BMJ Open

Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes.

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2014-005696
Article Type:	Research
Date Submitted by the Author:	14-May-2014
Complete List of Authors:	Lee, Sandra; School of Medicine, University of Nottingham Clement, Naomi; School of Medicine, University of Nottingham Tang, Natalie; School of Medicine, University of Nottingham Atiomo, William; School of Medicine, University of Nottingham
Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	General practice / Family practice, Patient-centred medicine, Health policy
Keywords:	EDUCATION & TRAINING (see Medical Education & Training), MEDICAL EDUCATION & TRAINING, PRIMARY CARE

Note: The following files were submitted by the author for peer review, but cannot be converted to PDF. You must view these files (e.g. movies) online.

Table 3. Summary of Findings from Online Survey.xlsm

SCHOLARONE™
Manuscripts

Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes.

Sandra WW Lee[1], Naomi Clement (BMedSci)[1], Natalie Tang (BMedSci)[1], William Atiomo (DM FRCOG)[2]

[1] School of Medicine, University of Nottingham, Queen's Medical Centre, NG7 2UH, United Kingdom.

[2] Clinical Sub-Dean, School of Medicine, University of Nottingham, NG7 2UH United Kingdom.

The lead author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained

Correspondence to:

Naomi Clement

Email: msxnc@nottingham.ac.uk
Telephone: 0115 978 5800
Fax: 0115 8230759

For extra data please contact the above

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, a worldwide licence to the Publishers and its licensees in perpetuity, in all forms, formats and media (whether known now or created in the future), to i) publish, reproduce, distribute, display and store the Contribution, ii) translate the Contribution into other languages, create adaptations, reprints, include within collections and create summaries, extracts and/or, abstracts of the Contribution, iii) create any other derivative work(s) based on the Contribution, iv) to exploit all subsidiary rights in the Contribution, v) the inclusion of electronic links from the Contribution to third party material where-ever it may be located; and, vi) licence any third party to do any or all of the above.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes.

Authors: Sandra WW Lee, Naomi Clement (BMedSci), Natalie Tang (BMedSci), William Atiomo (DM FRCOG)
.

Abstract:

Objective
To evaluate the current provision and outcome of community based education (CBE) in UK medical schools.

Design & Data Sources
An online survey of UK medical school websites and course prospectuses and a systematic review of articles from PubMed and Web of Science were conducted. Articles in the systematic review were assessed using Rossi, Lipsey and Freeman's approach to programme evaluation.

Study Selection
Publications from November 1998 to 2013 containing information related to community teaching in undergraduate medical courses were included.

Results
Out of the 32 undergraduate UK medical schools, one was excluded due to the lack of course specifications available online. Analysis of the remaining 31 medical schools showed that a variety of CBE models are utilised in medical schools across the UK. 28 medical schools (90.3%) provide CBE in some form by the end of the first year of undergraduate training, and 29 medical schools (93.5%) by the end of the second year.

From the 1378 references identified, 29 papers met the inclusion criteria for assessment. It was found that CBE mostly provided advantages to students as well as other participants, including GP tutors and patients. However, there were a few concerns regarding the lack of GP tutor's knowledge in specialty areas, the negative impact that CBE may have on the delivery of health service in education settings and the cost of CBE.

Conclusions
Despite the wide variations in implementation, community teaching was found to be mostly beneficial. To ensure the relevance of CBE for "Tomorrow's Doctors", a national framework should be established, and solutions sought to reduce the impact of the challenges within CBE.

Strengths and Limitations of this Study

- This is the first study to review how community based education is currently provided throughout Medical Schools in the UK
- However, a weakness is that this information was obtained online from medical schools online prospectuses. This means the data may be incomplete or out of date
- The use of Rossi, Lipsey and Freeman's method of programme evaluation means that the literature was analysed in a consistent and comprehensive way

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes

Introduction

The context of healthcare in the UK is changing, with an increasingly aging population and a growing focus on the prevention and management of disease.[1] This has prompted the need to ensure that medical graduates are adequately prepared to address these evolving health care needs, rather than maintaining a reactive approach to illness in the UK. These needs include the prevention and management of chronic health conditions such as diabetes, heart disease, cancer and other long-term illnesses. The promotion of health as well as the delivery of care of conditions like these often occurs within the community, outside the context of University teaching hospitals - provided by professionals from several disciples, including a significant input from social services. In the recently published UK government's white paper, *Equity and Excellence: Liberating the NHS*,[2] a need for a healthcare system focused on personalised care reflecting individuals' health and care needs was outlined. This would involve supporting carers and encouraging multidisciplinary care. These social demographic and political drivers require strong input from multi-professional healthcare providers in primary care and the recruitment of more General Practitioners (GPs) in order to fulfil the growing need for community-based care.

This concept also resonates globally and is considered important by health regulatory bodies that licence medical schools. In 1987, the World Health Organisation (WHO) recommended the reform of health professional curricula by incorporating methods to prepare students for providing care at all levels of health care settings,[3] which can be achieved by, among other things, aligning education with community needs. The UK General Medical Council's (GMC's) document "*Tomorrows Doctors*" recommend that clinical placements should reflect the changing patterns of healthcare and that they

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

must provide experience in a variety of environments including hospitals, general practices and community medical services.[4]

Curricula in the UK medical schools, therefore, currently offer community based education (CBE) in various forms and models of teaching.[5] Previous publications have evaluated these models of medical teaching in the community, including an analysis of their advantages and drawbacks. [6-28] However, a thorough literature search (as conducted in November 2013) found no existing systematic reviews on community-based teaching across all existing UK medical schools. It remains unclear what the extent of community based teaching in UK medical schools is, the impact this had made to the standards of healthcare, and how the effectiveness of community-based teaching programmes has been measured. Knowledge of this is considered important, as it would guide the structuring of undergraduate medical curricula to adapt to changing contexts in the UK, hence effectively developing a future generation of doctors who are appropriately prepared for upcoming health care needs. The aim of this study, therefore, was to conduct an online survey of the current provision of community based teaching within UK undergraduate medical schools to appreciate the extent of implementation. A systematic review was also conducted to evaluate the outcomes of community based teaching in UK medical curricula.

Methods

Online Survey

An online survey of the current provision of community-based teaching in UK Medical Curricula was completed by NC through accessing official online material of medical schools between 31st November 2013 and 8th December 2013. An up-to-date list of all the registered medical schools was obtained from the Medical Schools Council (MSC) website on 31st November 2013.[29] All graduate-

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

entry courses were excluded. Online material of the undergraduate medical curriculum was sourced using the Google search engine, and included content from university websites or online course prospectuses for the 2014 intake. The information search was specific to descriptions of both mandatory and elective components of the curriculum relating to "primary care", "general practice", or "community medicine".

Systematic Review: Data Sources

A systematic literature review was conducted using the electronic databases PubMed and Web of Science for papers published on undergraduate community-based medical education from 1998 to November 2013. The search criteria was ("community-based", "community-oriented", "community involvement", or "primary health care") and ("medical curriculum", "medical students", "undergraduate medical education" or "undergraduate medical school").

Systemic Review: Selection criteria & Data Extraction

The relevance of the articles was screened by the title and abstract based on the inclusion and exclusion criteria. Articles were selected if they described undergraduate medical education within the UK. Papers that included healthcare professionals apart from medical students were excluded. Any articles that were duplicated, not available in full text, or not published in English were also regarded as unsuitable for the review. In total 29 peer-reviewed articles were identified as relevant, and were selected for further qualitative content analysis by SL and NT (see figure 1). Data on the following were extracted from each article: (1) Format of CBE; (2) Type of evaluation used to assess the programme; (3) Findings of this evaluation; and (4) Method of data collection. Rossi, Lipsey and Freeman's (2004) approach to programme evaluation was adopted to systematically categorise the evaluation findings on CBE (see Table 1) based on impact of CBE on students, patients and other participants as well as cost and implementation of CBE.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Results

Current provision of community based teaching in UK medical schools.

We were able to obtain information from the medical school websites about the provision of community based teaching in all 32 undergraduate medical schools, and this is outlined in Table 2 and summarised in Table 3.

All undergraduate medical schools provided some form of community-based teaching or placement. There was however variation in the structure, duration and time in the course when community teaching was delivered (see Table 2 and Table 3). Community-based education mainly took the form of clinical placements, patient studies, and optional modules. The duration of community based teaching or placements varied from half day visits to various community settings (as undertaken in schools such as Hull York, Newcastle, Nottingham and St George's) to a year-long module on primary care and population medicine (as undertaken in Brighton & Sussex).

Analysis of the varying formats of CBE (with the exclusion of Norwich, due to the lack of year-by-year curriculum details) revealed that most medical schools (a total of 31) provided early exposure to general practice or community teaching. 28 medical schools (90.3%) provide community teaching from the first year of undergraduate medical education. By the end of the second year of pre-clinical education, students of 29 medical schools (93.5%) would have received some form of community-based education.

Fourteen (45.2%) medical schools provided regular exposure to community teaching in every year or phase of the course.

Literature review of studies evaluating outcomes of community based teaching

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

A summary of the studies evaluated in the systematic literature review are outlined in Table 4. The main methods of evaluation employed in the studies were questionnaires, interviews, and focus groups of the key stakeholders in CBE - students, patients, tutors and other staff in the community setting.

Needs Assessment of CBE

Studies of student expectations of CBE highlighted that students valued experiential patient-centred learning and tutor supervision in the community setting.[14, 30] In a Sheffield study,[14] students also recognised that CBE was a powerful vehicle for changing their approach to medicine and illness, where the patient as a person is given emphasis over the disease.

Implementation Assessment of CBE

All forms of community-based teaching were generally well-received by medical students, patients, and participating health care professionals, supporting the continuation of existing community-based teaching programmes in the future. This included community-based teaching which was incorporated into specialty modules such as: Obstetrics and Gynaecology[31], Psychiatry[22] and Surgery[27]. The unique approach of incorporating primary healthcare in an intercalated Bachelor of Science medical research year also received positive feedback[23].

Three studies found that student's preferred the implementation of practice-based teaching over hospital-based teaching. Hastings *et al*. found that students in Leicester preferred practice-based teaching on the grounds of both teaching method and content.[11] O'Sullivan *et al*. had similar findings among students from University College London, where practice-based teaching bore qualities of better teaching attitudes, teaching methods, and course organisation.[12] Interestingly, these findings were consistent with Powell and Easton's investigation on Imperial College students undertaking their surgery module.[27] These students preferred surgical teaching within general practices due to

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

there being learner-centred teaching, more protected teaching time, and regular access to suitable patients for acquiring clinical skills.

The success of community teaching in Leicester was analysed by Hastings *et al*.[11] It was found that the improved quality of teaching by GP tutors was attributed to a higher proportion of GP tutors attending teacher-training courses. General practices were also found to have greater resource availability and NHS funding specifically in support of teaching medical undergraduates. All these factors placed hospital doctors at a disadvantage in preparing quality clinical teaching sessions in comparison to General Practitioners.

Impact Assessment of CBE

Impact on Students: Learning Outcomes

The impact of CBE on student's in summarised in Figure 2.

Implementation of CBE in medical schools had a significant positive impact on medical students' learning outcomes. The following results provide evidence to the strong educational value among students: 11 studies showed that medical student's gained insight into patient-centered medicine and continuity of care, which were learning outcomes that students viewed as important in their education. [10, 13, 17, 19-21, 23, 25-26, 28, 32] This was measured quantitatively through questionnaires that were administered to students, supplemented by quantitative feedback gathered from focus groups and interviews.

An appreciation and understanding of the role of primary care was a theme that was common to four studies.[20-21, 28, 32] This was revealed through questionnaires, where students rated the extent of their understanding of primary care and its relationship with other levels of care. Two studies reported the benefit of community placements in broadening the student's awareness of teamwork in multi-disciplinary teams. [19, 30] Another study reported the positive finding of successfully exposing students to a broad and varied range of clinical problems in a community setting. [33]

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

In comparison to hospital-based teaching, improved confidence in clinical skills and competencies was found to be a favourable outcome of CBE in four studies. [10, 12, 19, 20] This finding was derived from questionnaires and focus group interviews from students who had experienced CBE.

Two studies found no difference in academic performance between students under CBE and 'traditional' hospital-based teaching. [17, 20] One study of students who undertook a specialty placement in Obstetrics and Gynaecology also found that there was no difference in clinical performance as rated by their tutors, and no statistically significant difference in student final clerkship grade. [34]

Although most evaluations produced consistent evidence on the benefits of community teaching, two studies highlighted the lack of in-depth knowledge of specialist teaching when conducted by GP tutors: the significance of this finding was measured qualitatively through student interviews,[27] and quantitatively through academic scores for the respective specialty module.[34]

Impact on Students: Behavioural Changes to Primary Care

Two studies found that the implementation of CBE resulted in a reversal of negative attitudes towards primary care, and an increase of interest in General Practice as a career option among students.[23, 32]

Impact on Students: Traits of Future Doctors

Studies also showed that medical graduates from curricula with increased emphasis on community-based teaching were at no disadvantage to graduates from the traditional hospital-based teaching. [17, 33] Academically, graduates from a community-based curriculum performed as well as their counterparts on their final formative assessments. Moreover, graduates from curricula where community-based teaching had been offered had the advantage of increased confidence in communication skills and clinical skill competencies. This outcome of CBE was evaluated in three studies.[17, 20, 28] Two of these three studies additionally reported that graduates felt less confident in

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

their medical knowledge on disease processes.[20, 28] However, there was no evident difference found in comparison to graduates of 'traditional' programmes of old medical curricula which had no CBE component when measured by academic results and feedback from educational supervisors.[20,28]

Impact on Others Involved in CBE Programme

Other than student outcomes, CBE also had an impact on participating doctors, staff, patients and medical schools. This is summarised in Figure 3.

In three studies, it was found that GP tutors and participating staff had both role satisfaction and development of professional and personal ethics [7, 13, 24] Grant and Robling also found strengthened team ethics between members of the primary health care team.[24]

Doctors and staff, however, were found to have organisational issues in juggling community-teaching with practice commitments. The expense of one over the other was described in CBE implemented by the University of Birmingham.[7] The unfavourable outcome of blurred boundaries in the doctor-patient relationship was also reported as a concern in two studies. [18, 22]

Five studies evaluated the positive patient outcomes of CBE: Four of these studies reported the beneficial sense of empowerment that patients gained from participating in community teaching. [9, 21-22, 24] The remaining study reported that patients developed feelings of altruism from helping medical students in their education. [18]

Apart from gaining a sense of empowerment, Walters *et al*. also reported the development of a more balanced doctor-patient relationship, and a therapeutic benefit for the patients as a result of talking to students about their medical condition.[22]

Among these five studies on patient outcomes, two studies included further evaluations on the negative impact that resulted from patient participation. The negative outcomes comprised of reinforced feelings of ill-health which may be distressing or anxiety-provoking, and concerns of breeching patient confidentiality. [18, 22]

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Powel *et al*'s evaluation also shed light on the benefits that medical schools gained from tapping into teaching within the community. By doing so, medical schools were able to increase the availability of learning opportunities to medical students.[27]

Two studies raised the possibility of the negative impact that CBE would have on hospital tutors.[7, 13] The concern raised in these studies was with regards to a shift of focus from teaching conducted by hospital-based tutors towards an emphasis on community-based education.

Cost Assessment of CBE

Only one study evaluated the costs of running a community-based course. An evaluation of a CBE in Cambridge revealed that the programme was cost-feasible since the total expenditure on one student-year of community-based teaching was within the cost estimates of Service Increment for Teaching (SIFT) funding.[17] The study also noted that the balance between placement costs and facilities costs stood at a ratio of approximately 2:1, which is a reverse of the traditionally allocated 1:4 ratio in SIFT funds. This finding implied that the traditional allocations for SIFT funds would be inappropriate when applied to community-based teaching.

Discussion

This study was conducted to analyse the current provision of community-based education across undergraduate medical schools in the UK. All medical schools were found to offer some community based teaching in their curricula, which falls in line with the recommendations of the WHO and the GMC as well as following the social demographic and political changes within the UK.

In general, community-based teaching was well-received by medical students due to its good educational value on many levels of learning outcomes. It also gave students insight into the option of General Practice as a future career. This is consistent with the direction of travel the UK healthcare workforce needs to address due to the changing demographics and the emphasis

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

changing in health care delivery from management to prevention. Not only was community-based teaching of value to students, but it was also found to produce medical graduates of equal clinical skills and competencies to their counterparts who were taught under the 'traditional' hospital-based medical programme.[17,33] This outcome is consistent with findings in Australian medical schools which showed that students generally did as well as or, in some areas of clinical competencies, even better than their counterparts who received hospital-based teaching[7]. Community-based teaching in medicine was also beneficial to medical schools in maximising the sources of available learning opportunities for medical students.[27] Moreover, community-based teaching in medicine was found to offer a unique opportunity to foster inter-professional learning – an outcome that is consistent with the political drivers for better patient care.[35]

Although it was evident that community-based teaching has a vast array of benefits, several drawbacks were identified and underscored as challenges to the implementation of CBE. Studies reflected the challenges of general practice tutors lacking adequate knowledge in specialty areas,[27] and community teaching having a negative impact on the delivery of health service in some general practices.[7] Murray and Modell discuss possible solutions to these issues, such as the development of university-linked practices that would scrutinise the effectiveness of teaching.[38] It is imperative that these solutions are explored and tested in current CBE programmes so that the impact of programme drawbacks may be reduced. This would be the way-forward to strengthening the implementation of CBE in medical curricula.

An assortment of models were seen to be used for community-based teaching in the UK, where programmes varied in their methods of delivery, durations of exposure and points of undergraduate education at which the teaching was delivered. This is congruous with guidance from the GMC publication "Tomorrow's Doctors", which states that it was for each medical school to design its own curriculum to suit its own circumstance. Unfortunately, the diversification of CBE poses a challenge for developing a standardised set of criteria for evaluating the outcomes of CBE. Consequently, it

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

becomes difficult to establish a national framework for quality assurance of medical curricula, and to make recommendations for improving the implementation of CBE.

In order to achieve the expectations laid out for "Tomorrow's Doctors",[4] there is a principal need to define the competencies that are required to prevent illness and promote health in the primary care or community based setting. Ladhani *et al*., for example, categorised six themes of community-based education competencies within nursing and medicine: Public health; Cultural diversity; Leadership and management; Community development and advocacy; Research and evidence based practice; and Generic competencies.[36] Subsequently, a national framework may be derived from these key competencies so as to measure the effectiveness of community-based teaching in achieving these targeted goals.

The development of a national framework was explored and suggested by Cotton *et al*.,[37] where a list of criteria for quality practice-based teaching in the UK was consensually derived from views of medical educators and students at a national conference. However, since its development, there has been no literature found on the use of these criteria to objectively evaluate community-based education at a local, regional or national level. More work in this area should be encouraged to achieve a national standard for community-based education in the UK.

