



## THIS WEEK'S RESEARCH QUESTIONS

- 1345** Can falls be prevented in older wearers of multifocal glasses by provision of single lens distance glasses?
- 1346** Does regular follow-up in memory clinics decrease the rate of functional decline in Alzheimer's disease?
- 1347** What is the cost effectiveness of vaccination with three types of pneumococcal conjugated vaccines in a Dutch national immunisation programme?
- 1348** How is IQ in early adulthood associated with subsequent risk of attempted suicide in men with and without psychosis?
- 1349** Has the rate of hospital admissions for myocardial infarction changed since the introduction of smoke-free legislation in England?

## Smoke-free legislation and admission rates for myocardial infarction

Articles on passive smoking always prompt controversy, and this paper by Michelle Sims and colleagues is no exception (p 1349). The authors took numerous steps to conduct a robust study. They examined emergency admissions for myocardial infarction among all of England's 49 million adults for five years before the 2007 ban on smoking in enclosed public places, and for 15 months afterwards, giving this study more statistical power than any such work so far. Their complex segmented Poisson regression analysis accounted for underlying trends in population size and admissions for myocardial infarction, and for potential confounders such as season, temperature, flu, and holidays. They reported their findings cautiously and self critically without claiming cause and effect. Despite this caution, which was echoed in the *BMJ*'s press release ([www.bmj.com/content/vol340/issue7759/press\\_release.dtl](http://www.bmj.com/content/vol340/issue7759/press_release.dtl)), some of the media misreported the association as definitely causal (for example [www.telegraph.co.uk/health/healthnews/7810868/Thousands-of-heart-attacks-prevented-by-the-smoking-ban.html](http://www.telegraph.co.uk/health/healthnews/7810868/Thousands-of-heart-attacks-prevented-by-the-smoking-ban.html)). Now here come the critical rapid responses ([www.bmj.com/cgi/eletters/340/jun08\\_1/c2161](http://www.bmj.com/cgi/eletters/340/jun08_1/c2161)).



## Low IQ scores and risk of attempted suicide

An international team of researchers from the United Kingdom, Australia, and Sweden have found a link between low IQ scores in young men and an increased risk of subsequent suicide attempts (p 1348). The authors followed up for 24 years more than a million Swedish men who completed IQ tests at an average age of 18 years. Among the 17 736 (1.6%) men who had at least one hospital admission for attempted suicide, those in the lowest IQ group were almost nine times more likely to have a hospital admission for attempted suicide than men in the highest IQ group. Duncan Jarvies talks to coauthor David Batty at more length about the study's findings in a recent *BMJ* podcast (<http://bmj.com/podcasts>).



## Falls and poor vision

Glasses with multifocal lenses are often prescribed to correct for presbyopia in older people. But their drawbacks, which include jumps in vision and impaired perception of depth and contrast, can contribute to falls. In a randomised controlled trial, Mark J Haran and colleagues (p 1345) assessed whether falls could be prevented by giving single lens glasses for distance use to older people who wore multifocal glasses. They found that with appropriate counselling, the intervention helped to reduce falls in people who took part in regular outdoor activities. But in frailer people, who had lower levels of outdoor activity, the opposite was true—and overall, the likelihood of falling remained unchanged. In an editorial, A John Campbell and colleagues say that although various sight care interventions can help older people, such changes should be introduced with care to allow for adjustment, so as not to do more harm than good.



**LATEST RESEARCH:** For these and other new research articles see <http://www.bmj.com/channels/research.dtl>

**The toll of HIV/AIDS on elderly people in Africa** High mortality among African adults aged 18-59 with HIV/AIDS has left elderly people living on their own or as the only carers of young children, according to new research published online this week (doi:10.1136/bmj.c284). Tim Kautz and colleagues estimate that in the 22 countries they studied, which represent 70% of the population in sub-Saharan Africa, the HIV/AIDS epidemic was probably responsible for 582 200-917 000 elderly people living alone and 141 000-323 100 older individuals being the sole caregivers for young children in 2006.

# Effect on falls of providing single lens distance vision glasses to multifocal glasses wearers: VISIBLE randomised controlled trial

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## EDITORIAL by Campbell et al

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**STUDY QUESTION** Does the provision of single lens distance glasses to older wearers of multifocal glasses prevent falls?

