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## SUICIDE ATTEMPTS IN NSW: ASSOCIATED MORTALITY AND MORBIDITY

*Geoffrey Sayer, Gavin Stewart and Jennifer Chipps  
Epidemiology and Surveillance Branch and Centre for Mental Health  
Public Health Division, NSW Health Department*

**T**his article is the fifth in a series on suicide in New South Wales by the Mental Health Epidemiology Group<sup>(a)</sup>. Its aim is to provide a quantitative account of suicide attempts and the associated mortality and morbidity in NSW during 1992 (the most recent year for which data were available) as context for consideration of the overall problem of suicide in NSW. We therefore assembled available data that would allow estimation of the numbers of suicide-related events for a single year in NSW, from the prevalence of thoughts of suicide (suicide ideation), through suicide attempts, access to community services, hospitalisation, referral and discharge, to disability and death. Quantifying the number of suicide attempts and their consequences, and examining the characteristics of people who experience the consequences, is a first step in determining the feasibility and benefit of possible interventions at different stages.

This quantitative account lacks detail in some important areas, and is limited in precision by variations in the ways in which "intentionality" may have been ascertained and/or defined in different data sources, to distinguish intentional self-harm from accidental self-harm. We have dealt with this by presenting much of the data in the form of range estimates which reflect our best judgement of the effects of these factors. A premise of our approach is that all suicide attempts should be treated as of equal importance, seriousness, and potential lethality unless clearly known to be otherwise. An impulsive attempt may be stigmatised as a "gesture" simply because the circumstances in which it occurred allowed intervention, treatment, and survival, whereas an equally impulsive attempt may result in death because of different circumstances such as isolation. Although not all people who harm themselves intend to die at the time of the attempt, it is also likely that some of those who died did not intend to do so either. Similarly, a carefully planned attempt meeting all the usual criteria of "seriousness" may not result in death, though at the time the person fully intended that result. For this report we consider only the officially classified and reported data on actions and their consequences.

### METHOD

We use the term "suicide attempt" to identify actions which are classified as intentional, and carry an acute risk of self-harm, including possible death, as the consequence. We considered a suicide attempt to be any intentional self-poisoning or self-injury (ICD-9-CM codes E950-E959)<sup>1</sup>, whether or not the suicide attempt resulted in death. We determined the number of suicide attempts resulting in death in 1992 from deaths occurring in that year within Australian Bureau of Statistics (ABS) deaths registrations for 1992 and 1993; and the number of suicide attempts resulting in hospitalisation from the 1991-1992 and 1992-1993 NSW Inpatient Statistics Collection (ISC), using separations between January 1 and December 31, 1992. All incoming inter-hospital transfers (see Figure 1) were excluded from most estimates on the assumption that the separation had been recorded and reported as a

(a) The contact address for MHEG is Mental Health Epidemiology Group, Centre for Mental Health, Public Health Division, NSW Health Department, Locked Bag 961, North Sydney 2059.

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### Correspondence

*Please address all correspondence and potential contributions to:*

*The Editor;  
NSW Public Health Bulletin,  
Public Health Division,  
NSW Health Department  
Locked Bag No 961,  
North Sydney NSW 2059  
Telephone: (02) 391 9191  
Facsimile: (02) 391 9029*



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recorded and reported as a suicide attempt at the hospital from which the patient was transferred. Combining the death and hospitalisation data also added duplicate death records – some people who were admitted to hospital subsequently died. We subtracted the number of in-hospital deaths from total number of deaths to arrive at an estimate of the number of people who attempted suicide and died without reaching hospital<sup>(b)</sup>.

The results are therefore based on:

- ISC and ABS data; and
- interpolations of data derived from reports of NSW or Australian data, published and unpublished.

Data from the latter source, or obtained by subtraction of such data from a known number, are expressed as ranges. The uncertainty behind these ranges reflects the quality and/or variability of the available studies and judgment of their applicability to the NSW environment. All numbers in brackets are estimates, and should not be quoted or used without a full explanation of the way in which they depend on the sources for the estimation. The global estimate of the number of attempts, for example, rests entirely on multiplying the number of deaths by either 30 or 40, and this estimate of the multiplier rests on a single paper<sup>2</sup> in the literature.

