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DEVELOPMENT OF A CHRONIC DISEASE RISK FACTOR INDEX AND IDENTIFYING POPULATION SUBGROUPS AT RISK USING NEW SOUTH WALES ADULT HEALTH SURVEY 2002 DATA

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Recent chronic disease prevention frameworks at both the national and state level in Australia have emphasised a transition from vertical, single-issue public health efforts to a more coordinated approach that targets clustered risk factors for chronic disease.[1,2] An integrated approach to reducing modifiable risk factors requires the development of suitable performance measures that can be used to monitor the progress and effectiveness of combined efforts as well as to identify trends in the risk of population subgroups to assess progress in addressing health inequalities.

NSW Health recently proposed the concept of a 'Dashboard of Indicators' to monitor health system performance and prevention activities. This study describes different methods of calculating an indicator of chronic disease risk using health behaviour measures from the NSW Adult Health Survey 2002, and explores the use of a summary indicator for identifying subgroups within the population at high risk of developing chronic disease.

BACKGROUND

An important role of surveillance is to describe the population prevalence and clustering of risk factors for chronic disease.[3-9] Risk factor clustering has been described for obese populations[10] and for those with coronary artery disease.[11] Other studies have used cohort data on multiple risk factors to predict mortality[12-14] or specific disease outcomes.[11, 13-15]

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The methods for assessing risk factor clustering vary widely across studies. Most researchers have simply summed the number of risk behaviours or conditions for each person[4, 6, 7, 9, 10, 13-16], while others have looked at *a priori* defined combinations of specific risk factors[5, 11, 12] or which risk factors are more likely to co-exist or 'cluster'.[6-8] Murtagh and colleagues also calculated a numerical risk score which considered the magnitude of the dose-response relationship in the scoring system.[8] Kim and colleagues created a 'lifestyle index' that also weighted different risk factors according to their contribution to different disease outcomes in China and the United States.[17] This paper extends previous work by developing and comparing indexes that include a weighting of risk factors by their contribution to the burden of disease in Australia, which is methodologically more rigorous than previous summary indices.

The chronic diseases included in the *NSW Chronic Disease Prevention Strategy* 2003–2007 are cardiovascular diseases, cancers, asthma and chronic lung disease, non-insulin-dependent (Type II) diabetes, obesity, injuries from falls, and poor emotional and psychological well-being.[2] The primary risk factors agreed upon in the strategy as potentially contributing to chronic disease risk include smoking, poor nutrition (lack of fruit and vegetables), hazardous alcohol use, physical inactivity, and psychosocial risk factors such as stress. This study describes the development of summary indices for clusters of chronic disease risk factors in the NSW population, based on risk behaviours reported in the NSW Adult Health Survey 2002.

METHODS

This analysis used data from all adults (aged 16 years and over) who participated in the NSW Adult Health Survey 2002. Cases were excluded where the participant had not responded to survey items to assess each of the risk behaviours and demographic variables.

The model of chronic disease risk outlined in the *Chronic Disease Prevention Strategy 2003–2007*[2] formed the basis of the analysis, with slight modifications for theoretical and measurement-related reasons. Psychological health was excluded from this analysis for two reasons: firstly

TABLE 1

RISK FACTOR SCORE ASSIGNMENT TO THREE CHRONIC DISEASE RISK FACTOR INDEXES

	Definitions of risk and attributable weight			
	Index 1	**Index 2**		**Index 3**
	Dichotomous categories currently used for NSW Health reporting (un-weighted) (Range = 0–5)	Dichotomous categories weighted for different contributions to the score proportionate to their contribution to total DALYs[a] (Range for males = 0–2.47) (Range for females = 0–3.08)[b]		Unweighted multiple categories developed according to linear risk associated with differing levels of the risk factor (Range = 0–3.8)
		Males	**Females**	
Smoking	Smoker = 1 Non–smoker = 0	Smoker = 1 Non-smoker = 0	Smoker = 1 Non-smoker = 0	Smoke daily = 1 Smoke occasionally = 0.8 Ex-smoker = 0.5 Never smoked = 0
Lack of fruit & vegetables	Inadequate = 1 Adequate = 0	Inadequate = 0.25 Adequate = 0	Inadequate = 0.35 Adequate = 0	Tertiles for total serves per day Low = 0.4 Moderate = 0.2 High = 0
Alcohol[c]	Any risk drinking = 1 No risk drinking = 0	Any risk = 0.35 No risk = 0	Any risk = 0 No risk = 0	Non-drinker/low risk = 0 Hazardous = 0.3 Harmful = 0.4
Physical inactivity	Inadequate PA[d] = 1 Adequate PA = 0	Inadequate = 0.5 Adequate = 0	Inadequate = 1.1 Adequate = 0	Sedentary = 1 Inadequate = 0.4 Adequate = 0.1 High = 0
Overweight and obesity	Not o'weight/ obese = 0 O'weight or obese = 1	Not o'weight/ obese = 0 O'weight/ obese = 0.37	Not o'weight/ obese = 0 O'weight/ obese = 0.63	Underweight/ healthy weight = 0 O'weight = 0.3 Obese = 1

[a] Disability-adjusted life years

[b] Since the attributable burden of disease associated with each risk factor differs for men and women, the score for the presence of each risk factor and the resulting index (Index 2) are gender-specific.

[c] For alcohol, the total attributable risk used to calculate Index 2 and Index 3 was based on the sum of the contribution of alcohol harm and alcohol benefit (negative risk).

[d] Physical activity

because it has not been applied as a risk factor in other studies and secondly because the K-10 measure of psychological distress in the survey comprises a chronic disease outcome. Overweight and obesity (based on body mass index calculated from self-reported height and weight) was included as a risk factor rather than a disease outcome, since this is consistent with current risk factors defined in the Burden of Disease and Injury in Australia study.[18] Risk factors included in the analysis are outlined in Table 1. The definitions used to categorise exposure to each risk factor were consistent with national reporting norms[18] and are explained and justified elsewhere.[19]

Three methods for defining the primary risk factors to construct a chronic disease risk factor index were explored (see Table 1):

1. Utilising dichotomous categories currently used for reporting by the ongoing NSW Population Health Survey as a basis for scoring each risk factor, assigning a score of one for exposure to the risk factor and a score of zero for no exposure. Scores were summed across risk factors to calculate Index 1, which represents the total number of risk factors. This method assumes the equal influence of each risk factor in developing chronic disease.
2. Dichotomous scoring for each risk factor weighted proportionate to its contribution to the total burden of disease (measured in disability-adjusted life years, or DALYs)[18] relative to the contribution of smoking (set at a score of one). Risk factors were weighted relative to smoking because tobacco contributes most to the overall burden of disease.[18] Weighted scores were then summed across risk factors to calculate Index 2. This method attempts to account for the differential contribution of risk factors to chronic disease outcomes and is thus more sensitive to differences in risk factors that have higher contributions to the burden of disease (such as smoking in men and physical inactivity among women).
3. To account for dose response relationships between primary risk factors and chronic diseases, the total risk for each risk factor was divided across levels of exposure to the risk factor. This was distributed according to the estimated relative risk of chronic disease for each level of exposure to the risk factor, based on current epidemiological evidence. The sum of 'weighted' scores across risk factors was used to derive the index (see Table 1). This method attempts to account for linear associations between risk factor exposure and chronic disease, and is thus more sensitive to the cumulative effect of exposure to multiple risk factors at lower levels. The justification for the relative weighting of categories for each risk factor is reported elsewhere.[19]

In order to identify population sub-groups at increased risk and compare findings using the different indices, differences in mean risk factor index levels across the three risk indices were described by gender, age group, and ethnicity (as described by the variables 'country of birth' and 'language spoken at home'). Differences were also examined by socioeconomic status using measures of highest level of education and quintile of socioeconomic

TABLE 2

PROPORTION OF ADULTS IN NEW SOUTH WALES AGED 16 YEARS AND OVER WITH A HIGH INDEX 2 ACROSS LEVELS OF SOCIODEMOGRAPHIC CHARACTERISTICS, AND ESTIMATED ODDS RATIOS (OR) WITH AND WITHOUT ADJUSTMENT FOR OTHER SOCIODEMOGRAPHIC VARIABLES

	Men					Women				
	% (high risk)	OR	95% CI	Adjusted OR[a]	95% CI	% (high risk)	OR	95% CI	Adjusted OR[a]	95% CI
Socioeconomic disadvantage										
Least disadvantaged	19.9	1.0		1.0		19.3	1.0		1.0	
Second least disadvantaged	23.8	1.3	0.9–1.7	1.2	0.9–1.6	23.7	1.3	1.0–1.7	1.2	0.9–1.6
Mid disadvantage	26.6	1.5	1.1–1.9[b]	1.4	1.0–1.8	27.8	1.6	1.3–2.1[b]	1.5	1.2–1.9[b]
Second most disadvantaged	28.9	1.6	1.3–2.1[b]	1.5	1.3–2.0[b]	31.6	1.9	1.5–2.5[b]	1.8	1.4–2.2[b]
Most disadvantaged	32.5	1.9.	1.5–2.5[b]	1.8	1.4–2.4[b]	33.3	2.1	1.6–2.6[b]	1.8	1.4–2.3[b]
Language spoken at home										
English speaking	28.4	1.0		1.0		29.6	1.0		1.0	
Non-English speaking	24.0	0.8	0.6–1.0	0.8	0.6–1.0	27.1	0.9	0.7–1.1	1.0	0.8–1.3
Educational Attainment										
Tertiary educated	19.3	1.0		1.0		19.9	1.0		1.0	
No tertiary education	30.3	1.8	1.5–2.2[c]	1.7	1.5–2.1[c]	31.5	1.9	1.6–2.1[c]	1.6	1.4–1.9[c]

CI = confidence interval

[a] Adjusted for age and other sociodemographic characteristics presented in the table.

[b] Significantly different from those in the least disadvantaged quintile.

[c] Significantly different from those with a tertiary degree.

Source: NSW Adult Health Survey 2002

disadvantage, based on the SEIFA (socioeconomic index for areas) index of relative socioeconomic disadvantage.[20] Independent sample two-tailed t-tests and one-way analysis of variance was used to examine differences across demographic groups for each index.

Further analysis was conducted using Index 2, because this score used risk categories aligned with the current reporting categories from the ongoing NSW Population Health Survey while accounting for the differential contribution of each risk factor to overall chronic disease risk. Index 2 was categorised as 'high' (vs 'other') based on the highest quartile of scores (ie upper 25 per cent) in the distribution for men and women separately. Logistic regression analysis assessed the likelihood of having a 'high' Index 2 score based on sociodemographic variables. The models for each index were gender specific, and were calculated both with and without adjustment for other sociodemographic variables. All statistical analysis was conducted using SPSS 13.0.

RESULTS

Of the total sample aged 16 years or over, 92.8 per cent (N = 11,710) responded to all items necessary for calculation of the indices and were included.

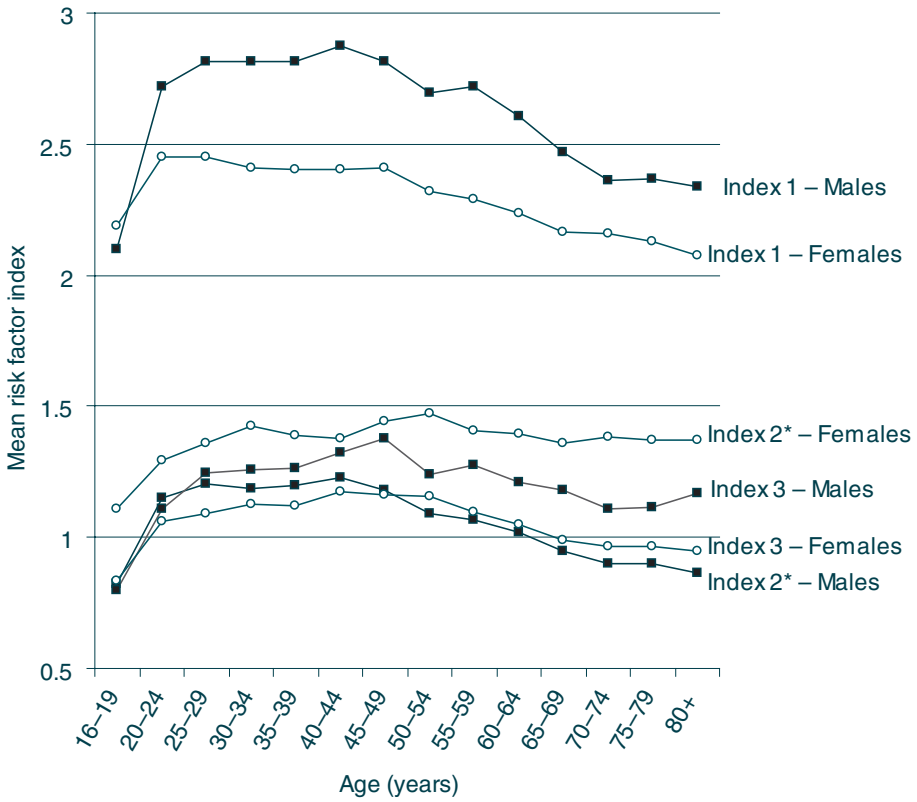
The mean index was significantly higher among men than women for both Index 1 ($p<0.001$), and Index 3 ($p<0.001$). Index 2 was not compared between men and women since score construction was gender-specific. Mean indices across all three scoring protocols were significantly different by age groups for men and women ($p<0.001$; see Figure 1). Differences between men and women in the pattern of mean Index 3 in older age groups suggest that there is a steady decline in risk with age among women that is not evident among men.

Mean index across all three indices increased significantly with increasing socioeconomic disadvantage for both men and women ($p<0.001$; see Figure 2). Similar patterns across levels of education were found for both men and women using each index, and those who had completed a tertiary degree had significantly lower risk across all indices for both men and women ($p<0.001$).

The majority of the people sampled were Australian born (80.2 per cent), and had a slightly higher mean Index 1 ($p<0.001$) and mean Index 3 ($p<0.001$) compared with

FIGURE 1

MEAN RISK FACTOR INDICES BY AGE FOR NEW SOUTH WALES ADULTS AGED 16 YEARS AND OVER IN 2002



*The score construction for Index 2 was gender specific, so the results for males and females cannot be compared.

Source: NSW Adult Health Survey, 2002

those born elsewhere (Mean (Index 1) = 2.31 and Mean (Index 3) = 1.06). When separated by gender, the mean of all indices was higher among those born in Australia than those born elsewhere ($p<0.001$).