**SUMMARY ANSWER** Provision of single lens glasses significantly reduces falls in older multifocal glasses wearers who take part in regular outside activities.

**WHAT IS KNOWN AND WHAT THIS PAPER ADDS** Multifocal glasses impair avoidance of obstacles and increase the risk of falls in older people. With appropriate counselling, provision of single lens glasses for older multifocal wearers who take part in regular outdoor activities is a simple and effective falls prevention strategy, although the intervention may be harmful in multifocal wearers with low levels of outdoor activity.

## Design

This was a randomised single blind controlled trial stratified by recruitment site and source of referral, with block randomisation. We provided single lens distance glasses with recommendations for wearing them for walking and outdoor activities to intervention group participants.

## Participants and setting

We included 606 regular wearers of multifocal glasses (mean age 80 (SD 7) years). Inclusion criteria included increased risk of falls (a fall in the previous year or a timed up and go test of at least 15 seconds) and outdoor use of multifocal glasses at least three times a week. Participants were living independently in the community in the Sydney and Illawarra regions of New South Wales, Australia.

## Primary outcome(s)

The primary outcome was the number of falls and injuries from falls during 13 months of follow-up.

## Main results and the role of chance

Single lens glasses were provided to 275 (90%) of the 305 intervention group participants within two months; 162 (54%) of the intervention group reported satisfactory use of distance glasses for walking and outdoor activities for at least 7/12 months after dispensing. In the 299 intervention group and 298 control participants available to follow-up, the intervention resulted in an 8% reduction in falls: incidence rate ratio 0.92 (95% confidence interval 0.73 to 1.16). Pre-planned subgroup analyses showed that the intervention was effective in significantly reducing all falls (incidence rate ratio 0.60, 0.42 to 0.87), outside falls, and injurious falls in people who regularly took part in outside activities. In this subgroup the num-

## FALLS PER PERSON OVER 13 MONTH FOLLOW-UP

Adelaide activities profile level	Rate (SD)		Incidence rate ratio (95% CI)
	Intervention	Control	
Overall	1.54 (2.40) (n=299)	1.66 (3.04) (n=298)	0.92 (0.73 to 1.16)
Low*	1.81 (2.75) (n=151)	1.36 (1.68) (n=185)	1.29 (0.95 to 1.75)
High†	1.26 (1.96) (n=148)	2.16 (4.41) (n=113)	0.60 (0.42 to 0.87)

\*Below median subtotal of 15 for outside activities.

†At or above median subtotal of 15 for outside activities.

bers needed to treat to prevent one fall, outdoor fall, and injurious fall within 12 months were 1.1, 1.9, and 2.6 people. We found a significant increase in outside falls in people in the intervention group who took part in little outside activity (number needed to harm 4.5). We found no statistically significant between group differences for the secondary outcome measures (falls efficacy, physical activity levels, physical and mental health) at the end of the intervention.

## Harms

Older people who infrequently take part in regular outdoor activities may not benefit from this intervention. An increase in non-fall related injuries was associated with the intervention.

## Bias, confounding, and other reasons for caution

Many of our results rely on the subgroup analysis using outdoor activity items of the Adelaide activities profile. The validity of this assessment is supported by separate analyses showing that these subtotals are correlated with the amount of self reported outdoor walking (P<0.001).

## Generalisability to other populations

The study findings should be generalisable to older people living in the community. However, the findings may not be generalisable to frail older people with significant cognitive impairment or major mobility problems.

## Study funding/potential competing interests

This study was funded by an Australian National Health and Medical Research Council grant (NHMRC ID 350855) in 2005. The research was conducted independently from the funding body.

## Trial registration number

ClinicalTrials.gov Protocol Number 350855.

# Effectiveness of a specific care plan in patients with Alzheimer's disease: cluster randomised trial (PLASA study)

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## EDITORIAL by Schneider

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**STUDY QUESTION** Does regular follow-up in memory clinics with comprehensive evaluation and targeted management decrease the rate of functional decline in community dwelling patients with mild to moderate Alzheimer's disease?

