

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository:<https://orca.cardiff.ac.uk/id/eprint/132384/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Bullock, Alison , Kavadella, Argyro, Cowpe, Jonathan, Barnes, Emma , Quinn, Barry and Murphy, Denis 2020. Tackling the challenge of the impact of continuing education: an evidence synthesis charting a global, cross-professional shift away from counting hours. *European Journal of Dental Education* 24 (3) , pp. 390-397. 10.1111/eje.12514

Publishers page: <https://doi.org/10.1111/eje.12514>

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See <http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



Tackling the challenge of the impact of continuing education: an evidence synthesis charting a global, cross-professional shift away from counting hours

Running title: Changing continuing education requirements

Alison Bullock, Cardiff University

Argyro Kavadella, Association for Dental Education in Europe and Athens University

Jonathan Cowpe, Cardiff University

Emma Barnes, Cardiff University

Barry Quinn, Kings College

Denis Murphy, Association for Dental Education in Europe

Abstract

Introduction

Health professionals worldwide are required to maintain their knowledge and skills through continuing education. However, there is limited evidence that the accumulation of hours of educational activity enhances practice. The aim of this study was to review evidence of the impact of continuing professional development (CPD), best educational practice, and new models of CPD requirements.

Methods

We conducted a rapid evidence synthesis, reviewing literature and websites on continuing education for healthcare and non-healthcare professionals.

Results

We extracted data from 184 publications. Evidence of changed practice and improved patient care is uncommon in studies of CPD. What evidence there is suggests that activities are more likely to have impact if a combination of methods is used and if they are aligned with learning needs. Impact is also affected by the learner and their work environment.

In terms of CPD requirements, we identified three models: input-based; outcomes-based and mixed models. We found a clear shift from quantitative, time-serving, input-models to outcomes-focused models which emphasise the identification of learning needs, selection of educational activity relevant to practice, and reflection on practice improvement. Across a range of professions, recently updated CPD regulations no longer require registrants to accumulate CPD hours/points/credits. In funding this study, the UK General Dental Council exemplifies its commitment to reviewing its CPD requirements.

Conclusion

Outcomes-based models support registrants' engagement in relevant, meaningful CPD which holds greater potential to positively impact on practice and strengthen patient safety.

Key words: continuing education, continuing professional development, CPD, literature review, rapid evidence synthesis, impact-on-practice

Acknowledgements and Disclosure Statement

This study was commissioned and funded by the General Dental Council (GDC). The views and opinions expressed in the paper are those of the author and do not necessarily reflect those of the GDC. The authors have no conflicts of interest.

Introduction

It is an ethical obligation for all health professionals to maintain their knowledge and competence. They achieve this through engaging in continuing professional development (CPD). In the UK, dental professionals must ensure their practice is up-to-date, relevant to their scope of practice and that the CPD is seen as contributing to improved quality of care (1). However, there is considerable variation in CPD requirements, across countries and healthcare and non-healthcare professions, some focused on inputs (for example CPD hours), others on outcomes (practice change); some have mandatory systems whilst others are voluntary (2-6). Although CPD is the chief mechanism to ensure that clinical and professional practice is appropriate, up-to-date and contributes to assuring safe patient care, achieving the intended outcomes of CPD, in terms of enhancing professional practice, is challenging. Hours-based CPD requirements have been commonplace for a long time. However, there is very limited evidence that such an input-based system improves practice. In an effort to enrich the outcomes from CPD, regulators internationally are exploring approaches focused on practitioner ownership and reflection rather than 'top-down' systems. The intention is to support professional self-motivation so that the practitioner takes greater responsibility for their own professional development, attending to their specific needs, rather than accumulating CPD points. Underlying this shift is an aspiration to maximise the impact of continuing education and thus, in dentistry, strengthen the quality of the oral healthcare provided to patients.

In the light of these developments, this paper reports on two research questions: what is best practice CPD in terms impact, and what use is there of CPD systems/models which focus on outcomes rather than inputs (hours)? We then identify implications for future CPD proposals for dental professionals.

Method

We conducted a rapid evidence synthesis, reviewing literature on CPD in relation to dentists and the dental team, other healthcare professionals and non-healthcare professionals, across the UK and internationally. Rapid evidence syntheses employ a similar structured and rigorous process as systematic reviews but are completed in a much shorter timeframe (around 3-6 months). In order to achieve this, they are less exhaustive in their search, sometimes searching fewer databases, with stricter inclusion criteria. They also employ more concise data extraction and less in-depth quality appraisal (7, 8). While rapid evidence syntheses raise more concerns regarding bias than systematic reviews, they can be completed more quickly and by a smaller research team to establish an overview of the evidence base on a selected topic (9). We searched an extensive range of electronic databases: OVID Medline; EMBASE; CINAHL; SCOPUS, and the Cochrane Database of Systematic Reviews. We included ERIC-after-1996 and the British Education Index to capture educational literature, and ISI Web of Knowledge, ASSIA-after-1987 and PsychInfo for social sciences and psychology. We searched HeinOnline and LexisLibrary for publications related to the legal profession. We identified additional papers from Google Scholar, the reference lists of retrieved articles and hand searching the *European Journal of Dental Education* and the *British Dental Journal*. Websites of a selection of healthcare (doctors, nurses, optometrists, pharmacists) and non-healthcare bodies (solicitors, engineers and the airline industry) were also scrutinised. In addition, an online survey was constructed and circulated widely to relevant 'Research Area Experts' in an effort to identify additional website links and publications. Contacts were made with a purposive sample of stakeholders affiliated to the UK Royal Colleges, Postgraduate Dental Deans through COPDEND, and Deans of UK and Ireland dental schools. The survey was also brought to the attention of respondents through presentations at international dental research conferences. The conferences included the International Association for Dental Research (IADR) 2018 conference in London where participants attending three research area group meetings and two workshops and symposia were made aware of the survey. Attendees at the ADEE 2018 conference, in Oslo were also alerted to the survey.