Little data was found on the cost implications of community-based teaching. Given the wide variations in the format of CBE programmes conducted across the UK, it is difficult to make general conclusions about the cost impact of community-based teaching. Nonetheless the findings from Oswald *et al*.'s study sets a benchmark for other similar community teaching within the UK.[17] Oswald *et al*. found that the absolute costs per student session of community teaching was within the budgets of SIFT funding. The cost-feasibility implied in this study is consistent with Murray *et al*'s 1993 study of the University College London teaching programme,[38] where community teaching cost £60 per student session, comparing well with the SIFT provision of £64 per student session. However, Oswald *et al*. discusses that the national formula for SIFT funds is inappropriate for community teaching due to a mismatch in the 2:1 ratio of placement costs and facilities costs in

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

community teaching, versus the traditionally allotted 1:4 SIFT ratio between placement costs and facilities costs. SIFT funding to medical education institutions is traditionally divided to cater for the costs of clinical placements (about 20%) and the costs of facilities (80%). The 1995 Winyard Report specified that the use of SIFT funding would support teaching conducted in settings other than the main university hospital, such as in general practices and community settings.[39] This report unfortunately failed to realise the inappropriateness of applying the 1:4 formula (for facilities and placement costs) in the context of primary care. The allocation of 80% SIFT funding to facilities would be disadvantageous to community-based teaching since this money will be retained for usage within the hospital setting. It is important that the provision of SIFT funding is reconsidered so that it suits a growing emphasis of community-based education in the medical curriculum and therefore help develop these settings as centres of education.

The strengths of our study are that it provides the most up-to-date picture of the UK landscape of community based teaching in medical schools and the fact that the literature review was conducted in a systematic way. The use of Rossi, Lipsey and Freeman's widely accepted approach to programme evaluation also ensured that programme evaluations in the literature were analysed comprehensively. The weaknesses are that the online survey relied on data provided on the websites of medical schools which can occasionally be out of date and not complete. The online survey also had the disadvantage of inconsistency in the extent of details provided online. For example, the online sources may not have mentioned details on clinical placements which are primarily hospital-based, but also provide supplementary clinical teaching within the community setting, (e.g. shadowing of a community midwife in an Obstetrics & Gynaecology placement). To address these weaknesses, the method of information collection may be improved by contacting course administrators to obtain detailed information on any community-based teaching that is offered to students in all the course modules.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Conclusion

In this study, all undergraduate medical schools in the UK were seen to be offering some form of community-based teaching in their medical curriculum. The delivery of CBE varied broadly, but all forms of community teaching were generally found to be beneficial and was therefore well-received by students, patients, participating staff, and medical schools. The challenges and cost issues of community teaching should also not be overlooked, and solutions to address these need to be explored such that the delivery of CBE may be improved.

Under the pressures of social demographics and political drivers to incorporate more community-based teaching in medical education, there is a need to ensure that CBE is delivered at acceptable quality standards for it to achieve its anticipated benefits. A national framework would need to be established to ensure these standards are met. This would then succeed to act as a standardised national guideline for evaluating the effectiveness of CBE programmes in developing professional competencies that are expected of "Tomorrow's Doctors".

Competing Interests

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

Authors' Contributions

WA came up with the concept of the study, NC performed the Medical School online survey and SL and NT the Literature Review. SL, NC and NT wrote the draft of the manuscript and editing was performed by SL, NC, NT and WA.

References

[1]*Our Priorities for 2013/14* [Internet]. London: Public Health England; [Updated 26 April 2013, Accessed January 2014]. Available from: https://www.gov.uk/government/publications/public-health-englands-priorities-for-2013-to-2014

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[2] *Equity and Excellence: Liberating the NHS* [Internet]. London: Department of Health; [Updated July 2010, Accessed January 2014]. Available from: https://www.gov.uk/government/publications/liberating-the-nhs-white-paper

[3] *Community Based Education of Health Personnel: Report of a WHO Study Group* [Internet]. Geneva: World Health Organisation; [Updated November 1987. Accessed January 2014]. Available from: http://apps.who.int/iris/handle/10665/41714

[4] *Tomorrow's Doctors* [Internet]. London: General Medical Council; [Updated 2009, Accessed January 2014]. Available from: http://www.gmc-uk.org/education/undergraduate/tomorrows_doctors_2009.asp

[5] Major SC, Booton P. Involvement of general practice (family medicine) in undergraduate medical education in the United Kingdom. *J Ambul Care Manage* 2008 September;31(3):269-75.

[6] Davison H, Capewell S, Macnaughton J, Murray S, Hanlon P, McEwen J. Community-oriented medical education in Glasgow: developing a community diagnosis exercise. *Med Educ* 1999 January;33(2):55-62.

[7] Parle J, Greenfield S, Thomas C, Ross N, Lester H, Skelton J, *et al*. Community-based clinical education at the University of Birmingham Medical School. *Acad Med* 1999 March;74(3):248-53.

[8] Seabrook MA, Lempp H, Woodfield SJ. Extending community involvement in the medical curriculum: lessons from a case study. *Med Educ* 1999 November;33(11):838-45.

[9] Stacy R, Spencer J. Patients as teachers: a qualitative study of patients' views on their role in a community-based undergraduate project. *Med Educ* 1999 September; 33(9):688-94.

[10] Thistlethwaite JE, Jordan JJ. Patient-centred consultations: a comparison of student experience and understanding in two clinical environments. *Med Educ* 1999 September;33(9):678-85.

[11] Hastings AM, Fraser RC, McKinley RK. Student perceptions of a new integrated course in clinical methods for medical undergraduates. *Med Educ* 2000 February;34(2):101-7.

[12] O'Sullivan M, Martin J, Murray E. Students' perceptions of the relative advantages and disadvantages of community-based and hospital-based teaching: a qualitative study. *Med Educ* 2000 August;34(8):648-55.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[13] Thistlethwaite JE. Introducing community-based teaching of third year medical students: outcomes of a pilot project one year later and implications for managing change. *Educ Health* 2000;13(1):53-62.

[14] Howe A. Patient-centred medicine through student-centred teaching: a student perspective on the key impacts of community-based learning in undergraduate medical education. *Med Educ* 2001 July;35(7):666-72.

[15] Howe A, Ives G. Does community-based experience alter career preference? New evidence from a prospective longitudinal cohort study of undergraduate medical students. *Med Educ* 2001 April;35(4):391-7.

[16] Murray E, Alderman P, Coppola W, Grol R, Bouhuijs P, van der Vleuten C. What do students actually do on an internal medicine clerkship? A log diary study. *Med Educ* 2001 December;35(12):1101-7.

[17] Oswald N, Alderson T, Jones S. Evaluating primary care as a base for medical education: the report of the Cambridge Community-based Clinical Course. *Med Educ* 2001 August;35(8):782-8.

[18] Coleman K, Murray E. Patients' views and feelings on the community-based teaching of undergraduate medical students: a qualitative study. *Fam Pract* 2002 April;19(2):183-8.

[19] Gavin J, Lempp H, Elliman A, Grogan C. Teaching in partnership: linking a medical school and a community trust. *Br J Community Nurs* 2002 January;7(1):32-6.

[20] Jones A, McArdle PJ, O'Neill PA. Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Med Educ* 2002 January;36(1):16-25.

[21] Anderson ES, Lennox AI, Petersen SA. Learning from lives: a model for health and social care education in the wider community context. *Med Educ* 2003 January;37(1):59-68.

[22] Walters K, Buszewicz M, Russell J, Humphrey C. Teaching as therapy: cross sectional and qualitative evaluation of patients' experiences of undergraduate psychiatry teaching in the community. *BMJ* 2003 April;326(7392):740.

[23] Jones M, Singh S, Lloyd M. "It isn't just consultants that need a BSc": student experiences of an Intercalated BSc in primary health care. *Med Teach* 2005 March;27(2):164-8.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[24] Grant A, Robling M. Introducing undergraduate medical teaching into general practice: an action research study. *Med Teach* 2006 November;28(7):192-7.

[25] Muir F. Placing the patient at the core of teaching. *Medical Teacher* 2007 March;29(2-3):258-260.

[26] Mullen K, Nicolson M, Cotton P. Improving medical students' attitudes towards the chronic sick: a role for social science research. *BMC Med Educ* 2010 November;10:84.

[27] Powell S, Easton G. Student perceptions of GP teachers' role in community-based undergraduate surgical education: a qualitative study. *JRSM Short Rep* 2012 August;3(8):51.

[28] Watmough S. An evaluation of the impact of an increase in community-based medical undergraduate education in a UK medical school. *Educ Prim Care* 2012 November;23(6):385-90.

[29] UK medical schools A-Z [Internet]. London: Medical Schools Council; [Accessed November 2013]. Available from: http://www.medschools.ac.uk/Students/UKMedicalSchools/Pages/UK-Medical-Schools-A-Z.aspx

[30] Lennox A, Petersen S. Development and evaluation of a community based, multiagency course for medical students: descriptive survey. *BMJ* 1998 February;316:596-599.

[31] Nicholson S, Osonnaya C, Carter Yh, Savage W, Hennessy E, Collinson S. Designing a community-based fourth-year obstetrics and gynaecology module: an example of innovative curriculum development. *Med Educ* 2001 April;35(4):398-403.

[32] Sinclair HK, Ritchie LD, Lee AJ. A future career in general practice? A longitudinal study of medical students and pre-registration house officers. *Eur J Gen Pract* 2006 April;12(3):120-7.

[33] Alderson TS, Oswald NT. Clinical experience of medical students in primary care: use of an electronic log in monitoring experience and in guiding education in the Cambridge Community Based Clinical Course. *Med Educ* 1999 June;33(6):429-33.

[34]Frattarelli LC, Kamemoto LE. Obstetrics and gynecology medical student outcomes: Longitudinal multispecialty clerkship versus traditional block rotations. *Am J Obstet Gynecol* 2004 November;191(5):1800–1804.

[35]Hosny S, Kamel MH, El-Wazir Y, Gilbert J. Integrating interprofessional education in community-based learning activities: case study. *Med Teach* 2013;35:S68-73

[36]Ladhani Z, Scherpbier AJ, Stevens FC. Competencies for undergraduate community-based education for the health professions--a systematic review. *Med Teach* 2012;34(9):733-43.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[37]Cotton P, Sharp D, Howe A, Starkey C, Laue B, Hibble A*, et al*. Developing a set of quality criteria for community-based medical education in the UK. *Educ Prim Care*. 2009 May;20(3):143–51.

[38]Murray E, Jinks V, Modell M. Community-based medical education: feasibility and cost. *Med Educ* 1995 January;29(1):66-71.

[39]NHS Executive. SIFT into the Future. Leeds: NHS Executive, 1995 (The Winyard Report).

Legend of figures and tables.

Figure 1. Flow chart of search strategy used in systematic review

Figure 2. Key Points: Impact of CBE on Students

Figure 3. Key Points: Impact of CBE on Other Participants in CBE

Table 1. Domains in Rossi, Lipsey and Freeman's approach to Programme Evaluation

Table 2. Community Based Teaching in Medical Schools in the UK

Table 3. Summary of Findings from Online Survey

Table 4. Summary of Systematic Review

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

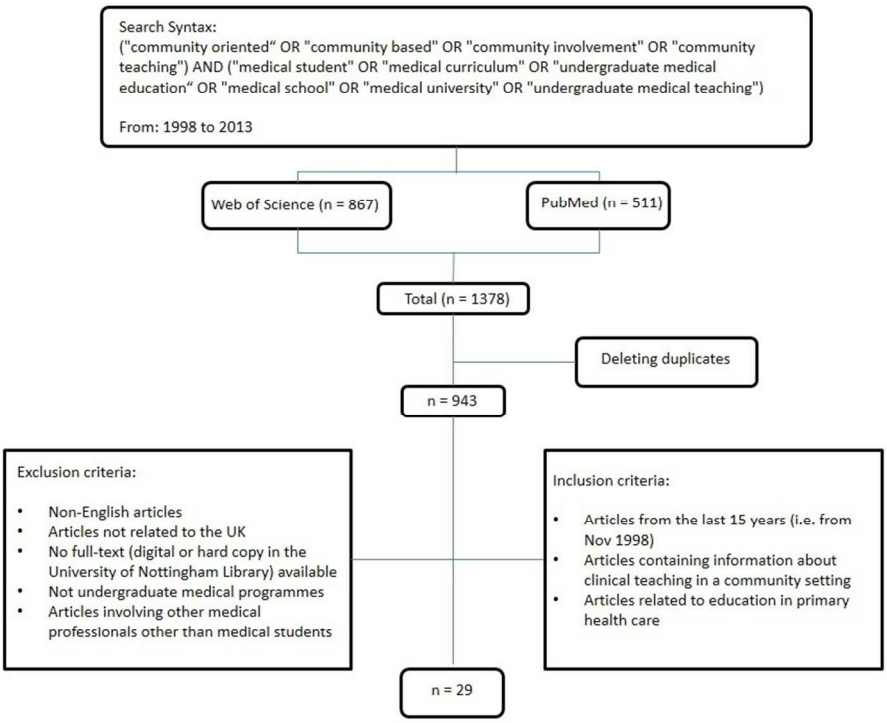

Figure 1
Flow chart of search strategies used in systematic review
254x190mm (96 x 96 DPI)

For peer review only

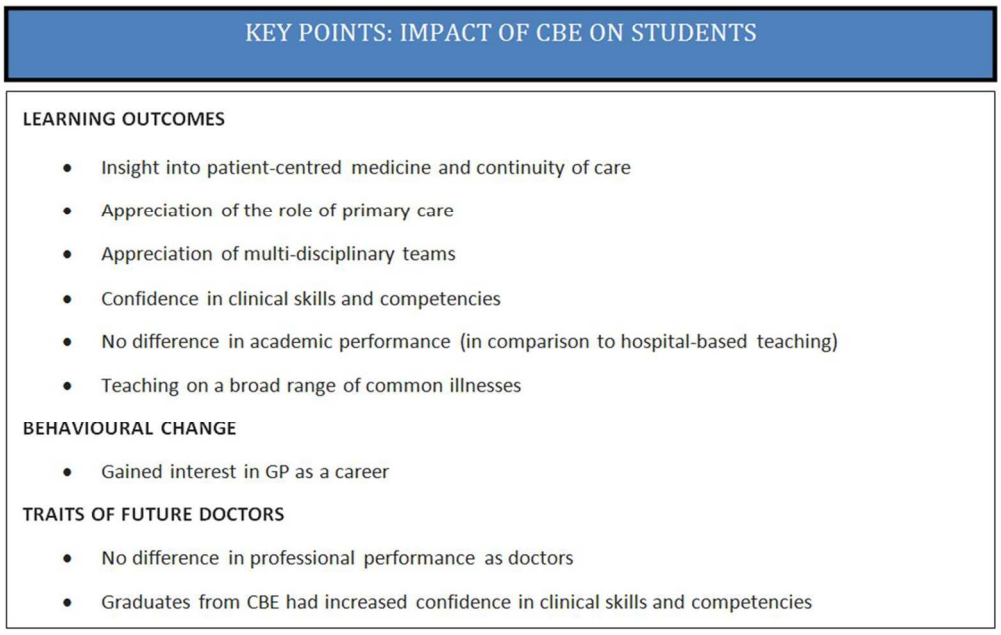

Figure 2
Key points: Impact of CBE on Students
266x172mm (137 x 132 DPI)

eview only

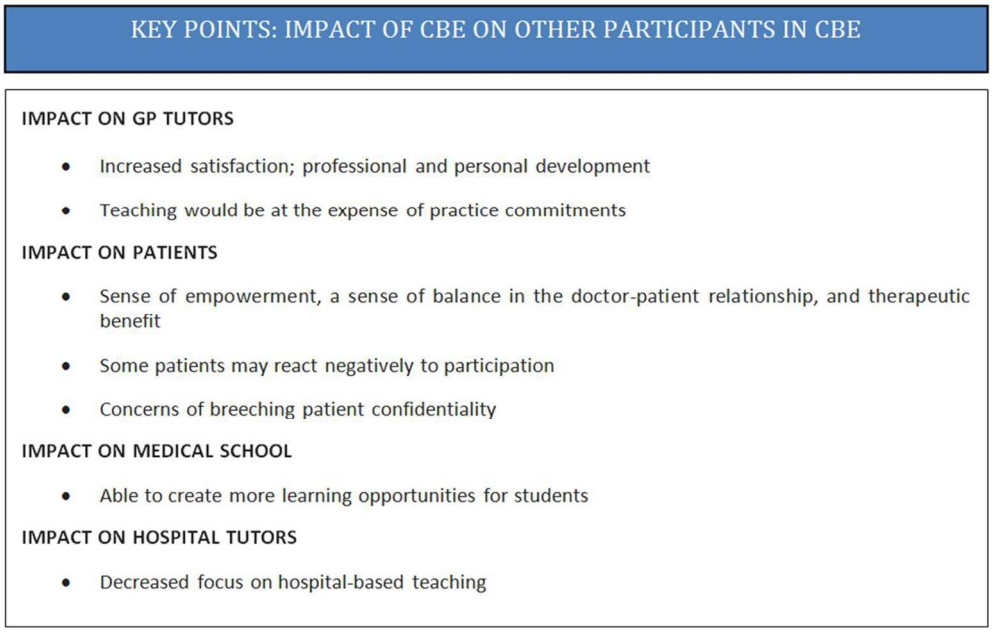

Figure 3
Key Points: Impact of CBE on Other Participants in CBE
244x159mm (149 x 144 DPI)

eview only

Table1: Domains in Rossi, Lipsey and Freeman's Approach to Programme Evaluation

Domains of Programme Evaluation	
Needs Assessment	Examining the need in the population that the programme intends to target.
"Logic Model" Assessment (of programme conceptualisation and design	Examining the plausibility of how the programme is supposed to achieve its aims.
Implementation Assessment	Evaluation determines whether the programme addresses its target population with the intended services.
Impact Assessment	Determines the effectiveness of the programme in achieving its intended outcomes.
Efficiency assessment	Analyses the cost-benefit or cost-effectiveness of the programme by comparing its benefits and costs.

