

Changes in AUDIT scores of Auckland general practitioner patients from 1995 to 2003

Felicity Goodyear-Smith, Ross McCormick, Grant Paton-Simpson, and Alistair Stewart

Correspondence to: f.goodyear-smith@auckland.ac.nz

Felicity Goodyear-Smith has been a practising GP since the late 1970s. She currently works eight-tenths as an Associate Professor at the Department of General Practice and Primary Health Care, The University of Auckland.

Ross McCormick is Director of the Goodfellow Unit and the Goodfellow Professor of Post-graduate General Practice, The University of Auckland.

Grant Paton-Simpson is the director of Paton-Simpson and Associates, which provides custom solutions for the IT/analysis interface.

Alistair Stewart is a Senior Research Fellow and Biostatistician with the Section of Epidemiology and Biostatistics, School of Population Health, The University of Auckland.

ABSTRACT

Aim

In 1999 New Zealand alcohol purchasing legislation changed, including a lower minimum alcohol purchasing age. We examined alcohol drinking within various demographic groups of patients presenting to Auckland general practitioners in 1995 and in 2003.

Method

Alcohol Use Disorder Identification Test (AUDIT) scores were obtained from consecutive presenting patients aged 16 years and over of 67 Auckland general practitioners previously participating in a 1995 study, or similar 'surrogate' practices.

Results

The increased percentage of 16–19-year-old respondents with risky or problem drinking in 2003 compared with 1995 was not significantly different from the increase seen in the 20–24-year-old group. Worsening 'risky', 'problem' and 'binge' drinking in females between 1995 and 2003 supports gender convergence of behaviour. This study shows reduced binge drinking in males over 19 years in 2003 compared with 1995, but no change in their risky or problem drinking.

Conclusion

The changes in females' alcohol drinking and that in older males are in opposite directions. This needs further research.

Key words

General practice; alcohol-related disorders; alcohol drinking; legal drinking age

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Introduction

The 1999 New Zealand Sale of Liquor Amendment Act lowered the legal alcohol purchasing age from 20 to 18 years. Other changes in the Act allowed increased alcohol sales on Sundays, permitted supermarkets to sell beer as well as wine, and in-

creased the responsibilities of liquor licensees.

Research on the effects of this legislative change has concentrated on youth. In the 12 months following the law change, the Auckland Hospital Emergency Department recorded an increase in the proportion

of 18–19-year-old patients who were intoxicated.¹ A 2000 national survey found that the proportion of 14–17-year-olds who had consumed alcohol in the previous 12 months had not changed from 1995 levels, but the frequency and amount consumed by those who did drink had signifi-

cantly increased.^{2,3} Women's volume of drinking (but not men's) had increased from 1995 to 2000 across all age groups, indicating 'gender convergence'.³ Kypri studied the ratio ('four years after' to 'four years before' 1999 law changes) of the incidence rate of alcohol-involved crash injuries and of hospitalisations because of traffic crashes among 18–19-year-olds and 15–17-year-olds.⁴ He used 20–24-year-olds as an age control group. His reported data show that in all three age groups and both genders incidence rates of alcohol-related crash injuries, and of hospitalisations because of traffic crashes, showed a declining trend between 1995 and 2003, apart from alcohol-related crash injuries in 18–19-year-old women. He showed a reduced rate of decline after 1999 in the two younger male age groups and in 18–19-year-old female alcohol related crash injuries compared to the 20–24-year-old age group.

A 2006 study found a positive trend in the rates of prosecutions for excess breath alcohol in 16–17-year-olds and an increase in the trend of alcohol-related crashes and driving with excess alcohol for 18–19-year-olds coincided with lowering of the minimum alcohol purchase age as well as increase in the rates of prosecutions for disorder offences for the 14–15-year-olds.⁵

The 1995 New Zealand arm of a World Health Organization (WHO) collaborative study on early detection and prevention of problem alcohol use collected 15 013 AUDITs on consecutive patients aged 16 years and older attending 67 general practitioners; selected by randomly choosing one practitioner from each of 67 randomly selected general practices.^{6,7}

The aim of this study was to compare and contrast AUDIT scores within various demographic groups of general practice patients in 2003 versus 1995.