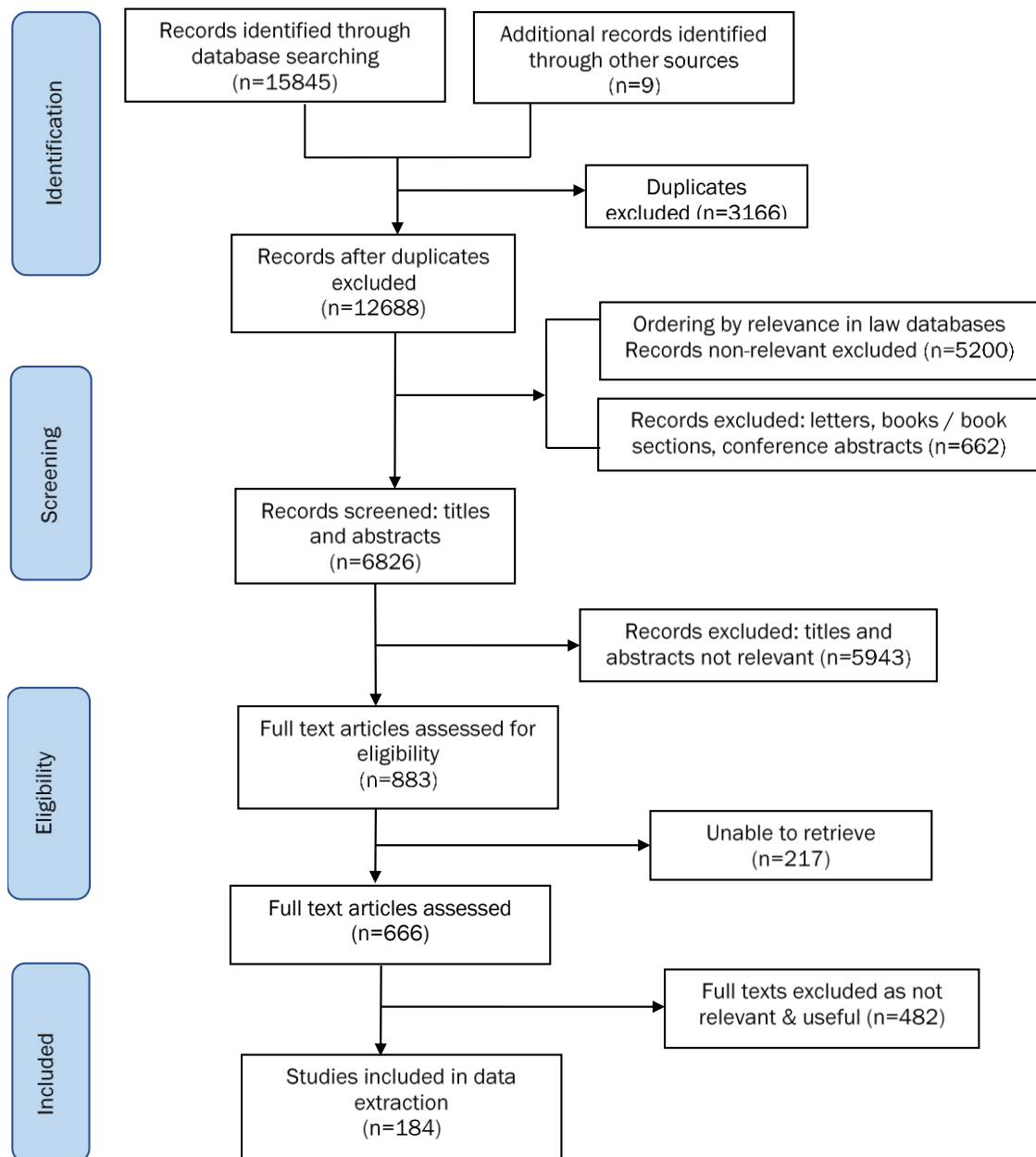


Figure 1: PRISMA flow diagram detailing the search results

We searched only for literature in English, published after 2005, defined by the key words. Our primary search terms related to CPD or continuing education or training or lifelong learning, and keywords related to professional groups. We excluded literature which: referred only to undergraduate education, vocational training or assessment; or reported small-scale interventions, usually within a hospital, addressing a specific scientific procedure. Our search process and results are given in Figure 1. In our data extraction process we focused on more recently published papers and excluded earlier papers which presented no new information. In addition to a grading of the quality of the study design (10), we recorded on our data extraction grid the author/title/date, country, professional group, research method and sample, CPD activity, results, conclusions and noted specific elements pertinent to the research questions. To quality assure the process, the data extraction template was initially piloted on 10 articles (by AK) and reviewed and modified by other the team members (AB and JC). Websites were also included in the review although the information was not graded for quality.

