Putting data into context: Findings from linking Medicare health service use and expenditure data with longitudinal health survey data

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Abstract

Introduction

The Australian Longitudinal Study on Women's Health (ALSWH), funded by the Commonwealth Department of Health and Ageing, is a study of the health and well being of three large cohorts of Australian women. The ALSWH has made extensive use of linked survey and Medicare/Department of Veterans' Affairs data. Results are presented to illustrate the value of the linked data for informing policy makers about provision of health services and for monitoring compliance with best practice guidelines.

Methods

The project recruited three large, nationally representative cohorts of women, aged 18–23 years (n=14,228), 45–50 years (n=13,338) and 70–75 years (n=12,317) in 1996. Self-administered postal surveys are completed every three years and include a wide range of measures of demographic, social and health-related factors. Almost 23,000 of the women have given written consent for the release of their individual records from the Health Insurance Commission. Data relating to more than 1.5 million Medicare/DVA services provided to these women during 1995–1999 have been linked to the first two phases of their survey data. Changes in health, health service use and the costs of services were examined according to age, urban/rural residence and socioeconomic status. Analysis of the linked data for subgroups of women, such as frequent attenders to general practice, and the use of best practice guidelines for diabetes care were also examined.

Results

For all age groups, women with lower socioeconomic status tended to have lower out of pocket costs for general practice visits. However, women in rural and remote areas reported poorer access to doctors who bulk bill and Medicare data showed these women had higher out of pocket costs than women living in urban areas. Many of the very frequent attenders to general practice had suffered a major personal illness, and the survey data showed that many also had very difficult personal and social circumstances. Women with diabetes, and those who developed diabetes, reported poorer health and greater use of health services and medications than women without diabetes. Medicare data helped to quantify the increased health service use and expenditure over time (for services outside hospital) for these women. However their Medicare data also showed that compliance with best practice guidelines for diabetes care, such as monitoring HbA1c, was sub-optimal.

Conclusions

The linked data provide information on medical conditions and social circumstances which are valuable for understanding health service use. Inequalities in the provision and costs of health care services were identified. The linked data can be used to monitor compliance with best practice guidelines for care and to determine the impact of strategies designed to improve the health and well being of women.

Introduction

Record linkage involves the amalgamation of records relating to the same individual from different sources, based on there being individual identifying information in each database to be linked (Sibthorpe et al, 1995; Lazaridis, 1997). Research based on linked records has the potential to make a major contribution to the understanding of the factors influencing diseases, disability and death and will become increasingly important in the evaluation of health services (Holman et al, 1999).

The linkage of survey and health service utilisation databases can provide a rich database for the measurement of health care utilisation, health and socioeconomic characteristics. Often administrative databases contain limited socioeconomic information about individuals and on the other hand, survey data contain little service information. Lillard and Farmer (1997) discussed the benefits and difficulties of linking survey data with Medicare administrative data in the United States and concluded that linkage can substantially expand the scope of research questions that can be addressed, compared to when

the databases are used separately. They concluded that linked data can be used to evaluate health policy development and for clinical and epidemiological research, but such studies are not widely represented in the literature.

In Australia, one source of utilisation data is the Health Insurance Commission (HIC), which processes claims for medical services provided by Medicare and the Department of Veterans' Affairs (DVA). The feasibility of linking HIC records with survey data, hospital records and cancer registry data was demonstrated by the Australian Record Linkage Pilot Study (McCallum et al, 1993). Several research studies have been based on the linked database for the 521 people who consented for their records to be linked, including the characteristics of persons who used multiple general practitioners (GPs) (Veale et al, 1995), the measurement of continuity of care (Pilotto et al, 1996) and the characteristics of longer consultations (Martin et al, 1997).

