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WHAT IS THE DIFFERENCE BETWEEN QUALITY ASSURANCE AND HEALTH OUTCOMES?

Johanna Westbrook, Michael Frommer and George Rubin,
Epidemiology and Health Services Evaluation Branch,
NSW Health Department

The December 1992 issue of the *Public Health Bulletin* introduced the NSW Health Outcomes Program. The overall objective of the program is to reorient the planning, implementation and evaluation of health and related services towards optimal health outcomes within available resources[1]. This article outlines the evolution of other initiatives which aim to improve the quality of health services and examines the relationship between the Health Outcomes Program and these initiatives.

THE EVOLUTION OF QUALITY ASSURANCE IN HEALTH

The term *quality assurance* describes efforts designed to improve health services by systematic monitoring and assessment of services, action based on the results of this monitoring, and follow-up evaluation (the so-called 'quality cycle')[2].

Quality assurance systems seek to promote uniformity in the way things are done. They are designed to detect variations in processes or practices, to understand why variations occur and to discourage them unless there is a very good reason for their existence.

Until two decades ago quality assurance activities in the health services mainly comprised reviews and discussion of unusual instances of morbidity or mortality by small groups of clinicians. In the 1970s more formal quality assurance processes were promoted and in 1973 the Australian Council on Healthcare Standards (ACHS) (then known as the Australian Council on Hospital Standards) was established to provide a mechanism for ensuring the adequacy of hospital care standards. The ACHS conducted its first survey of a NSW hospital in 1977[3].

In 1976 the Commonwealth Government invited the Australian Medical Association (AMA) to develop peer review mechanisms addressing the quality and effectiveness of medical care. Two years later the AMA's 17th Federal Assembly endorsed the progressive introduction of formal methods for evaluating health care through peer review. This was followed by the establishment of the AMA/ACHS Peer Review Resource Centre which was funded by the Commonwealth Government to promote peer review programs[4].

However, organised quality assurance programs did not become widespread until the 1980s. An investigation of 90 short stay acute care hospitals in 1974 revealed none had a comprehensive or organised quality assurance program[5]. The proliferation of formal hospital quality assurance programs in the late 1970s is often attributed in part to rising health care costs when there was increasing concern among consumers and health care professionals about the quality, cost, effectiveness and efficiency of health services[6-7].

Two significant landmarks in the development of quality assurance occurred in 1986. The ACHS introduced a requirement for hospitals to have a quality

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Correspondence

Please address all correspondence and potential contributions to:

The Editor,
NSW Public Health Bulletin,
Public Health Division,
NSW Health Department
Locked Bag No 961,
North Sydney NSW 2059
Telephone: (02) 391 9218
Facsimile: (02) 391 9232

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assurance program in operation before they could be accredited, and the NSW Government allocated more than $2 million over three years to promote, establish and develop quality assurance programs in hospitals. This assisted in expanding the range and extent of quality assurance activities in NSW. By 1987, 86 per cent of NSW hospitals were involved in quality assurance activities and more than 60 per cent of public hospitals employed a quality assurance coordinator[8].

TOTAL QUALITY MANAGEMENT

Since 1990 quality assurance methods known to be effective in industry have been applied in health care institutions. It is difficult to differentiate between the most rigorously promoted of these methods, Total Quality Management (TQM) and Continuous Quality Improvement (CQI). The key characteristics of TQM in a health service context are as follows:

- TQM focuses on processes, and assumes a systematic review of how things are done will identify those that should be changed, leading to improved quality, less waste and lower costs.
- TQM is primarily concerned with understanding how processes work, measuring them and introducing a cycle of continuous improvements and subsequent re-evaluation.
- TQM has a strong customer focus, linking the needs of users of health services to the way in which services are organised.
- TQM often requires a change in the way organisations are managed. It requires a participatory approach to management, with the aim of engendering collective responsibility and participation in the continual improvement of services.
- The object of understanding and measuring processes is to control and eliminate process variation[9]. Process variation is categorised into two groups: chance variation (known as 'controlled' or 'common causes' variation), and variation which can be ascribed to definable causes ('uncontrolled', 'assignable', 'special' or 'attributable' variation). Efforts to minimise variation concentrate on 'uncontrolled' variation[9-10].
- In dealing with variation TQM differs from other approaches in two ways. First, TQM asserts that variation is due to the way processes and structures are organised, rather than human behaviour. Second, while most quality assurance systems are based on comparisons against established standards of practice, TQM asserts existing standards can constrain continuous quality improvement; it might be possible to do better than any existing standard. Instead, TQM embraces 'benchmarking', which involves comparing current activities ". . . against the best of the competition, the idea being to develop a product or process that is better than that of the competition"[11]. A new benchmark is created whenever performance exceeds an existing benchmark.
- In TQM systems, staff members are provided with tools to analyse processes and control variation. Seven tools of data analysis and presentation are advocated: cause and effect diagrams, Pareto charts, histograms, scatter diagrams, flow charts, run or trend charts and control charts. TQM also uses several process techniques such as nominal groups, brain storming, quality circles and quality teams[11].

HEALTH OUTCOMES

Almost three decades ago Donabedian[12] suggested that assessments of the quality of health care should examine three components: structure (the adequacy of structural elements of health services, equipment and facilities available), process (defined as the interaction between health personnel and patients receiving care), and outcome (the effect of a health service on people's health with regard to indicators such as morbidity and mortality and measures of satisfaction and quality of life). However, most quality assurance initiatives concentrate on structure and process and neglect outcomes. Perhaps this is not surprising because health outcomes are difficult to measure.

In contrast, outcomes-oriented thinking begins with the question: "What are we trying to achieve?" This leads to a specification of markers of these outcomes that can be quantified with sufficient reliability and precision to detect change. Such markers are called health outcome indicators. Information on health outcome indicators can be used to understand the effects of altering the structure and processes of services on health outcomes, with the aim of finding the best way of organising services to optimise their outcomes in relation to the available resources.

While it is not a new idea to think about health outcomes, the NSW Health Outcomes Program is an innovation because it represents the first comprehensive attempt in NSW to use measures of the impact of health services on people's health in the planning, implementation and evaluation of the health system.

While traditional quality assurance initiatives concentrate on separate services (such as patient care, laboratory quality control and hospital hotel services), health outcomes thinking can be applied to:

- Populations, using a small number of health status indicators, e.g. cause-specific mortality rates, the population prevalence of important conditions such as diabetes, or the prevalence of certain risk factors, and assessing changes over time with repeated measures.
- Services, by monitoring the outcomes of these services in clients or patients.
- Treatments, by comparing health outcomes following different forms of treatment or management for certain conditions.
- Individual patients.

On any of these levels, the aim is to ensure that health resources are used optimally, taking into account the perspectives of clinicians, managers, consumers and public health professionals.

COMMON ELEMENTS

Health system thinking about quality assurance and health outcomes has intersected with other developments, including casemix, customer focus, health goals and targets,

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AN APPROACH TO EVALUATING HEALTH OUTCOMES

Les Irwig, Associate Professor,
Department of Public Health, University of Sydney

Health services often seem to expend enormous resources without a clear picture of the outcomes achieved. With rapid improvements in computer hardware and software, it is enticing to use health service data to generate information about the outcomes of health care. Evaluating health outcomes, which also encompasses measuring the process of care, has enormous potential for improving health. To achieve maximum gains, we need a clear framework to guide this work and its interpretation. In this article I propose a framework based on four major questions[1]. By assessing which of the questions is being addressed and whether the methods are appropriate for that question, you may discover ways in which your own work or your interpretation of others' findings could be improved.

QUESTION 1: WHAT IS THE RIGHT THING TO DO? (EFFECTIVENESS)

This is the most critical of the questions. It is concerned with deciding policy whereas the remaining questions are concerned with quality assurance of its implementation. Without reasonable certainty about the effectiveness of the policy, addressing later questions may do a disservice by encouraging uniform application of a policy which may be harmful. Which methods should be used to ensure Question 1 is answered adequately?

1. **Choose the right study design: randomised trials**
   Health policies or practice guidelines should be based on randomised trials and not on observational studies or opinion[2]. This is contrary to much of the health outcomes literature which suggests the efficacy of interventions can be ascertained from sophisticated analysis of outcome variability between different sources of care, often using routinely collected data[3]. I do not think such data can be used to test interventions[2]. The effects of therapy are often small and easily overshadowed by the selection biases inherent in observational studies. Selection biases are likely to be much greater in studies of interventions than in studies of environmental, lifestyle or occupational exposures. This occurs because both physicians and patients are deliberately choosing interventions on the basis of patient characteristics, not all of which will be explicit. Moreover, it will not be possible to adjust adequately for important predictors of outcome, such as case-mix, because they are imperfectly measured[4].

