



THIS WEEK'S RESEARCH QUESTIONS

- 584** Is ethnicity related to academic performance in doctors and medical students trained in the UK?
- 585** Does weekly ultrasound treatment improve hard to heal venous ulcers?
- 586** Has the survival of patients with cystic fibrosis with low lung function improved over the past 20 years?
- 587** Do older residents in care homes receive poorer quality care for chronic diseases than residents living in the community?
- 588** How much published research on primary care is authored by primary care researchers, and how good is it?

Ethnicity and academic performance

Katharine Woolf and colleagues' systematic review tackles a sensitive subject and comes to a controversial conclusion (p 584). The authors reviewed 23 quantitative studies that evaluated the performance of nearly 28 000 UK trained medical students and doctors, in both summative and formative assessments (including machine marked exams), and found that candidates from non-white ethnic groups did significantly less well than white candidates.

The full paper on bmj.com is very detailed, showing how the authors did seven separate meta-analyses and took into account adjustments for confounding factors such as sex, first language, previous exam performance, and socioeconomic status. The association persisted and, despite limitations that included considerable heterogeneity in the primary studies and a mainly white versus non-white classification, the *BMJ*'s reviewers, editorial advisers, and editors agreed that the findings were robust enough.

The need to ensure effective and fair ways to train all doctors is a challenge for all of us, say the authors in their long and nuanced discussion of these findings.

Ultrasound and ulcers

In 2009, we published the VenUS II trial of larval therapy for leg ulcers (it didn't improve healing) (*BMJ* 2009;338:b773). This week we publish VenUS III—different treatment, same negative result (p 585).

Compression bandaging is effective for most new leg ulcers, but larger and older ulcers have a poorer prognosis. VenUS III recruited patients with these hard to heal ulcers and looked at whether ultrasound therapy, in addition to standard care, might improve healing. Previous

findings had suggested that it might, but the studies were not robust.

In this study, ultrasound seemed to have no effect on ulcer healing. The treatment was given in short weekly sessions of low dose, high frequency ultrasound for up to 12 weeks. One reviewer wondered whether a higher dose might have been more effective, but another agreed with the authors that the regimen tested was consistent with what was likely to be provided in primary care.



Leg ulceration is a chronic, recurring condition that affects 1.5–1.8% of adults in industrialised countries (with venous leg ulcers representing up to 84% of leg ulcers) and substantially affects health and quality of life. To learn more about management of venous leg ulcers, read a recent Clinical Review (*BMJ* 2010;341:c6045).

Benchmarking UK primary care research

The UK contributes 9% of the world's research output for 4.5% of the world's research expenditure, say Julie Glanville and colleagues, but is the work of world beating quality? (p588). With the new Research Excellence Framework (REF) (<http://hefce.ac.uk/research/ref>) about to replace the UK Research Assessment Exercise (RAE), the authors decided to benchmark the performance of research in their field, UK primary care.

Their bibliometric analysis looked at a 15% sample of the more than 82 000 primary care based studies that came from the UK, United States, Australia, Canada, Germany, and the Netherlands, and were indexed in Medline and Embase between 2001 and 2007. In every comparison the UK was in the top two countries for volume of papers and performance measures such as citation bangs for the buck/euro/pound.

The authors conclude that the RAE 2008 primary care panel was right to judge more than half its submissions as "internationally excellent or world leading." Will the same apply in the REF 2014 assessment, with Chinese research improving by the day?

LATEST RESEARCH: For this and other new research articles see www.bmj.com/research

Cannabis and psychosis Responses to *Continued cannabis use and risk of incidence and persistence of psychotic symptoms* (doi:10.1136/bmj.d738). This cohort study found that cannabis use was a risk factor for the development of incident psychotic symptoms. Read the full responses at <http://bit.ly/fgtUwD>.