The Australian Longitudinal Study on Women's Health (ALSWH), also known as the "Women's Health Australia" project, provided an opportunity to link survey data and HIC data for large numbers of women. The initial objective of the longitudinal study was to establish baseline prevalence data on a broad range of health indicators, to examine associations between health indicators, health care utilisation and quality of life, and to determine the factors associated with a number of key outcomes (Brown et al, 1996). Although the potential for determining causality in the short term was relatively limited, the study was designed to yield increasingly valuable information about predictors of health outcomes for women over time.

Findings from several studies using linked ALSWH data and HIC data have been published (Young et al, 2000; Young et al, 2001a; Young et al, 2001b). These studies have examined issues relating to individual consent to linkage, access and equity in the provision of GP services and the determinants of GP use. It has also been suggested that linked data can be used to monitor quality of care processes and outcomes for women with conditions such as diabetes (Colagiuri et al, 1998). Also if very frequent users of health services are to receive appropriate medical and social care, their consulting behaviour over time needs to be better understood in the context of their social circumstances as well as their medical conditions (Neal et al, 1998). This paper presents an overview of the work currently being undertaken using linked ALSWH data and HIC data and discusses the value of these linked data for understanding health service use.

Methods

Survey data

The project recruited three large, nationally representative cohorts of women, aged 18–23 years (n=14,228), 45–50 years (n=13,338) and 70–75 years (n=12,317) when the study commenced in 1996. The recruitment methods and the response rates for this study have been reported elsewhere (Brown et al, 1998; Brown et al, 1999). The age groups were selected so that participation in the study commenced, for many women, before the occurrence of major life events such as first pregnancy (young cohort), menopause (mid age cohort) and death of spouse or decline in health (older cohort). Self-administered baseline surveys were completed in 1996 (Survey 1). Survey 2 for the mid age cohort was completed in 1998, for the older cohort in 1999 and for the young cohort in 2000. Follow up surveys are continuing, with each cohort receiving a survey every three years. The surveys include a wide range of questions designed to measure demographic, social and health-related factors that may contribute to health and well being among women (Women's Health Australia, 2002). In particular, the Short-Form 36 (SF–36) Quality of Life questionnaire is used to measure health related quality of life (Ware and Sherbourne, 1992). The women are also asked about their medical conditions and symptoms, education, marital status, employment, time use, medications, and their access to and satisfaction with health care services.

Health service use data

Participants were asked for their permission for ALSWH to have access to information held by the HIC. The methods used to request consent and the consent rates have been published previously (Young et al, 2001a). In summary, 19,700 women consented to record linkage after the first request in 1997 and a further 3,000 consented in 1999. For consenters, the unit record information provided by the HIC for the five-year period 1995–1999 included the ALSWH study number (to enable linkage to the ALSWH database); postcode of residence; date of the service; item number; broad type of service category; amount charged by the provider; Medicare benefit for the service (the 'rebate'); whether Medicare or the DVA paid for the service; the provider's sex, age group, major specialty, state of residence and a de-identified provider number. The HIC data were summarised by us for each woman to measure the number of GP visits, the out of pocket cost for each service, the number of GPs consulted, and the number of condition-specific tests, such as HbA1c tests for established diabetes.

Frequent attenders

Of the women who consented to record linkage, the highest 5% of GP attenders in each age group were defined as frequent attenders. During the two-year period 1995–1996 the frequent attenders in the mid age group accounted for 20% of the GP attendances of women their age and each had at least 27 attendances (n=396 women). Those mid age consenters who had no GP visits processed by the HIC for the two-year period 1995–1996 were defined as non-attenders (n=262). The remaining mid age women who had at least one GP attendance but were not frequent attenders were allocated to two groups of similar size according to the frequency of their GP attendance during 1995–1996 (n=3726 women with 1–7 attendances and n=3514 women with 8–26 attendances).

Women with diabetes

Responses to the questions on diabetes in Survey 1 and Survey 2 for the mid age and older women were used to define diabetes status. Some women reported they had diabetes at the time of Survey 1 in 1996 (n=236 mid age and n=840 older women). Women who reported having diabetes at the time of the Survey 2 and not Survey 1 were considered to be newly diagnosed cases (n=141 mid age and n=266 older women) and the remaining women were defined as not having diabetes (n=11,853 mid age and n=9,315 older women).

