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Original Research

The three domains of public health: An internationally relevant basis for public health education?

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Summary By focusing on the Masters of Public Health course, this study took a pragmatic approach to exploring the interface between public health education and public health practice. The commonly utilized ‘three domains of practice’ framework could provide a robust and explicit link between educational provision and practice for public health. This model provides the workforce, the university, the students and the potential funders of the course with an easily comprehensible framework for understanding how the modules of an MSc can support the development of competency within the context of practice.

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Introduction

The ‘three domains of practice’ is an operationally robust framework for public health practice. The utility of the model is increased by the overlap of the domains, which reflects the lack of clear boundaries in practice. It has proven to be popular with the specialist public health workforce for its ability to provide a cohesive framework that

encompasses the broad-ranging challenges and roles within the broader field of public health,^{1,2} at specialist and practitioner levels, and enables the mix of skills to be contextualized within a practice-orientated context.^{3–5,a} The model describes public health in terms of three inter-related but distinct aspects of public health practice:

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^aA survey of primary care trust directors of public health in the spring of 2004 suggested that 88% of respondents supported the conceptualization.²

- health improvement, which draws heavily on the local government roots of the profession, socio-economic influences and health promotion, tackling the underlying determinants of health;
- health protection, which incorporates communicable disease control; environmental, chemical, radiation and nuclear threats; and occupational health; and
- health service quality improvement, which incorporates healthcare systems, service quality, evidence-based practice, clinical effectiveness and health economics.

Practice within the three domains draws upon the underpinning core skills and knowledge of epidemiology, biostatistics, use of information, law and ethical practice, conceptualized within the model by the overlap between the domains (Fig. 1). This provides a robust operational framework to describe the areas of practice, the services to be delivered, and the roles and responsibilities of those delivering them, particularly the core skills, knowledge and competencies that are needed. Theoretically, this systemized approach to public health delivery can be used to draw out the different levels of competency that will be required by the workforce to carry out their respective roles, and as such has potential for adaptation to underpin educational provision.

Rasmussen's research into theories of learning supports a competency-based approach to learning. Theoretically, courses that are able to recreate the

practice environment, e.g. by looking at the competencies required to function in the field, rather than the competencies in isolation, would improve the ability of the students to apply the theoretical skills of the classroom to the workplace, and improve their ability to make intraprofessional linkages.^{6–12} Professional support for the concept of education linked to practice is high, and it is already firmly embedded in the USA for both professional development and educational provision, with competency frameworks reflected in the curricula for training programmes, and both courses and schools for public health subject to assessment and accreditation of their programmes.^{13,14}

The purpose of this study was to explore the interface between public health education and public health practice. This is particularly important because of the ill-defined nature of the public health workforce. As an analysis of job vacancies in Australia demonstrated, public health skills and competencies are applicable across a wide range of workforce roles, with the lack of clear practice boundaries complicating workforce planning.¹⁵ By providing a snapshot of current provision, this paper helps to create a common framework for dialogue between stakeholders and has the potential to inform future curriculum planning.

Methods

This study incorporated a background literature review using Cinahl and Pubmed, a web-based

