. Finally, the recall system does improve compliance, and improved automation should ease the administrative burden of sending reminders.

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May 1999

HIV INFECTION IN SOUTH AUSTRALIA

HIV Infection 1985 - 31/03/99

In South Australia 715 individuals have been diagnosed with HIV infection, 656 (92%) males and 59 (8%) females. Of the males, 503 (77%) reported male-to-male sexual contact, 53 (8%) reported injecting drug use and 28 (4%) reported both risk factors. Injecting drug use was reported by 23 (39%) females diagnosed with HIV infection and 30 (51%) reported heterosexual transmission.

HIV Infection 01/01/99 - 31/03/99

Three males were diagnosed with HIV infection in the first quarter of this year. Two of the men acquired their infection in the preceding 12 months (Table 1.3).

Laboratory Screening For HIV Infection 01/01/99 - 31/03/99.

During the first quarter of 1999, 18317 screening tests were performed; 8155 on males, 10063 on females, and 99 tests on individuals whose sex was unknown (Table 1.4).

**Table 1.1 HIV infection detected in South Australia, 1985 - 31/03/99.
Exposure category by sex.**

Exposure category	Male		Female		Total	
	No.	%	No.	%	No.	%
Homosexual contact	503	77	na		503	70
Homosexual contact/IDU	28	4	na		28	4
Heterosexual contact	33	5	30	51	63	9
IDU	53	8	23	39	76	11
Blood products	7	1	2	3	9	1
Other	4	1	3	5	7	1
Unknown	28	4	1	2	29	4
Total	656		59		715	

na not applicable

**Table 1.2 HIV infection detected in South Australia, 01/01/99 - 31/03/99.
Exposure category by sex.**

Exposure category	Male
Homosexual contact	1
Heterosexual contact	1
Heterosexual/IDU contact	1
Total	3

**Table 1.3 HIV infection detected in South Australia, 01/01/99 - 31/03/99.
Testing history by age at diagnosis of HIV infection.**

Testing history	Age group (years)		
	25 - 29	30 - 39	40+
Test last 12 months	1	-	1
No previous test	1	-	-
Total	2	-	1

**Table 1.4 Summary of HIV antibody tests, 01/01/99 - 31/03/99.
Laboratory by sex.**

Laboratory	Male	Female	Unknown	Total
Private*	2518	2603	-	5121
Public	5637	7460	99	13196
Total	8155	10063	99	18317

* Incomplete data

Table 1.5 Number of new diagnoses of HIV infection by sex¹ and State/Territory, cumulative to 31 December 1998, and for two previous yearly intervals. (From Australian HIV Surveillance Report, April 1999; 15, 2).

State / Territory	1 Jan 97 - 31 Dec 97		1 Jan 98 - 31 Dec 98		Cumulative to 31 Dec 98			Rate ²
	Male	Female	Male	Female	Male	Female	Total	
ACT	5	3	8	3	187	23	210	68.1
NSW³	372	27	328	41	10503	581	11363	179.2
NT	7	4	11	1	104	8	112	59.0
QLD	96	18	90	14	1867	132	2006	58.0
SA	29	6	28	6	648	57	705	47.8
TAS	-	-	2	1	77	5	82	17.4
VIC⁴	166	13	131	8	3749	199	3985	85.5
WA	29	6	27	18	869	102	974	53.2
Total⁵	704	77	625	92	18004	1107	19437⁶	103.7

1. Forty one people (19 NSW, 7 QLD, 13 VIC and 3 WA) whose sex was reported as transgender are included in the total column.
2. Rate per one hundred thousand current population. Population estimates by sex, State/Territory and calendar interval from *Australian Demographic Statistics* (Australian Bureau of Statistics).
3. Cumulative total for NSW includes 260 people whose sex was not reported.
4. Cumulative total for VIC includes 24 people whose sex was not reported.
5. Cumulative total for Australia includes 284 people whose sex was not reported.
6. Estimated number of new diagnoses of HIV infection, adjusted for multiple reports, was 16,720 (range 16,320 to 17,120). Reference: Law MG, McDonald AM and Kaldor JM. Estimation of cumulative HIV incidence in Australia, based on national case reporting. *Aust NZJ Public Health* 1996; 20: 215-217.

Table 1.6 Report from WHO Western Pacific Region

Dr G Pomerol, Regional Advisor, WHO Regional Office, Manila.