Methods

The study design was a repeated experiment using a pragmatic approach. Participants were consecutive patients aged 16 years and over of the 67 general practitioners in the greater Auckland region who participated in the 1995 WHO Strand III study. Where the original GP was no longer in practice, or was unavailable, an alternative GP who was likely to have a similar patient base was sought nearby. Ethics approval was obtained from the Auckland Ethics Committee.

The 67 GPs who participated in the 1995 AUDIT collection were identified; sent an explanatory letter and then approached by telephone. They were asked to repeat the AUDIT with 50% of the number of consecutive adult patients for whom they submitted AUDITs in 1995, and 100% of the

number of consecutive 'youth' (aged 16–24 years).

Once the GP had consented, the practice staff were briefed and provided with coded AUDIT resources. All consecutive patients 16 years and older were approached by the receptionist and invited to participate in the study.

The recruitment process and exclusion criteria were the same as 1995: patients unable to understand English, with a mental impairment that precluded meaningful participation, or who had already participated in the 2003 study. Consenting patients self-completed the AUDIT in the waiting room and 'posted' these anonymous forms in a slotted box. The general practitioner neither saw nor reviewed their AUDITs.

Once practices had reached their respective patient quota, the number of completed youth forms was determined and the practice given further forms for youth (to sample the youth population up to 100% of the number collected by that practice in 1995).

Raw data was double-entered with random checks for quality control. The AUDIT's 10 items each have a minimum score of 0 and maximum of 4, (total range of 0–40). A score of 0–7 designates 'responsible drinking'; 8–12 'risky drinking behaviour', and scores >12 'problem drinking'. Question 3 of the AUDIT measures binge drinking. Six or more standard drinks on one occasion at least weekly indicates bingeing. Abstainers have a score of zero and are included in the 'responsible drinkers' category. Raw data was entered in Microsoft Excel. Statistical tests were undertaken in SAS 9.1.

To assess the effect of age, gender and year of data collection on the drinking behaviour of respondents, generalised linear mixed models were used. Because the audit scores were categorised into three ordered groups (responsible, risky and problem), modelling was done using an ordinal logistic regression with general practitioner as a random effect. This same model without the random effect was used to assess the proportional odds assumption (proportional odds assumes that the relationship between 'Responsible' and 'Risky' drinking is the same as the relationship between 'non-Problem' and 'Problem' drinking). All confidence intervals are the 95% confidence intervals.

Where the proportional assumption was not reasonable the data were analysed by two sub-categories of the score variable ('Responsible' v 'Risky' and 'Responsible or Risky' v 'Problem'). In this situation and for the analysis of binge drinking a binary logistic regression with general practitioner as a random effect was used.

Results

Of the original 67 general practitioners (GPs) who were approached to be

A 2000 national survey found that the proportion of 14–17-year-olds who had consumed alcohol in the previous 12 months had not changed from 1995 levels, but the frequency and amount consumed by those who did drink had significantly increased

involved in this repeat study, one declined to participate and five were no longer at their 1995 location. Similar practices in the locality were recruited in their stead.

In 1995 the GPs collectively obtained 15 013 completed AUDITs, of which 1909 (12.7%) were from 'youth' (aged 16–24 years). The total number of 2003 AUDITs was 7671, with 1581 (20.6%) youth.