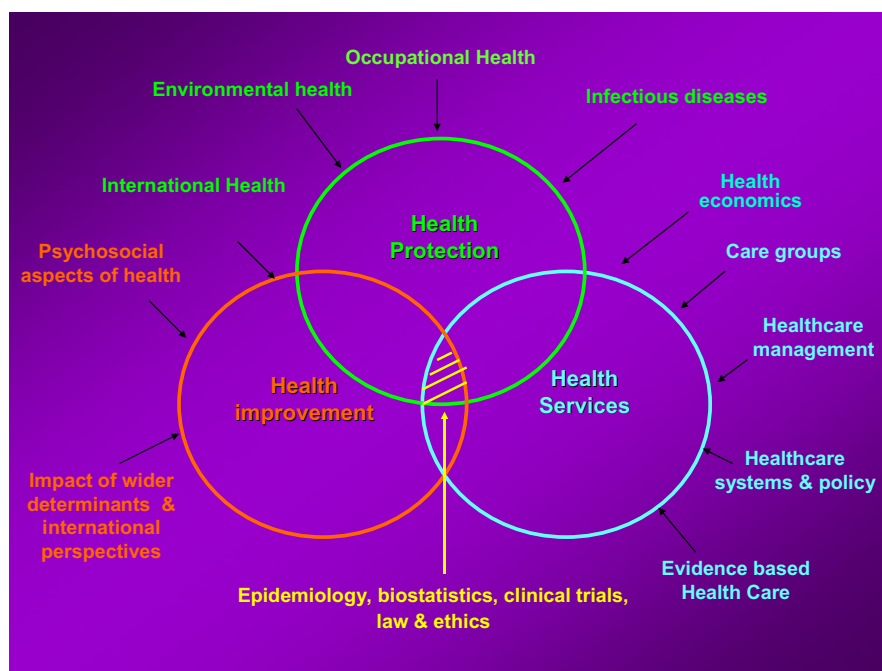


Figure 1 The three domains of public health (source: www.sph.cuhk.edu.hk).

survey of Masters of Public Health (MPH) prospecti to identify their modular provision, and a case study in Hong Kong. Concept analysis techniques were used to deconstruct the concept of competency in public health systematically, using the routinely available data on MPH educational provision (i.e. web-based prospecti) as a surrogate for public health education provision.

To inform the analytical methodology, a PubMed search was used to identify academic frameworks that had been used for studies informed by concept analysis. This suggested that there were four main models or frameworks.^{16–19} In line with Botes' analysis of the limitations of concept analysis, a dual methodology, which incorporated both empirical investigation techniques (i.e. the web-based survey and data analysis) and a literature review, was used to enhance the quality of concept analysis and increase the reliability and validity of the study,²⁰ enabling a greater focus on the way in which support for the development of public health competency was 'operationalized' within MPH prospecti (Box 1).¹⁸

A three-stage process was used to identify and map existing courses:

- identification of relevant MPH courses within overall postgraduate provision within the UK;
- identification of 'core modules' common to the majority of courses—theoretically, the 'generic' skills or competencies taught within universities; and
- mapping modular provision to the three domains of practice model to determine how MPH modular provision mapped against the operational framework for public health practice and competency development.

At the time of the study (October 2005), the search strategy identified 1079 postgraduate courses, across 55 universities, which included

'public health' in their course description. Many of the courses identified were subsequently excluded as they only offered discrete modules on public health and were not primarily about public health, e.g. animal care and science degrees, with a total of 35 MPH courses identified by the research strategy.

Inevitably, the eventual data-collection methodology, i.e. a web-based collection strategy for the module descriptions, had implications for the depth of information that was available on each of the modules. Whilst future studies could take a more detailed approach to this to validate the findings, the chosen methodology reflects consideration of the ethical justifiability of approaching universities for copies of their course prospecti for research and not enrolment purposes, and the time restraints involved in undertaking and submitting an MPH dissertation.

The use of the Internet in research, although generally found to be valuable, raises particular concerns about the quality, authority and credibility of sources, as the ability to post on the Internet is unrestricted.²³ Whilst currency, in theory, is one area in which Internet resources have been found to have a potential advantage over print resources,²⁴ sites are often undated, with inconsistent updating of the links between the sites affecting the efficacy of the research tool.

Results

In the UK, the policy trajectory for professional development in public health shows an increasing emphasis on the acquisition of health improvement skills and competency-based frameworks at all levels^{25–28} to support the development of a 'fully engaged scenario'.²⁵ There is now, in essence, a framework that could be utilized to form the progressive steps of a 'skills escalator'²⁹ model for public health and health improvement by

Box 1 Methodology overview.

The web-based survey used the free-text terms 'public health' and 'post graduate' to identify the universities offering postgraduate public health and/or MPH courses in the UK.

The case study involved a series of informal interviews with key stakeholders in Hong Kong to establish the levels of support for and understanding of the proposed changes.

E-mails were sent out at the time of the Hong Kong case study to identify any grey literature of relevance, identifying only one other study.²¹ A copy of the interim report from this study was obtained.

The web-based survey and competency analysis was undertaken as part of an MSc dissertation submitted by one of the authors.²²

defining what is expected of staff working at each of the workforce levels, and increasingly within each of the domains of practice. The standardized competency framework for specialists³⁰ and practitioners^{31–33} in public health is already in place at a generic level, and work is underway to define the intraspecialism and entry-level competencies.³⁴ With the introduction of 'Agenda for change' and the underpinning knowledge and skills framework, the relationship between demonstration of competency and standards of practice is articulated across the whole of the health service workforce. Alongside this notion of a wider workforce for public health, the professionally led response has been to put developmental work into place that defines more clearly what is meant by being a 'specialist' in this wider conceptualization of the workforce, with explicit articulation of what it means to be a 'competent' specialist or a 'competent' practitioner (Table 1).