For peer review only

TABLE 2: An Outline Of Community-Based Teaching In Undergraduate Medical Courses Within The UK

1	**Aberdeen (University of)**	**Year 1** –The "Community Course": including GP, Public Health, Mental Health, Environmental & Occupational Medicine, HCE and Paediatrics; allowing learning about the social, economic and environmental impacts on health. **Year 2** - The Community Course continues. **Year 3** – The Community Course is completed. **Year 4** - 5 week GP placement **Year 5 –** 8-week blocks of: (1) a medical speciality, (2) a surgical speciality, (3) a GP or psychiatry course, (4) an elective, and (5) a Professional Practice Block.
2	**Barts and The London School of Medicine and Dentistry, Queen Mary, University of London**	**Years 1 & 2 -** regular GP placements **Years 3 & 4 –** work with clinical teams both in the hospital and also within community placements. **Year 5** - clinical and community placements, including GP surgeries.
3	**Birmingham (University of)**	**Years 1 & 2 -** 10 days per year spent in GP. **Year 3 –**Community Based Medicine module **Years 4 & 5 --** One GP attachment within these 2 years.
4	**Brighton and Sussex Medical School**	**Years 1 & 2** - 25% of learning is clinically based including experience in primary care, community medicine and out-patient settings. Patients do two family studies: One in year 1 ("family with a new baby"), and one in year 2 ("the chronic illness patient"). **Years 3 & 4** – A year-long module on primary care and population medicine, alongside clinical placements both in hospital trusts and primary care.
5	**Bristol (University of)**	**Year 1** - GP and patient home visits. **Year 2** – clinical skills teaching in the primary care setting. **Year 3** - teaching in both hospitals and in general practice. **Year 4 -** Two "Community Orientated Medical Practice" modules. **Year 5 -** 2 weeks in a GP placement (within preparation for Professional Practice)
6	**Cambridge (University of)**	**Years 1** – meet patients in the GP. **Years 2 & 3 –** Students meet patients through visiting community-based health-related agencies, as well as following a pregnant women and her family throughout pregnancy (Year 3 project). Students also have primary care teaching in the following: - Module on the "Clinical Method" involves time spent in primary care, including teaching - Module on "The Life Course" involves time spent in primary and community care. Learning is focused on how diseases present, are managed and the patients' perspective. - Module on "Preparation for Practice**"** involves one GP attachment
7	**Cardiff University**	**Year 1 –**12 week introductory programme involving short clinical experience days in GP . **Years 1 & 2** – one day a week seeing patients in hospitals, GP or other community based services. **Year 5** - 8 week placement in the community.
8	**Dundee (University of)**	"Doctors, Patients and Communities" course runs throughout the undergraduate medical programme, allowing early patient contact. This course includes public health and primary care. Students submit a record of clinical experience. **Years 4 &5** – Primary care attachments, with an option to extend the 5th year primary care attachment to 2 or 3 months.
9	**Durham (University of)**	**Years 1 & 2 –** Community-based teaching in: - The "Patient Study" module involves observing the effect of a chronic condition on a person and their immediate family in primary care and the community. - The "Family Project" follows a pregnant woman and then the effect of having a new baby in a family. - The "Community Placement" with a variety of health and social care agencies, observing inter-professional and inter-agency working within the community. It may involve visiting patients at home and within primary care **Years 3-5 –** *Medical programme completed at Newcastle University*
10	**Edinburgh (The University of)**	**Years 1 & 2** – Student have community projects, GP-based teaching and three student selected projects on a range of topics (can be clinical and non-medical) **Years 3 & 4** - "Further clinical experience" *(clinical setting not specified)* **Year 5** - One placement in general practice
11	**Exeter (University of)**	**Years 1 & 2 –** Community placements **Years 3 & 4 –** meet patients at home, in GP's, in acute and community hospitals. **Year 5 –** One community placement.

For peer review only

12	**Glasgow (University of)**	**First 15 weeks of Year 3** – Students develop clinical skills in the hospital and GP environment. **Second half of Year 3, years 4 & 5** – One GP placement
13	**Hull York Medical School**	Students alternate between a hospital and primary care setting in all clinical placements. **Year 1** – Half a day each week on clinical placement. **Year 2** – One day each week on clinical placement. **Years 3 & 4** – Clinical placements in both GP and hospitals. **Year 5** – Medical student is treated as a junior member of the medical team. Students have a general practice rotation, in which they see patients and perform routine medical procedures under the supervision of the GP.
14	**Imperial College School of Medicine**	**Years 1 & 2** – "The Patient Contact Course" (for chronic illnesses) involve students getting attached to one patient/family and visiting them at their homes and in the clinical setting. Learning is supplemented by GP and hospital visits. **Year 3** - Learning basic clinical skills and methods in general practice. **Year 5** - One GP & Primary Health Care placement. **Year 6** - 3 week "General Practice Student Assistantship" placement.
15	**Keele University**	**Year 1** - Placements in GP setting. **Year 2** - Students select a "third sector" placement from a range of community organisations. **Year 3** - 4 weeks spent consolidating clinical skills in GP surgery. **Year 4** - 4 weeks in general practice, as well as an option of a Special Study Component in GP. **Year 5** - Longer GP placement. Students also work in small groups to identify community needs.
16	**King's College London School of Medicine (at Guy's, King's College and St Thomas' Hospital)**	Inter-professional education is embedded in the medical curriculum throughout the duration of the course. **Year 1 (term 1)** – Students have their first experiences of primary care (visiting GP and interviewing patients) & hospital. **Phase 2 (3 terms)** - Continuing clinical contact in primary care attachments and GP visits **Phase 3 (3 terms)** – Students study basic skills with a GP teacher. Each of the three placements involve community attachments. **Phase 4 (3 13-weeks rotations)** - A "Community and Applied-Health Promotion Study" is done following a pregnant women and her family. Students also continue Multi-Disciplinary Team learning. **Phase 5 (final year)** - One 8 week attachment in GP and community.
17	**Lancaster University**	**Year 1** – Students have a community attachment in the second term with health visitors **Year 2** - One day per week on community attachment e.g. GP, community clinical teaching or community-related assessment. **Year 3** – One GP placement with a focus on disability. **Year 4** - One day per week in GP **Year 5** – One community attachment.
18	**Leeds (University of)**	**Year 1** – "Campus to Clinic" module (lasting half the academic year): students work in a healthcare team for 1 day per week, rotating between primary and secondary care. Medical students also arrange a community visit to a healthcare voluntary group close to their practice. **Year 2** – "Campus to Clinic" module (lasting half the academic year). **Year 3** - 5 week primary care placement. **Year 5** - One placement (8 weeks) involves integrating teaching between primary and secondary care.
19	**Leicester (University of)**	**Phase 1 (First 5 Terms) –** Community attachments are undertaken to gain experience of the social implications of medicine. Study of social and behavioural sciences supplements these placements. **Phase 2 –** Time is spent in "innovative community attachments" to allow learning of the Multi-Disciplinary Team.
20	**Liverpool (University of)**	**Years 2-5 –** Hospital and community-based clinical experiences.
21	**Manchester (University of)**	**Year 1** - Community visits **Year 3** - Community placements related to certain modules. **Year 4** - Community and primary care teaching on further modules. **Year 5** - Students work as part of the team in GP, community paediatrics or community psychiatry, running their own consultations and seeing patients independently.
22	**Newcastle University Medical School**	**Year 1 & 2** – Early clinical experience with full and half-days spent in GP practices and hospital visits. Students also do 2 patient studies: One "family study project" and one in-depth study of a patient with chronic illness. **Year 3** – Half a day each week spent in General Practice. **Year 5 –** Primary Care clinical rotation including out-of-hours calls with GPs.
23	**Norwich Medical School, University of East Anglia**	*NB: No year-by-year information given.* "Regular placements in both hospital and General Practice allow students to observe the full range of

For peer review only

		patient care"
24	**Nottingham (The University of)**	**Year 1 & 2 –** One morning every month spent with GP. **Year 3 -** "Community Follow Up Project" (starting in Year 2) is completed. Projects involves following an assigned patient for 18 months, and learning about the effects of the patients care on the patient and their family. **Year 4 –** One week Community Attachment during Obstetrics and Gynaecology placement and one day spent with a community midwife. Regular community visits during Paediatrics attachment (GP, Community Paediatrician, Health Visitor, and School Nurse). Students are also given an option of a Special Study Module in primary care. **Year 5 -** One 5 week GP placement.
25	**Oxford (University of)**	**Years 1 & 2 –** meeting patients in GP **Year 4 –** meeting patients in GP (2 weeks) and a GP Residential Attachment (1 week). **Year 5 –** One community placement (in clinical geratology, dermatology, palliative care, primary health care or public/ population health) **Year 6 –** optional 12-week special study module in primary care.
26	**Plymouth University, Peninsula Schools of Medicine and Dentistry**	**Year 1 –**Weekly practical community based work throughout the course, inclusive of "Sure Start" or drug clinic visits. **Year 2 –** GP practice visits on 6 separate days. **Year 3 & 4 –** Students can see patients themselves in supervised settings in a General Practice during a week-long placement, three times in each year. **Year 5 –** 6 week long GP placement.
27	**Queen's University Belfast**	*NB: Little information on course structure is available online* **Years 4 & 5 -** Teachings in GP
28	**Sheffield (The University of)**	**Years 1 & 2** - Community attachments within GPs & some social services locations. **Two years including second half of Year 3, Year 4 & first half of Year 5 –** One community health placement at GP.
29	**Southampton (University of)**	**Years 1 & 2** - Contact with patients in a variety of clinical settings, including a community engagement project. **Year 3 –** Students undertake a research study which may involve work with general practices or in the community. Students also undertake a GP clinical placement, focusing on the effects of clinical disorders on patients and their families. **Year 4** - Range of clinical placements *(clinical setting not specified).* **Year 5** – One GP placement.
30	**St Andrews (University of)**	**Years 1 & 2** - Regular primary care attachments in local hospitals. **Between 2nd & 3rd Year -** Optional residential week in a range of primary clinical care placements. **Years 4 & 5** – *Medical programme completed at a "Partner Medical School" in Aberdeen, Dundee, Edinburgh, Glasgow or Manchester.*
31	**St George's, University of London**	**Year 1** - Half days of GP and community visits. **Year 3** - 3 week GP/primary care placement. **Year 5** - 5 week placement in GP, 2 weeks in public health.
32	**University College London**	**Years 1 & 2 -** "Opportunities for early patient contact and for meeting health professionals". **Year 4 -** "Three long attachments in hospitals and associated community and GP settings" concentrating on community based care, ward based care and emergency care. **Years 6** – 4-week GP placement

For peer review only

TABLE 4: Summary of Systematic Review

	University	Author (Year)	Description of CBE	Type of Evaluation	Evaluation findings	Evaluation method
1.	**Aberdeen (University of)**	Sinclair et al. (2006)	Years 1-3: GP-led patient-centred tutorials and clinical sessions Year 4: 5-week community-themed clinical rotation Year 5: optional 7-week GP attachment	Impact Assessment	Increase in students interested in pursuing a career in GP as curriculum progressed Exposure to community settings had positive effect on students' attitudes towards a career in general practice	Questionnaire – Student Survey
2.	**Barts and The London School of Medicine and Dentistry**	Nicholson et al. (2001)	Year 4: Community-based Module prior to Obstetrics and Gynaecology hospital placement	Implementation Assessment Impact Assessment	Adequate clinical exposure within the community Variation in opportunities to gain relevant experience in clinical exposure Students found small-group learning and GP attitudes to be beneficial to their learning Multi-disciplinary interaction enhanced their clinical experience Successfully Incorporated specialty with community environment	Questionnaire – Student Feedback
3.	Birmingham (University of)	Parle et al. (1999)	Years 1-4: GP practice visits	Implementation Assessment Impact Assessment	Students found GP tutors to be encouraging GP Tutors reported: -Enhanced development of both students and GPs -Organizational drawbacks	Questionnaire – Student Feedback
4.	Cambridge (University of)	Alderson and Oswald (1999)	15-month attachment to GP practice	Implementation Assessment	Adequate exposure of all clinical specialities was achieved Individual experiences may vary due to variation in opportunities	Student Log Diary
5.	Cambridge (University of)	Oswald et al. (2001)	15-month attachment to GP practice	Implementation Assessment Impact Assessment Cost Assessment	Course was feasible in terms of organization and student logistics Extended relationships with patients enriched students' clinical experience No difference in academic performance on formative assessments between students undertaking community-based versus hospital-based teaching Reported costs were less than the average *SIFT into the Future* student-year	Debriefing Sessions – Student Feedback
6.	Cardiff University	Grant and Robling (2006)	Year 5: GP attachment	Needs assessment	All parties found the attachment to be positive GPs felt more confident clinically	Discussion Meetings – Primary Care Team Feedback Interviews – GP

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

				Impact assessment	through teaching students Primary care team felt team ethic was strengthened	Feedback
7.	Dundee (University of)	Muir (2007)	Year 1-3: Patient Follow-up in the community	Impact Assessment	Students were able to gain a better insight into patient-centred medicine as a result of the attachment Early exposure to patients evoked student enthusiasm	Focus Group – Student Interview
8.	Glasgow (University of)	Davison et al. (1999)	Year 1: Educational exercise of three teaching sessions	Needs Assessment	Students found that learning objectives were met through community-themed educational exercises	Questionnaire – Student Evaluation
9.	Glasgow (University of)	Mullen et al. (2010)	Year 1: Patient interviews in the community	Impact Assessment	Integration of community-based exercise positively influenced students' attitudes in regards to: -understanding of psycho-social model of illness -development of empathy	Questionnaire – Student Evaluation
10.	Imperial College	Powell and Easton (2012)	Year 3: 3-session surgical module conducted by GP teachers	Implementation Assessment	Surgical teaching delivered by GPs was favourable based on the following benefits: - protected time for learning - regular access to suitable patients - learner-centred teaching GPs lacked specialist knowledge, and teaching was not directed by syllabus	Focus group – Student Interview
11.	King's College London	Seabrook et al. (1999)	Year 1: Healthcare Team Module Year 2: Special Study Module	Implementation Assessment Impact Assessment	Community-based courses are feasible and well-received by students Multi-disciplinary teamwork is encouraged positively	Questionnaires – Student feedback Small-group discussions – Student feedback Focus groups – Tutor Feedback
12.	King's College London	Gavin et al. (2002)	Year 2 – Community-based Special Study Module	Impact Assessment	Student appreciation of: - psychosocial needs of patients - inter-professional teamwork	Questionnaire survey: students and teaching professionals
13.	Leeds (University of)	Thistlethwaite and Jordan (1999)	Year 3: GP-led days in community setting	Impact Assessment	Early community exposure to patient-centred consultations allowed students to:	Focus Groups – Student Interviews

For peer review only

					-Appreciate importance of patient-centred communication -Gain more confidence in their abilities Direct observation and feedback from clinician was beneficial to student learning	
14.	Leeds (University of)	Thistlethwaite (2000)	Year 3: GP-led days in community setting	Implementation Assessment Impact Assessment	Positive feedback from students: -community environment allowed ease of patient-centre approach -students now routinely ask about patient concerns Positive feedback from GPs: -teaching was motivating and gratifying	Questionnaire – Student Feedback
15.	Leeds (University of), Sheffield (University of) and Hull York Medical School	Macallan and Pearson (2013)	Year 3-4: GP attachment	Implementation Assessment	GP enthusiasm and engagement crucial to determining the quality of the placement Well-organized GP practices were valued by students Students felt that GPs needed to be better informed of placement outcomes	Focus Groups – Student Interviews
16.	Leicester (University of)	Lennox and Petersen (1998)	Year 3: Patient Study	Needs Assessment Implementation Assessment Impact assessment	Pre-course Needs Assessment of CBE programme based on students' opinions of: - Structure of course - Method of implementation - Assessment format End-course impact assessment revealed that: Course effectively achieves GMC recommendations for "Tomorrow's Doctors" End-Course Implementation assessment revealed that: Continuation of the course was supported by all participants (students, patients and agencies)	Questionnaire – Student, Patient and Agency Feedback
17.	Leicester (University of)	Hastings et al. (2000)	Year 3 or 4: GP practice-based teaching	Implementation assessment	Comparison of practice-based & hospital-based teaching with respect to the 'teaching content' and the 'teaching processes revealed students favouring practice-teaching in both respects.	Questionnaire – Student Feedback
18.	Leicester (University of)	Anderson et al. (2003)	Year 3: Community placement and Patient study	Implementation assessment Impact assessment	Implementation assessment: - Continuation of course was well-supported by students, patients and staff Impact Assessment: - Course effectively achieved students' learning objectives in community education.	Questionnaires – Student and Patient Feedback Focus Groups – Staff Interviews

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

					- Positive patient and staff experience in their involvement in medical education.	
19.	Liverpool (University of)	Watmough (2012)	Year 1-4: Community-based teaching Year 5: Community placement	Implementation Assessment Impact Assessment	Implementation Assessment: -Increased curriculum time on community-based teaching was appreciated in terms of clinical skills practice, and understanding the role of primary care. Impact Assessment: - Reformed course achieved significantly better understanding on the relationship between primary, social care and hospital care.	Questionnaires and Interviews – Student Feedback
20.	Liverpool (University of)	Watmough et al. (2012)	Year 1-4: Community-based teaching Year 5: Community placement	Impact Assessment	Impact Assessment: - Graduates from reformed curriculum had more confidence in clinical skills & communication skills, but felt less well prepared with their medical knowledge.	Questionnaires – Student Feedback
21.	Manchester (University of)	Jones et al. (2002)	Year 3-4: GP teaching in core modules Year 5: Community placement	Impact Assessment	Overall positive impact on students' perception of preparedness in competencies and skills for entering professional practice. This includes a significantly improved understanding of the role of primary care. Students also had no disadvantage to graduates of traditional programme in terms of basic science and clinical knowledge.	Questionnaires – Student and Supervisor Feedback
22.	Newcastle University Medical School	Stacy and Spencer (1999)	Year 2: Patient study projects	Impact Assessment	Patients have a positive perception of their role in community-based teaching. They also feel that they benefited from participation.	Interviews
23.	Royal Free and University College Medical Schools	Walters et al. (2003)	Year 4: Community education integrated in the psychiatry attachment	Impact Assessment	Impact of participation in teaching on patients: - Mainly positive experience (more balanced doctor-patient relationship, and some had therapeutic benefit) - However a few patients found the teaching encounter distressing	Questionnaire – Patient Survey Interviews - Patients, Students and GP tutor Feedback
24.	Royal Free and University College Medical Schools	Jones et al. (2005)	Intercalated BSc in Primary Health Care	Impact Assessment	Students saw benefit in: - development of critical approach and skills relevant to medicine - adding depth to views on GP and primary care	Interviews – Student Feedback
25.	Sheffield (University of)	Howe and Ives (2001)	Year 4:GP placement	Impact Assessment	Increased exposure to primary and community care alters career intention, and enhances the view of the role of primary care.	Questionnaires – Student Feedback

For peer review only

26.	Sheffield (University of)	Howe (2001)	Year 4: GP placement	Needs Assessment	Students value community-based learning which have the qualities of: - person-centred clinical methods and learning contexts - positive attitude and committed GP tutors and primary care teams	Questionnaire – Student feedback
27.	University College London	Coleman and Murray (2002)	GP placement	Impact Assessment	Patients mainly felt positive about participating in community-based teaching. However there were also negative aspects that may concern patients. There may also be shifts in the doctor-patient relationship.	Interviews – Students and GP tutor Feedback
28.	University College London	Murray et al. (2001)	GP placement as part of the internal medicine clerkship	Implementation Assessment	-Time spent on teaching and learning activities were similar in both settings - Supervised interaction with patients (which was experienced mainly with the GP) is perceived by students as the most educationally valuable and enjoyable activity - Patient-based learning was highly valued	Student Log Diary
29.	University College London	O'Sullivan et al. (2000)	Year 3: Community Medicine placement	Implementation Assessment Impact Assessment	Implementation Assessment - basic clinical skills could be learnt in both settings, but GP was better for learning of communication skills & psychosocial issues - GP teaching was advantageous in terms of: quality of teaching, tutors' teaching attitude, teaching methods, course organisation. Impact Assessment revealed that: - GP enabled students to increase in confidence and competence	Interviews – Student Feedback Focus Groups – Student Feedback

For peer review only

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3~4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	5 Table 1
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	NA
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	NA

BMJ Open

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	Table 1
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1 5
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	5
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	NA
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Figures 2~ 3
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	12
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	14
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	13
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	NA

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open

The Current Provision of Community-Based Teaching in UK Medical Schools: An Online Survey and Systematic Review.

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2014-005696.R1
Article Type:	Research
Date Submitted by the Author:	12-Sep-2014
Complete List of Authors:	Lee, Sandra; School of Medicine, University of Nottingham Clement, Naomi; School of Medicine, University of Nottingham Tang, Natalie; School of Medicine, University of Nottingham Atiomo, William; School of Medicine, University of Nottingham
Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	General practice / Family practice, Patient-centred medicine, Health policy
Keywords:	EDUCATION & TRAINING (see Medical Education & Training), MEDICAL EDUCATION & TRAINING, PRIMARY CARE

SCHOLARONE™
Manuscripts

For peer review only

The current provision of community-based teaching in UK medical schools: an online survey and systematic review

Sandra WW Lee[1], Naomi Clement (BMedSci)[1], Natalie Tang (BMedSci)[1], William Atiomo (DM FRCOG)[2]

[1] School of Medicine, University of Nottingham, Queen's Medical Centre, NG7 2UH, United Kingdom.