Initial analysis (Figure 1) suggested differing patterns of male and female alcohol drinking. Because the level of 'risky or problem' drinking in 20–24-year-old males appeared greater than either the 16–19 or 25–29 age groups, and the pattern for male 'risky or problem' drinking appeared to decrease with age only above age 20–24 years whereas the pattern of female 'problem drinking' decreased above 16–19 years, it was decided to restrict the analyses and comparisons of 'all ages' to those aged 20 years and above. A 16–19-year-old group v 20–24-year-old comparison has been done separately using the 20–24-year-old group as an age control group akin to the within state comparison used in the studies by Smith and Burvill⁸ and more recently used by Kypri.⁴

16–19-year-old youth group v 20–24-year group comparison

With both sample years combined, the genders behave differently ($p < 0.001$). The proportion of males in the risky and problem drinking categories was greater in the 20–24 age group than in the 16–19 age group ($p = 0.002$) while the proportion of females in the more extreme drinking categories was less in the 20–24-year-old group than in the 16–19-year group ($p = 0.001$) – see Figure 2. The odds ratio for a male being in a higher drinking category at 20–24 years compared with 16–19 years was 1.41 (1.14, 1.76) while the odds ratio for a female being in a higher drinking category at 20–24 years compared with 16–19 years was 0.72 (0.59, 0.88). The odds ratio for

Figure 1. The percentage with risky or problem alcohol drinking behaviour by age, gender and year (1995 and 2003).

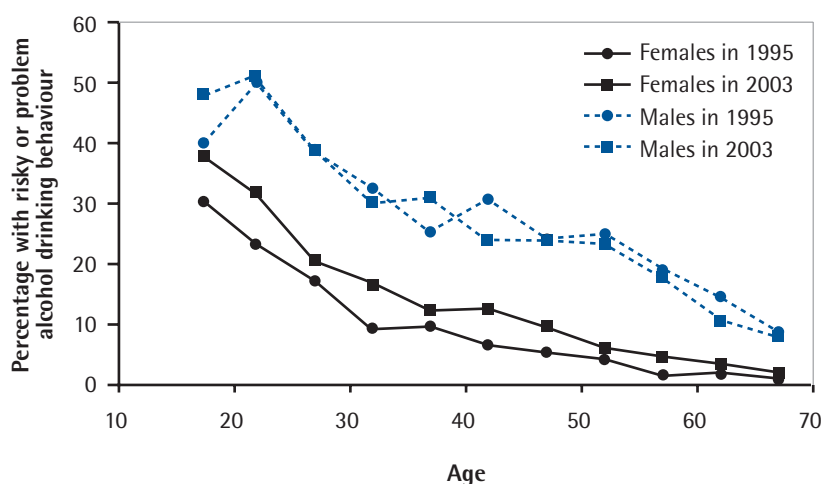
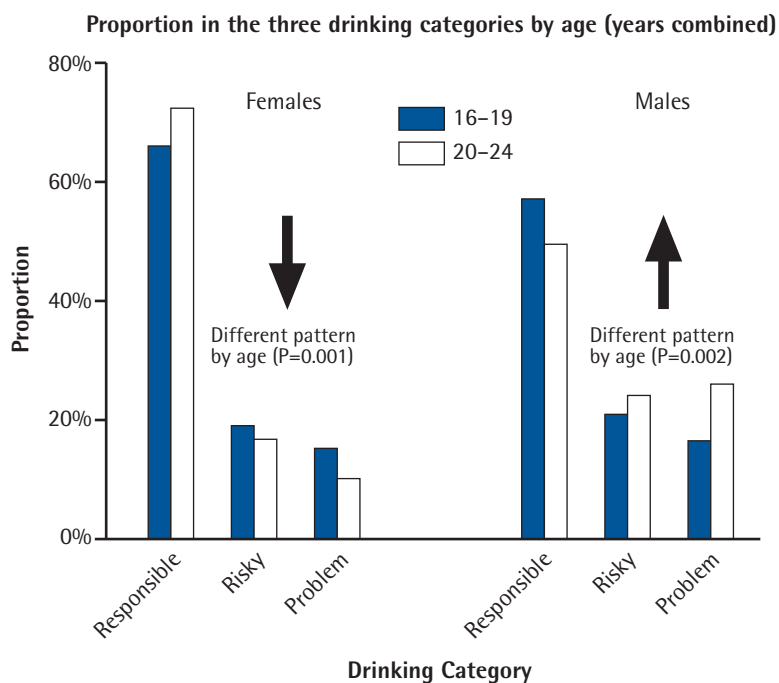