All work was undertaken in five months from June to October 2018.

Results

In total, we extracted data from 184 publications. We report a synthesis of findings related to evidence of CPD impact and best practice; and qualitative-based models for CPD.

Impact of CPD and best practice

Few studies evaluate how CPD leads to change in practice and impacts on patients or clients. Those that do evaluate impact include measures such as change in prescribing patterns or numbers of patients successfully treated after an educational intervention. For example, a multifaceted CPD programme for Canadian primary physicians (11), designed to address the disease management of HIV patients, reported a 76% increase in the number of HIV-positive patients receiving HIV medication refills. In another illustration, Ferrat et al. (12) assessed the impact of an interactive two-day CPD activity on French general medical practitioners' antibiotic prescribing habits. The activity led to a significant reduction in inappropriate antibiotic prescribing over a four-and-a-half-year period. Based on an analysis of clinical data from 11,538 patient charts, Bird et al. (13) found that participation in a 'performance improvement' online module on diabetes management improved physicians' performance and benefited patients. In another study, nurses' use of an app on ulcer management, increased the number of patient days free from avoidable pressure ulcers from 100 days pre-intervention to more than 200 days post-intervention (14). In contrast, other studies suggested no positive impact on patient care. For example, the use of a skin cancer recognition toolkit, for primary care physicians in the UK did not impact on skin cancer diagnoses or appropriate referrals (15); and an active learning intervention on the management of patients with hypertension in primary care in Brazil did not improve patient outcomes compared with a control group (16).

Despite these examples, studies that relate educational activity to change in practice are rare, not least because many interventions do not have measurable clinical outcomes. Evaluations are typically based on self-reported measures, usually at two time-points but sometimes at three time-points: pre-educational activity, immediate post-activity and at a later time point. The majority of evaluations focus on learner satisfaction with the training and gains in knowledge, skills or attitudes (17-21). Curran and Fleet (22) identified no studies of web-based CPD that demonstrated impact on patients' health. Most studies report changes in knowledge or skills, or behavioural intentions to change practice, typically based on self-report. Although the absence of hard measures is common, such studies nonetheless add to the evidence base, particularly those that gather data at three time-points (for example, Allen et al) (20). However, even where a post-test confirms *improved* knowledge or skills (rather than confirmation that knowledge or skills are up-to-date), there is no certainty that these gains will translate to improved practice.

Despite these evidence limitations, findings from many studies suggest that benefits from CPD activities are enhanced where a combination of methods are used, such as case-based

discussions, practical exercises, e-learning, group learning and mentor support (23, 24). Wallace and May (25) argue that learning experiences should include interaction with peers and the wider team, a reflective component and provide opportunities to practise skills. They contend that activities should be “outcomes-based”, not undertaken in isolation and participants should have opportunity to repeat the activity. This idea is echoed by Bennett-Levy and Pedesky (26) in Australia who found that structured and on-going reflection on learning involving multi-professionals across the medical arena supported the transfer of learning to clinical practice. Another factor enhancing the benefit of CPD activities is alignment with learning needs which are relevant to a professional’s scope of practice (27). Allaire et al.’s (28) study with Canadian family physicians, found that changed behaviour is more likely if content is aligned with the participants’ training needs assessment and linked to their day-to-day practice.

Not only does the method and content of the educational activity affect the likelihood of the learning being applied to practice but impact is also affected by the learner and their work environment. Personal commitment, enthusiasm (29) and a positive workplace environment (30) can help to maximise the impact of learning. Long-term impact evaluation is scarce but confirms the value of sustained support in consolidating the knowledge acquired (31, 32). Sustained support after completion of a course can be accomplished through online materials, prolonged mentorship, virtual communities or follow-up booster sessions. For example, the *Stemming the Tide of Antibiotic Resistance (STAR)* educational programme, aimed at general medical practitioners in the UK, includes online reflection on practice and a ‘booster session’ provided 6-months after completion of the course. Participants reported positive changes in prescribing attitudes and changes in clinical practice (33).

Models of CPD

We classified CPD models into three main groups: quantitative, input-based, outcome-based and mixed. Input-based models rely on registrants engaging in a specified number of hours of CPD or amassing prescribed numbers of CPD points/credits (which themselves are typically based on hours). Outcomes-based models are concerned with the value and consequences of the learning – the difference it makes to the registrants’ professional practice. Features include: personal development plans (PDPs) – used to identify CPD relevant to a registrant’s needs and scope of practice; reflection on learning, on practice and forward planning; feedback from others about their practice; and registrant ownership of their CPD. Mixed models emphasise qualitative, outcomes-based elements, but include some quantitative aspects. We provide illustrations of the newer models. These groupings should, however, be interpreted with some caution; on the basis of the description we had available, it was sometimes difficult to judge which category the models best matched. In addition, we report on the supportive and instructional guidance made available to registrants and information about new and emerging quality management processes to enhance present and future CPD models.

Outcome-based models

In the UK, a revalidation process was recently introduced for pharmacy registrants (pharmacists and pharmacy technicians) (34, 35). Registrants must record their learning experiences through an online portal, reflect on them and link them to their scope of practice (36). From 2019, registrants are not required to log hours of CPD activity. Instead, they will submit six CPD records, including peer discussions and reflective accounts, which are mandatory components.