The majority of the sample spoke English at home (92.8 per cent), and had significantly higher mean Index 1 ($p<0.001$) and Index 3 score ($p<0.05$) compared to those who spoke a language other than English. Among men, higher mean scores were evident among English-speaking respondents for all indices ($p<0.01$). English-speaking women had a significantly higher mean Index 1 ($p<0.01$) and Index 3 ($p<0.001$) compared to those who spoke a language other than English at home, but there was no significant difference in mean Index 2 scores.

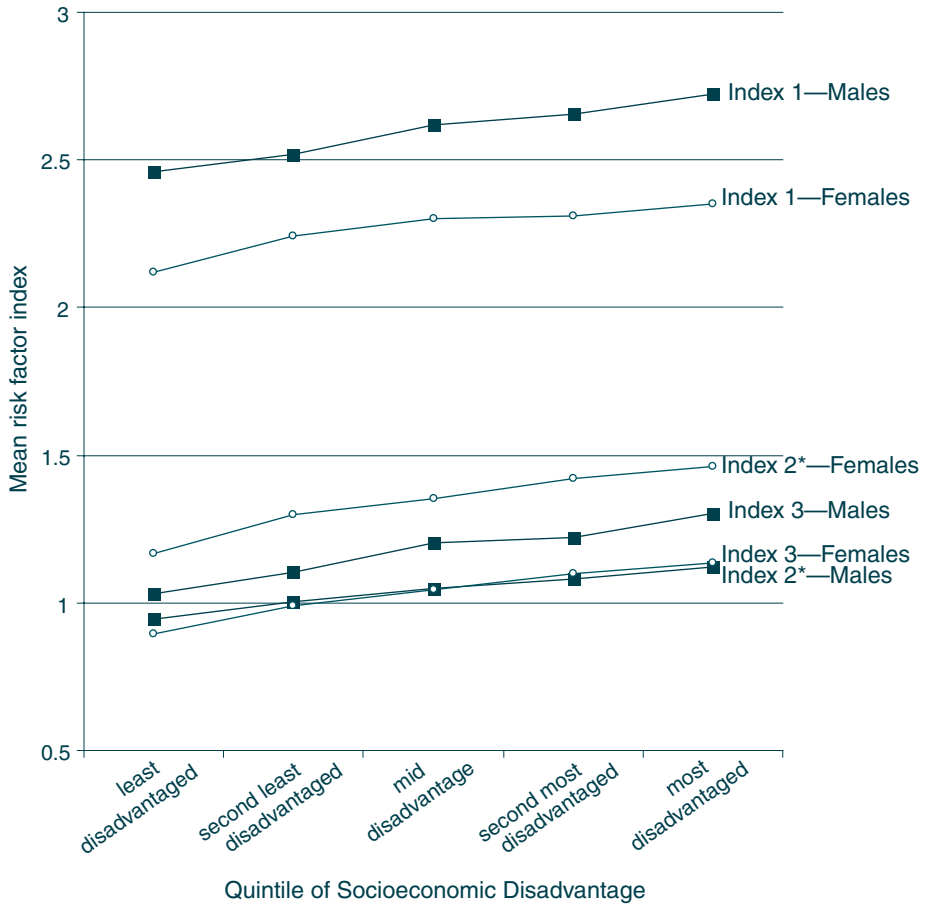
Both men and women in the three highest quintiles of socioeconomic disadvantage were more likely to be at high risk using Index 2 than those in the least disadvantaged quintile (see Table 2). Not having a tertiary degree significantly increased the likelihood of being at high risk for both men and women after adjusting for age, language spoken at home, and socioeconomic disadvantage.

DISCUSSION

The results demonstrate the calculation and use of chronic disease risk factor indices in population surveys. These different scoring protocols generally find similar at-risk population sub-groups. Consistent findings suggest that mean risk scores and the odds of a high risk score decrease with socioeconomic advantage and education among both men and women. Speaking a language other than English at home and being born outside Australia were significantly associated with lower risk, with the exception of Index 2 among women. Since Index 2 is more heavily weighted for physical inactivity because of its substantial contribution to ill health among women, lack of difference based on language may be explained by a high prevalence of physical inactivity among non-English speaking women in Australia.[21]

FIGURE 2

MEAN RISK FACTOR INDICES BY QUINTILE OF SOCIOECONOMIC DISADVANTAGE FOR NEW SOUTH WALES ADULTS AGED 16 YEARS AND OVER



*The score construction for Index 2 was gender specific, so the results for males and females cannot be compared.

Source: NSW Adult Health Study, 2002

Comparison of risk across age groups suggests that those aged 16–19 years have significantly lower summary risk scores compared with those in all other age groups. However, this may be partly attributable to misreporting of certain risk behaviours that are legislatively discouraged for those at the lower end of this age group (such as tobacco and alcohol use). Risk behaviours appear to steadily decrease with age among those 50 years and older. The observed decline in risk factors with age may be confounded by a survival effect, whereby those people who survive into older age have lower summary risk than those who do not. There is a steep decrease in number of risk factors among men from age 60, which is not evident among women. This may be attributable to the earlier onset of heart disease in men.[21]

Patterns of risk according to age group also revealed some interesting differences between an index based on crude number of risk factors compared to that which accounts for differing levels of exposure to each risk factor. Most notably, the decline with increasing age was steeper for Index 1 than for Index 3. Since the scoring of Index 3 accounts for lower levels of exposure to risk behaviours, this suggests that older groups may be engaging in risk behaviours at lower levels of exposure that are not accounted for when risk is categorised dichotomously in Index 1.

Development of these chronic disease risk factor indices was limited by the questions asked in the NSW Adult Health Survey 2002. For some of the variables, these categories do not allow sensitivity analyses using alternative categories across each risk factor. Other studies with continuous measures available have developed more sensitive dose-response weighted scoring systems. More sensitive measures of these risk behaviours and appropriate weighting of each level of exposure are likely to result in less misclassification for risk of the outcome. Nonetheless, the work here, based on the Australian Burden of Disease study [18], allows a comparison with other work done at the national level. It has also helped to identify population sub groups experiencing multiple risk factors and should inform the development of a standard index for ongoing analysis of chronic disease risks within the context of surveillance data in Australia.

CONCLUSIONS

The methods used to calculate different risk factor indices resulted in the identification of very similar high-risk population sub-groups. The findings of this study reinforce the known socioeconomic gradients in chronic disease risk as being related to economic and educational disadvantage rather than ethnicity[16], and observed trends were similar to gradients observed for single risk factors (such as tobacco, alcohol and obesity).

Index 2 uses dichotomous categories of exposure weighted proportionate to each risk factor's contribution to the total burden of disease. This method of calculating a summary measure of chronic disease risk is recommended if policymakers wish to use a summary index for ongoing surveillance; the reason for this is that it uses categories currently defined for NSW Health reporting and it is aligned with the Australian Burden of Disease approaches. [18]

A chronic disease risk factor index can be used in performance assessment for integrated public health campaigns that target multiple risk factors and attempt to address health inequities through targeting at-risk population subgroups. Before its application, the validity of the index should be tested for its ability to predict chronic disease health outcomes and for its sensitivity in detecting meaningful reductions in risk exposure.

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ADMISSION TO HOSPITAL FOR SUNBURN AND DRUG PHOTOTOXIC AND PHOTOALLERGIC RESPONSES: NEW SOUTH WALES, 1993–94 TO 2000–01

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This article describes the incidence of patients with sunburn and drug-induced phototoxic and photoallergic response who have required hospitalisation in NSW between 1993–94 and 2000–01.

BACKGROUND

High levels of ultraviolet (UV) radiation in Australia, and the fair-skinned nature of a large portion of its population, make sunburn and its long-term consequences a major public health issue in this country. Despite this, there have been few studies of the incidence of sunburn in Australia. A recent survey of men from northern Australia with a history of non-melanoma skin cancer found that over half reported recent sunburn.[1] Considerable attention has been given to the study of sun protection knowledge, attitudes, behaviour, exposure, and education programs in Australia, particularly in school children [2-5] and young adults.[6]

Photosensitivity refers to an abnormal cutaneous response involving the interaction between photosensitising substances (including many medications) and UV radiation. Medication-induced photosensitivity also has the potential to be a significant public health concern, having the potential to increase the incidence of skin cancer.[7] While Moore[7] has recently reviewed many aspects of drug-induced cutaneous photosensitivity, and Beggs[8] has raised the potential consequences of stratospheric ozone depletion for photosensitivity, the issue has been somewhat neglected in Australia. For example, Moore[7] has noted the remarkably infrequent summaries on the subject of drug-induced photosensitivity from the Adverse Drug Reactions Advisory Committee of the Australian Therapeutic Goods Administration, the most recent being in 1983[9] and 1987.[10]

This study examined routinely collected data to determine both the incidence of sunburn and drug-induced phototoxic and photoallergic response requiring hospitalisation in NSW, and the characteristics of these patients.

METHODS

Data used in this study were from NSW Health's Inpatient Statistics Collection (ISC). Eight years of de-identified unit record data were obtained, from 1 July 1993 to 30 June 2001. Clinical information in the Inpatient Statistics Collection, such as principal diagnosis, additional diagnoses, and external causes of injury or poisoning, are coded according to the International Statistical Classification of Diseases and Related Health Problems – Tenth Revision – Australian Modification (ICD-10-AM). Codes examined included L55 (sunburn), including L55.0 (sunburn, erythema), L55.1 (sunburn, partial thickness), L55.2 (sunburn, full thickness), L55.8 (other sunburn), and L55.9 (sunburn, unspecified); and L56 (other acute skin changes due to ultraviolet radiation), including L56.0 (drug phototoxic response) and L56.1 (drug photoallergic response). External causes Y40-Y59 (drugs, medicaments and biological substances causing adverse effects in therapeutic use) used in addition to the two L56 codes were also examined in

order to identify the associated drug. ICD-9-CM was used prior to the introduction of ICD-10-AM in 1998–99. The L55 diagnoses had been mapped from 692.71 (sunburn); the L56 diagnoses from 692.72 (acute dermatitis due to solar radiation); and Y40-Y59 from E930-E949 (drugs, medicinal and biological substances causing adverse effects in therapeutic use).

Temporal characteristics were examined by analysis of the data by year, month, and day of the week. Spatial characteristics were examined by analysis of the data by statistical division, and latitudinal (north or south) and coastal/non-coastal groupings of statistical divisions. Incidence rates were calculated using 1996 census populations. Rates were age-standardised using the 1996 Australian population.

RESULTS

The number of admissions for sunburn as either the principal or as additional diagnoses was small, with a total of 508 over the study period (Table 1). Most of these (58 per cent) were as principal diagnosis. In order to focus on admissions where sunburn was chiefly responsible, all sunburn results presented hereafter are for the principal diagnoses admissions only. The average annual statewide age-standardised incidence rate for sunburn was 0.58 per person year per 100,000. Overall, more females were admitted with sunburn: a male to female ratio of 0.8:1. However, more males than females were admitted between the ages of five and 14 (Table 2). The median age of admissions with sunburn was 22; the range was from less than one year of age to 95 years of age. The under five years age group had over twice as many admissions as any other age group, and admissions for children under one year of age occurred in every year. The majority of sunburn admissions (83 per cent) were born in Australia, followed by England, New Zealand, and Ireland (each with about two per cent).

Of the 293 sunburn admissions, 131 (45 per cent) had one or more additional diagnoses. Although 125 codes were used as additional diagnosis, 'burns classified according

TABLE 1

SUMMARY OF ADMISSIONS FOR SUNBURN (L55)* IN NSW FROM 1993–94 TO 2000–01

Year	Principal diagnosis *n*	Additional diagnosis[b] *n*	Total *n*	Crude rate per 100,000 person years[a]	Age-standardised rate per 100,000 person years[a]
1993–94	14	10	24	0.23	0.23
1994–95	23	11	34	0.38	0.38
1995–96	23	12	35	0.38	0.33
1996–97	32	26	58	0.53	0.52
1997–98	25	38	63	0.41	0.40
1998–99	76	38	114	1.26	1.21
1999–00	51	43	94	0.84	0.83
2000–01	49	37	86	0.81	0.75
Total	293	215	508	0.61	0.58

*L55 includes sunburn, erythema; sunburn, partial thickness; sunburn, full thickness; other sunburn; and sunburn, unspecified.

Note: a these relate only to principal diagnosis.
b additional diagnoses of sunburn where sunburn was also the principal diagnosis are excluded.

Source: NSW Health Inpatient Statistics Collection

TABLE 2

AVERAGE ANNUAL HOSPITAL SEPARATION RATES (PER 100,000) FOR SUNBURN BY AGE GROUP AND GENDER, NSW, 1993–94 TO 2000–01

Age (years)	Males	Females	Total
0–4	1.60	1.98	1.78
5–9	1.08	0.42	0.76
10–14	1.14	0.30	0.73
15–19	0.65	0.87	0.76
20–24	0.17	0.81	0.49
25–29	0.62	0.50	0.56
30–34	0.37	0.69	0.53
35–39	0.37	0.67	0.52
40–44	0.11	0.45	0.28
45–49	0.18	0.78	0.48
50–54	0.30	0.76	0.53
55–59	0.45	1.11	0.77
60–64	0.21	0.73	0.47
65+	0.27	0.17	0.21
Total	**0.54**	**0.68**	**0.61**

Source: NSW Health Inpatient Statistics Collection

to extent of body surface involved' (T31) made up 22 per cent of additional diagnoses, with the next most common being 'volume depletion' (E86) with six per cent. Only 77 (26 per cent) of the sunburn records included an external cause of injury or poisoning code, with the most common of these being exposure to sunlight (X32).

The number of sunburn admissions varied from year to year, with the lowest number, 14, in 1993–94 compared to 76 in 1998–99. There was a distinctive seasonal distribution (Figure 1), with most admissions occurring in November to February inclusive, and particularly high rates in December and January (25 per cent and 28 per cent respectively). Admissions also varied according to the day of the week, with 25 per cent occurring on Tuesdays and 17 per cent on Mondays and Thursdays. The western (non-coastal) statistical divisions appeared to have the highest rates, with the overall average annual age-standardised incidence rate of these being 0.82 per person year per 100,000 compared to 0.54 per person year per 100,000 for the eastern (coastal) statistical divisions. A much smaller difference was seen in northern versus southern statistical divisions (age-standardised incidence rates of 0.64 and 0.57 per person year per 100,000 respectively).

