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TACKLING HEALTH INEQUALITIES: BALANCING UNIVERSAL AND TARGETED APPROACHES

GUEST EDITORIAL

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In 1998–99 expenditure on health services in NSW was estimated at A$17.6 billion. This is made up of contributions by the Commonwealth (A$8.3 billion), State and Local Governments (A$4 billion) and payments through medical benefits funds, personal contributions, and insurance claims, etc. (A$5.3 billion).[1] Many tens of thousands of people work in the health system and in the course of 12 months most people will have had contact with the health system. *Health is big business*. The challenge we face within the health system when tackling health inequalities is to find ways of harnessing this huge investment of human and economic capital in ways that ensure that our efforts are efficient and effective and not marginalised, with insufficient 'firepower' to make a difference.[2]

One of the most common ways in which this challenge presents itself is in finding the balance between accessible, high quality, universal (whole population) services, and targeted programs that meet the specific needs of vulnerable populations and groups. The development of clinical services for indigenous Australians provides an excellent example. There is growing evidence that community-controlled health services and programs where there is a specific focus on meeting the needs of indigenous communities, contribute significantly to health gain in these communities.[3] However, it is also true that for most indigenous people, most of the time they will also be using mainstream health services. How should we balance our effort? The evaluation of the first Aboriginal Health Strategic Plan in South Western Sydney Area Health Service found that while all the strategies aimed at building Aboriginal community owned and controlled health services had been either fully (54 per cent) or partly (46 per cent) achieved, none of the mainstream service strategies had been fully implemented and only 60 per cent had been partly implemented.[4]

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But what is it that we expect of mainstream services and programs? Is there a generic way in which health services can be delivered that will address issues of equity or are there very specific responses that are required for particular groups who have poor health? One way forward is to identify some key service dimensions to be considered in discussing the mix of mainstream and targeted services that we may need. A United Kingdom framework for Primary Health Care research has identified a number of focus areas in the delivery of clinical care systems that may guide this thinking:

- access: attitudes and behaviour of heath professionals and the impact this has on accessibility of services;
- quality of care: timeliness, appropriateness of care, evidence-based practice, comprehensive approaches;
- continuity of care: ongoing management of health problems;
- integration of care: involvement of other service providers in multidisciplinary approaches to care within and across services;
- participatory care: patient–client–carer involvement in decision-making.[5]

The issue is just as real when dealing with population health issues. While it may be possible to ensure that the entire population benefits from some programs such as fluoridation of water, this may not be true for programs aimed at lifestyle change that are dependent on a complex set of behaviours and access to resources. What is the most appropriate mix of universal and targeted health promotion strategies?

Sergerie and Farley have suggested a way through this by developing a set of criteria for designing intervention programs to reduce injury.[6] Using examples such as bicycle-related head injuries, fire-related injuries, and playground injuries, they make judgements on the relative impact of universal and targeted strategies:

- Is there a difference in the illness rate between socioeconomic groups?
- Are there any differentiating risk factors related to socioeconomic group?
- Are there any effective preventive measures?
- What different interventions exist according to whether a whole population or a selective (high-risk group) approach is used?
- What gains are expected in terms of a reduction of incidence or prevalence according to whether a whole population or a selective approach is used?
- What are the costs and impacts of the measure?
- What ethical principles need to be considered?

The process of asking these questions highlights the difficulties of trying to find relatively simple answers to one aspect of a complex problem. For example, in thinking about reducing fire-related injury the authors identify a lack of smoke detectors, rental accommodation, heating systems, smoking, and alcohol as the main risk factors and recognise that the relative risk of all these factors is higher in low socioeconomic groups. They explore the evidence on whether a population-based (legislative) approach to installing smoke detectors is more effective than the targeted distribution of smoke alarms to high risk communities. However, ultimately it is hard to decide whether either approach to the installation of smoke alarms will by itself be effective while there is a complex web of other risk factors related to the initiation of the fire. In reality a balance between targeted and universal approaches appears most likely to achieve long-term outcomes.

In this third issue of the *NSW Public Health Bulletin* that focuses on health inequalities, we turn the spotlight towards action to reduce inequalities. The complexity related to balancing on the one hand mainstream and universal interventions and on the other hand targeted interventions is taken up in different ways in the first three papers. Harris and Furler examine ways in which primary care can contribute to reducing health inequalities. They conclude that to be effective specific interventions that provide outreach or targeted preventive services and those that aim to build the capacity of disadvantaged individuals and groups need to be underpinned by a system that ensures good access to high quality health services for everyone.

Alperstein and Nossar examine the ways in which the NSW *Families First* program can contribute to reducing health inequalities. They provide an overview of the evidence that early intervention and school and community based programs positively impact on child health outcomes. However, they also warn of the limitations of targeting 'reactive services' to high risk families and individuals rather than providing population-based preventive interventions. Many of those who need support may not be identified through tight targeting of services and there is a chance that we may lose sight of the broad global and societal influences that are determining the context in which children are being raised.

Gibbs, Sondalini and Pearce discuss the evolving nature of the NSW Health Resource Distribution Formula (RDF). The tension between providing funds on the basis of health need or health outcomes is discussed and ways in which these considerations can be built into the RDF are outlined. They also discuss the dilemma of providing funds for targeted services within area health services and the difficulties of ensuring that resources are reallocated within area health services to those issues or populations with greatest need.

On a related issue, Leeder provides examples of evidence being used to promote the health of disadvantaged groups

and argues that currently available information about interventions that actually improve health should be used to help disadvantaged populations now rather than waiting for radical social change. Catchatoor, in an update on the Health Inequalities Research Collaboration, describes how action is being taken at the national level to build the evidence base.

The papers by Turrell and Harding remind us that we need to see any action to tackle health inequalities in the wider social context of income distribution, employment, community infrastructure and global forces. As big as the health system is, it still plays only a small part in the overall solutions. Turrell emphasises the need for action on upstream, midstream and downstream influences on health. Harding, in a sequel to a paper published in the Bulletin last year (Volume 12, Number 5), reminds us that all data sources must be scrutinised carefully.

As our thinking shifts from defining and describing the patterns of health inequality to acting to reduce inequalities, it is important to recognise that doing our 'core business' well and in a way that effectively addresses health inequality is an important contribution to creating a more equal Australian society. The NSW Health and Equity Statement is a local example of how the priorities of health services are being defined to reduce inequality.[7]

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HOW CAN PRIMARY CARE INCREASE EQUITY IN HEALTH?

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BACKGROUND

A number of comparative studies have demonstrated an association between the provision of primary care in developed countries and favourable markers of health status.[1,2] There is also evidence for an association between health-care systems that are organised around a strong primary-care sector and reduced health inequalities.[3] Because they reach so much of the population, primary care services such as general practice have an opportunity to address health inequities by improving access to quality care: for example, by providing better anticipatory or preventive care within primary care services themselves, and by outreach into disadvantaged communities. However, to be most effective, these need to be integrated with other multilevel community-based strategies that address the social and economic determinants of health.

ACCESS

Tudor Hart, working as a general practitioner in Wales, first described the 'inverse care law' in which those with the greatest need access health services the least.[4] This applies both to access to primary care services and access to those services that occur subsequent to first contact. In Australia, the evidence for disparities in access to primary care is most apparent in relation to primary, secondary, and tertiary preventive care services. People who are socioeconomically disadvantaged are more likely to need, but are less likely to use, preventive health services such as dentists, immunisation, and cancer screening tests.[5]

For example, single parent and migrant families—and families where the parents are unemployed, on low income, or have low levels of education—are at risk of low levels of age-appropriate immunisation.[6,7] There is evidence to suggest that women of low socioeconomic status are less likely to have attended health services for a Pap smear, although women living in low socioeconomic areas have a higher incidence of cervical cancer.[8,9,10] This lack of anticipatory care, leading to more crisis management in health, is most evident for indigenous Australians.[11,12]

Access to health care services in Australia is mediated by a number of factors:

- geographic availability of services, especially in rural and outer urban areas;[13]
- cost of health care services, especially services to which patients are referred from primary care (for example: allied health, medical specialists, private health care); and cost of treatments (for example, prescribed drugs) including 'co-payments' on top of Medicare and the Pharmaceutical Benefits Scheme. An extreme example of restricted access to care is found in the case of asylum seekers who may be without access to primary or hospital care;[14]
- waiting times for publicly-funded health services, especially allied health services, outpatient medical specialist services, and elective procedures;
- conscious and unconscious barriers to disadvantaged groups, including cultural and language barriers, which may apply at both the practitioner and the patient level.

One strategy to deal with this disparity in access is to target disadvantaged communities and populations with specific health programs and services. While this may work in the short-term, as commitment wanes it may be more difficult to sustain when compared to 'mainstream' programs and services. There is also a potential for stigmatisation. On the other hand, ensuring mainstream services are distributed according to clearly-defined need can assist in ensuring fair access.

QUALITY OF CARE

Disadvantaged groups need not only to access health care services but also for these to be of comparable quality. Subtle and unconscious factors may affect the way in which health care is provided to disadvantaged groups. For example, in primary care we have found differences in the way in which general practitioners (GPs) respond to patients with anxiety or depression—being more likely to prescribe to, and less likely to refer or offer non-pharmacological interventions for, unemployed patients.[15] GPs may spend less time in consultations with socioeconomically disadvantaged patients.[16,17,18] Other studies have shown socioeconomic differentials in the use of allied health services, waiting times in emergency departments,[19] and referral for investigations such as angiography.[20]

Systematically addressing the financial, structural, and attitudinal barriers to more equitable quality health care requires more than education for service providers. A key strategy in improving equity and quality of care is, therefore, to carefully examine patterns of service provision. For this to be possible, socioeconomic data needs to be routinely recorded and analysed.[21] This seems particularly challenging in primary care. While practitioners are often comfortable in being sensitive to gender or ethnicity in their work, being sensitive to social disadvantage appears to have less legitimacy.[22]

SPECIFIC INTERVENTIONS IN PRIMARY CARE TO REDUCE HEALTH INEQUALITIES

Strategies that have been shown to be effective in reducing health inequalities include outreaching services, reducing cost and other barriers to access, developing culturally-appropriate services, and increasing access to skills and resources that will enable people to adopt more health-promoting lifestyles.[23,24] A number of divisions of general practice have developed programs that attempt to improve access for socioeconomically disadvantaged groups, through direct provision of allied health services and raising community awareness of the need to access GPs for preventive care.[25] Targeted community-based preventive or outreach programs are effective in reducing behavioural risk factors and improving preventive health care.[26,27] Outreach programs have achieved improved health outcomes for disadvantaged groups such as homeless people.[28] As part of a holistic approach to family support, home visiting has been shown to minimise the risks of child abuse and neglect.[29]

Approaches to improving the health of disadvantaged communities are most effective when they are tailored to the needs of those communities, involve local communities, and provide services in ways that increase their accessibility.[30,31] Developing relationships within communities takes time and often needs to start by addressing priority issues identified by the community. These may not be the same issues as identified by local service providers. A study to identify factors that enhanced the capacity of divisions of general practice to develop diabetes programs with indigenous communities found that having a population rather than a patient approach, an active involvement of local community controlled health services or community organisations, and a willingness to move at the pace set by the community, were key features of successful programs.[32]

SYSTEMIC CHANGE

Multilevel strategies are more effective than single strategies. In patients with health problems, this includes building systematic approaches to health care within primary care; building linkages between primary care and specialist services; and developing community awareness, health literacy, and self management skills.[33,34] In the United States, a number of studies have found that, when compared with services that are less well-integrated or specialist-oriented, there is an association between the provision of more 'holistic' and proactive community-based health care services and improved health outcomes at lower cost.[35,36,37]

Underpinning this, we need a system that is oriented to the needs of populations and communities, and in which

the various elements of primary care—especially general practice and community health—work more effectively together and counterbalance pressure from hospitals, which dominate the health care system in all states and territories. We are a long way from this at present; however, positive developments include:

- establishment of integrative structures at the local level (primary care partnerships in Victoria and primary care networks in NSW);
- various trials and examples of co-location or integrated service delivery between GPs and community health services;
- joint planning and provision of allied health services by some rural divisions of general practice and rural area health services;
- development of some integrated care programs for chronic disease that are focused on the community services rather than on hospital services.