Occupational therapists in the UK are not required to log number of hours of CPD activity. The Royal College of Occupational Therapists (RCOT) recently produced a ‘Career Development Framework’ which provides a set of guiding principles for the nine ‘levels’ within each of four Framework ‘pillars’ (37). In discussion with a peer or colleague, alongside consideration of the professional standards for occupational therapy, occupational therapists map their skills and experience to the ‘pillars’ at various ‘levels’ when reviewing their development needs.

The Solicitors Regulatory Authority (SRA) in the UK introduced a process for CPD (“continuing competence”), effective from November 2016 (5). Solicitors are no longer required to accumulate CPD hours or points. The new scheme is outcomes-based, promoting solicitors’ reflection on their learning needs and a record of the review of their CPD activities. To comply with the new system, solicitors must: 1) reflect on their current practice and identify knowledge gaps, 2) establish learning objectives and plan the activities, 3) participate in activities to address their learning needs and identify ways to incorporate the learning into their practices, 4) keep records of the activities, review the outcomes and identify further learning needs (38, 39). Stated benefits of the new system include reduction in bureaucracy and the freedom of solicitors to choose activities that are most relevant to their practice area (40).

The engineering profession provides another illustration of an outcomes-based model of CPD (6, 41). In the UK, registrants (engineering technicians, ICT technicians, incorporated engineers and chartered engineers) are required to follow the “Engineering CPD Code for Registrants” (6). The CPD code does not specify a minimum amount of time for CPD activities. Rather, registrants are responsible for ensuring that the CPD they undertake is relevant to their needs or informed by their employers or work colleagues. Registrants reflect on their learning, which then informs their personal development planning. Professional engineering institutions (PEIs) are licensed by the Engineering Council to provide guidance, resources and educational programmes to support their members’ CPD activities.

Mixed models

The new model for the renewal of registration of nurse practitioners in British Columbia, Canada, implemented in 2018, places much greater emphasis on personal development planning (42). Although the new requirements include a number of CPD hours, there is increased emphasis on self-assessment, peer feedback, multisource feedback, portfolio completion and the production of a PDP (43).

In 2018 in the UK, the GDC introduced an enhanced CPD scheme (44) which emphasises the place of the PDP in supporting reflection on learning and how learning might apply to working practice. The GDC provides an optional PDP template and activity log template for dental professionals to plan and record their CPD. The GDC recognises that, while their “Enhanced CPD” scheme is a significant first step in promoting dental professionals’ ownership of their CPD, more work is needed to improve the value of CPD for professionals and ensure that it meaningfully contributes to patient care and public protection.

In the UK, in the Nursing and Midwifery Council’s (NMC) pilot of the revised revalidation process, written reflections and reflective discussions were received positively (45). The three-year revalidation cycle comprises: practice hours; 35 hours of CPD (of which 20 hours must be ‘participatory’); five examples of practice-related feedback; five written reflective accounts; a reflective discussion with a ‘confirmer’ (typically a line-manager); and professional indemnity declarations. At the centre of the revalidation process is the NMC’s Code of professional standards for nurses and midwives (46). CPD activities are mapped to it and it acts as a focus for reflective discussions.

The General Chiropractic Council (GCC) recently introduced a new CPD scheme in the UK (47). CPD components include mandatory topics, structured discussions about CPD with peers, reflection and activities to ensure that registrants receive feedback from others about their practice.

The College of Physicians and Surgeons of Alberta (CPSA), in Canada, recently introduced a new approach designed to engage its members in the proactive pursuit of professional development. Regulated members are obliged to complete a quality improvement project at least once every five years. The new approach also includes a ‘Practice Check-up’ for all physicians. This is an annual report that supports self-assessment and highlights opportunities for improvement and professional development. For selected physicians (in general and specialist practices and

clinics) this also includes an 'Individual Practice Review (IPR)' and a 'Group Practice Review (GPR)'. The IPR is an in-depth competence assessment process, tailored to individual physician needs and which offers options for practice improvement. CPD credits are awarded to physicians who develop personal learning plans, perform practice changes based on the 'Practice Check-up' report or complete an IPR (48).

Although not an outcomes-based model, in the UK the General Optical Council (GOC) have in place a mandatory continuing education training (CET) scheme for its registrants (optometrists, dispensing opticians, contact lens opticians, therapeutic specialist optometrists) based on a weighted points system. Registrants are required to achieve 36 general CET points over a three-year cycle but activities involving peer discussions and/or clinical skills acquisition are given greater weight than passive approaches, for example, attendance at lectures. In a similar way to pharmacists, registrants can record all activities and supporting evidence through the regulatory body's on-line portal (49).

Guidance

It is easy for registrants to record CPD hours and simple for regulators to measure. In more qualitative models, registrants need to be helped to provide a reflective record and evidence of their CPD, which underpins their personal lifelong learning achievements. We found helpful supportive materials, guidance, checklists, case studies, video links, templates and apps on a selection of regulatory body websites or learning portals. The evidence registrants have to submit should be easy to complete, not time-consuming and offer an opportunity for self-assessment. A dedicated online platform, including CPD tools relevant to any new scheme (e-portfolio, clear instructions, recommendations, exemplar documents) can make it easy for registrants to upload their documentation and pose questions or offer views.

