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Avoidable hospitalisations: potential for primary and public health initiatives in Canterbury, New Zealand

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Abstract

Aim To investigate the extent of potentially "avoidable hospitalisations" in the Canterbury District Health Board area; specifically, to identify the leading causes, recent trends, and estimated costs of avoidable hospitalisations.

Methods All hospitalisations in Christchurch Hospital from 2000 to 2004 were analysed and potentially "avoidable admissions" were categorised using ICD10 clinical codes. Costs of these admissions were estimated for the financial year ending 30 June 2003 using diagnostic-related groups (DRGs).

Results The leading causes of potentially "avoidable hospitalisations" in Christchurch Hospital were cardiovascular disease, stroke, respiratory, gastrointestinal, and urinary disorders. The total estimated costs of avoidable hospitalisations in 2003 were NZ$96.6 million, accounting for an estimated 94,462 bed days. The estimated costs of cardiovascular admissions (excluding stroke) were $50.6 million, with stroke accounting for an additional $6.2 million.

Conclusion Potentially "avoidable admissions" to Christchurch Hospital comprised 31% of all hospital admissions. There is considerable opportunity to invest in public and primary health initiatives aimed at early detection and intervention, with the major opportunities being identified as cardiovascular disease, stroke, respiratory, gastrointestinal, and urinary disorders.

The New Zealand health system must make decisions about how best to spend limited budgets to attempt to cater for ever-increasing demands. The concept of "avoidable hospitalisations" offers a way of helping to identify options for spending these health resources on initiatives where heath gains may be achieved or even maximised.

The concepts "avoidable hospitalisations" and "avoidable mortality" have been proposed as a way of identifying hospital admissions and premature mortality that could potentially be prevented by timely and effective health interventions[1]. These are theoretical concepts based on a list of selected diseases and causes of death that are amenable to early detection and/or preventive measures.

The majority of potentially "avoidable hospitalisations" involve conditions that could have been identified and treated earlier by either public health or primary healthcare interventions, thereby preventing deterioration that may involve a hospital admission or even death. Examples include lung disease; cervical and breast cancer; traffic accidents; infectious, cardiovascular, and vaccine preventable diseases; early detection and excision of melanoma; and effective glycaemic control in people with diabetes.

The majority of these conditions are amenable to early diagnosis, prevention, and/or earlier interventions that could potentially prevent more severe morbidity and save life and health system costs.

The Ministry of Health[2,3] found that avoidable hospitalisations in New Zealand increased slightly during the 1990s, then stabilised from 2000. However, when this trend was disaggregated, ambulatory sensitive hospitalisations increased by 25% from 1989 to 1998.[2] These were categorised as diseases that are sensitive to prophylactic or therapeutic interventions that are able to be delivered in a primary healthcare setting.[2]

Other researchers have found that this increase in potentially avoidable hospitalisations has occurred since at least 1980, and that there are some regional differentials that are related to ethnic and demographic factors.[4] Indeed, some studies have suggested that there is a link between avoidable hospitalisations and under-utilisation of primary care, particularly by lower socioeconomic groups.[4,5] Lower income people may put off going to the doctor until it is too late to avoid hospitalisation.[5]

The idea of placing more emphasis on early detection and intervention is related to the concept of *allocative efficiency*, which aims to achieve a more efficient use of resources by providing services in different ways. This literature indicates the intriguing idea that it may be possible to achieve a reduction in potentially "avoidable hospitalisations" and "avoidable mortality" by placing more emphasis on primary-health and public-health interventions. Although this potential has been noted using national data, little attention has previously been given to investigating the extent of avoidable hospitalisations at the regional level, and the total resources that such admissions may be consuming.

Therefore, Canterbury District Health Board (CDHB) data were used to estimate the extent of potentially avoidable hospitalisations in Canterbury, the estimated costs of such admissions, the leading causes, and recent trends. Such data should be an important consideration for making decisions about both new investments and how existing services are configured.