Results

For all age groups, women with lower socioeconomic status tended to have lower out of pocket costs for general practice visits. However, women in rural and remote areas reported poorer access to doctors who bulk bill and Medicare data showed these women had higher out of pocket costs than women living in urban areas (Figure 1).
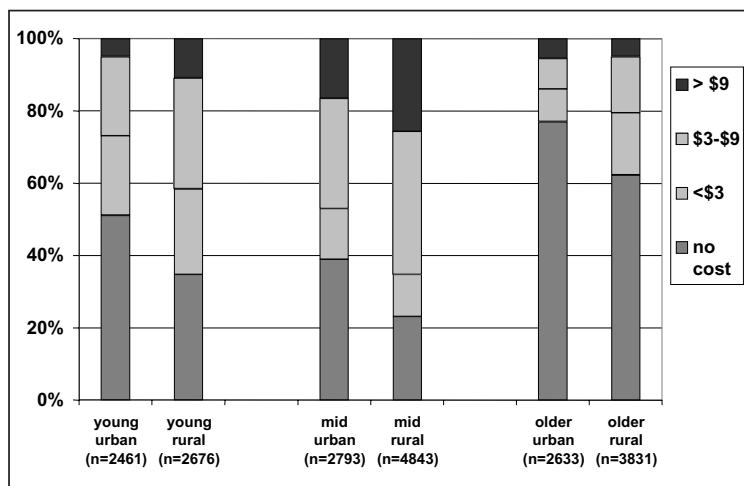
	very frequent attenders (n=396)	above median attenders (n=3514)	below median attenders (n=3726)	non-attenders (n=262)
	%	%	%	%
Urban residence	48	41	32	30
No post school education	71	65	59	59
Separated/divorced/widowed	25	14	11	7
No paid work	55	34	29	36
SF-36 scores (median) [a]				
general health	45	72	82	82
physical functioning	75	90	95	95
bodily pain	51	72	84	84
role physical	33	100	100	100
role emotional	67	100	100	100
mental health	60	76	80	84
social functioning	63	88	100	100
vitality	40	60	65	70
Major personal illness in previous year	38	13	4	3
Hospital stay in previous year	44	22	9	7
More than 3 medications	35	9	2	2
Medications for nerves	24	8	2	0
More than $6 out of pocket cost per GP visit	12	36	52	-

Table 1 Characteristics of mid age women by frequency of GP attendance
[a] higher score indicates better health

Women with diabetes, and those who developed diabetes, reported poorer health and greater use of health services and medications than women without diabetes (Figure 2). The women who were diagnosed with diabetes by Survey 2 also had higher levels of risk factors such as hypertension and obesity than women who did not develop diabetes (data not shown). Medicare data helped to quantify the increased health service use and expenditure over time (for services outside hospital) for women with diabetes (Figure 3). However the Medicare data also showed that compliance with best practice guidelines for diabetes care, such as monitoring HbA1c at least annually for women with established diabetes, was sub-optimal (Figure 4).
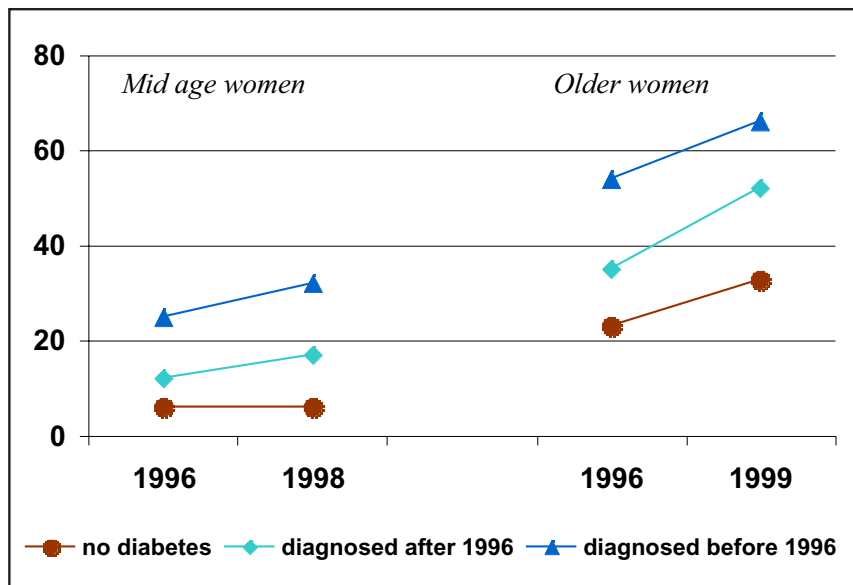

