



## INVESTING TO IMPROVE THE OUTCOMES OF DIABETES CARE

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In October 1994 the NSW Health Department began evolving a model or prototype for the development, planning and implementation of initiatives to improve the outcomes of health care, focusing on diabetes mellitus. This article outlines progress on this project, which is known as the Diabetes Outcomes Project. Key principles of the project are wide consultation, the identification and adoption of practices with evidence of effectiveness and efficiency, equity of access to health services, monitoring of health outcomes and the use of information obtained from monitoring in subsequent decision making.

### WHY DIABETES?

Diabetes was chosen as the model for several reasons.

- It is a prevalent disorder which typifies many chronic conditions in the NSW population. Diabetes affects 3-4 per cent of the Australian population<sup>1</sup>, at least 10 per cent of older people, up to 20 per cent of some Aboriginal communities<sup>2</sup>, and has a high prevalence in people from the Pacific Islands, the Middle East, Southern Europe and some Asian countries.
- Diabetes causes a substantial burden of morbidity and mortality. It is among the major causes of death and is the second most common reason for commencing renal dialysis in Australia<sup>3</sup>. It is estimated that up to 50 new cases of blindness and 775 non-traumatic lower extremity amputations are attributable to diabetes in NSW each year. Diabetes is also a major cause of ischaemic heart disease, stroke and impotence. The true burden in terms of health resources, personal suffering and detriment to quality of life is immeasurable.
- The care of people with diabetes spans the continuum from prevention and diagnosis, through initial and ongoing treatment, to rehabilitation and palliation. People with diabetes encounter a wide range of health professionals in the full spectrum of health care settings which are variously supported by Commonwealth- and State-sourced payment mechanisms. Thus diabetes care exemplifies all facets of the loosely networked Australian health care system.
- There is evidence that outcomes for people with diabetes can be substantially improved by providing better access to quality diabetes services. The focus is on preventing or minimising complications of the disease. It is estimated that the numbers of new cases of blindness and lower extremity amputations attributable to diabetes could be halved.

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- There had already been formal collaboration on the measurement of diabetes outcomes between the NSW Health Department and clinicians from medical, nursing and allied health backgrounds, and consumers. This collaboration resulted in the identification of process and outcome indicators for diabetes care and the development of a system to make clinical indicator information available in different health care settings.

### THE FRAMEWORK

The project initially concentrated on the development of a generic planning framework which could be applied to improve the health of people with diabetes as well as other chronic conditions. It comprises a series of interdependent, interacting steps, as follows:

- developing goals and targets for diabetes prevention and care;
- identifying and evaluating prevention and treatment strategies and interventions;
- defining and evaluating standards of care;
- evaluating services and identifying ways to improve service delivery;
- developing indicators and systems to monitor the quality and outcomes of services;
- identifying research needs for incorporation into a strategic research plan;
- developing, piloting and evaluating models for prevention and care; and
- developing a statewide plan for integrating diabetes services.

The planning framework has since been further refined, and is described on page 102 in this issue of the *Public Health Bulletin*.

### CONSULTATION

Since the inception of the project there has been an emphasis on the participation of people with diabetes, diabetes care providers and the organisations which represent them. To this end there has been a broad consultation process involving consumers, consumer groups, endocrinologists, general practitioners, diabetes educators, podiatrists and other relevant clinicians, health promotion practitioners and Area and District planning groups. An Expert Panel on Diabetes has been established to provide scientific and clinical advice and consumer perspectives. Its membership represents consumers, medical and non-medical clinicians, public health practitioners and representatives from Aboriginal Medical Services (AMS) and rural and community health services. Working groups of the Expert Panel have provided advice on guidelines and specific implementation issues.

### APPLYING THE FRAMEWORK

The goals of the diabetes outcomes project are to prevent or minimise the complications of diabetes, enable people with diabetes to have the best possible quality of life and prevent non-insulin-dependent diabetes.

It is not possible to prevent insulin-dependent diabetes. But there is evidence that factors such as improved nutrition and adequate physical activity contribute to

the prevention of non-insulin-dependent diabetes mellitus (NIDDM). Because community strategies for optimal nutrition and physical activity (which are already being implemented to prevent cardiovascular disease) may also prevent NIDDM, the Diabetes Outcomes Project has concentrated on diabetes care issues, as follows:

- describing the current state of diabetes care;
- identifying key elements of quality diabetes care and opportunities for improving outcomes;
- defining and disseminating evidence-based standards of care, including the development of methods for evaluating the quality of evidence;
- defining indicators and developing information systems to monitor progress; and
- encouraging service integration aimed at enhancing access and promoting a comprehensive, collaborative, population-based approach to diabetes care.

### CURRENT STATE OF DIABETES SERVICES IN NSW

A statewide survey of Area and District Health Services, community health services, specialist diabetes centres and services and private specialist physicians was conducted in December 1994 to determine the nature, scope and location of diabetes services in NSW.

Before the survey it was known that diabetes ambulatory care centres were established in all Area Health Services but one. It was acknowledged that a high standard of specialised diabetes care was provided by the multi-disciplinary teams in these centres and by endocrinologists in private practice, with an estimated 80 per cent of diabetes care taking place in general practice.

The survey results confirmed the variable nature of diabetes services and identified lack of access to specialist services as a major issue in rural and remote regions and for Aboriginal and non-English speaking people.

### ELEMENTS OF DIABETES CARE AND OPPORTUNITIES FOR IMPROVEMENT

There is a consensus of expert opinion, supported by published literature, that diabetes care and outcomes can be improved by providing access for all people with diabetes to:

- information about their condition and education for self care;
- ongoing clinical care to provide optimal metabolic control; and
- screening for and appropriate treatment of complications.

Seven guidelines have been prepared to aid clinical decision making and assist the practitioner in the management of diabetes in people over the age of 18 years. A group of paediatric endocrinologists is adapting these guidelines for application to children and adolescents with diabetes. Principles and recommendations for diabetes education and the promotion of self-care skills are also being developed.

As far as possible the guidelines are based on published evidence which has been evaluated using criteria and methods established for this purpose by Irwig, Liddle and Williamson<sup>4</sup>. Grading of the quality of the evidence for three guidelines (blood glucose control, diabetic eye disease and foot problems) is complete. The evidence supporting the recommendations for the blood glucose control and diabetic eye disease guidelines is strong. However, the evidence that screening for and treating foot problems results in improved

outcomes is variable or unavailable. This is partly due to the ethical difficulties of randomised allocation of people with a serious foot problem to receive no treatment. Where evidence is weak or absent, guidelines are based on consensus expert opinion.

### FROM PRINCIPLES TO PRACTICE

Integrated care has been identified as a model that is capable of improving access to care, quality of care and outcomes for people with diabetes. Shared care schemes have pioneered the integration of public specialist and general practitioner services for diabetes and have improved access to quality diabetes care and outcomes<sup>6</sup>. However, many shared care schemes have not addressed the need to formalise communication, specify responsibilities and incorporate auditing mechanisms<sup>7</sup>.

Integrated care builds on and extends the concept of shared care by incorporating a population-based approach to improve access to uniform standards of quality care through:

- commitment to local collaboration;
- development of an agreed Area- or District-wide service plan based on local needs;
- incorporating identified guidelines into clinical practice;
- the provision of training;
- enhanced communication mechanisms; and
- monitoring and feeding information into clinical practice.

The involvement of general practitioners, other medical and non-medical clinicians and consumers is central to the successful implementation of principles of diabetes care and guidelines into practice.

#### 1. Involvement of general practitioners

In view of the central role of GPs in providing and co-ordinating the care of people with diabetes, there was early involvement of GPs in the project. In addition to GP membership of the Expert Panel, all Divisions of General Practice in NSW were invited to participate in a workshop sponsored by the NSW Health Department and Diabetes Australia – NSW in April 1995<sup>8</sup>. The aim of the workshop was to inform GPs about the health outcomes approach, present the clinical management guidelines and seek GPs' input on the implementation of the guidelines. Sixty-three participants represented the Divisions of General Practice and the Royal Australian College of General Practitioners, the Australian Medical Association, the Aboriginal Medical Services in NSW and the NSW Corrections Health Service, as well as the General Practice Branch of the Commonwealth Department of Human Services and Health, Diabetes Australia and the NSW Health Department. The workshop was instrumental in building a partnership between the Divisions and the NSW Health Department and opened the way for frank dialogue on such issues as GPs' training needs in relation to diabetes and the availability of public non-medical clinical services (e.g. podiatry). Subsequently the Divisions of General Practice agreed to participate in pilots of integrated diabetes care.

#### 2. Consumer involvement

Consumer advice is being provided to the Expert Panel by Diabetes Australia – NSW, the Juvenile Diabetes Foundation Australia and representatives of people with insulin-dependent and non-insulin-dependent diabetes.

Other rural and metropolitan groups of consumers are also being consulted. The consumer groups are being asked to identify:

- the main issues and concerns for people with diabetes; and
- expectations of access to and standards of health services.

Based on this information, a working group is drafting a consumer charter to encourage and empower people with diabetes to request appropriate quality of care, and promote their involvement in the management of their condition. This working group has also provided advice on the principles of diabetes care and the clinical management guidelines.

### PILOTING INTEGRATED DIABETES CARE

To assess the feasibility, effectiveness and cost of integrated care, a call for expressions of interest in piloting integrated diabetes care systems was distributed in June 1995 to Area and District Health Services, Divisions of General Practice, Aboriginal Medical Services, diabetes centres and services and Public Health Units in NSW. It invited joint proposals from Areas/Districts, Divisions of General Practice and the other services.