CONCLUSIONS

Primary care can make a major contribution to reducing health inequalities. To do this, it needs to identify and address barriers to access and quality of care for disadvantaged population groups and communities. It also requires systemic change to underpin more specific interventions to provide outreach or targeted preventive services and to build the capacity of individuals and communities.

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CAN THE *FAMILIES FIRST* INITIATIVE CONTRIBUTE TO REDUCING HEALTH INEQUALITIES?

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This article describes the ways in which *Families First*—a coordinated strategy of the NSW Government that has increased the effectiveness of early intervention and prevention services in helping families to raise healthy and well adjusted children—can contribute to reducing health inequalities.

CHILD HEALTH INEQUALITY TODAY

Inequality of health outcomes continues to be a major (and potentially reversible) feature of the health of Australia's children. The health of children is particularly sensitive to their socioeconomic environment. This environment can diminish the potential of 'reactive' or 'clinical' services to reduce health inequalities in children.

In spite of this, there has been progress in reducing some health inequalities over the past century. In 1970, the gap in infant mortality between Aboriginal and non-Aboriginal children was approximately four-fold. In 1998 this gap had reduced to approximately three-fold, but there has been little change over the last decade. Almost every health indicator related to children and youth continues to reveal a significant gap between the Aboriginal and non-Aboriginal populations. [1] However, in Australia, there is a dearth of health outcomes data for children and youth by other indicators of disadvantage such as family income, occupation of parent(s), and income distribution.

There are abundant data indicating the relationship between socioeconomic inequality and poor health outcomes; and of growing income inequality in Australia.[2] For example, the share of equivalent gross household income received by the bottom 10 per cent of Australians decreased from 7.44 per cent in 1986 to 7.35 per cent in 1996; and that received by the top 10 per cent increased from 13.7 per cent in 1986 to 14.96 per cent in 1996; also, there has been an increase in child poverty in Australia.[3,4] Similar trends towards growing inequality have been even more clearly established between the developed and developing worlds. In the face of this, at best, unchanging income inequality—or, more probably, growing income inequality—how likely is it that the strategies underpinning *Families First* can reduce health and social inequalities?

It is also worth recalling that serious health inequalities can persist (and even widen) in spite of the implementation of 'effective' interventions as these may produce improvements in the average rates of problems or diseases, but result in a widening of the gap between the upper and lower social strata.[5,6,7]

WHAT IS *FAMILIES FIRST*?

Families First is a coordinated strategy of the NSW Government to increase the effectiveness of early intervention and prevention services in helping families to raise healthy, well adjusted children. The NSW Government has committed $54.2 million to implement the strategy in all areas of NSW over a four-year period.[8]

The implementation of *Families First* is the combined responsibility of a number of NSW government agencies (the area health services; the Department of Community Services; the Department of Ageing, Disability and Home Care; the Department of Education and Training; the Department of Housing; and the Department of Health) and non-government agencies funded by the NSW Government.

The main objectives of the *Families First* strategy are to:

- help children grow to their full potential; support parents in enhancing parenting skills and to have a sense of control over their lives; support those who are expecting or caring for babies, infants, and young children up to eight years of age; and assist families who require extra support;
- help communities build and sustain networks to support families through strengthening the connections between communities and families.

These objectives will be met through a combination of universal and targeted services:

- a universal home visiting program that also concentrates services to vulnerable and disadvantaged families;
- extra support to families with specific health and social problems; for example: mental health, substance abuse, social isolation, financial stress, homelessness, etc;
- a coordinated network of services linking all sectors relevant to the health and social wellbeing of families with young children;
- community capacity building and community development programs targeting disadvantaged communities, using the *Schools as Community Centres* and other models.

These strategies are supported by research indicating that early intervention services and community capacity building programs can produce a sustained improvement in children's health, education, and welfare.[9,10,11,12] There is also evidence that early intervention services have the greatest impact when they are capable of addressing a broad range of issues and are provided as part of a coordinated network.[13,14]

THE LINKAGES BETWEEN *FAMILIES FIRST* AND THE PROBLEM OF INEQUALITY

How much potential do the strategies underpinning *Families First* have for reducing inequalities of health outcomes? Which particular components of *Families First* are more likely to be effective?

Two of the overseas programs whose design underpin *Families First* (the Prenatal–Early Infancy Project and the High–Scope Perry Preschool Project) have demonstrated that the greatest benefit accrues to children in families at greatest social disadvantage.[9,10] These findings suggest significantly better prospects for the reduction of health inequalities through *Families First* than through conventional service-based initiatives.[9,15]

A number of randomised controlled trials of home visiting programs delivered to disadvantaged and vulnerable families predominantly in the USA,[16] but also in Australia,[17] have demonstrated positive health and social outcomes for children and mothers. These have included:

- reduced rates of smoking in pregnancy, hypertension of pregnancy, low birth-weight, preterm babies, child abuse, accidental injury, behavioural problems, high risk behaviours among adolescents, running away from home, delinquency, and mothers' dependency on welfare;
- increased rates of breastfeeding and immunisation, and better use of health services.

The data are less clear regarding the impact of a universally offered home visiting program with a concentration of services on the vulnerable and disadvantaged.

Intuitively, one would expect even better outcomes because the whole socioeconomic gradient is addressed and thereby potentially influencing greater numbers of children and families. However, there is some evidence that indicates that one home visit may be of little or no benefit.[18] There are also data indicating that the proportion of children living in relative poverty in the USA is greater;[19] and, in general, outcomes for the disadvantaged in the USA are worse than in Australia. Therefore, the degree of benefit observed in home visiting studies in the USA may be attenuated in the less-extreme Australian context. Although the funding currently provided to implement *Families First* is significant, it may yet prove insufficient to provide the levels of home visiting required to make a difference. For example, the Central Sydney Area Health Service would require an additional recurrent allocation of $1.2 million per year to implement a universal home visiting program to the level indicated by effective programs,

with resources focused on vulnerable and disadvantaged families.

Joint planning of services and preventative programs, which have been very successful in the Central Sydney Area Health Service as a means of addressing health inequities, has also not formally been evaluated. However, since health outcomes have multiple determinants, and approximately 70 per cent of which are not related to traditional health services,[20] the potential to further reduce health inequities is significant through joint planning with housing, education and community services, and other relevant agencies, including non-government agencies.

There is indirect evidence that community capacity building, and improving levels of social capital, have the potential to significantly improve not only child health outcomes but also adult health outcomes. There is a strong association between levels of social capital and total mortality rates; infant mortality rates; and deaths from cardiovascular disease, stroke, cancer, and homicide.[21,22] Improving children's and young people's perception of connectedness with their family and schools has also been demonstrated to be associated with reduced risk taking behaviours and better mental health outcomes among adolescents.[23]

POTENTIAL CONTRIBUTION OF *FAMILIES FIRST* TO REDUCING HEALTH INEQUALITIES

There is a growing body of evidence about the relative contributions of healthcare services, and of social and economic determinants of health, to measures of health outcome (such as mortality rates). It indicates that the contributions may be different at different ages, with socioeconomic factors having a greater effect at younger ages.[24,25]

Considering the importance of programs that address social and economic determinants to population health outcomes in children, *Families First* has the potential to significantly affect brain development in the early years of childrens' lives. Home visiting has been shown to decrease smoking rates in pregnancy in disadvantaged women; decrease rates of low birth-weight and preterm babies; increase rates of breastfeeding and the duration of breastfeeding; and improve education outcomes.[9,15] Provision of books, reading support programs, and transition to school programs for disadvantaged children, have been shown to improve readiness to start school.[26,27] Community capacity building programs such as the *Schools as Community Centres* program have improved social capital and empowered families in disadvantaged communities.[28] Taken together, these kinds of strategies—which form the basis of *Families First*—have the potential to start to break the cycle of poverty, vulnerability, and disadvantage for this cohort of children and their families; and to begin to reduce health inequalities.

There is also compelling evidence that cognitive function in adulthood is dependent on parents' socioeconomic circumstances (and parents' level of education).[29] This suggests that the health, developmental, and social benefits of the strategies underpinning *Families First* are likely to extend into adulthood—something confirmed in some studies.[9,10]

POTENTIAL LIMITATIONS OF *FAMILIES FIRST*

There are a number of possible risks to the likelihood that *Families First* will achieve improvements in health outcomes and reductions in health inequalities.

'Shifting attention away from the population distribution of health, *health inequalities*, to the health of the poorest groups in society, *health poverty*, and to conditions that the poor tend to suffer from in isolation of the circumstances in which those conditions are suffered' has not been shown to have had any beneficial impact on existing health inequalities.[30]

Nor is it clear how much the socioeconomic distribution of risk factors explains the observed health inequalities, making it risky to base efforts to reduce heath inequities on strategies that focus on risk factors.[30,31,32]

If *Families First* focuses on strategies providing 'reactive' services to 'high- risk' families or individuals, rather than providing population-based preventative interventions, there can be little confidence from the evidence that the anticipated improvements in population-level child health outcomes will be achieved.[33,34]

It is unclear from the evidence that targeting of services, such as the selection of geographically disadvantaged areas for community capacity building programs, will reduce existing health inequalities. Research from Glasgow, Scotland, concluded that selective targeting of resources on an area basis would miss more deprived people than it would include.[35] Such an analysis has not been done in NSW, but it is probable the same would apply. Furthermore, other determinants of health can all negate the potential benefits of *Families First*. These include: a world recession, or war; government policies that continue to contribute to widening the economic and social gap (such as retrogressive taxation and support of the privatisation of education and health systems); job insecurity; inappropriate design of public housing, which contributes to further erosion of social capital; tolerance by government and the community of discrimination and marginalisation based on gender, race, religion, and class; support of inequity as inevitable; and sustainability of the environment.

CONCLUSION

Families First has the potential to reduce inequalities in health outcomes in children, and so to contribute to breaking the cycle of poverty for disadvantaged children,

their families, and the adults they will become. However, this initiative cannot succeed on its own; it must be supported by other political, economic, and social developments.

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THE NSW HEALTH RESOURCE DISTRIBUTION FORMULA AND HEALTH INEQUALITIES

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BACKGROUND

A key feature of the NSW health system is its 17 geographically-based area health services (AHSs). Funding to the AHSs by the NSW Department of Health has been guided by the objective of providing the AHSs with a share of resources that allows the achievement of comparable access to health services, assuming the achievement of reasonable levels of efficiency.[1] The mechanism for achieving this objective is the Resource Distribution Formula (RDF). Since the late 1980s, the formula has been used to guide the allocation of funding to the AHSs and to monitor progress towards the achievement of geographical equity in health funding across NSW.

The RDF reflects a strong commitment to the idea that population-based funding should be directed to communities in accordance with their health needs, thus addressing one potential contributor to health inequalities: inequitable access to health services. It has been suggested that a population needs-based funding approach would also address equity at a national level, through better integration and targeting of various funding streams based on need.[2]

This paper briefly describes the RDF and discusses the role the formula might play in reducing health inequalities and responding to the inequitable distribution of health needs across the NSW population.

DESCRIPTION OF THE RESOURCE DISTRIBUTION FORMULA

The RDF is constructed using two sets of measures: measures that attempt to measure the relative need of populations within the AHSs, and measures that attempt to address legitimate differences in service delivery costs between the AHSs. These measures are considered in relation to each of the major programs of the NSW health system.