2. **Measure outcomes relevant to patients: quality of life and survival**
   Quality of life has been ignored for too long because it is difficult to measure. However, rapid advances are being made in the methodology which should enable its wider application[5].

   Apart from their quality of life, patients will be interested in their survival. We therefore should examine survival, or its proxy, all-cause mortality. Mortality from the disease at which the intervention is aimed may be reduced at the expense of an increase in mortality from other causes[6]. For decision making, we need to shift away from measures of relative improvement, such as relative risk, to measures of absolute improvement, such as risk difference, or its inverse the number of people who need to be detected/treated to prevent one death or illness. For example, one needs to screen 23,000 women aged 35-44 for high blood cholesterol and treat 4,500 of them for five years to prevent one death[7]. Moreover, this calculation is based on the assumption of a 20 per cent reduction in mortality from cholesterol intervention in all age-sex groups, which seems far too optimistic an estimate[8].

3. **Meta-analyse all the trials**
   Meta-analysing all randomised trials will provide an estimate of the efficacy of an intervention with narrower confidence intervals than any of the individual trials and may give sufficient power to examine efficacy in different subgroups of patients[9,6,8]. Continuously updating meta-analyses and making results readily accessible in computer format will help health practitioners make rational decisions and should form the basis for clinical practice guidelines[10,11,2,3].

This approach assumes the existence of randomised trials. I expect our hands will be full with addressing policy formulation and quality assurance for common conditions for which trials have been done. Doing randomised trials for important conditions where none has been done will be made easier if clinicians and patients become more accepting of the idea that there is uncertainty about the best treatment and more willing to enter trials. Trials should be made easier to incorporate into clinical practice by simplifying inclusion criteria and consent procedures, reducing the data requirements and changing funding arrangements[11].

QUESTION 2: DID WE DO THE RIGHT THING? (APPROPRIATENESS OF CARE)

Assessing appropriateness of care should be based on measuring the process of care (practice) against the 'gold standard' of the evidence-based policy generated in response to Question 1. It will have the greatest impact if the condition is common, actual practice varies considerably from the policy and clinical opinion leaders are keen to collaborate[12]. Commonly, appropriateness is measured by examining what proportion of people on whom a procedure was done should have had it[13]. This approach does not indicate how many patients got the procedure when they should have. Knowing how many people who needed the procedure did not get it is clearly as important as knowing how many got the procedure inappropriately. Methods for monitoring appropriateness of care should include both components and take steps to deal with error in the measurement of appropriateness[14].

QUESTION 3: DID WE DO THE RIGHT THING RIGHT? (PERFORMANCE)

The assessment of performance includes three main components: technical performance, patient satisfaction with the process of care, and efficiency. Technical performance often requires assessments which are more detailed than can be ascertained from systems set up to monitor appropriateness. Examples include the proportion of 'lumpectomies' in which the breast cancer has been removed with an adequate margin. Patient satisfaction includes several dimensions concerned with the process of care[15]. Efficiency is concerned with whether care was carried out in the most streamlined way, at least cost and without delays.

QUESTION 4: DID IT HAVE THE RIGHT RESULT? (OUTCOME)

A flow diagram of the expected sequence of events of an intervention helps in deciding which, if any, outcomes to measure[16]. Long-term outcomes such as five-year survival are often not worth measuring as it may not be possible to disentangle the effects of intervention from other sources of variability in outcome. Furthermore, distant events will not provide timely feedback for monitoring quality. Surrogates (indicators) of outcome should be used only if there is good evidence that they are an important intermediate step

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Evaluating health outcomes

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between the intervention and long-term outcome[17,18,19]. Surrogates may suggest mortality will be reduced when the opposite occurs[20,21]. Outcomes or their surrogates need to be unambiguously interpretable as an effect of intervention. This may occur if the effects are large, immediate, or rarely occur in the absence of the intervention, for example post-operative morbidity and mortality. Measuring immediate adverse events such as post-operative mortality may be useful for weighing up long-term benefits, estimated from randomised trials, against the risks in your patients[22].

In instances where outcomes will not be unambiguously interpretable as an effect of the intervention, quality assurance should be based on measuring the appropriateness and performance of the intervention, and we will need to assume it will have the benefit demonstrated in randomised trials.

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clinical indicators, clinical audit, peer review, utilisation review, best practice and managed care. The health outcomes approach and quality assurance initiatives have several elements in common.

First, they have a common purpose: the continual improvement of health services. They all involve a reiterative cycle of evaluation, adjustment of services (when necessary), and re-evaluation, leading to continual improvement.

Second, their evaluative processes are based on specified indicators – indicators of structure or process quality, or indicators of outcome.

Third, they are designed to be integrated into the work ethos and practices of all relevant personnel.

Fourth, they espouse an intention to promote improvements through positive measures rather than recrimination. They seek to respect the professional integrity of individual providers, especially clinicians, and they involve service providers in the evaluation and improvement of their own services.

Finally, implicitly or explicitly they advance the notion of customer focus. This involves identifying the customer, for whom any given service is undertaken, and seeking to provide optimal fulfilment of the customer's requirements. The customer may be external to the organisation or within it.

QUALITY, OUTCOMES, AND COSTS

Traditionally, quality assurance initiatives have been concerned with the way services are provided without systematic consideration of costs. However, it is now recognised that quality of care cannot be improved without regard for cost[13]. Information on both outcomes and costs is needed to ensure optimal use of resources. The health outcomes approach emphasises that decisions must be based on the health outcomes of services as well as costs.

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QUALITY AND POPULATION

George Rubin, Michael Frommer and Johanna Westbrook,
Epidemiology and Health Services Evaluation Branch, NSW Health Department

This article is based on a presentation by George Rubin at the Workshop on Quality Assurance of the International Society for Quality Assurance in Health Care at the Howard Florey Institute, Melbourne, Victoria, March 27, 1993.

"From the catwalks of healthcare fashion, outcomes research emerges as the star of the show. While the benefits of clinical activity have motivated doctors for generations, the new imperative is to combine these with the consumerist agenda – in effect, to put professional standards into consumer values." These glittering lines from a recent Lancet editorial herald new directions in health care.

Meantime, governments and health organisations strive to better assess, in health terms, the effectiveness of resources devoted to health services. Each year in Australia we spend around $32 billion. What do we achieve in terms of improving the health status and wellbeing of the population? Could these resources be allocated in a different way to obtain greater health benefits?

While we have become preoccupied with improving the quality of care there is a major gap in the way we are going about this. The World Health Organisation (WHO) defines quality as improving the outcome of all health care in terms of health, functional ability, patient wellbeing and consumer satisfaction. The quality assurance process deals with three elements – structure, process and outcome. A health outcome is a change in the health of an individual or population which is attributable to interventions.

The deficiency that we want to draw to your attention is a failure to link outcomes on the one hand with structure and process on the other. Most quality assurance activities have focused on only structure or process standards, with no clear relation to outcome. Indeed, whether these activities improve health benefits remains unclear and there is a growing recognition that many health interventions have not been evaluated and their effectiveness is not known.

Moreover, quality is not just about obtaining the best outcomes regardless of the cost of the structure and process needed to do this. Health resources are most appropriately used for interventions which provide the best value for money.

We have the methods to make this link between outcomes and the quality of health interventions. We have been using epidemiologic methods for a long time to describe and analyse health-related phenomena in populations. They have enormous potential in quality assurance to quantify how the structure and process of health interventions relates to their outcomes.

Epidemiology should underpin the key elements of health service management:

- information analysis and policy formulation;
- planning and program development;
- program delivery; and
- evaluation.

Epidemiology has been going through a long, slow transition from its historic association with the old style of public health (communicable diseases, rats and drains) to the realisation that it is crucial to good decision making in health and hence to good health services management.

To get epidemiology into the mainstream of quality assurance requires a reorientation of thinking in five key directions.

1. Implement an outcomes focus in health systems

We are beginning to make good progress on this in Australia. The Commonwealth has introduced health outcomes into the Medicare agreements. States will be required to contribute to the development of outcomes-based accountability systems. The National Health and Medical Research Council (NHMRC) has established a Quality of Care Committee to enhance this process and develop mechanisms for establishing appropriate practice guidelines.

NSW has a Health Outcomes Program. Under this program epidemiologists are working with clinicians, consumers, managers and health economists. The starting point is to ask what is the purpose of a particular clinical or public health service and then to agree on measurable health outcome indicators that fit with the explicit purpose of the service. The next steps are to establish data systems to collect, monitor and feed back information on the indicators, and for health service providers to use this information to improve the structure, process and outcomes of their services.