**SUMMARY ANSWER** Comprehensive evaluations and targeted management in memory clinics every six months did not slow functional decline in patients with Alzheimer's disease during two years of follow-up.

**WHAT IS KNOWN AND WHAT THIS PAPER ADDS** Patient education and social support as well as regular follow-up visits are widely recommended for the management of patients with Alzheimer's disease. Our study found that this kind of broad intervention does not work when applied in memory clinics alone without direct involvement of the general practitioner or a case manager.

## Design

This was a cluster randomised 24 month trial, with memory clinics as the randomised unit and two arms: intervention (n=574) and control groups (n=557). The intervention included a comprehensive twice yearly consultation for patients and their caregivers, with guidelines for the management of problems identified during the assessment. The intervention covered patients' and caregivers' knowledge of the disease, functional dependency, cognitive decline, drug review, nutritional status, gait disorders and walking capacities, behaviour, caregivers' well being, and legal questions on patients' safety. For each area assessed, a standardised management protocol was outlined that could be initiated when necessary.

## Participants and setting

Fifty memory clinics in France took part in the study. Participants had mild to moderate Alzheimer's disease (mini-mental state examination score 12-26).

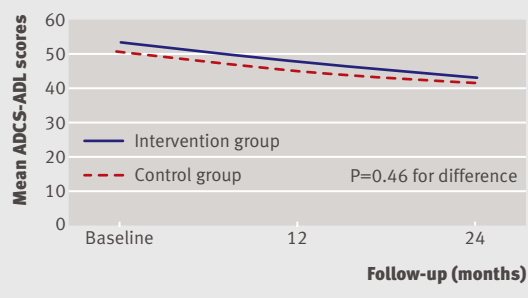
## Primary outcome

The primary outcome was change on the Alzheimer's Disease Cooperative Study-activities of daily living (ADCS-ADL) scale, assessed at 12 and 24 months.

## Main results and the role of chance

Functional decline did not differ between the two groups over the two years of follow-up. The annual decrease in the ADCS-ADL score was estimated at -5.96 (95% confidence interval -7.05 to -4.86) in the control group compared with -5.73 (-6.89 to -4.57) in the intervention group (P=0.78). The risk of being admitted to institutional care or mortality did not differ between the

## MEAN SCORES ON ALZHEIMER'S DISEASE COOPERATIVE STUDY-ACTIVITIES OF DAILY LIVING (ADCS-ADL) SCALE



groups at the two year follow-up (intervention v control: admission to institutional care, hazard ratio 0.954, 95% confidence interval 0.668 to 1.362, P=0.79; mortality, 0.796, 0.507 to 1.250, P=0.32).

## Harms

None.

## Bias, confounding, and other reasons for caution

Owing to the long duration of the study and recruitment period some contamination occurred between groups. Also, although the investigators recorded the frequency of use of the guidelines, we do not know if the proposed strategies were adequately implemented at home and how receptive caregivers or general practitioners were to our instructions. Furthermore, assessors were not blinded to intervention status.

## Generalisability to other populations

This work was a national multicentre study, enabling the follow-up of a population of patients with Alzheimer's disease in urban and rural areas. In France, as only specialists can prescribe drugs for dementia, there is no real difference between patients followed in these centres and those followed in other clinical settings. This population was not, however, representative of patients with Alzheimer's disease as we included only community dwelling patients with caregivers.

## Study funding/potential competing interests

This study was funded by the French Ministry of Health (PHRC 02-006-01). We have no competing interests.

## Trial registration number

ClinicalTrials.gov NCT00480220.

# Cost effectiveness of pneumococcal vaccination among Dutch infants: economic analysis of the seven valent pneumococcal conjugated vaccine and forecast for the 10 valent and 13 valent vaccines

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**STUDY QUESTION** What is the cost effectiveness of vaccination with the seven valent, 10 valent, and 13 valent pneumococcal conjugated vaccines (PCV-7, PCV-10, and PCV-13) within the Dutch national immunisation programme?

**SUMMARY ANSWER** Under base case assumptions, the incremental cost effectiveness ratio of the current Dutch infant vaccination programme with PCV-7 was estimated at €113 891 (£98 300; \$145 000) per quality adjusted life year (QALY), compared with €52 947 and €50 042 per QALY for PCV-10 and PCV-13, respectively.

