NATIONAL CENTRE IN HIV
EPIDEMIOLOGY AND
CLINICAL RESEARCH

Sydney Medically Supervised Injecting Centre Evaluation Report No. 4: Evaluation of service operation and overdose-related events

A report for the NSW Department of Health
by the National Centre in HIV Epidemiology and Clinical Research

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This report was prepared for the NSW Department of Health by Ms Allison Salmon, Professor John Kaldor and A/Professor Lisa Maher of the National Centre in HIV Epidemiology & Clinical Research (NCHECR), University of New South Wales.

Contact Details

A/Professor Lisa Maher
Head, Viral Hepatitis Epidemiology and Prevention Program
National Centre in HIV Epidemiology and Clinical Research
St Vincent's Medical Centre
Level 2, 376 Victoria Street
Sydney NSW 2010

Phone: (61) 2 9385 0900
Fax: (61) 2 9385 0920

Professor John Kaldor
Deputy Director & Professor of Epidemiology
National Centre in HIV Epidemiology and Clinical Research
St Vincent's Medical Centre
Level 2, 376 Victoria Street
Sydney NSW 2010

Phone: (61) 2 9385 0900
Fax: (61) 2 9385 0920

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Sydney Medically Supervised Injecting Centre (MSIC) client clinical data were collected by the staff of the service, with the consent of clients. Thanks go to the clients and staff of the service for their assistance and to the Evaluation Advisory Committee for their input. The authors would like to acknowledge the expertise provided by Dr Janaki Amin and A/Professor Matthew Law of the National Centre in HIV Epidemiology and Clinical Research (NCHECR).

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Ethics approval for the evaluation of the Sydney MSIC was obtained from the University of New South Wales Human Research Ethics Committee.

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Abbreviations

ATSI	Aboriginal and Torres Strait Islander
BOCSAR	Bureau of Crime Statistics and Research
DAL	Division of Analytical Laboratories
ED	Emergency Department
EDDC	Emergency Department Data Collection
FTEs	Full time equivalent
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
ICD-9	International Classification of Diseases, 9th Revision
LGA	Local Government Area
MSIC	Medically Supervised Injecting Centre
NCHECR	National Centre in HIV Epidemiology & Clinical Research
NDARC	National Drug and Alcohol Research Centre
NSP	Needle and Syringe Program/s
NSW	New South Wales

Executive Summary

The Medically Supervised Injecting Centre was established in Kings Cross, Sydney in May 2001 under a license issued by the New South Wales Government. An Evaluation Report was released in 2003 to cover the first 18 months of operation. The operation license was then extended and a second series of evaluation reports commissioned by the Government. This report represents the last in this series and covers service delivery, overdose-related events both on-site and away from the Centre, counts of discarded needles and syringes in the local vicinity and costings of the facility.

Client profile: From May 2001 to end April 2007, 9,778 IDUs had registered with the service with a monthly average of 138 new clients registered. Most were male (74%) with an average age of 33 years and had been injecting for an average of 14 years. Over 70% of clients had not completed high school, over 60% were not employed, 24% were in unstable accommodation and 23% had been imprisoned in the previous 12 months. Drug treatment had been previously initiated by 60%; 13% were currently receiving some form of drug treatment and nearly 40% reported daily or more injecting. Seven percent of clients had shared a needle and/or syringe at least once in the preceding month, 17% had shared other injecting equipment, and 49% indicated that they would have injected in public had they not been able to access the Sydney MSIC on the day of registration. Based on these data an estimated 191,673 public injections were averted by the presence of the MSIC (i.e. approximately 89 per day of MSIC operation). These client statistics show that the Sydney MSIC has continued to reach long-term, high frequency injecting drug users (IDU), who are highly socially marginalised and likely to inject drugs in public settings.

Visits, services and referrals: From May 2001 to end April 2007, the service was open on 2,163 days (approximately 361 days per year for 10 hours per day), during which 391,170 visits to inject were made with an average 181 daily rising to 212 in the last year. Heroin (62%), other opioids (12%), cocaine (14%) and meth/amphetamines (6%) were the drugs most commonly injected on-site. In addition to the supervision of injecting episodes, staff provided 44,082 other occasions of service (113 per 1,000 visits) including drug and alcohol information (approximately 5,000 occasions) and advice on drug and alcohol treatment (more than 3,000 occasions). On over 21,000 occasions staff provided vein care and safer injecting advice. A total of 6,243 referrals to other services were provided (16 per 1,000 visits). Forty-five percent of referrals were to drug treatment, most frequently to opioid substitution therapy. These results indicate that the MSIC continues to act as a gateway for treatment for this highly marginalised population of drug users.

Overdose-related events: During six years of operation the MSIC managed 2,106 overdose-related events on-site without fatality, including 93% which involved heroin or other opioids. It is likely that substantial proportions of overdoses managed at the site would have resulted in significant morbidity

had they occurred elsewhere, and that approximately half would have otherwise occurred in public places. Coincident with the opening of the MSIC there was a decline across New South Wales in events related to opioid-related overdoses that have been sustained over the past six years and attributed to a reduction in heroin availability and subsequent changes in patterns of drug use. Based on ambulance attendances, the reduction in opioid-related overdoses was much more substantial in the immediate vicinity of the MSIC than in other neighbouring areas and in New South Wales in general. This finding suggests that the Sydney MSIC provided an environment where injecting drug users at risk of overdose were able to receive early intervention and thereby avoid the need for ambulance services. It also suggests that supervised injecting facilities are most effective in preventing drug-related morbidity and mortality in areas of concentrated drug use and not in broader geographical areas.

Needle and Syringe Disposal: Monthly counts of discarded needles and syringes collected locally indicated a decrease of around 50% following the establishment of the service that has been sustained over six years.

Cost analysis: The overall cost of the Sydney MSIC increased from the set up of the service to 2007 primarily due to increases in client visits and staffing costs. On the other hand, the cost per client visit decreased and utilisation rates increased both overall and per unit of time that the MSIC was open.

There are many scientific, practical, and ethical challenges involved in evaluating complex public health interventions such as supervised injecting facilities, and accurately quantifying their effectiveness. However, the available evidence, including the international peer-reviewed literature and previous evaluation reports by the NCHECR and BOCSAR, together with the data presented in this report, indicates that the MSIC has provided a service that: reduces the impact of overdose-related events and other health related consequences of injecting drug use; reduces public injecting and the community visibility of injection drug use; provides access to drug treatment and other health services to people who are highly socially marginalised; and, has not lead to increases in crime or social disturbance in its immediate vicinity.

1. Introduction

1.1 Background

In 1998, the Joint Select Committee into Safe Injecting Rooms of the Parliament of NSW identified the potential public health benefits of supervised injecting facilities as including: reduced morbidity and mortality associated with drug overdoses; reduced transmission of blood borne viral infections such as HIV; hepatitis B virus (HBV) and hepatitis C virus (HCV); increased access to health and social welfare services; and contact with a marginalised injecting drug using population (NSW Parliament, 1998). The Committee also noted a number of possible public amenity benefits, including a reduction in street-based injecting and a reduction in the number of needles and syringes discarded in public places (Dolan, 2000). A NSW Parliamentary Drug Summit held in 1999 subsequently endorsed a trial of a Medically Supervised Injecting Centre (MSIC), recognising that its operation may have both public health and public order benefits. Specifically, the Government's objectives in establishing the Sydney MSIC were to decrease drug overdose deaths; provide a gateway to drug treatment and counselling; reduce problems associated with public injecting and discarded needles and/or syringes; and, reduce the spread of disease like HIV and hepatitis C (NSW Government, 1999).

The Sydney MSIC commenced operation at 66 Darlinghurst Road in Kings Cross in May 2001 for a trial period of 18 months. The initial, or phase one, evaluation covered the period May 2001 to October 2002 (MSIC Evaluation Committee, 2003). Following consideration of the evaluation results, the trial was extended to October 2007 and the NSW Department of Health commissioned the National Centre in HIV Epidemiology and Clinical Research (NCHECR) and the NSW Bureau of Crime Statistics and Research (BOCSAR) to undertake a second evaluation covering the period November 2002 to April 2007. The current evaluation is directed by a comprehensive evaluation protocol and overseen by an Evaluation Advisory Committee.

To date, the second evaluation phase has included an analysis of operation and service delivery data from November 2002 to December 2004 (NCHECR, 2005), an assessment of community attitudes towards the Sydney MSIC based on repeated cross-sectional telephone surveys with local residents and business owners (NCHECR, 2006b), as assessment of recent trends in property and drug-related crime in Kings Cross by the BOCSAR (Donnelly and Snowball, 2006); and a report examining Sydney MSIC client referrals and health (NCHECR, 2007). The present report is the final in the series produced by the NCHECR during the second evaluation phase of the Sydney MSIC.

1.2 Results from phase one evaluation

The first evaluation phase of the Sydney MSIC presented operation and service data plus data on overdose-related events at the service for the period May 2001 to October 2002. Additionally, data from routinely collected data sources were presented, including ambulance attendances at suspected

opoiod-related overdoses (May 1995 to October 2002); opioid-related deaths (July 1996 to October 2002); and opioid poisoning presentations at local Emergency Departments (July 1996 to October 2002) (MSIC Evaluation Committee, 2003). Also presented were a count of publicly discarded needles and syringes by the Kirketon Road Centre Clean Up Team (August 1999 to November 2002) and the South Sydney Council (August 1999 to November 2002); plus an economic evaluation (MSIC Evaluation Committee, 2003).

Some of the key findings from the analysis of the external data sets, as cited in the phase one Final Evaluation Report were as follows:

- In the months preceding the opening of the MSIC, the number of opioid overdose ambulance attendances and deaths decreased dramatically in the Kings Cross vicinity and across NSW. These decreases were attributed to a substantial reduction in the supply of heroin in Australia that occurred at the same time (p.44).
- Subsequent to the opening of the MSIC, there were further reductions in the number of opioid overdose ambulance attendances in the Kings Cross vicinity and across NSW. These reductions were associated with ongoing decreased heroin availability. It was not possible to distinguish the role of the MSIC in reducing demand on ambulance services from the effect of the continued reduction in heroin availability (p.44).
- The proportion of ambulance attendances to opioid overdoses in the Kings Cross vicinity that took place during hours of MSIC operation changed little during the evaluation period compared to the equivalent calendar period prior to the evaluation (p.44).
- There was no evidence that the operation of the MSIC affected the number of heroin overdose deaths in the Kings Cross vicinity (p.44).
- The data suggest that the opening of the MSIC occurred at the same time as a reduction in opioid poisoning presentations at St Vincent's Hospital and Sydney Hospital. It is likely this reduction was part of general trends associated with the reduction in heroin availability (p.61).
- Syringe counts in Kings Cross by the KRC Needle Clean-Up Team, researcher and the Council were generally lower after the MSIC opened than before, although increased levels were recorded at some sites and there was a subsequent trend of gradual increase detected (p.124).
- Financial cost evaluation of current operation of the Sydney MSIC shows that the set-up costs were $1,334,041; the initial year's operating costs were $1,995,784; and the budgeted costs for 12 months until 30.06.03 were $2,420,214. The cost per client visit was projected to be $37.23 assuming increased client throughput and efficiencies in the 2002/2003 years (p.180).

1.3 Aims

The current report presents operation and service delivery data plus overdose-related events occurring on-site for six years of Sydney MSIC operation (May 2001 to end April 2007). The report also presents data for the period May 1998 to end April 2006 in relation to:

1. Ambulance attendances at suspected opioid-related overdoses in the Kings Cross vicinity (postcodes 2010 and 2011) and in the rest of NSW (NSW Ambulance Service data);
2. Opioid-related deaths in the Kings Cross vicinity and in the rest of NSW (Division of Analytical Laboratories data);
3. Opioid poisoning presentations to Emergency Departments (St Vincent's Hospital and Sydney Hospital Emergency Department data, via NSW Emergency Department Data Collection);
4. Counts of publicly discarded needles and syringes in the local Kings Cross vicinity (Kirketon Road Centre Clean Up Team data and Sydney City Council data).

Finally, this report provides an analysis of costs relating to the operation of the Sydney MSIC from the set-up period to 2007 using data provided by the Mental Health and Drug & Alcohol Office of the NSW Department of Health.