Figure 2. Proportions of responsible, risky and problem drinking by age and gender.



a male binge drinking at 20–24 years compared with 16–19 years was 1.26 (0.98, 1.63) $p = 0.08$ while the odds ratio for a female binge drinking at 20–24 years compared with 16–19 years was 0.69 (0.52, 0.92) $p = 0.01$.

There was a significant increase in the overall proportion of our 16–24-year-old respondents in the risky and problem drinking categories with time ($p = 0.002$), and the odds ratio for a 16–24-year-old being in a higher

drinking category in 2003 compared with 1995 was 1.31 (1.11, 1.55).

Of particular interest is that the 16–19-year-old age group and the 20–24-year-old age group percentages with risky or problem drinking changed similarly between 1995 to 2003 ($p = 0.81$) as did males and females ($p = 0.18$) – see Figure 3.

The 16–19-year-old age group and the 20–24-year-old age group percentages with binge drinking also

changed similarly between 1995 and 2003 ($p=0.47$), as did males and females ($p=0.22$).

Analysis of ages 20 and above: 'Responsible' v 'Risky'

The proportional odds assumption did not hold for this age group so we have analysed the data in two steps 'Responsible' v 'Risky' and 'Responsible and Risky' v 'Problem'. The distribution of risky drinking over the age range 20–65 years was similar both in 1995 and in 2003 – genders combined ($p=0.48$). However, males and females changed differently. The proportion of 'Risky' drinking in 20–65-year-old males stayed much the same between 1995 and 2003 ($p=0.40$) while decreasing with increasing age ($p<0.001$). The proportion of 'Risky' drinking in the 20–65-year-old female group increased between 1995 and 2003 ($p<0.001$) while still decreasing with increasing age ($p<0.001$) – see Figure 1.

The odds ratio for a 20–65-year-old male being a 'Risky' drinker was 0.84 (0.82, 0.86) for an increase of five years of age while the odds ratio for a female was 0.73 (0.70, 0.75) for every increase of five years of age. The odds ratio for 'Risky' drinking in females in 2003 compared with 1995 was 1.53 (1.31, 1.78).

Analysis of ages 20 and above: 'Responsible and Risky' v 'Problem'

The pattern found here is similar to that reported for 'Responsible' v 'Risky' except that some of the odds ratios are different.

The distribution of problem drinking over the age range 20–65 years was similar both in 1995 and in 2003 – genders combined ($p=0.57$). However, males and females changed differently. The proportion of 'Problem' drinking in 20–65-year-old males stayed much the same between 1995 and 2003 ($p=0.26$) while decreasing with increasing age ($p<0.001$) – see Figure 1. The proportion of 'Problem' drinking in 20–65-year-old females increased between 1995 and 2003 ($p<0.001$) while still decreasing with increasing age ($p<0.001$).

The odds ratio for a 20–65-year-old male being a 'Problem' drinker was 0.77 (0.75, 0.79) for an increase of five years of age while the odds ratio for a female was 0.73 (0.70, 0.76) for every increase of five years of age. The odds ratio for 'Problem' drinking in females in 2003 compared with 1995 was 1.79 (1.45, 2.20).

Analysis of ages 20 and above: 'Binge Drinking'

The pattern found shows some differences to those reported above. The distribution of binge drinking over the age range 20–65 years was similar both in 1995 and in 2003 – gen-

ders combined ($p=0.29$). However, males and females again changed differently. The proportion of 'Binge' drinking in the 20–65-year-old male group decreased between 1995 and 2003 ($p=0.03$) while decreasing with increasing age within the group ($p<0.001$). The proportion of 'Binge' drinking in the 20–65-year-old female group increased between 1995 and 2003 ($p<0.001$) while still decreasing with increasing age ($p<0.001$) – see Figure 4.