However, a recent review of the specialist examination system suggested that this model is

incompletely reflected in postgraduate educational provision for public health development.³⁵

The survey of provision identified 55 universities in the UK offering public health courses, of which 35 were marketing their MPH course as generic. Analysis was restricted to these 35 generic courses. Looking across the spectrum of modular provision across the courses, perhaps unsurprisingly, labelling of modules was inconsistent, with 310 different titles in operation. However, the accompanying notes suggested that despite labelling inconsistencies, there was consistency in the coverage and stated purpose of the modules, for example in the skills and knowledge development offered within health protection courses (Table 2).

MPH course descriptions were analysed to identify those that referenced the Faculty of Public Health (FPH)/Voluntary Register and the National Occupational Standards (NOS) for Public Health explicitly. Twenty-three course descriptions did not mention the existence of the competency frameworks currently in operation in the UK, or of the FPH or the Voluntary Register. These descriptions tended to suggest that the courses were intersectoral and interprofessional, non-medical, internationally relevant and supported working in the 'broad field of public health'. However, module descriptions within these courses were comparable with those that did make explicit references to the FPH and NOS, sharing no common modular content or description that was not identifiable in the other category (Table 3).

Table 1 Characteristics of public health: UK model.

- Multidisciplinary;
- competency based: 'know-how/show-how' model;
- continuous assessment; and
- stepwise approach

Table 2 Overview of gross provision.

Overview

- Fifty-five universities were identified in the UK offering 'public health' courses, of which 35^a were generic MPH courses and 20 were dual specialisms, with health promotion and nutrition being the most common dual specialisms.

Findings from analysis of 35 MPH courses

- Three hundred and ten different modular titles in use; descriptions suggest skills development consistent;
- twenty-seven of the 35 generic MPH course websites stated explicitly which modules were core to their qualification and which were elective; and
- the 'top five' most commonly occurring modules, without differentiating between core and elective status, were:
 - introductory modules (20 modules offered in total, core modules at 17 universities);
 - epidemiology and biostatistics (37 modules offered in total, all universities offered at least one module);
 - health promotion modules (25 modules offered in total, core modules at 17 universities);
 - management modules (23 modules offered in total);
 - ethics and finance modules were designated 'core' at a single university; and
 - research design modules (43 modules offered in total, core modules at 27 universities, all universities offered at least one module).

MPH, Masters of Public Health.

^aOf the 35 courses, two did not provide any detail on the websites of modular content/titles for modules and were excluded from the analysis.

No clear picture of the operational framework emerged, nor was there a sense of how overall provision reflects and supports the development of competencies within the operational context of service practice. To address this shortfall, the 'three domains of practice' model, which has been found to be an operationally robust framework for scoping public health practices, was applied to the data collected on national modular provision.

Courses were grouped into four sections: generic skills for public health; health improvement courses; health protection courses; and courses that focused on the quality of health and social care. The placement of a module within a grouping was not arbitrary, but was informed by an analysis of the competency development work carried out by the FPH, Skills for Health and other partners, and utilized the framework produced by the scoping exercise undertaken in Hong Kong.^{34,36,37} The advice of senior public health specialists was sought where necessary to ensure that the positioning of courses within the domains was impartial. For some of the courses, it proved impossible to place them within a single domain, e.g. dental health. This reflects the content of the modular descriptions, which implied that the module proposed to build competencies in more than one domain of practice (Table 4).

A count was made of all the courses available within each of the domains. Courses that could not be placed within a single domain, or were categorized as core skills, were placed in a generic category of 'insufficient detail'. Two different analyses of the data are given in Fig. 2. This reflects the ambiguity in the literature around the status of epidemiology. Whilst some researchers have suggested it is a core public health skill, it has also been suggested that this is more appropriately visualized as a core skill for the health protection domain of public health. The available course descriptions did not give sufficient data to determine if the modules provided were purely introductory or if they gave a more in-depth analysis and, as such, might be more appropriately situated within the health protection sphere (Fig. 2).

It was noteworthy that the range of courses within the quality of health and social care domain was much wider than within the other domains, which tended to demonstrate greater consistency in the modules offered within the overarching framework. For example:

- health promotion modules largely focused on theory and lifestyles issues;
- health protection modules focused on disaster management and communicable disease control; and

Table 3 Links between Masters of Public Health and operational context in the UK.