[2] Clinical Sub-Dean, School of Medicine, University of Nottingham, NG7 2UH United Kingdom.

The lead author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained

Correspondence to:

Naomi Clement

Email: msxnc@nottingham.ac.uk
Telephone: 0115 978 5800
Fax: 0115 8230759

For extra data please contact the above

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, a worldwide licence to the Publishers and its licensees in perpetuity, in all forms, formats and media (whether known now or created in the future), to i) publish, reproduce, distribute, display and store the Contribution, ii) translate the Contribution into other languages, create adaptations, reprints, include within collections and create summaries, extracts and/or, abstracts of the Contribution, iii) create any other derivative work(s) based on the Contribution, iv) to exploit all subsidiary rights in the Contribution, v) the inclusion of electronic links from the Contribution to third party material where-ever it may be located; and, vi) licence any third party to do any or all of the above.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

The current provision of community-based teaching in UK medical schools: an online survey and systematic review

Authors: Sandra WW Lee, Naomi Clement (BMedSci), Natalie Tang (BMedSci), William Atiomo (DM FRCOG)
.

Abstract:

Objective
To evaluate the current provision and outcome of community-based education (CBE) in UK medical schools.

Design & Data Sources
An online survey of UK medical school websites and course prospectuses and a systematic review of articles from PubMed and Web of Science were conducted. Articles in the systematic review were assessed using Rossi, Lipsey and Freeman's approach to programme evaluation.

Study Selection
Publications from November 1998 to 2013 containing information related to community teaching in undergraduate medical courses were included.

Results
Out of the 32 undergraduate UK medical schools, one was excluded due to the lack of course specifications available online. Analysis of the remaining 31 medical schools showed that a variety of CBE models are utilised in medical schools across the UK. 28 medical schools (90.3%) provide CBE in some form by the end of the first year of undergraduate training, and 29 medical schools (93.5%) by the end of the second year.

From the 1378 references identified, 29 papers met the inclusion criteria for assessment. It was found that CBE mostly provided advantages to students as well as other participants, including GP tutors and patients. However, there were a few concerns regarding the lack of GP tutors' knowledge in specialty areas, the negative impact that CBE may have on the delivery of health service in education settings and the cost of CBE.

Conclusions
Despite the wide variations in implementation, community teaching was found to be mostly beneficial. To ensure the relevance of CBE for "Tomorrow's Doctors", a national framework should be established, and solutions sought to reduce the impact of the challenges within CBE.

Strengths and Limitations of this Study

This is the first study to review how community-based education is currently provided throughout Medical Schools in the UK. The use of Rossi, Lipsey and Freeman's method of programme evaluation means that the literature was analysed in a consistent and comprehensive way. However, a weakness is that data from the online survey was obtained from online medical school prospectuses. This means the data may be incomplete or out of date. Data in the literature review may also be skewed by publication bias.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

The current provision of community-based teaching in UK medical schools: an online survey and systematic review

Introduction

The context of healthcare in the UK is changing, with an increasingly aging population and a growing focus on the prevention and management of disease.[1] This has prompted the need to ensure that medical graduates are adequately prepared to address these evolving health care needs, rather than maintaining a reactive approach to illness in the UK. These needs include the prevention and management of chronic health conditions such as diabetes, heart disease, cancer and other long-term illnesses. The promotion of health as well as the delivery of care of conditions like these often occurs within the community, outside the context of University teaching hospitals - provided by professionals from several disciplines, including a significant input from social services. In the recently published UK government's white paper, *Equity and Excellence: Liberating the NHS*,[2] a need for a healthcare system focused on personalised care reflecting individuals' health and care needs was outlined. This would involve supporting carers and encouraging multidisciplinary care. These social demographic and political drivers require strong input from multi-professional healthcare providers in primary care and the recruitment of more General Practitioners (GPs) in order to fulfil the growing need for community-based care.

This concept also resonates globally and is considered important by health regulatory bodies that licence medical schools. In 1987, the World Health Organisation (WHO) recommended the reform of health professional curricula by incorporating methods to prepare students for providing care at all levels of health care settings,[3] which can be achieved by, among other things, aligning education with community needs. The UK General Medical Council's (GMC's) document "*Tomorrow's Doctors*" recommend that clinical placements should reflect the changing patterns of healthcare and that they

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

must provide experience in a variety of environments including hospitals, general practices and community medical services.[4]

Curricula in the UK medical schools, therefore, currently offer community-based education (CBE) in various forms and models of teaching.[5] CBE is defined as a medical education programme that may employ any variety of teaching methods to promote an understanding of health concerns at a community level. The programme is set within the community, and involves individuals within the community.

Previous publications have evaluated these models of medical teaching in the community, including analyses of their advantages and drawbacks. [6-28] However, a thorough literature search (as conducted in November 2013) found no existing systematic reviews on community-based teaching across all existing UK medical schools. It remains unclear what the extent of community-based teaching in UK medical schools is, the impact this had made to the standards of healthcare, and how the effectiveness of community-based teaching programmes has been measured. Knowledge of this is considered important, as it would guide the structuring of undergraduate medical curricula to adapt to changing contexts in the UK, hence effectively developing a future generation of doctors who are appropriately prepared for upcoming health care needs. The aim of this study, therefore, was to conduct an online survey of the current provision of community-based teaching within UK undergraduate medical schools to appreciate the extent of implementation. A systemic review was also conducted to comprehensively evaluate community-based teaching in UK medical curricula on the domains of programme needs, implementation, impact, and cost.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Methods

Online Survey

An online survey of the current provision of community-based teaching in UK medical curricula was completed by NC through accessing official online material of medical schools between 31st November 2013 and 8th December 2013. An up-to-date list of all the registered medical schools was obtained from the Medical Schools Council (MSC) website on 31st November 2013.[29] All graduate-entry courses were excluded. This was due to the wide variations of graduate-entry course structure, as well as the lack of literature on post-graduate community-based medical education. This was a prerequisite in order for the results of both the online survey and systematic review to be evaluated in parallel.

Online material of the undergraduate medical curriculum was sourced using the Google search engine, and included content from university websites or online course prospectuses for the 2014 intake. The information search was specific to descriptions of both mandatory and elective components of the curriculum relating to "primary care", "general practice", or "community medicine".

Systematic Review: Data Sources

A systematic literature review was conducted using the electronic databases PubMed and Web of Science to source for papers published on undergraduate community-based medical education. With the understanding that community-based education has evolved over the years, only publications published within the last 15 years, from November 1998 to 2013, were included in this study. The search criteria was ("community-based", "community-oriented", "community involvement", or "primary health care") and ("medical curriculum", "medical students", "undergraduate medical education" or "undergraduate medical school").

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Systematic Review: Selection criteria & Data Extraction

The relevance of the articles was screened by the title and abstract, based on the inclusion and exclusion criteria. Articles were selected if they described undergraduate medical education within the UK. Papers that included healthcare professionals apart from medical students were excluded. Any articles that were duplicated, not available in full text, or not published in English were also regarded as unsuitable for the review. In total, 29 peer-reviewed articles were identified as relevant, and were selected for further qualitative content analysis by SL and NT (see figure 1). Data on the following were extracted from each article: (1) Format of CBE; (2) Type of evaluation used to assess the programme; (3) Findings of this evaluation; and (4) Method of data collection. Rossi, Lipsey and Freeman's (2004) approach to programme evaluation was adopted to systematically categorise the evaluation findings on CBE (see Table 1). The domains applicable to this study were the needs assessment, implementation assessment, impact assessment, and cost assessment. The impact assessment was further sub-categorised into the impact on students (target population of CBE), and the impact on others involved in CBE programmes.

Abstraction of data was performed independently by reviewers SL and NT. Themes were also independently drawn from data analysis of the impact assessments on students. Disagreements between the two reviewers were resolved by arriving at a consensus.

Results

Current provision of community-based teaching in UK medical schools

We were able to obtain information from the medical school websites about the provision of community-based teaching in all 32 undergraduate medical schools, and this is outlined in Table 2 and summarised in Table 3. All undergraduate medical schools provided some form of community-

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

based teaching or placement. There was, however, variation in the structure, duration and time in the course when community teaching was delivered (see Table 2 and Table 3). CBE mainly took the form of clinical placements, patient studies, and optional modules. The duration of community-based teaching or placements varied from half day visits to various community settings (as undertaken in schools such as Hull York, Newcastle, Nottingham and St George's) to a year-long module on primary care and population medicine (as undertaken in Brighton & Sussex). Analysis of the varying formats of CBE (with the exclusion of Norwich, due to the lack of year-by-year curriculum details) revealed that most medical schools (a total of 31)provide early exposure to general practice or community teaching. 28 medical schools (90.3%) provide community teaching from the first year of undergraduate medical education. By the end of the second year of pre-clinical education, students of 29 medical schools (93.5%) would have received some form of community-based teaching.

The most popular form of community-based teaching within medical schools was GP placements with 83.9% (26 schools from a total of 31) providing GP placements within the first two years of study. Patient studies were the least common form of placements. These were defined as projects where students visited patients within the community or at home. Only 38.7% (12 schools) provided this format of community education at some point in their courses.

Fourteen (45.2%) medical schools provided regular exposure to community teaching in every year or phase of the course.

With regards to optional modules offered to students, only three of the medical schools offered them – 9.7%. This implies that, if students are particularly interested in community care, they may find it difficult to achieve extra studies in this area.

Literature review of studies evaluating community-based teaching

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

A summary of the studies evaluated in the systematic literature review are outlined in Table 4. The main methods of evaluation employed in the studies were questionnaires, interviews, and focus groups of the key stakeholders in CBE - students, patients, tutors and other staff in the community setting.

Needs Assessment of CBE

Studies of student expectations of CBE highlighted that students valued experiential patient-centred learning and tutor supervision in the community setting. [14, 30] In a Sheffield study, [14] students also recognised that CBE was a powerful vehicle for changing their approach to medicine and illness, where the patient as a person is given emphasis over the disease.

Implementation Assessment of CBE

All forms of community-based teaching were generally well-received by medical students, patients, and participating health care professionals, supporting the continuation of existing community-based teaching programmes in the future. This included community-based teaching which was incorporated into specialty modules such as Obstetrics and Gynaecology[31], Psychiatry[22] and Surgery[27]. The unique approach of incorporating primary healthcare in an intercalated Bachelor of Science medical research year also received positive feedback[23].

Three studies found that students preferred the implementation of practice-based teaching over hospital-based teaching. Hastings *et al*. found that students in Leicester preferred practice-based teaching on the grounds of both teaching method and content.[11] O'Sullivan *et al*. had similar findings among students from University College London, where practice-based teaching bore qualities of better teaching attitudes, teaching methods, and course organisation.[12] Interestingly, these findings were consistent with Powell and Easton's investigation on Imperial College students undertaking their surgery module.[27] These students preferred surgical teaching within general practices due to

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

the learner-centred approach in teaching, more protected teaching time, and regular access to suitable patients for acquiring clinical skills.

The success of community teaching in Leicester was analysed by Hastings *et al*.[11] It was found that the improved quality of teaching by GP tutors was attributed to a higher proportion of GP tutors attending teacher-training courses. General practices were also found to have greater resource availability and NHS funding specifically allocated to support the teaching of medical undergraduates. All these factors placed hospital doctors at a disadvantage in preparing good-quality clinical teaching sessions in comparison to General Practitioners.

Impact Assessment of CBE

Studies of CBE impact on students bore the following themes: (1) Learning Outcomes, (2) Behavioural Changes to Primary Care, and (3) Traits of Future Doctors. These are summarised in Figure 2.

CBE also had an impact on participating doctors, staff, patients and medical schools. A summary of this is shown in Figure 3.

Impact on Students: Learning Outcomes

Implementation of CBE in medical schools had a significant positive impact on medical students' learning outcomes. The following results provide evidence of the strong educational value among students: Eleven studies showed that medical students gained insight into patient-centred medicine and continuity of care, which were learning outcomes that students viewed as important in their education. [10, 13, 17, 19-21, 23, 25-26, 28, 32] This was measured quantitatively through questionnaires that were administered to students, supplemented by quantitative feedback gathered from focus groups and interviews.

Students' appreciation and understanding of the role of primary care was found in four studies.[20-21, 28, 32] This was revealed through questionnaires, where students rated the extent of their

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

understanding of primary care and its relationship with other levels of care. Two studies reported the benefit of community placements in broadening the student's awareness of teamwork in multi-disciplinary teams. [19, 30] Another study reported the positive finding of successfully exposing students to a broad and varied range of clinical problems in a community setting. [33]

In comparison to hospital-based teaching, improved confidence in clinical skills and competencies was found to be a favourable outcome of CBE in four studies. [10, 12, 19, 20] This finding was derived from questionnaires and focus group interviews from students who had experienced CBE.

Two studies found no difference in academic performance between students under CBE and 'traditional' hospital-based teaching. [17, 20] One study of students who undertook a specialty placement in Obstetrics and Gynaecology also found that there was no difference in clinical performance as rated by their tutors, and no statistically significant difference in student final clerkship grades. [34]

Although most evaluations produced consistent evidence on the benefits of community teaching, two studies highlighted the lack of in-depth knowledge of specialist teaching when conducted by GP tutors: the significance of this finding was measured qualitatively through student interviews,[27] and quantitatively through academic scores for the respective specialty modules.[34]

Impact on Students: Behavioural Changes to Primary Care

Two studies found that the implementation of CBE resulted in a reversal of negative attitudes towards primary care, and an increase of interest in General Practice as a career option among students.[23, 32]

Impact on Students: Traits of Future Doctors

Studies also showed that medical graduates from curricula with increased emphasis on community-based teaching were at no disadvantage to graduates from the traditional hospital-based teaching.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[17, 33] Academically, graduates from a community-based curriculum performed as well as their counterparts on their final formative assessments. Moreover, graduates from curricula where community-based teaching had been offered had the advantage of increased confidence in communication skills and clinical skill competencies. This outcome of CBE was evaluated in three studies.[17, 20, 28] Two of these three studies additionally reported that graduates felt less confident in their medical knowledge on disease processes.[20, 28] However, there was no evident difference found in comparison to graduates of 'traditional' programmes of old medical curricula which had no CBE component when measured by academic results and feedback from educational supervisors.[20,28]

Impact on Others Involved in CBE Programmes

In three studies, it was found that GP tutors and participating staff had both role satisfaction and development of professional and personal ethics [7, 13, 24] Grant and Robling also found strengthened team ethics between members of the primary health care team.[24]

Doctors and staff, however, were found to have organisational issues in juggling community teaching with practice commitments. The expense of one over the other was described in CBE implemented by the University of Birmingham.[7] The unfavourable outcome of blurred boundaries in the doctor-patient relationship was also reported as a concern in two studies.[18, 22]

Five studies evaluated the positive patient outcomes of CBE: Four of these studies reported the beneficial sense of empowerment that patients gained from participating in community teaching. [9, 21-22, 24] The remaining study reported that patients developed feelings of altruism from helping medical students in their education. [18]

Apart from gaining a sense of empowerment, Walters *et al*. also reported the development of a more balanced doctor-patient relationship, and a therapeutic benefit for the patients as a result of talking to students about their medical condition.[22]

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Among these five studies on patient outcomes, two studies included further evaluations on the negative impact that resulted from patient participation. The negative outcomes comprised, reinforced feelings of ill-health which may be distressing or anxiety-provoking, and concerns of breaching patient confidentiality. [18, 22]

Powel *et al.*'s evaluation also shed light on the benefits that medical schools gained from tapping into teaching within the community. By doing so, medical schools were able to increase the availability of learning opportunities to medical students.[27]

Two studies raised the possibility of the negative impact that CBE would have on hospital tutors.[7, 13] The concern raised in these studies was with regards to a shift of focus away from teaching conducted by hospital-based tutors, and towards an emphasis on teaching in the community.

Cost Assessment of CBE

Only one study evaluated the costs of running a community-based course. An evaluation of CBE in Cambridge revealed that the programme was cost-feasible as the total expenditure on one student-year of community-based teaching was within the cost estimates of Service Increment for Teaching (SIFT) funding. [17] The study also noted that the balance between placement costs and facilities costs stood at a ratio of approximately 2:1, which is a reverse of the traditionally allocated 1:4 ratio in SIFT funds. This finding implied that the traditional allocations for SIFT funds would be inappropriate when applied to community-based teaching.

Discussion

This study was conducted to analyse the current provision of community-based education across undergraduate medical schools in the UK. All medical schools were found to offer some community-based teaching in their curricula, which falls in line with the recommendations of the WHO and the GMC which also follows the social demographic and political changes within the UK. Furthermore, a

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

significant proportion of medical schools offered community-based teaching early in the medical course. The benefits of this early exposure is explored by Dornan *et al.*, where the opportunity to learn in context of clinical settings enabled students to develop an awareness of their interpersonal skills, attitudes and abilities.[35,36]

In general, community-based teaching was well-received by medical students due to its good educational value on many levels of learning outcomes. It also gave students insight into the option of General Practice as a future career. This is consistent with the direction of travel the UK healthcare workforce needs to address due to the changing demographics and the emphasis changing in health care delivery from management to prevention. Not only was community-based teaching of value to students, but it was also found to produce medical graduates of equal clinical skills and competencies to their counterparts who were taught under the 'traditional' hospital-based medical programme.[17,33] This outcome is consistent with findings in Australian medical schools which showed that students generally did as well as or, in some areas of clinical competencies, even better than their counterparts who received hospital-based teaching [7]. Community-based teaching in medicine was also beneficial to medical schools in maximising the sources of available learning opportunities for medical students. [27] Moreover, community-based teaching in medicine was found to offer a unique opportunity to foster inter-professional learning – an outcome that is consistent with the political drivers for better patient care.[37]

Although it was evident that community-based teaching has a vast array of benefits, several drawbacks were identified and underscored as challenges to the implementation of CBE. Studies reflected the challenges of general practice tutors lacking adequate knowledge in specialty areas, [27] and community teaching having a negative impact on the delivery of health service in some general practices.[7] Murray and Modell discuss possible solutions to these issues, such as the development of university-linked practices that would scrutinise the effectiveness of teaching.[38] It is imperative that these solutions are explored and tested in current CBE programmes so that the impact of

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

programme drawbacks may be reduced. This would be the way-forward to strengthening the implementation of CBE in medical curricula.

An assortment of models were seen to be used for community-based teaching in the UK, where programmes varied in their methods of delivery, durations of exposure and points of undergraduate education at which the teaching was delivered. This is congruous with guidance from the GMC publication "Tomorrow's Doctors", which states that it was for each medical school to design its own curriculum to suit its own circumstance. It should be noted that community-based education broadly encompasses varied delivery formats, including both clinical and non-clinical experiences. Unfortunately, the diversification of CBE poses a challenge for developing a standardised set of criteria for evaluating the outcomes of CBE. Consequently, it becomes difficult to establish a national framework for quality assurance of medical curricula, and to make recommendations for improving the implementation of CBE.