There were no admissions for drug phototoxic response, and admissions for drug photoallergic response occurred in only two years, 1998-99 and 1999-00, with less than five cases in each year. External causes of these few cases included tetracyclines (systematic antibiotics) (Y40.4), other systemic antibiotics (Y40.8), iminostilbenes (Carbamazepine, an antiepileptic) (Y46.4), and unspecified drug or medicament (Y57.9).

DISCUSSION

The NSW Inpatient Statistics Collection (ISC) is the most reliable measure of illness that can be readily obtained from official sources. It is a 'census of all admitted patient services provided by New South Wales Public Hospitals, Public Psychiatric Hospitals, Public Multi-Purpose Services, Private Hospitals, and Private Day Procedures Centres'.[11] Therefore, one of its limitations is that it does not capture patients who present only to emergency departments, general practices or other non-hospital health services (such as pharmacies), or those who do not consult any health service. Errors that have been identified for the ISC include non-response (failure to collect all relevant data), errors in transcribing patient data from medical records to the collection media, coding errors, and clerical and editing errors. It is also noteworthy that the reliability of ISC data depends on the specific disease, and that there is likely to be variability in hospital admission practices.

The overall predominance of females admitted for sunburn is consistent with studies of adolescents in NSW showing a lower prevalence of adequate sun protection in females compared to males, and gender being a significant predictor of having an adequate level of sun protection.[2] The concentration of admissions in younger age groups is a concern, given that sunburn in children and adolescents may play an important role in the development of melanoma. [2,3]

Although the cause of the peak in sunburn admissions in 1998–99 is unlikely to be simple, it is noteworthy that the area of the Southern Hemisphere stratospheric ozone hole (where the total ozone amount is less than 220 Dobson units) was particularly large in the spring and summer of 1998, existing for longer (to 15 December) than in any other year recorded and almost reaching its maximum size (around 27 million km^2).[12] The introduction of ICD-10-AM in 1998–99 may have also contributed to the big increase in separations in this year. In other similar studies[13], it has been suggested that such an increase could reflect improvements in recording of hospital data.

The peak in sunburn admissions over the summer months was expected given the peak in UV radiation and outdoor activity at this time of the year. Although more sunburn admissions were expected on the weekend, the finding of more during the week (particularly Tuesday) may have resulted from individuals with severe sunburn waiting a day or more after exposure on the weekend before seeking help.

The drugs identified as external causes of the few photoallergic responses (tetracyclines, other antibiotics, and carbamazepine) are known to potentially cause adverse photosensitivity reactions.[14]

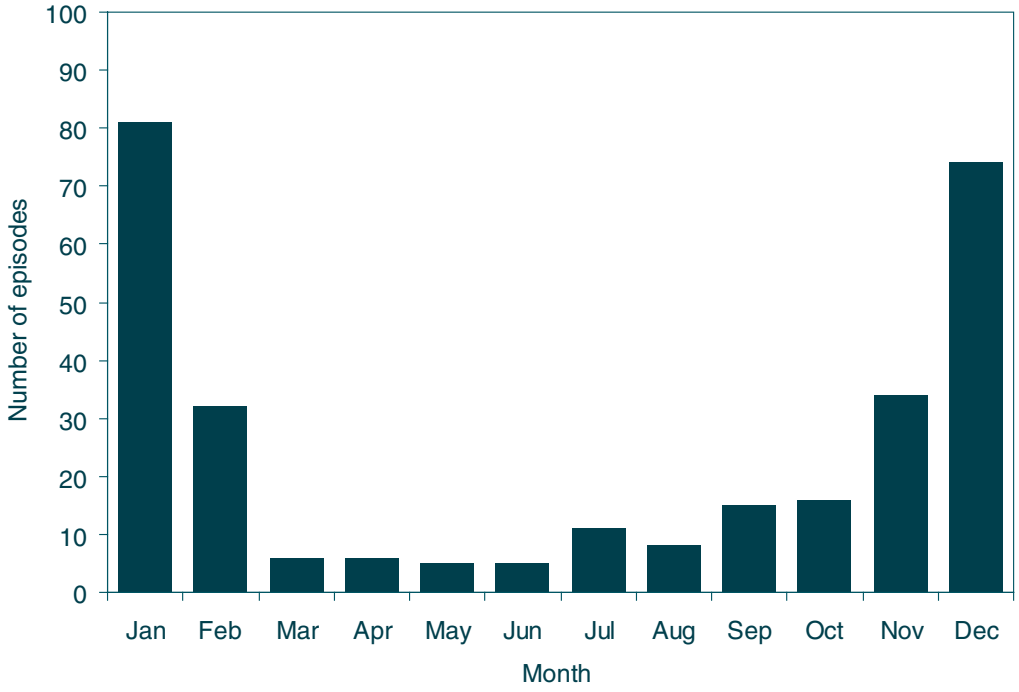
This work could be expanded to consider other Australian states and territories as well as other countries. This study has only examined severe cases of sunburn and drug phototoxic and photoallergic response, those requiring hospitalisation. Further study is required of the incidence and characteristics of less severe sunburn and drug phototoxic and photoallergic responses in Australia. Such work could examine measures such as hospital attendance, general practitioner visit, or a specifically designed survey. Such a study has produced interesting results in Southern Chile[15], with analysis of dermatologists' records of sunburns and photosensitivity disorders revealing a significant increase associated with stratospheric ozone depletion and increased ground level UVB radiation. More importantly, the long-term implications of these responses require consideration in Australia, with the examination of past medical records (including medication use) of skin cancer patients one method likely to provide answers to this important question.

CONCLUSION

The results of this study suggest that hospitalisation for sunburn and drug phototoxic and photoallergic responses, in itself, is not a major public health issue in NSW. However, some of the trends revealed in this study should be noted by sun protection program developers, and the long-term implications of these severe sunburn cases are a concern. The incidence of less-severe sunburn and photosensitivity responses remains inadequately quantified at present.

FIGURE 1

MONTH OF ADMISSION FOR SUNBURN (L55)* IN NEW SOUTH WALES FROM 1 JULY 1993 TO 30 JUNE 2001. ONLY PRINCIPAL DIAGNOSIS SUNBURN ADMISSIONS ARE SHOWN



* L55 includes sunburn, erythema; sunburn, partial thickness; sunburn, full thickness; other sunburn; and sunburn, unspecified.

Source: NSW Health Inpatient Statistics Collection.

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RESEARCHING CULTURE AND HEALTH: VARIABLES USED TO IDENTIFY CULTURALLY DIVERSE GROUPS IN NEW SOUTH WALES

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NSW is one of Australia's most multicultural states, with 29 per cent of residents having been born overseas and 24 per cent speaking a language other than English at home. [1] Given that rates of death and disease and patterns of health service utilisation differ across cultural variables such as region or country of birth[2,3], a better understanding of the interactions between culture and health may enable public health programs and clinical services to be more sensitive to community needs.

To help build in NSW the research capacity to identify cultural and linguistic diversity it is useful to first describe the current practice of health research in this area. A description of the data that are currently collected and how this is used would establish whether current research practice is consistent with national guidelines. In addition, the strengths and weaknesses of available information could be determined, especially its utility for allowing comparisons across studies.

In 1999 the Australian Bureau of Statistics (ABS) released *Standards for Statistics on Cultural and Language Diversity.*[4] The Standards include a *Minimum Core Set* and a larger *Standard Set* of diversity variables (see Box 1). While a recent review has looked at the collection of diversity data in national health and community datasets[9], little is known about the way the ABS sets or other variables are being used by individual health researchers in NSW or the rest of Australia.

Here, we present findings from a cross-sectional survey that provides a snapshot of data collected in health research with a cultural component in NSW. We were especially interested to find out which of the variables included in the *Minimum Core Set* or *Standard Set* were most commonly used by researchers, and whether these recommended variables were used alone or in combination with others.

METHOD

In October 2004 a letter of invitation enclosing an information sheet and questionnaire were emailed to 650 individuals who were identified either as likely to be carrying out health research with a cultural component in NSW or as holding a position that would enable them to circulate the material among likely participants. Recipients were requested to return completed questionnaires by email attachment and to also forward the invitation to colleagues who might be engaged in relevant research. 'Cultural component' was defined as relating to ethnicity, language or religion, with the exception of research exclusively concerned with the health of Aboriginal and Torres Strait Islander peoples.

Researchers were identified through searches of publication databases and lists of researchers awarded funding for projects in the area of culture and health from the National Health and Medical Research Council or Australian

BOX 1

MINIMUM CORE SET AND STANDARD SETS OF DIVERSITY VARIABLES

The *Standards for Statistics on Cultural and Linguistic Diversity*[4] set out standards to identify, define, classify and disseminate particular attributes of a person or group that relate to their origins and cultural and language background, and outline methods for their use in statistical, administrative and service provision settings. The standards provide governments, academics and private sector organisations with a consistent way of identifying, measuring and monitoring service needs associated with advantage or disadvantage related to cultural background. Several of the standards make reference to major Australian standard classifications concerned with language and cultural diversity.[5-8] In 1999 the Council of Ministers of Immigration and Multicultural Affairs recommended that the following minimum core set of variables be implemented in all commonwealth, state and territory statistical and administrative collections that require information on cultural and language diversity:

- Country of Birth of Person
- Main Language Other than English Spoken at Home
- Proficiency in Spoken English
- Indigenous Status.

This *Minimum Core Set* is drawn from a *Standard Set* that also includes:

- Country of Birth of Mother
- Country of Birth of Father
- First Language Spoken
- Languages Spoken at Home
- Main Languages Spoken at Home
- Ancestry
- Religious Affiliation
- Year of Arrival in Australia.

Research Council between January 2000 and October 2004. Others contacted included the staff of health research centres in NSW and at health-related faculties, schools or departments at all the universities in NSW; personnel at statewide multicultural health services (for example the NSW Refugee Health Service); and the heads of multicultural health services, public health units and research and development bodies in all area health services. Initial contacts were followed up after a week with a reminder email, and again by a second email a week later.

The four-page questionnaire included both open-ended items and closed items. The items covered respondents' broad research interests, any research they had conducted with a cultural component, how they defined their samples, and the cultural variables on which they collected data (including a request to indicate each of the *Standard Set* of diversity variables employed).

TABLE 1

FREQUENCY WITH WHICH DIVERSITY VARIABLES WERE INCLUDED IN RESPONDENTS' DATASETS (N=119)

Variable	*n*	%
Country of Birth	97	82
Main Language Spoken at Home	62	52
Year of Arrival in Australia	51	43
Main Language Other Than English Spoken at Home	50	42
Proficiency in Spoken English	43	36
Languages Spoken at Home	41	34
Country of Birth of Mother	38	32
Country of Birth of Father	37	31
Indigenous Status	37	31
First Language Spoken	28	24
Religious Affiliation	26	22
Ancestry	19	16
Ethnicity*	11	9

* Also 'ethnic background', 'ethnic or cultural background' or 'ethnic group identity'

RESULTS

One hundred and nineteen surveys were returned. Of the 148 researchers who were identified through publications and grants searches, 31 (21 per cent) returned surveys. Just over half the respondents (55 per cent) named a university as their main workplace, with the rest identifying a principal role in the health service, with or without a conjoint appointment at an academic institution. Public health and/or health promotion were the most common disciplines, followed by psychology/psycho-oncology and epidemiology.

Table 1 describes the frequency with which individual cultural diversity variables were used by researchers, while Table 2 describes the frequency with which two or more variables were used in combination.

DISCUSSION

While not representative of the practice of health researchers in NSW generally, the survey results, which are almost equally divided between academic and practice-based

TABLE 2

COMBINATIONS OF CULTURAL AND LINGUISTIC DIVERSITY VARIABLES USED BY RESPONDENTS (N=119)

Variables used	Researchers		Examples
n	*n*	%	
2	8	7	COB, MLSH COB, LSH
3	17	14	COB, IS, YOA COB, MLOTESH, MLSH
4	18	15	COB, COB father, COB mother, YOA COB, MLSH, IS, RA
5	10	8	COB, MLSH, FLS, PSE, YOA COB, IS, A, RA, YOA
6	14	12	COB, COB father, COB mother, MLSH, PSE, RA COB, MLOTESH, MLSH, LSH, IS, YOA
7	10	8	COB, MLOTESH, MLSH, LSH, FLS, A, RA, COB, COB mother, COB father, PSE, IS, A, YOA
8	9	8	COB, COB father, COB mother, MLSH, PSE, IS, RA, YOA COB, MLOTESH, MLSH, LSH, FLS, PSE, RA, YOA
9	6	5	COB, COB father, COB mother, MLOTESH, MLSH, FLS, LSH, RA, YOA COB, COB father, COB mother, MLSH, LSH, FLS, PSE, IS, YOA
10	2	2	COB, COB father, COB mother, MLOTESH, MLSH, LSH, FLS, PSE, RA, YOA
11	2	2	COB, COB father, COB mother, MLOTESH, MLSH, LSH, FLS, PSE, IS, RA, YOA
12	1	1	COB, COB father, COB mother, MLOTESH, MLSH, LSH, FLS, PSE, IS, A, RA, YOA

A = Ancestry; COB = Country of Birth; IS = Indigenous Status; FLS = First Language Spoken; LSH = Languages Spoken at Home; MLSH = Main Language Spoken at Home; MLOTESH = Main Language Other than English Spoken at Home; PSE = Proficiency in Spoken English; RA = Religious Affiliation; YOA = Year of Arrival in Australia

research and include responses from a broad cross-section of disciplines, provide a useful snapshot of research with a cultural component in NSW. The relatively low response rate by authors of publications and grants may have been due, in part, to the retrospective nature of the study. A current and major interest in culture and health research would likely have been a motivating factor in deciding to participate.

The most frequently used diversity variable was 'Country of Birth'; this is also the variable most commonly featured in Australia's national datasets.[9] 'Country of Birth' provides information about origin and enables ready comparison with census and overseas data. However, when used on its own, this variable fails to identify cultural groups who belong to minority groups in their countries of origin.[4] It was encouraging, then, to find a strong preference in the present sample for collecting cultural data across more than one variable. Variables in combination capture disproportionately more information than any single item. However, only one researcher made use of the full *Standard Set* of diversity variables, and only a handful used the *Minimum Core Set*, with or without additions from the *Standard Set* or elsewhere. 'Ancestry' was infrequently used, perhaps because it is a poor indicator of service needs and possibly as a result of a perception that many Australians feel no strong identification with a non-proximal heritage.[4]

The majority of respondents chose to collect data on three or four variables. This may have been thought to represent a balance in cost-benefit, where increases in the burden placed on the participants are weighed against the benefits of gaining more information.[10] The most popular combination was 'Country of Birth', one of the language variables and 'Year of Arrival in Australia', which may have been favoured as an estimate of familiarity with Australian services. 'Period of Residence', a more accurate measure of time spent in Australia, was never reported, although it may have been calculated from 'Year of Arrival'. Interestingly, 'Proficiency in Spoken English'—the best predictor from the *Standard Set* of socio-economic status and the most powerful indicator of service needs[4]—was only ever used as part of a larger set of variables. It is not known whether researchers included other more direct measures of socio-economic status.