The starting point for need-measures is typically the population of each area, both current estimates and future projections. Consideration is then given to the influence of the age and sex composition on the need for services. Finally, attention is paid to other factors that are demonstrated to influence the need for services. In this context, the NSW Department of Health has developed, in collaboration with the Health Services Research Group at the University of Newcastle, a 'health needs index' for non-tertiary and non-obstetrics services. The development of this index parallels research sponsored by the English National Health Service for the development of indices of need for use in their funding arrangements.[3,4,5]

TABLE 1

NSW HEALTH NEEDS INDEX BY AREA HEALTH SERVICE[6]

Health Area	SMR (90-92)	EDOCC (1991)	Rurality Index	Need Index
Northern Sydney	75.1	112.9	16.6	82.5
South Eastern Sydney	97.0	105.8	16.7	93.9
Wentworth	98.3	101.5	15.1	97.7
Western Sydney	103.3	100.0	16.1	99.4
Illawarra	98.8	96.5	14.6	100.2
South West Sydney	101.2	95.3	15.3	101.1
Central Coast	102.1	95.8	13.6	102.9
Central Sydney	115.4	102.1	17.0	102.9
Hunter	104.2	95.6	14.3	103.2
Northern Rivers	92.6	93.6	10.1	103.7
Mid North Coast	98.7	92.7	10.6	105.5
Southern	104.1	97.4	8.9	107.5
Greater Murray	106.1	96.4	8.8	108.6
Mid Western	111.1	95.9	8.6	110.8
New England	115.0	95.7	7.6	113.5
Macquarie	119.1	94.4	8.2	115.3
Far West*	147.1	89.8	1.6	167.7

* An additional loading was applied to Far West Area Health Service to recognise its unique circumstances

The version of the NSW health needs index currently in use was developed in 1994, and it takes into account the influence of three factors: premature mortality (Standardised Mortality Ratio less than 65 years), socioeconomic status or EDOCC (Australian Bureau of Statistics SEIFA Index of Education–Occupation), and a rurality index (Table 1).[6] The health needs index is currently under review, using data from later periods. Analysis for this review demonstrates that an additional factor should be introduced to the index: the percentage of the population that identifies as indigenous.

In 1996, additional factors were introduced to the overall RDF for the funding programs covering non-inpatient services to reflect the additional needs of the indigenous people and homeless people. The rationale for introducing these factors was to provide some capacity for strategies that targeted the poor health status of these groups.

Major cost factors that are taken into account include: the extent to which private sector services meet the local population's needs; the additional costs of delivering services to dispersed rural or remote populations; the cost of interpreter services for non-English speakers; the impact of the role that principal referral hospitals play in terms of managing more severely-ill patients; teaching and research; and the effect of certain statewide services. The RDF also adjusts for the flows of patients between AHSs.

The output of the formula is a target share of resources for each AHS. Based on population projections, target shares can be developed for future years, and these targets have been used to guide the allocation of new funds across AHSs.

PROGRESS IN ACHIEVING EQUITY IN RESOURCE DISTRIBUTION

Various reports in NSW from the late 1980s noted the '…unacceptable disparities in the allocation of health resources in New South Wales',[7] largely arising from the unresponsiveness of historical funding to changing population trends and health needs.[8,9] Similar findings had been found earlier in the United Kingdom, when in 1974 a deliberate strategy was adopted to reduce disparities '…in terms of the opportunity for access to health care of people at equal risk'. This strategy influenced thinking in NSW to consider similar issues.[10]

Since the adoption of the RDF approach in the late 1980s, considerable progress has been made in reducing the disparities in funding across NSW. In 1989–90, approximately 16.4 per cent of the health budget needed to be reallocated to achieve equity in funding.[8] By 1994–95, this figure was reduced to 9.6 per cent, and by 1998–99 it was 4.4 per cent.[1] With three-year growth funding announced by the NSW Minister for Health in 2000, further progress is being made towards fairer funding for the AHSs that will further reduce these disparities. While all AHSs have received growth in funding, a greater share is being directed towards historically under-funded population growth AHSs such as those in greater western Sydney, the Central Coast, and the North Coast of NSW. The aim is to bring relatively under-funded AHSs to within two per cent of their RDF target share of resources.

THE RDF'S ROLE IN REDUCING HEALTH INEQUALITIES

It should be acknowledged that achieving equity in access to health services will not necessarily address the underlying causes of health inequalities. There may be some indirect effects. For example an equitable distribution of government-funded services tends to ameliorate broader inequalities in the distribution of income and wealth.[11] Further, the health sector can play an important role in addressing geographical inequities in the distribution of employment opportunities, which is also an important influence on income and wealth distribution.

Achieving equity of access shapes the response of the health system to health inequalities as evidenced by variations in need across the population. In this respect, the RDF plays several important roles. First, equitable access may be required to ensure that once the illnesses associated with health inequalities emerge, disadvantaged populations have comparable access to effective services.

A second mechanism is through minimising the number of patients travelling long distances for routine hospital services which should be provided locally. The RDF helps achieve this by guiding a greater share of resources to develop new services in the AHSs that have historically been relatively under-serviced or have experienced rapid population growth.

In parallel with the RDF, the NSW Department of Health is implementing a system of budget holding, which will provide incentives and capacity for the AHSs to identify historical patient flows to hospitals that could be reversed through the build up of local services. While many patients travel out of an AHS for treatment for legitimate reasons—such as proximity of services to AHS boundaries, or for specialist services that are only available in a few locations—a proportion of patient flows reflects historical referral patterns to established services that are a significant distance from the patient's home.

An important question is whether the RDF's objectives ought to be expanded beyond equity of access. This issue was at the centre of debates in 1996 over whether additional weightings should be introduced for indigenous and homeless people. These changes were

justified on the basis of the need to target resources at groups with significantly poorer health status. In effect, this is a subtle shift from the objective of achieving *equity in access* towards the objective of achieving more *equitable health outcomes* for these groups. A serious argument, currently under consideration, is whether the formula should be enhanced to ensure resources for health programs targeted at intervening in the processes that lead to health inequalities are appropriately distributed across AHSs, in order to reflect the underlying target groups for these programs. This development may only make marginal change to the target share for each AHS, but it may embrace a more important message.

LIMITATIONS

It is important to be clear that the RDF is only one policy lever for addressing the equity issue, and by itself is an insufficient mechanism. While the RDF aims to create the broad resource capacity for equity to be achieved within the health system, an essential ingredient in delivering on equity objectives is action at the local level within AHSs. These actions may be shaped by state-level policies, but ultimately local-level strategies for addressing unmet need, and targeting of populations with relative health disadvantages, are what matter. In this context, tools for local-level decision making and resource allocation are very important.

The RDF is deliberately neutral on the issue of efficiency, and achievement of equity objectives might be frustrated by inefficient services. Other policy mechanisms are used in NSW to deal with the efficiency objective, including episode funding and hospital-cost benchmarking.

Finally, the NSW public sector health system is only part of the broader health system. While some attempts are made to take account of other sectors (such as in adjustments for private hospital use) the distribution of resources under federal programs and private finance is also important to the achievement of equity.

CONCLUSION

When combined with other strategies, the RDF is a powerful tool for addressing equity objectives in NSW. The formula will continue to be refined so that AHSs with unique factors that adversely affect the health status of their populations receive funding to improve access and meet the health needs of the population. It is also important to improve our understanding of relative differences in health need at a more micro-level, and to assist area-level decision making by refining the model to identify needs at the smaller geographic level within AHSs. A question for the immediate future is whether to broaden the objectives for the formula to include achievement of equitable health outcomes.

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HOW CAN EVIDENCE-BASED PRACTICE CONTRIBUTE TO REDUCING HEALTH INEQUALITIES IN NSW?

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Health inequalities are apparent within Australia; however, they are more starkly obvious when we compare our health with that of our Pacific and Asian neighbours. In examining how evidence-based practice can help reduce health inequalities, I begin with an example of how evidence obtained from research has been useful in dealing with a cause of massive health inequalities, a problem that consigned millions to the twilight zone of mental retardation.

Iodine deficiency is considered by the World Health Organization to be the single most common cause of preventable mental retardation and brain damage in the world. Iodine leaches from the soil in the mountains, especially when trees are cut down. Iodine deficiency has been a cause of immense health inequality, through congenital cretinism, scattered through the mountain communities of less developed nations.

The contribution of many Australians to its resolution has been a superb public health contribution. Basil Hetzel of Adelaide has had a lifelong commitment to preventive medicine and public health and is now chairman of the International Council for the Control of Iodine Deficiency Disorders. He has been involved in the prevention and control of iodine deficiency disorders since 1964, when his team showed in Papua New Guinea that brain damage due to severe iodine deficiency could be prevented by the correction of iodine deficiency before pregnancy. Iodine deficiency has been a huge public health problem in China. In Sydney, Cres Eastman of the Institute of Clinical Pathology and Medical Research at Westmead Hospital has led a team with Australian aid that over the past 20 years has worked closely with health authorities in China and the Asia Pacific region to research how to overcome this problem. The work of Cres Eastman and others in China has been a great success. The National Iodine Deficiency Disorders Elimination Program (NIDDEP) was developed in China in 1993. The principal strategy agreed upon was universal salt iodisation as well as education of the population. A review by the World Bank found that there had been excellent progress made in the efforts to eliminate iodine deficiency disorders in China through implementation of the NIDDEP. Over 90 per cent of salt is now iodised in most provinces and the national goitre rate has almost halved from 20 per cent in 1995 to 10 per cent in 1997.[1] Tibet is a current area of need. Cres Eastman and colleagues are now concentrating their efforts in this area, hopefully achieving the same outstanding progress made in eliminating iodine deficiency disorders in China.[2]

What appeals to me greatly about this story is not only its success but also that it is a fine example of the way in which evidence from social, clinical, laboratory, and public health research has been combined with a systems and policy approach to work with communities to improve their health and reduce health inequalities.

The iodine story illustrates how, in some circumstances, health inequalities can be reduced effectively by correcting small environmental deficits. This applies to all the inequalities attributable to trace element and vitamin deficiency. It is important to note that these are preventive interventions. The interventions are effective only when applied before any disease becomes manifest.

In Australia, the opportunities for simple changes are less dramatic—universal water fluoridation, dietary supplementation when appropriate (for example, with folate and thiamine), and the provision of clean water to all indigenous communities, are among the relatively simple things we might do whose value is clear.

In Australia perhaps the most demonstrably effective reduction in health inequalities in recent years, based on evidence, has been the recent national program *Immunise Australia*, that addressed low immunisation completion rates among children. Although there is no evidence that I can find that suggests that the inequality due to not being immunised is related to social class, this does not diminish the difference in risk experienced by those who have been immunised and those who have not. This is a genuine health inequality. *Immunise Australia*, together with the advent of new technology such as immunisation against *Haemophilus influenzae,* has led to reductions in diseases against which immunisation is offered. This applies especially to measles.

Available statistics indicate that completed immunisation was at 75 per cent five years ago in 1997.[3] With a combination of enhanced fee incentives for general practitioners to provide immunization and the passage of state legislation (in Victoria, NSW, ACT, and Tasmania) limiting access to school to children with certified completed immunisation we have seen the immunisation completion rates increase to around 86 per cent in June 2001.

Some health inequalities, attributable to differential access to effective health services, can be corrected by acting on the evidence that justifies the effective intervention. If the evidence in relation to the management of severe trauma is examined, especially in the case of head injury, the more rapid the access to high level tertiary services the better the outcome.[4] No further evidence is needed to support strengthening the provision of speedy rescue services to all people with severe trauma, wherever they

live. The question then reduces to one of cost in relation to the benefit, especially when service provision to rural and remote communities is considered. However, equity considerations may well lead to the provision of such services even though they might not make great sense in terms of efficiency.

As with all epidemiological observations, care must be exercised in interpreting associations between environmental factors and ill health and health inequalities. Thus while poverty and ill health show a close association, there is little reason for adopting a passive, utopian approach that does nothing about health inequalities on the basis that, until poverty is eradicated, illness will persist.

Interventions designed to reduce the burden of illness may enable and empower the community, otherwise depressed by its impoverished circumstances, to achieve greater economic productivity. Thus while the evidence permits us to say that there is a strong association between poverty and illness it does not permit us to say that one is completely causal of the other. Efforts to address both sets of factors are important. Thus, among indigenous children, pneumoccocal vaccination and treatment of middle ear disease may well enable children to experience far better education opportunities than if nothing specific were done about this problem. While indisputably their home environment could benefit from general environmental uplift, uplift will not be achieved if, through indolence, we do nothing to reduce the prevalence of profound deafness among the next generation.

There is an abundance, possibly a surfeit, of literature about health inequalities, much of it revolving around the notion that to improve health we must first of all improve everything else: reduce poverty, educate people, find jobs for them, house them, and give them a strong sense of social control. These explorations are nearly all based on the assumption of a linear, causal relation between every form of environmental difficulty and subsequent poor health. They appear to relieve health professionals of any obligation to act other than through political activism.

Utopian notions of waiting for the revolution are the emperor's new clothes. There is ample evidence that a few effective interventions can be mounted to improve health and reduce inequalities right now. If I had a choice, that's where I'd put my health dollar first.