"Elegant large-scale epidemiological studies such as this are able to clarify and here largely exclude the role of potential confounders, but this study in itself is concerned with cannabis-induced psychotic symptoms. Whether or not cannabis increases the risk for psychotic disorders, which it probably does, requires more clinically oriented studies using validated diagnostic instruments." Sameer Jauhar and Stephen M Lawrie, Southern General Hospital, Glasgow

"If someone having smoked cannabis five times in their life is classed as a cannabis smoker, then probably a third of the population under 60 could be classed that way." Rachel G Sagar, proofreader/tutor

"Cannabis is a psychoactive substance. It should be treated with respect and certainly not used by children. However, all these studies about psychosis are treated sensationally by the media." Peter Reynolds, Legalise Cannabis Alliance

"The precursors to psychosis are surely anxiety attacks and paranoia, and these are as much a product of legal and social context as the person and the drugs themselves." Darryl P Bickler, Drug Equality Alliance



Ethnicity and academic performance in UK trained doctors and medical students: systematic review and meta-analysis

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STUDY QUESTION Is ethnicity related to the academic performance of UK trained doctors and medical students?

SUMMARY ANSWER Compared with candidates of white ethnicity, this meta-analysis found that UK trained doctors and medical students from minority ethnic groups underperformed academically in undergraduate and postgraduate assessments, including written tests marked by machine.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

A third of all UK medical students and junior doctors are from minority ethnic groups. UK trained doctors and medical students from minority ethnic ("non-white") groups tend to underperform academically compared with candidates from white ethnic groups. Fairness and equality in training and assessment will be achieved only by acknowledging this is a shared problem.

Selection criteria for studies

All published and unpublished quantitative reports on the academic performance of UK trained medical students or doctors that included a measure of candidate ethnicity. We included 22 reports, with 23 742 participants.

Primary outcomes

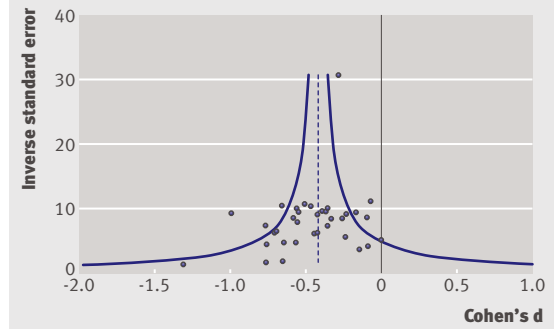
Academic performance, which included pass/fail, attainment of other academic related specific goals (such as achieving a placement or not), and mean assessment scores.

Main results and the role of chance

The meta-analysis comparing the academic performance of medical students and UK trained doctors of white and "non-white" ethnic groups found candidates of "non-white" ethnicity underperformed (effect size Cohen's $d = -0.42$, 95% confidence interval -0.50 to -0.34 ; $P < 0.001$).

Effects in the same direction and of similar magnitude were found in meta-analyses of undergraduate assessments ($d = -0.42$, -0.49 to -0.35 ; $P < 0.001$), postgraduate

FUNNEL PLOT OF ALL STUDIES SHOWS NO EVIDENCE OF PUBLICATION BIAS



assessments ($d = -0.38$, -0.60 to -0.17 ; $P < 0.001$), machine marked written assessments only ($d = -0.35$, -0.44 to -0.26 ; $P < 0.001$), practical clinical assessments only ($d = -0.42$, -0.52 to -0.33 ; $P < 0.001$), assessments with pass/fail outcomes only ($d = -0.59$, -0.84 to -0.35 ; $P < 0.001$), assessments with continuous outcomes ($d = -0.38$, -0.46 to -0.30 ; $P < 0.001$) and in a meta-analysis of white compared with Asian candidates only ($d = -0.40$, -0.51 to -0.28 ; $P < 0.001$). Heterogeneity was observed in all meta-analyses (range $I^2 = 50\%$ – 89%); it was lowest in the meta-analysis of undergraduate reports and highest in the postgraduate reports.

Bias, confounding, and other reasons for caution

The broad ethnic categories used by necessity might have masked differences in attainment between minority ethnic groups, which could reflect important causal mechanisms or confounding factors. Heterogeneity was found in all the meta-analyses. Lack of available data prevented a formal analysis of confounders. Funnel plots suggested no publication bias, though this is always possible.

Study funding/potential competing interests

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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► Commentary: An "ethnic minority" medical student (*BMJ* 2008;337:a1240)

► Increasing diversity among clinicians (*BMJ* 2008;336:a1082)

What types of article does the *BMJ* consider?

We are delighted to receive articles for publication—from doctors and others—on the clinical, scientific, social, political, and economic factors affecting health. We give priority to articles that will help doctors to make better decisions. Please see our advice to authors at <http://resources.bmj.com/bmj/authors>, and if you would like to submit an article do so via our online editorial office at <http://submit.bmj.com>.