Data was also collected by the current sample on a range of variables not included in the *Standard Set*. The most common of these was 'Ethnicity', variously construed as 'Ethnic Background', 'Ethnic or Cultural Background' or 'Ethnic Group Identity'. 'Ethnicity', like 'Ancestry', is potentially problematic as a research variable because of its highly subjective and changeable nature.[11] More information is needed on how health researchers assess cultural self-identification and how they apply this concept in their research.

Another point of concern relates to respondents' frequent use of the term 'non-English speaking background' when describing samples. The ABS has recommended that non-English speaking background should no longer be used as a general purpose indicator due to its many conflicting definitions, its failure to identify disadvantaged groups or to capture the diversity of Australia's cultural and linguistic groups, and its negative connotations.[4] Even when making comparisons between research carried out with similar populations, the reviewer needs to be wary of subtle differences between criteria used to define samples. 'Vietnamese-speaking', for example, refers to a different population than that described by 'Vietnam-born', 'Vietnamese-Australian' or simply 'Vietnamese', all of which featured as descriptions of samples on returned surveys.

A number of researchers pointed to proficiency in written or spoken English as being a requirement for completing the surveys/questionnaires they used, or for giving informed consent. Exclusion of whole groups from health research that aims to be representative is a matter of concern from both ethical and methodological perspectives.[12]

CONCLUSION

Given the need for more information about the way that interactions between cultural and other demographic and socio-economic factors influence health and wellbeing, it is essential to have high quality representative data on culturally diverse groups. With its rich cultural diversity, NSW has an opportunity to set the standard in conducting research with culturally diverse populations to ensure accurate representation. This paper summarises the diversity data collected by health researchers carrying out work in this field. Encouragingly, most researchers used combinations of variables rather than single variables on their own; however, few used the *Sets* of diversity variables recommended by the ABS. Further research should focus on the purposes to which researchers are putting different variables, especially highly subjective variables such as those pertaining to ethnicity.

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GETTING A 'GRIPP' ON THE RESEARCH-POLICY INTERFACE IN NEW SOUTH WALES

The Sax Institute, Sydney

The Sax Institute is a coalition of over 30 universities and research centres across NSW. The Institute is funded by NSW Health to improve health outcomes and services by building policy and practice focused research and increasing the impact of this research on health policy, programs and services. The Institute's 'Getting Research into Policy and Practice' (GRIPP) program was established to develop new models for linking research with policy and practice. This report outlines the background to the development of the GRIPP program and describes some of the program's key achievements to date.

GETTING STARTED: WHAT DID WE KNOW?

The lack of connection between research and policy and practice is widely acknowledged. Studies conducted with policy decision makers suggest that limited contact with researchers and a lack of timeliness or relevance of research results can act as barriers to the use of research evidence in policy development.[1, 2] Researchers in academic environments also face obstacles. For example, their incentive system emphasises publication in peer-reviewed journals over broader knowledge-transfer activities.[3, 4] Possibly the greatest challenge is understanding that research is one of many competing forms of 'evidence' in policy making. Political and economic realities and information from a variety of sources, such as reports and expert opinion, also influence policy decision making.[5]

Several models for improving research and practice links have been trialled. The Canadian Health Services Research Foundation, for example, has developed a collaborative knowledge exchange program to facilitate the planning, dissemination, and application of research in healthcare decision making. However, while these models provide useful descriptive information about research translation strategies, there remains very little evidence about what works in practice.

GETTING STARTED: WHAT DID WE DO?

Against this background the GRIPP committee was established in 2003. The committee was a conjoint venture between the Institute and NSW Health, initially co-chaired by Dr Greg Stewart (then NSW Chief Health Officer) and Professor Anthony Zwi (from the University of NSW). Members included senior policy makers from the NSW Department of Health and the area health services along with leading population health and health services researchers. In mapping out an initial direction for the GRIPP program, the committee sought to explore current perceptions and practice relevant to evidence-informed policy; implement a systematic approach to setting policy-relevant research priorities; and trial a range of new approaches to improving the conduct of policy-relevant research and the dissemination of findings through the health system.

WHAT HAVE WE ACHIEVED?

Survey of practice

In October 2003 the committee commissioned a confidential survey of 38 senior policy makers from NSW Health to explore their views about research and policy. The survey provided information about how research is currently used to inform policy development in NSW. For instance, few respondents (13 per cent) regularly used research to get issues onto the policy agenda, but over half (55 per cent) consistently used research to inform policy content (this included participants who used research in each policy situation more than half of the time). Importantly, the survey also offered insights into some of the barriers to and potential facilitators of research transfer. When asked about the relevance of local health research to policy and program development issues, 18 per cent of respondents thought research was not relevant and 30 per cent felt that its relevance varied considerably. Respondents were also invited to identify approaches they thought would improve the use of research in their organisations. The most commonly nominated strategy was enhanced links with researchers, including better access to research findings and summaries.

A corresponding survey of health researchers in NSW will be undertaken in 2006 to explore researchers' involvement in policy, service and practice development.

Priority setting

The survey of policy makers indicated a need to improve the relevance of local health research to the NSW policy context. A research priority-setting workshop was held in 2004 to encourage senior decision makers across the health system to identify issues of concern in NSW for the next five to 10 years where research could make a difference. Five broadly defined priorities for research were agreed:

- enabling individuals and communities to better manage their health
- improving workforce planning and education for future health needs
- addressing social, economic and environmental determinants of health through improved inter-sectoral collaboration
- developing effective management systems to improve service quality and safety
- developing models to promote Aboriginal health and community engagement.

Research partnerships and programs are being developed to address each of these priorities. For example, policy decision makers have been working with the Institute to better define the information needed to improve workforce planning in preparation for a partnership.

Evidence check

Findings from the survey of policy makers also highlighted the potential benefits of facilitating timely access to research summaries. Ideally, such a strategy would provide comprehensive reviews that draw from a broad range of knowledge and available literature to provide the synthesis of evidence needed to support policy development.

Using this framework as a guide, the committee oversaw the development of an 'Evidence Check' system that aims to help NSW Health policy decision makers to more easily commission research reviews relevant to a defined policy issue. Evidence Check has three core components:

- a standard commissioning form which decision makers complete to define the background to the policy issue and the components and format required of the review
- a 'knowledge broker' with extensive policy and research experience who is available to liaise between the policy and research environments during the process of commissioning the review. The broker is available to assist in articulating a review question, scoping the size and feasibility of the review, and negotiating a review contract with a relevant research expert in the field
- a 'researcher register' that has been developed to enable the rapid identification of researchers who could conduct reviews or provide other expertise.

Research partnerships

Collaborative partnerships that engage both the producers and users of research in all stages of the research process are recognised as an effective mechanism for improving research uptake.[6] The GRIPP committee has overseen the establishment of three research partnerships that aim to provide information useful for policy decision making about diabetes prevention.

In February 2004, at the request of the Centre for Chronic Disease Prevention and Health Advancement at the NSW Department of Health and in the context of new policy developments, the Institute hosted a forum to enable the exchange of information about current research into the prevention of Type 2 diabetes. A working group was established to identify key knowledge gaps, and research proposals were developed to address diabetes among three priority populations:

- general practice attendees with impaired glucose tolerance
- women with gestational diabetes mellitus
- Aboriginal communities.

Proposals have been finalised and seed funding approved for these partnerships. The Aboriginal project has been selected for the prestigious Community Actions to Prevent Chronic Disease program at Yale University. The GRIPP committee will monitor and evaluate the process of organising the partnerships, the acceptability of the approach, and the outcomes of the partnerships in terms of knowledge uptake.

WHERE TO NEXT?

The GRIPP program is innovative and experimental and over the next few years we hope to learn more about how to improve research and practice links. The next issue of the *NSW Public Health Bulletin* will highlight examples of how the principles of GRIPP are being used in public health programs in NSW. The issue has been guest edited by Philip Davies from the Government Chief Social Researcher's Office, Prime Minister's Strategy Unit, Cabinet Office, London, and Shelley Bowen, GRIPP Program Director at The Sax Institute.

The Sax Institute was formerly known as the Institute for Health Research. The Institute changed its name in 2005 to better reflect its role in building research partnerships for better health. The Institute is named after Dr Sidney Sax, one of Australia's first health planners and a major leader in public health, health services reform, and establishing research in these areas.

For more information about any of the initiatives described here, visit The Sax Institute website, www.saxinstitute.org.au, or contact Danielle Campbell via danielle.campbell@saxinstitute.org.au.

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THE BANGKOK CHARTER FOR HEALTH PROMOTION IN A GLOBALIZED WORLD: WHAT IS IT ALL ABOUT?

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On August 11, 2005, in Bangkok, Thailand, the delegates of the Sixth World Health Organization (WHO) Global Health Promotion Conference endorsed a statement known as the Bangkok Charter for Health Promotion in a Globalized World.[1] This article briefly describes the background to the Bangkok Charter, summarises the main components and highlights some of the issues arising from its preparation.

BACKGROUND

The Ottawa Charter of 1986, a product of the first WHO global health promotion conference, was a significant milestone in the evolution of health promotion.[2] It established the principles and strategies of health promotion and has effectively defined health promotion since then. The Charter is still highly relevant today.

Since 1986 there have been four other global health promotion conferences. These were held in: Adelaide (1988—theme of healthy public policy)[3], Sunsvall, Sweden (1991—theme of supportive environments conducive to health and sustainable development)[4], Jakarta, Indonesia (1997—focus on partnerships)[5] and Mexico City (2000—focus on confirming political support for health promotion).[6] Each of these meetings generated a Declaration or Statement, but none of these products had the same dramatic reach and impact as the Ottawa Charter.

The Sixth WHO Global Health Promotion Conference (7–11 August, 2005) endorsed the Bangkok Charter for Health Promotion in a Globalized World. Almost 20 years since the Ottawa Charter, the world is a different place, politically and economically. Transport and communication developments have allowed processes of globalization to rapidly change the contexts and environment of people in most countries of the world. Global economies and trade agreements mean that the same products are now available worldwide in a way never seen before. These changes require a new public health response and new ways of working.

HOW THE CHARTER WAS DEVELOPED

The Bangkok Charter was the product of a complex

process of consultation and discussion, culminating in its modification and final endorsement at the Sixth Global Conference. The WHO regional offices and the International Union of Health Education and Promotion held consultations on earlier draft versions of the Charter prior to the Bangkok conference. Also prior to the conference a draft had been posted on the WHO website and this had attracted comment from additional stakeholders. At the Bangkok Conference delegates participated in 29 separate technical discussions grouped around four major themes: sustainable actions, health-friendly globalization, partners, and new context. Recommendations from each group contributed to a complete revision of the Charter during the conference. Further input from delegates was then taken into account on the last evening of the conference by a 'finalisation' or writing group that prepared the final version, which was endorsed on August 11, 2005.

The Bangkok Charter for Health Promotion is not intended to replace the Ottawa Charter, but rather to complement and build upon it and the recommendations of the subsequent global health promotion conferences. It is intended as a framework rather than a detailed action plan, and does not seek to cover all aspects of health promotion. It briefly summaries the global context of health promotion before specifying the major action areas.

The Bangkok Charter for Health Promotion states that:

To make further advances in health all sectors and settings must act to:

- Advocate for health based on human rights and solidarity
- Invest in sustainable policies, actions and infrastructure to address the determinants of health
- Build capacity for policy development, leadership, health promotion practice, knowledge transfer and research, and health literacy
- Regulate and legislate to ensure a high level of protection from harm and enable equal opportunity for health well being for all people
- Partner and build alliances with public, private, non-governmental organizations and civil society to create sustainable actions.[1]

Addressing all of the Millennium Development Goals is identified as a critical entry point for health promotion.[7] The eight Millennium Development Goals were proclaimed in 2000 as goals that all United Nations agencies (including WHO) and member states (including Australia) should address, with the intention of reaching these goals by 2015. The goals seek to:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development.

Four commitments to health for all are stated in the Bangkok Charter. These are:

- to make the promotion of health central to the global development agenda
- to make it a core responsibility for all of government
- to make it a key focus of communities and civil society
- to make the promotion of health a requirement for good corporate practices.

A paragraph of text expands upon each of these points and the Charter ends with a global pledge by the conference participants.

ISSUES

Prior to the conference, a number of comments on the draft Charter were circulated by various stakeholders and, in particular, by the People's Health Movement. Their comments included comment on the neutral tone of the document towards globalization, with the suggestion that the document should explicitly identify the serious negative impact of globalization on health. While they acknowledged that some developing countries benefit from globalization, they proposed that elements of globalization such as transnational property and land tenure concentration, large-scale social exclusion, privatization of public resources, and the loss of human rights, have exacerbated health inequalities. Endorsement of public-private partnerships also received criticism, succinctly summarized by the comment that 'public-private partnerships should not be promoted but should be regulated'. A greater emphasis on human rights was called for, with the suggestion that there be specific reference to Article 12 of the International Covenant on Economic, Social and Cultural Rights.

During the conference, many issues familiar to health promotion and public health practitioners arose. These included the need for political will to support health promotion and not simply treatment services, the need for whole-of-government approaches, the need to work with partners and the need to address the social determinants of health—'the causes of the causes of poor health', as keynote speaker Michael Marmot put it.

The wide-ranging discussions of 700 conference delegates, the breadth of the challenges facing health promotion, and the editorial input of a diverse committee, make the writing of a document like the Bangkok Charter very difficult. Part of the difficulty in writing it revolves around identifying the audience for such a document. Is the Charter for health promotion people or for all stakeholders from various sectors that impact upon health? A narrower target group makes tailoring the document easier.

The Bangkok Charter was written for a very broad audience, for all potential stakeholders rather than primarily for people with a particular interest in health promotion. It seeks a number of commitments from these other stakeholders. However, contrary to health promotion principles, very few of these stakeholders participated in the process of developing the Charter or were invited as delegates to the Conference. This weakens the capacity of the Charter to have a direct influence on them.