Methods

All hospitalisations in Christchurch Hospital for financial years 1 July 2000 to 30 June 2004 were analysed, using data provided by the Decision Support Unit of the Canterbury District Health Board.

Hospitalisations were categorised using the International Classification of Diseases (ICD 10) and were identified as "avoidable" following the definition used by the Ministry of Health,[2] which states that potentially avoidable hospitalisations fall into two subcategories:

- Preventable hospitalisations which result from diseases preventable through population-based health promotion strategies (e.g. tobacco taxes, smokefree laws); and
- Ambulatory sensitive hospitalisations which result from diseases sensitive to prophylactic or therapeutic interventions deliverable in a primary care setting.

As stroke is an important health issue in its own right, stroke was recorded as a category distinct from other cardiovascular disease for the purposes of this study.

Identification of an admission as potentially "avoidable" was based on the primary diagnosis. Comorbidities and secondary discharge codes were not taken into account. Consistent with the Ministry of Health[2] definition, hospitalisations of people aged 75 years and over were excluded from the analysis.

The costs of hospitalisations were estimated using diagnostic-related groups (version New Zealand DRG WEIS 8B). ICD codes were mapped across to the corresponding DRG codes to obtain average

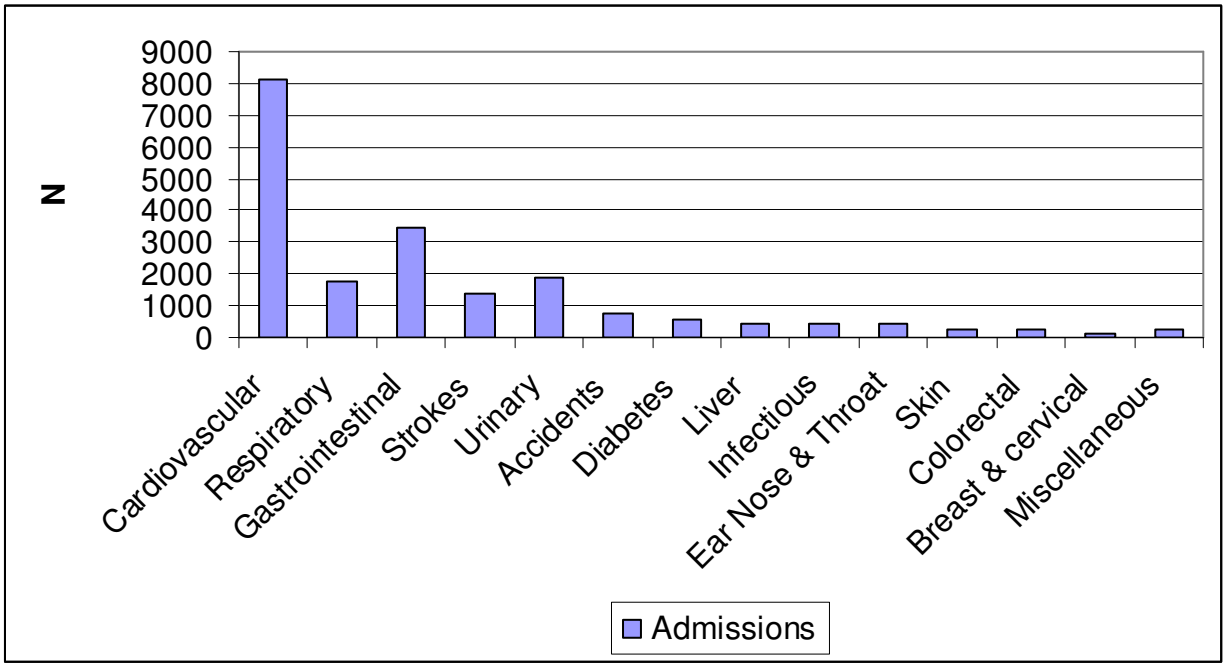
lengths of stay by admission, and the appropriate DRG payments were multiplied by the number of admissions to obtain an estimate of their total costs. Costs of hospitalisations were estimated for the financial year ending 30 June 2003.