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REDUCING SOCIOECONOMIC HEALTH INEQUALITIES: ISSUES OF RELEVANCE FOR POLICY

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BACKGROUND

During the twentieth century, the health of the Australian population improved markedly: life expectancy increased; the toll of communicable disease was reduced; and, in more recent times, death rates for cardiovascular disease and a number of major cancers have begun to decline.[1,2] However, against this backdrop of improving overall health, large health inequalities continue to exist between socioeconomic groups;[3,4] and, for some conditions, these inequalities are increasing over time.[5] Table 1 illustrates that, despite substantial reductions in age-standardised death rates between 1985–87 and 1995–97, the size of the mortality gap between the most and least disadvantaged areas (indicated by the rate ratio) widened for many conditions. Further, the excess mortality figures show that the burden of death in Australia attributable to socioeconomic inequality is large, and that substantial improvement in this country's national health profile would occur if mortality rates for all areas were equivalent to those of the least disadvantaged areas. This article presents a general discussion of the issues that need to be considered as part of the development and implementation of policies and interventions that are aimed at narrowing the health gap between socioeconomic groups, and halting the widening of mortality differentials.

A reference point for the discussion is evidence from studies that have investigated the main causes of health inequalities.[3] This evidence is summarised in Table 2, where each cause is positioned according to whether it represents an upstream (macro), midstream (intermediate), or downstream (micro) determinant of disease. As the ordering and flow of the evidence suggests, illness and disease are ultimately a consequence of adverse biological reactions (for example: hypertension, fibrin production, and suppressed immune function) that occur as a result of changes or disruptions to the functioning of various physiological systems (for example: the endocrine and immune systems). Thus, the poorer health of disadvantaged social groups is due to more sustained and/or longer term adverse changes to physiological and biological functioning.[6] Importantly, however, we must not lose sight of the fact that these changes are brought about by psychosocial processes and health behaviours (acting independently and inter-dependently), and that these in turn are a consequence of differential exposure to adverse social, physical, economic, and environmental

TABLE 1

AGE STANDARDISED MORTALITY RATES (PER 100,000), RATE RATIOS, AND EXCESS MORTALITY, BY AREA SOCIOECONOMIC STATUS (SES): MALES, 25–64 YEARS, 1985–87, 1995–97 [A]

	1985–1987 Age standardised rate [b]				1995–1997 Age standardised rate			
	High SES	Low SES	Rate Ratio [c]	Excess mortality [d]	High SES	Low SES	Rate Ratio	Excess mortality
All causes	338.4	568.5	1.68	24	250.4	410.8	1.64	26
Circulatory system	125.7	207.8	1.65	24	63.2	118.2	1.87[e]	32
Coronary heart disease	96.0	149.0	1.55	21	43.0	80.7	1.88[e]	33
Stroke	13.1	27.5	2.10	34	7.7	16.0	2.07	36
Diabetes mellitus	4.2	7.3	1.73	24	4.3	9.0	2.07[e]	32
Cancer	117.9	150.6	1.28	12	90.3	125.4	1.39[e]	19
Lung cancer	29.7	47.3	1.60	23	17.6	34.8	1.98[e]	35
Injury and Poisoning	50.6	99.2	1.96	30	43.7	76.9	1.76	30
Suicide	19.5	33.7	1.73	24	22.2	33.8	1.52	23
Motor vehicle accidents	16.8	28.9	1.73	27	8.4	19.6	2.33[e]	41
Respiratory system	13.7	31.7	2.31	37	8.0	20.0	2.49[e]	43
Chronic lung disease	5.1	9.7	1.90	33	4.4	13.3	3.02[e]	53
Digestive system	10.3	31.4	3.06	48	8.8	19.3	2.20	37

a. Source: Adapted from Turrell and Mathers. [5]

b. High and low correspond to the least and most disadvantaged quintiles of the Index of Socioeconomic Disadvantage respectively.

c. Ratio between the standardised mortality rate for the most and least disadvantaged quintile.

d. Per cent of deaths that would be avoided if all quintiles had the same mortality rate as the least disadvantaged quintile.

e. Statistically significant increases in mortality inequality between 1985–87 and 1995–97.

circumstances: this latter group of upstream factors is where the 'problem' of socioeconomic health inequalities originates.

An important first issue for policy is at what stage in the disease process do we intervene. It is implied in Table 2 that policy and intervention efforts can be directed at upstream, midstream, or downstream influences. However, where we focus and concentrate our efforts has implications in terms of making a measurable impact on health inequalities. Attempts to tackle health inequalities by focusing on upstream factors are likely to result in the greatest impact on population-wide differentials. However, societal-level changes are the most difficult to bring about, and the most politically sensitive. By contrast, policies and interventions that focus on midstream factors might benefit the groups or areas that are targeted, but they are unlikely to reduce inequalities at the national level. In other words, midstream efforts might improve psychosocial health, or result in behaviour change, but they are not likely to alter the social and economic conditions that gave rise to the problems in the first place. We could also focus our efforts at the micro level via, for example, health promotion information provided at visits to general practitioners. This approach, however, while important, probably only serves to improve individual health, and it is not likely to impact in any discernible way on national-level health inequalities.

Second, while approaches will differ in their impact depending on where they are directed (upstream, midstream, or downstream), attempts to tackle health inequalities should focus simultaneously on all three levels of influence. Policies and interventions need to be implemented on a broad front.[7]

Third, evidence about the causes of socioeconomic health inequalities points to the need for a 'whole of society' approach to the problem. Health inequalities originate from societal-level conditions associated with housing, employment, education, income, transport, etc; and reducing inequalities will not be achieved exclusively (or even primarily) by actions taken within the health sector. An effective response to the poorer health of disadvantaged groups will therefore require actions from all public sectors, and thus inter-sectoral collaboration and joined-up efforts are essential. In this respect, workers in the health sector can play an important advocacy role by ensuring that public policy makers are informed about the possible consequences of their decisions and actions for the health of disadvantaged groups.

Fourth, sociologists have long argued that social, economic, physical, and environmental contexts exert an independent influence on health, separate from the characteristics of individuals within these contexts. Recent studies using multi-level research designs and statistical methods have provided empirical support for these claims.[8] In terms of policies and interventions, this

TABLE 2

SOCIOECONOMIC DETERMINANTS OF HEALTH [A,B]

Upstream (macro)	Midstream (intermediate)	Downstream (micro)
Social, physical, economic, and environmental factors	**Psychosocial factors**	**Physiological systems**
• Education	• Control	• Endocrine
• Employment	• Stress	• Immune
• Occupation	• Depression	
• Working conditions	• Self esteem	
• Income	• Social support & networks	**Biological reactions**
• Housing	• Hopelessness	• Hypertension
• Area of residence	• Demand–strain	• Fibrin production
	• Isolation and marginalisation	• Adrenalin
		• Blood lipid levels
	Health Behaviours	• Body mass index
	• Food and Nutrition	
	• Smoking	
	• Physical activity	
	• Alcohol	
	• Self harm	
	• Preventive health care use	
	Main direction of influence →	

a. Adapted from Turrell and Mathers. [4]

b. The table is not exhaustive in terms of its identification of the socioeconomic determinants of health.

evidence suggests that efforts to tackle health inequalities should focus on both contexts and individuals by taking a social–ecological approach to the problem.[9] To date, policy and intervention efforts have largely been non-contextual, and targeted at individuals, which has had limited success in terms of reducing socioeconomic health inequalities. Indeed, an individualised approach may have actually widened health differences between social groups.[10] For example, health promotion programs that attempt to change individual behaviour have been more effective among the socioeconomically advantaged.[11] This is because disadvantaged groups are often constrained by their social and economic circumstances in ways that make behavioural change difficult.

Fifth, while national public (health) policy and interventions have apparently been effective in terms of improving average health, population-wide approaches do not necessarily alter underlying health inequalities. This is clearly evident in Table 1, which shows that socioeconomic health inequalities remained unchanged (or increased) between 1985 and 1997 even though everyone's overall health improved. This suggests that national efforts to improve health need to be complemented by policies and interventions that are designed with, and for, socioeconomically disadvantaged groups.

Sixth, attempts to understand the genesis of socioeconomic health inequalities have increasingly focused on the influence of factors that occur at early or critical stages of development (in utero, infancy, childhood),[12] and across the lifecourse.[13] Studies examining these issues have shown that propensity for poorer health in adulthood is greatest among those from disadvantaged backgrounds in childhood (irrespective of what happens in the intervening years between childhood and adulthood). Moreover, it is now clear that disease risk accumulates longitudinally over the lifecourse, such that the worst health is experienced by those who have the greatest cumulative exposure to social and economic adversity. Taken together, this evidence suggests that early life, and mothers and young children in particular, should form an important focus of our policy and intervention efforts to reduce socioeconomic health inequalities. Focusing on this lifecourse stage and social group is likely to result in health benefits for current and future generations.

Finally, the Australian health care system plays a crucial role in terms of moderating and hence minimising health inequalities. Integral to this is the maintenance of a universal, non-targeted system that is economically, geographically, and culturally accessible. Importantly, the health care system is more than simply a biomedical curative entity: it also encompasses primary and community care, including home care, community health centres, disease prevention and health promotion, and the public health sector. Those who preside over the distribution of health care funds might want to consider evidence from overseas studies which suggest that the greatest potential impact of the health care system in terms of minimising health inequalities is via a more equal distribution of funding and resources between these non-clinical preventive components and the more clinically oriented curative component.[14,15]

In summary, reducing socioeconomic health inequalities represents a major policy challenge. Health inequalities need to gain greater public visibility, for public opinion and support are likely to be important 'push' factors in any government's decision to address the problem. Public policy and health policy need to work in concert, to inform one another, and be directed at countering the life circumstances that generate poor health, and promoting those that give rise to good health.

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BUILDING THE EVIDENCE BASE TO ADDRESS HEALTH INEQUALITIES

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The Australian Health Inequalities Research Collaboration (HIRC) was established by the Commonwealth Government in 1999. In the July 2001 issue of the *NSW Public Health Bulletin* (Volume 12, Number 7), Dixon and Sibthorpe, from the National Centre for Epidemiology and Population Health, which previously housed the HIRC Secretariat, reviewed the work of HIRC in its first 18 months. Here we provide an update of its activities.

HIRC is designed to assist research workers who are applying their energies to improving our understanding of health inequalities, what causes them, and how they may be ameliorated. This support is by way of clarifying research priorities, supporting networking by researchers, and advocating for more funding support for such research. HIRC is especially keen to foster research that tests interventions on the basis of sound theory.

Some interventions can appear relatively simple, although they may have an underlying complexity. For example, adding iodine or other trace elements to the diet of mothers and children who are deficient can save lives and prevent mental sub-normality. Culturally-appropriate interventions can also achieve health gain, such as the *Strong Women, Strong Babies, Strong Culture* project in the Northern Territory, involving antenatal care for indigenous women.[1] This project achieved a 47 per cent reduction in low birth-weight, from 20.3 per cent to 11.5 per cent); and a 55 per cent reduction in the pre-term birth rate, from 21 per cent to 9.5 per cent.[1]

To make such interventions sustainable involves social and political commitment. In other cases, interventions are needed that take account of economic and environmental factors that are the root causes of health inequality.[2]

HIRC's contribution to building capacity in relation to health inequalities research and development is articulated in its *Strategic Action Plan 2001–2003*. The key objectives of this plan are to:

- increase the national focus on reducing health inequalities;
- build national capacity and support for research and development in health inequalities;
- establish close collaboration among researchers, practitioners, and policy developers;
- promote the uptake of research findings in policy, practice, and evaluation.

Functioning as an institute without walls, HIRC is building virtual networks in a few key subject areas that the evidence suggests are instrumental to improving health and reducing health inequalities. These areas, and their coordinating teams, are:

- *Children, Youth and Families*—coordinated by Jan Nicholson, School of Public Health Research, Queensland University of Technology; Elizabeth Waters, Murdoch Children's Research Institute; and Graham Vimpani, University of Newcastle;
- *Primary Health Care*—coordinated by Elizabeth Harris, Centre for Health Equity Research, Training and Evaluation; John Furler, Department of General Practice, University of Melbourne; and Julie McDonald, network coordinator and private consultant;
- *Sustainable Communities*—coordinated by Pierre Horwitz, Edith Cowan University.