The general endorsement of the Bangkok Charter highlights the strategic issues that health promotion needs to address in a global context. Supporting documentation or further direction is needed as to what health promotion practice should do to address globalization issues, the social determinants of health and 'the underlying causes of poverty, poor health and inequalities'. Workforce development is one area needing attention, as new skills will be necessary to effect change in a more 'global' world. For example, the recent signing of the bilateral Free Trade Agreement between Australia and the United States is likely to have important public health consequences for Australia, but (with some notable exceptions) there was relatively little discussion within the public health community here, let alone as part of the general public discourse. The majority of public health and health promotion experts lack skills in foreign policy, not to mention the political skills that are necessary to influence what is largely a political process. Re-orienting health services towards prevention was one of the five strategies of the Ottawa Charter and is still very relevant.

Whether the Bangkok Charter is the best it can be or not, it is the product of the attention of a great many people. It is too early to tell what influence it will have but at the very least it should alert us to the importance of paying more attention to the negative aspects of globalization and to addressing the fundamental social determinants of health.

A discussion of the Bangkok Charter appears in a series of Editorials in the December 2005 issue of the *Health Promotion Journal of Australia* (volume 16, number 3).[8–10]

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OBITUARY

SIR RICHARD DOLL 1912 – 2005

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Sir Richard Doll, who died in July aged 92, was an epidemiologist who demonstrated one of the most important causality relationships of the past century: the association between smoking and lung cancer. In collaboration with Sir Austin Bradford Hill, Doll conducted first a case control study and then a prospective cohort study of British doctors, comparing rates of lung cancer amongst smokers and non-smokers. Although only a small number of deaths occurred in the first few years of the cohort study, Doll demonstrated a clear and significant increase in mortality from lung cancer as smoking increased and a smaller but significant increase in coronary thrombosis.[1] In the 1950s, when 80 per cent of the British population smoked, the implications of these findings were very important.

Since then, the ongoing British Doctors Cohort study has continued to produce evidence about the effects on health of smoking. A recent publication from this study—published in the *British Medical Journal* this year with Doll as first author—showed that on average, smokers die 10 years earlier than non-smokers and smoking kills two-thirds of those who smoke.[2] As a result of this and other studies, the number of illnesses considered to be smoking related has now been expanded to include a range of cancers, respiratory diseases, and cardiovascular disease. Public health measures introduced in response to this compelling evidence have reduced the proportion of the population who smoke to less than 20 per cent in Australia.[3]

Sir Richard Doll's extensive contribution to epidemiology and medicine also covered a range of other areas. He published papers that described the risks and benefits of the oral contraceptive pill and disproved the theory about the role of a bland diet in treating gastric ulcers. He also conducted research on the effects of low-level radiation, the role of aspirin in protecting against heart disease, and the link between alcohol consumption and breast cancer. He researched the health of doctors and their families, finding higher rates of suicide and liver disease.

Doll was born in Hampton, England, in 1912 and graduated from St Thomas Medical School in 1937. During his career in medicine he worked in the army from 1939 to 1945, first in France and the Middle East and then in Egypt, where he ran a ward for infectious diseases including diphtheria, polio, and smallpox. He later worked on a hospital ship in the Mediterranean and was involved in the invasion of Sicily. His experiences as an army medical officer were published in the *British Medical Journal*. After leaving the army he started work in 1946 with Bradford Hill at the Medical Research Council, where he began researching the role of smoking in lung cancer. He eventually became director of the Medical Research Unit. In 1969 he was appointed regius professor of medicine at Oxford University. He formally retired in 1979 but continued to participate in research until nearly the end of his life. Sir Richard Doll married another medical researcher, Dr Joan Faulkner.

Doll's life contained some controversy, not only because of the scepticism of tobacco companies about the link between smoking and diseases. In 2001 he angered the anti-smoking lobby when he downplayed the risks from second-hand smoke. However, as further evidence became available he became persuaded and later strongly argued in support of a link between environmental tobacco smoke and cancer.

Sources: *The Times*, the *Guardian* and the *British Medical Journal*.

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Sir Richard Doll's work turned the tide of what the World Health Organization called the 'brown plague' of the twentieth century. In 1950, with Austin Bradford Hill, Doll authored the first significant study showing the relationship of smoking to lung cancer.[4] Four years later he commenced the most famous longitudinal study in medical history, the British doctors study, with 34,439 participants.[1] Then every 10 years he published the latest chapter in what had happened to the smoking doctors in the group. In 1994, one in two had died from a smoking caused disease.[5] By 2004, at the 50-year follow-up, two in three had died, losing an average of 10 years off normal life expectancy.[2]

When Doll first published his findings in 1950, about 80 per cent of men smoked. Today in Australia 17 per cent of men smoke each day. Among doctors it is down to three per cent. Today there are about three million smokers in Australia. Had Doll never started tobacco's downhill ride, the figure might well have been five times that. Everything we take for granted today, like smoke-free planes and restaurants, can be traced back to his work.

The impact of Doll's research compares with the discovery of vaccination by Edward Jenner. After Doll's work began appearing in print, hundreds of millions of people who would have been expected to take up smoking didn't and there are now far more ex-smokers than smokers.

* Simon Chapman is the Editor of *Tobacco Control* and, along with Richard Doll, was awarded the Luther Terry Medal for Tobacco Control in 2003.

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EPI*REVIEW*

EPIDEMIOLOGY OF NEWLY DIAGNOSED HIV INFECTION IN NEW SOUTH WALES, 1994–2003

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Human immunodeficiency virus (HIV) infection is caused by a retrovirus transmitted from person to person via infected blood and body fluids such as semen and vaginal fluids. Most persons infected with HIV develop detectable antibodies within one to three months of infection. People with this disease are able to transmit HIV throughout their life.[1] The control of HIV remains an important public health challenge with an estimated 38 million persons infected worldwide.[2] NSW has approximately 57 per cent of all newly diagnosed HIV infections in Australia.[3] Surveillance for new HIV infections enables health departments to identify groups at risk and to monitor long-term trends in the disease, which in turn informs the development of prevention policies and programs.

This review presents an analysis of new notifications of HIV infections among NSW residents for the period January 1994 to December 2003.

METHODS

In NSW there are seven HIV reference pathology laboratories. These laboratories confirm HIV infections and notify positive clinical specimens. Under the *NSW Public Health Act 1991*, all HIV reference pathology laboratories in NSW are required to notify the NSW Department of Health of persons newly diagnosed with HIV infection. A nationally standardised case definition is applied. The definition requires the detection of HIV by a repeatedly reactive result on screening test and a positive western blot and/or virological assay. Laboratories send a standard notification form with the HIV positive result to the treating medical practitioner, seeking detailed demographic information about the case and information about clinical history, health status and HIV risk exposure. De-identified information is forwarded to the NSW Department of Health and entered on a secure database, the NSW HIV/AIDS Database.

De-identified data, comprising cases defined by the HIV and AIDS protocol for NSW public health units[4], were extracted from the database and analysed. We undertook a descriptive analysis of cases by age group (based on date of first positive HIV diagnosis), country of birth, place of residence and HIV risk exposure category. 'Place of residence' is described according to 2003 NSW area health service boundaries. 'Country of birth' and countries with high prevalence of HIV, were defined according to the Joint United Nations Programme on HIV/AIDS (UNAIDS).[5] Annual crude notification rates were calculated using Australian Bureau of Statistics population estimates for NSW (accessed through HOIST, the Health Outcomes Indicator Statistical Toolbox).

As described above, risk exposure category information is obtained by the treating medical practitioner through consultation with the case. For surveillance purposes, where there was more than one reported risk exposure, a hierarchy of risk is used to designate a case's primary risk exposure and one or more secondary risk exposure/s, as defined according to the *Rules for Risk Exposure Assignment*.[6] The primary risk exposure is that most strongly associated with

transmission of HIV. Where male-to-male sex is reported, this is always considered the primary risk exposure. For this analysis, notifications for males who reported homosexual exposure and males who reported bisexual exposure were combined. Where a case cannot accurately report his/her HIV risk exposure history, the risk exposure category assigned is 'undetermined'. If a case reported a sexual contact history with only person(s) of the opposite sex, further information regarding the case's sexual partner(s) is sought.

RESULTS

From 1994 to 2003, some 4171 new notifications of HIV infection were reported in NSW, representing a crude incidence rate of 6.6 per 100,000 population for each year. There was a gradual decline in HIV infections from 1995 to 2001. The rates of HIV notifications increased 15 per cent between 2001 and 2002 and by six per cent between 2002 and 2003 (Figure 1 and Table 1).

Males represented 91 per cent of all people notified with HIV infections from 1994 to 2003. The proportion of females notified with HIV infection during this period has remained stable. The number of HIV notifications in males, however, increased by 14 per cent from 2001 to 2002, and by a further seven per cent between 2002 and 2003.

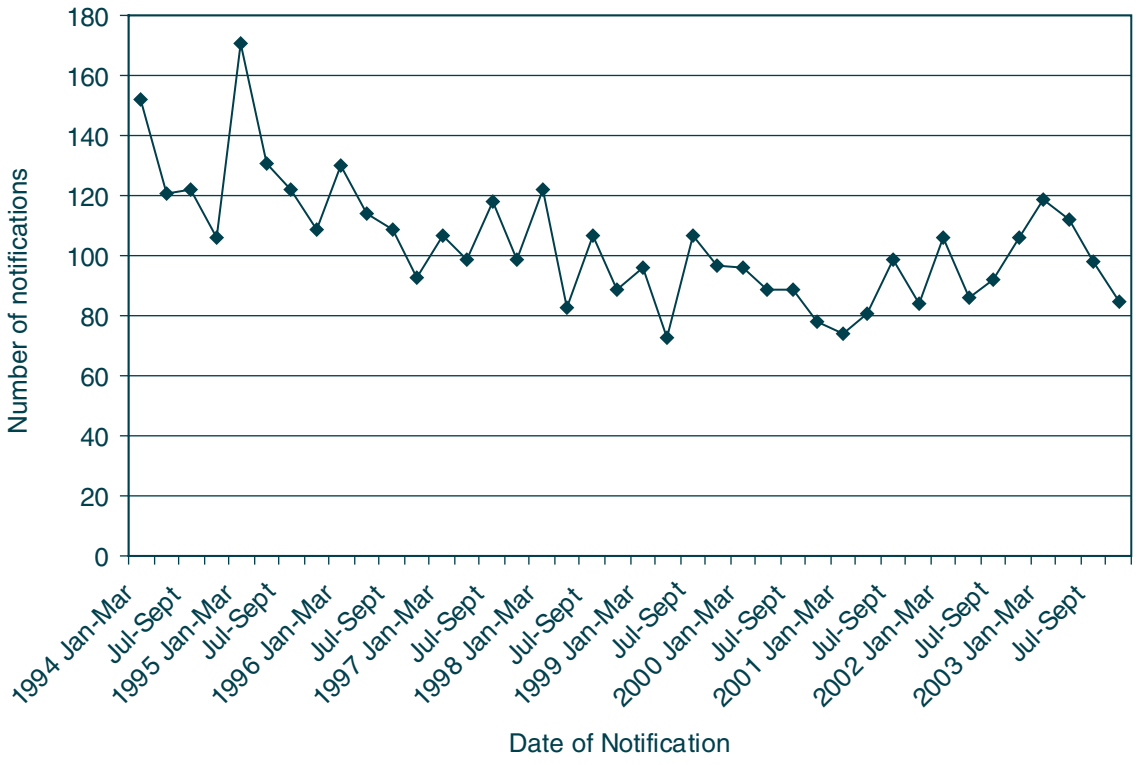
Exposure risk factors

Male-to-male sexual contact was the major primary risk exposure for HIV infection reported in the study period, with the majority of these men (93 per cent) reporting no other risk factor. An increase in the number of notifications reporting the risk exposure of male-to-male sexual contact has been observed since 2002 and reflects the increase in HIV notifications overall (Figure 2, Table 1). Heterosexual contact was the primary risk exposure reported in 15 per cent of notifications and 42 per cent of these cases were female. Forty five percent of cases (n=293) had heterosexual contact with a person from a country with a high HIV prevalence and 10 per cent had sexual contact with a person known to have a HIV infection. A third of cases that had heterosexual contact did not specify a secondary risk factor. Injecting drug use was the primary risk exposure reported in four per cent of notifications. Approximately 17 per cent of notifications that cited injecting drug use as the primary risk exposure were female. Half (51 per cent) of these cases did not report a secondary risk factor.