2. Operation and service delivery

2.1 Methods

2.1.1 MSIC data collection

At their first attendance, individuals who present to inject drugs at the Sydney MSIC undertake a registration process with a health professional who records a range of demographic characteristics, plus information regarding drug use and drug treatment history, health, drug overdose history and blood borne virus risk behaviours. In accordance with internal management protocols, no personal contact details are collected or recorded. The eligibility criteria for the service requires that all clients be aged 18 years or above, have injected drugs previously, not be known to be, or obviously be pregnant, not be accompanied by children, and not be intoxicated. Eligible clients are assigned a unique registration number, along with a client chosen password to allow for accurate linkage to visit records. At each visit, information is collected on the drug most recently used by the client, other drug and/or alcohol use that day, and the drug to be injected on that occasion. Any referral or other service provided by staff during a client visit is also recorded in the database, as are any clinical episodes related to the visit e.g. an overdose. Data are held in an operational database (Microsoft Access 2003) and operation and service delivery data are available for the period May 2001 to end April 2007 and therefore all data presented in this chapter relate to this six year time frame.

2.2 Results

2.2.1 Days and hours of operation

The Sydney MSIC was open on 2,163 days for a total of 22,105 hours, which equates to approximately 361 days per year and 10 hours of operation per day. Clinical operations commenced for four hours per day on 6th May 2001. From the 2nd July 2001, the MSIC was open for eight hours per day, providing services in one afternoon session (12.00 noon until 4.00pm, with clients to exit the premises by 4.30pm) and one evening session (6.00pm until 9.30pm, with clients to exit the premises by 10.00pm). From the18th March 2002, day shift hours were extended to 4.30pm every day except for Wednesdays and from 18th May, weekend hours extended into one shift from 12.00pm to 9.30pm. As of 17th August 2002 weekend hours were changed to 10am to 6.00pm. From 28th January 2003, hours were extended to one 12.5 hour session on Monday, Tuesday, Thursday and Friday between 9.30am to 10.00pm, two sessions on Wednesdays with a total of 11.25 hours from 9.30am to 4.45pm and 6pm to 10.pm, and an 8.5 hour session on weekends from 11am to 7.30pm (Table 1). Hours of operation varied slightly on Public Holidays and the MSIC was closed for the day on ten occasions for staff training from May 2001 to end April 2007.

Table 1: Current operating hours of the Sydney MSIC

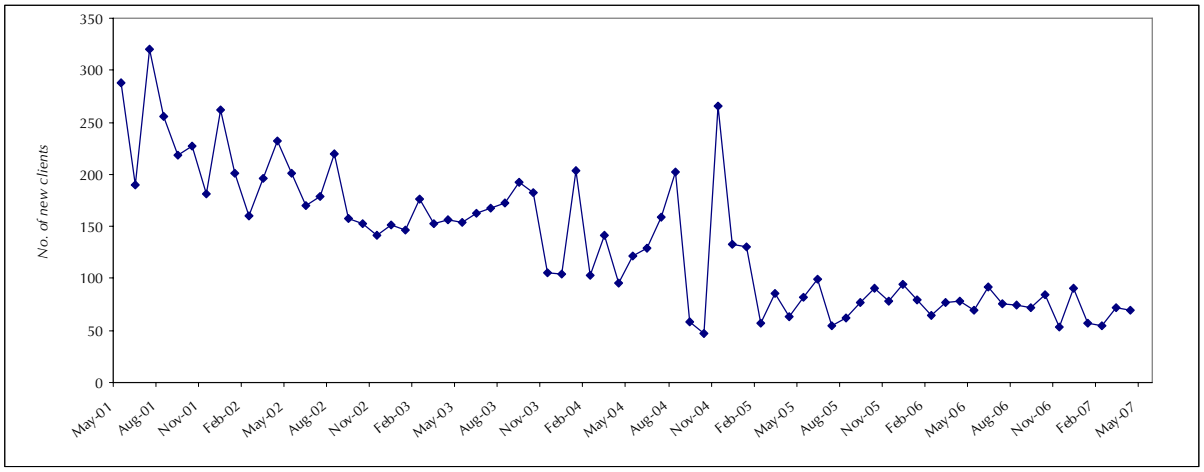
Day	Opening times[1]	Total hours of opening
Monday	9.30am – 10 pm	12.5 hours
Tuesday	9.30am – 10 pm	12.5 hours
Wednesday	9.30am – 4.45pm 6pm – 10pm	11.25 hours
Thursday	9.30am – 10 pm	12.5 hours
Friday	9.30am – 10 pm	12.5 hours
Saturday	11am – 7.30pm	8.5 hours
Sunday	11am – 7.30pm	8.5 hours

[1]*Hours of operation vary slightly on public holidays and for staff training*

2.2.2 Client registration

During the six years of operation a total of 9,778 clients were registered at the Sydney MSIC, with an average of 138 new registrations per month (range 47-321 registrations, Figure 1). Since the extension of the service opening hours in January 2003, the average number of new registrations per month has been 109 (range 47-265 registrations).

Figure 1: Sydney MSIC registrations per month, May 2001 to end April 2007



2.2.3 Client characteristics

Of the 9,778 registered clients, complete registration data were available from 9,549 (98%) of these clients. Most were male (74%), with an average age of 33 years (Table 2) and the majority reported being heterosexual (81%). Among registered clients, 92% spoke English at home and one in ten (10%) reported Aboriginal and/or Torres Strait Islander background. Almost one third had completed high school (27%) with 71% reporting their level of education as primary, some high school or school certificate. The majority reported social security benefits as their main source of income (61%), and eight percent had engaged in sex work in the month prior to registration. Unstable accommodation is reported by 24% of the clients, defined as living in a boarding house, hostel, shelter, refuge, squat, street or homeless. Approximately one in five had recently been imprisoned (23%). Twenty-three percent of registered clients reported living locally in the King Cross vicinity, defined as postcodes 2010 (Darlinghurst, East Sydney, Surry Hills), 2011 (Elizabeth Bay, Kings Cross, Potts Points, Rushcutters Bay, Woolloomooloo). Two percent of clients self-reported their sero-status as positive for HIV and 42% for hepatitis C. Seventy-two percent of clients reported that they were not accessing local primary health care services (Kirketon Road Centre and K2).

Table 2: Socio-demographic characteristics, May 2001 to end April 2007

Characteristic	*n= 9,549*	*%*
Age in years (mean years, SD, range)	33 (8,18-70)	
< 25 years	1,722	18
25 to 29 years	2,133	22
30 to 34 years	2,023	21
> 35 years	3,671	38
Gender		
Male	7,079	74
Female	2,428	25
Transgender	41	<1
Missing	1	<1
Sexual orientation		
Heterosexual	7,760	81
Gay/lesbian	379	4
Bisexual	754	8
Unspecified	656	7
Language spoken at home		
English	8,817	92
Other language	640	7
Missing	92	1
Indigenous status		
Non indigenous	8,330	87
Aboriginal and/or Torres Strait Islander background	959	10
Missing	260	3

continued Table 2: Socio-demographic characteristics, May 2001 to end April 2007

Education levels		
Did not complete high school[1]	6,741	71
Completed high school	2,538	27
Missing	270	3
Main income source		
Employed	2,815	30
Social security benefits	5,834	61
Sex work	237	2
Other	537	6
Missing	126	1
Sex work, last month	782	8
Accommodation status		
Stable	6,234	65
Unstable[2]	2,329	24
Other	667	7
Missing	319	3
Imprisoned, last 12-months		
No	7,306	77
Yes	2,151	23
Missing	92	<1
Live locally[3]	2,150	23
HCV anti-body positive sero-status (self-report)		
No	3,967	42
Yes	4,018	42
Missing	1,564	16
HIV anti-body positive sero-status (self-report)		
No	7,499	79
Yes	166	2
Missing	1,884	20
User of local IDU services		
No	6,829	72
Yes	2,720	28

[1] Level of education reported as: primary school, some high school or school certificate
[2] Current accommodation reported as: boarding house, hostel, shelter, refuge, squat, street or homeless
[3] Postcode of residence reported as: 2010 or 2011
Note: percentages may not add to 100% due to rounding of decimal places

Drug injection was initiated at an average of 19 years of age among Sydney MSIC clients and clients had been injecting for an average of 14 years at registration (Table 3). Thirty-five percent reported a history of one or more drug overdoses (i.e. 11%=one overdose; 17%= two to five overdoses; 7%= six or more overdoses). A history of drug treatment was reported by 60% of clients and 13% were currently in some kind of drug treatment. Forty-one percent had been enrolled in methadone maintenance treatment (MMT) at some time and 13% were currently enrolled in MMT. One in ten clients (10%) reported a history of injecting-related injury or disease (such as abscesses or thromboses) and 26% had a history of at least one injecting-related problem (including prominent scarring or bruising, or difficulties finding a vein). In the month prior to registration, 38% of clients reported injecting drugs at least once per day and 49% had injected in public in the preceding month.

Among the 85% of clients (n=8,129) who had injected in the month preceding registration with the service, heroin was the main drug injected by approximately half (51%) with 20% of clients reporting meth/amphetamines as the main drug injected. The majority of clients (93%) reported not having shared needles and syringes in the preceding month while 3% had shared once, 2% twice, 1% three to five times and 1% over five times. Seventeen percent of clients reported sharing injecting equipment, which includes spoons, water, filters, tourniquets or drug solution. Additionally, 49% of clients reported that they would have injected in public (defined as street, park, beach, public toilet or squat).

Table 3: Injecting drug use and risk behaviour profile, May 2001 to end April 2007

Characteristic	*n= 9,549*	*%*
Age at first injecting drug use (mean years, range)	19 (<10-61 years)	
Age at first injecting drug use		
10 to 18 years	5,301	56
19 to 24 years	2,447	26
25 or more years	1,458	15
Missing	343	4
Duration of injecting (mean years, range)	14(<1-51 years)	
Years of injecting drug use		
<1 years	94	1
1 to 6 years	2,199	23
7 to 12 years	2,576	27
>12 years	4,680	49
Number of drug overdoses		
None	6,246	65
One overdose	1,061	11
Two to five overdoses	1,578	17
6 or more overdoses	622	7
Missing	42	<1
Ever in drug treatment	5,739	60
Currently in drug treatment	1,258	13
Ever MMT[1]	3,879	41
Currently MMT	1,234	13
Injecting injury and disease, ever	975	10
Injecting-related problems, ever	2,474	26
Frequency of injecting		
Less than daily	4,521	47
Daily	3,608	38
Did not inject last month	932	10
Missing	488	5
Injected drugs, last month	***8,129***	***85%***

continued Table 3: Injecting drug use and risk behaviour profile, May 2001 to end April 2007

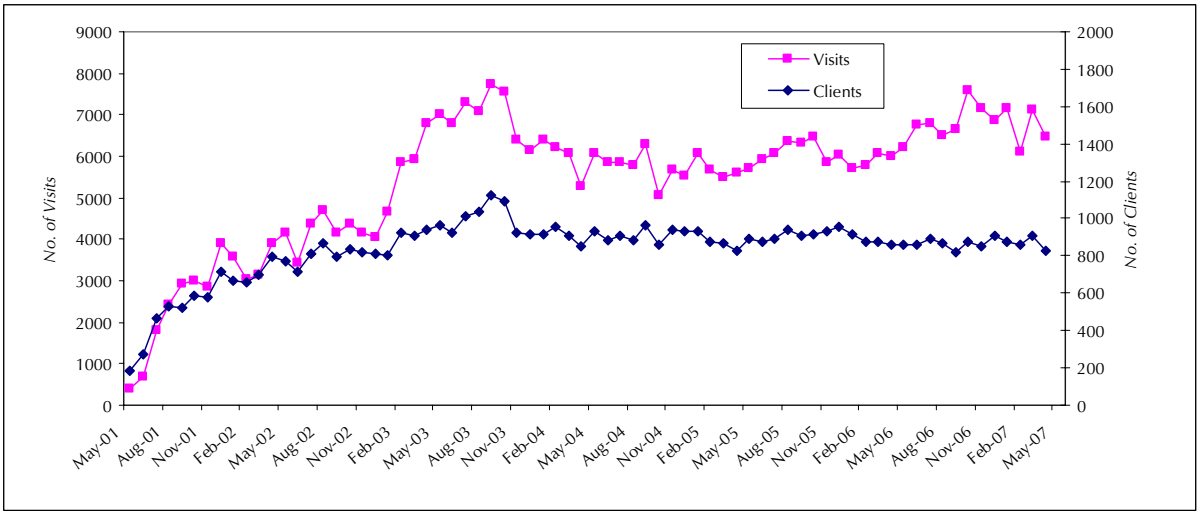
Main drug injected, in the last month		
Heroin	4,145	51
Meth/amphetamines	1,626	20
Cocaine	975	12
Injected in a public place, last month		
No	4,146	51
Yes	3,983	49
Shared needles and/or syringes, last month		
None	7,554	93
Once	212	3
Twice	128	2
3 to 5 times	98	1
More than 5 times	118	1
Missing	19	<1
Injecting equipment shared, last month		
No	6,738	83
Yes	1,391	17

[1]*MMT= methadone maintenance treatment*
Note: percentages may not add to 100% due to rounding of decimal places

2.2.4 Client attendance

There were a total of 391,170 visits for injection at the Sydney MSIC during the six years of operation, with an average number of visits to inject per day of 181 (range 15-266). The number of visits per month increased rapidly in 2001 and continued to increase steadily throughout 2002 (Figure 2). An increase in the number of visits per month coincided with the extension of the hours of operation in late January 2003, and this increase was sustained throughout 2003 and early 2004. Since January 2003, the average number of visits to inject per day has been 208 (range 151-266) and in the twelve months from May 2006 to end April 2007 the daily visit rate was 212 (range 184-245).