The website of the Engineering Council and the Institute of Mechanical Engineers' (IMechE) provides video guidance on CPD activities for engineers (50). There are links to reflective practice examples. Engineering registrants are encouraged to utilise a toolkit - mycareerpath® - to record their activity (6). The use of this toolkit facilitates the appraisal process for professionals. On the General Optical Council (GOC) website, MyGOC enables registrants to maintain an e-portfolio and a record of their educational activity. The General Pharmaceutical Council (GPhC) provides an e-portfolio and information relating to planned and unplanned CPD, peer discussion and reflective accounts (51). The Royal Pharmaceutical Society's (RPharmS) website contains links to support and to advice on the types of records required of registrants (34, 35). In addition, they provide MyCPD webinars, examples of CPD entries, details of revalidation learning events, online tools and resources and peer discussion prompt sheets. The GMC website provides 'CPD Guidance' (52) and registrants can download MyCPD app. The CPD guidance includes details about peer-based learning, peer-reviewing and peer-tutoring as well as advice on reflecting with a peer and examples of 'reflective narratives'. The NMC website contains supporting resources for registrants in the form of examples of CPD activities, case studies, films, guidance and a form to record the reflective discussion (53). Registrants are advised to use the NMC template to log their CPD activities. In addition, there are links to examples of completed forms and templates (54). The Solicitors Regulatory Authority (SRA) provide a competence toolkit which includes information on regulatory obligations, advice on how to plan continuing competence, how to address learning needs and how best to apply reflective practice and evaluate the success of continuing educational activities (5) In addition, there are links to 'development plan' and 'development record' templates and to information relating to 'case studies'.

Quality management processes

In these outcomes-based and mixed-models, systems of quality assurance typically include random audits of the CPD records of registrants. For example, the Engineering Council audits five percent of its registrants. Audited registrants are provided with information on what should be submitted and given an example of a SWOT analysis (strengths, weaknesses, opportunities, strengths) and links to guidance on benchmarking. The premise is that registrants should feel

comfortable with the regulatory body accessing their reflective records and evidence of quality educational activities as detailed in their online portfolios, as part of management processes (50).

Another aspect of quality management systems utilised in some models, is the integration of processes to identify registrants who require greater input which is then provided through peer support, mentoring or workshops. For example, the quality assurance process for pharmacists in Ontario, Canada is two-tier (55). On the basis of a structured practice review process which assesses their practice quality and their CPD activities, pharmacists are deemed as either meeting the required expectations and are placed in the 'self-directed' category (the majority), or fall into the 'peer support' category and are required to provide a written education plan and take part in professional skills enhancement workshops facilitated by volunteer pharmacist mentors. Akin to this, some regulators have chosen to incorporate CPD requirements within a revalidation process (45, 52, 56-60).

Quality assurance practices vary. Some regulators 'recognise' organisations/professional bodies as CPD providers and require them to follow a code of conduct. For example, the General Optical Council (GOC) has a quality management system for their continuing education system and a 'code of conduct' for CET providers (49). Other regulators do not accredit CPD providers or CPD activities.

Discussion

In terms of impact of CPD and best practice we observed limitations in the quality of evidence. There is widespread reliance on self-reported change in behaviour or intention to change, rather than observation of workplace practice or more objective assessments of impact. However, it is perhaps unsurprising that few studies include objective measures of the impact of the educational activity on practitioner practice as it is difficult to determine, firstly, if changes to practice or behaviour have occurred and secondly, to establish a causal relationship with the educational activity rather than any change being influenced by other factors.

Despite these limitations, the evidence suggests that benefits from CPD are enhanced when a combination of interactive methods are used, including a reflective component and sustained support; when the CPD is aligned to learning needs and relevant to day-to-day practice; when the practitioner is committed and enthusiastic; and when the workplace environment is positive and supportive.

We found a clear shift away from quantitative, time-serving models towards outcomes-focused ones. The most recently updated CPD regulations of professional groups are either solely or predominantly outcomes-based. Examples of professional groups using outcome-based models in the UK include chiropractors (new CPD scheme introduced in 2019), pharmacists (new system since 2018), engineers (since 2017), solicitors (since 2016), nurses and midwives (since 2015); registrants are not required to accumulate CPD hours. Developments in Canada also reflect this move to outcomes-based models: dental hygienists of British Columbia (since 2013), dental hygienists in Ontario (since 2015), and nurses in British Columbia (since 2018),

Many systems (even those not outcomes-based) now include qualitative aspects (such as peer feedback, reflection and personal development planning). Yet many regulatory bodies across the health professions globally, continue to impose mandatory hours of CPD activities (61). That said, Wareing et al (62) in their review of literature relating to radiography, detected that although many countries still use CPD credits/points/hours, there is a move towards the inclusion of outcomes-based elements and a more reflective-based approach.

This shift towards outcomes-based models is in part a response to the recognised failure of input-based models to lead to improved performance and patient care (25). Writing in 2005, Hughes (63) argued that "the focus on hours and CPD points takes the onus away from reflection and impact on practice". Focused on CPD in veterinary practice, May and Kinnison (64) comment

that the previous CPD process had failed to produce meaningful and sustained changes in clinicians' clinical practice; this was a driver for the Royal College of Veterinary Surgeons outcomes-focused approach to CPD using reflective accounts of participating registrants. Moving away from counting hours should motivate registrants to actively pursue meaningful, relevant CPD activities that best match their learning needs, scope of practice, professional aspirations and their provision of enhanced patient care.