People aged 30–39 years had the highest average annual notification rate (16.6 cases per 100,000), followed by people aged 20–29 years (13.2 per 100,000) and 40–49

FIGURE 1

NUMBER OF NEW HIV NOTIFICATIONS IN NSW RESIDENTS, PER QUARTER, 1994–2003



Source: NSW HIV / AIDS database 2003

TABLE 1

DEMOGRAPHIC AND PRIMARY SOURCE OF RISK EXPOSURE FOR PEOPLE NEWLY NOTIFIED WITH HIV IN NSW FOR EACH YEAR, 1994–2003

		1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		Total	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Sex	Male	459	91.6	495	92.9	408	91.5	390	92.2	357	89.0	344	92.2	313	88.9	305	90.2	349	89.5	372	89.9	3792	90.9
	Female	34	6.8	34	6.4	34	7.6	26	6.1	40	10.0	28	7.5	28	8.0	31	9.2	30	7.7	32	7.7	317	7.6
	Transgender	1	0.2	1	0.2	2	0.4	1	0.2	1	0.2	1	0.3	0	0.0	0	0.0	4	1.0	0	0.0	11	0.3
	Not stated	7	1.4	3	0.6	2	0.4	6	1.4	3	0.7	0	0	11	3.0	2	0.6	7	1.8	10	2.4	51	1.2
Age group	0–2	5	1	2	0	1	0.22	1	0.2	2	0.5	1	0.3	2	0.6	0	0.0	1	0.3	0	0.0	15	0.4
(in years)	3–12	1	0.2	3	0.6	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5	7	0.2
	13–19	10	0.2	9	1.7	8	1.8	5	1.2	9	2.2	7	1.9	4	1.1	7	2.1	3	0.8	9	2.2	71	1.7
	20–29	188	37.5	169	31.7	134	30.0	130	30.7	111	27.7	108	29.0	86	24.4	98	29.0	111	28.5	99	23.9	1234	29.6
	30–39	171	34.1	206	38.6	186	41.7	157	37.1	156	38.9	145	38.9	140	39.8	137	40.5	164	42.1	170	41.1	1632	39.1
	40–49	83	16.6	94	17.6	75	16.8	87	20.6	88	21.9	73	19.6	75	21.3	66	19.5	76	19.5	82	19.8	799	19.2
	50–59	24	4.8	31	5.8	22	4.9	31	7.3	27	6.7	30	8.0	29	8.2	16	4.7	23	5.9	39	9.4	272	6.5
	60 +	17	3.4	15	2.8	14	3.1	9	2.1	8	2.0	7	1.9	7	2.0	8	2.4	12	3.1	13	3.1	110	2.6
	Missing	2	0.4	4	0.8	5	1.1	3	0.7	0	0.0	2	0.5	9	2.6	6	1.8	0	0.0	0	0.0	31	0.7
Place of residence	Metropolitan Sydney	410	81.8	431	80.9	346	77.6	333	78.7	324	80.8	311	83.4	300	85.2	298	88.2	333	85.2	319	77.1	3405	81.6
	Per 100 000 population	12		12		9		9		9		8		8		8		9		8		9	
	Rural NSW	44	8.8	66	12.4	49	11.0	44	10.4	44	11.0	36	9.7	44	12.5	37	10.9	39	10.0	62	15.0	465	13.7
	Per 100 000 population	2		3		2		2		2		1		2		1		1		2		2	
	Unknown	47	9.4	36	6.8	51	11.4	46	10.9	33	8.2	26	7.0	8	2.3	3	0.9	18	4.9	33	8.0	301	4.7
Primary exposure	MSM	345	68.9	363	68.1	292	65.5	285	67.4	244	60.8	243	65.1	232	65.9	214	63.3	248	63.6	282	68.1	2856	65.2
	Heterosexual	59	11.8	64	12.0	58	13.0	60	14.2	89	22.2	57	15.3	59	16.8	55	16.3	56	14.4	63	15.2	651	14.9
	Undetermined	39	7.8	53	9.9	59	13.2	47	11.1	41	10.2	41	11.0	24	6.8	24	7.1	47	12.1	42	10.1	473	10.8
	MSM & injecting drug user	25	5.0	24	4.5	15	3.4	17	4.0	16	4.0	15	4.0	8	2.3	18	5.3	13	3.3	9	2.2	162	3.7
	Injecting drug user	19	3.8	20	3.8	16	3.6	11	2.6	9	2.2	12	3.2	19	5.4	18	5.3	8	2.1	12	2.9	153	3.5
	Blood-tissue recipient	7	1.4	2	0.4	4	0.9	1	0.2	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	18	0.4
	Vertical (ie mother-to-child)	7	1.4	5	0.9	2	0.4	1	0.2	2	0.5	1	0.3	2	0.6	0	0.0	1	0.3	2	0.5	23	0.5
	Haem-coag disorders*	0	0.0	1	0.2	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0
	Not stated	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	3	0.8	8	2.3	9	2.7	17	4.4	4	1.0	43	1.0
Country of birth	Australia	106	21.2	100	18.8	60	13.5	59	14	62	15.5	50	13.4	197	55.9	194	54.4	199	51.0	232	56.0	1259	30.2
	High HIV prevalence country	9	1.8	11	2.1	17	3.8	15	3.6	30	7.5	18	4.8	38	10.8	32	9.5	25	6.4	26	6.3	221	5.3
	Other overseas country	46	8.2	40	7.5	39	8.7	39	9.2	25	6.2	38	10.2	66	18.8	77	22.8	94	24.1	95	22.9	559	13.4
	Unknown	340	67.9	383	85.9	330	74.0	310	73.2	284	70.8	267	71.2	51	14.5	35	10.4	72	18.5	61	14.7	2133	51.1
Total		501		533		446		423		401		373		352		338		390		414		4171	
Crude incidence rate	Per 100 000 population	8.3		8.7		7.2		6.7		6.3		5.8		5.4		5.2		5.9		6.2		6.6	

MSM: men who have sex with men

*Haemophilia–coagulation disorders

Source: NSW HIV / AIDS database 2003

years (8.7 cases per 100,000) (Figure 3, Table 1). History of male-to-male sexual contact amongst 30–39 year old men represented 41 per cent of all HIV notifications, a rate of 12.3 cases per 100,000 population. The rate of HIV infection due to heterosexual contact in people of this age group was 2.2 cases per 100,000.

Place of residence

The HIV notification rate of people resident in metropolitan Sydney was higher than for rural NSW (nine per 100,000 compared with two per 100,000). Between 1995 and 2001, the rate of notifications declined steadily in metropolitan Sydney but remained stable in rural NSW (Table 1). Between 2002 and 2003 an increase in notifications was reported among residents of the Central Sydney, South Eastern Sydney, Hunter and Illawarra area health services. The highest annual crude rate of HIV cases in metropolitan Sydney were among residents of the South Eastern Sydney (21.0 cases per 100,000), Central Sydney (16.9 cases per 100,000) and Western Sydney (3.1 cases per 100,000) area health services. In rural NSW, the Hunter Area Health Service recorded the highest crude rate (2.4 cases per 100,000 population), followed by the Illawarra (1.8 cases per 100,000) and Northern Rivers (1.4 cases per 100,000) area health services.

Country of birth

For thirty eight per cent of HIV notifications, where the country of birth was provided (n=2039), the person was born overseas. Of these people, 28 per cent were born in countries of high HIV prevalence.

Notifying practitioners

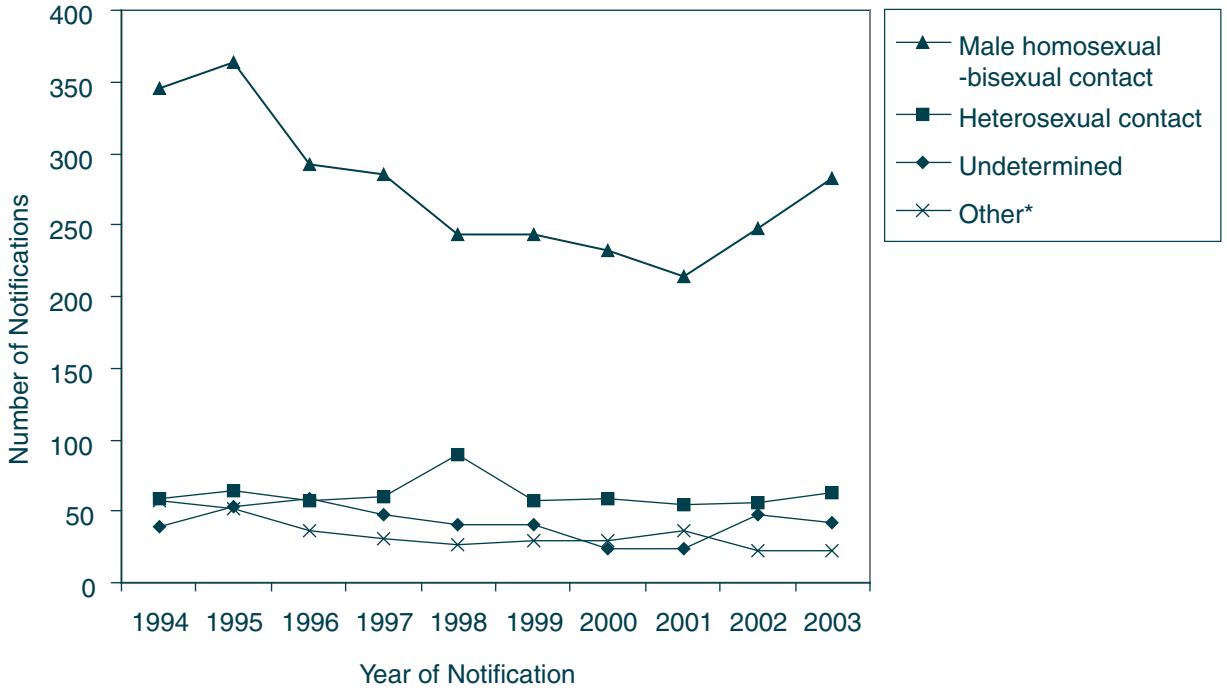
Medical practitioners provided detailed information for 71 per cent of notifications (n=3096). Of these notifications, 1411 were by medical practitioners with an interest in HIV medicine: 881 (28 per cent) by general practitioners with a high proportion of gay men as patients, and 530 notifications (17 per cent) by specialist sexual health physicians. Notifications from other general practitioners represented 54 per cent.

DISCUSSION

In NSW the number of people with a newly diagnosed HIV infection decreased between 1995 and 2001. However, in 2002 and 2003 the number increased, with most of these cases reported in males aged between 25 and 49 years who lived in metropolitan Sydney. The proportion of new HIV diagnoses in females fluctuated between 6 and 10 per cent over the period 1994–2003. The increase in the number of notifications since 2001 represents the first sustained

FIGURE 2

NUMBER OF NEW HIV NOTIFICATIONS IN NSW RESIDENTS BY THEIR PRIMARY HIV RISK EXPOSURE, 1994–2003



*Other: men who have sex with men & IDU (injecting drug user); IDU; blood tissue recipient; haemophilia/coagulation disorder; vertical (mother-to-child transmission)

Source: NSW HIV / AIDS database 2003

increase since the late 1980s.

More than half of the people notified with HIV reside in metropolitan Sydney, principally within inner Sydney. However increasing numbers of HIV notifications have been observed since 2001 in the residents of the Illawarra and Hunter area health services. The analysis by age group reflects previously published epidemiological information showing that the majority of cases are aged between 20 and 49 years.[7] Approximately 65 per cent of people with HIV reported primary exposure through male-to-male sexual contact and 15 per cent reported primary exposure through heterosexual contact.

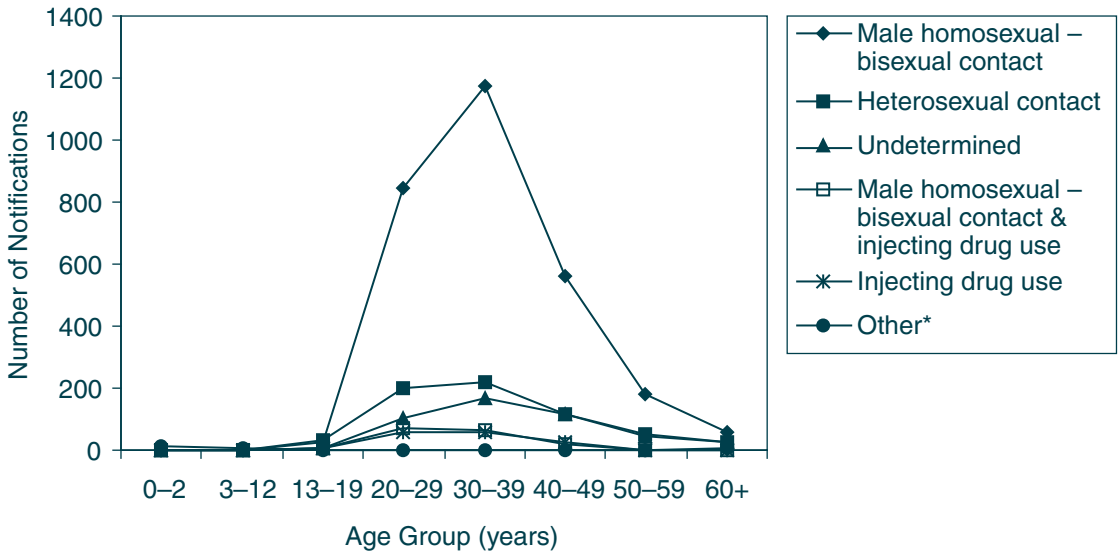
The decrease in cases during the 1990s was most likely due to the effectiveness of health promotion activities that consistently reinforced messages of condom use and regular HIV testing for homosexually active men who have unprotected sex with casual partners.[8,9,10,11] Since 1996 the introduction of highly active antiretroviral therapy (HAART) is likely to have contributed to reducing HIV morbidity.[3,12] The subsequent increase in notifications since 2001 may have been due to various factors, including the cumulative impact of increases in sexually transmitted infections facilitating HIV transmission[7,13] and the increased seroprevalence of HIV.[3] An upward trend in occasions of unprotected sex among gay men since 1999 was observed; however, rates of unprotected sex appear to have now plateaued.[14] This reveals a point of vulnerability in the NSW response to HIV and suggests a strengthening of health promotion activities is needed.

In NSW over the review period, a third of people with HIV who reported their country of birth were born in countries other than Australia. Notification patterns suggest the need for continued monitoring of notifications among people from some culturally and linguistically diverse communities, particularly those from countries with high HIV prevalence. Intervention such as promotion of health knowledge and safe practices and access to services has been undertaken over the review period to increase the understanding of HIV in various communities. Ongoing intervention, however, is needed to address existing barriers to information about HIV transmission and access to health services.[15]

As with all surveillance systems, the quality of the data and its completeness is an ongoing issue within the NSW HIV/ AIDS Database. Protocols exist for repeated follow-up with those who notify cases in order to maximise data completeness. Regular audits are also undertaken with the NSW reference laboratories and the National Centre in HIV Epidemiology and Clinical Research to ensure data capture and to obtain additional information. There are discrepancies between NSW HIV reports and the National Centre in HIV Epidemiology and Clinical Research reports due to the different reporting parameters used and the timing of the snapshots taken of the database.

FIGURE 3

NUMBER OF NEW HIV NOTIFICATIONS IN NSW RESIDENTS BY THEIR AGE AT TIME OF FIRST POSITIVE TEST AND HIV RISK EXPOSURE, 1994–2003



Other: blood tissue recipient, haemophilia/ coagulation disorder, vertical (mother-to-child transmission)

Source: NSW HIV / AIDS database 2003

CONCLUSION

This review used surveillance data from the NSW HIV/AIDS Database to describe newly diagnosed HIV infections in NSW and reported risk exposures for the period 1994 to 2003. The analysis supports previous epidemiological evidence from NSW and Australia about patterns of HIV infection and highlights the finding that male-to-male sexual contact was the most frequently reported category of primary exposure.[7] The review provides a longitudinal picture of HIV infection in NSW and supportive evidence of the success of public health initiatives to reduce HIV infection transmission over the past decade. The recent increase in notifications, however, emphasises the need for continued public health action targeting groups who are at risk.

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BLOOD BORNE VIRUSES IN CORRECTIONAL FACILITIES

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Blood borne viruses (BBVs) are viruses that are transmitted by blood or body fluids containing blood. The most important BBVs in Australia include hepatitis C (HCV), hepatitis B (HBV) and human immunodeficiency virus (HIV). The August 2005 Bug Breakfast explored the prevalence of BBVs in people entering prison, BBV-related risk behaviours in prisons, and existing harm reduction strategies in correctional facilities.