Figure 2: Number of visits and clients attending Sydney MSIC per month, May 2001 to end April 2007



2.2.5 Entry refusals and referral of ineligible attendees

During the six years of operation, individuals who sought to use the Sydney MSIC were refused entry on 1,203 occasions (Table 4). The main reasons for being refused entry were intoxication (70%) or having been sanctioned (11%). A sanction is a temporary ban, imposed by a staff member, on an existing client accessing the service due to inappropriate behaviour.

Table 4: Reasons for refusal of registration or entry to Sydney MSIC, May 2001 to end April 2007

Reason for refusal	n	%
Intoxicated	843	70
Sanctioned[1]	128	11
Aged <18 years old	67	6
Unacceptable behaviour	60	5
Pregnant or possibly pregnant	36	3
Wishing to share drugs	30	2
Not previously an injecting drug user	17	1
Accompanied by children	15	1
Wanting to use non-injecting routes	4	<1
Unable to self-administer drugs	3	<1
Total refusals	***1,203***	

[1] *A temporary ban on accessing the MSIC*
Note: percentages may not add to 100% due to rounding of decimal places

On 244 occasions over the six years of operation, individuals who wanted to use the Sydney MSIC were unwilling to wait or did not wish to register.

The MSIC staff attempt to refer all people who are ineligible to use the service to other relevant services. From January 2003 to end April 2007 a log has been kept of these occasions and there have been 23 occasions where women were unable to access the Sydney MSIC due to pregnancy or possible pregnancy. Staff noted that on 13 occasions they referred the woman to the Kirketon Road Centre, on two occasions a referral to a social welfare agency was made and on one occasion a referral to St Vincent's Hospital was provided. On seven occasions, the woman left the service before a referral could be arranged. On 15 occasions during this period, potential clients were unable to access the MSIC due to their age (i.e. aged less than 18 years). On seven of the 15 occasions a referral was provided (three to the Kirketon Road Centre, three to a social welfare agency and one to a Needle and Syringe Program). On the other eight occasions, the young person left the service before a referral was able to be arranged.

2.2.6 Behavioural episodes

A range of behavioural episodes occurred on-site at the Sydney MSIC on 289 occasions in the six years of operation to date (i.e. 7 per 10,000 visits). These episodes have included two arterial injections; five allergic reactions; 13 ambulance transportations; 26 seizures; 36 behavioural issues

requiring removal from the premises; 62 acts involving violence/harassment; four acts of vandalism/theft and 141 other episodes noted by staff as 'adverse events'.

2.2.7 Injecting episodes

The most commonly injected drugs at the Sydney MSIC during the six years of operation were heroin (62%), cocaine (14%), opioids other than heroin (12%), meth/amphetamines (6%) and benzodiazapines (3%).

Figure 3 presents the proportion of visits to inject heroin, cocaine, meth/amphetamines, benzodiazepines and opioids other than heroin per month, while Figure 4 presents the number of visits by drug type.

Figure 3: Proportion of visits inject at the Sydney MSIC by drug type, May 2001 to end April 2007

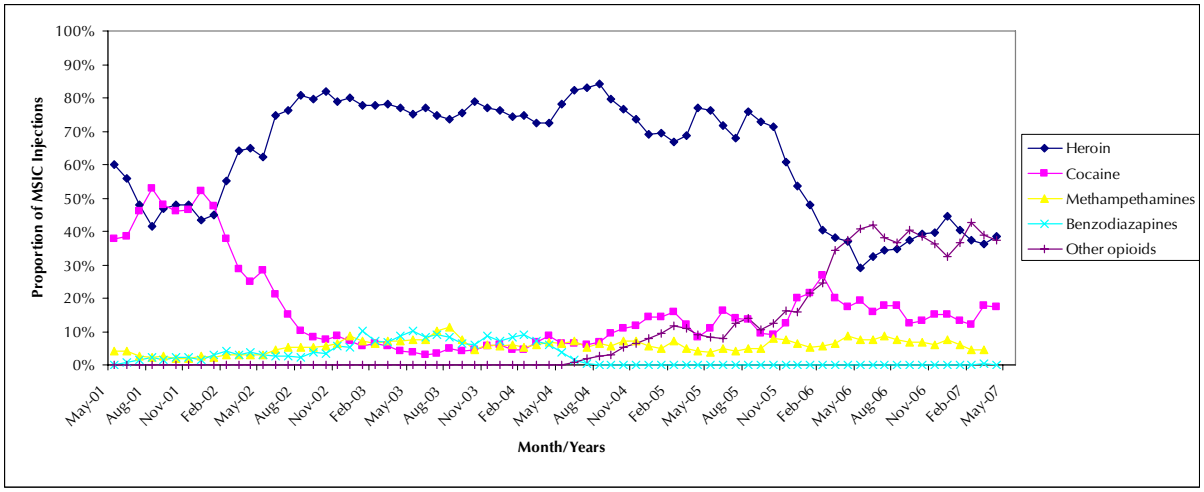
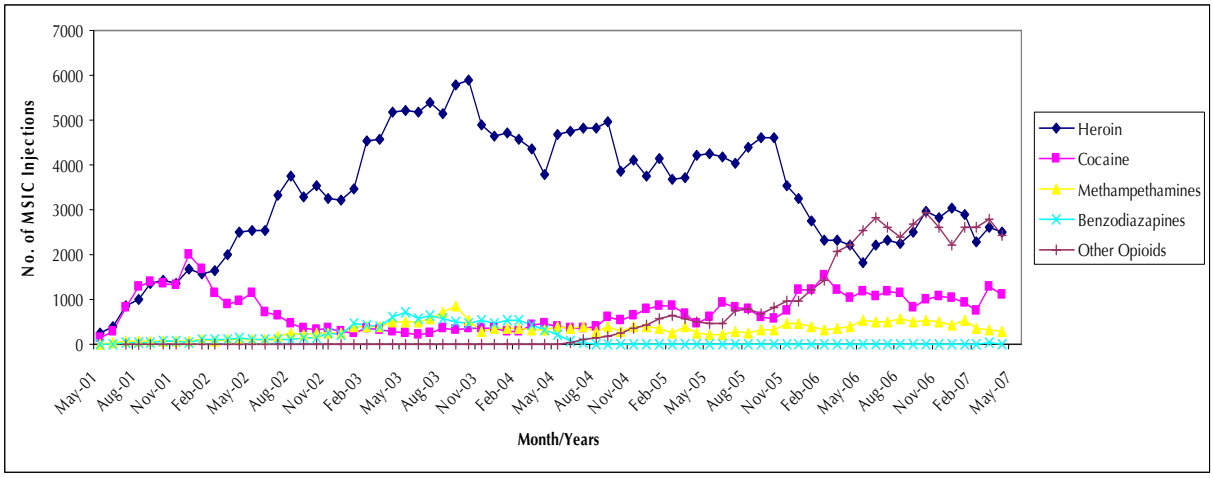


Figure 3 illustrates a marked increase in the proportion of visits to inject heroin at the Sydney MSIC after February 2002 and a continued increase to September 2002, where heroin injections plateaued at 75%-80% of all injections for the remainder of 2002 and throughout 2003. There was a corresponding decrease in the proportion of visits to inject cocaine from mid 2002 which was sustained during 2003 and into the first half of 2004 with a slight increase occurring during the second half of 2004.

From July 2005 there was a marked increase in the number and proportion of injections involving opioids other than heroin and a corresponding decline in visits to inject heroin. From April 2006 to May 2007 the use of heroin and other opioids were comparable (Figure 4). This increase in the injection of diverted opioid pharmaceuticals since 2005 may be due to a reduction in heroin availability and/or quality, an increase in the availability of other opioids and/or client preferences for other opioids.

Figure 4: Number of visits inject at the Sydney MSIC by drug type, May 2001 to end April 2007



2.2.8 Provision of client services

In addition to the supervision of injections, both the nursing and health education staff of the Sydney MSIC have provided 44,082 other occasions of service (i.e. clinical services, general medical services and psycho-social services) to clients in the six years of operation. These services were provided in all three stages of the service (reception area, injecting room and after-care area) and there was an average of 113 services per 1,000 visits (Table 5). Injecting and vein care advice accounted for the majority of the clinical services provided (n=21,779; 65% of the clinical services; 56 per 1,000 visits), followed by other drug and alcohol information (n=4,988; 15% of clinical services; 12 per 1,000 visits). General counselling was provided on 3,552 occasions (46% of the psycho-social services provided, 9 per 1,000 visits).

Table 5: Number and type of occasions of service (excluding referrals), May 2001 to end April 2007

Service type	n	%	Rate /1,000 visits
Clinical services			
Injecting and vein care advice	21,779	65	
Well woman advice[1]	717	2	
Advice on drug treatment	3,030	9	
Drug and alcohol information	4,988	15	
Sexual health advice	201	1	
Other health education	2,659	8	
Subtotal for clinical services	***33,374***	***76****	***85/1,000 visits***
General medical services			
Other medical	1,222	40	
Wound dressing or tissue trauma	1,086	36	
Skin disorder[2]	484	16	
Asthma/chest infection	56	2	
Sexual health information	86	3	
Women's health advice	110	4	
Subtotal for medical services	***3,044***	***7****	***8/1,000 visits***
Psycho-social services			
General counselling[3]	3,552	46	
Accommodation	1,489	19	
Legal	632	8	
Crisis counselling	602	8	

Service type	n	%	Rate /1,000 visits
Finances	143	2	
Other	1,246	16	
Subtotal psycho-social services	***7,664***	***17****	***20/1,000 visits***
Total services provided	***44,082***		***113/1,000 visits***

[1] *Includes contraception and reproductive health advice*
[2] *Includes abscess, rash and other topical infections*
[3] *Includes all counselling activity other than crisis counselling. Common themes are drug use, living skills, relationship and custody issues, and sex work issues*
**Percentage of total*
Note: percentages may not add to 100% due to rounding of decimal places

2.2.9 Provision of client referrals

In addition to supervision of injection and other occasions of service (see Table 5 above), a total of 6,243 referrals were provided in the six years of operation to date (16 per 1,000 visits; Table 6). As with the provision of other services, referrals were provided in all three stages of the MSIC (reception area, injecting room and after-care area). The most frequently provided health care referral was for medical consultations (n=1,078; 63% of all health care referrals; 3 per 1,000 visits), while the most common drug treatment referral was to opioid substitution treatment i.e. buprenorphine and methadone treatment combined (38% of drug treatment referrals) followed by drug detoxification programs (n=947; 34% of drug treatment referrals; 2 per 1,000 visits). Referrals to social welfare assistance were provided on 919 occasions (53% of all social welfare referrals; 2 per 1,000 visits).