Health professionals possess a variety of tools and processes to assist them in evaluating their needs and plans for future learning. Reflection is the key word within these processes and tools, and it is also the critical element that makes the difference between learning as a rewarding experience and an obligatory, bureaucratic exercise. Still, the actual impact-on-practice of these processes has yet to be proven.

CPD underpinning lifelong learning throughout the registrant's career, is an essential requirement for the dental professional. Registrants' meaningful and productive engagement with CPD activities should support their delivery of oral healthcare. Our review suggests that this could be enhanced by a reliable, comprehensive online portfolio, which is easy for the registrants to populate. Many of the other healthcare regulatory bodies provide helpful online resources (examples of how to record, how to reflect, how to plan ahead for activities that will have a positive impact on practice). An online portfolio which is accessible to the regulatory body and acceptable to the registrants who should take pride in sharing their achievements, could strengthen and enhance the quality management process.

As evidenced in this review, the direction of travel is that new approaches to CPD acknowledge practitioners' responsibility for their own professional development, undertaking education that is relevant and tailored to their individual needs. Newer CPD schemes recognise the registrant's 'ownership' of their professional development, in contrast to the previous models which tended to create the feeling of obligation and conformance to regulations. In terms of dentistry in the UK, the GDC's recent publication, "Shifting the Balance: a better, fairer system of dental regulation" (65) speaks directly to these sentiments of dental professionals taking ownership and responsibility for their future CPD aspirations, planning and development in support of safe practice for their patients. The GDC's overall commitment to this is further exemplified by their funding of this study.

Conclusion

If the aspiration is to create motivation across all registrants to actively pursue meaningful, relevant CPD activities, then the approach to CPD should promote the concept of a responsible professional, who maintains and enhances their clinical and professional skills and shares their experience with their peers and the regulatory body. Outcomes-focused models of CPD seem best suited to the achievement of such a goal. On the basis of our synthesis of the literature, we conclude that an outcomes-focused model of CPD for dental professionals would emphasise reflection and reflective practice, and include a review of learning needs and development planning, use of an online portfolio to record evidence, and interaction with and feedback from others (peers, mentors and the regulator). Such an approach would be well placed to promote registrants' sense of ownership of their continuing educational activity and pride in their achievements and enhanced professional practice. In turn, this should strengthen the engagement between registrants and the regulatory body and bolster the public's confidence in the profession.

References

1. General Dental Council. Scope of Practice 2013. Available from: <https://www.gdc-uk.org/api/files/Scope%20of%20Practice%20September%202013.pdf>. [Accessed on: 17.10.18]
2. Bullock, A, Bailey, S, Cowpe, J, *et al.*, (2013) Continuing professional development systems and requirements for graduate dentists in the EU: survey results from the DentCPD project. *European Journal of Dental Education*.17: s1:18-22.
3. Barnes, E, Bullock, AD, Bailey, SER, Cowpe, JG, Karaharju-Suvanto, T. (2013) A review of continuing professional development for dentists in Europe*. *European Journal of Dental Education*.17: s1:5-17.
4. The Centre for Legal Leadership. An introduction to CPD: Thomson Reuters Practical Law; 2019. Available from: [https://uk.practicallaw.thomsonreuters.com/w-008-6591?originationContext=knowHow&transitionType=KnowHowItem&contextData=\(sc.Default\)&firstPage=true&bhcp=1#co_pageContainer](https://uk.practicallaw.thomsonreuters.com/w-008-6591?originationContext=knowHow&transitionType=KnowHowItem&contextData=(sc.Default)&firstPage=true&bhcp=1#co_pageContainer). [Accessed on: 05.11.19]
5. Solicitors Regulation Authority. Continuing competence 2016. Available from: <https://www.sra.org.uk/solicitors/cpd-accreditation.page>. [Accessed on: 17.10.18]
6. Engineering Council. Continuing Professional Development (CPD) 2018. Available from: <https://www.engc.org.uk/cpd>. [Accessed on: 17.10.18]
7. Barends, E, Rousseau, DM, Briner, RB. CEBMa Guideline for Rapid Evidence Assessments in Management and Organizations Amsterdam: Center for Evidence Based Management; 2017. Available from: www.cebma.org/guidelines/. [Accessed on: 05.11.19]
8. Center for Evidence-Based Management. What is a Rapid Evidence Assessment (REA)? Amsterdam: Center for Evidence-Based Management; 2019. Available from: <https://www.cebma.org/faq/what-is-an-rea/>. [Accessed on: 05.11.19]
9. GOV.UK. Rapid Evidence Assessments 2015. Available from: <https://www.gov.uk/government/collections/rapid-evidence-assessments>. [Accessed on: 05.11.19]
10. Ball, C, Sackett, D, Phillips, B, Haynes, B, Straus, S. Levels of Evidence and Grading Recommendations: Centre for Evidence Based Medicine; 1998. Available from: Retrieved from <http://www.eboncall.org/content/levels.html>; Now available from: <https://archive.is/N5Zwh>. [Accessed on: 05.11.19]
11. Kang, H, Yip, B, Chau, W, *et al.*, (2014) Continuing professional development in HIV chronic disease management for primary care providers.1-4, 2014 Dec 09.
12. Ferrat, E, Le Breton, J, Guery, E, *et al.*, (2016) Effects 4.5 years after an interactive GP educational seminar on antibiotic therapy for respiratory tract infections: A randomized controlled trial. *Family Practice*.33: 2:192-99.
13. Bird, GC, Marian, K, Bagley, B. (2013) Effect of a Performance Improvement CME Activity on Management of Patients With Diabetes. *Journal of Continuing Education in the Health Professions*.33: 3:155-63.
14. Rajpaul, Acton. (2015) The use of smart technology to deliver efficient and effective pressure-damage education. *British Journal Of Nursing (Mark Allen Publishing)*.24: 20.
15. Gulati, A, Harwood, CA, Rolph, J, *et al.*, (2015) Is an online skin cancer toolkit an effective way to educate primary care physicians about skin cancer diagnosis and referral? *Journal of the European Academy of Dermatology and Venereology*.29: 11:2152-59.
16. Pimenta, HB, Caldeira, AP, Mamede, S. (2014) Effects of 2 Educational Interventions on the Management of Hypertensive Patients in Primary Health Care. *Journal of Continuing Education in the Health Professions*.34: 4:243-51.