AIDS and HIV in the WHO Western Pacific Region by country; based on reports available at 31 December 1998. (From Australian HIV Surveillance Report, April 1999; 15, 2).

Country/ Area	Cumulative AIDS Cases				AIDS Rate ¹	Cumulative Diagnoses HIV
	Male	Female	Children <13 Years	Total		
American Samoa	-	-	-	-	-	-
Australia	7710	337	45	8070	43.0	19437
Brunei	11	1	-	12	3.1	475
Cambodia	108	23	122	1379	4.2	14670
China	269	18	-	301	-	10676
Cook Islands	-	-	-	-	-	-
Fed. S. Micronesia	2	-	-	2	1.8	2
Fiji	2	1	-	8	1.0	43
French Polynesia	4	-	-	54	24.9	174
Guam	45	4	-	49	29.6	108
Hong Kong	314	35	5	349	4.2	1066
Japan	1007	162	10	1897	1.2	5388
Kiribati	3	1	-	4	2.6	20
Laos	42	29	2	91	0.7	288
Macao	11	2	-	13	2.2	173
Malaysia	1696	108	19	1804	3.0	26549
Marshall Islands	1	1	-	2	3.8	9
Mongolia	-	-	-	-	-	3
Nauru	-	-	-	-	-	1
New Caledonia	52	14	1	66	26.9	169
New Zealand	626	30	4	656	18.9	1285
Niue	-	-	-	-	-	-
N. Mariana Islands	5	1	-	8	10.4	15
Palau	1	-	-	1	5.8	1
Papua New Guinea	215	196	9	417	5.4	1213
Philippines	219	123	7	343	0.5	1099
Rep. of Korea	104	11	-	115	0.1	811
Samoa	4	2	2	6	3.7	9
Singapore	389	30	1	419	9.2	831
Solomon Islands	-	-	-	-	-	1
Tokelau	-	-	-	-	-	-
Tonga	10	2	-	14	6.1	19
Tuvalu	-	-	-	-	-	1
Vanuatu	-	-	-	-	-	-
Vietnam	1008	157	4	1819	1.0	10118
Wallis and Futuna	1	-	-	1	7.1	2
TOTAL	13859	1288	231	17900	0.8	94656

1. AIDS cases per 100,000 total current population.

HEPATITIS C SURVEILLANCE IN SOUTH AUSTRALIA

Hepatitis C Medical Notification 01/01/99 - 31/03/99

In the first quarter of 1999, 270 medical notifications of positive hepatitis C antibody tests were received.

Data from medical notifications show 247 (78%) individuals had a positive hepatitis C test for the first time in 1999, while 23 individuals had a previous negative test. Of the 23 with negative tests, six were tested more than 12 months earlier, and 17 within the last year. In 185 (69%) cases, past or present injecting drug use was a likely transmission route for hepatitis C virus (Table 2.1).

At diagnosis, the majority were aged between 20 and 39 years, 110 (62%) males and 65 (71%) females (Table 2.2).

Incident Cases

Seventeen incident cases were identified during the quarter, all had negative serology in the preceding 12 months. The incident cases comprised three females and 14 males. The probable mode of transmission for hepatitis C virus was injecting drug use in all cases (Table 2.3). The most common age-group at diagnosis was 20 to 29 years (13/17); two males, but no females, were aged less than 20 years (Table 2.4).

Collated laboratory data for hepatitis C antibody tests performed during the quarter are shown in Table 2.5.

Table 2.1 Hepatitis C infection, 01/01/99 - 31/03/99. Exposure category by sex.

Exposure category	Male		Female		Total	
	No.	%	No.	%	No.	%
IDU*	125	70	60	66	185	69
Blood transfusion/blood products	13	7	7	8	20	7
Tattoos	14	8	3	3	17	6
Other**	15	8	12	13	27	10
Unknown	12	7	9	9	21	8
Total	179		91		270	

* includes IDU in combination with other categories

** includes - residence in a high prevalence country, household contact, positive sexual partner, possible occupational exposure

Table 2.2 Hepatitis C infection, 01/01/99 - 31/03/99. Age group by sex.

Age group (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
10 - 19	8	4	3	3	11	4
20 - 29	44	25	31	34	75	28
30 - 39	66	37	34	37	100	37
40 - 49	49	27	14	16	63	23
50+	12	7	9	10	21	8
Total	179		91		270	

Table 2.3 Incident cases of hepatitis C infection, 01/01/99 - 31/03/99. Exposure category by sex.