THE PRISON CONTEXT

Approximately 24,000 people move through the NSW correctional system each year, the majority (90 per cent) serving sentences of less than six months. These inmates experience a disproportionate burden of health problems, including mental health disorders, substance use, sexually transmitted infections and BBVs. Inmates are more likely than the general population to be Aboriginal and to have histories of poor educational attainment and unemployment. In correctional facilities in NSW both Justice Health and the Department of Corrective Services provide programs designed to prevent BBV transmission.

PREVALENCE OF BBVS AMONG AUSTRALIAN PRISON ENTRANTS

The National Prison Entrants' Bloodborne Virus Survey was the first nationally coordinated survey of prisoners undertaken in Australia.[1] A consecutive cross section of prison entrants was taken over two weeks in May 2004. Participants were 612 of the 739 individuals entering eight reception prisons in NSW, Queensland, Tasmania and Western Australia.

Voluntary confidential testing for markers of exposure to HIV, HCV and HBV was conducted on all prison entrants who participated in the study. The study was modelled on the national Needle and Syringe Program Survey (NSPS), a community survey of needle exchange attendees. Demographic data and data related to risks for BBV transmission, including sexual activity, body piercing, tattooing and injecting drug use, were collected.

The response rate was high for both the questionnaire (77 per cent) and the blood testing (63 per cent) components of the study. The overall prevalence of HIV, HBV core antibody, and HCV antibody in the sample was less than one per cent, 20 per cent and 35 per cent respectively. Among injecting drug users the prevalence for HIV, HBV core antibody, and HCV antibody was less than one per cent, nine per cent and 56 per cent respectively. The prevalence of HIV among prison entrants is low and is consistent with the findings of the NSPS; HCV prevalence is also consistent with the findings of the NSPS. The proportion of inmates who had been previously vaccinated against HBV varied across correctional jurisdictions.

Fifty nine per cent of those screened reported injecting drugs in their lifetime. Of these, 65 per cent reported injecting in the month prior to entering prison. Nationally, the most frequently reported drugs to be last injected were amphetamines (55 per cent), but in NSW heroin was the drug most frequently reported as last injected (52 per cent).

The National Prison Entrants' Bloodborne Virus Survey collected data from twice the proportion of Indigenous Australians as compared to the NSPS, and allows for greater surveillance of BBVs among this population. The survey of prison entrants also provides information on non-injecting drug users who may be at risk of BBV infection. This survey is an adjunct to the NSPS and significantly enhances current national surveillance of BBVs.

BBV-RELATED RISK BEHAVIOURS

Prisons are a high-risk environment for BBV transmission due to the relatively higher prevalence of these infections among prison entrants and the large proportion of inmates who report engaging in behaviours conducive to the transmission of BBVs, including injecting drug use (IDU), non-sterile tattooing, skin piercing, physical violence, self-harm, unprotected sex, recreational sport and prison employment.[2]

A significant number of inmates inject drugs while in prison. Of the 73 per cent of female and 53 per cent of male inmates who report a history of injecting drug use, 62 per cent of female and 48 per cent of male inmates continue to inject while in prison. Of these, 70 per cent re-use syringes and over 30 per cent report sharing syringes with five or more inmates per injection.[3] Sharing of other injecting equipment (spoons, water, filters and tourniquet) also occurs. HIV transmission via IDU has been confirmed in at least two Australian prison studies.[4,5]

*Bug Breakfast is the name given to a monthly series of hour-long breakfast seminars on communicable diseases delivered by the NSW Department of Health's Division of Population Health.

Prison tattooing with non-sterile equipment is common; approximately 40 per cent of inmates receive a tattoo while in prison.[6] Prison tattooing is an independent risk factor for HBV and HCV infection in inmates who have never injected drugs.[6]

Unsafe sex places inmates at a heightened risk of contracting sexually transmitted infections and HIV. The risk is heightened in sexual assaults.[3] Evidence suggests that a proportion of prisoners engage in consensual sexual activity in prison. Twenty three per cent of women and three per cent of men report engaging in sexual activities in prison and 23 per cent of women and 15 per cent of men report being aware of sexual assaults occurring in prison in the previous twelve months.[3] These figures may underestimate the true frequency.

Prison assaults and self-harm are situations where inmates and correctional staff may come into contact with blood through direct involvement, by being a bystander or through cleaning up blood spills afterwards.[2]

Recreational sport and prison employment are activities that have been associated with exposure to blood. One Australian survey reported that 18 per cent of inmates were exposed to blood while engaging in recreational activities and 25 per cent reported workplace exposures to blood.[2]

EXISTING HARM MINIMISATION STRATEGIES

A range of existing harm minimisation strategies are currently in place in NSW correctional facilities. These include the provision of treatment for drug dependence; BBV education, screening, counselling and treatment; the provision of bleach to clean injecting equipment; provision of condoms and lubricant to encourage safe sex; HBV vaccination; and HBV and HIV post exposure prophylaxis. At present professional tattooing and piercing and needle and syringe programs are not available in NSW prisons.

CONCLUSION

Prisoners experience a disproportionate burden of health problems; they have a high prevalence of BBVs and many engage in high-risk behaviours for BBV transmission. High-risk behaviour is not, however, random, uncontrollable or inevitable. BBV transmission is preventable. Many factors that contribute to an individual's propensity to engage in high-risk behaviours for BBVs transmission can be modified and lasting changes can result from targeted and persistent harm reduction initiatives.

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FACTSHEET

INFECTIOUS MONONUCLEOSIS

Infectious mononucleosis mostly affects teenagers and young adults. The disease is spread through saliva and causes fever, sore throat, and swollen lymph glands. It usually lasts from one week to several weeks. The most effective preventive measures are hand washing and thorough cleaning of soiled objects.

WHAT IS INFECTIOUS MONONUCLEOSIS?

Infectious mononucleosis (sometimes called glandular fever) is caused by infection with *Epstein-Barr virus* (EBV).

WHAT ARE THE SYMPTOMS?

- Infection with EBV usually causes no or few symptoms in young children.
- Teenagers and adults are more likely to become sick if infected.
- Symptoms include fever, sore throat, swollen lymph glands, tiredness, and feeling generally unwell. The doctor may find swelling of the spleen or liver.
- The illness usually lasts between one week and several weeks. A small proportion of people can be sick for months.
- Most people make a complete recovery.
- Once infected, the virus remains in the body for life.

HOW IS IT SPREAD?

- Infectious mononucleosis is spread from person to person through direct contact with saliva.
- It can be spread from people who are sick with the illness or by healthy people who carry and can spread the virus intermittently throughout their life.
- The time from infection to appearance of symptoms ranges from 4 to 6 weeks.

WHO IS AT RISK?

- Anybody can get infected with EBV. By the time they are adults, most people will have been infected but only a proportion will have had symptoms.
- Rarely, symptoms can recur in people with a poorly functioning immune system.

HOW IS IT PREVENTED?

Spread of the virus can be prevented through:

- careful hand washing with soap and running water if you have the illness, especially after sneezing and coughing and before touching other people
- avoiding saliva contact (eg kissing) with people who have the infection
- thorough cleaning with soap and water of soiled objects such as the toys of sick children.

HOW IS IT DIAGNOSED?

A blood test can confirm the diagnosis in a patient who is suspected of having infectious mononucleosis. This includes a blood count and a 'mono spot' test.

HOW IS IT TREATED?

There is no specific treatment for infectious mononucleosis. Your doctor can advise on the treatment for symptoms such as fever and sore throat. Rest and a balanced diet may be helpful.

WHAT IS THE PUBLIC HEALTH RESPONSE?

Infectious mononucleosis is not notifiable in NSW. Cases are not excluded from childcare, school or work, but should be advised to rest at home until they feel better and told how to help prevent spread.

For further information please contact your doctor, local public health unit, or community health centre.

September–October 2005

NSW HEALTH

COMMUNICABLE DISEASES REPORT, NEW SOUTH WALES, FOR JULY AND AUGUST 2005

For updated information, including data and facts on specific diseases, visit www.health.nsw.gov.au and click on **Infectious Diseases.**

TRENDS

Tables 2 and 3 and Figure 1 show reports of communicable diseases received through to July and August 2005 in NSW.

Notably, there have been the seasonal winter declines in **arboviral infections** and **salmonellosis**, and increases in **influenza** and **invasive pneumococcal disease.** A weekly update on influenza activity can be found at: www.health.nsw.gov.au/infect/pdf/flureport.pdf.

Reports of **meningococcal disease** so far this winter have been less frequent than in previous winters. In NSW in June and July 2005, 20 cases were reported compared with 35 for the same period in 2004, 42 in 2003, and 50 in 2002. An analysis of the serogroups involved demonstrated that while there was some decline in cases caused by serogroup B (15 cases in 2005 compared with 20 in 2004, 23 in 2003, and 20 in 2002), a sharper decline has occurred in cases caused by the vaccine-preventable serogroup C (one in 2005, compared with five in 2004, nine in 2003 and 12 in 2002). A biweekly update on meningococcal disease activity can be found at: www.health.nsw.gov.au/infect/pdf/mening_update.pdf.

Reports of **pertussis** continue to increase, with 711 cases notified across the state in July. Reports of laboratory-confirmed **mumps** have increased in 2005 (72 in NSW from January to July 2005) compared with previous years (64 for all of 2004 and 35 for 2003). Of the cases reported in the previous 12 months, the largest proportion has been among people (predominantly men) in their twenties and older adults (both sexes). No case of **measles** has been reported in NSW since a patient with onset in April 2005.

Data from the NSW Influenza Surveillance Program www.health.nsw.gov.au/infect/pdf/flureport.pdf show an increase in **influenza** in the late part of August. The program collects data from selected general practitioners, emergency departments and laboratories. Four outbreaks of influenza were reported among residents of aged care facilities in NSW in August. Each outbreak was located in a different area health service. Three of the outbreaks were due to influenza A and one to influenza B. In each outbreak, local public health unit staff were able to assist in the rapid diagnosis and provision of infection control recommendations and, where indicated, provide vaccination and anti-influenza medications to residents and staff at risk of infection. The outbreaks appeared to quickly subside. Further evaluation is pending.

ENTERIC DISEASE

The number of cases of **cryptosporidiosis** with onset dates in August 2005 declined (n=25), when compared to previous months (83 in January, 42 in February, 62 in March, 118 in April, 96 in May, 54 in June, and 42 in July). However, the number of notifications with onset in August 2005 is greater than that reported for the previous four years (12 in 2004, six in 2003, eight in 2002, and nine in 2001). Since 1 May 2005, public health units have been following up cases of cryptosporidiosis to obtain information about potential exposures. As reported in a previous edition of the *NSW Public Health Bulletin*, the May 2005 outbreak was linked to swimming in contaminated pools. The increase in case reports may also be related to the introduction by some laboratories in 2004 of new testing procedures for cryptosporidiosis.

There was an increase in **gastroenteritis** outbreaks in aged care facilities and childcare centres reported by public health units in August, with norovirus and rotavirus identified as the causative agents in a number of outbreaks. This increase in gastroenteritis in institutions follows earlier reports of increases in diarrhoea and vomiting presentations at child emergency departments and subsequent increases in diarrhoea and vomiting presentations at adult emergency departments throughout August, identified through the Public Health Real-time Emergency Department Surveillance System. For example, for the week ending 21 August 2005, for the 17 participating emergency departments combined, there were 460 gastroenteritis-related emergency department visits in that week compared with an average of 241 visits per week in the past 12 months. Of these, 76 per cent were in children, compared with a weekly average of 55 per cent in the past 12 months. Twenty nine per cent were admitted compared with an average of 31 per cent.

The protracted outbreak of ***Salmonella*** **Typhimurium** phage type 170/108 infections that began in November 2004 appears to have subsided, with only four cases notified with onset in August at the time this data was downloaded (6 September 2005).

QUARTERLY REPORT: AUSTRALIAN CHILDHOOD IMMUNISATION REGISTER

Table 1 compares the percentages of fully immunised Indigenous and non-Indigenous children in NSW aged 12 months to less than 15 months in each area health service, reported by all service providers as at 30 June 2005 and 30 September 2005.

These data refer to children whose age has been calculated 90 days before data extraction. The information contained in the report has been extracted from the Australian

Childhood Immunisation Register (ACIR) and may be underestimated by approximately three per cent due to children being vaccinated late or to service providers failing to forward information to the ACIR.

TABLE 1

COMPARISON OF PERCENTAGES OF FULLY IMMUNISED CHILDREN IN NSW AGED 12 MONTHS TO LESS THAN 15 MONTHS AS AT 30 JUNE 2005 AND 30 SEPTEMBER 2005, CATEGORIZED BY AREA HEALTH SERVICE AND BY INDIGENOUS AND NON-INDIGENOUS STATUS.

Area Health Service	30 June 2005		30 September 2005	
	Non-Indigenous %	Indigenous %	Non-Indigenous %	Indigenous %
Greater Southern	93	91	93	88
Greater Western	92	81	92	84
Hunter / New England	94	87	93	82
North Coast	83	83	85	78
Northern Sydney / Central Coast	91	92	91	96
South Eastern Sydney / Illawarra	90	91	90	83
Sydney South West	90	83	90	83
Sydney West	90	93	90	90
NSW	91	87	91	85
AUSTRALIA	91	85	91	85

ERRATA

In the May-June 2005 issue of the *NSW Public Health Bulletin* (Volume 16, Number 5–6) there is an error on page 80 in Table 1: Disease notifications by year of onset of illness, NSW, 1991 to 2004. The number of new HIV infections for 1993 should read 586, not 56. This error has been corrected in the web versions of this issue.

In the July-August 2005 issue of the *Bulletin* (Volume 16, Number 7–8) there is an error in the table on page 139: Table 2, Reports of notifiable conditions received in May 2005 by Area Health Service. The column headings SES and ILL (under South Eastern Syd/Illawarra) should be transposed. The same error appears in the table on page 140: Table 3, Reports of notifiable conditions received in June 2005 by Area Health Service. This error has been corrected in the web versions of this issue.

We apologise for any confusion these errors may have caused.

FIGURE 1

REPORTS OF SELECTED COMMUNICABLE DISEASES, NSW, JAN 2000 TO AUG 2005, BY MONTH OF ONSET

Preliminary data: case counts in recent months may increase because of reporting delays.