Monitoring of service provision and outcomes will make use of the NDOW information system developed by clinicians and NSW Health Department staff and named after the 1993 NSW Diabetes Outcomes Workshop<sup>8</sup> which has generated a minimum dataset of diabetes process and outcome indicators.

Three pilot sites have been selected, encompassing the Western Sydney Area, the Orana and Far West Districts and the Macleay-Hastings District. The pilots will be run over a two-year period with funding provided jointly by the NSW Health Department and the General Practice Branch of the Commonwealth Department of Human Services and Health. An evaluation committee will oversee the process, including final assessment of the effectiveness, efficiency, cost, feasibility and wider application of integrated care.

### INFORMATION SYSTEMS FOR MONITORING CARE AND OUTCOMES

The September 1993 NSW Diabetes Outcomes Workshop (NDOW) identified 59 consensus indicators, including measures of metabolic control, modifiable risk factors and morbidity relating to individual patients<sup>9</sup>. These indicators are known as the NDOW dataset. A NSW Health Outcomes grant awarded in 1994 developed a data collection system for the NDOW dataset, enabling the data to be transferred between clinical settings electronically, by facsimile or as paper copy. The NDOW Data System has been trialled at the Prince of Wales Hospital and Lidcombe Hospital diabetes centres and is being piloted by a group of GPs in the Central Coast Area.

Throughout the project, gaps in the documented evidence for some areas of clinical practice, the relative efficacy of models of care and prevention, and morbidity data have been flagged. The implementation of the NDOW data system in the three integrated care pilots will provide accurate information on morbidity and will assist in

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# A FRAMEWORK FOR APPLYING A HEALTH OUTCOMES APPROACH

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Traditionally the performance of the health system has been assessed by measuring the number, type, length and cost of interactions with patients. With the focus on outcomes, attention is turning to measuring the impact of health services on the health of people. Health outcomes initiatives in NSW have concentrated on the development of indicators to monitor services and their effect on health, and on the use of indicator data to improve the quality and outcomes of health services.

As described on page 99 of the *NSW Public Health Bulletin*, the NSW Health Department has developed and applied a planning framework designed to improve the outcomes of care for people with diabetes mellitus. The planning framework is being adapted for application to the national priority areas of cardiovascular disease, cancer, injury and mental health. This article describes the planning framework and outlines the steps in its application to improve the quality and outcomes of health services.

## WHAT IS MEANT BY 'HEALTH OUTCOMES APPROACH'?

The objective of the health outcomes approach is to ensure that the structures and processes of health care and prevention have a positive impact on people's health. Although the emphasis is on improving health and health status, the approach is also concerned with the quality, delivery and organisation of services, the examination and evaluation of evidence for existing and proposed interventions, consumer acceptability, resource management, and equity of access and outcomes. It depends on the availability of systems to monitor these factors as well as changes in the health of individuals and populations. By linking information on process and outcomes with information on costs, the health outcomes approach can

assist in setting priorities for the planning and delivery of health services at a local level, across the spectrum from prevention through early diagnosis, treatment and management to continuing care, rehabilitation and palliation.

The emphasis on equity of access to services and equity of outcomes is especially important for disadvantaged groups, such as rural communities, Aboriginal and Torres Strait Island people, and people from non-English speaking backgrounds.

## WHAT IS NEW ABOUT THE HEALTH OUTCOMES APPROACH?

Health professionals have for many years applied a similar approach, using evidence-based practice in health care and meticulously monitoring patient outcomes. Many health services and organisations have incorporated programs to improve the quality of their services and to meet the needs of their patients. The reorientation of ambulance and emergency department services to improve outcomes for trauma patients is an example of how a health outcomes approach has been applied to improve patient care in NSW.

The health outcomes approach is innovative in that it relies on the systematic application of a cycle of defining outcomes and indicators, developing systems to provide indicator information, monitoring processes and outcomes, linking outcome information to cost information, and using this information in decision making.

## HOW IS THE HEALTH OUTCOMES APPROACH APPLIED?

The health outcome approach is essentially problem-based, and can be posed in relation to a specific health problem. The following list of nine questions encompasses the practical application of the health outcomes approach. They represent the components of a reiterative process.

- What is the problem?
- What do we aim to achieve?
- What is the best thing to do?
- How can we measure what we achieve?
- Are we doing the best thing now?

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identifying the processes and service configurations which lead to the best outcomes.

### LESSONS TO DATE

There have been two important lessons from the diabetes outcomes project.

The first has been the importance of wide consultation from an early stage. The contribution from people with a consumer or professional interest in diabetes is remarkable and their collaboration has generated a wide ownership of the process.

The second lesson has been the value of moving the debate on health outcomes from a conceptual level to one of practical implementation. The focus on diabetes as a model for implementation has enabled the health system to define

objectives and to identify opportunities for attaining clearcut, quantifiable improvements in health.

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2. McGrath M, Collins V, Zimmet P, Dowse G. Lifestyle disorders in Australian Aborigines: diabetes and cardiovascular disease risk factors: a review. International Diabetes Institute, for ATSI Better Health Program. 1991.
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5. Colagiuri R, Williamson M. Report on the 1995 NSW Diabetes Outcomes Workshop for General Practitioners, Epidemiology Branch, NSW Health Department. April 1995.
6. Diabetes Integrated Care Evaluation Team. Integrated care for diabetes: clinical, psychological and economic evaluation. *Br Med J* 1994; 308:1208-1212.
7. Baksi AK. To fulfil a defect in primary health care: in Gatekeeper and Providers of Primary Care in Diabetes Mellitus Symposium, 15th International Diabetes Federation Congress, Japan, 1994 (in press).
8. Waters J, Churches T. Report on the 1993 NSW Diabetes Outcomes Workshop. Epidemiology Branch, NSW Health Department. January 1994.

- How can we improve it?
- How much will it cost?
- How well did it work?
- How do we generalise and sustain it?

Underlying these questions is a series of actions which identify broad tasks to assist in answering them. Figure 1 summarises the relationship between the questions and actions. A more detailed summary of the actions is presented in Table 1.

**Question 1: What is the problem?**

*Initial development* of the project involves determining the scope of what is to be achieved, the target population or group for which it is to be achieved and why it needs to be achieved. Background information is obtained from data sources on the condition, service or program and through consultation with consumers, service providers and other stakeholders. This information forms the basis of a preliminary action plan.

Consultation is central to the health outcomes approach. It is imperative to develop a plan for wide consultation with stakeholders and opportunities for their input throughout the process.

**Question 2: What do we aim to achieve?**

The action plan provides a basis for *setting preliminary goals and targets*. These may be refined subsequently in the light of possible strategies and interventions.

**Question 3: What is the best thing to do?**

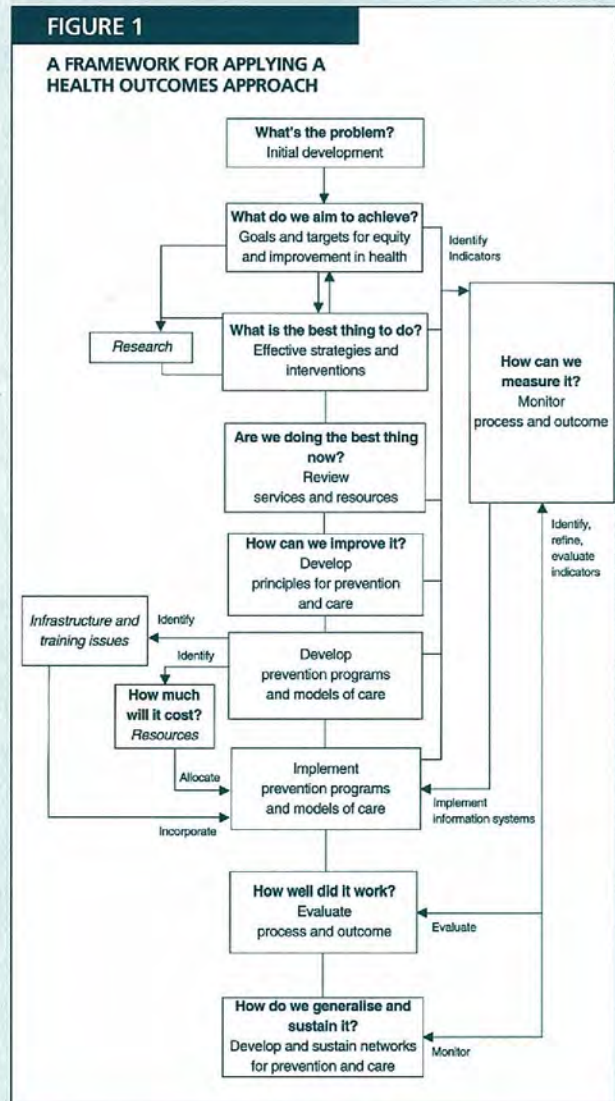
The next step relies on the *identification of effective strategies and interventions, including any research needs*. Identifying effective strategies and interventions to improve the health of, and access to, health services of the target population will require the systematic examination of the evidence for their effectiveness through literature reviews and consultation with experts. This information can be used to estimate the extent of health gain expected and assess the feasibility of implementing the strategies.