### RESULTS

Figure 1 summarises NSW data on the estimated frequency of suicide attempts in 1992 and the associated mortality and morbidity. In broad terms, the data towards the top of Figure 1 are most reliant on estimates; data in the lower part of the diagram are based on analysis of hospital separations. Deaths are recorded on the right of the figure, and there are only two data items involved: 741 in total from the ABS data, and 53 deaths in hospital from ISC data. Discharges and returns to the community appear on the left of the figure, and the health care data in the centre.

In describing the estimates, we have followed the temporal order of events, from the top to the bottom of Figure 1, explaining the basis for each estimate and giving a summary account of the data sources considered. This treatment is intended to allow others to repeat the process for their own purposes if they have access to better or more locally relevant information, or to evaluate the evidence differently.

• **Estimates suggest that 1-2 per cent of the NSW population in 1992 had thoughts of suicide.**

We estimated the prevalence of suicidal ideation from another estimate: the prevalence of self-harm attempts.

(b) Deaths in hospital reflect the coding assigned by hospital staff to the records of patients admitted for treatment, whereas deaths in the official ABS data are classified by a specialist Cause of Death Coding Unit in the Queensland ABS Office. This is done to ensure national consistency in cause of death data, and is based on information from coroners and the State Registries of Births Deaths and Marriages. Thus some of the in-hospital deaths by suicide may be classified differently in ABS data, and it is also possible that some in-hospital deaths would be classified as suicide by ABS when they were classed in some other way (e.g. accidental) in the ISC data.

The Western Australian Child Health Survey<sup>3</sup> found that one adolescent reports making a self-harm attempt for every three who report thinking about suicide or self-harm in a six-month period. Although there is no good reason to suppose this ratio would apply in other age groups or for 12 months rather than six, we have been unable to find any other Australian data on the ratio of suicidal ideation to actual attempts. Therefore we have used the ratio 3:1 for all people in NSW. Given the estimate of 22,000-30,000 attempts (see below), we estimated that between 66,000 and 90,000 people (1-2 per cent of the NSW population) had suicidal ideation in 1992.

• **Estimates suggest that 22,000-30,000 people in NSW made attempts at self-harm of some kind in 1992.**

It is estimated<sup>2</sup> that for every suicide death there are 30-40 attempts. There were 741 deaths by suicide in NSW in 1992. Thus we can estimate that there were between 22,000 (i.e. 741 x 30) and 30,000 (741 x 40) attempts, or a crude population rate of about 370-500/100,000 people per year.

• **Only 7 per cent of those who died had survived long enough to be hospitalised.**

There were 741 fatal suicide attempts, and 53 people died in hospital after being admitted after a suicide attempt. Thus we estimated that 688 people died from suicide without hospitalisation. This would include deaths occurring during ambulance transport, in emergency departments, or in the course of any form of health care before hospital admission, as well as those whose attempt had fatal consequences before any form of care could be provided.

• **Estimates suggest that 20-50 per cent of people who made attempts were treated in the health system.**

We estimated the number of people receiving health care after suicide attempts from the estimated number attending Emergency Departments (EDs) (about 4,600-9,900: see below) and general practitioners or other community services (about 400-1,200: see below). Together, these suggest an overall estimate of about 5,000-11,100 seen in the health system, or about 20-50 per cent of the 22,000-30,000 people who made suicide attempts.

• **About 4,600-9,900 of those who made suicide attempts attended Emergency Departments of hospitals.**