In order to achieve the expectations laid out for "Tomorrow's Doctors",[4] there is a principal need to define the competencies that are required to prevent illness and promote health in the primary care or community-based setting. Ladhani *et al*., for example, categorised six themes of community-based education competencies within nursing and medicine: public health; cultural diversity; leadership and management; community development and advocacy; research and evidence-based practice; and generic competencies.[38] Subsequently, a national framework may be derived from these key competencies so as to measure the effectiveness of community-based teaching in achieving these targeted goals.

The development of a national framework was explored and suggested by Cotton *et al*.,[39] where a list of criteria for quality practice-based teaching in the UK was consensually derived from views of medical educators and students at a national conference. However, since its development, there has been no literature found on the use of these criteria to objectively evaluate community-based education at a local, regional or national level. More work in this area should be encouraged to achieve a national standard for community-based education in the UK.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Little data was found on the cost implications of community-based teaching. Given the wide variations in the format of CBE programmes conducted across the UK, it is difficult to make general conclusions about the cost impact of community-based teaching. Nonetheless the findings from Oswald *et al*.'s study sets a benchmark for other similar community teaching within the UK.[17] Oswald *et al*. found that the absolute costs per student session of community teaching was within the budgets of SIFT funding. The cost-feasibility implied in this study is consistent with Murray *et al.*'s 1993 study of the University College London teaching programme,[40] where community teaching cost £60 per student session, comparing well with the SIFT provision of £64 per student session. However, Oswald *et al*. discusses that the national formula for SIFT funds is inappropriate for community teaching due to a mismatch in the 2:1 ratio of placement costs and facilities costs in community teaching, versus the traditionally allotted 1:4 SIFT ratio between placement costs and facilities costs. SIFT funding to medical education institutions is traditionally divided to cater for the costs of clinical placements (about 20%) and the costs of facilities (80%). The 1995 Winyard Report specified that the use of SIFT funding would support teaching conducted in settings other than the main university hospital, such as in general practices and community settings.[41] This report unfortunately failed to realise the inappropriateness of applying the 1:4 formula (for facilities and placement costs) in the context of primary care. The allocation of 80% SIFT funding to facilities would be disadvantageous to community-based teaching since this money will be retained for usage within the hospital setting. It is important that the provision of SIFT funding is reconsidered so that it suits a growing emphasis of community-based education in the medical curriculum and therefore help develop these settings as centres of education.

The strengths of our study are that it provides the most up-to-date picture of the UK landscape of community-based teaching in medical schools and the fact that the literature review was conducted in a systematic way. The use of Rossi, Lipsey and Freeman's widely accepted approach to programme evaluation also ensured that programme evaluations in the literature were analysed comprehensively.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

The weaknesses of the online survey are that it relied on data provided on the websites of medical schools which can occasionally be out of date and incomplete. The online survey also had the disadvantage of inconsistency in the extent of details provided online. For example, the online sources may not have mentioned details on clinical placements which are primarily hospital-based, but also provide supplementary clinical teaching within the community setting, (e.g. shadowing of a community midwife in an Obstetrics & Gynaecology placement). To address these weaknesses, the method of information collection may be improved by contacting course administrators to obtain detailed and focused information on any community-based teaching that is offered to students in all the course modules. The weaknesses of the literature review include that of publication bias. The majority of the papers included in the review were written in support of CBE, and there are very few publications which focused on the disadvantages of CBE. This imbalance may have skewed our data in favour of CBE.

Conclusion

In this study, all undergraduate medical schools in the UK were found to offer some form of community-based teaching in their medical curriculum. The delivery of CBE varied broadly, but all forms of community teaching were generally found to be beneficial and was therefore well-received by students, patients, participating staff, and medical schools. The challenges and cost issues of community teaching should also not be overlooked, and solutions to address these need to be explored such that the delivery of CBE may be improved.

Under the pressures of social demographics and political drivers to incorporate more community-based teaching in medical education, there is a need to ensure that CBE is delivered at acceptable quality standards for it to achieve its anticipated benefits. A national framework would need to be established to ensure these standards are met. This would then succeed to act as a standardised

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

national guideline for evaluating the effectiveness of CBE programmes in developing professional competencies that are expected of “Tomorrow’s Doctors”.

Competing Interests

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

Authors’ Contributions

WA came up with the concept of the study, NC performed the Medical School online survey and SL and NT the Literature Review. SL, NC and NT wrote the draft of the manuscript and editing was performed by SL, NC, NT and WA.

Data sharing

No further data from this study is available.

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

References

[1]*Our Priorities for 2013/14* [Internet]. London: Public Health England; [Updated 26 April 2013, Accessed January 2014]. Available from: https://www.gov.uk/government/publications/public-health-englands-priorities-for-2013-to-2014

[2] *Equity and Excellence: Liberating the NHS* [Internet]. London: Department of Health; [Updated July 2010, Accessed January 2014]. Available from: https://www.gov.uk/government/publications/liberating-the-nhs-white-paper

[3]*Community-based Education of Health Personnel: Report of a WHO Study Group* [Internet]. Geneva: World Health Organisation; [Updated November 1987. Accessed January 2014]. Available from: http://apps.who.int/iris/handle/10665/41714

[4]*Tomorrow's Doctors* [Internet]. London: General Medical Council; [Updated 2009, Accessed January 2014]. Available from: http://www.gmc-uk.org/education/undergraduate/tomorrows_doctors_2009.asp

[5] Major SC, Booton P. Involvement of general practice (family medicine) in undergraduate medical education in the United Kingdom. *J Ambul Care Manage* 2008 September;31(3):269-75.

[6] Davison H, Capewell S, Macnaughton J, Murray S, Hanlon P, McEwen J. Community-oriented medical education in Glasgow: developing a community diagnosis exercise. *Med Educ* 1999 January;33(2):55-62.

[7] Parle J, Greenfield S, Thomas C, Ross N, Lester H, Skelton J, *et al*. Community-based clinical education at the University of Birmingham Medical School. *Acad Med* 1999 March;74(3):248-53.

[8] Seabrook MA, Lempp H, Woodfield SJ. Extending community involvement in the medical curriculum: lessons from a case study. *Med Educ* 1999 November;33(11):838-45.

[9] Stacy R, Spencer J. Patients as teachers: a qualitative study of patients' views on their role in a community-based undergraduate project. *Med Educ* 1999 September; 33(9):688-94.

[10] Thistlethwaite JE, Jordan JJ. Patient-centred consultations: a comparison of student experience and understanding in two clinical environments. *Med Educ* 1999 September;33(9):678-85.

[11] Hastings AM, Fraser RC, McKinley RK. Student perceptions of a new integrated course in clinical methods for medical undergraduates. *Med Educ* 2000 February;34(2):101-7.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[12] O'Sullivan M, Martin J, Murray E. Students' perceptions of the relative advantages and disadvantages of community-based and hospital-based teaching: a qualitative study. *Med Educ* 2000 August;34(8):648-55.

[13] Thistlethwaite JE. Introducing community-based teaching of third year medical students: outcomes of a pilot project one year later and implications for managing change. *Educ Health* 2000;13(1):53-62.

[14] Howe A. Patient-centred medicine through student-centred teaching: a student perspective on the key impacts of community-based learning in undergraduate medical education. *Med Educ* 2001 July;35(7):666-72.

[15] Howe A, Ives G. Does community-based experience alter career preference? New evidence from a prospective longitudinal cohort study of undergraduate medical students. *Med Educ* 2001 April;35(4):391-7.

[16] Murray E, Alderman P, Coppola W, Grol R, Bouhuijs P, van der Vleuten C. What do students actually do on an internal medicine clerkship? A log diary study. *Med Educ* 2001 December;35(12):1101-7.

[17] Oswald N, Alderson T, Jones S. Evaluating primary care as a base for medical education: the report of the Cambridge Community-based Clinical Course. *Med Educ* 2001 August;35(8):782-8.

[18] Coleman K, Murray E. Patients' views and feelings on the community-based teaching of undergraduate medical students: a qualitative study. *Fam Pract* 2002 April;19(2):183-8.

[19] Gavin J, Lempp H, Elliman A, Grogan C. Teaching in partnership: linking a medical school and a community trust. *Br J Community Nurs* 2002 January;7(1):32-6.

[20] Jones A, McArdle PJ, O'Neill PA. Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Med Educ* 2002 January;36(1):16-25.

[21] Anderson ES, Lennox AI, Petersen SA. Learning from lives: a model for health and social care education in the wider community context. *Med Educ* 2003 January;37(1):59-68.

[22] Walters K, Buszewicz M, Russell J, Humphrey C. Teaching as therapy: cross sectional and qualitative evaluation of patients' experiences of undergraduate psychiatry teaching in the community. *BMJ* 2003 April;326(7392):740.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[23] Jones M, Singh S, Lloyd M. "It isn't just consultants that need a BSc": student experiences of an Intercalated BSc in primary health care. *Med Teach* 2005 March;27(2):164-8.

[24] Grant A, Robling M. Introducing undergraduate medical teaching into general practice: an action research study. *Med Teach* 2006 November;28(7):192-7.

[25] Muir F. Placing the patient at the core of teaching. *Medical Teacher* 2007 March;29(2-3):258-260.

[26] Mullen K, Nicolson M, Cotton P. Improving medical students' attitudes towards the chronic sick: a role for social science research. *BMC Med Educ* 2010 November;10:84.

[27] Powell S, Easton G. Student perceptions of GP teachers' role in community-based undergraduate surgical education: a qualitative study. *JRSM Short Rep* 2012 August;3(8):51.

[28] Watmough S. An evaluation of the impact of an increase in community-based medical undergraduate education in a UK medical school. *Educ Prim Care* 2012 November;23(6):385-90.

[29] UK medical schools A-Z [Internet]. London: Medical Schools Council; [Accessed November 2013]. Available from: http://www.medschools.ac.uk/Students/UKMedicalSchools/Pages/UK-Medical-Schools-A-Z.aspx

[30] Lennox A, Petersen S. Development and evaluation of a community-based, multiagency course for medical students: descriptive survey. *BMJ* 1998 February;316:596-599.

[31] Nicholson S, Osonnaya C, Carter Yh, Savage W, Hennessy E, Collinson S. Designing a community-based fourth-year obstetrics and gynaecology module: an example of innovative curriculum development. *Med Educ* 2001 April;35(4):398-403.

[32] Sinclair HK, Ritchie LD, Lee AJ. A future career in general practice? A longitudinal study of medical students and pre-registration house officers. *Eur J Gen Pract* 2006 April;12(3):120-7.

[33] Alderson TS, Oswald NT. Clinical experience of medical students in primary care: use of an electronic log in monitoring experience and in guiding education in the Cambridge Community-based Clinical Course. *Med Educ* 1999 June;33(6):429-33.

[34]Frattarelli LC, Kamemoto LE. Obstetrics and gynecology medical student outcomes: Longitudinal multispecialty clerkship versus traditional block rotations. *Am J Obstet Gynecol* 2004 November;191(5):1800–1804.

[35]Dornan T, Bundy C. What can experience add to early medical education? Consensus Survey, *British Medical Journal* 2004; 32:834-840.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

[36]Dornan T, Littlewood S, Margolis SA, Scherpbier A, Spencer J, Ypinazar V. How can experience in clinical and community settings contribute to early medical education? A BEME systematic review. *Medical Teacher* 2006;28(1):3–18.

[37]Hosny S, Kamel MH, El-Wazir Y, Gilbert J. Integrating interprofessional education in community-based learning activities: case study. *Med Teach* 2013;35:S68-73

[38]Ladhani Z, Scherpbier AJ, Stevens FC. Competencies for undergraduate community-based education for the health professions--a systematic review. *Med Teach* 2012;34(9):733-43.

[39]Cotton P, Sharp D, Howe A, Starkey C, Laue B, Hibble A*, et al*. Developing a set of quality criteria for community-based medical education in the UK. *Educ Prim Care*. 2009 May;20(3):143–51.

[40]Murray E, Jinks V, Modell M. Community-based medical education: feasibility and cost. *Med Educ* 1995 January;29(1):66-71.

[41]NHS Executive. SIFT into the Future. Leeds: NHS Executive, 1995 (The Winyard Report).

Legend of figures and tables.

Figure 1. Flow chart of search strategy used in systematic review

Figure 2. Key Points: Impact of CBE on Students

Figure 3. Key Points: Impact of CBE on Other Participants in CBE

Table 1. Domains in Rossi, Lipsey and Freeman's approach to Programme Evaluation

Table 2. Community-based Teaching in Medical Schools in the UK

Table 3. Summary of Findings from Online Survey

Table 4. Summary of Systematic Review

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

For peer review only

Table1: Domains in Rossi, Lipsey and Freeman's Approach to Programme Evaluation

Domains of Programme Evaluation	
Needs Assessment	Examining the need in the population that the programme intends to target.
"Logic Model" Assessment (of programme conceptualisation and design	Examining the plausibility of how the programme is supposed to achieve its aims.
Implementation Assessment	Evaluation determines whether the programme addresses its target population with the intended services.
Impact Assessment	Determines the effectiveness of the programme in achieving its intended outcomes.
Efficiency assessment	Analyses the cost-benefit or cost-effectiveness of the programme by comparing its benefits and costs.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

TABLE 2: An Outline Of Community-Based Teaching In Undergraduate Medical Courses Within The UK

1	**Aberdeen (University of)**	**Year 1** –The "Community Course": including GP, Public Health, Mental Health, Environmental & Occupational Medicine, HCE and Paediatrics; allowing learning about the social, economic and environmental impacts on health. **Year 2** - The Community Course continues. **Year 3** – The Community Course is completed. **Year 4** - 5 week GP placement **Year 5** – 8-week blocks of: (1) a medical speciality, (2) a surgical speciality, (3) a GP or psychiatry course, (4) an elective, and (5) a Professional Practice Block.
2	**Barts and The London School of Medicine and Dentistry, Queen Mary, University of London**	**Years 1 & 2** - regular GP placements **Years 3 & 4** – work with clinical teams both in the hospital and also within community placements. **Year 5** - clinical and community placements, including GP surgeries.
3	**Birmingham (University of)**	**Years 1 & 2** - 10 days per year spent in GP. **Year 3** –Community Based Medicine module **Years 4 & 5** -- One GP attachment within these 2 years.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

4	**Brighton and Sussex Medical School**	**Years 1 & 2** - 25% of learning is clinically based including experience in primary care, community medicine and out-patient settings. Patients do two family studies: One in year 1 ("family with a new baby"), and one in year 2 ("the chronic illness patient"). **Years 3 & 4** – A year-long module on primary care and population medicine, alongside clinical placements both in hospital trusts and primary care.
5	**Bristol (University of)**	**Year 1** - GP and patient home visits. **Year 2** – clinical skills teaching in the primary care setting. **Year 3** - teaching in both hospitals and in general practice. **Year 4** - Two "Community Orientated Medical Practice" modules. **Year 5** - 2 weeks in a GP placement (within preparation for Professional Practice)
6	**Cambridge (University of)**	**Years 1** – meet patients in the GP. **Years 2 & 3** – Students meet patients through visiting community-based health-related agencies, as well as following a pregnant women and her family throughout pregnancy (Year 3 project). Students also have primary care teaching in the following: - Module on the "Clinical Method" involves time spent in primary care, including teaching - Module on "The Life Course" involves time spent in primary and community care. Learning is focused on how diseases present, are managed and the patients' perspective. - Module on "Preparation for Practice**"** involves one GP attachment
7	**Cardiff University**	**Year 1** –12 week introductory programme involving short clinical experience days in GP . **Years 1 & 2** – one day a week seeing patients in hospitals, GP or other community based services. **Year 5** - 8 week placement in the community.
8	**Dundee (University of)**	"Doctors, Patients and Communities" course runs throughout the undergraduate medical programme, allowing early patient contact. This course includes public health and primary care. Students submit a record of clinical experience. **Years 4 &5** – Primary care attachments, with an option to extend the 5th year primary care attachment to 2 or 3 months.
9	**Durham (University of)**	**Years 1 & 2** – Community-based teaching in: - The "Patient Study" module involves observing the effect of a chronic condition on a person and their immediate family in primary care and the community. - The "Family Project" follows a pregnant woman and then the effect of having a new baby in a family. - The "Community Placement" with a variety of health and social care agencies, observing inter-professional and inter-agency working within the community. It may involve visiting patients at home and within primary care **Years 3-5** – *Medical programme completed at Newcastle University*
10	**Edinburgh (The University of)**	**Years 1 & 2** – Student have community projects, GP-based teaching and three student selected projects on a range of topics (can be clinical and non-medical) **Years 3 & 4** - "Further clinical experience" *(clinical setting not specified)* **Year 5** - One placement in general practice
11	**Exeter (University of)**	**Years 1 & 2** – Community placements **Years 3 & 4** – meet patients at home, in GP's, in acute and community hospitals. **Year 5** – One community placement.
12	**Glasgow (University of)**	**First 15 weeks of Year 3** – Students develop clinical skills in the hospital and GP environment. **Second half of Year 3, years 4 & 5** – One GP placement
13	**Hull York Medical School**	Students alternate between a hospital and primary care setting in all clinical placements. **Year 1** – Half a day each week on clinical placement. **Year 2** – One day each week on clinical placement. **Years 3 & 4** – Clinical placements in both GP and hospitals. **Year 5** – Medical student is treated as a junior member of the medical team. Students have a general practice rotation, in which they see patients and perform routine medical procedures under the supervision of the GP.
14	**Imperial College School of Medicine**	**Years 1 & 2** – "The Patient Contact Course" (for chronic illnesses) involve students getting attached to one patient/family and visiting them at their homes and in the clinical setting. Learning is supplemented by GP and hospital visits. **Year 3** - Learning basic clinical skills and methods in general practice. **Year 5** - One GP & Primary Health Care placement. **Year 6** - 3 week "General Practice Student Assistantship" placement.
15	**Keele University**	**Year 1** - Placements in GP setting.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