Laboratory-confirmed cases only, except for measles, meningococcal disease and pertussis

BFV = Barmah Forest virus infections, RRV = Ross River virus infections

Lab conf = laboratory confirmed

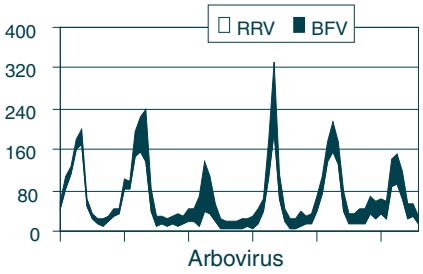
Men Gp C and Gp B = meningococcal disease due to serogroup C and serogroup B infection, other/unk = other or unknown serogroups.

NB: multiple series in graphs are stacked, except gastroenteritis outbreaks.

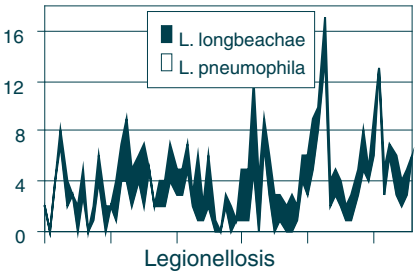
NB: Outbreaks are more likely to be reported by nursing homes and hospitals than by other institutions

NSW population	
Male	50%
<5 yrs	7%
5–24 yrs	27%
25–64 yrs	53%
65+ yrs	13%
Rural	46%

Jun 05–Aug 05	
Male	50%
<5	1%
5–24	12%
25–64	75%
65+	12%
Rural	87%



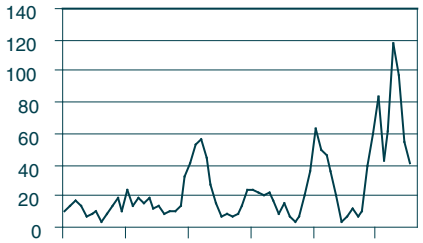
Arbovirus



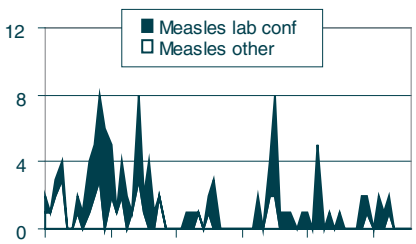
Legionellosis

Jun 05–Aug 05	
Male	60%
<5	0%
5–24	0%
25–64	53%
65+	47%
Rural	47%

Jun 05–Aug 05	
Male	55%
<5	44%
5–24	24%
25–64	30%
65+	2%
Rural	24%



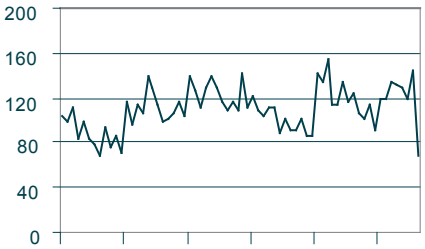
Cryptosporidiosis



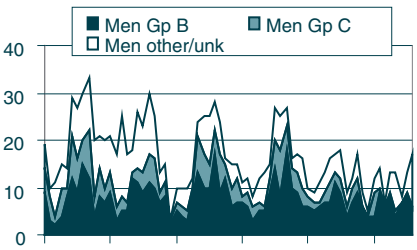
Measles

Jun 05–Aug 05	
Male	0%
<5	0%
5–24	0%
25–64	0%
65+	0%
Rural	0%

Jun 05–Aug 05	
Male	88%
<5	0%
5–24	26%
25–64	73%
65+	1%
Rural	15%



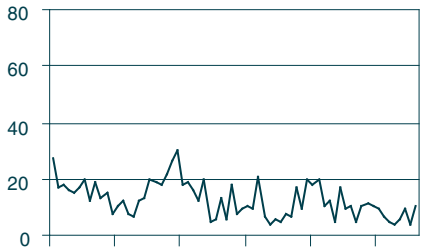
Gonorrhoea



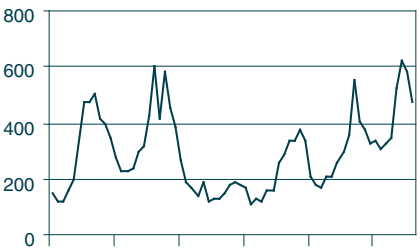
Meningococcal disease

Jun 05–Aug 05	
Male	45%
<5	34%
5–24	32%
25–64	29%
65+	5%
Rural	40%

Jun 05–Aug 05	
Male	52%
<5	4%
5–24	48%
25–64	48%
65+	0%
Rural	13%



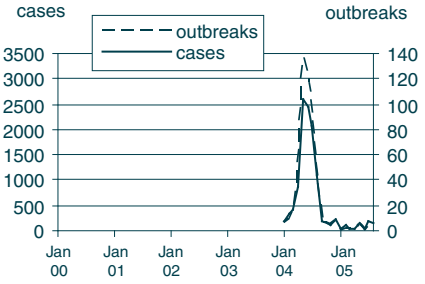
Hepatitis A



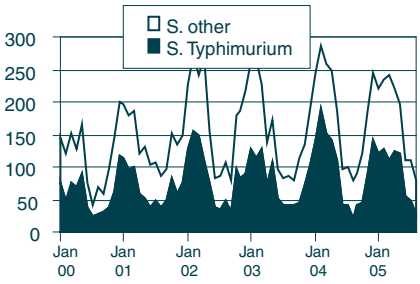
Pertussis

Jun 05–Aug 05	
Male	41%
<5	4%
5–24	15%
25–64	69%
65+	12%
Rural	31%

Jun 05–Aug 05	
All outbreaks	14
Nursing homes	6
Hospitals	0
Child care	8
Schools	0
Other	0



Gastroenteritis outbreaks in institutions



Salmonella infections

Jun 05–Aug 05	
Male	54%
<5	22%
5–24	32%
25–64	32%
65+	14%
Rural	37%

TABLE 2 REPORTS OF NOTIFIABLE CONDITIONS RECEIVED IN JULY 2005 BY AREA HEALTH SERVICES

	Area Health Service (2005)																			
	Greater Southern		Greater Western			Hunter / New England		North Coast		Northern Syd / Central Coast		South Eastern Syd / Illawarra		Sydney South West		Sydney West			Total	
Condition	GMA	SA	FWA	MAC	MWA	HUN	NEA	MNC	NRA	CCA	NSA	ILL	SES	CSA	SWS	WEN	WSA	JHS	for July+	To date+
Blood-borne and sexually transmitted§																				
Chancroid*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital)*	32	18	3	11	28	118	34	27	48	25	83	43	134	96	55	47	70	-	873	6616
Gonorrhoea*	-	-	-	-	-	9	1	-	8	2	10	3	67	13	6	1	9	-	131	876
Hepatitis B–acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis B–other*	2	2	-	1	-	5	2	2	5	4	40	3	33	37	78	4	5	-	223	2172
Hepatitis C–acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis C–other*	16	25	1	7	11	44	16	26	41	26	28	24	53	51	69	32	54	4	532	3775
Hepatitis D–unspecified*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	2	7
Syphilis	-	-	-	-	-	3	3	4	2	1	2	5	17	7	9	1	8	-	62	556
Vector-borne																				
Barmah Forest virus*	1	-	-	1	-	3	1	21	5	-	-	2	-	-	-	-	1	-	35	317
Ross River virus*	2	-	-	1	1	3	2	8	6	2	-	-	-	-	1	1	-	-	27	357
Arboviral infection (other)*	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-	3	26
Malaria*	-	-	-	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	3	150
Zoonoses																				
Anthrax*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptospirosis*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	24
Lyssavirus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis*	3	-	-	-	-	1	-	-	-	-	-	1	-	-	1	2	-	-	8	78
Q fever*	1	-	-	1	2	1	1	1	1	-	-	-	-	-	-	-	-	-	8	76
Respiratory and other																				
Blood lead level*	-	1	-	-	-	1	-	1	-	1	-	-	-	-	3	-	-	-	7	134
Influenza*	2	-	-	5	-	11	-	3	5	4	10	2	29	4	26	9	26	-	137	640
Invasive pneumococcal infection*	1	2	-	2	3	8	1	3	3	4	11	4	4	6	4	5	15	-	76	354
Legionella longbeachae infection*	-	1	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	4	13
Legionella pneumophila infection*	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	2	36
Legionnaires' disease (other)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Leprosy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Meningococcal infection (invasive)*	-	-	-	-	-	1	-	-	-	-	2	-	1	2	2	1	1	-	10	75
Tuberculosis	-	1	-	-	-	1	-	1	-	3	2	-	6	-	1	1	7	-	23	207
Vaccine-preventable																				
Adverse event after immunisation (AEFI)**	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-	1	1	-	5	57
H. influenzae type b infection (invasive)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Measles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Mumps*	-	-	-	-	-	1	-	-	1	-	-	-	3	-	-	-	2	-	7	72
Pertussis	19	14	2	45	8	33	5	21	20	21	74	37	132	69	72	42	96	-	711	2959
Rubella*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enteric																				
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptosporidiosis*	1	-	-	-	1	1	1	-	5	-	8	2	4	1	13	4	8	-	49	526
Giardiasis*	5	-	-	3	2	11	1	4	1	4	16	1	19	6	12	7	10	-	102	896
Haemolytic uraemic syndrome	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Hepatitis A*	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1	-	-	-	4	47
Hepatitis E*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	6
Listeriosis*	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	16
Salmonellosis*	-	3	-	2	3	12	4	4	8	3	10	4	14	8	13	6	22	-	116	1411
Shigellosis*	2	-	1	2	-	1	-	-	-	-	1	-	1	1	1	-	1	-	11	83
Typhoid*	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	2	22
Verotoxin producing *E. coli**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Miscellaneous																				
Creutzfeldt-Jakob disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Meningococcal conjunctivitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

* lab-confirmed cases only + includes cases with unknown postcode § HIV and AIDS data are reported separately in the *NSW Public Health Bulletin* quarterly

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JHS = Justice Health Service

TABLE 3 REPORTS OF NOTIFIABLE CONDITIONS RECEIVED IN AUGUST 2005 BY AREA HEALTH SERVICES

	Area Health Service (2005)																			Total	
	Greater Southern		Greater Western			Hunter / New England		North Coast		Northern Syd / Central Coast		South Eastern Syd / Illawarra		Sydney South West		Sydney West					
Condition	GMA	SA	FWA	MAC	MWA	HUN	NEA	MNC	NRA	CCA	NSA	ILL	SES	CSA	SWS	WEN	WSA	JHS	for Aug+	To date+
Blood-borne and sexually transmitted§																				
Chancroid*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital)*	31	21	8	20	33	110	33	41	47	41	85	39	199	75	39	31	77	-	942	7575
Gonorrhoea*	-	-	-	2	2	1	1	1	4	1	9	3	48	35	6	1	10	-	125	1007
Hepatitis B–acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis B–other*	5	5	2	-	1	10	2	1	1	3	31	3	28	47	67	12	56	-	275	2505
Hepatitis C–acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis C–other*	15	13	1	9	14	47	9	34	30	28	24	28	56	73	69	17	50	-	521	4308
Hepatitis D–unspecified*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	8
Syphilis	-	-	1	1	1	1	-	4	2	1	7	3	22	6	19	3	13	-	84	628
Vector-borne																				
Barmah Forest virus*	1	1	-	-	-	3	-	13	8	-	-	-	1	-	-	-	-	-	27	343
Ross River virus*	-	1	2	2	-	1	1	7	2	1	1	-	2	-	-	-	-	-	20	378
Arboviral infection (other)*	-	-	-	-	-	1	-	-	-	-	3	-	1	-	-	-	1	-	6	32
Malaria*	-	-	-	1	1	-	-	2	-	-	3	-	1	1	1	1	3	-	14	165
Zoonoses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Anthrax*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	2	2
Leptospirosis*	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	2	26
Lyssavirus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis*	-	1	-	-	1	-	2	-	-	-	-	-	-	-	-	4	-	-	8	88
Q fever*	-	-	1	3	2	-	-	-	-	-	-	-	-	-	1	-	-	-	7	83
Respiratory and other																				
Blood lead level*	-	-	-	1	3	11	-	1	-	-	-	-	-	-	5	4	-	-	25	166
Influenza*	3	6	4	29	-	14	2	10	19	4	37	5	27	10	40	10	31	-	251	895
Invasive pneumococcal infection*	4	-	2	1	7	6	-	8	3	5	8	7	9	5	10	5	9	-	90	446
Legionella longbeachae infection*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Legionella pneumophila infection*	-	-	-	-	-	-	-	1	-	2	1	2	-	-	-	1	1	-	8	44
Legionnaires' disease (other)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Leprosy	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	2
Meningococcal infection (invasive)*	-	1	-	1	2	1	-	3	2	1	-	1	3	-	-	1	2	-	18	94
Tuberculosis	-	-	-	-	-	-	-	-	-	1	5	2	9	6	3	2	6	-	34	249
Vaccine-preventable																				
Adverse event after immunisation (AEFI)**	1	-	-	-	-	-	-	1	-	-	-	-	2	-	1	2	-	-	7	64
H. influenzae type b infection (invasive)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Measles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Mumps*	-	-	-	-	-	-	-	-	1	-	2	-	3	1	1	1	2	-	11	83
Pertussis	27	11	4	49	2	30	6	28	15	30	86	22	175	68	82	27	102	-	765	3738
Rubella*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enteric																				
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptosporidiosis*	1	1	-	-	-	1	2	2	2	1	3	2	3	6	4	4	9	-	41	567
Giardiasis*	-	3	1	7	-	7	1	3	-	3	20	5	19	6	11	5	11	-	102	1000
Haemolytic uraemic syndrome	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	4
Hepatitis A*	-	-	-	-	1	-	-	-	1	-	-	-	2	2	1	1	2	-	11	59
Hepatitis E*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	7
Listeriosis*	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	18
Salmonellosis*	3	2	-	3	-	9	3	2	12	1	18	3	20	10	12	-	13	-	111	1525
Shigellosis*	-	-	3	1	-	2	1	-	1	-	4	-	2	-	-	-	-	-	14	101
Typhoid*	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	2	24
Verotoxin producing *E. coli**	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	6
Miscellaneous																				
Creutzfeldt-Jakob disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	4
Meningococcal conjunctivitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

* lab-confirmed cases only + includes cases with unknown postcode §HIV and AIDS data are reported separately in the *NSW Public Health Bulletin* quarterly

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