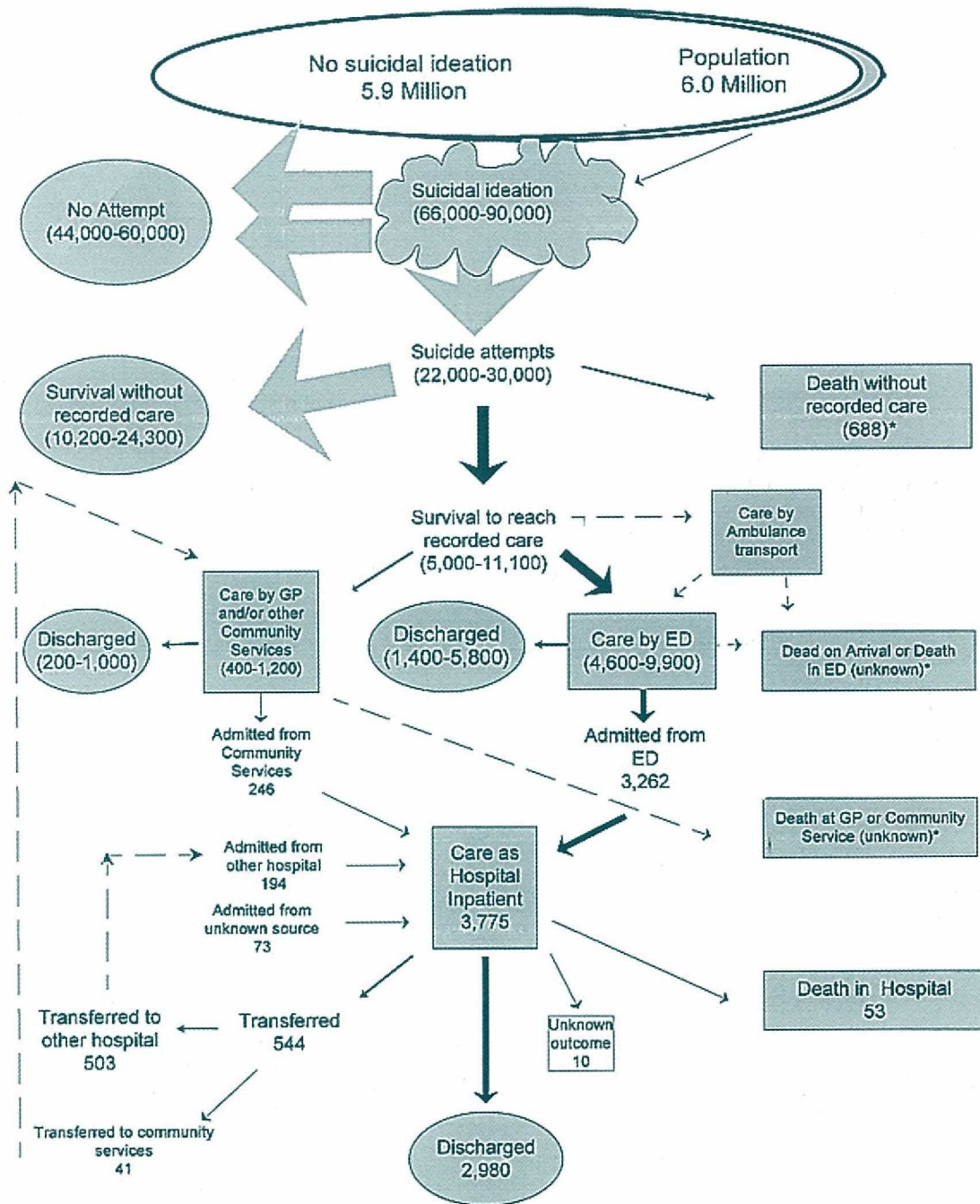
In NSW in 1992 there were no comprehensive data on the number of patients attending an ED after a suicide attempt. At present there is a standard Emergency Department Information System (EDIS) which is operational in 47 major EDs around NSW, but suicide attempts are not routinely identified in the system. We have therefore used information from a survey of all patients attending the Royal Adelaide Hospital ED in the three years 1986-88, which showed that about 70 per cent of those attending after a suicide attempt were admitted as inpatients<sup>4</sup>. Since we know from the NSW ISC data for 1992 that there were 3,262 inpatient episodes of care which began with an admission from ED after a suicide attempt, we can estimate the total of ED attendances as about 4,600 (= 3,262 x 100/70).

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**FIGURE 1**

ESTIMATED NUMBERS OF SUICIDE-RELATED EVENTS, NSW, 1992



\* All locations of death recorded as "unknown" are indicated in the non-hospital death total of 688.



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On the other hand, the figure of 70 per cent from the Royal Adelaide Hospital was determined from a survey which reviewed ED case files and used the ED data on admissions to the hospital, rather than using the hospital inpatient record (as we did). When South Australian hospital inpatient morbidity records were used rather than ED records, it appeared that 68 per cent of those attending the ED after a suicide attempt were admitted in 1986, and 81 per cent in 1987, but only 33 per cent in 1988. The drop in 1988 simply reflected a change in administrative policy by the South Australian Health Commission, requiring "unequivocal" evidence of suicidal intent before an admission could be coded as a suicide attempt. Thus in 1988 the number of ED attendances meeting survey criteria remained much the same as in previous years, as did the number of admissions from the ED, but more than half these admissions failed to meet the revised definition used in the hospital record.