All original research articles are submitted, although we may invite submission (without promising acceptance) if we come across research being presented at conferences, if we see it in abstract form, or if the authors make an inquiry about the suitability of their work before submission.

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Use of weekly, low dose, high frequency ultrasound for hard to heal venous leg ulcers: the VenUS III randomised controlled trial

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STUDY QUESTION What is the clinical effectiveness of low dose, high frequency ultrasound delivered in conjunction with standard care for treating hard to heal venous ulcers?

SUMMARY ANSWER None. The adjuvant ultrasound, administered weekly for 12 weeks, did not affect ulcer healing rates, quality of life, or ulcer recurrence.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS Current clinical evidence that therapeutic ultrasound can help heal leg ulcers comes from studies that are methodologically weak, small in size, and vary widely in application regimens. This large study of low dose, high frequency ultrasound given weekly for 12 weeks found no evidence of a benefit in terms of ulcer healing rates or quality of life for people with hard to heal ulcers.

Design

Patients were randomised to receive weekly administration of low dose, high frequency ultrasound therapy (0.5 W/cm², 1 MHz, pulsed pattern of 1:4) for up to 12 weeks plus standard care, or standard care alone. Standard care comprised low adherent dressings and bandaging (four layer high compression, reduced compression, or no compression depending on patient's tolerance). Nurses telephoned an independent randomisation service for concealed treatment allocation.

Participants and setting

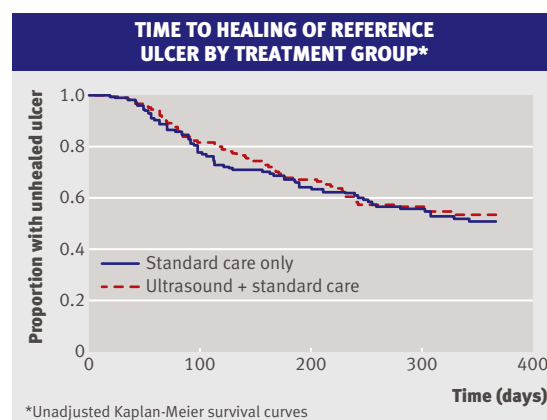
Participants with at least one venous leg ulcer of >6 months' duration or ≥5 cm² area, or both, and an ankle brachial pressure index of ≥0.8 were recruited from UK and Irish district nurse caseloads, community leg ulcer clinics, and hospital outpatient leg ulcer clinics.

Primary outcome(s)

The primary outcome was time to healing of the reference ulcer.

Main results and the role of chance

Between January 2006 and December 2008, 168 patients were randomised to ultrasound plus standard care and 169 to standard care. At 12 months' follow-up there was no significant difference between the treatment groups in the time to healing of the reference leg ulcer (log rank statistic 0.254, P=0.61). Adjustment for ulcer area and duration at baseline, use of compression bandages, and treatment centre did not affect the results (hazard ratio 0.99, P=0.97). There was no significant difference in the proportion of patients with all ulcers healed by 12 months (72/168 in ultrasound group v 78/169 in standard care group, P=0.39 Fisher's exact test), nor in the change in ulcer size after four weeks' treatment. The median time to complete healing of all ulcers was 328



days (95% CI 235 to inestimable) for standard care and 365 days (224 to inestimable) for ultrasound plus standard care. We found no significant difference in rates of recurrence after healing or in health related quality of life. Those centres with the highest recruitment rates had the highest healing rates.

Harms

More participants in the ultrasound group reported at least one adverse event (86 in ultrasound group v 67 in standard care group), but, as this trial was open to the treating nurses, it is possible that they attributed adverse events more readily to the new treatment.

Bias, confounding, and other reasons for caution

Strengths of this study include a large sample, wide inclusion criteria, blinded allocation, best available standard treatment, blinded outcome assessment, low loss to follow-up, collection of data on quality of life and effectiveness, and duration of follow-up. Limitations included the modest response rate from patients at 12 months for quality of life questionnaires.

Generalisability to other populations

We evaluated a particular ultrasound regimen, and so our results cannot be extrapolated to other regimens. Recruitment from a wide range of centres means the results are probably transferable to many care settings.