Where possible, the adoption of specific interventions should be based on high quality scientific evidence for effectiveness. In practice, high quality evidence may not be available and different levels of evidence can be used. For example, a randomised trial to define the best thing to do for major trauma may be inappropriate. It is possible, however, to extrapolate from studies of components of trauma care, such as the value of reaching definitive care within a certain period, to define best practice at different stages of care. If no strategies or interventions of proven effectiveness exist, policy and service provision can be based on expert advice. Where further research is needed, priorities can be set in consultation with experts and consumers.

Depending on what achievements are possible, the goals and targets set in Question 2 may need to be revised.

**Question 4: How can we measure what we achieve?**

Even at this early stage it is important to identify or develop methods for *monitoring process and outcome*. This begins with the identification of potential process and outcome indicators, followed by an assessment of their validity and reliability and the feasibility of collecting data on them in various clinical and population settings. There is a need to consider whether ongoing information on these indicators can be incorporated into available information systems or whether new systems will be required.



**Question 5: Are we doing the best thing now?**

Once effective strategies and interventions have been identified, it is necessary to determine whether we are doing the best thing by *reviewing current services and resources*. This involves collecting information on services and documenting the status of service organisation and delivery. In specific situations the processes of care or prevention may be as crucial as the specific treatment or intervention. For example, the timeliness of administration of thrombolysis for acute myocardial infarction is as important as the fact of administering a thrombolytic.

The review should help to identify service gaps and problems. It should encompass considerations of effectiveness, appropriateness, cost, performance, outcome, equity of access and outcomes, and consumer perspectives.

**Question 6: How can we improve services?**

The answer to Question 5 should help to identify possible avenues for improvements. This may involve *developing*

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**TABLE 1**

**DETAILED ACTIONS TO APPLY  
A HEALTH OUTCOMES APPROACH**

Question	What's involved	How do you do it?
What is the problem?	Initial development	<ul style="list-style-type: none"> <li>• Identify and document what needs to be achieved and why</li> <li>• Initiate consultation with consumers, service providers and other stakeholders</li> <li>• Examine available information on the condition/service (eg prevalence, incidence, hospitalisations, mortality, costs and other outcome information)</li> <li>• Develop a preliminary action plan</li> </ul>
What do we aim to achieve?	Identify goals and targets for improvement and equity in health	<ul style="list-style-type: none"> <li>• Identify interim goals and targets</li> <li>• After evaluating strategies and interventions and identifying indicators, reassess goals and targets</li> </ul>
What is the best thing to do?	Identify effective strategies and interventions	<ul style="list-style-type: none"> <li>• Identify potential strategies and interventions from the literature and through consultation                             <ul style="list-style-type: none"> <li>– Examine the natural history of the disease/condition and identify known modifiable and non-modifiable risk factors for the development and progression of the disease/condition/injury</li> <li>– Identify the possible intervention points which might alter the course of the disease/condition/injury</li> <li>– Identify strategies and interventions to improve prevention, early diagnosis, management and on-going care</li> </ul> </li> <li>• Assess and rate evidence for the effectiveness of strategies and interventions</li> <li>• Estimate benefit in terms of health gain attained from implementation of the strategies and interventions</li> <li>• Assess the feasibility (including cost) of the implementation of these strategies and interventions</li> <li>• Recommend effective strategies and interventions</li> </ul>
	Identify and prioritise research needs	<ul style="list-style-type: none"> <li>• Identify research needs through discussion with experts and consumers and by examining the strategies, interventions, guidelines and the quality of evidence supporting them</li> <li>• Prioritise research needs of the disease/condition</li> <li>• Incorporate research needs into the NSW Health Department's research agenda</li> <li>• Develop processes to review and implement significant research findings</li> </ul>
How can we measure what we achieve?	Monitor process and outcome	<ul style="list-style-type: none"> <li>• Identify potential process and outcome indicators</li> <li>• Assess the feasibility of their collection in various clinical settings</li> <li>• Assess the validity and reliability of the indicators</li> <li>• Develop and implement information systems to collect and manage indicator data</li> </ul>
Are we doing the best thing now?	Review services and resources	<ul style="list-style-type: none"> <li>• Identify what and how services are being delivered                             <ul style="list-style-type: none"> <li>– Identify and implement methods to collect information about services</li> <li>– Document how services are provided and identify service gaps and problems</li> </ul> </li> <li>• Review services according to their effectiveness, appropriateness, cost, performance, outcome, equity of access and outcomes and consumer concerns</li> </ul>

**TABLE 1 continued**

**DETAILED ACTIONS TO APPLY  
A HEALTH OUTCOMES APPROACH**

Question	What's involved	How do you do it?
How can we improve it?	Develop principles for prevention and care	<ul style="list-style-type: none"> <li>• Develop a clear set of principles for preventing and caring for people with disease/condition/injury in collaboration with experts and consumers and based on evidence</li> <li>• Promote development of guidelines based on principles for prevention and care based on these principles, the evidence and consensus                             <ul style="list-style-type: none"> <li>– Identify where guidelines for prevention and care are needed</li> <li>– Prepare preliminary guidelines</li> <li>– Identify and assess the evidence for interventions outlined in the guideline (where available)</li> <li>– Finalise guidelines following distribution for comment</li> </ul> </li> <li>• Incorporate guidelines for prevention and care into current practice                             <ul style="list-style-type: none"> <li>– Ensure the guidelines are clear and unambiguous</li> <li>– Develop guideline implementation process</li> <li>– Evaluate implementation of guidelines</li> </ul> </li> </ul>
	Develop prevention programs and models of care	<ul style="list-style-type: none"> <li>• Develop systems to implement models of care and prevention programs to ensure access, quality and effectiveness of care</li> <li>• Develop systems to monitor and improve quality of care. These are based on defined objectives and use indicators of quality defined by their impact on health outcome</li> </ul>
	Identify and incorporate infrastructure and training needs	<ul style="list-style-type: none"> <li>• Identify infrastructure needs to develop and implement prevention programs and models of care including                             <ul style="list-style-type: none"> <li>– organisational structure</li> <li>– conceptual framework</li> <li>– data provision</li> <li>– intersectoral links</li> <li>– integration of prevention and treatment initiatives</li> </ul> </li> <li>• Identify, develop and implement professional training and support to ensure providers are able to supply quality services                             <ul style="list-style-type: none"> <li>– Identify areas where training, accreditation and support are needed</li> <li>– Work with professional bodies and health professionals to identify strategies for the development of an infrastructure to support appropriate training and support</li> <li>– Develop an implementation plan</li> </ul> </li> <li>• Identify and incorporate required changes to policy and service configuration                             <ul style="list-style-type: none"> <li>– Identify policy issues to improve the delivery and access to quality services</li> <li>– Develop a strategic plan for the implementation of these policy issues</li> <li>– Work with stakeholders to implement the plan</li> </ul> </li> </ul>
	Implement prevention programs and models of care	<ul style="list-style-type: none"> <li>• Implement models of care and prevention programs                             <ul style="list-style-type: none"> <li>– Investigate methods for implementation of programs and models eg training, consultation, structural change, incentives and disincentives</li> <li>– Incorporate these methods into the implementation process</li> </ul> </li> </ul>
How much will it cost?	Identify resource implications	<ul style="list-style-type: none"> <li>• Consider issues to ensure the best use of resources.                             <ul style="list-style-type: none"> <li>– Estimate cost-effectiveness of interventions at an Area and District level</li> <li>– Identify available resources</li> <li>– Recommend appropriate resource allocation</li> </ul> </li> </ul>
How well did it work?	Evaluate process and outcome using previously defined indicators	<ul style="list-style-type: none"> <li>• Develop evaluation plans for these prevention programs and models of care based on process and outcome indicators</li> <li>• Evaluate prevention programs and models of care in operation based on appropriateness, effectiveness, efficiency, patient and provider acceptability and satisfaction and resultant health outcomes</li> <li>• Implement recommendations following the evaluation</li> </ul>
How do we generalise and sustain it?	Develop and sustain networks for prevention and care	<ul style="list-style-type: none"> <li>• Develop a plan to ensure an integrated approach to prevention and care across the Area/District/State</li> <li>• Incorporate into business plans</li> <li>• Ensure ongoing monitoring of quality and outcomes for prevention and care</li> </ul>

## Health outcomes approach

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*principles for prevention and care, developing prevention programs and models of care based on these principles, identifying infrastructure and training needs, and building these changes into policy and service configuration.*

The development of principles depends on published evidence or, if published evidence is not available, a consensus of expert opinion. The principles form a basis for guidelines, policies or protocols designed to improve services, access to services and health status. Consultation with stakeholders is an essential component.

Prevention programs and models of care can be developed based on these principles and the guidelines, policies or protocols, and partners identified to collaborate in the process.

Infrastructural and training issues need to be addressed if effective service models and programs are to be implemented. These include resource allocation, local, state or federal policy, service configuration and links to other sectors. Systems to monitor quality of care and prevention, based on defined indicators and incorporating processes for review, are essential.

In addition, requirements for intersectoral links to address issues outside the health sector should be assessed.

### Question 7: How much will it cost?

An integral component of the processes outlined under Questions 5 and 6 is the need to *identify the resource implications* of the changes. It is placed under a separate question to highlight its importance.

To ensure the best use of resources, the cost-effectiveness of interventions at an Area and District level and at a statewide level must be assessed in conjunction with a determination of available resources. This should be used to inform resource allocation. While in the longer term proposed changes may reduce the cost of the health service, in the shorter term additional resources may be required to effect changes.