If the 3,262 episodes of inpatient care in NSW represented as little as 33 per cent rather than 70 per cent of ED attendances, this would lead to an estimate of 9,900 ED attendances after suicide attempts rather than 4,600. Uncertainty about the comparability over time and different hospitals in the criteria for classifying self-injury and self-poisoning as "intentional" therefore makes it very difficult to estimate ED attendances from inpatient admissions with any assurance. To reflect this uncertainty we have given the whole range 4,600-9,900 as the best estimate of ED attendances in NSW in 1992, although we believe the lower figure is more likely, in view of our other analyses of ISC data between 1988-89 and 1993-94<sup>5</sup>.

• **Information reflecting community (non-hospital) services suggests that between 400 and 1,200 general practice encounters were for suicide attempts in NSW in 1992.**

In a national survey of general practitioners in 1990-1991<sup>6</sup>, 12/100,000 encounters involved a person whose reason for presentation was suicidal tendencies, suicidal impulses, suicidal personality, suicidal ideas, suicide attempts or suicide acts<sup>7</sup>. In 8/100,000 encounters the GP decided the problem to manage was the suicide attempts, ideation and related behaviours. There were about 30 million general practitioner consultations in NSW in 1992. Using the "reason for encounter" rate, we estimated that about 2,400 GP encounters were suicide-related. Alternatively, using the rate for the decision by the GP to manage the problem, we estimated that about 3,600 GP encounters were suicide-related. Applying a 3 to 1 ratio of ideation to attempts, as before, we estimated that between 800 and 1,200 GP encounters in 1992 would have followed a suicide attempt.

Another way of attempting to estimate attendances in general practice can be based on data from the South East NSW Public Health Unit<sup>8</sup>, in a rural area. These data showed that 58 per cent of those who saw GPs after suicide attempts were admitted to hospital. The 1992 ISC contained 246 direct admissions following a suicide attempt where the source of referral was given as community services. If all of these were from GPs, about 400 ( $=246 \times 100/58$ ) GP attendances related to suicide attempts. This is well below the previous estimate of 800-1,200 GP encounters. Direct admissions by GPs are likely to occur more in a rural area

than metropolitan areas, because GPs in country areas have closer links with the hospital system and are more likely to manage their own patients in the local hospital<sup>9</sup>. It is thus more likely that in metropolitan areas the admission would be via the ED, even if initiated from a GP consultation. This would result in 400 being an under-estimate. Since this cannot be resolved with available data we have simply taken the range from the lowest to the highest estimate, namely 400-1,200.

• **We have little information on how people reach care.** The NSW Ambulance Service keeps records of ambulance transportation, but the primary focus of this data collection is enumeration of transports and details of trauma. No information is recorded on intentionality, that is, the distinction between accidental and self-inflicted injury. Statistical record linkage of Ambulance Service data and ISC data by Epidemiology and Surveillance Branch may provide this information in the future.

An unpublished review by South Eastern NSW Public Health Unit suggested that 8.5 per cent of patients transported by ambulance after suicide attempts were dead on arrival at ED<sup>8</sup>. These data were limited to the rural South East region of NSW, and covered the period between February and July 1991. Assuming that all those reaching ED after suicide attempts were transported by ambulance, we might estimate that about 350 people Statewide were dead on arrival at EDs. This estimate seems far too high, but cannot be confirmed or refuted with the available data.

• **We have little data on how people are discharged from care.**

The lower part of Figure 1 shows that 79 per cent (2,980/3,775) of patients were discharged home. There is clearly a discrepancy between the number of separations recorded in the ISC as transferred to another hospital (503) and as admitted from another hospital (194). These figures would be expected to be more or less equal. It seems likely from other unpublished comparisons that incoming patients transferred from other hospitals were received at the ED and thus recorded in the ISC as admitted from the ED<sup>6</sup>. The main deficiency in discharge data, however, is that we have little or no information on whether patients have after-care support services available. Only a very small number (41) are recorded as being discharged to "community services", and it is not clear what these services might be. Clearly, there is considerable scope for improving information about after-care.

• **The method used in a suicide attempt is important in determining survival.**

Table 1 shows data by the method used for those suicide attempts which resulted in hospitalisation and/or death (information is available only on attempts resulting in hospitalisation or death). For each method, we calculated a fatality rate and a hospitalisation rate. There is a clear distinction between the three methods most likely to be fatal (hanging, firearms, and motor vehicle exhaust gases were the method in 14 per cent of these attempts, and resulted in 68 per cent of deaths) and the two methods most likely to be used (self-poisoning with therapeutic drugs and self-cutting were the method in 75 per cent of these attempts, and resulted in 16 per cent of deaths).