Table 6: Number and type of referrals from the Sydney MSIC, May 2001 to end April 2007

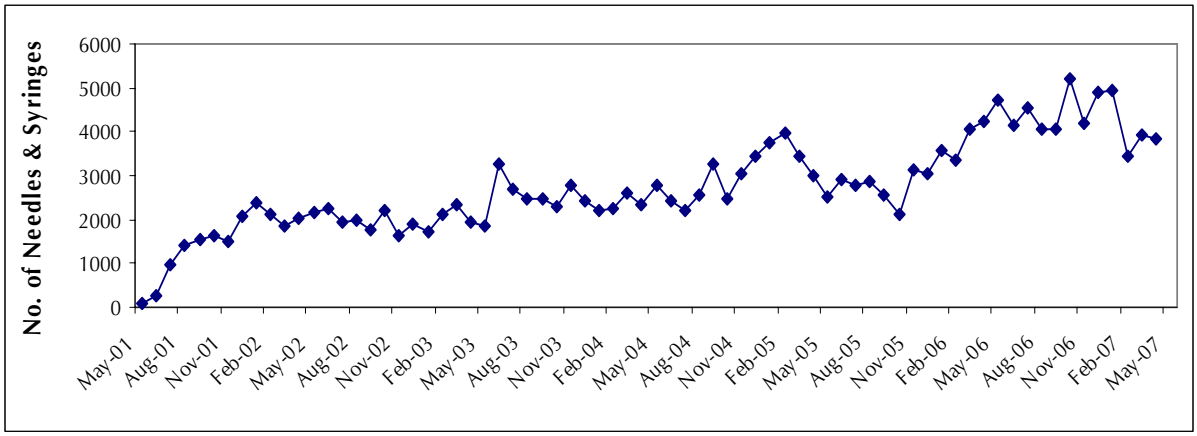
Referral type	n	%	Rate / 1,000 visits
Drug treatment			
Drug detoxification program	947	34	
Buprenorphine treatment	577	21	
Drug and alcohol counselling	466	17	
Methadone treatment	475	17	
Residential rehabilitation	263	9	
Narcotics Anonymous/Self-help	59	2	
Naltrexone treatment	14	0	
Subtotal for drug treatment	***2,801***	***45****	***7/1,000 visits***
Health care			
Medical consultation[1]	1,078	63	
Health education	533	31	
BBV/STD testing	109	6	
Subtotal for health care	***1,720***	***28****	***4/1,000 visits***
Social welfare			
Social welfare assistance	919	53	
Other counselling	301	17	
Other	502	29	
Subtotal for social welfare	***1,722***	***28****	***4/1000 visits***
Total referrals provided	***6,243***		***16/1,000 visits***

[1] *Includes dental health and psychiatric referrals*
**Percentage of total*
Note: percentages may not add to 100% due to rounding of decimal places

2.2.10 Injecting equipment supplied

A total of 205,392 needles and syringes were dispensed to clients to take from the premises on 22,497 occasions in the six years, equating to a rate of 58 occasions per 1,000 visits (Figure 5).

Figure 5: Injecting equipment supplied by the Sydney MSIC per month, May 2001 to end April 2007



Data regarding the number of needles and syringes used on the premises were available for the years 2004, 2005 and 2006. During that period, there were 320,641 needles and syringes dispensed in the injecting room, equating to an average of 1.5 syringes used per visit. The use of more than one syringe on each visit may be due to quality control issues in relation to the equipment and/or venous access issues (e.g. faulty needles and/or syringes; multiple attempts by clients to access veins and blood clotting in the syringe during the injection process).

3. Overdose-related events

3.1 Background

Opioid-related deaths, the majority of which are related to heroin use, represent a large proportion of illicit drug-related deaths in Australia (Barker and Degenhardt, 2003; Australian Bureau of Statistics, 2003). These deaths usually occur among dependent heroin injectors in their late twenty or early thirties who have used heroin for five to ten years and most occur in the company of others where medical help is not sought or is sought too late (Zador et al., 1996). One of the potential public health benefits of supervised injecting facilities is a reduction in the morbidity and mortality associated with drug overdose-related events (NSW Parliament, 1998; van Beek et al., 2004). International evidence to date indicates that there have been no deaths from heroin overdose within supervised injecting facilities (Integrative Drogenhilfe, 1997 cited in Wright and Tompkins, 2004). When considering data presented in this chapter, it should be noted that the opening of the Sydney MSIC in May 2001 coincided with the peak period of a nationwide reduction in heroin availability (Day et al., 2003; Topp et al., 2003), an event associated with significant decreases in opioid-related harms (Degenhardt et al., 2005a).

3.2 Methods

3.2.1 Data collection

3.2.1.1 Overdose-related events at the Sydney MSIC

Overdose-related events occurring on-site at the Sydney MSIC are recorded electronically and a specific emergency treatment form is also completed by the attending staff member/s, which documents clinical details of the specific event. Clinical observations including respiration and heart rates, blood pressure, pulse oximetry (to measure the arterial oxygen saturation of haemoglobin) and Glasgow Coma Scores (to assess a person's level of consciousness) are used to diagnose drug overdose cases and to assess treatment outcomes. Clinical protocols enable registered nurses to administer oxygen and naloxone (Narcan®) in the event of an opioid-related overdose and other basic life support measures in the event of other drug overdoses. These clinical protocols of the Sydney MSIC also reflect the fact that within a supervised injecting facility it is possible to intervene very early in the course of an overdose-related event. This earlier intervention may negate the need for subsequent naloxone administration, thereby avoiding potential naloxone-precipitated withdrawal syndrome and increasing the opportunity for clinical monitoring post overdose (Jauncey et al., 2005a). This strategy may reduce the likelihood of the client using further opioids to overcome acute withdrawal symptoms induced by naloxone which may then lead to further risk of overdose. On-site overdose-related event data are held in a clinical operational database (Microsoft Access 2003) and is available for the six year period May 2001 to end April 2007. It should be noted that the Sydney MSIC also has specific clinical protocols for other drug overdoses e.g. psychostimulants overdose/toxicity protocols.

3.2.1.2 Ambulance attendances at suspected opioid overdoses

Data were available from the NSW Ambulance Service on ambulance attendances at suspected opioid overdoses in NSW for the period May 1998 and end April 2006. A suspected opioid overdose was defined as an ambulance attendance where the patient was administered the opioid antagonist naloxone (Narcan®). Events occurring during the operating hours of the Sydney MSIC were identified for this analysis. The time of the ambulance booking was used to calculate the number of attendances that would have or did occur during MSIC opening hours prior to or following its establishment. Specifically, for the period prior to the opening of the Sydney MSIC, the operating hours outlined in Table 1 were used to calculate the attendances that would have occurred in the operating bracket. For the period from May 2001 to April 2006, actual opening hours (see page 13) were used for the calculations. As in previous evaluation reports, the Kings Cross vicinity was broadly defined as the areas captured by postcodes 2010 and 2011 (includes Darlinghurst, East Sydney, Surry Hills, Elizabeth Bay, Kings Cross, Potts Points, Rushcutters Bay and Woolloomooloo) (MSIC Evaluation Committee, 2003; NCHECR, 2006b). See Appendix 1 for maps of the geographical boundaries of the postcodes 2010 and 2011. Ambulance attendances occurring in 2010 and 2011 were defined as occurring in the Kings Cross vicinity and the remaining attendances defined as occurring in the rest of NSW.

It should be noted that these data will: a) include a small number of patients who have not overdosed from using heroin or another opioid per se but who received naloxone (Narcan®) as empirical treatment to exclude this as a cause of decreased level of consciousness; and b) exclude actual heroin overdose cases where naloxone was not indicated or where the attending officers were not authorised to administer naloxone or where the patient declined naloxone. However, the reliability of these data as an indicator of the prevalence of non-fatal opioid-related overdose (Degenhardt et al., 2001) and its correlation with trends in fatal overdoses has been established previously (Degenhardt et al., 2002).

3.2.1.3 Opioid-related deaths

There is debate regarding the definition of opioid-related deaths and the most appropriate data source for measurement of opioid-related deaths in Australia (Jauncey et al., 2005b). For the purposes of this report, data used were from the Division of Analytical Laboratories (DAL) which monitors drug and alcohol constituents found in blood and tissue samples of persons who died in drug-related circumstances. The DAL defines an opioid-related death as one where morphine (a primary heroin metabolite) was detected in blood and/or tissue samples. A death in the Kings Cross vicinity was defined as one where the death occurred in postcodes 2010 and 2011, with the remaining deaths defined as occurring in the rest of NSW. The available DAL data for the period May 1998 to end April 2006 were used in these analyses.

3.2.1.4 Opioid poisoning presentations at Emergency Departments

Data related to opioid poisoning presentations at hospital Emergency Departments in the Kings Cross vicinity (i.e. St Vincent's Hospital and Sydney Hospital) were available for the period May 1998 to end April 2006. The hospitals, St Vincent's Hospital and Sydney Hospital record presentations via the NSW Emergency Department Data Collection (EDDC), and opioid poisoning presentations are classified as International Classification of Diseases, 9th Revision (ICD-9) codes 965.0 to 965.09. These codes are: 965.0 opiates and related narcotics – 965.00 opium (alkaloids, unspecified; 965.01 heroin, diacetylmorphine; 965.02 methadone; 965.09 other, codeine (methylmorphine), meperidine (pethidine), morphine. Only presentations occurring during the operating hours of the Sydney MSIC were included in the analysis. The time of presentation was used to calculate the number of that would have or did occur during MSIC opening hours prior to or following its establishment, as per the calculations for ambulance attendances detailed above.

3.2.2 Data analysis

The average number of monthly ambulance attendances at suspected opioid overdoses, opioid-related deaths and opioid poisoning presentations to Emergency Departments were calculated based on postcode. For each data set, ratios of counts per month were calculated and comparisons were made for both the 36 months prior to, and 60 months following the opening of the Sydney MSIC. These were calculated for both locations of the Kings Cross vicinity and the rest of NSW. The significance of the ratio was assessed using Poisson regression. Interactions between time period and location were also assessed for ambulance attendances and deaths using Poisson regression and a *P*-value of <0.05 was considered statistically significant. Additional analysis was conducted for ambulance attendances at suspected opioid overdoses that separately considered attendances in postcode 2011 versus postcode 2010 and the rest of NSW combined.

3.3 Results

3.3.1 Overdose-related events at the Sydney MSIC

In the period May 2001 to end April 2007 2,106 overdose-related events were managed at the Sydney MSIC (Table 7). The majority of drug overdoses were heroin or other opioid-related (93%); 18% of which required the administration of naloxone (Narcan®). There were 66 cases of cocaine-related toxicity (4%), 53 benzodiazepine-related overdoses (3%) and three cases of meth/amphetamine-related toxicity (<1%). The overall overdose rate was 5.4 per 1,000 visits and 7 per 1,000 visits where heroin or another opioid was injected.

Table 7: Overdose-related events by drug type, May 2001 to end April 2007

Drug type	n	%
Heroin and other opioids	1960	93
Cocaine	66	3
Benzodiazepines	53	3
Meth/amphetamines	3	0
Other drugs	24	1
Total drug overdoses	***2,106***	

3.3.2 Ambulance attendance at suspected opioid overdoses

During the period May 1998 to end April 2006 there were 20,409 ambulance attendances at suspected opioid overdoses across NSW. Sixty-two percent (n=12,646) of these attendances occurred during the operating hours of the Sydney MSIC, and of these 12% (n=1,485) were in the postcodes 2010 and 2011 (Kings Cross vicinity) and 88% (n=11,161) occurred elsewhere in NSW. Figure 6 shows monthly counts of attendances for both Kings Cross vicinity and the rest of NSW, during the operating hours of the Sydney MSIC.