Figure 1 Mean out of pocket cost per GP attendance 1995–96 for each woman, by age group and area of residence, for women with at least one GP visit.

Mid age frequent attenders were more likely than other women their age to live in urban areas, have lower levels of education, be separated, divorced or widowed and not be in the paid workforce (Table 1). Many of the frequent attenders to general practice had suffered a major personal illness, and the survey data showed that many also had very difficult personal and social circumstances. The median scores for the eight dimensions of the SF–36, particularly those dimensions reflecting physical health, were lower for the frequent attenders (Table 1). Only twelve percent of mid age frequent attenders paid more than $6 per visit out of pocket compared to 52% of women who attended less than the median number of times.

Figure 2 Percentage of mid age and older women taking 4 or more prescribed medications

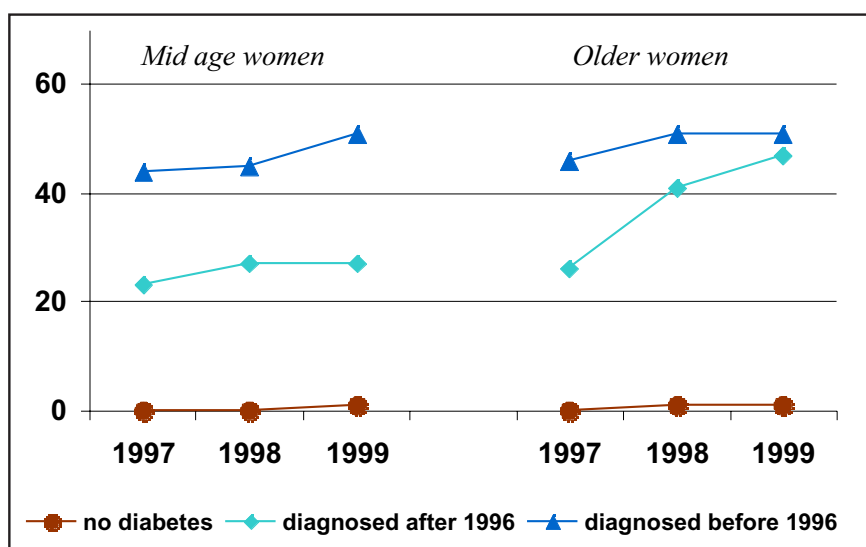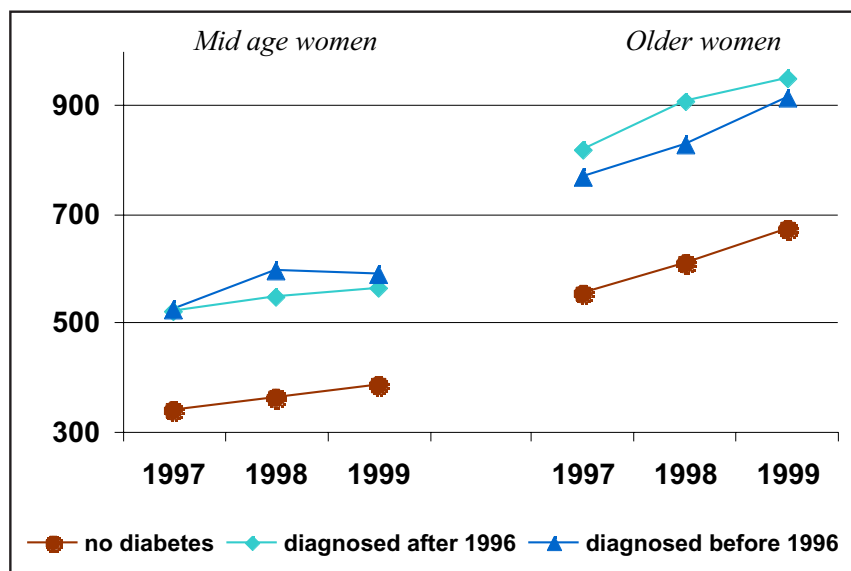Figure 3 Total Medicare/DVA rebate ($) per woman for services outside hospital