**WHAT IS KNOWN AND WHAT THIS PAPER ADDS** Recent pneumococcal surveillance studies show a significant increase in non-vaccine serotype disease in immunised populations, which reduces the overall direct effects of vaccination and offsets potential positive herd protection benefits in unvaccinated individuals. Vaccination with PCV-7 was estimated to be not cost effective, whereas the cost effectiveness ratios for PCV-10 and PCV-13 may possibly be acceptable, in particular if total programme costs can be lowered by reduced schedules, reductions in vaccine prices, or both.

## Design

We performed cost effectiveness analyses comparing PCV-7, PCV-10, and PCV-13 with no vaccination in a cohort of 180 000 newborns, using quality adjusted life years (QALYs) as the outcome for health effects. The analytic time frame of the study was five years, corresponding to the assumed duration of protection of the vaccine.

## Sources of effectiveness

Clinical trials and observational studies for effectiveness of pneumococcal vaccines.

## Resources and costs sources

Surveillance data on the incidence and serotype distribution of invasive pneumococcal disease before national

implementation of PCV-7 for the period 2004-2006 and registrations for resource use and costs.

## Main results

Under base case assumptions—that is, assuming a five year protective period of the vaccine and no assumed net indirect effects (herd protection minus serotype replacement) among children aged over 5 years—vaccination with PCV-7 in a four dose (3+1) schedule was estimated to prevent 71 and 5778 cases of invasive and non-invasive pneumococcal disease, respectively, in children aged up to 5 years. This corresponds with a total net gain of 173 life years or 277 QALYs. The incremental cost effectiveness ratio of PCV-7 was estimated at €113 891 (£98 300; \$145 000) per QALY, well over the ratio of €50 000 per QALY required for PCV-7 to be regarded as potentially cost effective. A three dose (2+1) schedule of PCV-7 reduced the incremental cost effectiveness ratio to €82 975 per QALY. For various assumptions and including 10% of the maximum net indirect effects among individuals aged 5 years and over, PCV-10 and PCV-13 had incremental cost effectiveness ratios ranging from €31 250 to €52 947 per QALY.

## Results of sensitivity analysis

The main area of uncertainty refers to the size of the indirect effects of vaccination, in both vaccinated and unvaccinated individuals. However, our results were quite robust over a broad range of sensitivity analyses.

## Limitations

Given the relatively small number of cases reported during the surveillance period of two years, our predictions regarding the increase of disease caused by non-vaccine serotypes may have limited precision; however, they are based on the best data currently available.

## Study funding/potential competing interests

MHR was funded by an unrestricted grant from Wyeth Hoofddorp and AJvH was financed by the Netherlands Vaccine Institute, Bilthoven. MJP has received travel grants from GlaxoSmithKline and Wyeth to attend expert meetings; EAMS has received unrestricted grants from Wyeth and Baxter for research, consulting fees from Wyeth and GlaxoSmithKline, lecturing fees from Wyeth, and grant support from Wyeth and GlaxoSmithKline for vaccine studies; and AvdE has received unrestricted grants from Wyeth and Novartis. This work has been previously presented at a workshop on pneumococcal vaccines at the European Public Health Association conference in Lisbon, Portugal, which was supported by a research grant from GlaxoSmithKline Netherlands.

## EFFICACY AND EFFECTIVENESS ESTIMATES FOR VARIOUS FOUR DOSE VACCINES WITHIN THE DUTCH IMMUNISATION PROGRAM

	PCV-7	PCV-10	PCV-13
<b>Cases averted by vaccination (for a birth cohort of 180 000 during five years)</b>			
Invasive pneumococcal disease	71	108	150
Acute otitis media	5372	6124	6876
Non-invasive pneumonia	406	463	520
<b>Cost effectiveness estimates (€/QALY)</b>			
Base case scenario	113 891	52 947	50 042
Reduced dose schedule (to three doses)	82 975	37 891	35 743
Reduced vaccination costs (by 25%)	Not applicable	41 106	31 250

QALY, quality adjusted life year.