Figure 6: NSW Ambulance attendances at suspected opioid overdoses, within MSIC opening hours: May 1998 to end April 2006

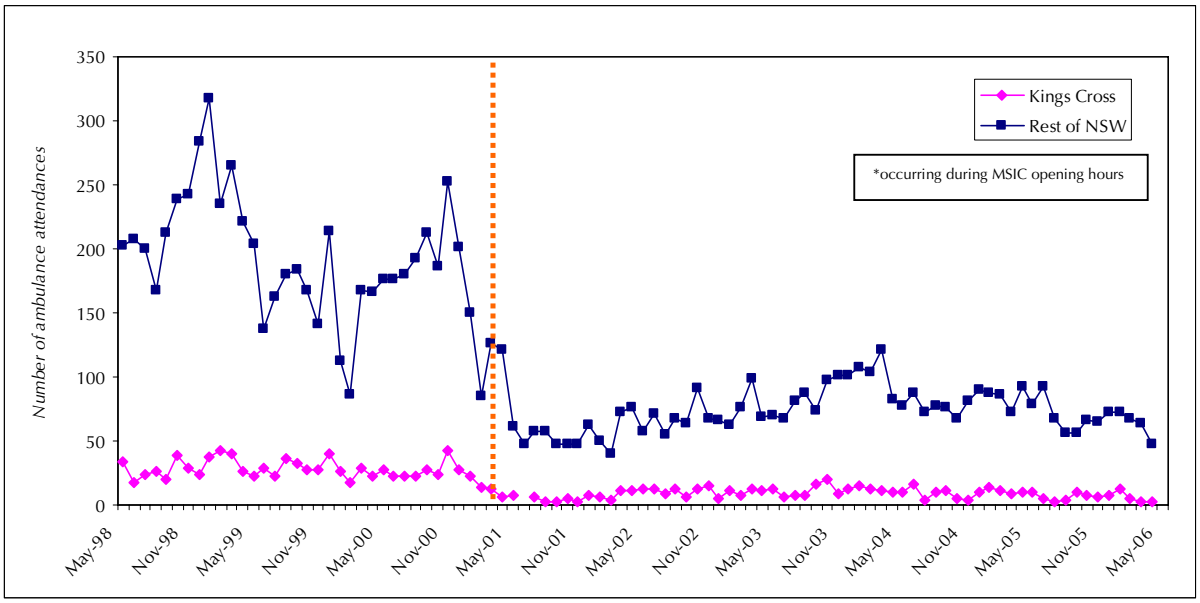


Table 8 presents the total number of attendances and the average monthly ambulance attendances within MSIC opening hours in the period prior to and following the establishment of the MSIC, for both Kings Cross vicinity and the rest of NSW. There was a statistically significant decrease from an average of 27 attendances per month in Kings Cross vicinity in the period prior to the opening of the MSIC to an average of 9 attendances per month following the establishment of the facility (*P-value*<0.001). There was also a statistically significant decrease from 188 to 73 ambulance attendances per month in the rest of NSW (*P*-value<0.001). There was a 68% decrease in the average monthly ambulance attendances from the period prior to the MSIC opening to the period following its establishment. This decline was greater than the decline seen in the rest of NSW (61%) and the

difference in the changes in ambulance attendances in the two locations over time was tested, using a Poisson regression, and found to be statistically significant (X^2=9.62, *P-value=0.002*).

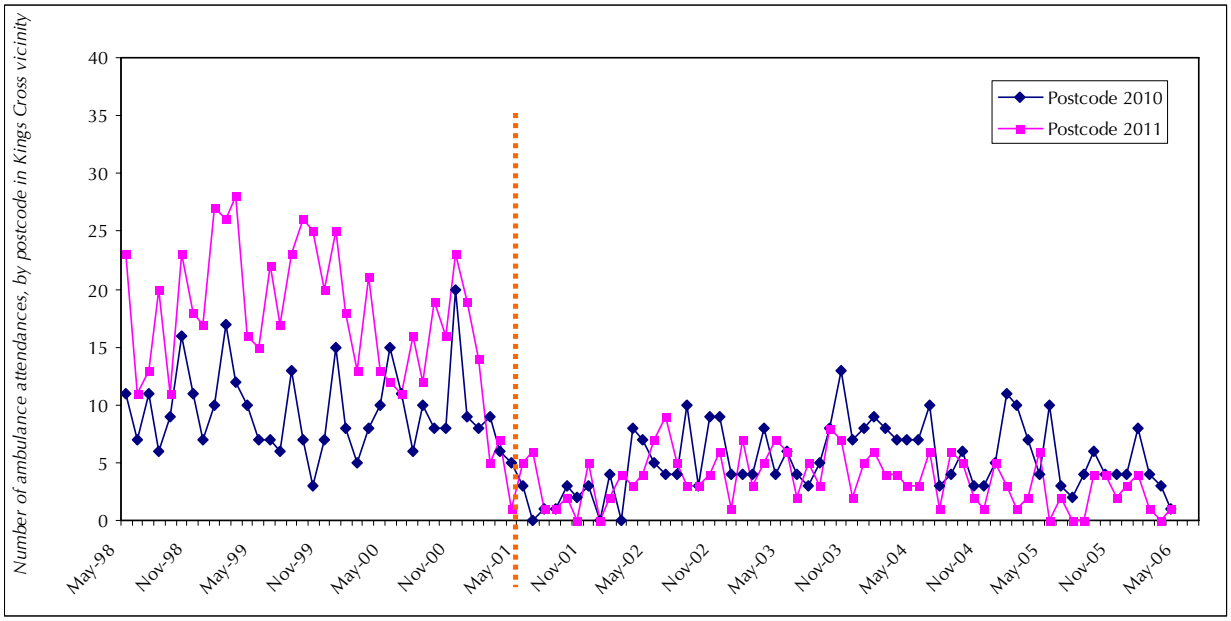
Table 8: NSW ambulance attendances at suspected opioid overdoses, within MSIC opening hours: May 1998 to end April 2006

	Period	Ambulance attendances within MSIC hours	Average /month	Ratio
Kings Cross	*Prior to MSIC:* May 98-April 01	964	27	
	Following MSIC: May 01-April 06	521	9	0.32 (0.29-0.36)*
Rest of NSW	*Prior to MSIC:* May 98-April 01	6,779	188	
	Following MSIC: May 01-April 06	4,382	73	0.39 (0.37-0.40)*
		12,646		

**P-value<0.001*
Note: interaction between locality and period for attendances within MSIC opening hours is X^2=9.62; P-value=0.002

In order to further explore the significance of these results we conducted additional analyses examining postcode areas 2011 and 2010 separately (shown in Figure 7and Table 9).

Figure 7: NSW Ambulance attendances at suspected opioid overdoses in postcodes 2010 and 2011, within MSIC opening hours: May 1998 to end April 2006



These results (Table 9) indicate that while a significant decline was observed in both areas, the magnitude of the decrease in ambulance attendances at suspected opioid overdoses was greatest in the area covered by postcode 2011 (includes Elizabeth Bay, Kings Cross, Potts Points, Rushcutters Bay, Woolloomooloo) as compared to 2010 (which includes Darlinghurst, East Sydney, Surry Hills). That is, a 80% decline versus a 45% decline. The difference in the changes in ambulance attendances in the two postcode areas was tested, using Poisson regression and found to be statistically significant different (X^2=81.23; *P-value*<0.001).

Table 9: NSW ambulance attendances at suspected opioid overdose in postcodes 2010 and 2001,within MSIC opening hours: May 1998 to end April 2006

	Period	Within MSIC hours	Av / month	Ratio
Postcode: 2011	*Prior to MSIC:* May 98-April 01	626	17	
	Following MSIC: May 01-April 06	210	4	0.20 (0.17-0.24)*
Postcode: 2010	*Prior to MSIC:* May 98-April 01	338	9	
	Following MSIC: May 01-April 06	311	5	0.55 (0.47-0.64)*
		1,485		

**P-value<0.001*
Note: interaction between locality and period for all attendances is X^2=81.23; P-value<0.001

We also compared the magnitude of the decline observed in postcode area 2011 with that observed in the rest of NSW and 2010 combined (Table 10). The decline was greater in postcode 2011 (80%) than in the NSW and 2010 combined (60%) and the difference between the two was tested using Poisson regression and found to be statistically significant ((X^2= 68.04; *P-value*<0.001).

Table 10: NSW ambulance attendances at suspected opioid overdoses: May 1998 to end April 2006

	Period	Within MSIC hours	Average / month	Ratio
2011	*Prior to MSIC:* May 98-April 01	626	17	
	Following MSIC: May 01-April 06	210	4	0.20 (0.17-0.24)*
NSW + 2010	*Prior to MSIC:* May 98-April 01	7,117	198	
	Following MSIC: May 01-April 06	4,693	78	0.40 (0.38-0.41)*
		12,646		

**P-value<0.001*
Note: interaction between locality and period for all attendances is X^2=68.04; P-value<0.001

3.3.3 Opioid-related deaths

During the period May 1998 to end April 2006 there were 1,652 morphine deaths in NSW, as detected at autopsy by the Division of Analytical Laboratories. Of these, 211 (13%) cases occurred in the postcodes 2010 and 2011 (Kings Cross vicinity) and 1,441 (87%) in the rest of NSW. Figure 8 shows the monthly count of deaths for both Kings Cross vicinity and the rest of NSW.

Figure 8: Opioid-related deaths: May 1998 to end April 2006

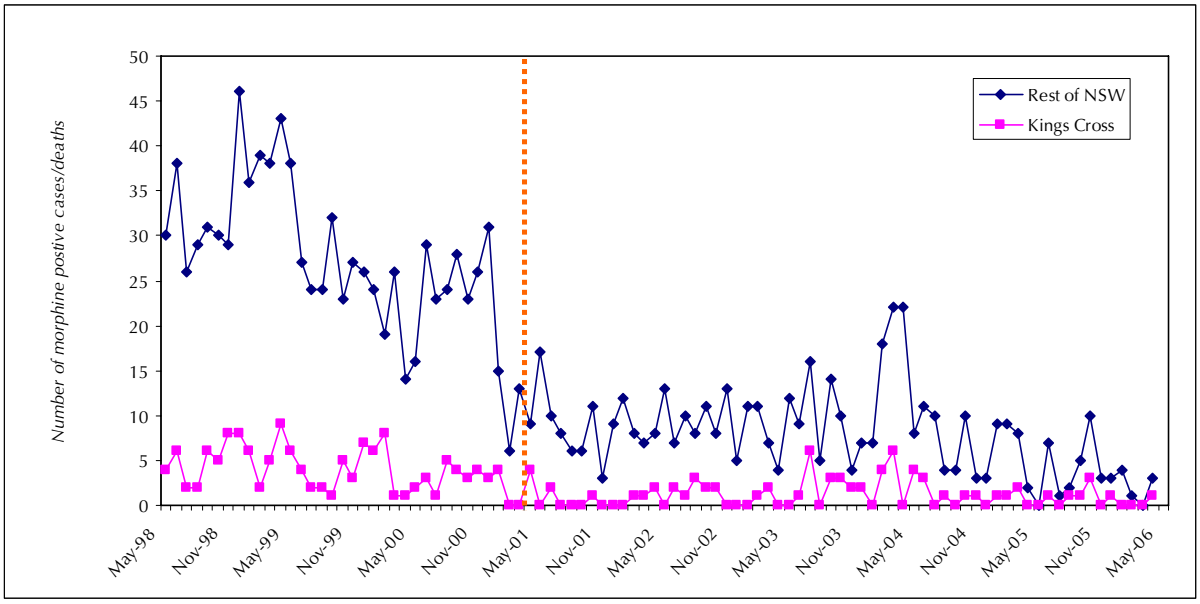


Table 11 presents the number of deaths and monthly averages, prior to and following the establishment of the Sydney MSIC. In the Kings Cross vicinity, the decrease from an average of four deaths per month in the period prior to the opening of the facility to an average of one death per month in period following was significant (*P-value*<0.001) as was the decrease from 27 to 8 deaths per month in the rest of the State (*P-value*<0.001). In both groups, there was approximately a 70% decrease in average monthly deaths from the period prior to the MSIC opening and the period following its establishment. The difference between the two locations in the change in deaths over time was tested using a Poisson regression and was found not to be statistically significant (X^2=0.02, *P-value*=0.877). The assessment of the impact of location (Kings Cross versus the rest of NSW) on the declines in opioid-related deaths may have been hampered by small sample sizes.

Table 11: Opioid-related deaths: May 1998 to end April 2006

	Period	Months	Deaths	Average / month	Ratio
Kings Cross	*Prior to MSIC:* May 98-April 01	36	142	4	1.00
	Following MSIC: May 01-April 06	60	69	1	0.29 (0.22-0.39)*
Rest of NSW	*Prior to MSIC:* May 98-April 01	36	962	27	1.00
	Following MSIC: May 01-April 06	60	479	8	0.30 (0.27-0.33)*
			1,652		

**P-value<0.001*

Note: interaction between locality and period (X^2=0.02; P-value=0.877)

3.3.4 Opioid poisoning presentations at Emergency Departments

During the period May 1998 to end April 2006 there were 1,558 opioid poisoning presentations to St Vincent's Hospital (82%) and Sydney Hospital (18%). Seventy-five percent of these presentations arrived by ambulance and 724 were outside and 834 occurred during Sydney MSIC operating hours.

Figure 9 shows the distribution of the monthly presentations occurring within MSIC opening hours (n=834).