(c) We thank Dr Mike Hill for drawing our attention to a similar issue in the analysis of transfers of trauma patients in 1993-94 ISC data. Many of these transfers may also be recorded in current ISC data as "readmissions within 28 days" which would also inflate the apparent suicide reattempt rate.



- **Contrary to the view that more women than men make suicide attempts, there was little difference for those attempts resulting in hospitalisation and/or death in 1992.**

The crude hospital separation rate for females following suicide attempts was higher than for males (69/100,00 compared to 57/100,000 people respectively in NSW in 1992), but this included inter-hospital transfers. Excluding incoming transfers to obtain a hospitalised suicide attempt rate, the difference between females and males remained (67/100,000 compared to 54/100,000 people respectively). However, when we added the suicide deaths from the ABS data and eliminated the double counting of those who died in hospital to determine an overall suicide attempt rate, the difference between males and females almost disappeared (73/100,000 compared to 71/100,000 people respectively). Thus attempts resulting in the serious consequences of death or hospitalisation were equally frequent among men and women in NSW in 1992.

## DISCUSSION

The numerical estimates in Figure 1 are useful in considering where interventions may be made, and where their impact might be monitored if relevant, current, local data were available on a regular basis. The following discussion is intended only to illustrate some of these possibilities.

### Areas for targeting interventions

Starting with the population as a whole, it is clear that the general community debate about the suicide rate, and attention in the media, may increase the proportion of those who think about suicide in general, and for some this might lead on to suicidal ideation. This is recognised as an issue in the suicide prevention literature, and could be monitored by sample surveys if need be.

It may also be that a broadly-based and specific survey may show that rates of suicidal ideation are more prevalent and not related to media attention, or perhaps related to other social and personal influences (e.g. poverty, unemployment, personal loss and distress).

Similarly, we could monitor, by surveys, the proportion of a population who report suicidal ideation, relative to the proportion of those who report making an attempt. These data might be used to monitor the overall impact of services which aim to encourage people thinking about suicide to make contact for support (e.g. telephone support services). However, we have only a very crude estimate of the proportion who move from the stage of ideation to the stage of making an attempt, let alone the proportion of attempts

preventable by telephone support and similar services. Though we lack baselines from which to judge the impact of those services, the measurable benefit of intervention at this stage is most likely to lie in the following areas:

- Reducing deaths where an impulsive, relatively unplanned attempt has fatal consequences because of the method, or the isolation of the individual which prevented discovery in time to intervene (as in self-poisoning).
- Reducing morbidity from non-fatal attempts.

Once an attempt has been made, and if the person has survived, we estimate that between 10,200 and 24,300 survivors in NSW in 1992 did not come to the attention of health services. We do not know the level of physical or psychological morbidity in that sub-group of survivors, or the proportion who might later make other attempts, or any other factor which distinguishes this group from others. On the other hand, we also know that between 5,000 and 11,100 of those who made suicide attempts survived to reach health care, mainly hospital EDs and inpatient services, and that there were relatively few deaths in this group. Combining these observations suggests the following:

- There is considerable scope for programs to improve the proportion of people who contact health services after a self-defined suicide attempt, even where the immediate physical consequences were not severe.
- GP and other community health services were not heavily used and might well address the needs of this group. This could be monitored by more frequent surveys of general practice as well as community health services.
- EDs should be a major focus for interventions to reduce the risk of people making another attempt.
- It is important to ensure that those who attempt suicide and survive to reach health care receive the best care possible<sup>10</sup>. Best practice guidelines for management of suicide attempts should be developed in conjunction with the existing NSW protocol for the management of suicide attempts<sup>11</sup>, which requires facilities to have policies and procedures for the assessment of the risk of suicide in specific settings, such as accident and emergency departments.
- Adequate post-discharge follow-up data is essential if we are to monitor the effectiveness of prevention programs for those who reach care.

### Improving the evidence

The only annual data available in NSW on suicide record deaths and hospitalisations, both of which have a

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TABLE 1

METHODS OF SUICIDE ATTEMPTS RESULTING IN DEATH OR HOSPITALISATION IN NSW, 1992.