# Psychosis alters association between IQ and future risk of attempted suicide: cohort study of 1 109 475 Swedish men

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## STUDY QUESTION

How does intelligence (IQ) in early adulthood influence subsequent risk of attempted (non-fatal) suicide in men with and without psychosis?

## SUMMARY ANSWER

Low IQ scores were associated with a subsequently increased risk of attempted suicide in men free from psychosis; no association was evident in men with psychosis.

## WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Emerging evidence suggests an association between IQ and attempted (non-fatal) suicide. In a large cohort, strong stepwise associations were found between decreasing IQ score and increasing risk of attempted suicide in men free from psychosis.

## Participants and setting

We included men born in Sweden from 1950 to 1976 with data linked to housing, military, death, and hospital discharge registers.

## Design, size, and duration

Men had IQ scores measured at military conscription at mean age 18 and were then followed up for hospital discharges for attempted suicide over an average of 24 years. Men with psychosis were identified either at conscription (on the basis of a clinical diagnosis) or during follow-up (on the basis of hospital discharges pre-dating any discharges for attempted suicide). We based analyses on 1 109 475 men with complete data on IQ and all confounding or mediating variables, which included socioeconomic status in childhood and adulthood and educational attainment. Of these men, 17 736 (1.6%) had at least one discharge for

attempted suicide during follow-up and 12 328 (1.1%) were identified as having psychosis.

## Main results and the role of chance

In age adjusted analyses of all men combined, we found strong, consistent, stepwise associations between decreasing IQ scores and increasing risk of attempted suicide (age adjusted hazard ratio per standard deviation decrease in IQ=1.71, 95% confidence interval 1.68 to 1.74). Adjustment for confounding factors, particularly education, led to a reduction in magnitude, but strong associations remained in multiply adjusted models (hazard ratio per SD decrease in IQ=1.38, 1.36 to 1.41). Separate analyses suggested that associations between IQ and attempted suicide were restricted to men without psychosis (age adjusted hazard ratio per SD decrease in IQ=1.73, 1.70 to 1.75); in contrast, we found no evidence of any marked association between IQ and attempted suicide in men with psychosis (P for statistical interaction <0.001).

## Bias, confounding, and other reasons for caution

We based our analyses on an almost complete birth cohort, well defined for potential confounding and mediating variables, and with complete data available for more than 80% of men. However, men with missing data tended to have lower educational attainment and fewer discharges for attempted suicide, and our results could be slight overestimates of effect.

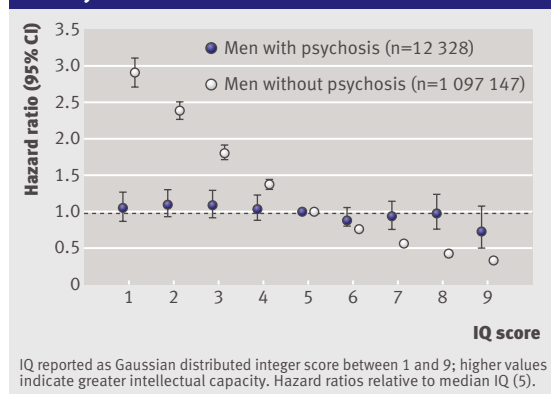
## Generalisability to other populations

Results are based on an entire population of Swedish men aged 16 to 57 years, although they provide no information on associations between IQ and attempted suicide in women or older men. However, we have no reason to believe that associations will differ in these groups, and the hazard ratios presented here are similar in magnitude to those seen in other populations.

## Study funding/potential competing interests

GDB is a Wellcome Trust career development fellow (WBS U.1300.00.006.00012.01), funding from which also supports EW. GDB, CRG, and IJD are members of the University of Edinburgh Centre for Cognitive Ageing and Cognitive Epidemiology, part of the cross council Lifelong Health and Wellbeing Initiative (G0700704/84698). FR is supported by the Swedish Research Council, the Labour Market Insurance Ltd (AFA), and the Swedish Council for Working Life and Social Research. Funding from the BBSRC, EPSRC, ESRC, and MRC is gratefully acknowledged.