Figure 9: Opioid poisoning presentations at St Vincent's & Sydney Hospital: May 1998 to end April 2006

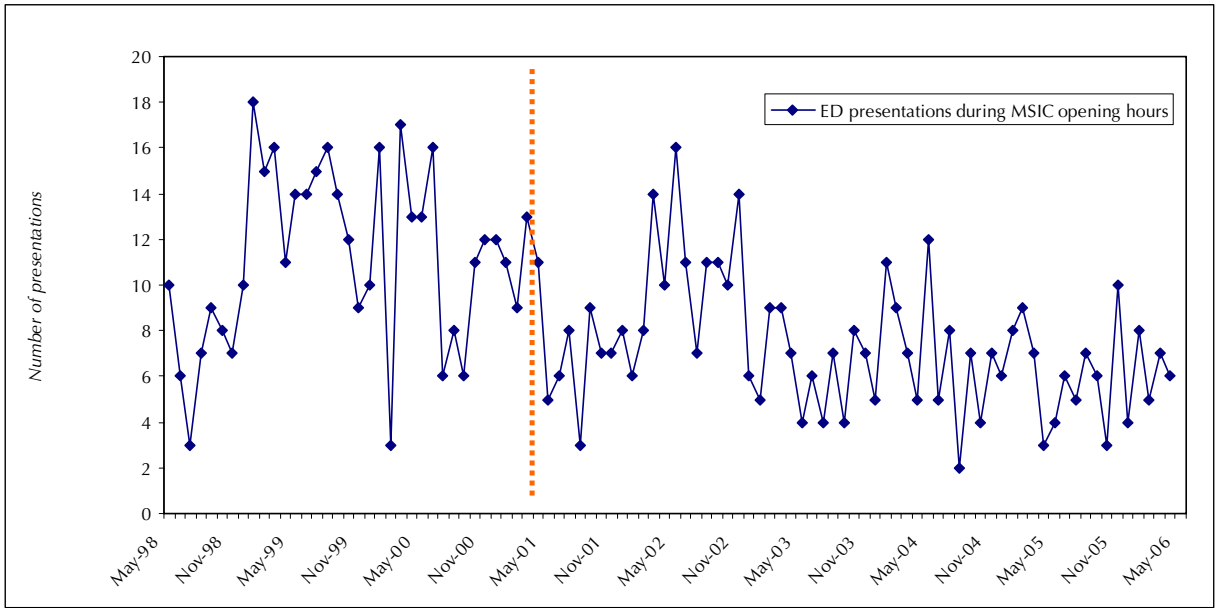


Table 12 presents the average monthly presentations occurring prior to, and following, the establishment of the MSIC. There was a significant decrease from an average of 11 presentations per month in the period prior to the opening of the Sydney MSIC to seven in the period following the opening of service (*P-value*<0.001). This equates to a 35% decrease over time in the average monthly Emergency Department presentations from the period prior MSIC operation to the period following.

Table 12: Opioid poisoning presentations at St Vincent's and Sydney Hospital: May 1998 - end April 2006

	Period	Month	Presentations	Average /month	Ratio
Kings Cross	*Prior to MSIC:* May 98-April 01	36	401	11	1.00
	Following MSIC: May 01-April 06	60	433	7	0.65 (0.57-0.74)

**P-value<0.001*

To summarise, the changes over time in each of the three main external indicators presented in this chapter is outlined below in Table 13.

Table 13: Changes in ratio of overdose-related events, prior to and following establishment of Sydney MSIC[1]

	Ratio of change prior to and following establishment of Sydney MSIC		
	Kings Cross (2010 & 2011)	***Rest of NSW***	***Poisson regression locality and period interaction***
Ambulance attendances at suspected opioid overdoses during MSIC opening hours	0.32 (0.29-0.36)	0.39 (0.37-0.40)	*X^2=9.62, P-value=0.002*
Opioid-related deaths	0.29 (0.22-0.39)	0.30 (0.27-0.33)	*X^2=0.02; P-value=0.877*
Opioid poisoning presentations during MSIC opening hours	0.65 (0.57-0.74)	n/a	

[1] *Defined as 36 months prior and 60 months post the establishment of the Sydney MSIC*

As noted, there were significant decreases in the average monthly counts and ratios over time for all opioid overdose-related indicators. However, the opening of the Sydney MSIC in May 2001 coincided with the peak period of a nationwide reduction in heroin availability (Day et al., 2003; Topp et al., 2003), an event associated with significant decreases in opioid-related harms (Degenhardt et al., 2005a; Degenhardt et al., 2004; Day et al., 2004). In order to minimise potential confounding introduced by the reduction in heroin availability we compared the rate of decreases observed in Kings Cross with rates observed in the rest of NSW for two of the three indicators (Emergency Department presentation data for hospitals outside of the 2011/2010 area were not available). While there were no statistically significant differences in the rates of decrease in opioid-related deaths between Kings Cross and the rest of NSW, the rate of decrease in ambulance attendances at suspected opioid overdoses in the Kings Cross vicinity (postcodes 2010 and 2011), during the operating hours of the Sydney MSIC, was significantly greater than the rate observed in the rest of NSW (X^2=9.62, *P-value*=0.002).

The magnitude of the decline observed in postcode 2011 was also significantly greater than that observed in postcode 2010 (X^2=81.23; *P-value*<0.001) and in the rest of NSW combined (X^2= 68.04; *P-value*<0.001).

4. Needles and syringes disposal

4.1 Background

The Kirketon Road Centre (KRC), a primary health care service in Kings Cross, provides a Needle Clean Up service which collects discarded needles and syringes in Eastern Sydney and Darlinghurst, Kings Cross and Woolloomooloo on weekdays. A designated worker collects any injecting equipment discarded in public locations identified as "hot spots", which are monitored and adjusted when patterns of public injecting change. The majority of hot spots are located within a 500 metre radius of the Sydney MSIC. The worker also responds to calls from the public to the NSW Needle Clean Up Hotline.

4.2 Methods

4.2.1 Data collection

4.2.1.1 Counts of discarded needles and syringes by KRC Needle Clean Up Team

Monthly counts of discarded needles and syringes collected by the Needle Clean Up Team within 500 metres of the Sydney MSIC have been provided by the Kirketon Road Centre for the period January 2000 to January 2007.

4.2.1.2 City of Sydney Community Sharps Bin Collection council

The City of Sydney currently manages 62 community sharps bins and provides needle clean-up as part of its cleansing program in locations throughout the Local Government Area (LGA). Due to changes in the LGA boundaries and management, data on community sharps bins in the vicinity of the Sydney MSIC are available for the period 2005 onwards only. Counts from bins (both 1.4 litre and 23 litre capacity) in the following locations are presented: Fitzroy Park Toilets (n=3); Kings Cross Library Toilets (n=3)Walla Mulla Park; Walla Mulla Park Toilets (n=3); Corner of Corfu St/Talbot Lane; Bear Park (n=2); Lawrence Hargraves Park (n=2); Wayside Chapel; Hordern Stairs; Hourigan Lane; Daffodil Park; Talbot Place; Burraphore Lane; Francis Lane; Surry Hills Library Toilet; Kings Lane; Forbes Street Steps; Arthur Park; KRC, Victoria Street; Rankin Court, Victoria Street; Green Park (n=2). It should be noted that since 2005, there has been an increase in the number of sharp bins and the number of services of the bins provided in the LGA.

4.2.1.3 Data analysis

The average monthly count of needles and syringes collected by the KRC Clean Up Team were calculated. Ratios of counts per month were calculated and comparisons of counts in the 16 month period prior to and the 71 month period following the opening of the Sydney MSIC. The significance of ratios were assessed using Poisson regression.

4.3 Results

4.3.1 KRC Clean Up Team

During the period January 2000 to January 2007 234,910 needles and syringes were collected by the KRC Clean Up Team within 500 metres of the Sydney MSIC. Figure 10 shows the monthly counts, prior to and following the establishment of the Sydney MSIC.

Figure 10: Monthly counts of discarded needles and syringes collected by KRC Clean Up Team: January 2000 to January 2007

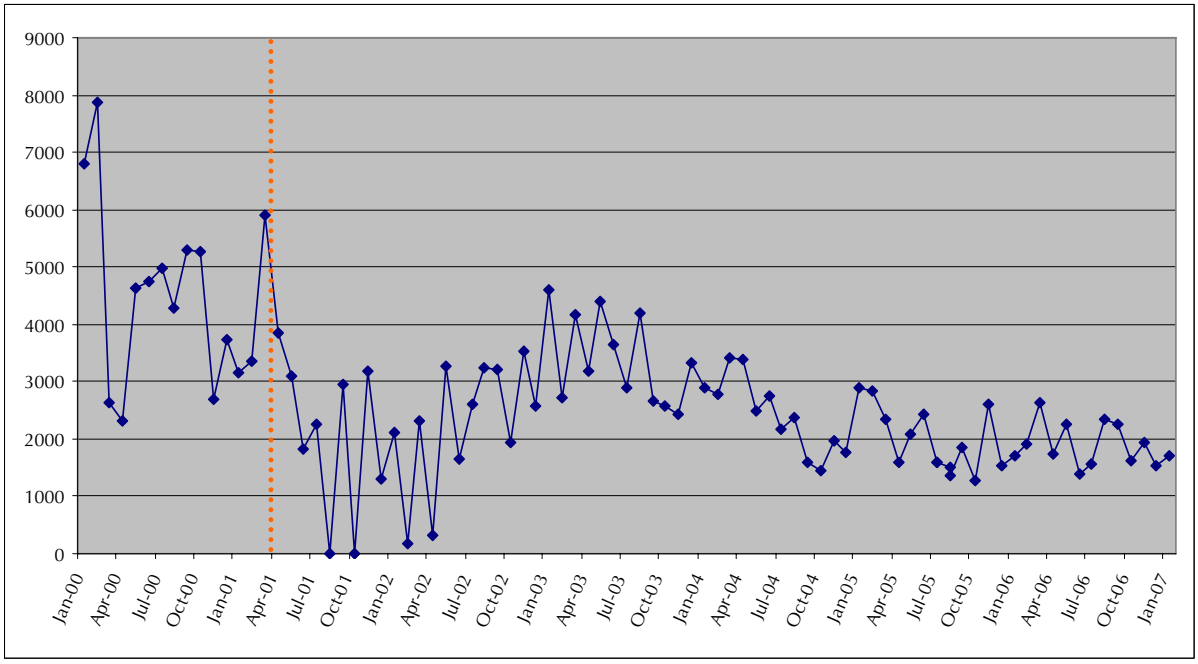


Table 14 presents the average monthly count of needles and syringes collected prior to and following the establishment of the MSIC. There was a significant decrease from an average of 4,468 needles and syringes collected per month in the period prior to the MSIC opening to an average monthly count of 2,302 in the period after the service opening (*P-value*<0.001). This equates to a 48% decrease over time.

Table 14: Counts of discarded needles and syringes collected by the KRC Clean Up Team: January 2000 to January 2007

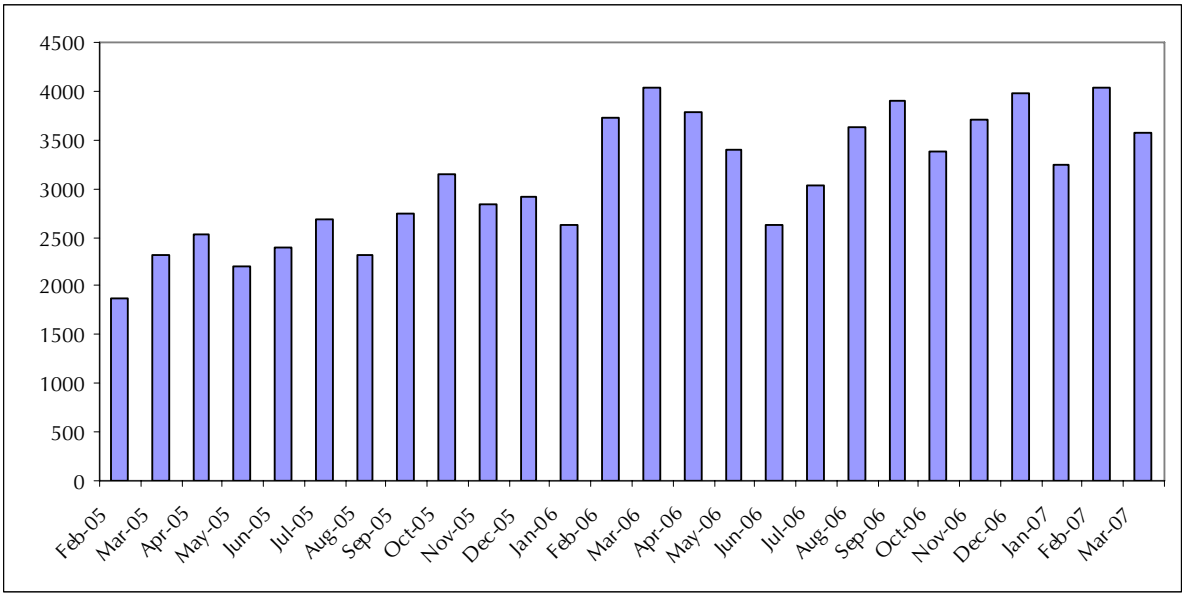
	Period	*Months*	*Count*	*Average / month*	*Ratio*
Kings Cross	*Prior to MSIC:* May 98-April 01	16	71,487	4,468	1.00
	Following MSIC: May 01-April 06	71	163,423	2,302	0.52 (0.51-0.52)
			234,910		

**P-value<0.001*

4.3.2 City of Sydney Community Sharps Bin Collection

During the period February 2005 to March 2007 there were 80,657 needles and syringes collected via City of Syringe sharp bins, as illustrated in Figure 11.