The three HIRC networks will be responsible for:

- establishing and maintaining a comprehensive and viable research network, and addressing rural health and the health of indigenous Australians;
- providing expert advice on priority research topics, questions, and related maters. This includes advice on the evidence for effective interventions;
- facilitating communication and collaboration between network members and other individuals and groups;
- undertaking activities to build capacity in research concerning health inequalities as it applies to the subject areas.

The HIRC will be judged against the following indicators:

- improved investment in health inequalities research by government and non-government organisations;
- research funding bodies accounting for what they spend on health inequalities;
- increased efforts at all levels to intervene to reduce health inequalities, as described in the published and unpublished literature;
- acknowledgement from indigenous Australian health organisations that HIRC has contributed to the effort to reduce health inequalities;
- effective network relationships between researchers, practitioners, and policy makers, as indicated by the activities of the HIRC-sponsored networks.

Researchers and others interested in the subject areas covered by the three HIRC networks are welcome to contact the network coordinators. For general information about HIRC, and how to contact the network coordinators, contact Helen Catchatoor, HIRC Secretariat by email at helen.catchatoor@health.gov.au or visit the HIRC Web site at www.hirc.health.gov.au.

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GROWING APART: FURTHER ANALYSIS OF INCOME TRENDS IN THE 1990S

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BACKGROUND

There has been debate in Australia about whether income inequality is increasing. Using *annual* income data, a range of studies suggested that income inequality increased in the 1980s.[1,2] Using *weekly* income data, Harding found that income inequality had remained stable between 1982 and 1993–94,[3] and between 1982 and 1996–97.[4] However, it has since emerged that there may be major problems with the weekly income data collected in the 1982 Income Survey, so that there are now doubts about the reliability of results based on this data. In addition, recent research conducted by the National Centre for Social and Economic Modelling (NATSEM) has also suggested that income inequality in the 1996–97 Income Survey looks much too equal, relative to earlier and later surveys.[5] These issues, of possible data problems and data comparability, are currently being examined in a joint project by the Australian Bureau of Statistics (ABS) and the Social Policy Research Centre. This current article is thus restricted to an analysis of data collected at the end of the 1980s and in the 1990s.

INCOME TRENDS

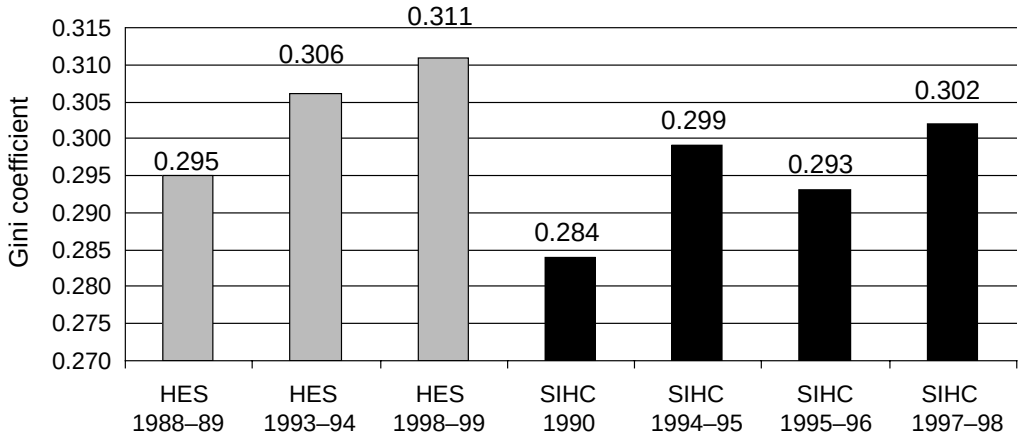
This article uses weekly income data from two sets of national sample surveys undertaken by the Australian Bureau of Statistics to look at income inequality trends in the 1990s. The methodology of the study is described in detail in Harding and Greenwell.[5] In summary, the data sources are the unit record tapes released by the ABS for the Household Expenditure Surveys and the Income Surveys; the income unit used is the household; 'dependent children' means all persons aged less than 18 years living in the household except where the young person lived by themselves, with a spouse, or in a group household; the equivalence scale used is the square root of household size, which is widely used internationally; income is current weekly income; in the later surveys negative business and investment incomes have been reset to zero to maintain comparability with the earlier surveys; the measure of resources is disposable (after-income tax) income, adjusted by the equivalence scale to take into account the needs of households of different size; and the income distribution is determined by a ranking of people by their equivalent household income, so that a household containing five people is counted five times, not once, when calculating inequality.

One widely used measure of the change in aggregate income inequality is the Gini coefficient, which varies between 0 (when income is equally distributed) to 1 (when one household holds all income). In general, a higher Gini coefficient is associated with increasing inequality. As Figure 1 shows, data from both the Household Expenditure Surveys and the Income Surveys both suggest that income inequality increased over the course of the 1990s. Thus, the Gini coefficients derived from the Expenditure Surveys increase by 0.016 between 1988–89 and 1998–99, while those derived from the Income Surveys increase by 0.018 between 1990 and 1997–98.

Another popular way of looking at income inequality is to examine real (that is, inflation adjusted) incomes at different points in the income distribution. Percentile 10, for example, is the equivalent disposable household

FIGURE 1

COMPARISON OF GINI COEFFICIENTS FOR EQUIVALENT DISPOSABLE HOUSEHOLD INCOME FROM THE EXPENDITURE AND INCOME SURVEYS



Data source: ABS Household Expenditure Survey and Income Survey unit record files.

income of the person at the 10th percentile of the income distribution. According to the Household Expenditure Survey, weekly income at this point has remained fairly stable in real terms, rising from A$393 in 1988–89 to A$410 10 years later (Table 1). Above this point, incomes at the lower-middle and middle of the income distribution pick up between the 1993–94 and 1998–99 surveys, after little change over the previous five years. But perhaps the most significant movement is at the top end of the distribution, with the average real incomes of those at the 90th and 95th percentiles of the distribution increasing strongly over the last decade—and apparently particularly in the last half of the 1990s. For example, the left hand column in Table 1 indicates that real weekly incomes at the 95th percentile have increased from A$1770 to A$2103 over the 10 years to 1998–99, which is an increase of 18.8 per cent.

This suggests that there has been a growing gap between the top and the middle as well as between the top and the bottom. This is confirmed by the ratios between these various income points, shown in the middle panel in Table 1. Both the 90/10 and the 95/10 ratios have increased markedly over the 10 years to 1998–99. The gap between the top and the middle has also grown since 1988–89 but not by as much, as shown by the lesser increase in the 90/50 ratio over those 10 years. The relative distance between the middle and the bottom has apparently increased in the last 10 years, with median income now reaching 2.17 times that of the 10th percentile.

Do the Income Surveys tell us the same story about income inequality as the Expenditure Surveys? In comparing the two, we have to keep in mind the slightly different time periods covered. In particular, the Expenditure Surveys cover two additional years, so higher increases in income might be expected given the longer time period.

The Income Surveys tell a somewhat different story about what is happening at various points within the income distribution (Table 1). Relative to the Expenditure Surveys, the Income Surveys suggest that:

- the bottom has fared better;
- the middle has fared worse;
- the top has fared less well than indicated in the Expenditure Surveys.

However, there is still some consistency within the results from the two sets of data, in that the top has experienced larger gains in income than either the bottom or the middle over the 1990s. It is also important to note that, even after taking out the impact of inflation, both sets of surveys

TABLE 1

RANGE OF INDICATORS OF INCOME INEQUALITY, HOUSEHOLD EXPENDITURE SURVEYS AND INCOME SURVEYS

	Expenditure Surveys			Income Surveys		
	1988–89	1998–99	% change 1989–99	1990	1997–98	% change 90–98
Weekly income at particular points in the distribution						
95th percentile	$1,770	$2,103	18.8%	$1,967	$2,121	7.9%
90th percentile	$1,533	$1,775	15.8%	$1,709	$1,843	7.8%
75th percentile	$1,155	$1,318	14.1%	$1,326	$1,390	4.9%
Mean	$908	$1,011	11.4%	$1,025	$1,073	4.7%
Median	$804	$890	10.7%	$944	$956	1.3%
25th percentile	$542	$586	8.1%	$624	$625	0.1%
10th percentile	$393	$410	4.2%	$443	$449	1.5%
5th percentile	$343	$327	-4.6%	$364	$376	3.2%
Ratios						
95/10 ratio (very top/bottom)	4.5	5.13	14.1%	4.44	4.72	6.3%
90/10 ratio (top/bottom)	3.9	4.33	11.2%	3.86	4.1	6.3%
90/50 ratio (top/middle)	1.91	2	4.6%	1.81	1.93	6.4%
50/10 ratio (middle/bottom)	2.04	2.17	6.2%	2.13	2.13	-0.1%
Decile shares						
Bottom 10%	3.2	2.7	-14.7%	3.1	3	-3.1%
Bottom 20%	8.1	7.4	-6.3%	8	7.7	-3.7%
Middle 20%	17.8	17.6	-1.2%	18.3	17.8	-2.7%
Top 20%	37.4	38.2	2.1%	36.1	37.5	3.9%
Top 10%	22.2	22.5	1.3%	20.9	22	5.6%

Note: The income measure is the International equivalent weekly disposable household income of individuals. All incomes have been adjusted for inflation to March 2001 dollars, using the CPI. The 95/10 ratio is the ratio between the incomes of those at the 95th percentile of the income distribution with those at the 10th percentile of the income distribution.

Source: ABS Household Expenditure Survey unit record files.

suggest that both the average and median (middle) households enjoyed higher incomes at the end of the 1990s than at the beginning.

INCOME SHARES

Finally, the bottom panel of results in Table 1 present a third set of measures commonly used to look at income inequality. This is the share of total income received by various groups in the population. For example, according to the Expenditure Surveys, the poorest 10 per cent of the population saw their share of the income pie decline from 3.2 per cent to 2.7 per cent of the total. Similarly, the middle 20 per cent of the population, when ranked by their household income, experienced a marginal fall in their income share, down to 17.6 per cent of the total pie in 1998-99. The Income Surveys also suggest that the middle and the bottom lost ground over the 1990s. Both surveys indicate that the most affluent 10 and 20 per cent of the population increased their share of the pie.

CONCLUSION

The results from the two sets of ABS data differ in some respects, but some clear conclusions emerge. First, income inequality has increased over the course of the 1990s, although it is not entirely clear how much of that increase occurred primarily in the first half of the decade. However, all of the inequality measures used suggest growing income inequality for the decade as a whole.

There has been strong growth in incomes at the top end of the income spectrum. Growth in incomes has been slower at the middle and the bottom of the income spectrum. As a result, the gap between the top and the middle, and between the top and the bottom, has increased during the 1990s. There has been a decline in the share of the total income cake going to the bottom 10 per cent and the middle 20 per cent of Australians. This has been offset by the increase in the share of total income going to the top 20 per cent of Australians.

It is not entirely clear how middle Australia has been faring relative to those on the lowest incomes. The Income Surveys suggest that the middle and the bottom have experienced comparable income increases over the course of the 1990s, so that the relative gap between the incomes of the two groups has remained constant. The Expenditure Surveys paint a very different picture and suggest that middle incomes have increased more rapidly than the incomes of those at the bottom of the income spectrum.

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CRYPTOSPORIDIOSIS IN NSW, 1990–2000

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BACKGROUND

Cryptosporidium parvum is an intracellular protozoan parasite that causes disease in humans and other mammals. It was first described in 1907,[1] but was not shown to cause human illness until 1976.[2] Transmission occurs by the faecal–oral route; consequently, person-to-person transmission can occur—especially between household members, sexual partners, and children in day-care. Animal-to-human transmission may occur, especially from farm animals. The organism is resistant to most water purification techniques, and many outbreaks have been documented originating from drinking water,[3] and through swimming in contaminated pools.[4] Food-borne outbreaks are rarely reported.