The odds ratio for a 20–65-year-old male being a binge drinker was 0.86 (0.84, 0.88) for an increase of five years of age while the odds ra-

Figure 3. Changes in youth percentages with risky or problem drinking between 1995 and 2003.

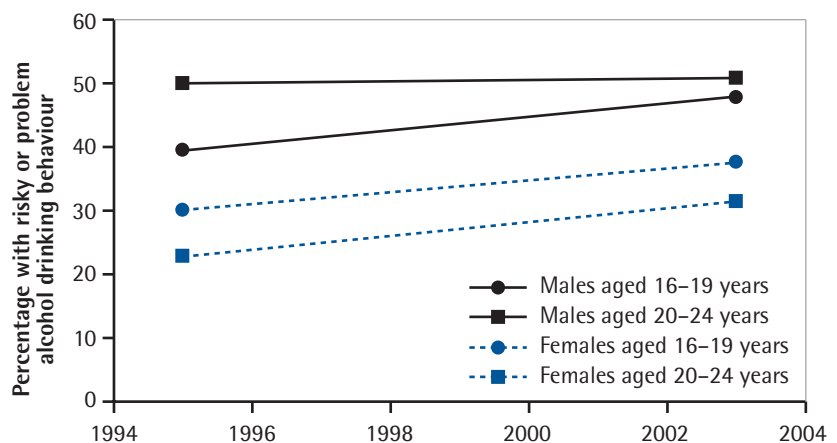
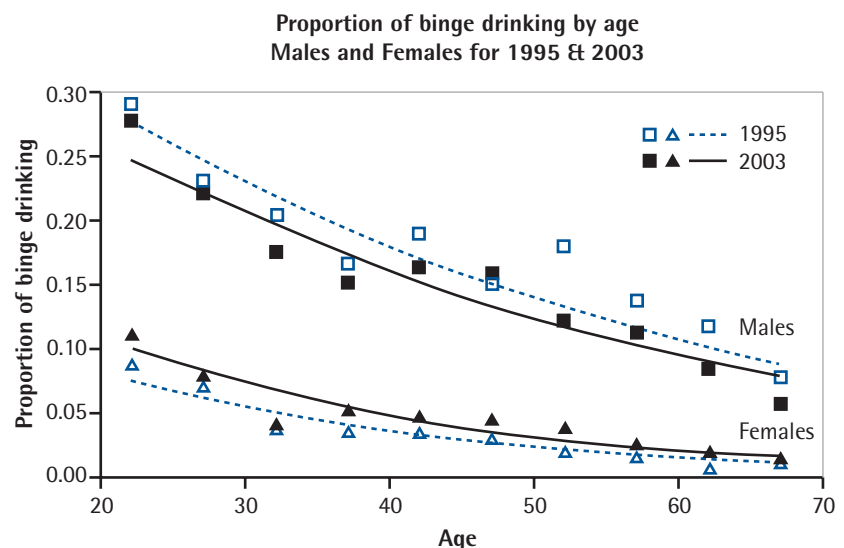


Figure 4. Proportion binge drinking by age for 1995 and 2003.



tio for a female was 0.80 (0.77, 0.83) for every increase of five years of age. The odds ratio for binge drinking in 20–65-year-old males in 2003 compared with 1995 was 0.87 (0.76, 0.99) and the odds ratio for binge drinking in females in 2003 compared with 1995 was 1.37 (1.14, 1.65).

Discussion

The 1999 New Zealand legislative changes relating to the sale and purchase of alcohol occurred four years after our first survey and four years before our second. It is acknowledged that the changes in alcohol drinking behaviour found in a descriptive study such as this are unlikely to be due solely to the law changes.