		Year 2 - Students select a "third sector" placement from a range of community organisations. **Year 3** - 4 weeks spent consolidating clinical skills in GP surgery. **Year 4** - 4 weeks in general practice, as well as an option of a Special Study Component in GP. **Year 5 -** Longer GP placement. Students also work in small groups to identify community needs.
16	**King's College London School of Medicine (at Guy's, King's College and St Thomas' Hospital)**	Inter-professional education is embedded in the medical curriculum throughout the duration of the course. **Year 1 (term 1)** – Students have their first experiences of primary care (visiting GP and interviewing patients) & hospital. **Phase 2 (3 terms) -** Continuing clinical contact in primary care attachments and GP visits **Phase 3 (3 terms)** – Students study basic skills with a GP teacher. Each of the three placements involve community attachments. **Phase 4 (3 13-weeks rotations)** - A "Community and Applied-Health Promotion Study" is done following a pregnant women and her family. Students also continue Multi-Disciplinary Team learning. **Phase 5 (final year) -** One 8 week attachment in GP and community.
17	**Lancaster University**	**Year 1** – Students have a community attachment in the second term with health visitors **Year 2 -** One day per week on community attachment e.g. GP, community clinical teaching or community-related assessment. **Year 3** – One GP placement with a focus on disability. **Year 4 -** One day per week in GP **Year 5** – One community attachment.
18	**Leeds (University of)**	**Year 1** – "Campus to Clinic" module (lasting half the academic year): students work in a healthcare team for 1 day per week, rotating between primary and secondary care. Medical students also arrange a community visit to a healthcare voluntary group close to their practice. **Year 2** – "Campus to Clinic" module (lasting half the academic year). **Year 3 -** 5 week primary care placement. **Year 5 -** One placement (8 weeks) involves integrating teaching between primary and secondary care.
19	**Leicester (University of)**	**Phase 1 (First 5 Terms) –** Community attachments are undertaken to gain experience of the social implications of medicine. Study of social and behavioural sciences supplements these placements. **Phase 2 –** Time is spent in "innovative community attachments" to allow learning of the Multi-Disciplinary Team.
20	**Liverpool (University of)**	**Years 2-5 –** Hospital and community-based clinical experiences.
21	**Manchester (University of)**	**Year 1 -** Community visits **Year 3 -** Community placements related to certain modules. **Year 4** - Community and primary care teaching on further modules. **Year 5** - Students work as part of the team in GP, community paediatrics or community psychiatry, running their own consultations and seeing patients independently.
22	**Newcastle University Medical School**	**Year 1 & 2** – Early clinical experience with full and half-days spent in GP practices and hospital visits. Students also do 2 patient studies: One "family study project" and one in-depth study of a patient with chronic illness. **Year 3** – Half a day each week spent in General Practice. **Year 5 –** Primary Care clinical rotation including out-of-hours calls with GPs.
23	**Norwich Medical School, University of East Anglia**	*NB: No year-by-year information given.* "Regular placements in both hospital and General Practice allow students to observe the full range of patient care"
24	**Nottingham (The University of)**	**Year 1 & 2 –** One morning every month spent with GP. **Year 3 -** "Community Follow Up Project" (starting in Year 2) is completed. Projects involves following an assigned patient for 18 months, and learning about the effects of the patients care on the patient and their family. **Year 4 –** One week Community Attachment during Obstetrics and Gynaecology placement and one day spent with a community midwife. Regular community visits during Paediatrics attachment (GP, Community Paediatrician, Health Visitor, and School Nurse). Students are also given an option of a Special Study Module in primary care. **Year 5 -** One 5 week GP placement.
25	**Oxford (University of)**	**Years 1 & 2 –** meeting patients in GP **Year 4 –** meeting patients in GP (2 weeks) and a GP Residential Attachment (1 week). **Year 5 –** One community placement (in clinical geratology, dermatology, palliative care, primary health care or public/ population health) **Year 6 –** optional 12-week special study module in primary care.
26	**Plymouth University,**	**Year 1 –**Weekly practical community based work throughout the course, inclusive of "Sure Start" or

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

	Peninsula Schools of Medicine and Dentistry	drug clinic visits. **Year 2 –** GP practice visits on 6 separate days. **Year 3 & 4 –** Students can see patients themselves in supervised settings in a General Practice during a week-long placement, three times in each year. **Year 5 –** 6 week long GP placement.
27	**Queen's University Belfast**	*NB: Little information on course structure is available online* **Years 4 & 5 -** Teachings in GP
28	**Sheffield (The University of)**	**Years 1 & 2** - Community attachments within GPs & some social services locations. **Two years including second half of Year 3, Year 4 & first half of Year 5 –** One community health placement at GP.
29	**Southampton (University of)**	**Years 1 & 2** - Contact with patients in a variety of clinical settings, including a community engagement project. **Year 3 –** Students undertake a research study which may involve work with general practices or in the community. Students also undertake a GP clinical placement, focusing on the effects of clinical disorders on patients and their families. **Year 4** - Range of clinical placements *(clinical setting not specified).* **Year 5** – One GP placement.
30	**St Andrews (University of)**	**Years 1 & 2** - Regular primary care attachments in local hospitals. **Between 2nd & 3rd Year -** Optional residential week in a range of primary clinical care placements. **Years 4 & 5** – *Medical programme completed at a "Partner Medical School" in Aberdeen, Dundee, Edinburgh, Glasgow or Manchester.*
31	**St George's, University of London**	**Year 1** - Half days of GP and community visits. **Year 3** - 3 week GP/primary care placement. **Year 5** - 5 week placement in GP, 2 weeks in public health.
32	**University College London**	**Years 1 & 2 -** "Opportunities for early patient contact and for meeting health professionals". **Year 4 -** "Three long attachments in hospitals and associated community and GP settings" concentrating on community based care, ward based care and emergency care. **Years 6** – 4-week GP placement

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Table 3 - Summary of Findings from Online Survey

		Year of Study					
	Medical School	1st	2nd	3rd	4th	5th	6th
1	Aberdeen	●, ȣ	●, ȣ	●, ȣ	●	●	n/a
2	Barts and Queen Mary	●	●	●, ȣ	●, ȣ	●, ȣ	n/a
3	Birmingham	●	●	ȣ	●	●	n/a
4	Brighton and Sussex	●, ȣ,P	●, ȣ,P	●, ȣ	●, ȣ		n/a
5	Bristol	●, P	ȣ	●	ȣ	●	n/a
6	Cambridge	●	●, ȣ,P	●, ȣ,P			
7	Cardiff	●	●, ȣ			ȣ	n/a
8	Dundee	●, ȣ	●, ȣ	●, ȣ	●, ȣ	●, ȣ	n/a
9	Durham (Year 3-5 completed in Newcastle)	●, ȣ,P	●, ȣ,P	n/a	n/a	n/a	n/a
10	Edinburgh	●, P	●, P			●	n/a
11	Exeter	●, ȣ	●, ȣ	●, ȣ,P	●, ȣ,P	ȣ	n/a
12	Glasgow			●	●	●	n/a
13	Hull York	●, ȣ	●, ȣ	●	●	●	n/a
14	Imperial College	●, ȣ,P	●, ȣ,P	●		●, ȣ	●
15	Keele	●	ȣ	●	●, ×	●	n/a
16	King's College London	●, ȣ,P	●, ȣ	●, ȣ	P	●, ȣ	n/a
17	Lancaster	ȣ	●, ȣ	●	●	ȣ	n/a
18	Leeds	●, ȣ	●, ȣ	●, ȣ	●, ȣ	●, ȣ	n/a
19	Leicester	●, ȣ	●, ȣ	●, ȣ	●, ȣ	●, ȣ	n/a
20	Liverpool		ȣ	ȣ	ȣ	ȣ	n/a
21	Manchester	ȣ		ȣ	●, ȣ	●, ȣ	n/a
22	Newcastle	●, P	●, P	●		●	n/a
23	Norwich	*no year by year breakdown - regular GP placements reported*					
24	Nottingham	●	●,P	P	●, ȣ	●	n/a
25	Oxford	●,P	●,P		●,P	ȣ	×
26	Plymouth	ȣ	●	●	●	●	n/a
27	Queen's University Belfast				●	●	n/a
28	Sheffield	●, ȣ	●, ȣ		●	●	n/a
29	Southampton	●, ȣ, P	●, ȣ, P	●, ȣ, P		●	n/a
30	St Andrews (Year 4-5 completed in Manchester)	ȣ	ȣ, ×		n/a	n/a	n/a
31	St George's, University of London	●, ȣ		●, ȣ		●, ȣ	n/a
32	University College London	●, ȣ			●, ȣ	●	n/a

●: GP Placement within curriculum

ȣ: Community-Based Education - other than GP Placement - within the curriculum

P: Patient Studies within the community involving visiting the patient within the community or at home

×: Optional community-based module offered

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

TABLE 4: Summary of Systematic Review

	University	Author (Year)	Description of CBE	Type of Evaluation	Evaluation findings	Evaluation method
1.	**Aberdeen (University of)**	Sinclair et al. (2006)	Years 1-3: GP-led patient-centred tutorials and clinical sessions Year 4: 5-week community-themed clinical rotation Year 5: optional 7-week GP attachment	Impact Assessment	Increase in students interested in pursuing a career in GP as curriculum progressed Exposure to community settings had positive effect on students' attitudes towards a career in general practice	Questionnaire – Student Survey
2.	**Barts and The London School of Medicine and Dentistry**	Nicholson et al. (2001)	Year 4: Community-based Module prior to Obstetrics and Gynaecology hospital placement	Implementation Assessment Impact Assessment	Adequate clinical exposure within the community Variation in opportunities to gain relevant experience in clinical exposure Students found small-group learning and GP attitudes to be beneficial to their learning Multi-disciplinary interaction enhanced their clinical experience Successfully Incorporated specialty with community environment	Questionnaire – Student Feedback
3.	Birmingham (University of)	Parle et al. (1999)	Years 1-4: GP practice visits	Implementation Assessment Impact Assessment	Students found GP tutors to be encouraging GP Tutors reported: -Enhanced development of both students and GPs -Organizational drawbacks	Questionnaire – Student Feedback
4.	Cambridge (University of)	Alderson and Oswald (1999)	15-month attachment to GP practice	Implementation Assessment	Adequate exposure of all clinical specialities was achieved Individual experiences may vary due to variation in opportunities	Student Log Diary
5.	Cambridge (University of)	Oswald et al. (2001)	15-month attachment to GP practice	Implementation Assessment Impact Assessment Cost Assessment	Course was feasible in terms of organization and student logistics Extended relationships with patients enriched students' clinical experience No difference in academic performance on formative assessments between students undertaking community-based versus hospital-based teaching Reported costs were less than the average *SIFT into the Future* student-year	Debriefing Sessions – Student Feedback
6.	Cardiff University	Grant and Robling (2006)	Year 5: GP attachment	Needs assessment Impact assessment	All parties found the attachment to be positive GPs felt more confident clinically through teaching students Primary care team felt team ethic was strengthened	Discussion Meetings – Primary Care Team Feedback Interviews – GP Feedback
7.	Dundee (University of)	Muir (2007)	Year 1-3: Patient Follow-up in the community	Impact Assessment	Students were able to gain a better insight into patient-centred medicine as a result of the attachment Early exposure to patients evoked student enthusiasm	Focus Group – Student Interview
8.	Glasgow (University of)	Davison et al. (1999)	Year 1: Educational exercise of three teaching sessions	Needs Assessment	Students found that learning objectives were met through community-themed educational exercises	Questionnaire – Student Evaluation
9.	Glasgow (University of)	Mullen et al. (2010)	Year 1: Patient interviews in the community	Impact Assessment	Integration of community-based exercise positively influenced students' attitudes in regards to: -understanding of psycho-social model of illness -development of empathy	Questionnaire – Student Evaluation
10.	Imperial College	Powell and Easton (2012)	Year 3: 3-session surgical module conducted by GP teachers	Implementation Assessment	Surgical teaching delivered by GPs was favourable based on the following benefits: - protected time for learning - regular access to suitable patients - learner-centred teaching GPs lacked specialist knowledge, and	Focus group – Student Interview

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

					teaching was not directed by syllabus	
11.	King's College London	Seabrook et al. (1999)	Year 1: Healthcare Team Module Year 2: Special Study Module	Implementation Assessment Impact Assessment	Community-based courses are feasible and well-received by students Multi-disciplinary teamwork is encouraged positively	Questionnaires – Student feedback Small-group discussions – Student feedback Focus groups – Tutor Feedback
12.	King's College London	Gavin et al. (2002)	Year 2 – Community-based Special Study Module	Impact Assessment	Student appreciation of: - psychosocial needs of patients - inter-professional teamwork	Questionnaire survey: students and teaching professionals
13.	Leeds (University of)	Thistlethwaite and Jordan (1999)	Year 3: GP-led days in community setting	Impact Assessment	Early community exposure to patient-centred consultations allowed students to: -Appreciate importance of patient-centred communication -Gain more confidence in their abilities Direct observation and feedback from clinician was beneficial to student learning	Focus Groups – Student Interviews
14.	Leeds (University of)	Thistlethwaite (2000)	Year 3: GP-led days in community setting	Implementation Assessment Impact Assessment	Positive feedback from students: -community environment allowed ease of patient-centre approach -students now routinely ask about patient concerns Positive feedback from GPs: -teaching was motivating and gratifying	Questionnaire – Student Feedback
15.	Leeds (University of), Sheffield (University of) and Hull York Medical School	Macallan and Pearson (2013)	Year 3-4: GP attachment	Implementation Assessment	GP enthusiasm and engagement crucial to determining the quality of the placement Well-organized GP practices were valued by students Students felt that GPs needed to be better informed of placement outcomes	Focus Groups – Student Interviews
16.	Leicester (University of)	Lennox and Petersen (1998)	Year 3: Patient Study	Needs Assessment Implementation Assessment Impact assessment	Pre-course Needs Assessment of CBE programme based on students' opinions of: - Structure of course - Method of implementation - Assessment format End-course impact assessment revealed that: Course effectively achieves GMC recommendations for "Tomorrow's Doctors" End-Course Implementation assessment revealed that: Continuation of the course was supported by all participants	Questionnaire – Student, Patient and Agency Feedback

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

					(students, patients and agencies)	
17.	Leicester (University of)	Hastings et al. (2000)	Year 3 or 4: GP practice-based teaching	Implementation assessment	Comparison of practice-based & hospital-based teaching with respect to the 'teaching content' and the 'teaching processes revealed students favouring practice-teaching in both respects.	Questionnaire – Student Feedback
18.	Leicester (University of)	Anderson et al. (2003)	Year 3: Community placement and Patient study	Implementation assessment Impact assessment	Implementation assessment: - Continuation of course was well-supported by students, patients and staff Impact Assessment: - Course effectively achieved students' learning objectives in community education. - Positive patient and staff experience in their involvement in medical education.	Questionnaires – Student and Patient Feedback Focus Groups – Staff Interviews
19.	Liverpool (University of)	Watmough (2012)	Year 1-4: Community-based teaching Year 5: Community placement	Implementation Assessment Impact Assessment	Implementation Assessment: -Increased curriculum time on community-based teaching was appreciated in terms of clinical skills practice, and understanding the role of primary care. Impact Assessment: - Reformed course achieved significantly better understanding on the relationship between primary, social care and hospital care.	Questionnaires and Interviews – Student Feedback
20.	Liverpool (University of)	Watmough et al. (2012)	Year 1-4: Community-based teaching Year 5: Community placement	Impact Assessment	Impact Assessment: - Graduates from reformed curriculum had more confidence in clinical skills & communication skills, but felt less well prepared with their medical knowledge.	Questionnaires – Student Feedback
21.	Manchester (University of)	Jones et al. (2002)	Year 3-4: GP teaching in core modules Year 5: Community placement	Impact Assessment	Overall positive impact on students' perception of preparedness in competencies and skills for entering professional practice. This includes a significantly improved understanding of the role of primary care. Students also had no disadvantage to graduates of traditional programme in terms of basic science and clinical knowledge.	Questionnaires – Student and Supervisor Feedback
22.	Newcastle University Medical School	Stacy and Spencer (1999)	Year 2: Patient study projects	Impact Assessment	Patients have a positive perception of their role in community-based teaching. They also feel that they benefited from participation.	Interviews
23.	Royal Free and University College Medical Schools	Walters et al. (2003)	Year 4: Community education integrated in the psychiatry attachment	Impact Assessment	Impact of participation in teaching on patients: - Mainly positive experience (more balanced doctor-patient relationship, and some had therapeutic benefit) - However a few patients found the teaching encounter distressing	Questionnaire – Patient Survey Interviews - Patients, Students and GP tutor Feedback
24.	Royal Free and University College Medical Schools	Jones et al. (2005)	Intercalated BSc in Primary Health Care	Impact Assessment	Students saw benefit in: - development of critical approach and skills relevant to medicine - adding depth to views on GP and primary care	Interviews – Student Feedback
25.	Sheffield (University of)	Howe and Ives (2001)	Year 4:GP placement	Impact Assessment	Increased exposure to primary and community care alters career intention, and enhances the view of the role of primary care.	Questionnaires – Student Feedback
26.	Sheffield (University of)	Howe (2001)	Year 4: GP placement	Needs Assessment	Students value community-based learning which have the qualities of: - person-centred clinical methods and learning contexts - positive attitude and committed GP tutors and primary care teams	Questionnaire – Student feedback
27.	University College London	Coleman and Murray (2002)	GP placement	Impact Assessment	Patients mainly felt positive about participating in community-based teaching. However there were also negative	Interviews – Students and GP tutor Feedback

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

					aspects that may concern patients. There may also be shifts in the doctor-patient relationship.	
28.	University College London	Murray et al. (2001)	GP placement as part of the internal medicine clerkship	Implementation Assessment	-Time spent on teaching and learning activities were similar in both settings - Supervised interaction with patients (which was experienced mainly with the GP) is perceived by students as the most educationally valuable and enjoyable activity - Patient-based learning was highly valued	Student Log Diary
29.	University College London	O'Sullivan et al. (2000)	Year 3: Community Medicine placement	Implementation Assessment Impact Assessment	Implementation Assessment - basic clinical skills could be learnt in both settings, but GP was better for learning of communication skills & psychosocial issues - GP teaching was advantageous in terms of: quality of teaching, tutors' teaching attitude, teaching methods, course organisation. Impact Assessment revealed that: - GP enabled students to increase in confidence and competence	Interviews – Student Feedback Focus Groups – Student Feedback

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

~~Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes.~~

The current provision of community-based teaching in UK medical schools: an online survey and systematic review

Sandra WW Lee[1], Naomi Clement (BMedSci)[1], Natalie Tang (BMedSci)[1], William Atiomo (DM FRCOG)[2]

[1] School of Medicine, University of Nottingham, Queen's Medical Centre, NG7 2UH, United Kingdom.

[2] Clinical Sub-Dean, School of Medicine, University of Nottingham, NG7 2UH United Kingdom.

The lead author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained

Correspondence to:

Naomi Clement

Email: msxnc@nottingham.ac.uk
Telephone: 0115 978 5800
Fax: 0115 8230759

For extra data please contact the above

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, a worldwide licence to the Publishers and its licensees in perpetuity, in all forms, formats and media (whether known now or created in the future), to i) publish, reproduce, distribute, display and store the Contribution, ii) translate the Contribution into other languages, create adaptations, reprints, include within collections and create summaries, extracts and/or, abstracts of the Contribution, iii) create any other derivative work(s) based on the Contribution, iv) to exploit all subsidiary rights in the Contribution, v) the inclusion of electronic links from the Contribution to third party material where-ever it may be located; and, vi) licence any third party to do any or all of the above.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

~~Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes.~~ The current provision of community-based teaching in UK medical schools: an online survey and systematic review

Authors: Sandra WW Lee, Naomi Clement (BMedSci), Natalie Tang (BMedSci), William Atiomo (DM FRCOG)

Abstract:

Objective

To evaluate the current provision and outcome of ~~community based~~community-based education (CBE) in UK medical schools.

Design & Data Sources

An online survey of UK medical school websites and course prospectuses and a systematic review of articles from PubMed and Web of Science were conducted. Articles in the systematic review were assessed using Rossi, Lipsey and Freeman's approach to programme evaluation.

Study Selection

Publications from November 1998 to 2013 containing information related to community teaching in undergraduate medical courses were included.

Results

Out of the 32 undergraduate UK medical schools, one was excluded due to the lack of course specifications available online. Analysis of the remaining 31 medical schools showed that a variety of CBE models are utilised in medical schools across the UK. 28 medical schools (90.3%) provide CBE in some form by the end of the first year of undergraduate training, and 29 medical schools (93.5%) by the end of the second year.

From the 1378 references identified, 29 papers met the inclusion criteria for assessment. It was found that CBE mostly provided advantages to students as well as other participants, including GP tutors and patients. However, there were a few concerns regarding the lack of GP tutor~~'~~s' knowledge in specialty areas, the negative impact that CBE may have on the delivery of health service in education settings and the cost of CBE.