The incubation period is usually 7–10 days. In those with healthy immune systems, incubation is usually followed by a self-limiting diarrhoea that lasts 2–26 days. The diarrhoea may be mild or severe. Asymptomatic infections are common.[5] There is no curative treatment. In those with weak immune systems, particularly those with concurrent HIV infection, cryptosporidiosis often persists and can become life-threatening. The disease is widespread throughout the world, and affects people of all ages, although it is most common in young children.

This article describes the epidemiology of cryptosporidiosis in NSW between 1990 and 2000, and draws upon several sources of data.

METHODS

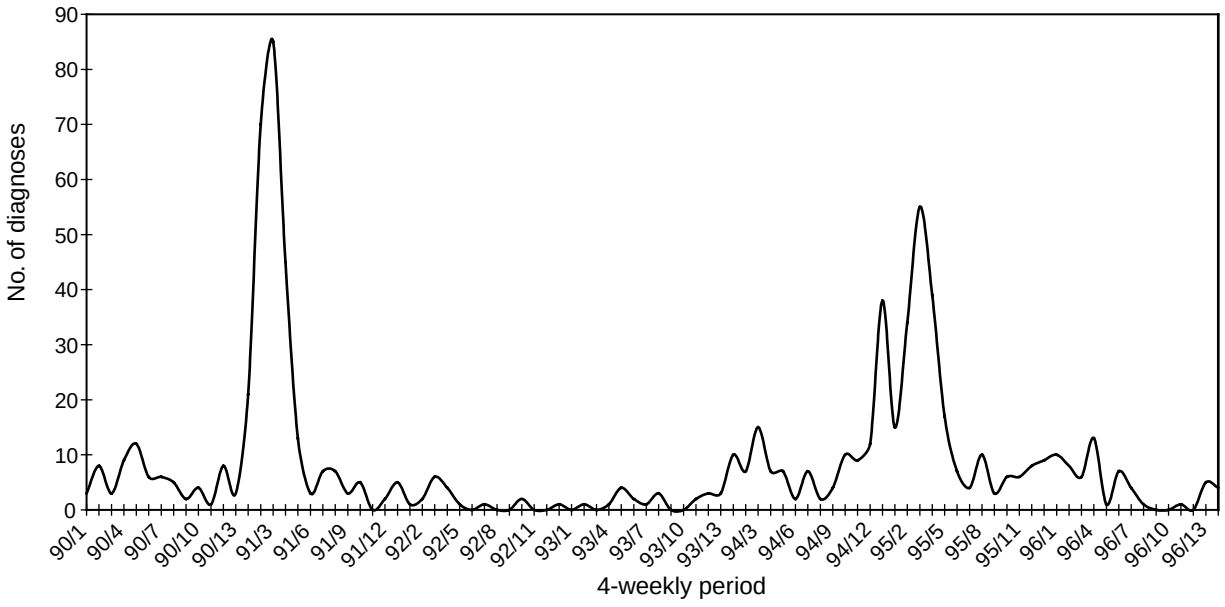
Between 1990 and 1996, the Eastern Sydney Laboratory Surveillance Program collected data from microbiology laboratories describing many non-notifiable communicable diseases, including cryptosporidiosis. Participating laboratories were those serving public hospitals in Eastern Sydney; as well as the Royal Alexandra Hospital for Children in Camperdown; and several private pathology services, some of which have collection services in many parts of NSW.

Since December 1996, cryptosporidiosis has been a notifiable condition under the NSW Public Health Act. Notifications from all NSW laboratories to public health units between 1997 and 2000 were included in this analysis.

Since July 1996, the NSW Department of Health's Inpatient Statistics Collection (ISC) has included an ICD-9 code

FIGURE 1

REPORTS OF CRYPTOSPORIDIOSIS FROM THE EASTERN SYDNEY LABORATORY SURVEILLANCE PROGRAM, 1990-1996



Source: * Eastern Sydney Laboratory Surveillance Program, South Eastern Sydney Public Health Units

for cryptosporidiosis (007.4). Data were available up to June 2000. Hospitalisations were included in the analysis if cryptosporidiosis was entered as either the principal diagnosis responsible for the admission, or was the first additional diagnosis that affected treatment or length of stay.

Cryptosporidiosis is one of 26 illnesses that, when combined with HIV infection, defines the Acquired Immune Deficiency Syndrome (AIDS). Since 1982 AIDS has been notifiable by medical practitioners and hospitals under the NSW Public Health Act. NSW notifications for the period 1991–2000 were analysed.

Rates were calculated by determining the age of populations in NSW using Australian Bureau of Statistics Estimated Residential Populations for 1998, which is based on the 1996 Census. Data on disease notifications, hospital separations, and populations, were analysed using the NSW Department of Health's Health Outcome Indicator Statistical Toolkit (HOIST). Data were analysed by age group, sex, area health service of residence, and month and year of specimen collection or admission to hospital.

RESULTS

Laboratory Diagnoses

Between 1990 and 1996, 773 cases of cryptosporidiosis were reported to the Eastern Sydney Laboratory Surveillance Program. There was considerable variation in the yearly totals (Table 1), with peaks in 1991 and 1995 (Figure 1). No annual seasonal cycle was evident.

TABLE 1

CRYPTOSPORIDIOSIS BY YEAR, NSW 1990–2000

Year	ESLSP*	Notifications	Hospitalisations**
1990	70	-	-
1991	266	-	-
1992	18	-	-
1993	20	-	-
1994	130	-	-
1995	213	-	-
1996	56	-	15
1997	-	157	36
1998	-	1129	140
1999	-	121	36
2000	-	133	7

* Eastern Sydney Laboratory Surveillance Program

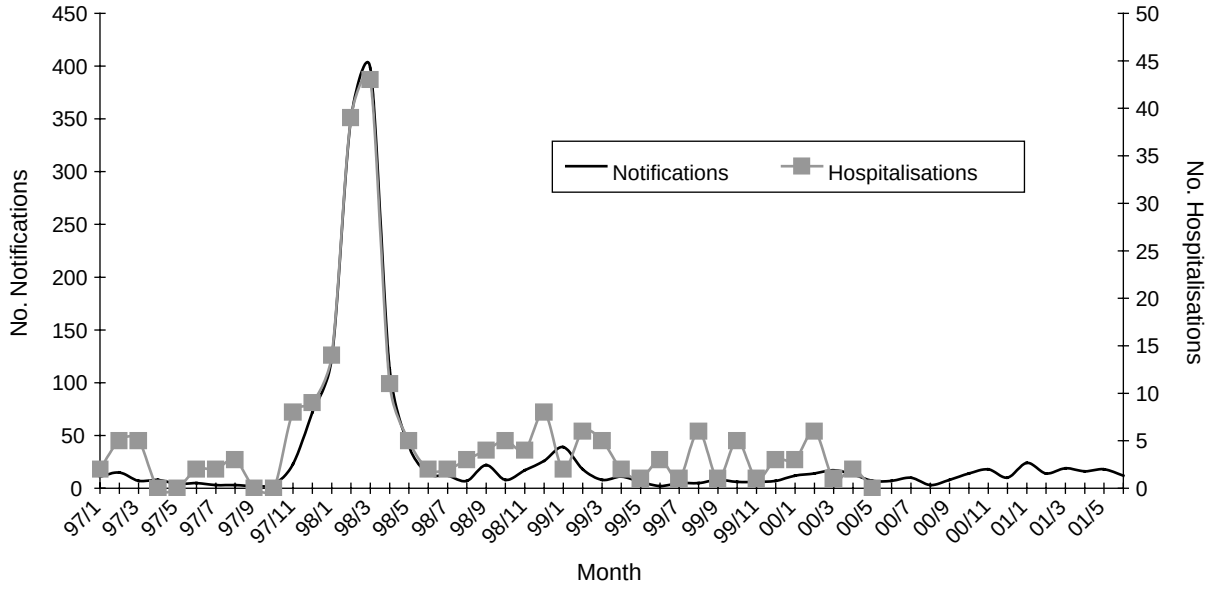
** Data from July 1996 to June 2000

Notifications

Between 1997 and 2000, 1540 cases were notified to public health units by NSW laboratories. Again there was wide variation in yearly totals (Table 1), with a large peak in 1998, and no evident annual seasonal cycle (Figure 2). Of all notifications in the four-year period, 71 per cent (1096) occurred during a six-month period in 1997–1998. Males had a slightly higher notification rate than females

FIGURE 2

CRYPTOSPORIDIOSIS NOTIFICATIONS AND HOSPITALISATIONS, 1997–2001



Source: Notifiable Disease Database, Inpatient Statistics Collection, Health Outcome Indicator Statistical Toolkit

(6.3/100,000 and 5.8/100,000, respectively). Average yearly notification rates were highest in the 0–4 year age group (43.4/100,000 population), followed by 5–9 years (14.8/100,000), compared to 6.1/100,000 for the total population (Table 2). Among the area health services, New England had the highest notification rate (18.6/100,000) followed by Northern Rivers (17.2/100,000), Mid North Coast (14.0/100,000), and Macquarie (12.9/100,000).

Hospitalisations

There were 239 hospitalisations due to cryptosporidiosis between July 1996 and June 2000, an average annual rate of 0.9/100,000 in the total population (Table 2). Hospitalisations peaked in 1998, at the same time as notifications. As with notifications, males had a slightly higher rate than females (1.1 and 0.8 per 100,000, respectively), and the 0–4 year and 5–9 year age groups had the highest rates (6.0 and 2.7/100,000). The area health services with the highest hospitalisation rates were New England (3.4/100,000) and Mid North Coast (3.1/100,000).

Twenty-nine (12.1 per cent) hospitalisations for cryptosporidiosis were also reported to have HIV infection. Of those, all were over 30 years of age. Six of those 29 (21 per cent) occurred during the epidemic of 1997–98.

AIDS notifications and cryptosporidiosis

There were 3260 cases of AIDS notified in NSW between 1991 and 2000. Of those, 164 (5.0 per cent) reported having cryptosporidiosis at the time of their AIDS diagnosis. Between 1997 and 2000 there was a considerable decline in AIDS notifications, with 576 cases of AIDS notified, 27 (4.7 per cent) of whom had cryptosporidiosis.

DISCUSSION

Between 1990 and 2000 the epidemiology of cryptosporidiosis in NSW was dominated by epidemics

TABLE 2

CRYPTOSPORIDIOSIS NOTIFICATIONS AND HOSPITALISATIONS, NSW 1997–2000

	Notifications	Average annual rate / 100,000*	Hospitalisations*	Average annual Rate / 100,000
Gender				
Male	796	6.3	134	1.1
Female	740	5.8	105	0.8
Age Group (yrs)				
0–4	755	43.4	104	6.0
5–9	263	14.8	48	2.7
10–14	94	5.4	13	0.7
15–19	32	1.8	3	0.2
20–29	111	3.0	20	0.5
30–39	159	4.0	30	0.8
40–49	49	1.4	13	0.4
50–59	26	0.9	2	0.1
60+	47	1.1	6	0.1
Area Health Service				
Central Coast	54	4.8	9	0.8
Central Sydney	100	5.2	11	0.6
Far West	8	4.1	3	1.5
Greater Murray	64	6.2	6	0.6
Hunter	102	4.8	15	0.7
Illawarra	59	4.3	2	0.1
Macquarie	53	12.9	4	1.0
Mid North Coast	143	14.0	32	3.1
Mid West	11	1.7	1	0.2
New England	131	18.6	24	3.4
Northern Rivers	175	17.2	15	1.5
Northern Sydney	68	2.2	16	0.5
South Eastern Sydney	191	6.3	23	0.8
Southern	70	9.7	13	1.8
South Western Sydney	128	4.2	21	0.7
Wentworth	70	5.7	13	1.1
Western Sydney	108	4.1	28	1.1
Total	1540	6.1	239	0.9

* Hospitalisations from July 1996 to June 2000

every 3–4 years, with little seasonal pattern in between. This pattern extended beyond NSW to other parts of Australia.[6–8] There were three epidemics during that time: 1991, 1994–1995, and 1997–1998. The 1991 epidemic was simultaneously documented in Adelaide and Sydney.[6] A study in Adelaide at the time found a protective effect from drinking only rain water.[7] For the epidemic in 1994–95, the peak was recorded in Sydney, Melbourne and Brisbane.[8] In Southern Sydney, infection was associated with swimming in one public swimming pool.[4] During the 1997–98 epidemic, cases were documented in Sydney, Canberra, Melbourne, and Brisbane; and in NSW infection was associated with swimming in public pools, rivers or lakes, and with not drinking bottled water.[9] In these epidemics, most cases were young children. Data since 1997 show that those living in non-metropolitan areas had a higher rate of infection. Cryptosporidiosis resulted in 239 recorded hospitalisations in NSW over a four-year period, and those hospitalised had a similar age and geographic distribution to the cases notified by laboratories.