Figure 11: City of Sydney Community Sharps Bin Collection, 2005-2007



5. Cost analysis

5.1 Background

This chapter examines the operating costs of the Sydney MSIC for the financial years 1999/00 to 2005/06, with the objectives of quantifying the service delivery costs; service facility costs; average cost per client visit; and, determining hourly costs and overall costs of the service (excluding part time medical director costs).

5.2 Methods

All financial expenditure data for the financial years 1999/00 to 2005/06, submitted by the Sydney MSIC to NSW Health, have been provided to the NCHECR. It should be noted that all 2006/07 figures are projections made in April 2007. While the service did not open for operation until May 2001, there was an 18 month planning and set-up period and therefore costs are presented from July 1999.

5.3 Results

5.3.1 Total costs, service delivery and service facility costs

The total operating costs, per financial year, are presented below in Table 15. Annual costs have increased over time, driven by increases in service delivery costs as illustrated in Table 16. Costs accumulated in the financial year 1999/00 were due primarily to set-up costs while costs in 2000/2001 included rental, refurbishment, staffing and staff training plus capital equipment costs.

Table 15: Total operating costs per annum

Financial Year	Totals
1999/00	$211,925
2000/01	$1,256,922
2001/02	$1,730,453
2002/03	$1,942,646
2003/04	$2,249,409
2004/05	$2,336,456
2005/06	$2,494,599
2006/07 (projected)	$2,679,748

Service delivery costs account for the majority (70%) of the total operating costs, the majority of which is staffing costs and some consumables. Consumables include pharmaceuticals and medical equipment. Rises in service delivery costs are primarily attributable to rises in staffing costs, which comprise approximately 87% of total service delivery costs.

Table 16: Service delivery and facility costs per annum

Financial Year	Service delivery costs[1]	Service facility costs[2]
1999/00	$57,104	$154,821
2000/01	$345,006	$911,916
2001/02	$1,118,970	$611,483
2002/03	$1,399,279	$543,367
2003/04	$1,723,492	$525,917
2004/05	$1,758,478	$577,978
2005/06	$1,914,486	$580,113
2006/07 (projected)	$2,089,021	$590,727

[1] *Includes staffing costs and consumable costs*
[2] *Includes rental cost for the facility*

Rises in service delivery costs are primarily attributable to rises in staffing costs which comprise approximately 87% all service delivery costs. It should be noted that under the Sydney MSIC's clinical management protocols there is a minimum level of staffing required before the service is allowed to open: six clinical staff, including three nursing staff, plus one security guard. There are a number of explanations for the increase in staffing costs. Approximately half of the increase is attributable to rises in annual State hospital awards, in all health categories, of approximately 4% per annum for each year of operation. The remaining increase, of approximately 5% per annum, is due to a) an increase in the opening hours from January 2003; b) creation of a full time Case Referral Coordinator position in October 2004; and, c) general rises in salaries as staffs' years of service increase.

The increase in the service delivery costs over time has also been driven by a number of other factors including a rise in the number of client visits and consumables over time and changes in type of actual consumables required. For the year ending June 2007 it is projected that client visits will exceed 80,000 which is more than double the 38,147 visits made in the first financial year of operation.

5.3.2 Cost per client visit

Table 17 illustrates the average service facility costs, service delivery costs and total costs per client visit to the Sydney MSIC, with the average total cost per client visit over the period being $34.14.

Table 17: Average cost per client visit, Sydney MSIC

Financial year	Average cost / client visit - service delivery	Average cost /client visit - service facility	Average cost / client visit - total
2001/02	$29.33	$16.03	$45.36
2002/03	$22.25	$8.64	$30.89
2003/04	$22.08	$6.74	$28.82
2004/05	$25.61	$8.42	$34.02
2005/06	$25.99	$7.88	$33.87
2006/07 (projected)	$24.87	$7.03	$31.90
Average	*$25.02*	*$9.12*	*$34.14*

Table 18 presents the service delivery cost per client visit, adjusted for inflationary changes, calculated using financial year consumer price index for consumables and financial year labour price index for the public health sector for staffing costs. The average adjusted cost was $22.79 per client visit and the service delivery cost per client visit has not varied greatly over the financial years.

Table 18: Average cost per client visit for service delivery, Sydney MSIC

Financial year	Average cost / client visit service delivery	Adjusted average cost per client visit (base = 2001/02)*
2001/02	$29.33	$29.33
2002/03	$22.25	$21.50
2003/04	$22.08	$20.34
2004/05	$25.61	$22.86
2005/06	$25.99	$22.24
2006/07 (projected)	$24.87	$20.49
Average	*$25.02*	*$22.79*

**Note: FY consumer price index used for consumables component and FY labour price index (for public health sector) used for staff cost.*

The average cost of consumables per client visit adjusted for inflation over the 2002/03 – 2006/07 period was $3.20.

Figure 12: Average cost per client visit: service delivery and service facility costs

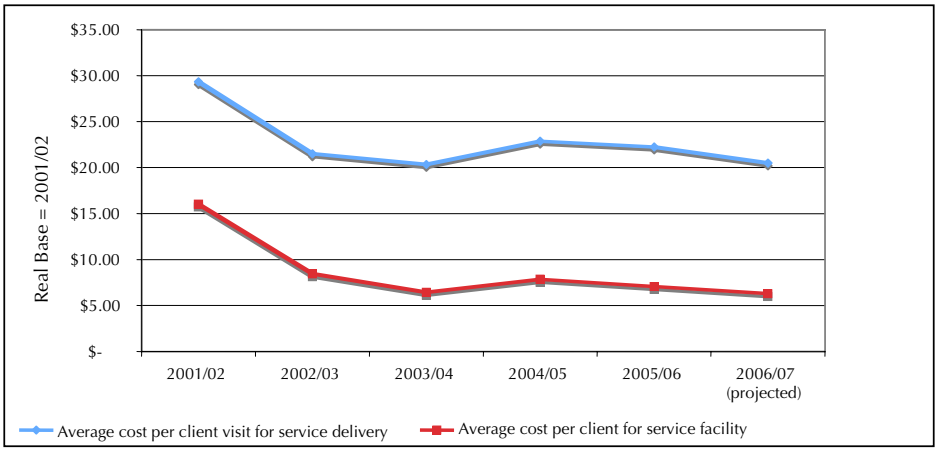


Figure 12 illustrate a decrease in service facility costs per client visit following a peak in the first year of operation. As expected, average cost per client visit declines as visits increase and the fixed costs are spread. In real terms, the average costs per client visit of both service delivery and service facility are declining over time (Figure 12).

5.4 Hours of operation

Hours of operation per annum will affect both the number of client visits and service delivery costs. As noted in previous chapters, Sydney MSIC opening hours were extended from January 2003. This is reflected in the increase in hours of operation from financial year 2002/03.

Table 19: Costs per hour open

Financial Year	Nominal staffing cost per hour open	Real staffing cost per hour open (base =2001/02)
2001/02	$341	$341
2002/03	$354	$342
2003/04	$352	$322
2004/05	$374	$331
2005/06	$410	$348
2006/07 (projected)	$452	$368

**Note: FY labour price index (for public health sector) used for staff cost.*

In real terms, staffing costs per hour have increased slightly over the period which may be due to rises in staffing costs as skills and experience increase.

Table 20: Number of client visits per hour

Financial year	Number of client visits	Number of client visits per hour
2001/02	38,147	13
2002/03	62,893	18
2003/04	78,043	19
2004/05	68,673	17
2005/06	73,658	18
2006/07 (projected)	84,009	21

The number of client visits has increased both annually and per hourly, as illustrated in Table 20 . In 2006/07, the Sydney MSIC is projected to have, on average, over 20 visits per hour and this increase contributes to increased hourly costs.

5.5 Costs, excluding medical director position

The medical director position of the Sydney MISC is required, as per section 36D of the Drug Misuse and Trafficking Act 1985, is available on an on-call basis covering 100% of service opening hours. This position has clinical, administrative and management responsibilities including overseeing of all clinical service operations (including enabling of nurse administration of naloxone (Narcan®) and other stand order medications) plus clinical policy and protocol development.

Table 21: Average cost per client visit for service delivery costs, excluding medical director

Financial Year	Excluding medical director costs	Including medical director costs	Difference
2004/05	$23.89	$25.61	$1.72
2005/06	$24.00	$25.99	$1.99
2006/07 (projected)	$23.04	$24.87	$1.83

As documented in Table 19, the differential cost of having a medical director on call for each potential client visit is negligible. On average it costs an additional $1.84 per client visit.

6. Discussion

Data from the six year period May 2001 to end April 2007 provide evidence that the Sydney MSIC has been successful in reaching a marginalised population of IDUs - i.e. people who are long-term injectors, those who inject frequently and in public places, IDUs who are homeless, those who are not currently accessing health care services, injectors with a history of unemployment and imprisonment, those with low education levels and those engaged in sex work. The level of both new registrations and ongoing use by existing clients indicates considerable demand for the service, while the eligibility criteria and client code of conduct do not appear to constitute major barriers to service access. As in European drug consumption rooms (Hedrich, 2004) and Vancouver's supervised injecting facility (*Insite)* (Tyndall et al., 2006), heroin has been the drug most frequently injected at the Sydney MSIC over the last six years (62% of all visits to inject). A range of other drugs are inject at the Sydney MSIC, which area associated with significant health-related harms, especially when injected.

Over 6,000 referrals to drug treatment, health care and social welfare services have been provided since the service opened. Previous reports have shown that the Sydney MSIC acts as a gateway to drug treatment by providing more than one in ten clients with referrals to drug treatment, and has been successful in a) targeting those clients at highest risk of drug-related mortality and morbidity for referrals to drug treatment; b) via a brokerage referral scheme, targeting particularly marginalised and at risk young IDUs, of whom 84% attended the referred service; and, c) facilitating the uptake of drug treatment among treatment naïve IDUs (NCHECR, 2007). Beyond the supervision of injecting episodes, staff have provided approximately 45,000 occasions of service, including the provision of injecting and vein care advice on over 20,000 occasions. This is an important achievement as recent studies show that factors related to poor injecting technique and requiring help to inject are independently associated with syringe sharing and incident HIV and HCV infection (Miller et al., 2002; O'Connell et al., 2005; Wood et al., 2003).

The Sydney MSIC client survey conducted in 2005, found that public injecting (defined as injecting in a street, park, public toilet or car), which is a high risk practice with both health and public amenity impacts, was reported as the main alternative to injecting at the MSIC by 78% of clients. Almost half of all clients (49%) indicated that they would have injected in public had they not been able to access the Sydney MSIC on the day of registration. Using these data to retrospectively calculate the number of injections that may have otherwise occurred in public for the full six years of Sydney MSIC operation indicates that 191,673 public injections were averted by the presence of the MSIC. This is consistent with results from a survey which found a significant decrease in the proportion of residents who reported witnessing public injecting in the last month (NCHECR, 2006b; Salmon et al., 2007).