Figure 4 Percentage of women with diabetes having at least one HbA1c test per year

Discussion

In this study almost 23,000 women consented to record linkage of their survey and HIC data. This is the first study in Australia to link longitudinal survey and health service utilisation data on such a large scale, within the current legislation that requires individual consent for researchers to have identifiable information. At no stage were the women under any obligation to consent to this request and it did not affect their participation in the longitudinal study.

A major strength of this study is the ability to measure an individual's utilisation of GP services funded by Medicare and the DVA, independent of where that utilisation took place. The analysis of the merged data provided insights into use of GP services, which could not have been determined from either source alone. Although there are advantages of using HIC data compared to using practice-based measures of utilisation, there may still be some inaccuracies in the measure of GP utilisation. For example, if a GP service was provided but the account (either paid or unpaid) was not submitted to Medicare for processing, then no record of the service would be included in the HIC database. There are also some GP services provided outside of the Medicare insurance system (such as services provided by Family Planning Clinic staff and in remote areas with salaried medical staff) and records of these services are not kept by the HIC.

This study highlighted substantial variations in out of pocket costs for GP services according to place of residence. The use of bulk billing is a discretionary matter for individual GPs. Bulk billing means that the GP only receives 85% of the schedule fee for the service, and co-payment by the patient is not permitted. GPs working in rural areas may have higher costs to maintain their practices or the higher charges may simply reflect a lack of competition for business. Some women who pay high out of pocket costs may, however, be doing so because their preferred GP does not bulk bill.

The negative effect of living in a non-urban area on out of pocket costs was evident, especially for the mid age women. One of the key aims of Medicare is to limit health costs by the provision of free or heavily subsidised medical care (McClelland, 1991). Richardson (1993) argues that a plausible explanation of the difference in bulk billing rates between urban and rural areas of Australia is that as the doctor supply (in urban areas) increases, a variety of competitive activities, including bulk billing, are undertaken. The effect of this practice on the use of GP services and the changes in access to bulk billing over time, need further investigation. The linked longitudinal ALSWH and HIC data provide a unique opportunity to monitor such changes over time.

By linking self reported and administrative data collections, this study has been able to describe the demographic, social and health-related characteristics of very frequent and very infrequent attenders to general practice in Australia. The quantitative and qualitative data available from the ALSWH study complemented the financial and service use data available from the HIC.

The linked longitudinal survey data and HIC data also provided an insight into the development of diabetes and its impact on the health and well being of women in the study. The data indicate clear differences in risk factor profiles, health and health service utilisation of women who do and do not develop diabetes, that are evident before diagnosis. The extent to which the women with diabetes receive recommended medical services and screening can also be assessed within the context of their health, well being and social circumstances.

In summary, record linkage is particularly useful in longitudinal studies to provide a rich resource for research into the relationships between health care utilisation and health and socioeconomic characteristics. The linked data provide information on medical conditions and social circumstances which are valuable for understanding health service use. The linked data can be used to monitor compliance with best practice guidelines for care for chronic conditions such as diabetes and to determine the impact of strategies designed to improve the health and well being of women.

Acknowledgments

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