A number of other factors may have influenced our observed changes. The socioeconomic and/or ethnic makeup of the general practice attendee population may have altered between 1995 and 2003. The increase in numbers of private Accident and Medical Centres in NZ since the early 1990s may have attracted many youth away from general practice, while conversely public hospital based Accident and Emergency services now discourage 'general practice' type attendances, which may have increased the numbers of young people attending general practices.

Patients self-completed the AUDIT and it was not feasible for receptionists to record the refusal rate. The same methodology was used in both 1995 and 2003 but this does not eliminate the possibility that the non-compliance rate in some demographic subgroups differed in the two time periods.

Different drinking patterns of men and women suggest there may be some gender variation in AUDIT sensitivity.⁹

This study is not able to completely analyse differing effects of the four parts of the 1999 legislative change on different age groups. The sale of alcohol on Sundays, increased responsibilities of licensees, in-

creased availability from supermarkets or other unknown cultural or environmental changes all may have affected different genders and age groups in different ways and need further research.⁴

Care needs to be taken when generalising the results of this study to the population as a whole. General practice serves 95% of the population¹⁰ with youth attending less frequently than the old and the very young. It is possible that youth who attend general practice are a different subgroup of society than those attending Accident and Emergency services.

Comparison of our AUDIT scores of consecutively screened general practitioner patients in 1995 and in 2003 indicates that there are three demographic groups with different patterns of change in their alcohol drinking between 1995 and 2003. These are 'Females of all ages', 'Young people' and 'Males aged 20–65 years'.

Females aged 16–24 years had the highest likelihood of risky, problem and binge drinking scores of any female age group, with a steady reduction in likelihood with increasing age. This is consistent with findings of a study of alcohol use in Australian women in which women under 25 years of age had the highest rates of alcohol consumption and problem drinking.⁹ In our study, female likelihood of risky, problem and binge drinking was increased in 2003 in all age groups compared with 1995. Our findings concur with results of two NZ surveys reported by McPherson et al.³ in 1995 and 2000 which indicate gender convergence over that time in alcohol consumption and related problems.

The only 1999 legislative change solely affecting young people was the

lowering of the legal alcohol purchasing age from 20 years to 18 years. Using the 20–24-year-old group as an age control group,⁸ there was no significant difference between the 1995 to 2003 increase in the proportion of 16–19-year-old youth with risky and problem drinking and the proportion that increased in the 20–24-year-old age group. There was

also no significant difference between the 1995 to 2003 increase in the proportion of female youth with risky and problem drinking and the proportion that increased in male youth. This could be because the reduction in the legal alcohol purchasing age did

not differentially change general practice attending under-20-year-olds' alcohol drinking, or that the effect was too small to show up in our survey.

At first sight this finding differs from other published analyses of the effects of the 1999 alcohol legislation. However our survey showed that between 1995 and 2003, 16–24-year-old youth as a group had a statistically significant increase in the percentage of risky and problem drinking. The 2000 national survey is consistent with our findings.^{2,3} The increase in the proportion of 18–19-year-old emergency department patients who were intoxicated in the 12 months after the law change¹ is consistent. Kypri's reported reduced rate of decline of alcohol-related crash injuries in under-20-year-old men following the 1999 law change is consistent with our survey results, although his reported absolute reduction in 15–24-year-old men's incidence rates of alcohol-related crash injuries and hospitalisations because of traffic crashes between 1995 and 2003 appears inconsistent. However

NZ legislation does not set a minimum drinking age, but merely a minimum alcohol purchasing age, leading to a need for caution when comparing this and other NZ survey data with the minimum drinking age literature

Kypri's sample was of hospital attendees whereas ours were general practice attendees.