Method	Attempts	Died without hospitalisation	Hospitalised	Died in hospital	Survived	Fatality rate (%)	Hospitalisation rate (%)
Hanging	230	186	44	2	42	82	19
Firearms	211	145	66	13	53	75	31
Motor vehicle exhaust gas	203	127	76	4	72	65	37
Jumping from a high place	102	56	46	3	43	58	45
Cutting and piercing instruments	382	19	363	4	359	6	95
Poisoning with therapeutic drugs	2,975	99	2,876	13	2,863	4	97
Others	360	56	304	14	290	19	84
<b>Total</b>	<b>4,463</b>	<b>688</b>	<b>3,775</b>	<b>53</b>	<b>3,722</b>	<b>17</b>	<b>85</b>



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considerable time lag between the events and the availability of data. All other data in this article had to be inferred or interpolated from ad hoc studies at various times and in various places, whose relevance to the NSW situation in 1992, let alone in 1996, is, at best, arguable. Very little of the large volume of published research on suicide, or speculation about its "causes", has contributed to a population-based picture, even for a single year, of the suicide problem in NSW. A number of steps might be taken to address the main issues:

- Epidemiologic surveillance of suicide deaths can be improved by conducting clinical audits and establishing surveillance of "probable" suicide from coroners' data, pending implementation of the National Coronial Information System.
- Epidemiological surveillance of non-fatal attempts can be improved by more regular surveys of general practice and surveys of other primary health care services, pending full implementation of information systems in all NSW Health community health services.
- Full implementation of EDIS will assist in better estimating the level of presentation to EDs in NSW, and more detailed studies at individual EDIS sites would improve estimates of current ED attendances and admission rates, ideally for specific population sub-groups.
- Improved flow of patient information between ambulance, ED, inpatient and community-based after-care services would help to ensure continuity of patient care as well as improve information on the effectiveness of interventions.
- Research to reduce the imprecision of estimates in Figure 1, whether by surveys or improved data collection in health care settings, would considerably enhance our ability to monitor the specific impacts of programs.

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In this issue we introduce a new format for reporting on infectious diseases. The format is designed to show Statewide trends *at a glance* for the diseases most likely to vary meaningfully over the year. The graphical presentation replaces some of the tables which appeared in earlier editions of the *Bulletin*. We encourage your comments on this new format - please fax them to Dr Jeremy McAnulty, Medical Epidemiologist, on (02) 9391 9848.

Editor

## TRENDS

In the new reporting format, Figure 2 shows cases of selected infectious diseases by month of onset over the previous 12 months. Numbers of diseases reported in each Area can be found in Table 3.

Reports of arbovirus infections (mostly Ross River virus [from the North Coast, Northern Districts and Western NSW<sup>1</sup>] with some Barmah Forest virus [mainly from the North Coast and Northern Districts]) and hepatitis A continued to decline in April. There is good news about the occurrence of vaccine-preventable diseases, with steady declines in notifications of measles, pertussis, and rubella over the past few months. Reports of leptospirosis peaked in March with six cases. Cases were reported mostly from north-eastern NSW, largely in abattoir or agricultural workers.

## INFLUENZA SURVEILLANCE

Influenza activity appears to be the same or slightly lower than at the same period in the previous few years.

Reports of influenza-like illness (ILI) from the NSW Sentinel General Practitioner (GP) Surveillance Scheme are being received through six Public Health Units (PHUs) from more than 50 GPs carrying out about 7,000 consultations a week. Figure 3 shows that the State average consultation rate for ILI during the first week of June was slightly lower than the average for the previous few years. The Western Sydney Area had the highest consultation rate at 3 per cent.

School absentee rates are being monitored from 11 schools with a total of about 10,000 students, through six PHUs. Figure 4 shows the average absentee rate in the first half of June was similar to the average for this time of year. The high rates during March were due to causes other than infectious diseases.

Reports from Sydney laboratories indicate that for May and the first half of June, diagnoses of influenza A were increasing (there were 11 serological diagnoses and seven virological diagnoses), while influenza B was still uncommon (three serological diagnoses). Respiratory Syncytial Virus is by far the most commonly diagnosed respiratory virus, with about 200 diagnoses in this period.

1. So far this year, Western NSW has received more reports of arbovirus infections than for any year since 1990 - mostly from around Dubbo and Lightning Ridge. Anecdotally, fewer reports of illness were received from towns where residents were offered free bottles of insect repellent (of course, cause and effect cannot be assumed).

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