Study funding/potential competing interests

This project was funded by the UK National Institute for Health Research, Health Technology Assessment Programme and will be published in full in *Health Technology Assessment*. The funder had no role in data collection and analysis, writing the article, or submission for publication. The views and opinions expressed here do not necessarily reflect those of the Department of Health.

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► Four layer bandage compared with short stretch bandage for venous leg ulcers (*BMJ* 2009;338:b1344)

► How to measure success in treating chronic leg ulcers (*BMJ* 2009;338:b1434)

CME

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Improved survival at low lung function in cystic fibrosis: cohort study from 1990 to 2007

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STUDY QUESTION Has the survival of patients with cystic fibrosis whose forced expiratory volume in one second (FEV₁) has declined below 30% of their predicted value improved over the past 20 years?

SUMMARY ANSWER Median survival increased from 1.2 years in a 1990-1 sub-cohort to 5.3 years in a 2002-3 sub-cohort, with a marked improvement between 1994 and 1997 and little change thereafter.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

An FEV₁ below 30% predicted is generally considered the threshold at which 50% of patients with cystic fibrosis survive two years or less. The survival of such patients has improved markedly, with a median predicted survival now of 5.3 years; some of this improvement may be due to use of nebulised recombinant human DNase.

Participants and setting

We studied all patients attending the Royal Brompton's adult cystic fibrosis unit whose FEV₁ was first observed to fall below 30% predicted between 1 January 1990 and 31 December 2003. We excluded patients who had lung transplantation.

Design, size, and duration

We did a cohort study examining the survival of 276 adults with cystic fibrosis through to 31 December 2007. We compared survival in two year sub-cohorts, using estimates of median survival. We used multivariate Cox regression models to examine clinical and demographic factors that might be associated with survival.

Main results and the role of chance

Median survival improved from 1.2 years in the 1990-1

sub-cohort to 5.3 years in the 2002-3 sub-cohort; a marked improvement occurred between 1994 and 1997, with little change thereafter. This improvement coincided with the introduction of nebulised recombinant human DNase, the use of which was associated with a reduced risk of death (hazard ratio 0.59, 95% confidence interval 0.44 to 0.79). We also saw a steady improvement in body mass index; a low body mass index (<19) was associated with an increased risk of death (hazard ratio 1.52, 1.10 to 2.10). Our study is observational, but the ecological relation between the use of recombinant human DNase and the improvement in survival, and the magnitude of its effect in regression analysis, are compelling observations.

Bias, confounding, and other reasons for caution

Disentangling the effect of recombinant human DNase from other (unmeasured) factors that may have changed over the time course of our study is difficult. We examined determinants of survival only at entry to the cohort rather than during follow-up. A time dependent analysis would probably have made little difference to our findings, as most if not all of the variables we examined would be unvarying over time.

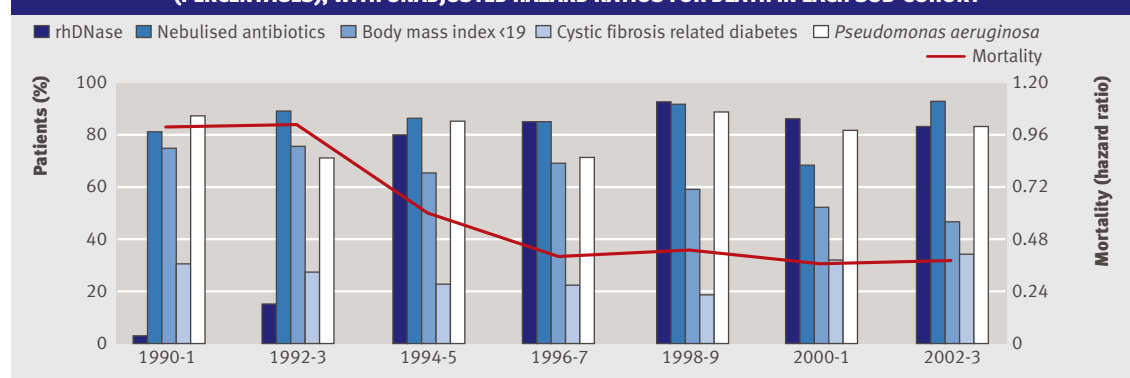
Generalisability to other populations

We recruited our patients from a single centre, and a small number were lost to follow-up. We doubt that this detracts from the generalisability of our findings, but other cystic fibrosis centres should examine survival in this population of patients with low lung function.