How do we make all this happen? In NSW we will shortly announce a series of demonstration projects which exemplify this sequence in cardiovascular disease, critical care, asthma, diabetes, immunisation and Aboriginal health. This leads me to the second direction.

2. Incorporate outcome measures into population health planning

Measurable health outcome objectives should increasingly be included in health department and local health service plans. This is already happening to a greater or lesser extent in NSW, Victoria, Tasmania and Western Australia. In NSW, where increasing emphasis on outcome measurement is apparent, the corporate plan is used as the basis for performance agreements between the area chief executives and the Director-General. Incentives to adopt outcomes approaches at the service level and involving consumers will undoubtedly increase as local information systems improve.

3. Foster links with health economics

Earlier the issue of value for money was raised. As well as indicators we need information on the resources involved in achieving the outcomes. In the lineup of people involved in the NSW outcomes program have been included health economists. A central plank in our outcomes approach is to involve health economists at the beginning of the process.

4. Improve information systems

Current developments in information technology provide a seamless information capture mechanism extending from points of clinical contact to aggregated data at the hospital, area and Statewide level. The developments will enable us to effect the link between health interventions and their outcomes at the service and population levels. Examples of information systems with these capacities already exist.

Under the NSW Quality Assurance Program clinicians are developing local PC-based outcome monitoring systems to improve their services in asthma, cardiovascular disease and obstetric care.

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PUBLIC HEALTH ABSTRACTS

Professor James S. Lawson, Professor and Head of the School of Health Services Management at the University of NSW, has prepared the following public health items from the literature.

DISABILITY AMONG IMMATURE INFANTS

Neo-natal intensive care has been described as 'perhaps the most successful of all medical technologies'. In terms of improving the chance of survival this may be so, but the rate of disabilities among the survivors is high as has been shown by a comprehensive survey involving nearly 100,000 infants in the United Kingdom. About 3.5 of 1,000 of these births were before 29 weeks of gestation. Half the babies survived to be discharged from the nursery. At four years, 93 per cent of the premature infants were still alive. Only 35 per cent of those four-year-olds were within normal limits. Around 29 per cent had mild disability, 13 per cent a moderate disability and 23 per cent were severely disabled. The severe disablements included cerebral palsy, blindness, severe hearing loss and intellectual handicap. A number of babies had multiple disabilities. An important finding was that the incidence of disability increases with declining gestational age of the babies.

Johnson A, Townshend P, Yudkin P et al. Functional abilities at age 4 years of children born before 29 weeks of gestation. *Br Med J*, 1993; 306:1715-1718.

NEVER DISMISS WHAT A PATIENT TELLS YOU

When 90-year-old Burt Adams was admitted to hospital he asked the staff to let his mother know. The doctors thought he must be senile. In fact, his mother Daisy, at 113 years, is the oldest woman in Britain. (The names are fictitious.)

Editorial. *Br Med J*, 1993; 307:48-49.

SEX, PREGNANCY, HORMONES AND MELANOMA

Many questions remain unanswered about the relationship between melanoma (the most rapidly increasing Australian cancer) and the hormonal environment. Several conclusions can be made within the current state of knowledge. First, there is no evidence that the use of oestrogens, either as oral contraceptives or hormone replacement therapy, has a role in the aetiology of melanoma. Second, women have a survival advantage over men that could be due to the inhibitory effect of normal oestrogens in the growth of melanoma. Third, prescribed oestrogens do not promote progression of the disease in patients with melanoma, therefore women who have been treated for melanoma can safely use hormonal supplements. Last, pregnancy seems to carry no adverse effect on survival after treatment for melanoma. (However, patients with thick melanomic lesions are advised to delay pregnancy for two to three years as this is when they are at the greatest risk of relapse).

Jatoi I and Gore ME. Sex, pregnancy, hormones and melanoma. *Br Med J*, 1993; 307:2-3.

BREAST-FEEDING REDUCES RISK OF BREAST CANCER

A large British study has confirmed that breast-feeding is associated with a statistically significant decreased risk of breast cancer. The risk of breast cancer falls with increased duration of breast-feeding, and with the number of babies breast-fed. However, breast-feeding each baby for longer than three months confers no additional benefits.

United Kingdom National Case-Control Study Group. Breast feeding and risk of breast cancer in young women. *Br Med J*, 1993; 307:17-20.

PRIVILEGE AND HEALTH – WHAT IS THE CONNECTION?

Socio-economic status is a powerful determinant of health. In current jargon, socio-economic status refers to a mix of factors that shape a person's relative social advantage. It is usually gauged by income, education, profession or some combination of the three. But no-one knows exactly which factors determine health, much less how they do so. This is a crucial issue as we know that in Australia the premature death rates among the highest social categories are about half those of the lowest social categories. The differences do not seem to be simply a matter of the privileged having better access to health care. So closely does socio-economic status co-relate with health that it confounds the interpretation of much clinical research. For example, studies of the effect of passive smoking on childhood asthma are uninterpretable unless an attempt is made to control for socio-economic status. Until more specific knowledge is

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5. Improve epidemiologic capability

There is much to be done requiring epidemiologic capability. This is not to say that we necessarily need more epidemiologists, however, we do need to get clinicians, managers, and even consumers thinking epidemiologically.

Training in, and practice of, epidemiology has expanded dramatically in Australia over the past five years. There has been a proliferation of university public health courses offering epidemiology as a key subject. The Faculty of Public Health Medicine has formed to improve training of doctors in the practice of epidemiology and public health. National and State programs have developed to train health professionals, both medical and non-medical, to apply epidemiologic principles to improving health services. Public health networks staffed with young epidemiologists are developing in most States.

NSW has established Statewide epidemiologic expertise with a central unit and a network of public health units. A training program encourages health professionals into public health and epidemiologic practice and links are being forged between the public health network, health services management and clinical practice.

We started by identifying the major gap between the structure and process preoccupations of current quality assurance thinking on the one hand, and health outcomes on the other. We have the means to close this gap, and we are already doing it. Optimistic that what is already happening will snowball over the next 12 months, we predict that health outcomes will remain the star on the catwalks of healthcare fashion. We will be well on the way to closing feedback loops between outcomes and the quality of services.

available about the way in which socio-economic status influences health, the fact that some illness has a socio-economic basis, and is therefore theoretically preventable, does not diminish the need for treatment or palliation.

Angell M. Privilege and health – what is the connection? *New Engl J Med*, 1993; 329:2:126-127.

SUDDEN DEALTH IN ELITE ATHLETES

The deaths of two elite United States athletes, Reggie Lewis and Hank Gathers, have drawn international attention to the problem of illness and sudden death in young athletes. Such athletes perform in a supercharged atmosphere with an intoxicating public recognition and enormous sums of money at stake and, accordingly, become viewed as high-priced commodities and not as patients. Both probably had viral-based infections of the heart and perhaps if they had been withdrawn from competitive sports for six to 12 months, could have returned safely to competition. However, the pressure to perform is enormous for all concerned – the athletes, medical advisers and competing teams. Medical and safety issues must have priority.

Maron BJ. Sudden Death in Young Athletes. *New Engl J Med*, 1993; 329:1:55-57.

CHANGING PATTERNS OF STREPTOCOCCAL DISEASE

Early this century Lancefield discovered that the bacteria streptococci could be classified into various groups. Group A streptococcus was associated with pharyngitis, leading to acute rheumatic fever and glomerulonephritis. Fry, in 1938, recognised a group B streptococcus which was associated with puerperal (post-pregnancy) sepsis. It has now been realised in the United States that group B streptococcus infections among non-pregnant adults are becoming an important cause of disease. These diseases include skin infection, septicaemia, pneumonia and a range of other infections. There is a mortality associated with these infections. Nearly all patients (98 per cent) have one or more underlying disease such as diabetes or cancer. Treatment approaches include penicillin.

Wessels MR and Kasper DL. The Changing Spectrum of Group B Streptococcal Disease. *New Engl J Med*, 1993; 328:1843-1844.
Farley MM, Harvey C, Stull T et al. A population-based assessment of invasive disease due to group B streptococcus in non-pregnant adults. *New Engl J Med*, 1993; 328:1807-1811.

SEX OF PHYSICIAN INFLUENCES CARE

There is a growing consensus that women's health issues have been neglected in terms of quality and quantity. Many factors affect women's cancer screening rates, including knowledge, attitudes and beliefs about disease, screening and the efficacy of treatment. But the most common reason women give for not being screened for breast and cervical cancer is that it was not offered or recommended by their physicians. A study involving nearly 100,000 women in the United States has demonstrated that female physicians are more much likely to be successful promoters and practitioners of preventive programs affecting women, particularly if they involve reproductive organs. The differences decline with age and physicians over 50 years of age are much more likely to be successful with offering preventive care to women than younger physicians, particularly those below 40. While many patients report a preference for a physician of the same sex, other factors include the possibility that women may be more interested and pay more attention to preventive care than men.