NZ legislation does not set a minimum drinking age, but merely a minimum alcohol purchasing age, leading to a need for caution when comparing this and other NZ survey data with the minimum drinking age literature.¹¹

Males aged 20–65 years showed no significant difference in their risky and problem drinking scores between 1995 and 2003. However they showed a significantly reduced binge drinking score. The reduced binge drinking score in males over the age of 20 years suggests that we may have detected early signs of a culture change toward safer drinking occurring in older males. This finding is consistent with Kypri's reported data indicating that in the

four years after the 1999 law changes there was a declining trend in alcohol-related crash injuries and in hospitalisations because of traffic crashes in most male age groups below the age of 24 years.⁴ However, care needs to be taken with our finding of reduced binge drinking in 20–65-year-old males in 2003 compared with 1995. We did not find a corresponding reduction in the proportion of males with risky or problem drinking, suggesting our older male binge drinking reduction finding could be an artefact. We have not seen a recent reduction in binge drinking in older males reported elsewhere.

This finding is in the opposite direction to that found in younger males and in females. If our finding is true it could imply a maturing phenomenon in older males or some

unknown cause. It is possible that the high rates of male youth binge drinking are unsustainable as they move into long-term careers and family relationships. Further research may confirm this finding and find evidence that helps speed up any male culture change toward alcohol drinking, and cause it to be adopted by females and younger males.

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Competing interests

None declared.

References

1. Everitt R, Jones P. Changing the minimum legal drinking age—its effect on a central city emergency department. *N Z Med J* 2002; 115(1146):9–11.
2. Habgood R, Casswell S, Pledger M, Bhatta K. Drinking in New Zealand: National Surveys Comparison 1995 & 2000. Alcohol & Public Health Research Unit: The University of Auckland 2001.
3. McPherson M, Casswell S, Pledger M. Gender convergence in alcohol consumption and related problems: issues and outcomes from comparisons of New Zealand survey data. *Addiction* 2004; 99(6):738–48.
4. Kypri K, Voas R, Langley J, Stephenson S, Begg D, Tippetts A, et al. Minimum purchasing age for alcohol and traffic crash injuries among 15- to 19-year-olds in New Zealand. *Am J Pub Health* 2006; 96(1):126–31.
5. Huckle T, Pledger M, Casswell S. Trends in alcohol-related harms and offences in a liberalized alcohol environment. *Addiction* 2006; 101(2):232–40.
6. McCormick R, Adams P, Powell A, Paton-Simpson G, Bunbury D, McAvoy B, et al. Alcohol and Primary Health Care; New Zealand findings and implications from the WHO collaborative study. Goodfellow Unit, The University of Auckland 2002.
7. Paton-Simpson G, McCormick R, Powell A, Adams P, Bunbury D. Problem drinking profiles of patients presenting to general practitioners: analysis of Alcohol Use Disorders Identification Test (AUDIT) scores for the Auckland area. *N Z Med J* 2000; 113(1105):74–7.
8. Smith D, Burvill P. Effect on juvenile crime of lowering the drinking age in three Australian states. *Br J Addict* 1987; 82(2):181–8.
9. Fleming J. The epidemiology of alcohol use in Australian women: findings from a national survey of women's drinking. *Addiction* 1996; 91(9):1325–34.
10. Ministry of Health. Taking the Pulse: 1996/97 New Zealand Health Survey. Ministry of Health, Manatu Hauora, Wellington 1999.
11. Wagenaar A, Toomey T. Effects of minimum drinking age laws: review and analyses of the literature from 1960 to 2000. *Journal of Studies on Alcohol – Supplement* 2002(14):206–25.

Doctors attending their patient's funerals

'I hope the curriculum development folks in medical schools, residency programs, and CME activities consider the issue of doctors attending funerals when they do their educational needs assessments about the proper behavior of competent, caring physicians in death and dying. I think it matters, for families, society, and ourselves.'

Lundberg GD. Why don't the doctors attend the funerals of their patients who die? *MedGenMed* <http://www.medscape.com/viewarticle/557500?src=sr> Posted 06/08/2007