### Question 8: How well did it work?

An evaluation plan must be developed and the *prevention programs and models of care evaluated* using the agreed process and outcome indicators. Based on the evaluation, recommendations may be made to improve prevention and care. The evaluation process should determine the appropriateness, effectiveness, efficiency of the service, satisfaction of consumers with the service and the resultant health outcomes.

### Question 9: How do we generalise and sustain it?

Finally, there is a need to arrive at methods for institutionalising changes in service arrangements by *developing and sustaining the networks for prevention and care*. This may be achieved by wider implementation of the changes or by developing mechanisms to ensure their continued support. This may involve incorporating aspects of the changes into business plans and using the systems already developed to ensure ongoing monitoring of quality and outcomes.

# WAITING LIST REDUCTION PROGRAM: INITIAL RESULTS

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The May 1995 issue of the *NSW Public Health Bulletin* contained an introductory article on some concepts and definitions relating to waiting lists in NSW public hospitals<sup>1</sup>, encompassing both medical and surgical elective admissions. This article examines the impact of the NSW Government's Waiting List Reduction Program for elective surgery from its inception in May 1995 until the end of September 1995.

The aim of the program is to reduce the March 31, 1995 elective surgery waiting lists by 50 per cent within 12 months, concentrating on people who have been waiting more than six months for surgery.

A key element of the program is to improve hospital practices through the introduction of best practice models. These include better operating theatre scheduling, planned bed management and streamlined admission and discharge practices to ensure more efficient and effective management and better patient care.

Some Area and District Health Services are implementing initiatives such as pre-admission clinics and day-of-surgery admissions, weekend and after-hours surgery, extension of existing theatre sessions and more effective utilisation of existing theatre time.

Waiting list data must be accurate to be a useful management tool. One means of achieving this is through what is known as clerical auditing. This integral part of waiting list management has been Health Department policy for some years. Regular and routine auditing of lists ensures that good quality information is available to managers and administrators and facilitates better patient communication and care. Patients waiting longer than six months are contacted every three months to ascertain whether they still require admission. This enables them to discuss options with the hospital and at the same time provides up-to-date information for theatre scheduling, discharge planning and bed management.

## DEFINITIONS

### Elective surgery

Elective surgery is surgery which, although deemed necessary by the treating clinician, can be delayed, in the clinician's opinion, for at least 24 hours.

NSW has adopted the nationally agreed definition of elective surgery, as specified by the Australian Institute of Health and Welfare. This essentially includes all surgical operations from the Medicare Benefits Schedule<sup>2</sup> **except** for certain procedures<sup>3</sup>. The exclusions cover specific procedures frequently done by clinicians without special qualifications in surgery, and some other procedures for which the waiting time is strongly influenced by factors other than the supply of services.

### Waiting times

The **expected waiting time** (or "clearance time") is the time required to clear the waiting list for specified



categories of patients. It is equal to the number of patients on the list divided by the number removed from the list in one month. For example, a hospital has a list of 100 patients waiting for total hip replacements. The hospital carries out 25 hip replacement operations a month, so it has an expected waiting time of four months for hip replacements.

The **average waiting time** is the average of the actual waiting times (the time between the date of listing and the date of admission) for those patients admitted in the month. For example, if half the patients admitted in July had been waiting for one month and half had been waiting for three months, the average waiting time for July would be two months.

The **average time on list** is the average of the actual waiting time (the time between the date of listing and the end of the current month) for those patients still on the list at the end of the current month.

#### List transfers

**List transfers** occur when lists previously held only in doctors' rooms or interstate are transferred to hospitals and are added to the hospitals' lists.

A list transfer is expressed as the number of patients added to a hospital's list.

List transfers were first measured several years ago as a means of refining measures of growth in demand as indicated by the length of lists. Because list transfers are an administrative change and do not reflect a change in local demand, they are not taken into account for the purposes of comparison with earlier lists. However, when a new list is started with the appointment of a new doctor, the increase is included in the count for comparative purposes, because it represents a genuine increase in demand.

#### RESULTS

By September 30, 1995, the elective surgery waiting list had decreased from 44,707 to 34,299 patients (a 23 per cent reduction).

Twenty-nine Areas and Districts had a decrease in lists, one had no change, two reported a negligible increase and two still showed an increase (Table 2).

The best-performing Areas were Western Sydney (43 per cent reduction, representing a decrease of 2,012 patients), South-Eastern Sydney (28 per cent reduction - 1,985 patients) and South West Sydney (25 per cent reduction - 1,134 patients). Among the Districts with the larger lists in March 1995, major decreases were reported by Macleay-Hastings (a 37 per cent reduction, or 144 patients), North West (34 per cent reduction - 412), New England (28 per cent reduction - 113) and Richmond (26 per cent reduction - 180) (Table 2).

In March 1995, 2,265 people had been on the waiting list more than 12 months and 6,379 had been on the waiting list for 6-12 months. By 30 September 1995 these figures had declined by 837 (37 per cent) and 2,617 (41 per cent) respectively. The reduction by 3,500 patients waiting more than six months has been a significant effect of the program, indicating that Areas and Districts were targeting longer-waiting patients (Table 3).

Western and South Eastern Sydney Area Health Services reported large reductions in the numbers of people waiting more than twelve months - 204 (69 per cent) and 301 (54 per cent) respectively. In Northern Sydney and Western Sydney Areas the number of patients waiting 6-12 months declined by three-quarters and almost two-thirds respectively, while South Eastern Sydney Area Health Service reported a decrease of 524 patients (a 46 per cent reduction) in this group (Table 3).

Riverina and Macleay-Hastings District Health Services reported that the numbers of people waiting more than 12 months decreased by 66 (86 per cent) and 35 (76 per cent) respectively (Table 3), while the New England District had no patients waiting more than six months at the end of September.

As a consequence of the initial concentration on patients who had been waiting for the longest time, the average waiting time of patients who were admitted in a month increased from 1.4 months in March to 1.6 months in September 1995.

Decreases in list numbers were recorded over all clinical specialties. Particularly significant were reductions in numbers of people waiting longer than six months for procedures such as cholecystectomy (down by 162 patients - 55 per cent), cataract extraction (501 - 41 per cent), tonsillectomy (310 - 50 per cent), varicose vein stripping and ligation (151 - 36 per cent) and total hip replacement (56 - 31 per cent).

#### COMMENT

Reductions occurred in the length of waiting lists for elective surgery between March and September 1995. Future issues of the *Public Health Bulletin* will contain updates on waiting lists and future analysis will include waiting times. The possibility of exploring relationships between waiting times and morbidity is also being considered.

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TABLE 2

## REDUCTIONS IN WAITING LISTS BY AREA AND DISTRICT HEALTH SERVICE, MARCH TO SEPTEMBER, 1995

Area/District/Institution	Number of patients on list		Total reduction	
	March 31, 1995	September 30, 1995*	March to September Number	%
Central Sydney	2,779	2,259	-520	-18.7
Northern Sydney	2,708	2,034	-674	-24.9
Western Sydney	4,650	2,638	-2,012	-43.3
Wentworth	2,122	1,654	-468	-22.1
South West Sydney	4,514	3,380	-1,134	-25.1
Central Coast	2,317	1,906	-411	-17.7
Hunter	4,178	3,583	-595	-14.2
Illawarra	2,778	2,321	-457	-16.5
South Eastern Sydney	7,190	5,205	-1,985	-27.6
Royal Alexandra Hospital	792	592	-200	-25.3
Barwon	43	34	-9	-20.9
Castlereagh	51	40	-11	-21.6
Central Western	588	705	117	19.9
Clarence	199	11	-188	-94.5
Evans	330	244	-86	-26.1
Far West	204	148	-56	-27.5
Hume	413	310	-103	-24.9
Lachlan	111	83	-28	-25.2
Lower North Coast	1,071	835	-236	-22.0
Macleay-Hastings	385	241	-144	-37.4
Macquarie	813	690	-123	-15.1
Mid North Coast	887	686	-201	-22.7
Monaro	59	69	10	16.9
Murray	16	18	2	12.5
Murrumbidgee	-	-	-	-
New England	404	291	-113	-28.0
North West	1,213	801	-412	-34.0
Orana	33	32	-1	-3.0
Richmond	681	501	-180	-26.4
Riverina	1,276	1,044	-232	-18.2
South Coast	89	43	-46	-51.7
Southern Tablelands	187	180	-7	-3.7
Tweed Valley	824	636	-188	-22.8
Port Macquarie Base Hospital	802	1,085	283	35.3
<b>New South Wales</b>	<b>44,707</b>	<b>34,299</b>	<b>-10,408</b>	<b>-23.3</b>

Source: Department of Health Reporting System, October 12, 1995

\* Excludes transfers - List transfers, in general, are an administrative change and not a change in local demand. They are therefore not taken into account when estimating changes in the number of patients on a list (see definitions).