Lurie N, Slater J, McGovern P, Ekstrum J et al. Preventive Care for Women. *New Engl J Med*, 1993; 329:478-482.

VITAMIN K AND CHILDHOOD CANCER

The most appropriate method of administering vitamin K to newborns is under discussion again. Vitamin K deficiency occurs in newborns because of poor placental transfer from the mother and leads to haemorrhagic disease which affects about 1.5 per cent of infants. The administration of vitamin K has virtually eliminated this problem. Golding and colleagues published two papers based on United Kingdom studies which implicated the giving of vitamin K by intramuscular injection in a higher incidence of leukaemia and other childhood tumours. This finding has been challenged on grounds of inadequate methodology. It has also been pointed out that the intramuscular use of vitamin K in the UK has increased steadily from 1978 to 1982 while the incidence of childhood leukaemia has not. A new and major study in the United States by Klebanoff and associates refutes the conclusion of Golding and colleagues. This study followed more than 50,000 children born in the early 1960s for eight years.

The divergent results are not easy to reconcile but appear to be based on different study methods. Golding and colleagues performed retrospective reviews whereas Klebanoff and colleagues had a prospective study. The conclusion is that the widespread use of vitamin K and the recognised serious consequences that result when it is withheld make it unjustifiable to repeat these studies. The study design and quality of data in the report by Klebanoff render its conclusion more credible. The continued use of intramuscular vitamin K has been recommended until an appropriate and effective oral preparation is available. This recommendation is from the American Academy of Paediatrics and is confirmed in a leading article in the Medical Journal of Australia by William McWhirter.

Golding J, Paterson M and Kinlen LJ. Factors associated with childhood cancer in a national cohort study. *Br J Cancer*, 1990; 62:304-8.
Golding J, Greenwood R, Birmingham K and Mott M. Childhood cancer, intramuscular vitamin K, and pethidine given during labour. *Br Med J*, 1992; 305:341-6.
Hilgartner MW. Vitamin K and the newborn. *N Engl J Med*, 1993; 329:957-958.
Klebanoff MA, Read JS, Mills JL and Shiono PH. The risk of childhood cancer after neonatal exposure to vitamin K. *N Engl J Med*, 1993; 329:905-908.
McWhirter WR. Vitamin K and childhood cancer. *Med J Aust*, 1993; 159;499.

CORONARY ARTERY SURGERY REMARKABLY SAFE

About 12,000 patients who had coronary artery surgery in Adelaide between 1978 and 1990 have been reviewed. The overall mortality rate is now 0.99 per cent, compared with the operative mortality of 5.8 per cent in the early 1970s. There is a very much lower operative mortality in patients who have an average bypass time of below 50 minutes compared with those whose bypass time was more than 100 minutes. These outstanding results are not a measure of the long-term survival of patients with ischaemic heart disease whether or not they have coronary artery surgery.

Iyer VS, Russell WJ, Leppard P and Craddock D. Mortality and myocardial infarction after coronary artery surgery. *Med J Aust*, 1993; 159:166-170.

INFECTIOUS DISEASES

NOTIFICATIONS

PERTUSSIS (WHOOPING COUGH)

The pertussis notification rate for the State for the period January to November was 18.2/100,000 population. This compares with a rate of 12.4 for the first 10 months of the year. Central West Public Health Unit received notifications at a rate of 27.8/100,000 population. A major cluster has been identified in the Sutherland Local Government Area. Another cluster has been identified in Campbelltown (South Western Sydney Area).

A total of 987 notifications for pertussis has been received this year. This is more than five times the number of notifications for the same period in 1992.

The mean age for notifications was 18.1 years (range one month to 92 years). Eleven per cent of cases have been for infants and neonates (i.e. ≤ one year of age); seventy-six per cent of notifications have been for people aged ≥ five years. As the epidemic continues, there is a trend for more adolescents and adults to be affected (the mean age for the first 10 months of the year was 17.3 years).

The Communicable Diseases Standing Committee of the National Health and Medical Research Council (NHMRC) has deferred the review of pertussis immunisation recommendations.

Immunisation providers are requested to consider the consequences of not offering whooping cough vaccine to infants and children at time when there is documented evidence of high levels of *Bordatella pertussis* throughout the State.

STATEMENT ON PERTUSSIS VACCINATION

The following statement was adopted by the National Health and Medical Research Council at its 116th session:

Council noted with concern the continued illness and preventable deaths due to whooping cough despite the availability of a safe and effective vaccine. The reported whooping cough immunisation rate of 71 per cent in the 1989-90 Australian Bureau of Statistics Survey was the lowest uptake of all individual routine childhood immunisations. The uptake of routine childhood immunisations ranged from 71 to 86 per cent. In Australia, 739 cases of whooping cough were notified in 1992 and 337 cases in 1991. At least 14 children died of whooping cough in Australia between 1982 and 1991.

Council acknowledged the continued fear of some health care workers and some members of the general public regarding the whooping cough vaccine but noted that these concerns are without scientific basis or legal precedent. Extensive studies have shown that the benefits of whooping cough vaccine outweigh any risks. The National Childhood Encephalopathy Study in the United Kingdom did not demonstrate an increased risk of permanent brain damage within seven days of whooping cough immunisation, nor did a large American study.

Council also noted that refusal to immunise children carries a serious risk of disease. Inadequately immunised one-year-old children had more than a one in six chance of developing whooping cough before the age of 10 years.

Mild reactions to whooping cough vaccine occur in about 50 per cent of infants and do not contraindicate further use. However, the effect of these minor reactions can be minimised by the routine use of paracetamol at the time of immunisation.

Whooping cough vaccine should not be given following a major reaction to a previous dose of diphtheria-tetanus-pertussis vaccine (triple antigen); diphtheria-tetanus vaccine (CDT) should then be used. Major reactions include fever above 40°C, convulsions, persistent screaming, hypotonia, severe local reactions. The risk of brain damage after pertussis vaccination is negligible if it exists at all.

Council recommended that health professionals seek every opportunity to promote whooping cough vaccine as a safe and effective vaccine.

MEASLES

The annual notification rate for the State is 33.6/100,000 population. This compares with a rate of 22.6 for the first 10 months of the year.

Western Sydney Public Health Unit has received notifications at a rate of 111.05/100,000 population. This compares with a rate of 86.7 for the first 10 months of the year.

Measles notifications continue to rise. This increase began in week 23. Most measles notifications have been for the Blacktown Local Government Area. Other clusters have been identified in Fairfield (South Western Sydney Area), Shellharbour-Albion Park (Illawarra Region), Bingara (New England Region) and Coonamble (Orana and Far West Region).

The mean age for notifications was 8.7 years (range one month to 69 years). Nine per cent of notifications were for neonates and infants. Seventy per cent of notifications were for children over the age of five; 28 per cent of cases were for people over the age of 12 years. The proportion of notifications for adolescents and adults has increased from 24 per cent of total notifications for the first 10 months of the year.

TUBERCULOSIS

Two hundred and ninety-six notifications have been received for 1993, for a rate of 5.5/100,000 population.

Only 70 notifications were for sputum smear positive cases – for a rate of 1.3/100,000 population.