Conclusions

Despite the wide variations in implementation, community teaching was found to be mostly beneficial. To ensure the relevance of CBE for "Tomorrow's Doctors", a national framework should be established, and solutions sought to reduce the impact of the challenges within CBE.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Strengths and Limitations of this Study

- This is the first study to review how community-based education is currently provided throughout Medical Schools in the UK. The use of Rossi, Lipsey and Freeman's method of programme evaluation means that the literature was analysed in a consistent and comprehensive way. However, a weakness is that data from the online survey was obtained from online medical school prospectuses. This means the data may be incomplete or out of date. Data in the literature review may also be skewed by publication bias. ~~This is the first study to review how community based~~community based ~~education is currently provided throughout Medical Schools in the UK~~
- ~~However, a weakness is that this information was obtained online from medical schools online prospectuses. This means the data may be incomplete or out of date~~
- ~~The use of Rossi, Lipsey and Freeman's method of programme evaluation means that the literature was analysed in a consistent and comprehensive way~~

Formatted: Font: 10 pt, Not Italic, Font color: Auto

Formatted: Line spacing: single

Formatted: Font color: Auto

Formatted: Left, Line spacing: single

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

~~Community based teaching in UK medical schools: Current provision and a systematic review of studies evaluating their outcomes~~

The current provision of community-based teaching in UK medical schools: an online survey and systematic review

Formatted: Space After: 0 pt, Line spacing: single

Introduction

The context of healthcare in the UK is changing, with an increasingly aging population and a growing focus on the prevention and management of disease.[1] This has prompted the need to ensure that medical graduates are adequately prepared to address these evolving health care needs, rather than maintaining a reactive approach to illness in the UK. These needs include the prevention and management of chronic health conditions such as diabetes, heart disease, cancer and other long-term illnesses. The promotion of health as well as the delivery of care of conditions like these often occurs within the community, outside the context of University teaching hospitals - provided by professionals from several ~~disciples~~disciplines, including a significant input from social services. In the recently published UK government's white paper, *Equity and Excellence: Liberating the NHS*,[2] a need for a healthcare system focused on personalised care reflecting individuals' health and care needs was outlined. This would involve supporting carers and encouraging multidisciplinary care. These social demographic and political drivers require strong input from multi-professional healthcare providers in primary care and the recruitment of more General Practitioners (GPs) in order to fulfil the growing need for community-based care.

This concept also resonates globally and is considered important by health regulatory bodies that licence medical schools. In 1987, the World Health Organisation (WHO) recommended the reform of health professional curricula by incorporating methods to prepare students for providing care at

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

all levels of health care settings,[3] which can be achieved by, among other things, aligning education with community needs. The UK General Medical Council's (GMC's) document "*Tomorrow's Doctors*" recommend that clinical placements should reflect the changing patterns of healthcare and that they must provide experience in a variety of environments including hospitals, general practices and community medical services.[4]

Curricula in the UK medical schools, therefore, currently offer ~~community based~~community-based education (CBE) in various forms and models of teaching.[5] CBE is defined as a medical education programme that may employ any variety of teaching methods to promote an understanding of health concerns at a community level. The programme is set within the community, and involves individuals within the community.

Previous publications have evaluated these models of medical teaching in the community, including ~~an~~ analyse~~i~~s of their advantages and drawbacks. [6-28] However, a thorough literature search (as conducted in November 2013) found no existing systematic reviews on community-based teaching across all existing UK medical schools. It remains unclear what the extent of ~~community based~~community-based teaching in UK medical schools is, the impact this had made to the standards of healthcare, and how the effectiveness of community-based teaching programmes has been measured. Knowledge of this is considered important, as it would guide the structuring of undergraduate medical curricula to adapt to changing contexts in the UK, hence effectively developing a future generation of doctors who are appropriately prepared for upcoming health care needs. The aim of this study, therefore, was to conduct an online survey of the current provision of ~~community based~~community-based teaching within UK undergraduate medical schools to appreciate the extent of implementation. ~~A systematic review was also conducted to evaluate the outcomes of community based teaching in UK medical curricula.~~ A systemic review was also conducted to comprehensively evaluate community-based teaching in UK medical curricula on the domains of programme needs, implementation, impact, and cost.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Methods

Online Survey

An online survey of the current provision of community-based teaching in UK mMedical cCurricula was completed by NC through accessing official online material of medical schools between 31st November 2013 and 8th December 2013. An up-to-date list of all the registered medical schools was obtained from the Medical Schools Council (MSC) website on 31st November 2013.[29] All graduate-entry courses were excluded. This was due to the wide variations of graduate-entry course structure, as well as the lack of literature on post-graduate ~~community based~~community-based medical education. This was a prerequisite in order for the results of both the online survey and systematic review to be evaluated in parallel.

Online material of the undergraduate medical curriculum was sourced using the Google search engine, and included content from university websites or online course prospectuses for the 2014 intake. The information search was specific to descriptions of both mandatory and elective components of the curriculum relating to "primary care", "general practice", or "community medicine".

Systematic Review: Data Sources

A systematic literature review was conducted using the electronic databases PubMed and Web of Science to source for papers published on undergraduate community-based medical education. With the understanding that community-based education has evolved over the years, only publications published within the last 15 years, from November 1998 to 2013, were included in this study. ~~from 1998 to November 2013.~~ The search criteria was ("community-based", "community-oriented",

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

"community involvement", or "primary health care") and ("medical curriculum", "medical students", "undergraduate medical education" or "undergraduate medical school").

Systematic Review: Selection criteria & Data Extraction

The relevance of the articles was screened by the title and abstract, based on the inclusion and exclusion criteria. Articles were selected if they described undergraduate medical education within the UK. Papers that included healthcare professionals apart from medical students were excluded. Any articles that were duplicated, not available in full text, or not published in English were also regarded as unsuitable for the review. In total, 29 peer-reviewed articles were identified as relevant, and were selected for further qualitative content analysis by SL and NT (see figure 1). Data on the following were extracted from each article: (1) Format of CBE; (2) Type of evaluation used to assess the programme; (3) Findings of this evaluation; and (4) Method of data collection. Rossi, Lipsey and Freeman's (2004) approach to programme evaluation was adopted to systematically categorise the evaluation findings on CBE (see Table 1). ~~based on impact of CBE on students, patients and other participants as well as cost and implementation of CBE.~~ The domains applicable to this study were the needs assessment, implementation assessment, impact assessment, and cost assessment. The impact assessment was further sub-categorised into the impact on students (target population of CBE), and the impact on others involved in CBE programmes.

Abstraction of data was performed independently by reviewers SL and NT. Themes were also independently drawn from data analysis of the impact assessments on students. Disagreements between the two reviewers were resolved by arriving at a consensus.

Results

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Current provision of ~~community based~~community-based teaching in UK medical schools~~.~~

We were able to obtain information from the medical school websites about the provision of ~~community based~~community-based teaching in all 32 undergraduate medical schools, and this is outlined in Table 2 and summarised in Table 3.

All undergraduate medical schools provided some form of community-based teaching or placement. There was, however, variation in the structure, duration and time in the course when community teaching was delivered (see Table 2 and Table 3). ~~Community based education~~CBE mainly took the form of clinical placements, patient studies, and optional modules. The duration of ~~community based~~community-based teaching or placements varied from half day visits to various community settings (as undertaken in schools such as Hull York, Newcastle, Nottingham and St George's) to a year-long module on primary care and population medicine (as undertaken in Brighton & Sussex).

Analysis of the varying formats of CBE (with the exclusion of Norwich, due to the lack of year-by-year curriculum details) revealed that most medical schools (a total of 31)~~(a total of 31)~~ provide~~d~~ early exposure to general practice or community teaching. 28 medical schools (90.3%) provide community teaching from the first year of undergraduate medical education. By the end of the second year of pre-clinical education, students of 29 medical schools (93.5%) would have received some form of community-based ~~education~~teaching.

The most popular form of ~~community based~~community-based teaching within medical schools was GP placements with 83.9% (26 schools from a total of 31) providing GP placements within the first two years of study. Patient studies were the least common form of placements. These were defined as projects where students visited patients within the community or at home. Only 38.7% (12 schools) ~~of~~ provided this format of community education at some point in their courses.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Fourteen (45.2%) medical schools provided regular exposure to community teaching in every year or phase of the course.

With regards to ~~When it comes to~~ optional modules ~~being~~ offered to students, ~~however,~~ only three~~3~~ of the medical schools offered them – 9.7%. This implies that, if students are particularly interested in community care, they may find it difficult to achieve extra studies in this area.

~~Fourteen (45.2%) medical schools provided regular exposure to community teaching in every year or phase of the course.~~

Literature review of studies evaluating ~~outcomes of community based~~community-based teaching

A summary of the studies evaluated in the systematic literature review are outlined in Table 4. The main methods of evaluation employed in the studies were questionnaires, interviews, and focus groups of the key stakeholders in CBE - students, patients, tutors and other staff in the community setting.

Needs Assessment of CBE

Studies of student expectations of CBE highlighted that students valued experiential patient-centred learning and tutor supervision in the community setting. [14, 30] In a Sheffield study, [14] students also recognised that CBE was a powerful vehicle for changing their approach to medicine and illness, where the patient as a person is given emphasis over the disease.

Implementation Assessment of CBE

All forms of community-based teaching were generally well-received by medical students, patients, and participating health care professionals, supporting the continuation of existing community-

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

based teaching programmes in the future. This included community-based teaching which was incorporated into specialty modules such as~~:~~ Obstetrics and Gynaecology[31], Psychiatry[22] and Surgery[27]. The unique approach of incorporating primary healthcare in an intercalated Bachelor of Science medical research year also received positive feedback[23].

Three studies found that student~~'~~s preferred the implementation of practice-based teaching over hospital-based teaching. Hastings *et al*. found that students in Leicester preferred practice-based teaching on the grounds of both teaching method and content.[11] O'Sullivan *et al*. had similar findings among students from University College London, where practice-based teaching bore qualities of better teaching attitudes, teaching methods, and course organisation.[12] Interestingly, these findings were consistent with Powell and Easton's investigation on Imperial College students undertaking their surgery module.[27] These students preferred surgical teaching within general practices due to the~~re being~~ learner-centred approach in teaching, more protected teaching time, and regular access to suitable patients for acquiring clinical skills.

The success of community teaching in Leicester was analysed by Hastings *et al*.[11] It was found that the improved quality of teaching by GP tutors was attributed to a higher proportion of GP tutors attending teacher-training courses. General practices were also found to have greater resource availability and NHS funding specifically allocated to support the teaching of ~~in support of teaching~~ medical undergraduates. All these factors placed hospital doctors at a disadvantage in preparing good-quality clinical teaching sessions in comparison to General Practitioners.

Impact Assessment of CBE

Studies of CBE impact on students bore the following themes: (1) Learning Outcomes, (2) Behavioural Changes to Primary Care, and (3) Traits of Future Doctors. These are summarised in Figure 2.

CBE also had an impact on participating doctors, staff, patients and medical schools. A summary of this is shown in Figure 3.

Formatted: Font: 11 pt, Not Italic, Font color: Black

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Impact on Students: Learning Outcomes

~~The impact of CBE on student's in summarised in Figure 2.~~

Implementation of CBE in medical schools had a significant positive impact on medical students' learning outcomes. The following results provide evidence ~~to~~ of the strong educational value among students: ~~11~~ Eleven studies showed that medical student~~'~~s gained insight into patient-centred~~centered~~ medicine and continuity of care, which were learning outcomes that students viewed as important in their education. [10, 13, 17, 19-21, 23, 25-26, 28, 32] This was measured quantitatively through questionnaires that were administered to students, supplemented by quantitative feedback gathered from focus groups and interviews.

Students'~~An~~ appreciation and understanding of the role of primary care was ~~a theme that was common to~~found in four studies.[20-21, 28, 32] This was revealed through questionnaires, where students rated the extent of their understanding of primary care and its relationship with other levels of care. Two studies reported the benefit of community placements in broadening the student's awareness of teamwork in multi-disciplinary teams. [19, 30] Another study reported the positive finding of successfully exposing students to a broad and varied range of clinical problems in a community setting. [33]

In comparison to hospital-based teaching, improved confidence in clinical skills and competencies was found to be a favourable outcome of CBE in four studies. [10, 12, 19, 20] This finding was derived from questionnaires and focus group interviews from students who had experienced CBE.

Two studies found no difference in academic performance between students under CBE and 'traditional' hospital-based teaching.[17, 20] One study of students who undertook a specialty placement in Obstetrics and Gynaecology also found that there was no difference in clinical performance as rated by their tutors, and no statistically significant difference in student final clerkship grades. [34]

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Although most evaluations produced consistent evidence on the benefits of community teaching, two studies highlighted the lack of in-depth knowledge of specialist teaching when conducted by GP tutors: the significance of this finding was measured qualitatively through student interviews,[27] and quantitatively through academic scores for the respective specialty modules.[34]

Impact on Students: Behavioural Changes to Primary Care

Two studies found that the implementation of CBE resulted in a reversal of negative attitudes towards primary care, and an increase of interest in General Practice as a career option among students.[23, 32]

Impact on Students: Traits of Future Doctors

Studies also showed that medical graduates from curricula with increased emphasis on community-based teaching were at no disadvantage to graduates from the traditional hospital-based teaching.[17, 33] Academically, graduates from a community-based curriculum performed as well as their counterparts on their final formative assessments. Moreover, graduates from curricula where community-based teaching had been offered had the advantage of increased confidence in communication skills and clinical skill competencies. This outcome of CBE was evaluated in three studies.[17, 20, 28] Two of these three studies additionally reported that graduates felt less confident in their medical knowledge on disease processes.[20, 28] However, there was no evident difference found in comparison to graduates of 'traditional' programmes of old medical curricula which had no CBE component when measured by academic results and feedback from educational supervisors.[20,28]

Impact on Others Involved in CBE Programmes

~~Other than student outcomes, CBE also had an impact on participating doctors, staff, patients and medical schools. This is summarised in Figure 3.~~

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

In three studies, it was found that GP tutors and participating staff had both role satisfaction and development of professional and personal ethics [7, 13, 24] Grant and Robling also found strengthened team ethics between members of the primary health care team.[24]

Doctors and staff, however, were found to have organisational issues in juggling community - teaching with practice commitments. The expense of one over the other was described in CBE implemented by the University of Birmingham.[7] The unfavourable outcome of blurred boundaries in the doctor-patient relationship was also reported as a concern in two studies. [18, 22]

Five studies evaluated the positive patient outcomes of CBE: Four of these studies reported the beneficial sense of empowerment that patients gained from participating in community teaching. [9, 21-22, 24] The remaining study reported that patients developed feelings of altruism from helping medical students in their education. [18]

Apart from gaining a sense of empowerment, Walters *et al.* also reported the development of a more balanced doctor-patient relationship, and a therapeutic benefit for the patients as a result of talking to students about their medical condition.[22]

Among these five studies on patient outcomes, two studies included further evaluations on the negative impact that resulted from patient participation. The negative outcomes comprised, ~~of~~ reinforced feelings of ill-health which may be distressing or anxiety-provoking, and concerns of breaeching patient confidentiality. [18, 22]

Powel *et al.*'s evaluation also shed light on the benefits that medical schools gained from tapping into teaching within the community. By doing so, medical schools were able to increase the availability of learning opportunities to medical students.[27]

Two studies raised the possibility of the negative impact that CBE would have on hospital tutors.[7, 13] The concern raised in these studies was with regards to a shift of focus away from teaching

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

conducted by hospital-based tutors, and towards an emphasis on ~~community-based education~~ teaching in the community.

Cost Assessment of CBE

Only one study evaluated the costs of running a community-based course. An evaluation of ~~a~~ CBE in Cambridge revealed that the programme was cost-feasible as~~since~~ the total expenditure on one student-year of community-based teaching was within the cost estimates of Service Increment for Teaching (SIFT) funding. [17] The study also noted that the balance between placement costs and facilities costs stood at a ratio of approximately 2:1, which is a reverse of the traditionally allocated 1:4 ratio in SIFT funds. This finding implied that the traditional allocations for SIFT funds would be inappropriate when applied to community-based teaching.

Discussion

This study was conducted to analyse the current provision of community-based education across undergraduate medical schools in the UK. All medical schools were found to offer some ~~community based~~community-based teaching in their curricula, which falls in line with the recommendations of the WHO and the GMC ~~as well as following~~which also follows the social demographic and political changes within the UK. Furthermore, a significant proportion of medical schools offered community-based teaching early in the medical course. The benefits of this early exposure is explored by Dornan *et al.*, where the opportunity to learn in context of clinical settings enabled students to develop an awareness of their interpersonal skills, attitudes and abilities.[35,36]

Formatted: Font: Italic

Formatted: Superscript

In general, community-based teaching was well-received by medical students due to its good educational value on many levels of learning outcomes. It also gave students insight into the option of General Practice as a future career. This is consistent with the direction of travel the UK healthcare workforce needs to address due to the changing demographics and the emphasis

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

changing in health care delivery from management to prevention. Not only was community-based teaching of value to students, but it was also found to produce medical graduates of equal clinical skills and competencies to their counterparts who were taught under the 'traditional' hospital-based medical programme.[17,33] This outcome is consistent with findings in Australian medical schools which showed that students generally did as well as or, in some areas of clinical competencies, even better than their counterparts who received hospital-based teaching [7]. Community-based teaching in medicine was also beneficial to medical schools in maximising the sources of available learning opportunities for medical students. [27] Moreover, community-based teaching in medicine was found to offer a unique opportunity to foster inter-professional learning – an outcome that is consistent with the political drivers for better patient care.[~~35~~37]

Although it was evident that community-based teaching has a vast array of benefits, several drawbacks were identified and underscored as challenges to the implementation of CBE. Studies reflected the challenges of general practice tutors lacking adequate knowledge in specialty areas, [27] and community teaching having a negative impact on the delivery of health service in some general practices.[7] Murray and Modell discuss possible solutions to these issues, such as the development of university-linked practices that would scrutinise the effectiveness of teaching.[38] It is imperative that these solutions are explored and tested in current CBE programmes so that the impact of programme drawbacks may be reduced. This would be the way-forward to strengthening the implementation of CBE in medical curricula.

An assortment of models were seen to be used for community-based teaching in the UK, where programmes varied in their methods of delivery, durations of exposure and points of undergraduate education at which the teaching was delivered. This is congruous with guidance from the GMC publication "Tomorrow's Doctors", which states that it was for each medical school to design its own curriculum to suit its own circumstance. It should be noted that community-based education ~~can encompass a broad term with~~ broadly encompasses varied~~variation in~~ delivery formats, including

Formatted: Font: +Body (Calibri)

Formatted: Font: +Body (Calibri)

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

both clinical and non-clinical experiences. Unfortunately, the diversification of CBE poses a challenge for developing a standardised set of criteria for evaluating the outcomes of CBE. Consequently, it becomes difficult to establish a national framework for quality assurance of medical curricula, and to make recommendations for improving the implementation of CBE.

In order to achieve the expectations laid out for "Tomorrow's Doctors",[4] there is a principal need to define the competencies that are required to prevent illness and promote health in the primary care or ~~community based~~community-based setting. Ladhani *et al.*, for example, categorised six themes of community-based education competencies within nursing and medicine: p~~P~~ublic health; c~~C~~ultural diversity; l~~L~~eadership and management; c~~C~~ommunity development and advocacy; r~~R~~esearch and evidence-based practice; and g~~G~~eneric competencies.[36~~38~~] Subsequently, a national framework may be derived from these key competencies so as to measure the effectiveness of community-based teaching in achieving these targeted goals.