In July–September 1998 a series of 'boil water' alerts were made to Sydney residents, following the detection of high levels of *Cryptosporidium parvum* and *Giardia lamblia* in samples of drinking water. Figure 2 shows that these alerts occurred shortly after the end of the epidemic of 1997–98, and that there was no detectable rise in notifications. A household survey also found no measurable increase in illness attributable to drinking Sydney water at that time.[10]

Cryptosporidiosis can be a very serious illness in those with HIV infection. Cases with HIV co-infection represent a small proportion of people diagnosed with cryptosporidiosis. Twelve per cent of hospitalisations for cryptosporidiosis had known HIV co-infection. AIDS notifications record cryptosporidiosis only if it occurs at the time of AIDS diagnosis and not later. AIDS notifications probably underestimate the total number of people with concurrent infection with HIV and cryptosporidium. The introduction of more effective drug therapies in mid-1996 has resulted in a decline in the already small number of reported AIDS cases due to cryptosporidiosis. The 1997–98 epidemic resulted in a big increase in total hospitalisations for cryptosporidiosis, but had little or no effect on the number of people hospitalised at the time who also had HIV infection.

The two laboratory surveillance schemes presented here covered different geographic areas, and therefore the total numbers should not be compared. Also, both schemes record only a small proportion of the total number of cases that occur in the community, because they capture only cases that had symptoms, sought medical care, and had a positive stool test result that was reported. However, the data they provide have allowed us to describe the epidemiology of cryptosporidiosis in NSW.

CONCLUSION

The investigation of outbreaks, both overseas and in Australia, have provided important information to assist in preventing infection.[11] Notifications will continue to play an important role in accurately describing the patterns of cryptosporidiosis in the community, and provide triggers for the investigation of outbreaks and public health interventions.

ACKNOWLEDGEMENTS

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FACT*SHEET*

PNEUMOCOCCAL DISEASE

WHAT IS PNEUMOCOCCAL DISEASE?

Pneumococcal disease is caused by infection with the bacteria *Streptococcus pneumonia*. This infection can cause a range of illnesses, the most common including:

- pneumonia (infection of the lungs);
- otitis media (infection of the middle ear);
- meningitis (infection of the membranes around the brain).

Other bacteria can also cause these diseases.

WHAT ARE THE SYMPTOMS?

Symptoms depend on the site of infection and the age of the person. They may include:

- pneumonia—shortness of breath, fast breathing, fever, lack of energy, loss of appetite, headache, chest pain, and cough;
- otitis media—(especially in children less than three years old, usually after a cold or flu-like illness) crying, tugging at the ear, fever, irritability, poor hearing, and sometimes diarrhoea and vomiting;
- meningitis—fever, headache, stiff neck, nausea, vomiting, and drowsiness.

HOW IS IT SPREAD?

The bacteria often live harmlessly in the throat of healthy people. They are passed from person-to-person via droplets when coughing or sneezing, kissing, or indirectly via toys and other soiled items. However, it is uncommon for people who are exposed to the bacteria to become ill.

WHO IS MOST AT RISK?

People most at risk for the infection include:

- Aboriginal and Torres Strait Islander people;
- the elderly;
- children under two years of age;
- people with other medical conditions such as lung disease, heart disease, cancer, kidney disease, HIV infection, or malnutrition;
- people whose spleen has been removed or doesn't work properly.

Outbreaks have occurred in childcare centres, nursing homes, and other institutions.

Pneumococcal infections are more common in Winter and early Spring.

HOW IS IT DIAGNOSED AND TREATED?

Your doctor can diagnose pneumococcal disease by listening to your symptoms, giving you a physical examination, and doing some tests. Tests may include a chest x-ray, and taking samples to look for the bacteria in the infected part of your body (for example: sputum, blood or cerebrospinal fluid).

Treatment may include:

- antibiotics;
- medicine to control the fever and pain, such as paracetamol;
- fluids to prevent dehydration;
- rest.

HOW IS IT PREVENTED?

Children

A vaccine to prevent pneumococcal disease in small children was introduced in Australia in 2001. In New South Wales it is recommended for:

- all Aboriginal and Torres Strait Islander children up to two-years of age;
- children under five years of age who:
  - were born with certain immune deficiencies;
  - are receiving certain drugs or radiation treatment;
  - have spleens that don't work properly;
  - have HIV infection;
  - have certain kidney diseases;
  - have heart disease causing cyanosis or heart failure;
  - have cerebrospinal fluid leaks.

For babies less than six months of age, three doses of vaccine are given two months apart. Fewer doses are needed for older children.

Adults and older children

A vaccine for preventing pneumococcal disease in adults and older children has been available for many years. Vaccination is recommended for:

- all people aged 65 years and older;
- Aboriginal and Torres Strait Islander people aged 50 years or older;
- people without a working spleen;
- people who are immunocompromised;
- people with chronic illnesses (for example: heart, kidney, lung, diabetes, or alcohol related illnesses);
- patients with cerebrospinal fluid leaks.

Re-vaccination is recommended every five years.

In some people at highest risk of severe pneumococcal disease, preventive antibiotic treatment may also be recommended.

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

March 2002

NSW HEALTH
Better Health *Good Health Care*

Health Working as a Team The Way Forward

COMMUNICABLE DISEASES, NSW: MARCH 2002

TRENDS

Through to January 2002 relatively few cases of **Ross River virus** infections were reported across the state for the time of year. **Barmah Forest virus** infections were predominantly notified from the north coast of NSW (Tables 1 and 2, Figure 1).

We are happy to report that there were no cases of **measles** reported in the previous three months (Figure 1).

We are also happy to report that, after a prolonged epidemic, notifications of **pertussis** seem to be declining. Nonetheless, there are still many cases about, with 391 notifications being received in January. To protect vulnerable members of the community, vigilance is important in terms of ensuring complete immunisation of children, case finding, treatment, and prophylaxis of household contacts with erythromycin.

MENINGOCOCCAL DISEASE AMONG CRUISE SHIP PASSENGERS

On Friday 25 January 2002, the South Western Sydney Public Health Unit (SWSPHU) notified the NSW Department of Health's Communicable Diseases Unit (CDU) of the death of a 21-year-old South Western Sydney man from suspected invasive meningococcal disease. The man was taken by ambulance to hospital on 24 January after collapsing at his home. He had a three-day history of sore throat but had otherwise been well. A rash was noted and a diagnosis of meningococcal disease was made. Despite aggressive intervention, the man died.

In the seven days prior to the onset of his illness, the man had been on a cruise to the South Pacific. The cruise ship carried over a thousand passengers from all over Australia.

SWSPHU identified over 50 close contacts of the man who may have been at increased risk of disease, and provided them with information about the disease and with antibiotics to help prevent its further spread. The CDU informed local public health units and other states and territories about the case. Shortly after, the South Australian Department of Health reported that a South Australian man on the same cruise had been diagnosed with meningococcal disease on 22 January 2002. The man's close contacts had been contacted and given antibiotics.

No direct personal link between the cases was established. The cruise operator agreed to contact all passengers and crew from the ship to tell them about these events and about meningococcal disease. The NSW Department of Health set up a hotline providing general information to the public, issued media releases, and conducted regular media interviews to update the public on events. Passengers were alerted to seek medical attention if they develop symptoms of the disease. As a result of the public warnings, several other passengers were investigated for possible meningococcal infection, but in none of these was the diagnosis confirmed.

HEPATITIS A INCREASING

Notifications of hepatitis A reached a nadir of seven in April 2001, but have since increased. Thirty cases had onset in December 2001. Of these 30 cases, the biggest reported exposure was male-to-male sex (nine cases or 30 per cent), followed by overseas travel and eating at restaurants (five cases each or 17 per cent each). By area of residence, male-to-male sex is the most prominently reported exposure in South Eastern Sydney and Central Sydney. Men who have sex with men are at increased risk of hepatitis A, which is acquired through faecal–oral contact, including during sexual activity. Outbreaks of hepatitis A have been recorded among men who have sex with men in South Eastern Sydney every few years, most recently in 1998.[1]

Hepatitis A can be prevented through:

- careful hand-washing with soap and running water after using the toilet, before handling food, and before and after sex;
- avoidance of exposure to faecal material;
- administration of immunoglubulin, which is recommended for household and other close contacts of cases;
- immunisation, which is recommended for some people at increased risk of the disease, including men who have sex with men.

Clinicians should be alert to the possible diagnosis of hepatitis A, especially among men who have sex with men living in or visiting Sydney, and notify the local public health unit (listed under 'Health' in the White Pages) of cases. PHU staff will help investigate the likely source and to help prevent disease in contacts.

CRYPTOSPORIDIOSIS

Notifications of cryptosporidiosis increased in December (21 cases) and January (30 cases). Most cases were individuals who resided in rural areas. About half the cases were children under five years of age. No common source has been identified among cases.

Cryptosporidiosis is a diarrhoeal illness caused by a water-borne parasite. Infections have been linked to drinking water, recreational water, childcare settings, person-to-person and animal-to-person contact. Large outbreaks of cryptosporidiosis have been recorded every three or four years in NSW, the last in 1997–8, associated with swimming in contaminated swimming pools.[2,3]

To avoid catching cryptosporidiosis:

- always wash hands thoroughly with soap and running water after using the toilet, handling, animals, changing nappies, or working in the garden;
- always wash hands thoroughly before preparing food and drinks;
- do not drink untreated water (for example, from rivers, streams, lakes and dams). Boiling water from these sources for one minute will kill germs, including cryptosporidiosis.

To avoid spreading cryptosporidiosis:

- keep small children who have diarrhoea home from school, preschool, childcare or playgroups until the diarrhoea has completely stopped;
- food handlers, childcare workers, and health care workers with cryptosporidiosis should not work until diarrhoea has stopped;
- do not use swimming pools or other water recreational areas, or share linen and towels with others, for at least one week after the diarrhoea has stopped.

Swimming pool operators should follow the NSW Department of Health's *Protocol for Minimising the Risk of Cryptosporidium in Public Swimming Pools and Spa Pools*. This is available from the Department's web site at www.hprb.health.nsw.gov.au/public-health/ehb/general/pools/publicpools.html.

Clinicians should consider the diagnosis among people presenting with diarrhoea lasting more than a few days. If suspected, the diagnosis should be confirmed with a stool sample specifically requesting a test for *Cryptosporidium*.

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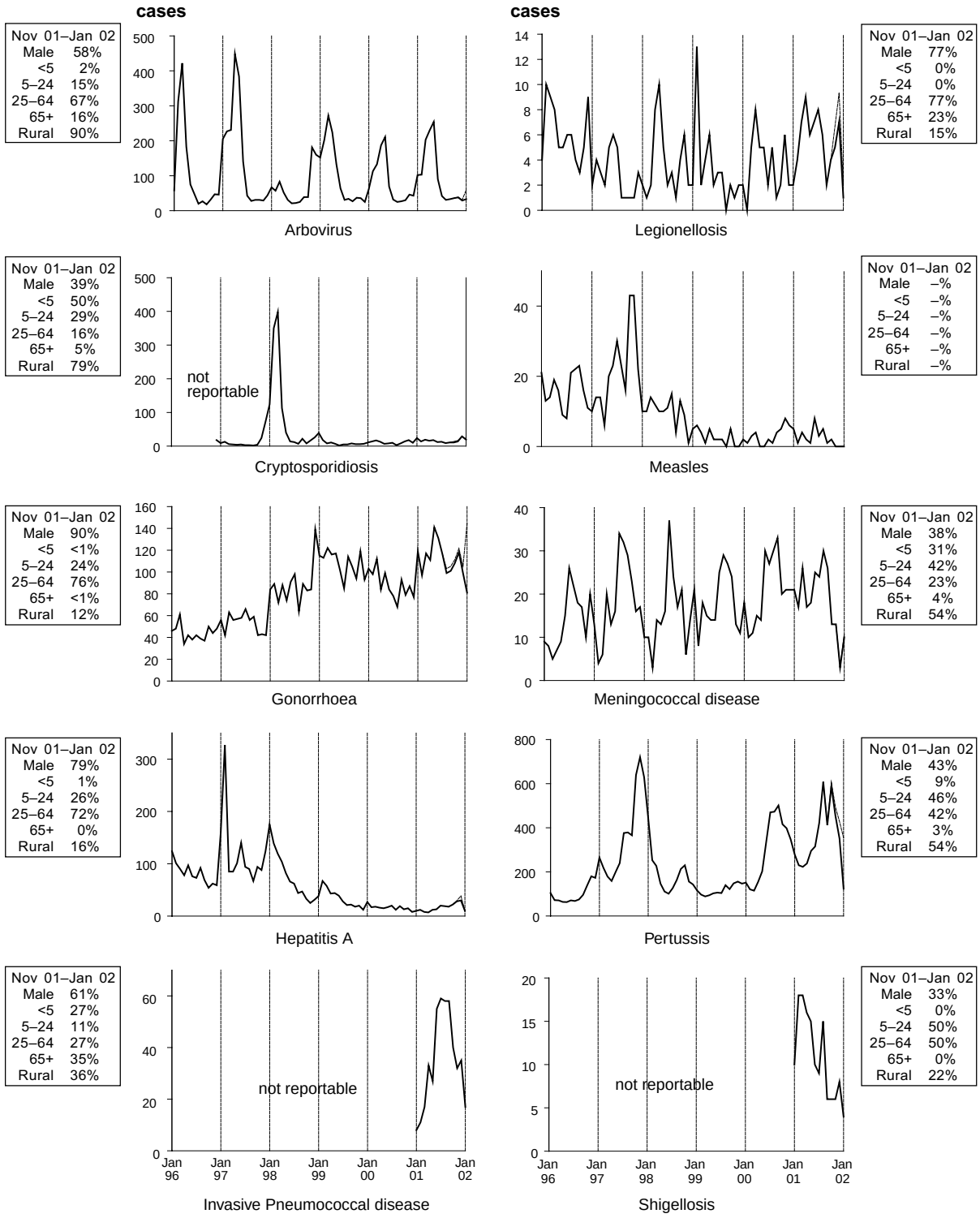
FIGURE 1

REPORTS OF SELECTED COMMUNICABLE DISEASES, NSW, JANUARY 1996 TO MAY 2001, BY MONTH OF ONSET

These are preliminary data: case counts for recent months may increase because of reporting delays. Laboratory-confirmed cases, except for measles, meningococcal disease and pertussis. _____ actual _ _ _ predicted after adjusting for likely reporting delays.

NSW population	
Male	50%
<5	7%
5–24	28%
25–64	52%
65+	13%
Rural*	42%



* For definition, see *NSW Public Health Bulletin*, April 2000

TABLE 1 REPORTS OF NOTIFIABLE CONDITIONS RECEIVED IN DECEMBER 2001 BY AREA HEALTH SERVICES

Condition	Area Health Service (2001) CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA	CHS	Total for Dec†	Total To date†
Blood-borne and sexually transmitted																				
Chancroid*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital)*	15	31	16	8	-	10	18	13	56	10	13	11	7	4	5	10	4	1	233	4,445
Gonorrhoea*	1	7	5	1	-	-	1	1	24	2	2	2	1	-	2	1	-	-	53	1,301
Hepatitis B - acute viral*	-	-	1	-	1	-	1	-	1	-	1	-	-	-	-	1	-	-	6	84
Hepatitis B - other*	18	30	1	2	100	1	3	1	35	3	2	1	5	2	1	2	1	-	208	4,782
Hepatitis C - acute viral*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	204
Hepatitis C - other*	55	2	-	33	93	28	50	21	57	17	17	11	2	6	3	12	13	23	465	8,873
Hepatitis D - unspecified*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Syphilis	5	-	4	-	9	-	-	1	13	-	1	-	-	1	-	-	1	1	36	758
Vector-borne																				
Barmah Forest virus*	-	-	-	-	-	1	-	-	-	5	12	-	-	-	-	-	-	-	18	406
Ross River virus*	-	-	-	-	-	1	2	1	-	3	3	-	-	-	1	-	-	-	11	764
Arboviral infection (Other)*	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	2	65
Malaria*	-	1	1	1	-	1	3	1	1	-	1	1	-	1	-	-	1	-	13	155
Zoonoses																				
Anthrax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptospirosis*	-	-	-	-	-	-	1	-	-	-	4	1	-	-	-	-	-	-	6	73
Lyssavirus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	2	35
Q fever*	-	-	-	-	1	-	1	-	-	3	1	-	4	-	-	-	-	-	10	154
Respiratory and other																				
Blood lead level*	-	3	-	2	-	-	3	-	-	-	1	1	-	-	-	-	-	-	10	497
Influenza	1	-	2	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	6	303
Invasive pneumococcal infections	-	10	9	2	1	3	1	1	3	2	1	-	-	2	-	-	-	-	35	417
Legionella longbeachae infections*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27
Legionella pneumophila infections*	-	-	2	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	5	38
Legionnaires' disease (other)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Leprosy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Meningococcal infection (invasive)	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	238
Tuberculosis	2	3	6	-	-	-	-	1	8	-	-	-	-	-	-	-	-	1	21	386
Vaccine-preventable																				
Adverse event after immunisation	1	-	3	-	-	-	1	-	-	-	-	-	-	-	-	1	3	-	9	102
H.influenzae b infection (invasive)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Measles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Mumps*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28
Pertussis	26	51	47	21	16	7	45	22	44	26	7	5	8	6	4	17	13	-	365	4,371
Rubella*	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	64
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Faecal-oral																				
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cryptosporidiosis*	2	1	1	-	-	-	-	-	1	5	2	5	2	1	-	1	-	-	21	176
Food borne illness (not otherwise specified)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Gastroenteritis (in an institution)	-	-	141	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	149	623
Giardiasis*	-	9	7	1	-	4	4	1	7	1	-	6	1	4	1	-	-	-	46	966
Haemolytic uraemic syndrome	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6
Hepatitis A*	7	2	4	-	2	-	1	-	9	1	-	-	-	-	1	-	-	-	27	192
Hepatitis E*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Listeriosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Salmonellosis (not otherwise specified)*	-	22	-	12	17	3	14	2	15	10	3	-	3	-	1	6	1	-	109	1,662
Shigellosis	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	131
Typhoid and paratyphoid*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	43
Verotoxin producing E. coli*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1

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

CSA = Central Sydney Area
NSA = Northern Sydney Area
WSA = Western Sydney Area
WEN = Wentworth Area
SWS = South Western Sydney Area
CCA = Central Coast Area
HUN = Hunter Area
ILL = Illawarra Area
SES = South Eastern Sydney Area
NRA = Northern Rivers Area
MNC = North Coast Area
NEA = New England Area
MAC = Macquarie Area
MWA = Mid Western Area
FWA = Far West Area
GMA = Greater Murray Area
SA = Southern Area
CHS = Corrections Health Service

TABLE 2 REPORTS OF NOTIFIABLE CONDITIONS RECEIVED IN JANUARY 2002 BY AREA HEALTH SERVICES

Condition	Area Health Service (2001) CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA	CHS	Total for Jan†	Total To date†
Blood-borne and sexually transmitted																				
Chancroid*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital)*	53	27	40	15	33	12	27	14	73	15	13	10	7	6	2	18	9	1	376	376
Gonorrhoea*	17	12	9	1	3	5	-	3	66	2	-	2	1	-	2	2	-	1	128	128
Hepatitis B - acute viral*	1	-	-	-	1	-	3	-	2	-	1	-	-	-	-	-	-	-	9	9
Hepatitis B - other*	52	30	36	6	138	7	7	4	35	2	2	4	2	-	3	1	5	-	254	254
Hepatitis C - acute viral*	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	1	5	5
Hepatitis C - other*	83	26	78	32	98	32	27	25	88	35	31	15	7	4	2	9	8	39	640	640
Hepatitis D - unspecified*	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Syphilis	8	-	8	2	17	2	2	-	11	2	1	3	1	1	2	-	-	3	63	63
Vector-borne																				
Barmah Forest virus*	1	-	-	-	-	-	-	1	-	7	9	-	-	-	-	-	-	-	18	18
Ross River virus*	1	1	-	-	-	2	-	-	-	2	2	3	3	2	-	2	1	-	19	19
Arboviral infection (Other)*	2	1	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	7	7
Malaria*	-	-	1	-	4	-	2	-	1	1	1	1	-	1	-	-	-	-	12	12
Zoonoses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Anthrax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptospirosis*	-	-	-	-	-	-	-	-	-	2	1	3	-	-	-	-	-	-	6	6
Lyssavirus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	2	2
Q fever*	-	-	-	1	-	1	2	-	-	3	4	2	3	-	-	-	1	-	17	17
Respiratory and other																				
Blood lead level*	1	2	1	1	4	-	1	2	2	1	-	1	2	-	10	-	-	-	28	28
Influenza	-	-	2	-	2	-	-	1	1	-	-	-	-	-	-	-	-	-	6	6
Invasive pneumococcal infections	1	3	8	1	1	1	2	4	5	-	1	-	-	-	-	-	-	1	28	28
Legionella longbeachae infections*	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	3	3
Legionella pneumophila infections*	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	2
Legionnaires' disease (other)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leprosy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meningococcal infection (invasive)	1	-	1	-	2	-	-	-	2	2	-	1	-	-	-	1	-	-	10	10
Tuberculosis	3	2	7	1	1	-	-	1	10	-	-	-	-	-	-	-	-	-	25	25
Vaccine-preventable																				
Adverse event after immunisation	-	3	-	-	-	1	4	-	-	-	-	-	1	-	-	1	-	-	10	10
H.influenzae b infection (invasive)*	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	2	2
Measles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mumps*	-	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	3	3
Pertussis	11	47	47	10	11	8	75	23	63	34	11	11	4	7	-	17	11	-	391	391
Rubella*	2	-	-	-	-	-	-	-	1	2	-	-	1	-	-	-	1	-	7	7
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Faecal-oral																				
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptosporidiosis*	-	2	3	-	-	-	2	1	-	5	5	8	2	-	-	1	1	-	30	30
Food borne illness (not otherwise specified)	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1
Gastroenteritis (in an institution)	-	-	47	-	-	-	-	7	-	-	-	-	2	-	-	-	-	-	56	56
Giardiasis*	-	11	5	2	4	3	5	3	11	4	1	3	2	1	-	3	-	-	58	58
Haemolytic uraemic syndrome	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1
Hepatitis A*	11	-	4	-	-	1	-	1	5	2	-	-	-	-	-	-	-	-	25	25
Hepatitis E*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Listeriosis*	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	2
Salmonellosis (not otherwise specified)*	8	18	28	14	23	14	24	2	14	34	11	6	7	4	-	6	7	-	221	221
Shigellosis	-	2	-	-	-	-	1	-	4	-	1	-	-	-	-	-	1	-	9	9
Typhoid and paratyphoid*	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	4	4
Verotoxin producing E. coli*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

CSA = Central Sydney Area
NSA = Northern Sydney Area
WSA = Western Sydney Area
WEN = Wentworth Area
SWS = South Western Sydney Area
CCA = Central Coast Area
HUN = Hunter Area
ILL = Illawarra Area
SES = South Eastern Sydney Area
NRA = Northern Rivers Area
MNC = North Coast Area
NEA = New England Area
MAC = Macquarie Area
MWA = Mid Western Area
FWA = Far West Area
GMA = Greater Murray Area
SA = Southern Area
CHS = Corrections Health Service

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The *Bulletin* aims to provide its readers with population health data and information to support effective public health action.

Submission of articles

Articles, news and comments should be 1000 words or less in length, and include a summary of key points to be made in the first paragraph.

References should be set out in the Vancouver style, described in the *New England Journal of Medicine*, 1997; 336: 309–315.
Send submitted manuscripts on paper and in electronic form, either on disc (Word for Windows is preferred), or by email.

The manuscript must be accompanied by a letter signed by all authors. Full instructions for authors are available on request from the managing editor.

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