Sites of infection for 1993 notifications are as follows:

TABLE 2

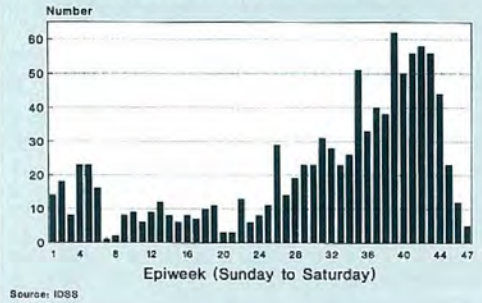
SITE	NUMBER	PERCENTAGE
Respiratory	161	55
Miliary	5	2
Primary	12	4
Genitourinary	8	3
Meningeal	5	2
Bone	6	2
Gastrointestinal	4	1
Other/unspecified	95	32

RUBELLA (GERMAN MEASLES)

There has been a resurgence of rubella activity in NSW since August. This increase in notifications began in week 31. The annual notification rate for the State is 8.1/100,000 population. This compares with a rate of 5.2/100,000

FIGURE 1

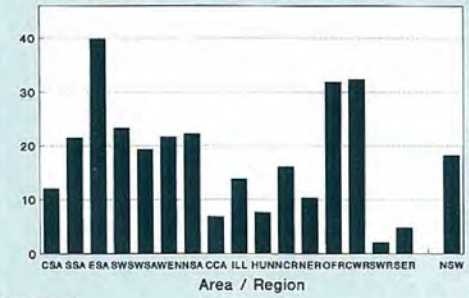
PERTUSSIS NOTIFICATIONS, NSW BY EPIWEEK, JANUARY-NOVEMBER 1993



Source: IDSS

FIGURE 2

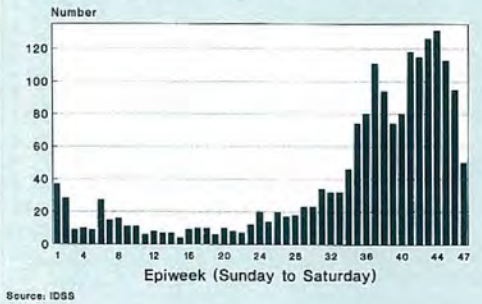
PERTUSSIS NOTIFICATIONS, NSW BY AREA/REGION, JANUARY-NOVEMBER 1993



(Source: IDSS)

FIGURE 3

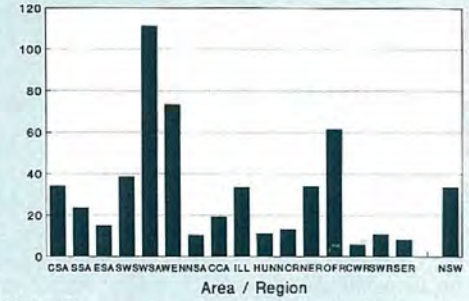
MEASLES NOTIFICATIONS, NSW BY EPIWEEK, JANUARY-NOVEMBER 1993



Source: IDSS

FIGURE 4

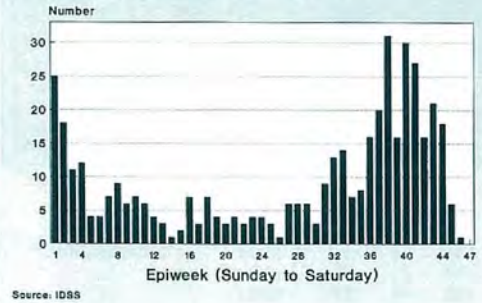
MEASLES NOTIFICATIONS, NSW BY AREA/REGION, JANUARY-NOVEMBER 1993



(Source: IDSS)

FIGURE 5

RUBELLA NOTIFICATIONS, NSW BY EPIWEEK, JANUARY-NOVEMBER 1993



Source: IDSS

FIGURE 6

HAEMOPHILUS INFLUENZAE TYPE B NSW, JANUARY-NOVEMBER 1993

Source: IDSS

population for the same period in 1992. New England Public Health Unit has received notifications at a rate of 32.8/100,000 population. Another large cluster of notifications has been in the Blacktown Local Government Area. Some of these notifications may be for misclassified measles cases.

BRUCELLOSIS ALERT

Medical practitioners are alerted to the re-emergence of brucellosis as a health problem due to high rates of *Brucella suis* infection in feral pig populations. Feral pig hunters and consumers are at risk. Special concerns are held for Aboriginal and Torres Strait Islander people who consume large quantities of feral pig meat.

Symptoms of brucellosis can be acute or insidious onset of fever, headache, weakness, profuse sweating, arthralgia and weight loss.

Laboratory diagnosis is made by appropriate isolation of the infectious agent from blood, bone marrow or other discharges/tissues from the patient. Serology may also be a useful mode of confirming the diagnosis.

Control of human brucellosis depends on the elimination of Brucella from animal reservoirs.

TABLE 3

SUMMARY OF NSW INFECTIOUS DISEASE NOTIFICATIONS NOVEMBER 1993

Condition	Number of cases notified			
	Period		Cumulative	
	Nov 1992	Nov 1993	Nov 1992	Nov 1993
Adverse reaction	1	–	31	24
AIDS	17	7	295	294
Arboviral infection	7	–	335	607
Brucellosis	1	–	3	4
Cholera	–	–	–	–
Diphtheria	–	–	–	–
Foodborne illness (NOS)	11	4	182	107
Gastroenteritis (instit.)	9	6	414	263
Gonorrhoea	48	16	367	304
H influenzae epiglottitis	6	–	48	32
H influenzae B – meningitis	6	1	98	52
H influenzae B – septicaemia	1	–	25	23
H influenzae infection (NOS)	5	–	32	14
Hepatitis A	52	22	526	523
Hepatitis B	284	134	3,082	3,149
Hepatitis C	367	195	3,982	4,949
Hepatitis D	1	–	7	11
Hepatitis E	N/A	1	N/A	1
Hepatitis, acute viral (NOS)	2	–	17	7
HIV infection	54	N/A	654	N/A
Hydatid disease	–	1	5	2
Legionnaires' disease	3	–	90	53
Leprosy	–	–	5	2
Leptospirosis	–	–	19	13
Listeriosis	–	1	15	12
Malaria*	12	2	144	136
Measles	266	378	705	1,818
Meningococcal meningitis	8	9	82	84
Meningococcal septicaemia	4	5	17	38
Meningococcal infection (NOS)	2	–	12	11
Mumps	1	1	21	8
Mycobacterial tuberculosis	50	7	409	296
Mycobacterial – atypical	31	3	469	249
Mycobacterial infection (NOS)	9	3	36	68
Pertussis	43	83	192	987
Plague	–	–	–	–
Poliomyelitis	–	–	–	–
Q fever	17	5	201	323
Rubella	113	25	279	437
Salmonella infection (NOS)	58	44	799	786
Syphilis	75	34	909	616
Tetanus	–	–	2	5
Typhoid and paratyphoid	2	–	29	22
Typhus	–	–	–	–
Viral haemorrhagic fevers	–	–	–	–
Yellow fever	–	–	–	–

* from Malaria Register

TABLE 4

INFECTIOUS DISEASE NOTIFICATIONS BY SELECTED MONTH OF ONSET FOR 1993

Condition	Month				
	Aug	Sep	Oct	Nov	Total
Adverse event after immunisation	2	5	1	–	8
AIDS	39	26	24	7	96
Arboviral infection	8	6	11	–	25
Brucellosis	1	1	–	–	2
Foodborne illness (NOS)	2	16	1	4	23
Gastroenteritis (instit.)	9	24	24	6	63
Gonorrhoea	32	14	28	16	90
H influenzae epiglottitis	4	–	1	–	5
H influenzae infection (NOS)	–	3	1	–	4
H influenzae meningitis	7	3	2	1	13
H influenzae septicaemia	3	1	2	–	6
Hepatitis A – acute viral	38	41	43	22	144
Hepatitis B – acute viral	5	5	3	2	15
Hepatitis B – unspecified	347	307	295	132	1,081
Hepatitis C – acute viral	2	2	3	–	7
Hepatitis C – unspecified	585	529	478	195	1,787
Hepatitis D – unspecified	1	1	2	–	4
Hepatitis E – unspecified	1	–	–	–	1
Hepatitis, acute viral (NOS)	1	1	–	–	2
HIV infection	–	–	–	–	–
Hydatid disease	–	–	–	1	1
Legionnaires' disease	3	5	3	–	11
Leprosy	1	1	–	–	2
Leptospirosis	1	1	1	–	3
Listeriosis	–	–	5	1	6
Malaria	22	16	3	2	43
Measles	175	376	477	378	1,406
Meningococcal meningitis	13	17	17	9	56
Meningococcal septicaemia	8	3	4	5	20
Meningococcal infection (NOS)	1	1	2	–	4
Mumps	1	4	1	1	7
Mycobacterial – atypical	12	9	3	3	27
Mycobacterial tuberculosis	31	22	16	7	76
Mycobacterial infection (NOS)	4	15	13	3	35
Pertussis	126	181	246	83	636
Q fever	40	30	23	5	98
Rubella	46	82	101	25	254
Salmonella (NOS)	39	21	35	40	135
Salmonella bovis morbificans	3	1	1	1	6
Salmonella typhimurium	7	15	16	3	41
Syphilis	76	43	46	34	199
Tetanus	1	–	–	–	1
Typhoid and paratyphoid	1	3	4	–	8
Total	1,698	1,831	1,936	986	6,451

TABLE 5

RARELY NOTIFIED INFECTIOUS DISEASES BY PUBLIC HEALTH UNIT CUMULATIVE 1993

Condition	CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NCR	NER	OFR	CWR	SWR	SER	Total
Brucellosis	1	1	–	–	–	–	1	–	–	–	1	–	–	–	–	–	4
Hepatitis E – unspecified	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Hydatid disease	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Leprosy	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	2
Leptospirosis	–	–	–	–	–	–	–	–	–	2	4	3	1	–	3	–	13
Listeriosis	2	–	1	2	2	–	1	–	–	4	–	–	–	–	–	–	12