TABLE 3

REDUCTIONS IN PATIENTS ON AREA AND DISTRICT WAITING LISTS, SEPTEMBER, 1995  
PATIENTS WAITING LONGER THAN SIX MONTHS

Area/District/Institution	NUMBER ON LIST							
	Waiting 6-12 months				Waiting > 12 months			
	Reduction				Reduction			
	Mar 31, 1995	Sept 30, 1995	Number	%	Mar 31, 1995	Sep 30, 1995	Number	%
Central Sydney	116	71	-45	-39	15	8	-7	-47
Northern Sydney	404	156	-248	-61	173	213	40	23
Western Sydney	836	207	-629	-75	295	91	-204	-69
Wentworth	340	192	-148	-44	293	184	-109	-37
South West Sydney	555	415	-140	-25	191	198	7	4
Central Coast	398	303	-95	-24	107	81	-26	-24
Hunter	768	430	-338	-44	179	131	-48	-27
Illawarra	463	279	-184	-40	173	149	-24	-14
South Eastern Sydney	1,150	626	-524	-46	559	258	-301	-54
Royal Alexandra Hospital	25	4	-21	-84	11	-	-11	-100
Barwon	-	-	-	-	-	-	-	-
Castlereagh	-	1	1	-	-	-	-	-
Central Western	80	96	16	20	8	12	4	50
Clarence	1	-	-1	-100	-	-	-	-
Evans	2	2	-	-	-	-	-	-
Far West	1	-	-1	-100	-	-	-	-
Hume	25	22	-3	-12	4	-	-4	-100
Lachlan	13	-	-13	-100	-	-	-	-
Lower North Coast	207	203	-4	-2	52	30	-22	-42
Macleay-Hastings	101	31	-70	-69	46	11	-35	-76
Macquarie	164	82	-82	-50	41	41	-	-
Mid North Coast	150	73	-77	-51	4	2	-2	-50
Monaro	-	-	-	-	-	-	-	-
Murray	-	-	-	-	-	-	-	-
Murrumbidgee	-	-	-	-	-	-	-	-
New England	26	-	-26	-100	1	-	-1	-100
North West	169	81	-88	-52	16	3	-13	-81
Orana	4	1	-3	-75	-	2	2	-
Richmond	95	32	-63	-66	1	3	2	200
Riverina	199	113	-86	-43	77	11	-66	-86
South Coast	4	1	-3	-75	-	-	-	-
Southern Tablelands	1	2	1	100	-	-	-	-
Tweed Valley	79	39	-40	-51	19	-	-19	-100
Port Macquarie Base Hosp	3	300	297	9,900	-	-	-	-
<b>New South Wales</b>	<b>6,379</b>	<b>3,762</b>	<b>-2,617</b>	<b>-41</b>	<b>2,265</b>	<b>1,428</b>	<b>-837</b>	<b>-37</b>

Source: Department of Health Reporting System, October 12, 1995

**PUBLIC HEALTH EDITORIAL STAFF**

The editor of the Public Health Bulletin is Dr Michael Frommer, Director, Research and Development, NSW Health Department. Dr Lynne Madden is production manager.

The Bulletin aims to provide its readers with population health data and information to motivate effective public health action. Articles, news and comments should be 1,000 words or less in length and include a summary of the key points to be made in the first paragraph. References should be set out using the Vancouver style, the full text of which can be found in *British Medical Journal* 1988; 296:401-5.

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# THE HUNTER-ILLAWARRA STUDY OF AIRWAYS AND AIR POLLUTION: REFINING THE PROCESS

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This article describes pilot studies and reports initial results from the Hunter-Illawarra Study of Airways and Air Pollution (HISAAP). HISAAP aims to examine the relationship between the occurrence of cough, wheeze and colds in children, and indicators of exposure to indoor and outdoor air pollution and aeroallergens.

HISAAP arose from longstanding community concerns about the health effects of air pollution in the Hunter and Illawarra areas. These areas have similar types of heavy industry and share relatively high levels of particulate and sulphur dioxide air pollution in residential areas in close proximity to industrial sites. HISAAP is part of the NSW Health Department's Health and Air Research Program (HARP), which was initiated as a consequence of the NSW Air Quality Summits.

The objectives of HISAAP were to determine whether children:

- living in areas with high levels of air pollution have more lung problems (cough, wheeze, colds) than children living in areas with low levels of air pollution;
- have episodes of lung problems more often on days when air pollution levels are high than on days when levels are low; and
- have lung problems more often in response to air pollutants or aeroallergens in outdoor air than in indoor air.

## METHODS

HISAAP comprises three phases which correspond to its three objectives.

- Phase I was a cross-sectional survey of respiratory and atopic symptoms in primary school children, other family members' symptoms, and the children's home environments.
- Phase II follows a cohort of children who reported frequent and recent lung symptoms. These children will keep a diary over a seven-month period, noting symptoms, peak flow measurements, treatment, time off school and visits to the doctor or hospital. These daily records will be compared with daily measurements of air pollution and pollens in each of the study areas.
- Phase III involves a clinical assessment of a smaller group of children from Phase II and detailed indoor air quality measurements.

This article focuses on a pilot study of Phases I and II, and presents some of the findings from Phase I.

The study was conducted in:

- three localities near heavy industry in the Hunter (Mayfield, Stockton and North Lake Macquarie);
- one locality near heavy industry in the Illawarra (Port Kembla);
- two localities further from heavy industry in the Hunter (Wallsend and Beresfield); and
- three localities progressively further from heavy industry in the Illawarra (Wollongong, Kembla Grange and Albion Park).

These localities were chosen because they were the sites of existing air quality monitoring stations, operated either by industry or the Environment Protection Authority.

All primary schools within a radius of about 3km of these monitoring sites were approached to be involved in the study. Children who were attending these schools in years 3, 4 and (from small schools) year 5 were given a questionnaire to take home for their parents to complete.

An important feature of HISAAP is its use of multiple study localities in the two areas, with several high-exposure localities and localities which provide a gradient of exposure intensity. This increases the statistical power to detect a relationship and promotes the general application of the results.

## PILOT STUDIES

Pilot studies of Phase I and Phase II were carried out in both areas. This provided an opportunity for testing the questionnaire that was developed for the study, and enabled team members to gain experience in managing a cohort of children who were keeping symptom diaries over two months.

The diversity of cultural backgrounds found in the Illawarra was specifically addressed in the pilot program. In some schools in the Illawarra, more than half of the children's parents speak a language other than English as their first language. The pilot helped to solve problems in the translation of questionnaires and the use of interpreters to assist in their completion.

In the pilot study of Phase I response rates differed between the Illawarra (82 per cent) and the Hunter (74 per cent). An investigation of this difference revealed the Illawarra team had spent much more time establishing rapport with the teachers at the pilot school while the Hunter team had communicated mainly with the school principal.

The pilots emphasised the need for detailed written protocols to ensure consistent procedures across both areas. These included uniform procedures for the diary-keeping component of Phase II and clear criteria for intervention if a child was found to be (or became) unwell during the study.

## Outcomes of the pilots

As a result of the pilots, the approach to each school was modified. Initially, the study team met the school principal to explain the study and gain consent for the school to be involved. At this meeting appointments were made to meet

teachers at the school (often at a staff meeting) and also the school council or parents and friends groups. Ideally, these meetings occurred before the questionnaire was sent home with the children.

Only minor changes to the questionnaire were required; and while only a few changes were made to the diary as a result of the pilot, the demands on researchers' time for enrolling children in the study and following them up fortnightly provided essential insights for the effective planning of Phase II.

The investigators made contact with the mass media (print, radio and television) before the study began. The investigators explained the aim of the study, indicated how long it would take to complete and discussed the obligations of the study team to participating families and schools. These included a recognition that it was important for participants to receive results from the study team, rather than through the media (a responsibility acknowledged and respected by the media). Regular contact was maintained and media releases were made after the results were presented to the schools. Where possible, the timing and content of the releases was coordinated between the Illawarra and the Hunter.

In summary, the pilot studies showed the importance of communicating with teachers and parents before the survey began. This improved the profile of the study and contributed to the high response rate. Regular feedback of results was provided to the participating families and schools, parent and community groups, other interested groups (EPA, industry) and the media. The communication effort was demanding but the response was rewarding.

### PHASE I RESULTS

Eighteen schools in the Hunter and 17 schools in the Illawarra participated in the study. About 1,500 primary school children in each region were given questionnaires in the fourth term of 1993. In the Hunter 1,284 questionnaires were returned (82 per cent) and in the Illawarra 1,056 questionnaires were returned (72 per cent). No attempt was made to take account of migration effects which might have occurred as a result of people developing symptoms and moving out of one area and into another.

#### Asthma diagnosis

The proportions of primary school children ever diagnosed with asthma by a doctor or at a hospital were generally higher in the Hunter study localities than those in the Illawarra (Figure 2). Factors to be considered in this comparison include the community's use of doctors or hospitals (for the diagnosis to be made) and the variability between doctors in their readiness to make a diagnosis of asthma.

#### Four or more episodes of wheeze in the previous 12 months

The question about episodes of wheeze in the previous 12 months was asked before the asthma questions and no distinction was sought on the basis of the presence or absence of a diagnosis of asthma. In the Hunter, the proportion of children who reported four or more episodes of wheeze was higher in the localities closer to heavy industry (Figure 3). This observation may be confounded by the use of medication and other environmental factors and may also be subject to recall bias. The overall proportion of children

FIGURE 2

PERCENTAGE OF CHILDREN EVER DIAGNOSED WITH ASTHMA BY AREA  
HISAAP 1993

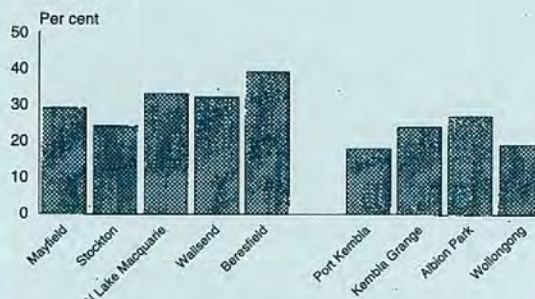
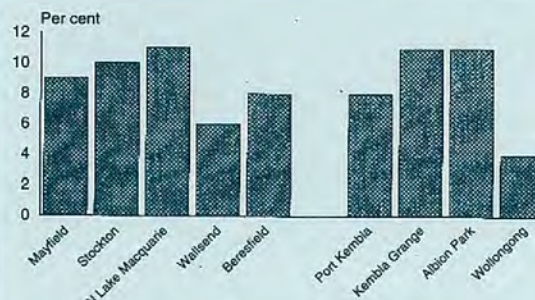


FIGURE 3

PERCENTAGE OF CHILDREN WITH 4 OR MORE EPISODES OF WHEEZE IN THE LAST 12 MONTHS, BY AREA  
HISAAP 1993



reporting four or more episodes of wheeze was similar to that found in a Melbourne study (about 9 per cent of children).

#### Adult(s) smoking cigarettes inside the home

Relatively high proportions of children lived in households where one or more adults smoked cigarettes inside the home (Figure 4). This is an important factor when trying to interpret any of the findings of this study relating to children's symptoms<sup>1,2</sup>.

#### Domestic gas appliances

The proportions of children who lived in a home where gas was available for cooking varied greatly, especially between Mayfield and Beresfield (Figure 5). Domestic gas appliances, gas stoves and heating appliances can contribute nitrogen oxides to the indoor environment which have the potential to affect airways<sup>3,4</sup>. The survey did not explore the use of gas appliances or the conditions under

Continued on page 112 ►

## Study of airways and air pollution

► Continued from page 111

which they were used, e.g. whether they were flued to the outside, and the adequacy of cross-ventilation.

In summary, children in the Hunter localities closest to heavy industry were more likely to have had frequent wheeze in the 12 months before the survey, but were not more likely to have been diagnosed with asthma. Other factors that may influence lung symptoms in children (e.g. gas appliances, cigarette smoking inside the home, pets, and house dust mite) could vary between the study areas and need to be considered.

Of children diagnosed with asthma, more than 30 per cent had a written plan of what to do when they had an episode of asthma. This represented a big improvement from the 1990 National Asthma Campaign survey, which reported that only 20 per cent had a plan<sup>5</sup>.

### NEXT STEPS

A more detailed analysis of Phase I data is being done to take these other causative factors, including air pollution measures, into account.

Children taking part in Phase II were split into two groups. Those in Phase IIa kept diaries from February to October 1994, and those in Phase IIb started their diaries in August 1994 and finished in March 1995. Results from Phase II are likely to be available early in 1996. Planning of Phase III, which examines indoor air pollution and specific clinical variables, is in progress.

### ACKNOWLEDGMENTS

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Members of the HISAAP Group are: Prof Dennis Calvert, Mr Trevor Dunn, Prof Michael Hensley, Dr David Jeffs, Dr Peter Lewis, Ms Ruth Toneguzzi, Dr Victoria Westley-Wise, Mr Richard Willison and Dr John Wlodarczyk.

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FIGURE 4

PERCENTAGE OF CHILDREN IN A HOUSEHOLD WHERE ONE OR MORE ADULTS SMOKE CIGARETTES INSIDE THE HOUSE, BY AREA HISAAP 1993

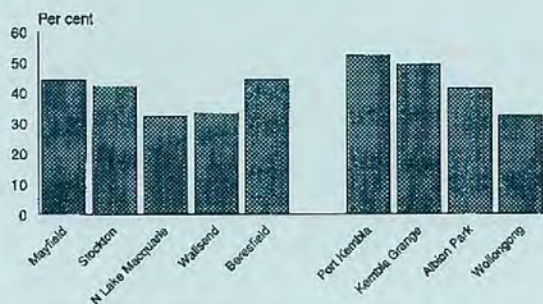
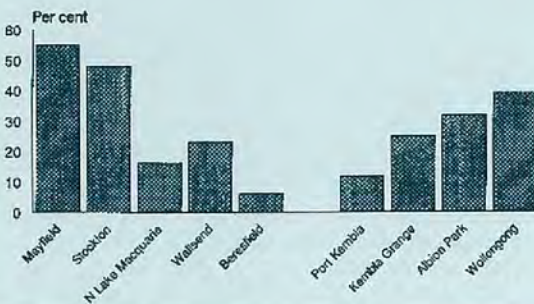


FIGURE 5

PERCENTAGE OF CHILDREN IN A HOUSEHOLD WITH GAS COOKING, BY AREA HISAAP 1993



## NOTIFICATION TRENDS

Notification rates were higher than historical levels in August 1995 (Figure 6) and September 1995 (Table 2) for gastroenteritis and rubella. Pertussis notifications were also elevated in August (Figure 6).

Notification trends for these conditions were discussed in the August and September issues of the *Public Health Bulletin*. Outbreaks of viral gastroenteritis have continued to be reported at unusually high levels since July by the Central Sydney, Northern Sydney, Southern Sydney, Western Sydney, Wentworth, North Coast and Hunter Public Health Units (PHUs).

HIV notifications for August were below the historical average (Figure 6). In the July 1995 issue of the *Bulletin* it was reported that HIV notifications had increased in 1995 compared with 1994. It appears the increase in notifications in the earlier months of the year has been interrupted. Notifications for the period January to June 1995 were 10 per cent higher than for the same period in 1994. However, notifications for the period January to August 1995 were only 4 per cent higher than those for the corresponding period in 1994.

## MENINGOCOCCAL DISEASE

NSW experienced a seasonal increase in notifications of meningococcal disease in the winter months of 1995, but this does not appear to have continued into the spring, as has occurred in recent years (Figure 7).

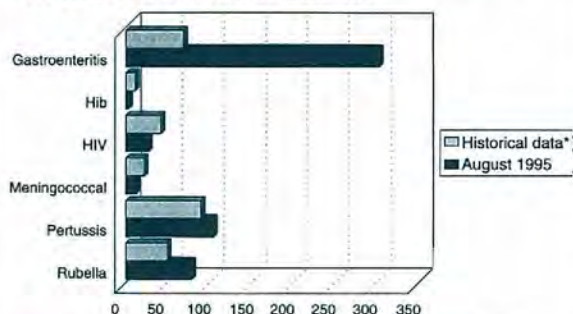
Meningococcal disease is caused by infection with the bacterium *Neisseria meningitidis*. Transmission is by close contact with the nasopharyngeal secretions of an infected person, entering the body by inhalation. Initially the disease may present as a nasopharyngitis, associated with upper respiratory symptoms. In many cases the infection is limited to this. However, in some individuals a meningococcal bacteraemia develops, and in some cases septicaemia supervenes. The most striking feature of meningococcal septicaemia is a characteristic skin rash. Meningococcus tends to invade the walls of small blood vessels, causing their rupture and leading to haemorrhages. This results in widespread skin petechiae and ecchymoses. In other cases a meningeal infection (meningitis) develops. Case fatality rates in industrialised countries have been quoted as 7 per cent for meningitis and 19 per cent for septicaemia. But in many cases infection is asymptomatic, as susceptibility to clinical disease is low and decreases with age.

Sixty-five per cent of NSW meningococcal infection notifications since 1992 were for meningitis, 24 per cent were for septicaemia and 11 per cent were for unspecified disease. Fifty-one per cent of notifications were for children aged 0-4 years, 13 per cent were for the 5-14 age group and 21 per cent were for young people aged 15-19 years. No meningococcal outbreaks (defined as two or more related cases) have been reported so far in 1995.

Meningococcal disease is notifiable by hospitals and laboratories. To assist the prompt response to a case, it is requested that notification be by telephone. The NSW Health Department's response protocol includes the administration of chemoprophylaxis to household contacts and others with a high risk of exposure to the patient's oral secretions. If the patient attends a child care facility,

FIGURE 6

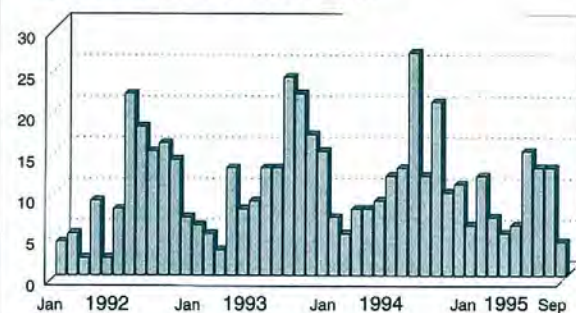
SELECTED INFECTIOUS DISEASES: AUGUST NOTIFICATIONS, 1995 COMPARED WITH HISTORICAL DATA



\* Historical data: the average number of notifications diagnosed in the same month in the previous three years.

FIGURE 7

MENINGOCOCCAL DISEASE  
NSW NOTIFICATIONS BY MONTH 1992-95



SOURCE: NSW INFECTIOUS DISEASE SURVEILLANCE SYSTEM

chemoprophylaxis should be offered to staff and other children at the facility.

Immunisation of contacts is considered during outbreaks caused by *Neisseria meningitidis* serogroups A or C. No vaccine exists for serogroup B.

## FOODBORNE OUTBREAKS

The Central Coast PHU is investigating a notification of at least 20 cases of illness following a function attended by 65 people in October 1995. At the time of writing, 19 people who attended the function had been interviewed, 16 of whom had been ill with symptoms of vomiting, diarrhoea, nausea and abdominal cramps. The meal at the function consisted of barbecued chicken (bought cooked) and home-made salads.

A joint investigation is being undertaken by the Western and South Western Sydney PHUs following notification of 40 cases of illness after a private function. The function, attended by about 60 people, was in September 1995 in the Western Sydney Area, with food provided by a caterer from

Continued on page 114 ▶

## Infectious diseases

► Continued from page 113

South Western Sydney. A range of spit-roasted meats, salads and desserts was consumed. Food Surveillance Officers were able to obtain left-over roast lamb from a garbage bin and *Clostridium perfringens* was isolated from this sample. To date 40 mailed questionnaires have been returned by guests at the function. Preliminary analysis of data suggests the onset and pattern of symptoms were consistent with *C perfringens* food poisoning. Spit-roasted lamb was the only food associated with a significantly elevated risk of illness.

Previous investigations of foodborne outbreaks associated with spit roast caterers in NSW have found that large portions of meat are often partially cooked at the premises of the caterer, some time before the function. The cooked meat is stored at ambient temperatures and later transported to the function site, where it is reheated and served. These handling procedures allow germination and growth of heat-resistant endospores of *C perfringens*. Subsequent reheating has not been sufficient to prevent the biological activity of the enterotoxin, which is responsible for the symptoms associated with *C perfringens*.

Large meat portions should be thoroughly cooked and preferably eaten immediately. If storage is necessary, meat should be rapidly chilled to below five degrees Celsius. Before serving, meat should be reheated to a minimum core temperature of 60 degrees Celsius for 10 minutes.

### INFLUENZA SURVEILLANCE

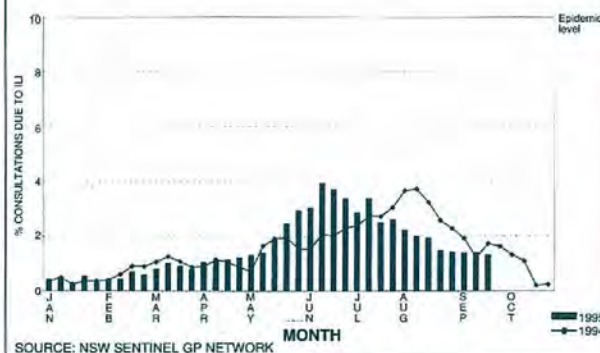
Influenza-like illness (ILI) activity has been decreasing since mid-August (Figure 8).

The ILI consultation rate reported by the NSW General Practitioner Sentinel Network for the third week of September 1995 was 1.3 per cent (similar to that of the previous four weeks). During September this included data from an average of 75 doctors a week and the average number of patient encounters was 10,000 a week. The Western Sector PHU (covering Western Sydney and Wentworth Areas) has reported the highest rates since mid-August.

Six PHUs covering 17 schools and about 12,000 pupils have been participating in surveillance of school absentee rates. The rate for the third week of September 1995 was a moderate 4.5 per cent (Figure 9).

FIGURE 8

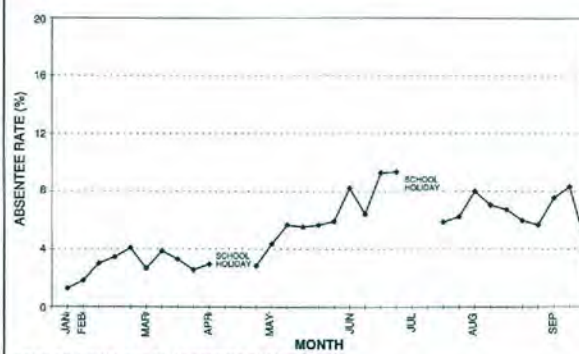
INFLUENZA LIKE ILLNESS IN NSW, 1994 AND 1995



SOURCE: NSW SENTINEL GP NETWORK

FIGURE 9

SCHOOL ABSENTEE SURVEILLANCE IN NSW, 1995



SOURCE: NSW SCHOOL ABSENTEE SURVEILLANCE

Laboratory reports were also low for September. The Serology Department of the Prince of Wales Hospital and the Westmead Institute of Clinical Pathology and Medical Research reported a total of 20 influenza A and 5 influenza B serology specimens. Virology reports from the Westmead ICPMR, the Virology Departments of The Prince of Wales Hospital, Royal Alexandra Hospital for Children and Liverpool Hospital totalled 1 isolate of influenza A, 5 of influenza B, 40 of respiratory syncytial virus, 16 of parainfluenza 3, 4 of rhinovirus and 8 of adenorespiratory virus.

TABLE 4

Immunisation	Rate (per cent)
Diphtheria-tetanus-pertussis	76.8
Sabin polio	89.5
Measles-mumps-rubella	92.6
Haemophilus influenza type b	20.0*
Overall	73.0

\*Of the 370 children, only 25 were born after the introduction of *Haemophilus influenza* type b (Hib) vaccine on May 1, 1993, and of these only 20 per cent were fully immunised against Hib. A voluntary catch-up program was conducted for children under 5 years of age and 48 children in the sample (13.9 per cent) were fully immunised with Hib as a result.

### STATEWIDE SENTINEL IMMUNISATION SURVEILLANCE

Under the Public Health Act 1991 directors of child care facilities are required to keep registers of the immunisation status of every enrolled child. A cluster sampling method has been developed, staggered throughout the year, to collect data from these registers on a total of 884 children aged 25-36 months, or about 1 per cent of the NSW population in that age range. Immunisation rates of the 370 children sampled between January and August 1995 were as follows (children with missing immunisation records were recorded as not immunised).

Updated results from the 1995 surveillance are published quarterly.



TABLE 5

INFECTIOUS DISEASE NOTIFICATIONS FOR NSW, 1995  
BY SELECTED MONTH OF ONSET  
RECEIVED BY SEPTEMBER 30, 1995

Condition	Jun	Jul	Aug	Sep	Total
Adverse event after immunisation	4	3	3	1	11
AIDS	31	14	8	4	57
Arboviral infection	25	12	13	5	55
Cholera	-	1	-	-	1
Foodborne illness (NOS)	9	14	5	3	31
Gastroenteritis (instit.)	12	184	303	113	612
Gonorrhoea infection	32	14	23	5	74
H. influenzae epiglottitis	-	-	1	1	2
H. influenzae meningitis	2	2	-	1	5
H. influenzae septicaemia	-	-	2	-	2
Hepatitis A - acute viral	32	16	16	4	68
Hepatitis B - acute viral	5	4	2	2	13
Hepatitis B - chronic/carrier	49	29	31	8	117
Hepatitis B - unspecified	369	258	197	20	844
Hepatitis C - acute viral	7	6	6	-	19
Hepatitis C - unspecified	695	464	382	121	1,662
Hepatitis D - unspecified	3	-	-	1	4
Hepatitis, acute viral (NOS)	-	1	-	-	1
HIV	32	32	27	29	120
Hydatid disease	5	1	-	-	6
Legionnaires' disease	6	7	1	1	15
Leptospirosis	-	1	-	-	1
Malaria	2	3	2	1	8
Measles	43	28	49	19	139
Meningococcal infection (NOS)	-	1	1	-	2
Meningococcal meningitis	12	10	6	3	31
Meningococcal septicaemia	3	2	5	1	11
Mumps	2	2	1	-	5
Mycobacterial atypical	26	13	2	1	42
Mycobacterial infection (NOS)	13	9	3	-	25
Mycobacterial tuberculosis	23	18	14	4	59
Pertussis	120	110	105	53	388
Q fever	18	18	30	5	71
Rubella	36	58	79	41	214
Salmonella (NOS)	49	68	54	15	186
Syphilis infection	61	71	43	15	190
Typhoid and paratyphoid	-	1	-	-	1

TABLE 6

SUMMARY OF NSW INFECTIOUS DISEASE NOTIFICATIONS  
SEPTEMBER 1995

Condition	Number of cases notified			
	Period		Cumulative	
	Sept 1994	Sept 1995	Sept 1994	Sept 1995
Adverse reaction	3	1	32	23
AIDS	56	4	419	203
Arboviral infection	5	5	360	489
Brucellosis	2	-	4	1
Cholera	-	-	-	1
Diphtheria	-	-	-	-
Foodborne illness (NOS)	8	3	147	299
Gastroenteritis (instit.)	54	113	254	699
Gonorrhoea	23	5	275	260
H influenzae epiglottitis	2	1	20	5
H influenzae B - meningitis	1	1	13	8
H influenzae B - septicaemia	1	-	11	6
H influenzae infection (NOS)	-	-	8	2
Hepatitis A	37	4	412	344
Hepatitis B	389	30	3,365	3,133
Hepatitis C	812	121	6,935	5,460
Hepatitis D	1	1	15	13
Hepatitis, acute viral (NOS)	-	-	2	1
HIV infection	36	29	337	350
Hydatid disease	-	-	12	10
Legionnaires' disease	3	1	53	58
Leptospirosis	-	-	3	1
Leptospirosis	-	-	13	4
Listeriosis	1	-	6	7
Malaria	11	1	156	83
Measles	217	19	604	458
Meningococcal meningitis	4	3	58	49
Meningococcal septicaemia	5	1	30	19
Meningococcal infection (NOS)	3	-	13	12
Mumps	2	-	6	8
Mycobacterial tuberculosis	38	4	322	227
Mycobacterial - atypical	50	1	398	250
Mycobacterial infection (NOS)	5	-	31	62
Pertussis	133	53	1,116	830
Plague	-	-	-	-
Poliomyelitis	-	-	-	-
Q fever	16	5	198	153
Rubella	21	41	150	400
Salmonella infection (NOS)	58	15	820	862
Syphilis	94	15	829	591
Tetanus	-	-	2	-
Typhoid and paratyphoid	3	-	28	29
Typhus	-	-	-	-
Viral haemorrhagic fevers	-	-	-	-
Yellow fever	-	-	-	-

*Abbreviations used in this Bulletin:*

CSA Central Sydney Health Area, SSA Southern Sydney Health Area, ESA Eastern Sydney Health Area, SWS South Western Sydney Health Area, WSA Western Sydney Health Area, WEN Wentworth Health Area, NSA Northern Sydney Health Area, CCA Central Coast Health Area, ILL Illawarra Health Area, HUN Hunter Health Area, NC North Coast Public Health Unit, ND Northern District Public Health Unit, WN Western New South Wales Public Health Unit, CW Central West Public Health Unit, SW South West Public Health Unit, SE South East Public Health Unit, OTH Interstate/Overseas, U/K Unknown, NOS Not Otherwise Stated.