Exposure category	Male	Female	Total
IDU	14	3	17
Total	14	3	17

Table 2.4 Incident cases of hepatitis C infection, 01/01/99 - 31/03/99. Age group by sex.

Age group (years)	Male	Female	Total
15 - 19	2	-	2
20 - 24	7	1	8
25 - 29	4	1	5
30 - 34	-	1	1
> 35	1	-	1
Total	14	3	17

Table 2.5 Summary of hepatitis C antibody tests, 01/01/99 - 31/03/99. Laboratory by sex.

Laboratory	Male	Female	Unknown	Total
Private	3839	5484	-	9323
Public	4804	5190	63	10057
Total	8643	10674	63	19380

HEPATITIS B SURVEILLANCE IN SOUTH AUSTRALIA

Hepatitis B Medical Notification 01/01/99 - 31/03/99

During the first quarter of 1999, 76 hepatitis B medical notifications were received. Of these, three were acute clinical cases of hepatitis B infection (Tables 3.1, 3.2). A further 15 were reports of chronic carriers of greater than twelve months duration, who had been previously diagnosed but not notified. There were two reports of antigen positivity of less than 12 months duration (defined by a negative hepatitis B surface antigen test in the 12 months prior to diagnosis) (Table 3.3). Reports of antigen positivity of uncertain duration accounted for 56 cases (Table 3.3).

Of the 56 reports of antigen positivity of uncertain duration, 29 tested surface antigen positive for the first time this quarter, 72 had a previous negative test and one had a previous positive test. The testing history was unknown for the remaining 24 cases. Among the 29 individuals who tested surface antigen positive for the first time, but were not acute cases, the racial origin of 17 (59%) was reported as Asian (Table 3.4).

The number of hepatitis B surface antigen tests performed by laboratories for this quarter is shown in Table 3.5.

**Table 3.1 Acute hepatitis B infection, 01/01/99 - 31/03/99.
Exposure category by sex.**

Exposure category	Male	Female	Total
IDU	1	1	2
Unknown	-	1	1
Total	1	2	3

**Table 3.2 Acute hepatitis B infection, 01/01/99 - 31/03/99.
Age group by sex.**

Age group (years)	Male	Female	Total
20 - 29	1	-	1
30 - 39	-	1	1
50+	-	1	1
Total	1	2	3

**Table 3.3 Hepatitis B infection, 01/01/99 - 31/03/99.
Case category by sex.**

Case category	Male	Female	Total
Acute Infection	1	2	3
Antigen Positive - < 12 months duration	2	-	2
Antigen positivity - uncertain duration	34	22	56
Chronic carriers - >12 months duration	6	9	15
Total	43	33	76

Table 3.4 Individuals who tested hepatitis B surface antigen positive for the first time, 01/01/99 - 31/03/99. Race by sex.

Racial origin	Male	Female	Total
Aboriginal	2	1	3
Asian	11	6	17
Caucasian	4	2	6
Other	3	-	3
Total	20	9	29

**Table 3.5 Summary of hepatitis B surface antigen tests, 01/01/99 - 31/03/99.
Laboratory by sex.**

Laboratory	Male	Female	Unknown	Total
Private	3677	5600	-	9277
Public	4441	6720	75	11236
Total	8118	12320	75	20513

GENITAL CHLAMYDIAL INFECTION IN SOUTH AUSTRALIA

Genital Chlamydial Infection 01/01/99 - 31/03/99

Between 1 January and 31 March 1999, 214 cases of chlamydial infection were notified by medical practitioners to the STD Control Branch. Eighty-seven (41%) cases occurred in males and 127 (59%) in females (Table 4.1).

The number of cases occurring in this quarter was similar to that for the previous quarter. Males and females aged less than 30 years accounted for 58 (67%) and 107 (84%) of cases of genital chlamydial infection, respectively (Table 4.1).

The number of laboratory tests for genital chlamydia performed during this quarter is shown in Table 4.2.

Table 4.1 Genital chlamydial infection in South Australia, 01/01/99 - 31/03/99. Age group by sex.