TABLE 6

INFECTIOUS DISEASE NOTIFICATIONS BY PUBLIC HEALTH UNIT, CUMULATIVE 1993

Condition	CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NCR	NER	OFR	CWR	SWR	SER	U/K	Total
Adverse event after immunisation	1	3	1	–	6	–	1	–	–	2	–	3	–	5	2	–	–	24
AIDS	55	8	108	15	14	8	30	3	3	6	29	1	2	5	7	–	–	294
Arboviral Infection	1	1	2	1	1	3	4	1	1	30	55	29	106	14	354	4	–	607
Brucellosis	1	1	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	4
Foodborne Illness (NOS)	6	4	–	22	24	10	–	3	6	–	–	2	11	14	5	–	–	107
Gastroenteritis (Instit)	69	6	–	11	14	29	1	21	–	39	–	17	4	20	32	–	–	263
Gonorrhoea	51	17	106	15	20	5	22	6	3	6	12	10	18	7	2	4	–	304
H. influenzae epiglottitis	1	7	1	2	–	2	4	1	2	2	2	2	1	–	2	3	–	32
H. influenzae infection (NOS)	–	–	2	–	2	1	3	2	–	3	–	–	1	–	–	–	–	14
H. influenzae meningitis	4	4	–	9	3	3	5	2	8	1	3	3	1	3	2	1	–	52
H. influenzae septicaemia	1	3	1	9	1	–	2	–	2	2	–	2	–	–	–	–	–	23
Hepatitis A – acute viral	43	21	41	51	113	20	48	12	18	14	46	67	6	5	13	5	–	523
Hepatitis B – acute viral	6	5	20	2	7	2	–	1	–	–	27	4	–	–	2	2	–	78
Hepatitis B – unspecified	484	404	13	885	491	41	438	41	44	72	53	40	16	15	24	10	–	3,071
Hepatitis C – acute viral	1	–	–	–	4	–	–	2	1	–	2	5	1	1	–	3	–	20
Hepatitis C – unspecified	679	367	613	516	521	111	544	224	301	374	298	85	26	80	122	68	–	4,929
Hepatitis D – unspecified	2	1	3	–	1	–	–	–	1	1	1	1	–	–	–	–	–	11
Hepatitis E – unspecified	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Hepatitis, acute viral (NOS)	–	–	2	–	–	–	–	–	–	1	–	1	1	2	–	–	–	7
HIV infection*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hydatid disease	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Legionnaires' disease	9	1	–	14	13	–	4	2	3	3	1	–	1	–	1	1	–	53
Leprosy	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	2
Leptospirosis	–	–	–	–	–	–	–	–	–	2	4	3	1	–	3	–	–	13
Listeriosis	2	–	1	2	2	–	1	–	–	4	–	–	–	–	–	–	–	12
Malaria	12	14	20	6	20	4	20	2	4	13	2	10	2	–	3	4	–	136
Measles	102	116	44	229	623	193	70	42	95	50	46	80	79	9	25	15	–	1,818
Meningococcal meningitis	3	5	4	15	11	3	4	3	6	4	7	3	6	2	1	7	–	84
Meningococcal septicaemia	4	8	3	2	2	3	5	–	2	2	2	3	1	–	–	1	–	38
Meningococcal infection (NOS)	–	–	1	–	–	–	1	2	1	1	–	–	4	1	–	–	–	11
Mumps	1	2	–	2	1	–	–	–	1	1	–	–	–	–	–	–	–	8
Mycobacterial – atypical	50	19	22	15	24	6	29	4	9	29	24	10	2	1	4	1	–	249
Mycobacterial tuberculosis	31	36	27	68	46	8	34	9	7	13	2	3	3	6	2	1	–	296
Mycobacterial infection (NOS)	16	2	1	2	3	–	21	3	8	2	6	1	1	–	2	–	–	68
Pertussis	36	105	117	138	108	57	149	15	39	34	60	24	41	50	5	9	–	987
Q fever	–	1	1	1	5	1	2	1	1	23	64	105	86	12	4	16	–	323
Rubella	7	15	14	81	86	37	25	7	10	20	30	77	–	5	12	11	–	437
Salmonella (NOS)	22	53	53	62	26	9	56	26	12	69	48	47	27	7	12	10	–	539
Salmonella bovis morbificans	1	5	2	2	2	–	3	–	–	10	–	–	–	1	1	–	–	27
Salmonella typhimurium	18	26	21	20	17	12	20	4	3	22	9	9	15	4	13	7	–	220
Syphilis	83	36	98	152	23	7	30	7	6	8	45	38	65	6	9	3	–	616
Tetanus	–	1	–	–	–	–	–	–	–	–	2	–	1	–	–	1	–	5
Typhoid and paratyphoid	1	2	4	3	1	2	3	–	–	1	2	–	–	3	–	–	–	22

*HIV data not available

TABLE 7

NOTIFICATIONS OF NON-NOTIFIABLE SEXUALLY TRANSMITTED DISEASES JANUARY-NOVEMBER 1993
(Diagnoses from sexual health centres unless otherwise stated in footnote)

AHS Infection		CSA[1]	SSA[1]	ESA[2]	SWS[2]	WSA[3] + WEN	NSA[4]	CCA[5]	ILL[6]	HUN[2]	NCR[4]	NER[4]	OFR[2]	CWR[7]	SWR[8]	SER[9]
Chlamydia trachomatis	Male	2	3	64	3	23	3	–	8	11	2	4	13	–	12	
	Female	1	4	52	6	16	1	1	4	32	2	13	13	–	27	
	Total	**3**	**7**	**116**	**9**	**39**	**4**	**1**	**12**	**43**	**4**	**17**	**26**	–	**39**	**4**
Donovanosis	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*Genital herpes	Male	8	12	222	3	35	12	7	7	21	3	2	3	–	3	
	Female	9	7	143	2	18	3	8	8	24	4	6	5	–	17	
	Total	**17**	**19**	**365**	**5**	**53**	**15**	**15**	**15**	**45**	**7**	**8**	**8**	–	**20**	**3**
*Genital warts	Male	31	74	490	57	155	31	25	62	93	36	16	20	–	2	
	Female	22	52	214	24	65	18	14	25	37	20	19	15	–	1	
	Total	**53**	**126**	**704**	**81**	**220**	**49**	**39**	**87**	**130**	**56**	**35**	**35**	–	**3**	**15**
Nongonococcal urethritis	Male	9	12	525	11	279	12	13	52	69	17	5	13	–	1	
	Female	2	–	–	3	3	4	5	–	–	4	–	1	–	–	
	Total	**11**	**12**	**525**	**14**	**282**	**16**	**18**	**52**	**69**	**21**	**5**	**14**	–	**1**	–
Lymphogranuloma venereum	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–		
	Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

* First diagnosis; 1. 01/01/93-30/09/93; 2. 01/01/93-31/08/93; 3. 01/01/93-31/07/93; 4. 01/01/93-31/10/93; 5. 01/01/93-30/11/93; 6. 01/01/93-30/06/93; 7. No SHC in Region; 8. Laboratory and SHC data 01/01/93-30/11/93; 9. No SHC in Region. Data from GP network 01/01/93-31/10/93.

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, NCR North Coast Health Region, NER New England Health Region, OFR Orana and Far West Health Region, CWR Central West Health Region, SWR South West Health Region, SER South East Health Region, 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.

DISCUSSION ON HEPATITIS C

We write to clarify some of the points in the article, Hepatitis C: the invisible virus producing very visible problems[1].

First, on the point of vertical transmission. Although initial reports showed a relatively high rate of vertical transmission (from mother to child), more recent data indicate that vertical transmission under normal circumstances is uncommon, probably less than 3 per cent. Where the mother has concurrent infection with the human immunodeficiency virus (HIV), or suffers acute infection with the hepatitis C virus (HCV) during pregnancy, or has active liver disease (chronic active hepatitis) due to HCV infection, there is a greater risk of vertical transmission occurring. Breast-feeding is not thought to be a transmission route for HCV[2].

The Victorian study of injecting drug users referred to found 68 per cent of *current* IDUs were seropositive at entry to the study[3]. More important, it found a seroconversion rate of nearly 20 per cent a year in this group, indicating rapid and continuing spread despite the existence of harm reduction programs aimed at reducing the likelihood of spread of HIV. This high incidence is consistent with findings from several studies, including this one and a NSW study[4], that between 30 per cent and 40 per cent of IDUs have been exposed to HCV within two years of beginning to inject. Subsequently, we have observed an incidence rate of 38 per cent a year among male prison entrants with a history of IDU in Victoria in 1991-2[5]. These data suggest that efforts to reduce spread of blood-borne viruses among IDUs are not totally successful, and the very real possibility exists of further spread of HIV in some subgroups of IDUs.