17. Jarvis, I, Ker, J. (2014) Ensuring standards for the extended role of optometry. *The clinical teacher*.11: 3:184-7.
18. Bullock, A, Barnes, E, Ryan, B, Sheen, N. (2014) Case-based discussion supporting learning and practice in optometry. *Ophthalmic and Physiological Optics*.34: 5:614-21.
19. Abbot, B, Laurence, C, Elliott, T. (2014) GP surgeons: what are they? An audit of GP surgeons in South Australia. *Rural and Remote Health*.14: 3.
20. Allen, D, Abourbih, J, Maar, M, Boesch, L, Goertzen, J, Cervin, C. (2017) Does a one-day workshop improve clinical faculty's comfort and behaviour in practising and teaching evidence-based medicine? A Canadian mixed methods study. *Bmj Open*.7: 7.
21. Houwink, EJJ, van Teeffelen, SR, Muijtjens, AMM, *et al.*, (2014) Sustained effects of online genetics education: a randomized controlled trial on oncogenetics. *European Journal of Human Genetics*.22: 3:310-16.
22. Curran, VR, Fleet, L. (2005) A review of evaluation outcomes of web-based continuing medical education. *Medical Education*.39: 6:561-67.
23. Forsetlund, L, Bjorndal, A, Rashidian, A, *et al.*, (2009) Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*2.
24. Arnold, SR, Straus, SE. (2005) Interventions to improve antibiotic prescribing practices in ambulatory care. *The Cochrane database of systematic reviews*4:CD003539-CD39.
25. Wallace, S, May, S. (2016) Assessing and enhancing quality through outcomes-based continuing professional development (CPD): a review of current practice. *Veterinary Record*.179: 20:515-20.
26. Bennett-Levy, J, Padesky, CA. (2014) Use It or Lose It: Post-workshop Reflection Enhances Learning and Utilization of CBT Skills. *Cognitive and Behavioral Practice*.21: 1:12-19.
27. Mattheos, N, Schoonheim-Klein, M, Walmsley, AD, Chapple, ILC. (2010) Innovative educational methods and technologies applicable to continuing professional development in periodontology. *European Journal of Dental Education*.14:43-52.
28. Allaire, A-S, Labrecque, M, Giguere, A, Gagnon, M-P, Legare, F. (2012) What Motivates Family Physicians to Participate in Training Programs in Shared Decision Making? *Journal of Continuing Education in the Health Professions*.32: 2:98-107.
29. Lee, N-J. (2011) An evaluation of CPD learning and impact upon positive practice change. *Nurse Education Today*.31: 4:390-95.
30. Nevalainen, M, Lunkka, N, Suhonen, M. (2018) Work-based learning in health care organisations experienced by nursing staff: A systematic review of qualitative studies. *Nurse Education in Practice*.29:21-29.
31. Baillargeon, J-P, Carpentier, A, Donovan, D, *et al.*, (2007) Integrated obesity care management system - implementation and research protocol. *Bmc Health Services Research*.7.
32. Baillargeon, J-P, St-Cyr-Tribble, D, Xhignesse, M, Grant, A, Brown, C, Langlois, M-F. (2014) Impact of an integrated obesity management system on patient's care - research protocol. *BMC Obesity*.1: 19.
33. Bekkers, M-J, Simpson, SA, Dunstan, F, *et al.*, (2010) Enhancing the quality of antibiotic prescribing in Primary Care: Qualitative evaluation of a blended learning intervention. *Bmc Family Practice*.11.
34. General Pharmaceutical Council. Revalidation for pharmacists and pharmacy technicians 2018. Available from: <https://www.pharmacyregulation.org/revalidation>. [Accessed on: 17.10.18]