Data was analysed using Microsoft Excel spreadsheets.

Results

Findings and trends—In 2003, 31% of admissions to Christchurch Hospital were categorised as potentially "avoidable hospitalisations." By far the largest category was cardiovascular disease, which comprised over 8000 of the total 66,399 admissions in Canterbury in 2003, and 40% of all avoidable hospitalisations. The next most frequent causes of avoidable admissions were gastrointestinal (17%), respiratory (9%), stroke (7%), and urinary disorders (9%) [Figure 1]. Comparatively small numbers of admissions were due to cervical, breast, and colorectal cancers.

Figure 1. Major categories of avoidable admissions to Christchurch Hospital in 2003



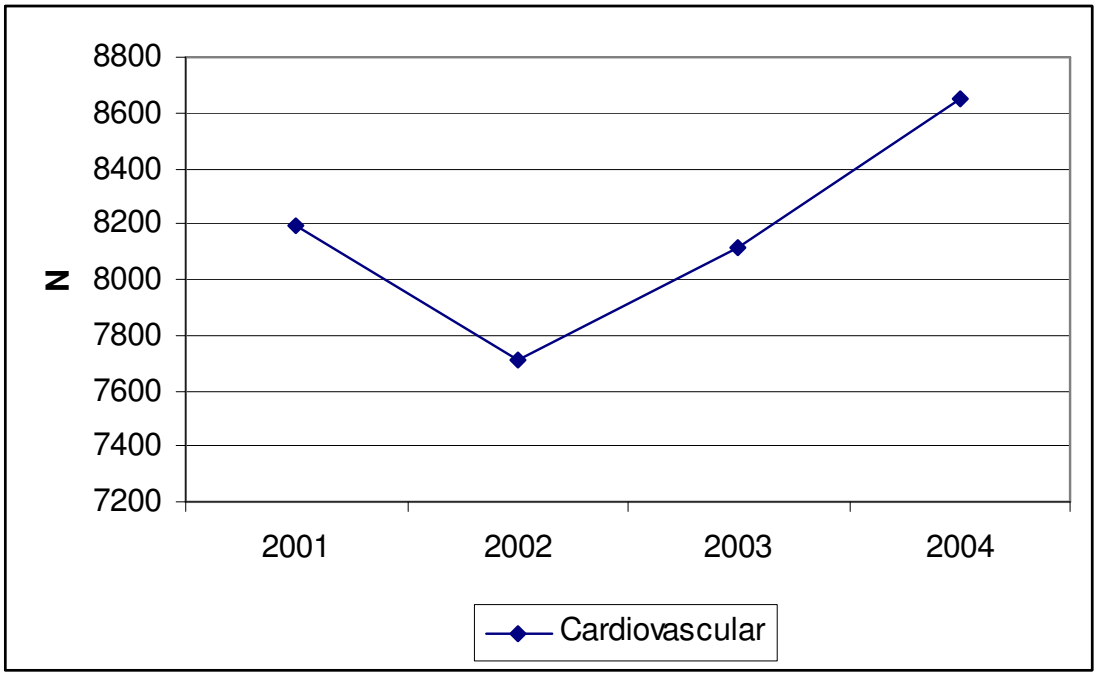
Note: Hospitalisations were for the financial year ending 30 June 2003.

The trend has been for increasing numbers of cardiovascular admissions from 2002 to 2004 (Figure 2), which reflects total numbers of admissions for people aged under 75 years, and does not control for possible age-specific trends. Numbers of admissions for respiratory and urinary disorders have demonstrated a similar increasing trend (Figure 3).

In contrast, admissions for gastrointestinal disorders have declined since 2003. While other diseases were comparatively less frequent, some of them have shown a trend of marked increases from 2001 to 2004, notably for liver disease and diabetes (Figure 4).

Given the increasing prevalence of both liver disease and diabetes, continued increases in hospital admissions can be expected in future, unless effective policies are implemented that are aimed at earlier intervention and prevention.

Figure 2. Trends in total cardiovascular admissions: 2001 to 2004



Note: Admissions were for the financial years ending 30 June, for each of the years 2001 to 2004.

Estimated costs of potentially avoidable admissions—Total estimated costs of potentially avoidable admissions to Christchurch Hospital in 2003 were NZ$96.6 million (Table 1). Cardiovascular disease (excluding stroke) accounted for 52% or $50.6 million and an estimated 34,390 bed days (Table 1).

Stroke accounted for a further $6.1 million and 12,160 bed days. Following (in descending order of cost) were ear, nose, and throat (ENT); respiratory; urinary; gastrointestinal disorders; accidents, poisonings, burns; and colorectal (Table 1).

Ranking in order of estimated total costs provides some changes in ranking compared with that obtained from total numbers of hospitalisations. The most notable are costs of ear, nose, and throat conditions, which rank third in order of total costs (Table 1), although they are comparatively low in actual numbers of admissions (Figure 1). Similarly, costs of colorectal admissions are high relative to their lower volumes shown in Figure 1.

Figure 3. Trends in total admissions for respiratory, gastrointestinal and urinary disorders: 2001 to 2004

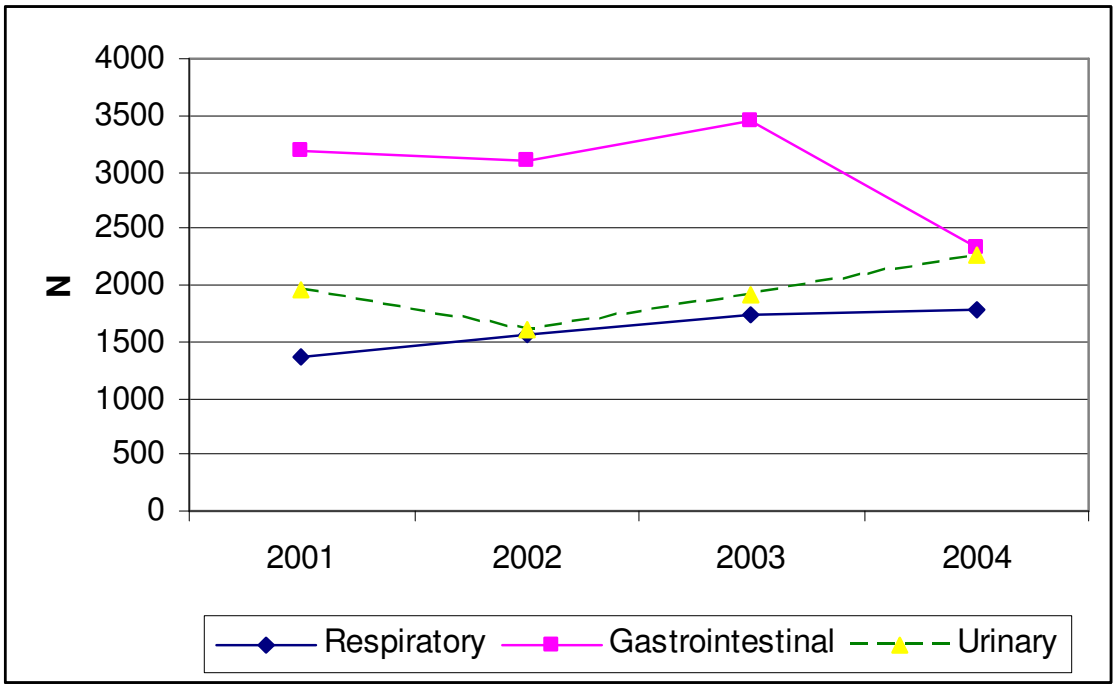


Figure 4. Trends in total admissions for diabetes, liver, and infectious diseases: 2001 to 2004

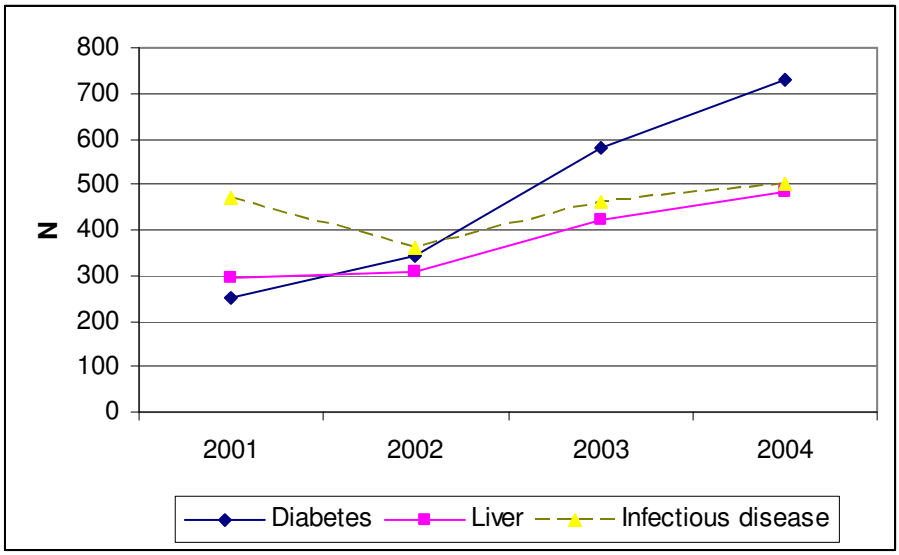


Table 1. Estimated costs of avoidable admissions to Christchurch Hospital in 2003

Disease or condition	Estimated cost (NZ$)	Estimated bed days
Cardiovascular disease	50,578,119	34,390
Stroke	6,168,203	12,160
Ear, nose, and throat (ENT)	7,903,666	5,579
Respiratory disorders	5,852,304	9,034
Urinary	4,812,688	6,348
Gastrointestinal	4,527,573	5,986
Accidents, poisonings, and burns	4,373,880	4,549
Colorectal	4,086,276	4,495
Diabetes	2,665,868	4,215
Liver and biliary	2,027,793	2,451
Infectious disease	1,991,593	2,882
Skin disease	518,395	1,052
Breast and cervical cancers	687,696	735
Miscellaneous	417,532	586
Total estimated costs	**96,611,586**	**94,462**

Note: Hospitalisations were for the financial year ending 30 June 2003.

Discussion

The concept of potentially "avoidable hospitalisations" helps to highlight opportunities for health interventions that may make a difference. It indicates the categories of morbidity that could potentially be targeted in public health and/or primary care settings. The proposal is that through earlier identification and intervention there are opportunities to prevent more advanced disease that may involve hospitalisations or deaths.

This data shows that, in Canterbury, by far the largest number of avoidable hospitalisations are for cardiovascular disease, involving estimated costs of over $50 million in 2003 and over 34,000 bed days.

Recently, the New Zealand Guidelines Group (NZGG)[6, 7] recommended more systematic screening and management of cardiovascular risk factors. Indeed, given the prevalence of cardiovascular disease, and the available options for preventive interventions, primary health care practitioners are well placed to play a key role in such a strategy.

The main components recommended in the NZGG guidelines were:

- Risk assessments at specified age thresholds, with earlier assessment for Māori, who bear the greatest burden of cardiovascular disease;
- Lifestyle changes such as physical activity and diet;
- Medication aimed at modifying blood pressure and lipid levels.[6]

The data presented in this paper reinforces the importance of cardiovascular disease that has been highlighted by other studies, and indicates the high costs of cardiovascular admissions in one of New Zealand's largest district health boards.

Cardiovascular disease has been well documented as being the leading cause of premature mortality and disability.[2] A recent New Zealand study has noted suboptimal management of risk factors in a sample of patients with known cardiovascular disease.[8] Only 30% of patients met all prevention targets, thus indicating the potential for a partnership between secondary and primary care providers with the aim of improving management of risk factors and preventive strategies.

Previous research has ranked respiratory disease as the fifth leading cause of premature mortality and disability for the total New Zealand population.[2] This study also found that, in Canterbury, respiratory disorders are one of the most important causes of avoidable hospitalisations (Figure 1).

The Ministry of Health[9] ranked chronic obstructive respiratory disease (CORD) and asthma as highly modifiable (using evidence-based medicine). Guidelines have been developed for improved management of respiratory disease in the community, with general practitioners playing a key role. Respiratory disease is currently not identified as one of New Zealand's health goals. However, because it is amenable to intervention and is a major cause of hospitalisation, consideration should be given to making it a higher priority.

Much of the literature on "avoidable morbidity," indicates that there is considerable opportunity for improving allocative efficiencies in healthcare by investing in initiatives which have the potential to make a difference in improving outcomes.

The idea of *allocative efficiency* involves providing services in different ways with more emphasis on earlier detection and intervention in order to prevent or slow the development of more severe disease. Examination of the main types of avoidable hospitalisations indicates that such initiatives should focus on cardiovascular disease, stroke, gastrointestinal, respiratory, and urinary disease (Figure 1).

As shown in Table 1, more than $75 million was spent on hospital care for these categories of admissions in Christchurch Hospital in 2003. Although these were the top five causes of such admissions, there is evidence of trends of continuing increases in admissions for other diseases, particularly for diabetes and liver disease (Figure 4).

There is an ongoing debate about whether new investments should emphasise secondary care such as angioplasty, or primary care such as improved lifestyle and management of high blood pressure and cholesterol. However, there is increasing evidence that improved health care in community settings can lead to better health outcomes and this should involve a partnership between secondary care, primary, and public health providers.

For example, a 2002 UK National Heart Forum study estimated that coronary heart disease incidence could be reduced by 30% by relatively modest changes in peoples' cholesterol levels, blood pressure, physical activity as well as by smoking cessation.[10] Also, two New Zealand studies have demonstrated that "avoidable admissions" can be successfully managed in primary healthcare settings.[11,12]

From 2002 to 2005, the New Zealand Government has committed over $400 million to the *Primary Healthcare Strategy*, with the major aim of reducing patients' out-of-pocket costs of attending consultations with general practitioners. While reduction in financial barriers to access is an important goal, consideration should also be given to

targeting some of this investment to detecting and managing common health problems that are amenable to intervention, such as cardiovascular disease. There is good evidence that this can be achieved cost-effectively.[13]

There will be challenges to placing more emphasis on prevention and earlier detection, with one of the major ones being how to fund these services. A possible option would be to target new investment in primary care specifically to preventive programmes, rather than the present strategy in which the new funding seems relatively untagged in the hope that it will flow on to lower patient co-payments.

A further option would be to improve the funding of public health programmes that could complement primary care strategies aimed at lifestyle changes such as quitting smoking as well as improvements in diet and physical activity. Historically, public health has received less than 4% of the *Vote Health* package (money allocated by the Government to health in its budget), despite contributing to major reductions in morbidity during the twentieth century. Such strategies would not involve major re-allocation of resources from curative services, rather they imply changes in emphasis and thinking.

The New Zealand health system has devoted much energy over the past 20 years to technical efficiencies—by reducing costs of overheads and service delivery. The data in this study, and in other research on "avoidable admissions," suggest that there may also be major opportunities to improve *allocative efficiency* by investing in initiatives that emphasise earlier detection as well as public health and primary health interventions.

CDHB is undertaking initiatives in some of these areas, in conjunction with primary health providers. A pilot project is being planned to screen for cardiovascular risk factors in some general practices. A revised manual is being trialled for rehabilitation of patients with cardiovascular disease.

Improved detection and management of diabetes is a major priority. Respiratory disease has also been recognised as a priority and a project is being planned to provide community spirometry services. These projects are important steps towards public and primary health initiatives that will promote earlier detection and management in community settings.

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