The estimates of 80,000 current and former IDUs chronically infected with HCV come from the Victorian study quoted, and are based on the estimate of 50 per cent of people seropositive for HCV being chronically infected, as is quoted in your article[4]. In fact, the proportion seropositive who are chronically infected is now thought to be higher – in the order of 80 per cent or more. As well, several studies have shown that the current second generation screening assays are imperfectly sensitive compared with polymerase chain reaction (PCR), and may miss as many as 10 per cent of chronically infected people in some populations[6]. In the quoted Victorian study, 5 per cent (2/38) of the HCV seronegative IDUs were repeatedly PCR positive. On the basis of these data, we have substantially revised our estimates upwards, and suggest now that in the order of 130,000 Australians are chronically infected with HCV as a result of injecting drug use, and between 13,000 and 20,000 are becoming infected each year.

The article also notes that "the HCV is toxic to liver cells". The early pathogenesis data supported this view, but more recent evidence is providing support for an immunological effect as well.

The conclusion of the article, in relation to the cost-effectiveness of alpha interferon treatment for chronic HCV infection, has not taken into consideration the relatively low success rate of this therapy in curing HCV infection, and the absence of long-term data on the effect of such therapy.

In the editorial comment, you refer to a large group of people with unidentified risk factors for HCV infection. There is a potential implication here which must be avoided until there is supportive evidence, and that is that there are as yet unidentified modes of transmission of the virus. Good data on the distribution of risk factors for HCV infection do not yet exist in Australia, but there are indications that a substantial proportion of those with no identified risk factor have a remote or hidden history of IDU[8], which has not been discovered by conventional notification systems.

Dr Nick Crofts, Head,
Epidemiology and International Health
Assoc Prof Stephen Locarnini, Director,
Victorian Infectious Diseases Reference Laboratory

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AUTHOR'S REPLY

Clearly, given the problems associated with the second generation antibody tests and the very definite possibility that PCR results can be over interpreted, the question of vertical transmission remains unsettled in my mind.

John Dwyer

EDITORIAL COMMENT

The comments from both Crofts and Locarnini, and Dwyer, reflect the rapidly changing knowledge of hepatitis C, and the continued differing opinions held by people knowledgable in the field of hepatitis.

PROGRESS REPORTS OF PROJECTS FUNDED UNDER THE NSW HEALTH OUTCOMES PROGRAM 1992-1993

In June 1993 a summary of each of the demonstration projects funded in 1992-93 under the NSW Health Outcomes Program was presented. The projects are demonstrating how an outcome-oriented approach in planning, implementation and evaluation of public health and clinical services can produce measurable improvements in health outcomes. Information about three of the projects will be provided in the next Health Outcomes report.

HEALTH GAINS IN INJURY

This project aims to demonstrate how specific organisational change in a district can result in better health services using injury as a case study. A management team for self-inflicted injuries has been established. Subcommittees have been formed in specific sectors of health-care delivery: health promotion and primary prevention; crisis intervention; hospital management; and post-intervention.

Appropriate care protocols for self-inflicted injuries will be prepared and implemented based on information gained from the following activities which have been completed: a literature review and analysis of local mortality and morbidity data; a review of suicide prevention strategies; documentation of existing practices; feedback on this information; and analysis of baseline data from a hospital study and school survey study. Suicide awareness workshops for professionals have been conducted and a resource directory of local agencies and professionals has been compiled. Difficulties have included maintenance of a large management committee and concurrent subcommittees and developing appropriate outcome indicators for suicide where the risk factors are multifactorial; 'at risk' people are difficult to identify; 'masking' and misdiagnosis of attempted suicides are often encountered; lack of appropriate monitoring and surveillance systems; and the management of self-inflicted injuries is dependent on a large number of health and allied professionals.

A similar process beginning in February 1994 will address orthopaedic trauma. Completion date is May 1994.

Anne Kempton and John Beard, North Coast Public Health Unit

ORGANISATION AND DELIVERY OF IMMUNISATION PROGRAMS

This project aims to establish and evaluate a system of delivery of on-the-spot immunisation to children and adolescents less than 15 years old in hospital, general practice and early childhood centres in the Central Sydney Health Area. The main outcome measure will be assessment of the number of immunisations given over the study period in each of the sites. More than 4,000 children were surveyed in August and September. Preliminary results show that 339 children were immunised on-the-spot during the study period; 75 over eight weeks by general practitioners, 72 over six weeks by nurses in the Eastern Sector early childhood centres and 192 over four weeks at Royal Alexandra Hospital for Children. Fewer than 80 per cent of children surveyed had an up-to-date immunisation status. Difficulties included non-compliance with filling out the immunisation data collection forms and resistance of staff to giving on-the-spot immunisation. Completion date is January 1994.

Margaret Burgess, Royal Alexandra Hospital for Children

OUTCOMES OF PATIENTS TREATED FOR CONGESTIVE HEART FAILURE IN WESTMEAD HOSPITAL

This project aims to develop disease indicators for congestive heart failure (CHF) and to explore ways of measuring the outcomes of its treatment. The project is based on all patients entering Westmead Hospital over a four-month period who have a principal diagnosis of congestive heart failure. A data-collection form and case-finding and case-identification procedures have been developed and tested. Data collection began in September. Patient recruitment will continue until January. Study factors being investigated include age, sex, severity of CHF, underlying cause, precipitating factors, investigations, treatment and drug use, co-morbidities and functional status. At four months after discharge follow-up details will be collected, including overall health, health service use and quality of life. Planning and development of the follow-up phase is under way. Completion date is June 1994.

Fiona Blyth, Westmead Hospital

QUALITY OF CARE AND OUTCOME INDICATORS FOR RURAL TRAUMA SERVICES

In July 1993 the rural trauma notification trial began in three localities. Ambulance officers use guidelines to identify seriously injured patients who might benefit from the early mobilisation and intervention of the local medical retrieval team. This information is communicated to the retrieval physician so an immediate coordinated response can be mounted to minimise the delay from injury to effective treatment.

The project team has consulted hospital and Health

District executives, Rural Network Critical Care Committees, NSW Ambulance Service and local clinicians about the development of health indicators. A provisional set of indicators is available.

Piloting of health indicators has begun. Procedures to identify trauma deaths for audit and review have been established. Data collection from ambulance and hospital records is in progress. A pilot clinical audit/ outcome committee has been set up in the Central West to review trauma fatalities and all patients identified using the pre-hospital trauma notification guidelines.

We have encountered some difficulties implementing the notification trial resulting in one of the original four localities withdrawing. No formal results are available yet, but a change in attitude from individuals to a regional approach to trauma is apparent. Completion date is July 1994.

Tony Burrell, Orange Base Hospital,
David Lyle, Epidemiology and Health Services Evaluation Branch, NSW Health Department

Development of an indicator for acute myocardial infarction

The aim of this project is to develop and pilot a standard diagnostic indicator for acute myocardial infarction. The standard diagnosis will be based on a combination of information on patients' symptoms, cardiac enzymes, ECG findings and previous history of myocardial infarction obtained from clinical records. Data have been collected for patients aged 25-79 years who are admitted to one of the Newcastle hospitals participating in the WHO MONICA Project. Data collection began in July and was completed in November, and data entry is being undertaken. Analysis will include the validation of the indicator against the more complex diagnostic criteria developed for the WHO MONICA Project, and will also be compared against ICD codes from the hospital morbidity data. Completion date is January 1994.

Annette Dobson, Centre for Clinical Epidemiology and Biostatistics

Assessment of diabetes in South Western Sydney

This project aims to compare the health outcomes and costs associated with ambulatory stabilisation of diabetics on insulin, with the more traditional method of initiating and stabilising insulin treatment on an inpatient basis. A review consisting of a random sample of medical records belonging to patients who had a principal diagnosis of diabetes in July 1992 and June 1993, and who attended one of five hospitals in South Western Sydney Area, has been completed. Patients who were admitted to hospital and those who were commenced on insulin on an ambulatory basis were identified. Preliminary results of this review indicated there was no standardised management plan within or between hospitals, and many substantial data items were missing from patients' medical records. From this random sample, most of the patients hospitalised for stabilisation were newly diagnosed Type I patients. Most of those treated on an ambulatory basis were Type II – tablet failure patients. A study has begun recruiting all patients who commence insulin for the first time, to investigate further the health outcomes of these individuals by assessing a number of clinical and psychological variables. Completion date is August 1994.