Study funding/potential competing interests

The study was supported by the Respiratory Biomedical Research Unit at the Royal Brompton Hospital and received no external funding.

SELECTED MEASURES OF DISEASE STATUS AND IMPORTANT TREATMENT MODALITIES AT TIME OF ENTRY TO COHORT (PERCENTAGES), WITH UNADJUSTED HAZARD RATIOS FOR DEATH IN EACH SUB-COHORT



Quality of chronic disease care for older people in care homes and the community in a primary care pay for performance system: retrospective study

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STUDY QUESTION Do older residents in care homes (nursing and residential) receive poorer quality care for chronic diseases compared with residents living in the community, and are they more likely to be excluded from targets in the UK Quality and Outcomes Framework (QOF)?

SUMMARY ANSWER Achievement for 14 of 16 quality indicators suitable for vulnerable older people was lower for residents of care homes than for those living in the community, taking account of differences in age and dementia prevalence. Residents in care homes were more likely to be excluded by doctors from QOF targets.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS It is not known whether older residents of care homes have benefited from implementation of the QOF. Chronic disease care for conditions included in the QOF is poorer for residents of care homes than those living in the community and doctors are more likely to identify residents of care homes as unsuitable or non-consenting for all QOF indicators for a condition.

Participants and setting

We studied 10 387 residents of care homes and 403 259 community dwelling residents aged 65 to 104 registered with 326 English and Welsh general practices in 2008-9.

Design

Retrospective analysis of The Health Improvement Network, an established primary care database.

Primary outcome(s)

The main outcome measure was 16 process quality indicators in chronic disease management appropriate for vulnerable older people for disease areas included in the UK QOF.

Main results and the role of chance

After adjustment for age, sex, dementia, and length of reg-

istration, attainment of quality indicators was significantly lower for residents of care homes than for those in the community for 14 of 16 indicators ($P < 0.002$). The largest differences were for prescribing in coronary heart disease (β blockers, relative risk 0.70, 95% confidence interval 0.65 to 0.75), and monitoring of diabetes (retinal screening 0.75, 0.71 to 0.80, measurement of glycated haemoglobin 0.87, 0.83 to 0.90). Monitoring of hypothyroidism (0.93, 0.90 to 0.95), blood pressure in people with stroke (0.92, 0.90 to 0.95), and electrolytes for those receiving loop diuretics (0.89, 0.87 to 0.92) showed smaller differences. Attainment was generally lowest in nursing homes. Residents of care homes were more likely to be identified by their doctor as unsuitable or non-consenting for all QOF indicators for a condition allowing their exclusion from targets; 33.7% for stroke and 34.5% for diabetes.

Bias, confounding, and other reasons for caution

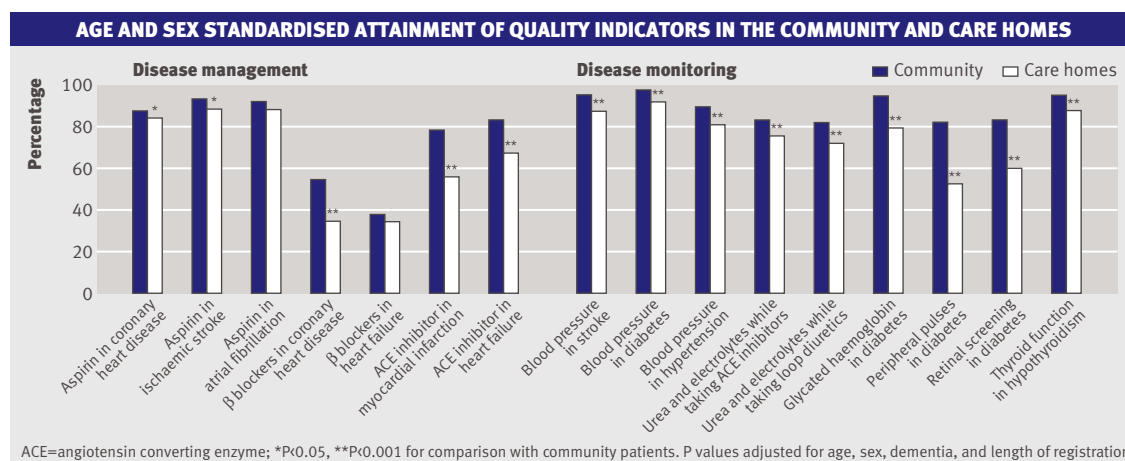
A concern for comparisons between residents of care homes and those in the community is the adequacy of adjustment for important demographic and clinical differences. We adjusted analyses for age and sex and stratified by dementia, but cannot completely exclude residual or unmeasured confounding. Our data rely on quality of recording in the electronic primary care record. Measures recorded at the time of consultation (for example, blood pressure) may be less likely to be recorded in care homes, where contemporaneous access to practice computer systems is not always possible.