35. Royal Pharmaceutical Society. Revalidation. Everything you need to know 2018. Available from: <https://www.rpharms.com/professional-development/revalidation>. [Accessed on: 17.10.18]
36. General Pharmaceutical Council. Renewing your registration 2018. Available from: <https://www.pharmacyregulation.org/renewal>. [Accessed on: 17.10.18]
37. Royal College of Occupational Therapists. Career Development Framework: Guiding Principles for Occupational Therapy 2017 2017. Available from: <https://www.rcot.co.uk/practice-resources/learning-zone/career-development-framework>. [Accessed on: 17.10.18]
38. Brannan, J. (2017) CPD: time to sharpen up. New Law Journal.27 January. 7731, p18
39. Rayner, J. Society spotlight: Professional development centre. The Law Society Gazette. 2017. 31 Jul, 23
40. Davis, V. (2017) Setting the Bar for CPD. New Law Journal.27th January. 7731, p17
41. Bernstein, A. (2014) CPD and your career. MWP.158: 6:16-16.
42. Registered Nurses' Association of British Columbia and College of Registered Nurses of British Columbia. (2008) Continuing competence for nurse practitioners. Nursing BC.40: 1:19-19.
43. British Columbia College of Nursing Professionals. Support & quality assurance 2018. Available from: <https://www.bccnp.ca/PracticeSupport/Pages/Default.aspx>. [Accessed on: 17.10.18]
44. General Dental Council. Enhanced CPD guidance 2018. Available from: <https://www.gdc-uk.org/education-cpd/cpd/enhanced-cpd-scheme-2018>. [Accessed on: 27.01.20]
45. Nursing & Midwifery Council. Revalidation pilot key findings report 2015. Available from: <https://www.nmc.org.uk/globalassets/sitedocuments/councilpapersanddocuments/council-2015/revalidation-key-findings-report.pdf>. [Accessed on: 17.10.18]
46. Nursing & Midwifery Council. The code for nursing and midwives 2015. Available from: <https://www.nmc.org.uk/standards/code/>. [Accessed on: 17.10.18]
47. General Chiropractic Council. Continuing Professional Development 2018. Available from: <https://www.gcc-uk.org/education/continuing-professional-development/>. [Accessed on 17.10.18]
48. College of Physicians and Surgeons of Alberta. Website 2018. Available from: <http://www.cpsa.ca/>. [Accessed on: 17.10.18]
49. General Optical Council. Continuing Education and Training (CET) 2017. Available from: <https://www.optical.org/en/Education/CET/index.cfm>. [Accessed on: 17.10.18]
50. Institute of Mechanical Engineers. Continuing Professional Development 2018. Available from: <http://www.imeche.org/membership-registration/continuing-professional-development>. [Accessed on: 17.10.18]
51. General Pharmaceutical Council. Revalidation resources for pharmacy professionals 2017. Available from: https://www.pharmacyregulation.org/revalidation-resources-pharmacy-professionals#revalidation_examples. [Accessed on: 17.10.18]
52. General Medical Council. Continuing professional development 2018. Available from: <https://www.gmc-uk.org/education/standards-guidance-and-curricula/guidance/continuing-professional-development>. [Accessed on: 17.10.18]
53. Nursing & Midwifery Council. Revalidation Resources 2017. Available from: <http://revalidation.nmc.org.uk/download-resources/>. [Accessed on: 17.10.18]
54. Nursing & Midwifery Council. Revalidation - Reflective discussion 2017. Available from: <http://revalidation.nmc.org.uk/what-you-need-to-do/reflective-discussion/>. [Accessed on: 17.10.18]

55. Austin, Z, Marini, A, Glover, NM, Tabak, D. (2006) Peer-mentoring workshop for continuous professional development. *American Journal of Pharmaceutical Education*.70: 5.
56. General Medical Council. Good medical practice 2013. Available from: <https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/good-medical-practice>. [Accessed on: 17.10.18]
57. General Medical Council. The impact of continuing professional development on doctors performance and patient outcomes 2013. Available from: <https://www.gmc-uk.org/about/what-we-do-and-why/data-and-research/research-and-insight-archive/the-impact-of-continuing-professional-development-on-doctors-performance-and-patient-outcomes>. [Accessed on: 17.10.18]
58. General Medical Council. Continuing professional development: Guidance for all doctors 2018. Available from: https://www.gmc-uk.org/-/media/documents/cpd-guidance-for-all-doctors-0316_pdf-56438625.pdf. [Accessed on: 17.10.18]
59. Nursing & Midwifery Council. How to revalidate with the NMC 2017. Available from: <https://www.nmc.org.uk/globalassets/sitedocuments/revalidation/how-to-revalidate-booklet.pdf>. [Accessed on: 17.10.18]
60. Nursing & Midwifery Council. Revalidation quarterly data reports 2018. Available from: <https://www.nmc.org.uk/about-us/reports-and-accounts/revalidation-reports/>. [Accessed on: 17.10.18]
61. Austin, Z. (2013) CPD and revalidation: Our future is happening now. *Research in Social & Administrative Pharmacy*.9: 2:138-41.
62. Wareing, A, Buissink, C, Harper, D, *et al.*, (2017) Continuing professional development (CPD) in radiography: A collaborative European meta-ethnography literature review. *Radiography*.23:S58-S63.
63. Hughes, E. (2005) Nurses' perceptions of continuing professional development. *Nursing Standard*.19: 43:41–49.
64. May, S, Kinnison, T. (2015) Continuing professional development: learning that leads to change in individual and collective clinical practice. *Veterinary Record*.177: 13.
65. General Dental Council. Shifting the balance: your views and next steps 2017. Available from: <https://www.gdc-uk.org/api/files/Shifting%20the%20Balance.pdf>. [Accessed on: 17.10.18]