Please note that the data contained in this Bulletin are provisional and subject to change because of late reports or changes in case classification. Data are tabulated where possible by area of residence and by the disease onset date and not simply the date of notification or receipt of such notification.

TABLE 7

INFECTIOUS DISEASE CUMULATIVE NOTIFICATIONS FOR NSW, 1995  
RECEIVED BY SEPTEMBER 30, 1995

Condition	CCA	CSA	CW	ESA	HUN	ILL	NC	ND	NSA	SE	SSA	SW	SWS	WEN	WN	WSA	U/K	Total
AIDS	2	42	1	70	7	1	24	-	24	-	10	-	6	6	-	10	-	203
Arboviral infection	6	4	-	7	12	24	191	46	5	155	3	12	1	2	18	3	-	489
Brucellosis	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cholera	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Gonorrhoea infection	2	41	6	106	6	9	14	6	13	7	14	-	14	3	10	9	-	260
Hepatitis B - acute viral	-	3	1	11	-	-	3	2	-	1	1	-	3	-	10	5	-	40
Hepatitis B - chronic/carrier	15	-	13	187	-	-	7	10	3	-	11	-	-	9	8	83	-	346
Hepatitis B - unspecified	18	269	9	51	62	60	46	8	378	22	384	16	1,013	19	6	386	-	2,747
Hepatitis C - acute viral	1	-	1	5	-	-	-	-	-	1	-	-	-	2	40	1	-	50
Hepatitis C - unspecified	138	495	247	818	341	303	610	152	387	187	334	162	625	104	22	483	-	5,409
Hepatitis D - unspecified	-	-	-	1	-	-	4	1	1	-	1	1	3	-	-	1	-	13
Hepatitis, acute viral (NOS)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
HIV infection	8	55	2	123	13	8	6	2	20	-	15	5	22	6	1	14	6	350
Hydatid disease	-	-	1	1	-	-	1	-	1	-	-	2	3	-	-	1	-	10
Legionnaires' disease	1	2	-	6	10	5	1	2	8	-	-	-	3	2	1	17	-	58
Leprosy	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Leptospirosis	-	-	-	-	1	-	1	2	-	-	-	-	-	-	-	-	-	4
Malaria	3	5	-	8	9	4	8	1	20	2	3	3	4	3	-	10	-	83
Meningococcal infection (NOS)	1	-	-	2	1	-	2	-	-	-	3	1	1	-	1	-	-	12
Meningococcal meningitis	5	1	4	3	8	3	4	2	7	3	2	-	4	1	-	2	-	49
Meningococcal septicaemia	-	3	-	-	5	-	1	1	2	1	1	1	2	2	-	-	-	19
Mycobacterial atypical	7	28	1	64	14	6	12	6	27	1	18	3	30	10	6	16	-	249
Mycobacterial infection (NOS)	3	5	-	-	7	-	4	-	9	-	4	-	21	2	-	7	-	62
Mycobacterial tuberculosis	3	21	1	13	5	4	3	2	28	1	25	3	54	3	4	57	-	227
Q fever	-	1	9	-	9	2	38	28	-	17	-	2	1	-	45	1	-	153
Salmonella infection	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Syphilis infection	5	54	10	111	14	10	53	33	26	6	36	3	88	13	91	38	-	591

TABLE 8

VACCINE PREVENTABLE AND RELATED CONDITIONS, CUMULATIVE NOTIFICATIONS FOR NSW, 1995  
BY PUBLIC HEALTH UNIT, RECEIVED BY SEPTEMBER 30, 1995

Condition	CCA	CSA	CW	ESA	HUN	ILL	NC	ND	NSA	SE	SSA	SW	SWS	WEN	WN	WSA	Total
Adverse event after immunisation	-	-	-	1	1	-	4	1	-	4	2	4	-	4	-	2	23
H. influenzae epiglottitis	-	-	1	1	-	-	1	-	-	-	1	-	-	-	1	-	5
H. influenzae infection (NOS)	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2
H. influenzae meningitis	-	1	-	-	-	-	3	-	-	-	-	-	1	-	-	3	8
H. influenzae septicaemia	-	-	-	-	1	-	1	-	1	-	1	-	1	-	-	1	6
Measles	13	23	11	53	50	53	39	44	12	5	32	9	29	37	6	42	458
Mumps	-	-	-	1	-	2	2	-	1	-	-	-	-	-	-	2	8
Pertussis	22	18	18	23	40	54	243	13	67	23	37	52	53	79	11	77	830
Rubella	2	7	8	23	66	2	117	25	51	5	16	3	16	16	8	35	400

TABLE 9

FOODBORNE INFECTIOUS DISEASE CUMULATIVE NOTIFICATIONS FOR 1995  
BY PUBLIC HEALTH UNIT, RECEIVED BY SEPTEMBER 30, 1995

Condition	CCA	CSA	CW	ESA	HUN	ILL	NC	ND	NSA	SE	SSA	SW	SWS	WEN	WN	WSA	Total
Foodborne illness (NOS)	16	9	3	-	162	-	3	1	4	-	1	8	49	-	23	20	299
Gastroenteritis (inst.)	-	33	-	-	96	-	47	-	109	1	45	-	-	185	2	181	699
Hepatitis A - acute viral	8	51	33	89	17	7	20	-	32	-	24	10	26	3	3	21	344
Listeriosis	-	1	1	1	-	-	-	1	1	1	-	-	-	-	-	1	7
Salmonella (NOS)	18	41	17	62	61	39	99	57	91	36	78	23	67	46	34	93	861
Typhoid and paratyphoid	-	1	-	8	-	-	3	-	3	-	5	-	4	1	-	4	29
Vibrio infection (non cholera)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1

## ERRATUM

August edition of the *NSW Public Health Bulletin*. 'Suicide Mortality in NSW: Clients of Mental Health Services.'

An error in printing caused a footnote '\* Crude rates' to be omitted from the bottom of table 1, on page 78. The table is reproduced in full below.

**TABLE 1**

**SUICIDE RATES AND SMRs BY PSYCHIATRIC DIAGNOSIS**

	Peridischarge risks				Chronic risks					
	Hospital contact group Rate/ 1,000 py	SMR (99%CI)	Oxford <sup>b</sup> 28-day follow-up Rate/ 1,000 py*	SMR (95%CI)	Community contact group Rate/ 1,000 py	SMR (99%CI)	Oxford <sup>c</sup> 29-365-day follow-up Rate/ 1,000 py*	SMR (95%CI)	Missouri <sup>2a</sup> 3-year follow-up Rate/ 1,000 py	SMR
<b>Males</b>										
Schizophrenia	27.4	132 (60-204)	9	46 (1-258)	1.8	9 (5-12)	6	30 (11-66)	2.1	7
Depression										
– Other depression	121	581 (271-891)	116	519 (260-929)	12.1	58 (33-83)	12	55 (28-990)	1.9	6
– Major depression	n.a.	n.a. n.a.	60	268 (98-585)	n.a.	n.a. n.a.	9	42 (18-83)	4	14
Other	9.5	46 (15-76)	n.a.	n.a. n.a.	1.1	6 (3-8)	n.a.	n.a. n.a.	n.a.	n.a.
<b>Females</b>										
Schizophrenia	10.4	173 (0-372)	10	92 (2-515)	0.7	12 (4-21)	3	30 (6-88)	0.9	10
Depression										
– Other depression	16.5	282 (0-605)	19	147 (40-375)	1.7	28 (5-50)	5	43 (21-79)	0.7	8
– Major depression	n.a.	n.a. n.a.	14	96 (19-282)	n.a.	n.a. n.a.	6	40 (19-74)	1.8	18
Other	6.8	113 (4-222)	n.a.	n.a. n.a.	0.3	5 (1-9)	n.a.	n.a. n.a.	n.a.	n.a.
<b>All</b>										
Schizophrenia	21	158 (80-236)	n.a.	n.a. n.a.	1.4	10 (7-14)	n.a.	n.a. n.a.	n.a.	n.a.
Depression	59.4	447 (231-663)	n.a.	n.a. n.a.	4.1	31 (18-44)	n.a.	n.a. n.a.	n.a.	n.a.
Other	8.4	63 (28-97)	n.a.	n.a. n.a.	0.6	5 (3-7)	n.a.	n.a. n.a.	n.a.	n.a.

\* Crude rates