Generalisability to other populations

Our sample has similar overall attainment of QOF indicators to national data and is likely to be representative of the UK population.

Study funding/potential competing interests

This study was funded by a grant from the BUPA Foundation, an independent medical research charity.



Research output on primary care in Australia, Canada, Germany, the Netherlands, the United Kingdom, and the United States: bibliometric analysis

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STUDY QUESTION

How much of research on primary care is authored by primary care researchers and what is the quality of published work compared across six countries with well developed primary care services?

SUMMARY ANSWER

This international comparison of the volume and citation rates of papers by researchers from primary care consistently placed UK researchers among the best performers internationally.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

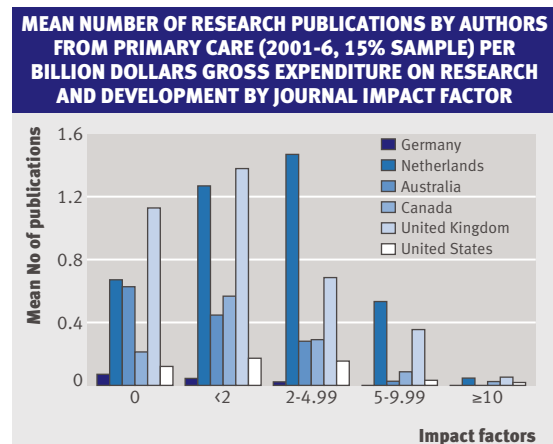
The UK Research Assessment Exercise in 2008 rated 50% of UK primary care research as world class or internationally excellent, but no direct international comparisons exist. We showed that in six countries with strong primary care, the United Kingdom and the Netherlands produce the most cited primary care led research on primary care, but identifying primary care research that is carried out by primary care researchers is difficult using routine bibliometric methods.

Participants and setting

Primary care researchers carrying out primary care research and publishing the most papers in the United Kingdom, United States, Australia, Canada, Germany, and the Netherlands.

Design

Bibliometric analysis and review of research publications relevant to comprehensive primary care and authored by researchers from primary care, recorded in Medline and Embase, with publication dates 2001-7 inclusive.



Primary outcome(s)

To measure the volume of published activity by generalist researchers from primary care and the quality of the research output by those publishing the most papers using citation metrics (numbers of cited papers, proportion of cited papers, and mean citation scores).

Main results and the role of chance

In total, 82 169 papers published between 2001 and 2007 in the six countries were classified as research on primary care. In a 15% pragmatic random sample of these records, 40% of research on primary care from the United Kingdom and 46% from the Netherlands was authored by researchers employed in a primary care setting or employed in academic departments of primary care. The 141 researchers with the highest volume of publications reporting research findings published between 2001 and 2007 (inclusive) authored or part authored 8.3% of the total sample of papers. For authors with the highest proportion of publications cited at least five times, the best performers came from the United States (five), United Kingdom (four), and the Netherlands (two). In the top 10 of authors with the highest proportions of publications achieving 20 or more citations, six were from the United Kingdom and four from the United States. The mean Hirsch index (measure of a researcher's productivity and impact of the published work, that is, the number of papers and number of citations) was 14 for the Netherlands, 13 for the United Kingdom, 12 for the United States, 7 for Canada, 4 for Australia, and 3 for Germany (the number corresponding to the number of papers that have been cited at least that same number of times).

Bias, confounding, and other reasons for caution

In addition to the standard limitations of bibliometric assessments, this study was limited on cost grounds to compare only six countries and to analyse quality of publications only among primary care researchers with the highest volume of publications. We considered only primary care researchers providing comprehensive primary care.

Generalisability to other populations

Not applicable.

Study funding/potential competing interests

This study was jointly funded by the Society for Academic Primary Care and the National Institute for Health Research National School for Primary Care Research.