During six years of operation 2,106 overdose-related events were managed without fatality at the Sydney MSIC. The majority of these events were related to heroin or other opioids (93%) and one-in-five (18%) required the administration of naloxone (Narcan®). The overall overdose rate was 5.4 per 1,000 visits and 7 per 1,000 visits where heroin or another opioid was injected. It is not possible to state which specific overdose-related events occurring on-site would have resulted in an ambulance call out or significant mortality or morbidity had they occurred elsewhere. However, it is likely that a substantial proportion of the 2,106 overdose-related events managed at the Sydney MSIC would have resulted in significant morbidity had they occurred off-site and indeed, as proportion of all overdose events, would also otherwise have occurred in public. International research from Frankfurt indicates that IDUs who overdosed on the street were ten times more likely to stay in hospital for one night than IDUs who overdosed in a supervised injecting facility (Integrative Drogenhilfe, 1997 cited in Wright and Tompkins, 2004). It can also be assumed that all of the opioid overdose cases treated at the MSIC would not otherwise have received such prompt assistance and that the early and effective intervention provided by the service is likely to have reduced the morbidity and mortality associated with these events had they occurred elsewhere.

It is well recognised that the major reduction in the heroin supply in Australia from early 2001 (which coincided with the establishment of the Sydney MSIC) led to a large and rapid decline in heroin use from a peak in 1999-2000 (Day et al., 2003;, Topp et al., 2003; Degenhardt et al., 2004; Degenhardt et al., 2005b). While changes in patterns of non-opioid injecting drug use in this period are less clear, there is evidence to indicate that many primary heroin injectors switched to cocaine and amphetamine use, including data on drugs injected at the Sydney MSIC (NCHECR, 2005), arrests related to amphetamines (NCHECR, 2006a), drugs injected by NSP attendees (Razali et al., 2007) and a longitudinal study of HCV seroconversion in IDUs (Maher et al., 2007). A recent analysis reviewed the magnitude of the decline in current, regular IDUs from 2000 onwards using five different data indictors to establish a best estimate. This report concluded that there had been a reduction in the number of current regular IDUs of 18% from 2000 to 2001, then 20%, 2%, 3% and 1% for each year between 2001 to 2005 (NCHECR, 2006a; Razali et al., 2007). This history helps to contextualise the decreases in all three measures of overdose-related events (ambulance attendances at suspected opioid overdoses, opioid-related deaths and opioid poisoning presentations to Emergency Departments) observed in the period prior to and following the opening of the MSIC in both the Kings Cross vicinity and the rest of NSW. The decreases in opioid-related deaths and opioid poisoning presentations to Emergency Departments in the Kings Cross vicinity were not significantly different to decreases observed in the rest of NSW for these indicators.

In relation to ambulance attendances at suspected opioid overdoses (occurring during the operating hours of the Sydney MSIC), the decline observed in the Kings Cross vicinity was greater than that observed in the rest of NSW and the difference between the two locations was found to be

statistically significant. The greatest decrease was found to be in the area covered by postcode 2011. Possible explanations that need to be considered include shifting demographics of the injecting population, such that there was a greater decline in the number of people injecting in the immediate vicinity (postcode 2011) than the neighbouring postcode (2010). However, the rapidity of the decline in the immediate vicinity indicates that the Sydney MSIC had a direct effect on reducing the need for ambulance services for opioid overdoses in this area. It would be reasonable to conclude that the Sydney MSIC has provided an environment where IDUs at risk of overdose can receive appropriate care and early intervention, without the need to access ambulance services. This in turn may have freed ambulance services to attend other life threatening call-outs within the community. These data also suggest that supervised injecting facilities may have limited geographical impact and are likely to have the strongest impact on drug-related morbidity and mortality in areas of concentrated drug use.

In the European and North American contexts, supervised injecting facilities have been associated with short term improvements in public amenity indicators such as reduced public injecting and reduced public disposal of needles and syringes (Zurhold et al., 2003; Kerr et al., 2005; Stoltz et al., 2007; Thein et al., 2005; Wood et al., 2004; Razali et al., 2007). A previous evaluation report by the NCHECR presented the results of cross sectional telephone surveys of residents and businesses in the Kings Cross vicinity and compared perceptions of public amenity prior to the establishment of the Sydney MSIC, after 18 months and then following four and a half years of operation (Salmon et al., 2007). This report found that the proportion of both residents and business operators who reported recently seeing needles and syringes discarded in their local area decreased significantly from 2000 (prior to the opening of the MSIC) to 2002 and 2005. This is consistent with declining monthly counts of discarded needles and syringes collected locally by the Kirketon Road Centre's Needle Clean Up Team. That is, a decrease from a monthly average of 4,468 collected needles and syringes in the period prior to the MSIC opening (January 2000 to April 2001) to a monthly average of 2,302 collected needles and syringes in the period following the opening of the MSIC (May 2001 to January 2007), equating to a 48% decrease over time.

The overall cost of the Sydney MSIC increased during the period 2000 to 2007, primarily due to increases in client visits and associated staffing and consumable costs. Staffing costs have risen mostly due to significant State hospital award increases for all staffing categories, increased operating hours and the creation of an additional full time case referral coordinator position. The cost per client visit decreased and utilisation rates increased, demonstrating realisation of economies of scale. The projected number of client visits to the services in 2006/07 was 21 per hour, an increase from 17 in 2004/05 and 18 in 2005/06. Any further increases in visits to inject per hour may require parallel increases in budget allocations. While not possible within the confines of the current evaluation, future consideration of cost efficiency should be informed by a comprehensive assessment of the health care costs averted by the intervention. The comprehensive economic evaluation conducted for

the first 18 month trial of the Sydney MSIC concluded that the potential rate of return of the MSIC to the community, in terms of the value of deaths adverted, is comparable to some other widely accepted public health measures (MSIC Evaluation Committee, 2003). A recent assessment of the economic impact of *Insite*, Vancouver's supervised injecting facility, estimated that the service saved between $3,862,000 and $8,780,000 in health care expenses over a two year period (Drucker, 2006).

To date, more than 28 methodologically rigorous studies have been published in leading peer-reviewed medical journals (Strathdee and Pollini, 2007). A growing body of evidence indicates that supervised injecting facilities are associated with reductions in overdoses, needle and syringe sharing, public injecting and numbers of publicly discarded syringes (Zurhold et al. 2003; Kerr et al., 2005; Stoltz et al., 2007; Thein et al., 2005; Wood et al., 2004; Hedrich, 2004), access to primary health care and low threshold interventions by a marginalised population (Hunt, 2006) increased uptake of drug detoxification and addiction treatment programs (Wood et al., 2006b; Wood et al., 2007) and have not led to increases in drug-related crime or rates of relapse among former drug users (Wood et al., 2006a; Kerr et al., 2006). The results presented here as part of the evaluation of the Sydney MSIC trial, add to and strengthen this evidence base. The evaluation findings for the current trial are consistent with international research which suggests that supervised injecting facilities are effective in reducing the harms associated with injecting drug use.

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7. Limitations

- A well designed and conducted randomised controlled trial remains the best study design for determining a causal relationship between a public health intervention and its outcomes. The scientific, practical, resource and ethical issues involved in applying this methodology to evaluating complex public health interventions such as supervised injecting facilities mean that the likelihood of obtaining this level of evidence is negligible. The next best study design is a long term prospective cohort study, utilised in the evaluation of the Vancouver supervised injecting facility, but currently unavailable here due to resource limitations. In lieu of the availability of this type of data, this report has relied on standard health service indicators as well as cross sectional survey data.
- Data on socio-demographic characteristics, injecting drug use and risk behaviours collected during the registration process are self-reported and may be subject to both recall and measurement bias. We attempted to specify these measures with precision by asking clearly defined and well accepted questions and to reduce recall bias by only asking about current risk behaviours in the last one to six months, depending on the variable (Hunter et al., 2000). While the literature suggests that drug users generally provide reliable and valid responses (De Irala et al., 1996), it should be noted that registration data were collected by Sydney MSIC staff. As such these data may be subject to social desirability bias and we cannot dismiss the possibility of under-reporting of some risk behaviours.
- There are limitations associated with the use of the postcodes 2011 and 2010 to define the Kings Cross vicinity. These postcodes cover a large and diverse geographical area, including Darlinghurst, East Sydney, Surry Hills, Elizabeth Bay, Kings Cross, Potts Points, Rushcutters Bay and Woolloomooloo, and may be overly inclusive when considering the potential impact of the Sydney MSIC on opioid overdose-related events. However, both 2011 and 2010 have been used previously to define the potential catchment area for the Sydney MSIC in the initial evaluation report (MSIC Evaluation Committee, 2003), the community surveys (Thein et al., 2005; Salmon et al., 2007) and earlier interim evaluation reports (NCHECR, 2005; NCHECR, 2006b; NCHECR, 2007) and in the interests of consistency we have maintained this definition. It should be noted, however, that analyses based on this definition may under-estimate the potential impact of the Sydney MSIC as the impact in the immediate vicinity of the facility may be diluted.
- When considering changes in overdose-related events there are several methodological limitations related to potential confounding introduced by the reduction in the heroin supply in Australia, which followed a peak in heroin use in 1999-2000, and which coincided with the establishment of the Sydney MSIC. These limitations have been addressed by the inclusion of a control (rest of NSW) in the analyses of opioid-related deaths and ambulance attendances at suspected opioid overdoses. Assessment of the impact of location (Kings Cross

versus the rest of NSW) on the declines in opioid-related deaths and opioid poisoning presentations to Emergency Departments may have been hampered by small sample sizes. Additionally, the analysis of opioid poisoning presentations was limited to the two study area hospitals only, which did not allow for a comparison of any reduction in presentations outside the study area.

- As stated in Chapter 3, it should be noted that counts of ambulance attendances at suspected opioid overdoses will: a) include a small number of patients who have not overdosed from using heroin per se but who received naloxone (Narcan®) as empirical treatment to exclude this as a cause of decreased level of consciousness; and b) exclude actual heroin overdose cases where naloxone was not indicated or where the attending officers were not authorised to administer naloxone or where the patient declined naloxone. However, the reliability of these data as an indicator of the prevalence of non-fatal opioid overdose (Degenhardt et al., 2001) and its correlation with trends in fatal overdoses has been established previously (Degenhardt et al., 2002).
- There were also limitations in the ability to assess any changes in patterns of disposal of needles and syringes in community sharps bin collections due to data availability.

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GIS-Epi

Geographic Information System for Epidemiology

Postcodes, 1 feature found

Rec	POSTCODE	LOCALITY
1	2010	Multiple Localities - See Index

Layers

- All Layers
  - Health
    - Public Hospitals
    - Public Hospitals - Clinic
    - Private Hospitals
    - Emergency Departmen
    - General Practices
    - Ambulance Stations
    - Pharmacies
    - Divisions Of General Pr
    - PHREDSS ED Hospitals
    - PHREDSS Proposed ED
  - Area Health Services
    - Area Health Service (20
    - AHS (2005) boundaries
    - Area Health Service (19
    - AHS (1996) boundaries
  - Localities
    - Regional localities
    - Localities
    - NSW addresses
    - Cadastre - southeast N
    - Cadastre - other NSW
    - Suburbs
    - Postcodes
    - Postal Areas 2001
    - Regional Co-ordination
  - Roads
    - Motorway
    - Primary
    - Sub-arterial
    - Arterial
    - Distributor
    - Local
    - Urban lane
    - Track

Legend

Help

Messages

centre of the screen.

By default the Auto Refresh feature is enabled. To disable

REFRESH MAP

Auto Refresh

GDA94 Longitude: **151.2361** Latitude: **-33.8949** Bookmark: -select- Approx Scale: 1 : 26,917

GIS-Epi

Geographic Information System for Epidemiology

Layers

- All Layers
  - Health
    - Public Hospitals
    - Public Hospitals - Clinic
    - Private Hospitals
    - Emergency Departmen
    - General Practices
    - Ambulance Stations
    - Pharmacies
    - Divisions Of General Pr
    - PHREDSS ED Hospitals
    - PHREDSS Proposed ED
  - Area Health Services
    - Area Health Service (20
    - AHS (2005) boundaries
    - Area Health Service (19
    - AHS (1996) boundaries
  - Localities
    - Regional localities
    - Localities
    - NSW addresses
    - Cadastre - southeast N
    - Cadastre - other NSW
    - Suburbs
    - Postcodes
    - Postal Areas 2001
    - Regional Co-ordination
  - Roads
    - Motorway
    - Primary
    - Sub-arterial
    - Arterial
    - Distributor
    - Local
    - Urban lane
    - Track

Legend

Help

Messages

GIS-Epi aims to provide spatial mapping capability to Population Health workers in NSW.

REFRESH MAP

Auto Refresh

Postcodes, 1 feature found

Rec	POSTCODE	LOCALITY
1	2011	Multiple Localities - See Index

GDA94 Longitude: **151.2364** Latitude: **-33.8744** Bookmark: -select- Approx Scale: 1 : 26,917