The development of a national framework was explored and suggested by Cotton *et al.*,[37~~39~~] where a list of criteria for quality practice-based teaching in the UK was consensually derived from views of medical educators and students at a national conference. However, since its development, there has been no literature found on the use of these criteria to objectively evaluate community-based education at a local, regional or national level. More work in this area should be encouraged to achieve a national standard for community-based education in the UK.

Little data was found on the cost implications of community-based teaching. Given the wide variations in the format of CBE programmes conducted across the UK, it is difficult to make general conclusions about the cost impact of community-based teaching. Nonetheless the findings from Oswald *et al.*'s study sets a benchmark for other similar community teaching within the UK.[17] Oswald *et al*. found that the absolute costs per student session of community teaching was within the budgets of SIFT funding. The cost-feasibility implied in this study is consistent with Murray *et al.*'s 1993 study of the University College London teaching programme,[38~~40~~] where community teaching cost £60 per student session, comparing well with the SIFT provision of £64 per student session.

Formatted: Font: +Body (Calibri)

Formatted: Font: +Body (Calibri)

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

However, Oswald *et al*. discusses that the national formula for SIFT funds is inappropriate for community teaching due to a mismatch in the 2:1 ratio of placement costs and facilities costs in community teaching, versus the traditionally allotted 1:4 SIFT ratio between placement costs and facilities costs. SIFT funding to medical education institutions is traditionally divided to cater for the costs of clinical placements (about 20%) and the costs of facilities (80%). The 1995 Winyard Report specified that the use of SIFT funding would support teaching conducted in settings other than the main university hospital, such as in general practices and community settings.[3941] This report unfortunately failed to realise the inappropriateness of applying the 1:4 formula (for facilities and placement costs) in the context of primary care. The allocation of 80% SIFT funding to facilities would be disadvantageous to community-based teaching since this money will be retained for usage within the hospital setting. It is important that the provision of SIFT funding is reconsidered so that it suits a growing emphasis of community-based education in the medical curriculum and therefore help develop these settings as centres of education.

The strengths of our study are that it provides the most up-to-date picture of the UK landscape of ~~community based~~community-based teaching in medical schools and the fact that the literature review was conducted in a systematic way. The use of Rossi, Lipsey and Freeman's widely accepted approach to programme evaluation also ensured that programme evaluations in the literature were analysed comprehensively.

~~The weaknesses of the literature review include that of publication bias. As the majority of the papers included in the review were written from supporters of CBE and there are very few publications on the disadvantages of CBE, perhaps skewing our data.~~ The weaknesses ~~are that~~of the online survey are that it relied on data provided on the websites of medical schools which can occasionally be out of date and ~~not~~ incomplete. The online survey also had the disadvantage of inconsistency in the extent of details provided online. For example, the online sources may not have mentioned details on clinical placements which are primarily hospital-based, but also provide supplementary clinical teaching within the community setting, (e.g. shadowing of a community

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

midwife in an Obstetrics & Gynaecology placement). To address these weaknesses, the method of information collection may be improved by contacting course administrators to obtain detailed and focused information on any community-based teaching that is offered to students in all the course modules. The weaknesses of the literature review include that of publication bias. The majority of the papers included in the review were written in support of CBE, and there are very few publications which focused on the disadvantages of CBE. This imbalance may have skewed our data in favour of CBE.

Conclusion

In this study, all undergraduate medical schools in the UK were found ~~seen~~ to ~~be~~ offer~~ing~~ some form of community-based teaching in their medical curriculum. The delivery of CBE varied broadly, but all forms of community teaching were generally found to be beneficial and was therefore well-received by students, patients, participating staff, and medical schools. The challenges and cost issues of community teaching should also not be overlooked, and solutions to address these need to be explored such that the delivery of CBE may be improved.

Under the pressures of social demographics and political drivers to incorporate more community-based teaching in medical education, there is a need to ensure that CBE is delivered at acceptable quality standards for it to achieve its anticipated benefits. A national framework would need to be established to ensure these standards are met. This would then succeed to act as a standardised national guideline for evaluating the effectiveness of CBE programmes in developing professional competencies that are expected of "Tomorrow's Doctors".

Competing Interests

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Authors' Contributions

WA came up with the concept of the study, NC performed the Medical School online survey and SL and NT the Literature Review. SL, NC and NT wrote the draft of the manuscript and editing was performed by SL, NC, NT and WA.

References

[1]*Our Priorities for 2013/14* [Internet]. London: Public Health England; [Updated 26 April 2013, Accessed January 2014]. Available from: https://www.gov.uk/government/publications/public-health-englands-priorities-for-2013-to-2014

[2] *Equity and Excellence: Liberating the NHS* [Internet]. London: Department of Health; [Updated July 2010, Accessed January 2014]. Available from: https://www.gov.uk/government/publications/liberating-the-nhs-white-paper

[3] ~~*Community Based*~~*Community-based Education of Health Personnel: Report of a WHO Study Group* [Internet]. Geneva: World Health Organisation; [Updated November 1987. Accessed January 2014]. Available from: http://apps.who.int/iris/handle/10665/41714

[4]*Tomorrow's Doctors* [Internet]. London: General Medical Council; [Updated 2009, Accessed January 2014]. Available from: http://www.gmc-uk.org/education/undergraduate/tomorrows_doctors_2009.asp

[5] Major SC, Booton P. Involvement of general practice (family medicine) in undergraduate medical education in the United Kingdom. *J Ambul Care Manage* 2008 September;31(3):269-75.

[6] Davison H, Capewell S, Macnaughton J, Murray S, Hanlon P, McEwen J. Community-oriented medical education in Glasgow: developing a community diagnosis exercise. *Med Educ* 1999 January;33(2):55-62.

[7] Parle J, Greenfield S, Thomas C, Ross N, Lester H, Skelton J, *et al*. Community-based clinical education at the University of Birmingham Medical School. *Acad Med* 1999 March;74(3):248-53.

[8] Seabrook MA, Lempp H, Woodfield SJ. Extending community involvement in the medical curriculum: lessons from a case study. *Med Educ* 1999 November;33(11):838-45.

For peer review only

[9] Stacy R, Spencer J. Patients as teachers: a qualitative study of patients' views on their role in a community-based undergraduate project. *Med Educ* 1999 September; 33(9):688-94.

[10] Thistlethwaite JE, Jordan JJ. Patient-centred consultations: a comparison of student experience and understanding in two clinical environments. *Med Educ* 1999 September;33(9):678-85.

[11] Hastings AM, Fraser RC, McKinley RK. Student perceptions of a new integrated course in clinical methods for medical undergraduates. *Med Educ* 2000 February;34(2):101-7.

[12] O'Sullivan M, Martin J, Murray E. Students' perceptions of the relative advantages and disadvantages of community-based and hospital-based teaching: a qualitative study. *Med Educ* 2000 August;34(8):648-55.

[13] Thistlethwaite JE. Introducing community-based teaching of third year medical students: outcomes of a pilot project one year later and implications for managing change. *Educ Health* 2000;13(1):53-62.

[14] Howe A. Patient-centred medicine through student-centred teaching: a student perspective on the key impacts of community-based learning in undergraduate medical education. *Med Educ* 2001 July;35(7):666-72.

[15] Howe A, Ives G. Does community-based experience alter career preference? New evidence from a prospective longitudinal cohort study of undergraduate medical students. *Med Educ* 2001 April;35(4):391-7.

[16] Murray E, Alderman P, Coppola W, Grol R, Bouhuijs P, van der Vleuten C. What do students actually do on an internal medicine clerkship? A log diary study. *Med Educ* 2001 December;35(12):1101-7.

[17] Oswald N, Alderson T, Jones S. Evaluating primary care as a base for medical education: the report of the Cambridge Community-based Clinical Course. *Med Educ* 2001 August;35(8):782-8.

[18] Coleman K, Murray E. Patients' views and feelings on the community-based teaching of undergraduate medical students: a qualitative study. *Fam Pract* 2002 April;19(2):183-8.

[19] Gavin J, Lempp H, Elliman A, Grogan C. Teaching in partnership: linking a medical school and a community trust. *Br J Community Nurs* 2002 January;7(1):32-6.

For peer review only

[20] Jones A, McArdle PJ, O'Neill PA. Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Med Educ* 2002 January;36(1):16-25.

[21] Anderson ES, Lennox AI, Petersen SA. Learning from lives: a model for health and social care education in the wider community context. *Med Educ* 2003 January;37(1):59-68.

[22] Walters K, Buszewicz M, Russell J, Humphrey C. Teaching as therapy: cross sectional and qualitative evaluation of patients' experiences of undergraduate psychiatry teaching in the community. *BMJ* 2003 April;326(7392):740.

[23] Jones M, Singh S, Lloyd M. "It isn't just consultants that need a BSc": student experiences of an Intercalated BSc in primary health care. *Med Teach* 2005 March;27(2):164-8.

[24] Grant A, Robling M. Introducing undergraduate medical teaching into general practice: an action research study. *Med Teach* 2006 November;28(7):192-7.

[25] Muir F. Placing the patient at the core of teaching. *Medical Teacher* 2007 March;29(2-3):258-260.

[26] Mullen K, Nicolson M, Cotton P. Improving medical students' attitudes towards the chronic sick: a role for social science research. *BMC Med Educ* 2010 November;10:84.

[27] Powell S, Easton G. Student perceptions of GP teachers' role in community-based undergraduate surgical education: a qualitative study. *JRSM Short Rep* 2012 August;3(8):51.

[28] Watmough S. An evaluation of the impact of an increase in community-based medical undergraduate education in a UK medical school. *Educ Prim Care* 2012 November;23(6):385-90.

[29] UK medical schools A-Z [Internet]. London: Medical Schools Council; [Accessed November 2013]. Available from: http://www.medschools.ac.uk/Students/UKMedicalSchools/Pages/UK-Medical-Schools-A-Z.aspx

[30] Lennox A, Petersen S. Development and evaluation of a ~~community based~~community-based, multiagency course for medical students: descriptive survey. *BMJ* 1998 February;316:596-599.

[31] Nicholson S, Osonnaya C, Carter Yh, Savage W, Hennessy E, Collinson S. Designing a community-based fourth-year obstetrics and gynaecology module: an example of innovative curriculum development. *Med Educ* 2001 April;35(4):398-403.

[32] Sinclair HK, Ritchie LD, Lee AJ. A future career in general practice? A longitudinal study of medical students and pre-registration house officers. *Eur J Gen Pract* 2006 April;12(3):120-7.

For peer review only

[33] Alderson TS, Oswald NT. Clinical experience of medical students in primary care: use of an electronic log in monitoring experience and in guiding education in the Cambridge ~~Community Based~~Community-based Clinical Course. *Med Educ* 1999 June;33(6):429-33.

[34]Frattarelli LC, Kamemoto LE. Obstetrics and gynecology medical student outcomes: Longitudinal multispecialty clerkship versus traditional block rotations. *Am J Obstet Gynecol* 2004 November;191(5):1800–1804.

[35]Dornan T, Bundy C. What can experience add to early medical education? Consensus Survey, *British Medical Journal* 2004; 32:834-840.

[36]Dornan T, Littlewood S, Margolis SA, Scherpbier A, Spencer J, Ypinazar V. How can experience in clinical and community settings contribute to early medical education? A BEME systematic review. *Medical Teacher* 2006;28(1):3–18.

[~~35~~37]Hosny S, Kamel MH, El-Wazir Y, Gilbert J. Integrating interprofessional education in community-based learning activities: case study. *Med Teach* 2013;35:S68-73

[~~36~~38]Ladhani Z, Scherpbier AJ, Stevens FC. Competencies for undergraduate community-based education for the health professions--a systematic review. *Med Teach* 2012;34(9):733-43.

[~~37~~39]Cotton P, Sharp D, Howe A, Starkey C, Laue B, Hibble A, *et al*. Developing a set of quality criteria for community-based medical education in the UK. *Educ Prim Care*. 2009 May;20(3):143–51.

[~~38~~40]Murray E, Jinks V, Modell M. Community-based medical education: feasibility and cost. *Med Educ* 1995 January;29(1):66-71.

[~~39~~41]NHS Executive. SIFT into the Future. Leeds: NHS Executive, 1995 (The Winyard Report).

Formatted: Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font: +Body (Calibri), Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font: +Body (Calibri), No underline, Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font: +Body (Calibri), No underline, Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font: +Body (Calibri), No underline, Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font: +Body (Calibri), No underline, Font color: Auto

Formatted: Font: +Body (Calibri), 11 pt, Font color: Auto

Formatted: Font: +Body (Calibri), No underline, Font color: Auto

Formatted: Font: +Body (Calibri), Font color: Auto

Formatted: No underline, Font color: Auto

Formatted: Font color: Auto

Formatted: No underline, Font color: Auto

Formatted: Font color: Auto

Formatted: No underline, Font color: Auto

Legend of figures and tables.

Figure 1. Flow chart of search strategy used in systematic review

Figure 2. Key Points: Impact of CBE on Students

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

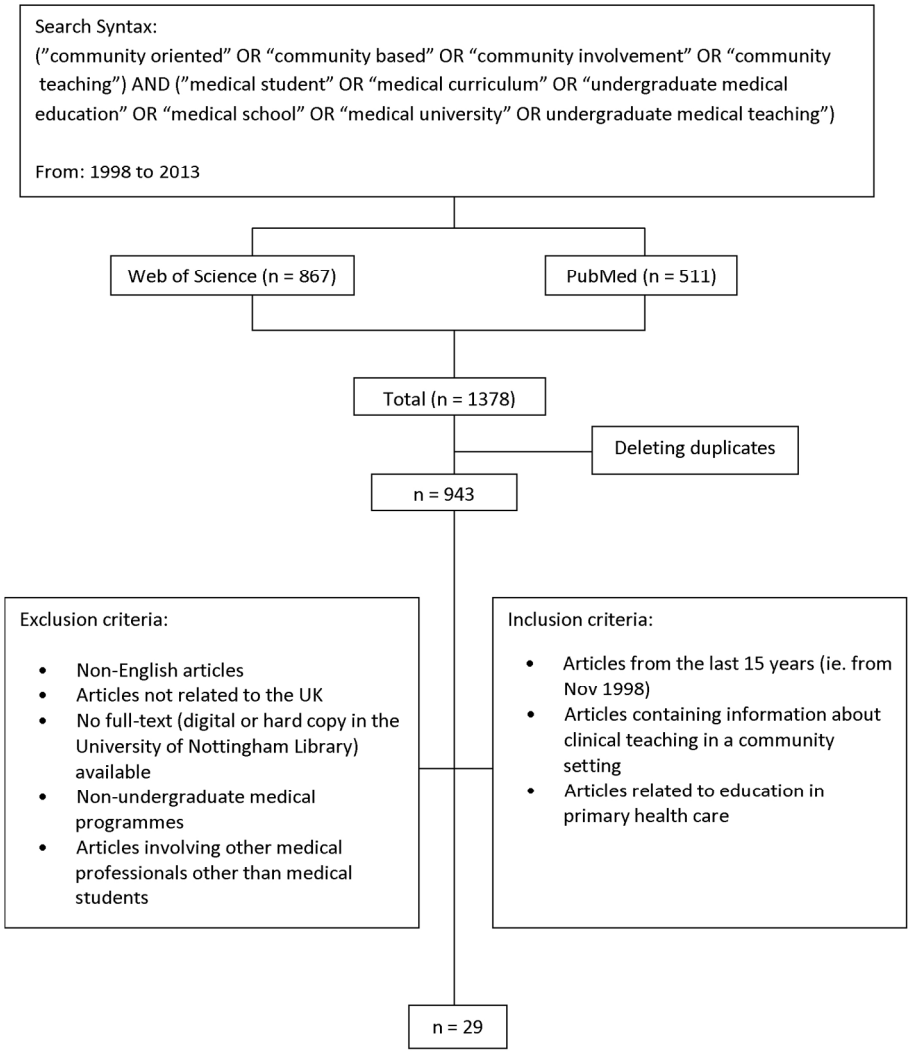

Figure 1 - Flow chart of search strategy used in systematic review
197x224mm (300 x 300 DPI)

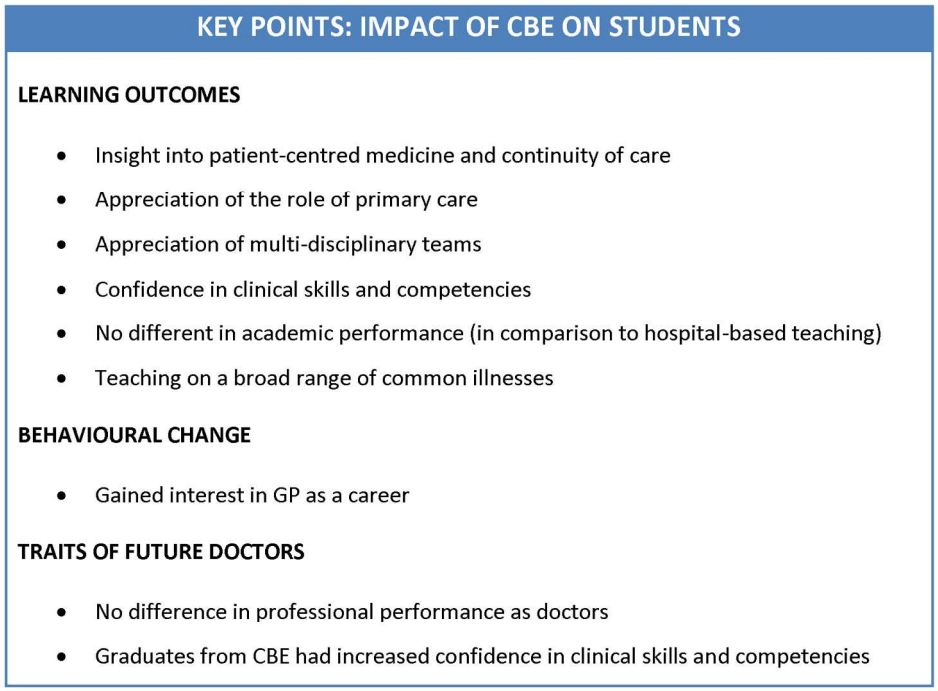

Figure 2 - Key Points: Impact of CBE on Students
163x122mm (300 x 300 DPI)

For peer review only

KEY POINTS: IMPACT OF CBE ON OTHER PARTICIPANTS IN CBE

IMPACT ON GP TUTORS

- Increased satisfaction; professional and personal development
- Teaching would be at the expense of practice commitments

IMPACT ON PATIENTS

- Sense of empowerment, a sense of balance in the doctor-patient relationship, and therapeutic benefit
- Some patients may react negatively to participation
- Concerns of breeching patient confidentiality

IMPACT ON MEDICAL SCHOOL

- Able to create more learning opportunities for students

IMPACT ON HOSPITAL TUTORS

- Decreased focus on hospital-based teaching

Figure 3 - Impact of CBE on Other Participants in CBE
181x130mm (300 x 300 DPI)

View only

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3~4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	5 Table 1
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	NA
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	NA

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	Table 1
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1 5
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	5
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	NA
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Figures 2~ 3
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	12
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	14
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	13
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	NA

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

BMJ Open

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml