

PLAB and UK graduates' performance on MRCP(UK) and MRCGP examinations: data linkage study

I C McManus,^{1,2} Richard Wakeford³

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¹UCL Medical School, University College London, London WC1E 6BT, UK

²Research Department of Clinical, Educational and Health Psychology, University College London

³Hughes Hall, University of Cambridge, Cambridge CB1 2EW, UK

Correspondence to: I C McManus i.mcmanus@ucl.ac.uk

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STUDY QUESTION Are international medical graduates passing the Professional and Linguistic Assessments Board (PLAB) exam performing as well as UK graduates at the end of foundation year 1 training, as required by the General Medical Council (GMC)?

SUMMARY ANSWER No, PLAB graduates' subsequent performance at MRCP(UK) and MRCGP exams (for membership of the royal colleges of physicians and of general practitioners) are over one standard deviation below that of UK graduates, and outcome equivalence would require the pass marks for PLAB exams to be raised considerably.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

International medical graduates perform less well than UK graduates in several UK postgraduate examinations for reasons that are unclear. This data linkage study shows that PLAB, the test that international medical graduates from outside Europe must pass before they can legally practise medicine in the UK, is a good predictor of subsequent MRCP(UK) and MRCGP performance and is therefore a valid assessment, but PLAB graduates perform substantially less well than UK graduates so that career progression is not equivalent. Examination performance could be made equivalent if pass marks for PLAB were raised considerably, but that would produce a large fall in pass rates, with workforce implications.

Participants and setting

Doctors in training for internal medicine or general practice in the United Kingdom.

Design, size, duration

Linkage of GMC PLAB performance data with data from the MRCP(UK) and MRCGP assessments, assessing the

performance of PLAB graduates (n=1388 to 7823) and UK graduates (n=5977 to 18352) at first attempt at MRCP(UK) (2001-12) and MRCGP (2008-12) examinations. Outcome measures were performance at the separate parts of MRCP(UK) and MRCGP, which were examined in relation to performance at first attempt at the two parts of PLAB (PLAB1 and PLAB2) and to International English Language Testing System (IELTS) scores. All marks are reported relative to the pass mark.

Main results

PLAB is a valid, highly significant, predictor for all outcome assessments with PLAB1 better predicting subsequent knowledge assessments and PLAB2 better predicting clinical assessments. PLAB graduates' marks are substantially lower than UK graduates' marks (see table), the average effect size being over one standard deviation. IELTS scores did correlate with later performance, but much less strongly than did PLAB1.

Two different types of calculation of the changes to PLAB pass marks that would produce outcome equivalence on MRCP(UK) and MRCGP exams suggest that pass marks for PLAB1 and PLAB2 would need to be raised considerably compared with the present pass marks. Raising IELTS requirements would have less impact on outcome equivalence than raising PLAB pass marks.

Implications

If outcome equivalence in these higher professional examinations is required, the standard for PLAB needs reconsideration and pass marks might need raising, which would have workforce implications, as some 1300 PLAB graduates are registered annually.

Bias, confounding, and generalisability

Only two (albeit major) postgraduate assessment areas were involved, and it would be desirable to conduct similar analyses on other major assessments, particularly those with a high proportion of international medical graduate trainees. We were not able to analyse the effect of confounding variables such as the quality of training programmes, and such analyses are urgently needed.

Study funding/potential competing interests

No funding was received for this study. ICMcM is a member of the General Medical Council's Working Party on the PLAB assessment and has received attendance fees from the GMC, and is educational adviser to the MRCP(UK); RW is an educational adviser to the MRCGP.

Mean (SD) marks of UK and PLAB graduates at their first attempt at the various parts of MRCP(UK) and MRCGP exams. (All differences are significant with $P < 0.001$)

Exam	UK graduates		PLAB graduates		Effect size (Glass's delta)*
	Mean (SD) marks	No of graduates	Mean (SD) marks	No of graduates	
MRCP(UK)					
Part 1	0.73 (10.12)	18 352	-8.73 (10.75)	7823	$\Delta = -0.94$
Part 2	6.41 (7.49)	14 094	-0.41 (6.91)	5133	$\Delta = -0.91$
PACES	1.15 (5.34)	14 376	-6.34 (6.32)	4386	$\Delta = -1.40$
MRCGP					
AKT	19.02 (15.04)	12 152	3.78 (16.23)	3160	$\Delta = -1.01$
CSA	13.44 (9.93)	5977	-4.61 (10.66)	1388	$\Delta = -1.82$

PACES= Practical Assessment of Clinical and Examination Skills. AKT= Applied Knowledge Test. CSA= Clinical Skills Assessment. *Glass's delta is calculated as $(\text{mean(PLAB graduates)} - \text{mean(UK graduates)}) / \text{SD(UK graduates)}$.

Annual Review of Competence Progression (ARCP) performance of doctors who passed Professional and Linguistic Assessments Board (PLAB) tests compared with UK medical graduates: national data linkage study

Paul A Tiffin,¹ Jan Illing,² Adetayo S Kasim,³ John C McLachlan²

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¹School for Medicine, Pharmacy and Health, Wolfson Research Institute for Health and Wellbeing, Durham University Queen's Campus, Stockton-on-Tees TS17 6BH, UK

²Centre for Medical Education Research, Burdon House, Leazes Road, Durham DH1 1TA, UK

³Wolfson Research Institute for Health and Wellbeing, Durham University Queen's Campus, Stockton-on-Tees TS17 6BH, UK

Correspondence to: P Tiffin
p.a.tiffin@durham.ac.uk

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STUDY QUESTION Does the use of the Professional and Linguistic Assessments Board (PLAB) examination system used to grant registration for international medical graduates result in equivalent postgraduate medical performance, as evaluated at Annual Review of Competence Progression (ARCP), between UK based doctors who qualified overseas and those who graduated from UK universities?

SUMMARY ANSWER International medical graduates who registered via the PLAB examination were significantly more likely to obtain a less satisfactory outcome at ARCP compared with UK graduates, even after control for the effects of demographic factors.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS Compared with UK medical graduates, international medical graduates are more likely to fail postgraduate examinations or be referred for concerns relating to fitness to practise. The PLAB examination system does not result in equivalent performance between international medical graduates and UK graduates, as evaluated later at ARCP.

Participants and setting

We studied 53 436 UK based doctors in training with at least one competency related ARCP outcome reported dur-

ing the study period, of whom 42 017 were UK medical graduates and 11 419 were international medical graduates who were registered following a pass from the PLAB route.

Design

This was a prospective observational cohort study. We linked ARCP outcome data from the UK deaneries with PLAB test performance and demographic data held by the UK General Medical Council (GMC).

Main results and the role of chance

International medical graduates were more likely to obtain a less satisfactory outcome at ARCP than were UK graduates. This finding persisted even after adjustment for sex, age, years of UK based practice, and ethnicity and exclusion of outcomes associated with postgraduate examination failure (odds ratio 1.63, 95% confidence interval 1.30 to 2.06). However, international medical graduates who scored in the highest twelfth at PLAB part 1 (at least 32 points above the pass mark) had ARCP outcomes that did not differ significantly from those of UK graduates. Higher marks on both parts of the PLAB and better performance on the International English Language Testing System predicted more satisfactory ARCP outcomes. In contrast, multiple resits for either part of the PLAB were associated with less satisfactory outcomes at ARCP. These findings suggest that the PLAB test used for registration of international medical graduates is not generally equivalent to the requirements for UK graduates.

Bias, confounding, and other reasons for caution

Almost one quarter of doctors had missing data on ethnicity. Only the world region of qualification was available, not the specific country where the primary medical degree was obtained.

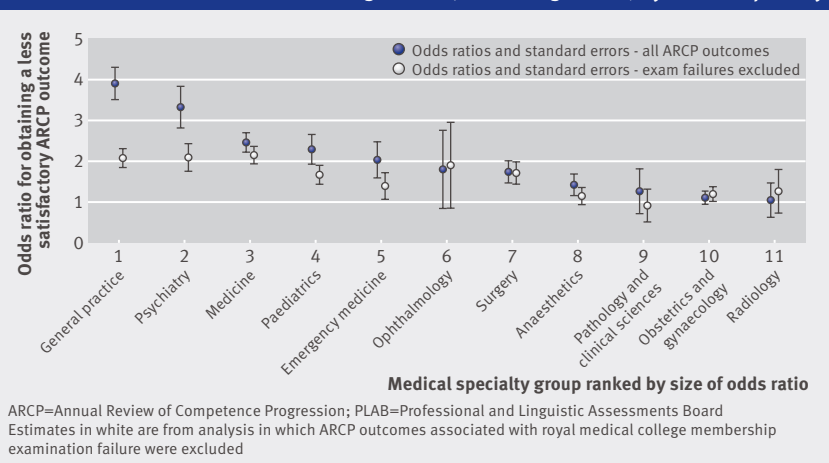
Generalisability to other populations

Our findings are based on data from international medical graduates who obtained registration via the PLAB examination. The results may not be generalisable to overseas doctors who registered with the UK GMC via alternative routes.

Study funding/potential competing interests

This study was funded by the GMC via an open tendering process.

Results from random effects ordinal regression models for obtaining less satisfactory ARCP outcome as international medical PLAB graduate (versus UK graduate) by medical speciality



Influence of blood prostate specific antigen levels at age 60 on the benefits and harms of prostate cancer screening: population based cohort study

Sigrid Carlsson,^{1,2} Melissa Assel,³ Daniel Sjöberg,³ David Ulmert,² Jonas Hugosson,¹ Hans Lilja,^{2,4,5,6,7} Andrew Vickers³

EDITORIAL by Wilt and Dahm

¹Department of Urology, Institute of Clinical Sciences, Sahlgrenska Academy at University of Gothenburg, Sweden

²Department of Surgery (Urology service), Memorial Sloan-Kettering Cancer Center, New York, NY, USA

³Department of Epidemiology and Biostatistics, Memorial Sloan-Kettering Cancer Center, New York, NY 10065, USA

⁴Departments of Laboratory Medicine and Medicine (GU-Oncology), Memorial Sloan-Kettering Cancer Center, New York, NY, USA

⁵Nuffield Department of Surgical Sciences, University of Oxford, Oxford, UK

⁶Institute of Biomedical Technology, University of Tampere, Tampere, Finland

⁷Department of Laboratory Medicine in Malmö, Lund University, Malmö, Sweden

Correspondence to: H Lilja
liljah@mskcc.org

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STUDY QUESTION Do the relative risks of prostate cancer incidence, metastasis, and mortality associated with screening vary by serum prostate specific antigen (PSA) levels at age 60?

SUMMARY ANSWER The overall effects of PSA screening at the population level are an average of two subgroups: men with PSA levels <2 ng/mL at age 60 (about 75% of the population), who experience overdiagnosis but no reduction in prostate cancer mortality, and those with PSA levels ≥2 ng/mL, who experience a large decrease in cancer mortality with moderate levels of overdiagnosis.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS The ratio of benefits to harms for PSA screening at the population level is questionable. The results of this paper suggest that screening after the age of 60 should focus on a subgroup of men with PSA levels ≥2 ng/mL and that no further screening is recommended for men with PSA levels <1 ng/mL at age 60.

Participants and setting

The study included two separate cohorts from Sweden. The first was a population based study of 1162 Swedish men aged 60 providing blood samples at baseline in 1981, for whom rates of PSA testing remained extremely low during follow-up. The second cohort included 1756 men aged 57.5-62.5 receiving PSA screening during 1995 onwards as part of a randomized trial.

Design, size, and duration

Non-randomized comparison of the 15 year risk of prostate cancer mortality in each cohort, separately by PSA level subgroups. In the non-screened cohort, PSA levels were measured in archived blood samples. Metastasis and death from prostate cancer was ascertained by case note review. In the screened cohort, an independent blinded review committee determined cause of death.

Main results and the role of chance

The rate ratio for death from prostate cancer by screening

overall was 0.57 (95% confidence interval 0.26 to 1.25), close to that reported in the randomized trial. Differences between groups varied dramatically by baseline PSA level. Screening reduced prostate cancer mortality for men aged 60 with PSA levels ≥2 ng/mL by 453 (95% confidence interval 108 to 797) per 10000 men, with 23 men needing to be screened and 6 diagnosed to prevent one prostate cancer death at 15 years. In contrast, there was no evidence of a decrease in mortality in men with PSA levels <2 ng/mL at age 60 (49 more deaths per 10000 men, 95% confidence interval 5 to 74).

Bias, confounding, and other reasons for caution

Although the comparison between the screened and unscreened cohorts might plausibly be affected by several biases, this would not affect the comparison between subgroups. It may be that 15 years is too short a follow-up given the long clinical course of prostate cancer. Yet while this may explain the failure to find statistically significant overall differences in mortality, most of the confidence intervals for the PSA subgroups are sufficiently narrow to exclude alternative clinical implications.

Generalisability to other populations

Many populations, such as that of the United States, are more racially diverse than that of Sweden, and absolute risks of prostate cancer incidence and mortality may differ. However, our results focus on relative differences between PSA subgroups. Evidence that the prognostic value of PSA is affected by race is lacking.

Study funding/potential competing interests

Details of study funding are in the full paper on bmj.com. HL holds patents for free PSA, kallikrein related peptidase 2, and intact PSA assays, and along with AV, is named as co-inventor on a patent application for intact/nicked PSA assays and for a statistical method for predicting the result of a prostate biopsy.

15 year difference in risk per 10 000 men between screened (Gothenburg) and unscreened (Malmö) cohorts by baseline total prostate specific antigen (PSA) levels

Prostate cancer outcomes	Risk difference/10 000 men (95% CI)					
	Baseline total PSA level (ng/mL)					
	0-0.99	1-1.99	0-1.99	2-2.99	≥2	≥3
Increase in diagnosis	171 (-32 to 374)	1462 (1101 to 1822)	767 (565 to 970)	2578 (1602 to 3554)	2485 (1797 to 3173)	2432 (1502 to 3362)
Decrease in metastasis	-37 (-70 to 11)	-70 (-182 to 42)	-54 (-112 to 3)	158 (-167 to 483)	415 (30 to 799)	579 (-15 to 1172)
Decrease in death	-17 (-43 to 14)	-85 (-138 to -2)	-49 (-74 to -5)	225 (-68 to 425)	453 (108 to 797)	604 (76 to 1131)

Effect of screening sigmoidoscopy and screening colonoscopy on colorectal cancer incidence and mortality: systematic review and meta-analysis of randomised controlled trials and observational studies

Hermann Brenner,^{1,2} Christian Stock,^{1,3} Michael Hoffmeister¹

¹Division of Clinical Epidemiology and Aging Research, German Cancer Research Center, INF 581, 69120 Heidelberg, Germany

²German Cancer Consortium, Heidelberg, Germany

³Institute of Medical Biometry and Informatics, University of Heidelberg, Heidelberg, Germany

Correspondence to: h.brenner@dkfz.de

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STUDY QUESTION What are the effects of screening sigmoidoscopy and screening colonoscopy on incidence of and mortality from colorectal cancer?

SUMMARY ANSWER Screening sigmoidoscopy and screening colonoscopy prevent a large proportion of deaths from distal colorectal cancer. Observational studies suggest that screening colonoscopy also decreases mortality from cancer of the proximal colon.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Randomised trials on screening sigmoidoscopy have shown a significant reduction in incidence of and deaths from distal colorectal cancer. This first systematic review and meta-analysis both of randomised controlled trials on screening sigmoidoscopy and of observational studies on screening sigmoidoscopy and screening colonoscopy found consistent and compelling evidence that screening sigmoidoscopy is able to prevent a large proportion of deaths from distal colorectal cancer, and suggests substantial added value of screening colonoscopy, especially in the prevention of deaths from cancer of the proximal colon.

Selection criteria for studies

We searched PubMed, Web of Science, and Embase for randomised controlled trials and observational studies on the impact of screening sigmoidoscopy and screening colonoscopy on colorectal cancer incidence and mortality in the general population at average risk.

Primary outcomes

Reduction in incidence of and deaths from total, proximal, and distal colorectal cancer by screening sigmoidoscopy or screening colonoscopy.

Main results and role of chance

For screening sigmoidoscopy, four randomised controlled trials published since 2009 and 10 observational studies published since 1992 were identified that consistently found a major reduction in distal but not proximal colorectal cancer incidence and mortality. Summary estimates of reduction in distal colorectal cancer incidence and mortality were 31% (95% confidence intervals 26% to 37%) and 46% (33% to 57%) in intention to screen analysis and 42% (29% to 53%) and 61% (27% to 79%) in per protocol analysis of randomised controlled trials, and 64% (50% to 74%) and 66% (38% to 81%) in observational studies. For screening colonoscopy, evidence was restricted to six observational studies. Four of these studies were published in 2012 and 2013 only, five studies reported on colorectal cancer incidence, and three studies reported on colorectal cancer mortality. Results suggest tentatively an even stronger reduction in distal colorectal cancer incidence and mortality by screening colonoscopy, along with a significant reduction in mortality from cancer of the proximal colon (53%, 95% confidence interval 24% to 71%). Indirect comparisons of results of observational studies on screening sigmoidoscopy and colonoscopy suggest a 40% to 50% lower risk of incident colorectal cancer and death from colorectal cancer after screening colonoscopy even though the incremental risk reduction was statistically significant for deaths from cancer of the proximal colon only.

Bias, confounding, and other reasons for caution

Effects of sigmoidoscopy in randomised controlled studies might have been underestimated by short follow-up and contamination of the control groups. Evidence for the effects of screening colonoscopy is restricted to observational studies, which might be prone to incomplete control of confounding and potential other biases.

Study funding/competing interests

This work was supported in part by grants from the German Research Council and the German Federal Ministry of Education and Research. We have no competing interests.

Summary effect estimates (relative risks with 95% confidence intervals) of screening sigmoidoscopy and screening colonoscopy

Outcome, location of colorectal cancer	Sigmoidoscopy			Colonoscopy: observational studies
	Randomised trials: intention to screen analyses	Randomised trials: per protocol analyses	Observational studies	
Incidence:				
Any	0.82 (0.75 to 0.89)	0.72 (0.62 to 0.84)	0.51 (0.39 to 0.65)	0.31 (0.12 to 0.77)
Proximal	0.91 (0.83 to 0.99)	0.94 (0.80 to 1.11)	0.76 (0.65 to 0.90)	0.44 (0.15 to 1.31)
Distal	0.69 (0.63 to 0.74)	0.58 (0.47 to 0.71)	0.36 (0.26 to 0.50)	0.21 (0.03 to 1.53)
Mortality:				
Any	0.72 (0.65 to 0.80)	0.56 (0.46 to 0.69)	0.53 (0.30 to 0.97)	0.32 (0.23 to 0.43)
Proximal	0.95 (0.77 to 1.17)	0.78 (0.45 to 1.35)	0.96 (0.65 to 0.90)	0.47 (0.29 to 0.76)
Distal	0.54 (0.43 to 0.67)	0.39 (0.21 to 0.73)	0.34 (0.19 to 0.62)	0.18 (0.10 to 0.31)