## AGE ADJUSTED HAZARD RATIOS FOR ATTEMPTED SUICIDE



# Short term impact of smoke-free legislation in England: retrospective analysis of hospital admissions for myocardial infarction

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## STUDY QUESTION

Has smoke-free legislation in England had a short term impact on hospital admissions for myocardial infarction?

## SUMMARY ANSWER

There was a small but significant fall in the number of emergency admissions for myocardial infarction in the population as a whole after the introduction of smoke-free legislation on 1 July 2007. Impacts were observed in men regardless of age but results for women were inconclusive.

## WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Studies from several countries have found a reduction in admissions for myocardial infarction after smoke-free legislation, but many failed to adequately account for potential confounders. This study addressed these issues and found a small but significant fall in admissions.

## Participants and setting

All participants were patients aged 18 or older and living in England who had an emergency admission with a primary diagnosis of myocardial infarction.

## Design, size, and duration

An interrupted time series design based on routinely collected hospital episode statistics data. We analysed weekly number of admissions from July 2002 to September 2008 using a segmented Poisson regression, adjusting for the pre-existing decline in admissions, trends in population size, and seasonal variation in admissions.

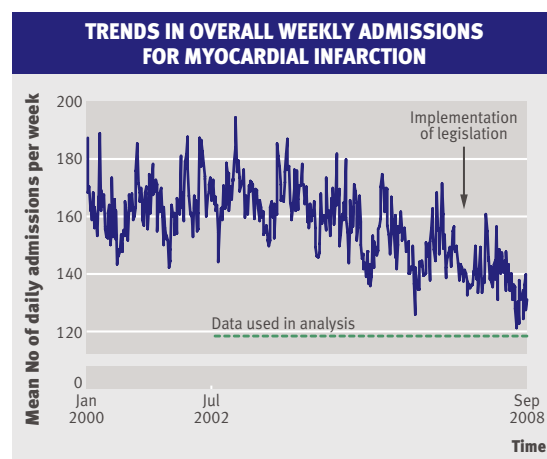
## Main results and the role of chance

After the implementation of smoke-free legislation there was a significant drop of 2.4% ( $P=0.007$ ) in the number of emergency admissions for myocardial infarction. This equates to 1200 fewer emergency admissions for myocardial infarction (1600 including readmissions) in the first year after legislation. The reduction in admissions was significant in men (3.1%,  $P=0.001$ ) and women (3.8%,  $P<0.007$ ) aged 60 and over and in men (3.5%,  $P<0.01$ ) but not in women (2.5%,  $P=0.38$ ) aged under 60. To provide further support for the findings we refitted the final models using false dates for the introduction of smoke-free legislation, ranging from January 2005 to January 2007. None of these dates led to a significant impact in the population as a whole or in men of any age, but in women aged over 60 significant impacts were observed with all but one of the false dates.



podcasts.bmj.com

Listen to Anna Gilmore, director of the Tobacco Control Centre at the University of Bath, talk about her research findings at <http://podcasts.bmj.com/bmj/>



## Bias, confounding, and other reasons for caution

We took into account potential sources of bias by adjusting for seasonal variation and underlying trends in population size and admissions for myocardial infarction (both of which varied by age). There could, however, be other unknown factors associated with the timing of the legislation that could affect admission so confounding might not be eliminated completely. The absence of an effect in women aged under 60 could be caused by insufficient power to detect the small impacts expected. In some of the analyses with “false dates,” significant findings in women aged over 60 indicate uncertainty around the impacts in this group.

## Generalisability to other populations

The smaller fall in England, compared with that observed elsewhere, probably reflects both lower levels of exposure to second hand smoke in England before the legislation and the fact that we accounted for underlying declines in admissions for myocardial infarction and other measurable confounders.

## Study funding/potential competing interests

This work was supported by the Department of Health's Policy Research Programme. The views expressed in the publication are those of the authors and not necessarily those of the Department of Health. AG is supported by a Health Foundation Clinician Scientist Fellowship. MS, LB, and AG are members of the UK Centre for Tobacco Control, a UKCRC Public Health Research: Centre of Excellence. The funders played no role in the study design, analysis and interpretation of data, or in the writing of the report or the decision to submit the article for publication.