Jeff Flack, Diabetes Centre, Lidcombe

New England immunisation register

A voluntary immunisation register is operating successfully in Armidale and surrounding areas. The aim of this project is to enrol all new babies from the remainder of the New England Region on to a voluntary immunisation register, to test four interventions to improve the rate and punctuality of immunisations in these infants, and to determine which intervention is the most cost-effective method of improving immunisation in the New England population. The register has been promoted to 143 immunisation providers, health services and maternity units, and local co-ordinators have been appointed. One of four interventions has been assigned to specific geographic areas. These interventions are:

i) provider lists for provider recall, a client 60-day reminder, client calendar;
ii) client reminders 14 days before and 30, 60 days after immunisations fall due, a home visit at 90 days, provider lists for recording (not recall);
iii) client calendar, client reminder at 60 days, home visit at 90 days, provider lists for recording (not recall); and
iv) client reminder at 60 days, home visit at 90 days, provider lists for recording (not recall).

Data about the costs associated with each intervention are being collected. Immunisation rates, punctuality of immunisations and cost will be measured. A survey of attitudes of providers and clients will also be undertaken. All 143 immunisation providers in the Region have agreed to notify the register of immunisations given. Enrolment of clients began on July 1. Of the 122 providers sent lists with clients' due date, 52 (43 per cent) have responded with a return notification indicating they have immunised

one of the children on their list. Participation has been slightly lower than in the Armidale pilot study which reported a 99 per cent uptake by parents. There has been variation between districts in the response rates of mothers agreeing to be placed on the immunisation register, uptake ranging from 97 per cent to 88 per cent. Completion date is April 1994.

Andrew Gardiner, New England Region Child Health Service

BARRABA COMMUNITY HEALTH OUTCOMES PLAN

The Barraba Community Health Outcomes Plan is being devised as a pilot model suitable for use in small rural communities. This will be achieved through the analysis and interpretation of a broad range of local data which will be used to assist a health service and local government consult with the community to develop and implement plans to improve the health of the community. The first phase of the project, which involved the analysis and interpretation of local data, performed by the Centre for Small Area Research (CSAR), University of Sydney, has been completed. A team comprising representatives from the Public Health Unit, local hospital, shire council, adult learning centre and CSAR has been formed to identify issues needing further investigation and to plan discussions about local health issues. In the next phase, community discussions will be held and the development and implementation of a Barraba Community Health Outcomes Plan will occur. Completion date is September 1994.

Bob Scott, New England Public Health Unit

EVALUATION OF THE IMMUNISATION SERVICE IN ORANA AND FAR EAST REGION

This project aims to evaluate the immunisation programs offered in a rural area of NSW and to examine a cluster sampling method to provide ongoing evaluation of immunisation programs. It also aims to identify constraints leading to failures in compliance on the part of parents and care givers which cause problems in immunisation programs in the State, including: an evaluation of the cold change, logistics of the immunisation program in OFW and an assessment of knowledge, attitudes and practices of health care providers and members of the community in relation to immunisation.

A point prevalence of immunisation status outcomes of children 24-48 months based on the WHO methodology, using 30 clusters of seven children, was planned. The standard WHO door-to-door method was too time-consuming so a modified telephone method was developed. The clusters have been completed and preliminary results show that immunisation coverage rates for children in Western NSW appear to be better than anticipated. Completion date is January 1994.

John Hall, Orana and Far West Public Health Unit

EVALUATION OF TUBERCULOSIS PROGRAM OUTCOME INDICATORS IN SOUTH WESTERN SYDNEY AND A TARGETED INTERVENTION TO MINIMISE DELAY IN DIAGNOSIS

In stage one of this project the aims are to quantify the delay in diagnosis, notification and initiation of appropriate treatment for TB in South Western Sydney. Factors which contribute to these delays and result in non-compliance of treatment will be examined. Data will be obtained by interviewing all patients attending Liverpool Chest Clinic with a diagnosis of TB over a 12-month period and seeking permission to review their clinical records. Mechanisms for monitoring TB program evaluation indicators will be developed.

The second stage involves trialling interventions to reduce delays in diagnosis, notification and treatment of TB cases. Interventions to be tested involve assessing the availability of the BACTEC diagnostic test and the effectiveness of an educational intervention for GPs and Emergency Department staff which aims to raise awareness of TB.

Interviews are in progress and the sample of GPs to be targeted is being selected. One difficulty has been that many patients with active TB do not attend Liverpool Chest Clinic for treatment (e.g. young children, patients under the care of private physicians supervising therapy, and people in institutions). This has necessitated conducting home visits to interview patients, many of whom require the services of an interpreter.

Preliminary results based on 20 cases of active TB show that the median delay of onset to diagnosis is 2.5 months (range 1 day-26 months); median delay of diagnosis to therapy is one week (range 2 days-9 weeks); median delay of diagnosis to notification is three days (range 0-3 weeks). Completion date is September 1994.

Greg Stewart, South Western Sydney Public Health Unit

QUALITY OF CARE AND OUTCOMES INDICATORS FOR CRITICAL CARE

This project involves the development and testing of a set of quality of care and outcome indicators to monitor and evaluate changes made to the critical care service configuration in South Western Sydney.

Ambulance and hospital services are being reorganised to deal with critical illness more effectively, in acute hospitals or when the need arises to transport critically ill patients between hospitals. A pilot survey of unplanned admissions to intensive care units (ICUs) is being conducted and a database developed. A survey of avoidable deaths across the Area is planned and a pilot of this project is under way at Liverpool Hospital. A hospital review committee will be set up to review these deaths. Deaths, unplanned admissions and patients with acute renal failure will continue to be monitored. Completion date is August 1994.

Ken Hillman, South Western Sydney Area
David Lyle, Epidemiology and Health Services Evaluation Branch, NSW Health Department

HEALTH INDICATORS FOR DIABETES – A CONSENSUS APPROACH

In September 1993, 45 diabetes health professionals, people with diabetes and NSW Health Department representatives attended the first NSW Diabetes Outcomes Workshop. Their goal was to reach consensus about what data should be collected to monitor outcomes in diabetes, how often and for what purposes.

The workshop was divided into two sessions, each consisting of individual group work and a plenary discussion time. For the first session participants were allocated to one of five groups dealing with specific diabetes outcomes such as acute complications, chronic complications, risk factor and demographic issues and diabetes self-care issues. Groups reconvened to discuss and gain consensus on appropriate and useful health outcome indicators for diabetes. This session resulted in 59 diabetes health outcome indicators representing various diabetes demographic and health outcome measures (including definitions and specifications). These indicators are referred to as 'agreed' diabetes indicators. Ten others were identified as potential indicators which required further discussion and development.

In the second session participants were assigned to one of four work practice areas – hospitals, GP and specialist, diabetes centre and community – to try to identify who could and should collect data. The 'agreed' indicators were considered by the four practice areas with respect to the practicalities of data collection. Most were seen as appropriate and feasible to be collected by all four areas. Several issues and areas of contention were identified for further discussion and debate.

A working party will be established to consider the potential indicators, any necessary indicator development and to resolve the areas of contention. The working party will also investigate further practical aspects of the collection of these items.

The 1993 NSW Diabetes Outcomes Workshop is a first step in establishing a minimum diabetes dataset for use in Australia. Its final report will be distributed in December 1993. The project has been completed.

Stephen Colagiuri, Diabetes Australia

PROFILING SEVERITY OF ILLNESS AND OUTCOME OF INTENSIVE CARE

This project will add substantial value to the Australian and New Zealand Intensive Care Society (ANZICS) information system which contains a standardised core of clinical data collected by 50 intensive care units (ICUs) in Australia. The aims are to design and implement a production data analysis and reporting system for the national ANZICS database and to prepare statistical reports on critical illness and intensive care units in Australia. Data on more than 8,000 ICU patient admissions have been analysed. Preliminary results show there are considerable differences in the patient mix across units, although the grouped data show little variation in severity of illness or outcomes with sex or age. Calculated standardised mortality ratios using APACHE II predictors compared favourably with published studies. Mean age was 57.8±16.8, mean APACHE II was 15.1, survival from ICU to discharge was 90 per cent and standardised mortality ratio was 0.81. Figure 1 illustrates mortality for ICUs for all diagnoses.

The data collection software will continue to be refined and education for the uses of the data will be provided. The central database and data error checking will also continue to be refined. Completion date is June 1994.

David McWilliam, Royal Prince Alfred Hospital

FIGURE 1

HOSPITAL OUTCOMES FOR ICUs: ALL DIAGNOSES