Age group (years)	Male	Female	Total
10 - 14	-	2	2
15 - 19	7	31	38
20 - 24	27	54	81
25 - 29	24	20	44
30 - 34	16	10	26
35 - 39	6	6	11
40+	7	4	11
Total	87	127	214

Table 4.2 Summary of laboratory tests for genital chlamydia, 01/01/99 - 31/03/99. Laboratory by sex.

Laboratory	Male	Female	Total
Private	634	2310	2944
Public	1417	3657	5074
Total	2051	5967	8018

GONOCOCCAL INFECTION IN SOUTH AUSTRALIA

Gonococcal Infection 01/01/99 - 31/03/99

During this quarter there were 50 cases of gonorrhoea notified to the STD Control Branch (Table 5.1). Thirty-one (62%) cases of gonococcal infection occurred in males, and 19 (38%) in females.

A lower male : female ratio of infection occurred, compared to the previous quarter (1.6:1 vs 5.6:1). An increase in cases of gonorrhoea among female aboriginals, from rural South Australia, was detected during this quarter; in males there was little change in the urban/rural pattern of infection.

Gonococcal infection in males was distributed across age strata, peaking in males aged between 25 and 29 years (Table 5.1). Among females, 95% of infection occurred in those aged less than 35 years.

The proportion of males with gonococcal infection reporting male-to-male sexual contact was 29 percent. Overall, the majority (76%) of infections were acquired in South Australia.

Table 5.1 Gonococcal infection detected in South Australia, 01/01/99 - 31/03/99. Age group by sex.

Age group (years)	Male	Female	Total
> 15	-	3	3
15 - 19	2	4	6
20 - 24	2	3	5
25 - 29	12	3	15
30 - 34	4	5	9
35 - 39	3	-	3
40+	8	1	9
Total	31	19	50

Table 6.2 Males diagnosed with chlamydia, gonorrhoea or *syphilis at C275, 01/01/99 - 31/03/99. Exposure category by infection.

Exposure category	Chlamydia	Gonorrhoea	Syphilis	Total
Homosexual	3	1	-	4
Bisexual	1	-	1	2
Heterosexual/IDU	3	2	1	6
Heterosexual, overseas contact [#]	4	1	-	5
Heterosexual	20	3	2	25
Total	31	7	4	42

Overseas contact in previous 12months.

* All syphilis cases were latent syphilis of unknown duration.

Table 6.3 Males diagnosed with hepatitis C, *hepatitis B or HIV infection at C275, 01/01/99 - 31/03/99. Exposure category by infection.

Exposure category	Hepatitis C		Hepatitis B*	Hepatitis B	HIV	Total
	Incident	Unknown duration	Previous exposure	Carrier		
Homosexual	-	-	5	1	-	6
Homosexual/IDU	-	-	1	-	-	1
Bisexual	-	-	2	-	-	2
Bisexual/IDU	-	-	-	-	-	-
Heterosexual/IDU	2	5	4	1	-	12
Heterosexual, o/s [#]	-	-	3	1	1	5
Heterosexual	-	2	14	3	-	19
Other/unknown	-	1	4	1	-	6
Total	2	8	33	7	1	51

• No case of acute hepatitis B diagnosed during the quarter.

* Previous exposure to hepatitis B refers to previous infection, now surface antibody positive with no history of vaccination.

Overseas contact in the previous 12months.

Table 6.4 Females diagnosed with chlamydia, gonorrhoea or *syphilis at C275, 01/01/99 - 31/03/99. Exposure category by infection.

Exposure category	Chlamydia	Gonorrhoea	Total
Heterosexual/IDU	2	1	3
Heterosexual, overseas contact [#]	2	-	2
Heterosexual	17	-	17
Sex worker/IDU	1	-	1
Total	23	1	24

* No cases of syphilis were diagnosed during the quarter.

Overseas contact in the previous 12months.

Table 6.5 Females diagnosed with hepatitis C, hepatitis B or HIV infection at C275, 01/01/99 - 31/03/99. Exposure category by infection.

Exposure category	Hepatitis C Uncertain duration	Hepatitis B* Previous exposure	Hepatitis B Carrier	Total
Heterosexual/IDU	-	2	-	2
Heterosexual	-	9	1	10
Sex worker/IDU	1	1	-	2
Other/Unknown	-	-	1	1
Total	1	12	2	15

- No cases of acute hepatitis B or HIV diagnosed during reporting period.
- * Previous exposure to hepatitis B refers to previous infection, now surface antibody positive with no history of vaccination.

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