Twenty-three of 35 courses made no reference to FPH/NOS on their website.

Twelve of 35 courses made explicit references to FPH/NOS, with:

- six suggesting that the course is compatible with preparation for FPH Part A examinations;
- four offering the opportunity to focus on 'defined areas of specialist practice', explicitly health promotion and health protection;
- three acknowledging the existence of frameworks, but not clarifying the role of the course in relation to frameworks;
- one running the specialist trainee programme in its region;
- one stating that the primary objective of the course was to 'provide the necessary academic components of training for those on a training scheme'; and
- one geared towards portfolio development for voluntary registration.

FPH, Faculty of Public Health; NOS, National Occupational Standards.

Table 4 Dental health practice within the three domains.

Health improvement: oral health strategy, promotion of health, e.g. balanced nutrition, diet, less carbonated/sugary drinks, sweets and snacking;

health protection: water fluoridation, more fluorides in contact with tooth surfaces, mouthguards in sport, cycle helmets and effective tooth cleaning/mouth rinsing after food; and

health services quality: dental health services with evidence-based practice, e.g. dental hygiene, National Institute for Clinical Excellence guidance on wisdom teeth, recall intervals for check-ups.

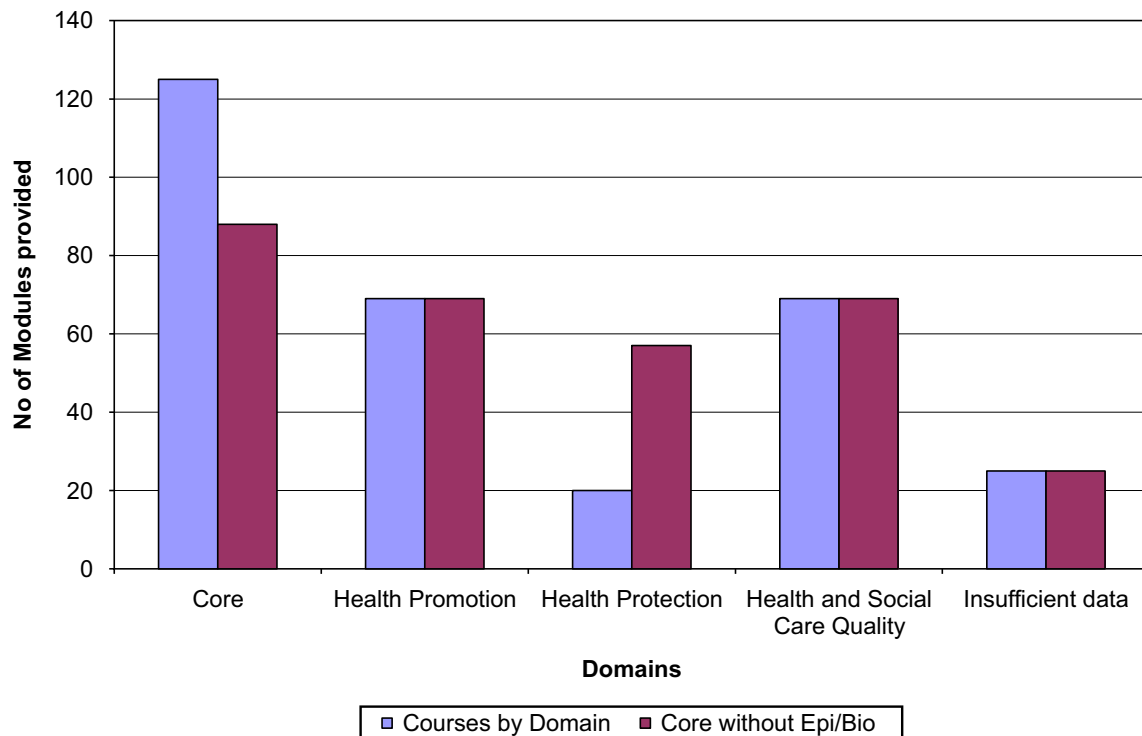


Figure 2 Utilizing the three domains of practice.

- quality of health and social care modules covered the range from policy to management, often offering very discrete modules, e.g. on personnel management and project financing.

The data collected suggest that elective courses tend to be offered more frequently in the fields of health promotion and quality of health and social care than in health protection, suggesting that students engaging in MPHs are offered more opportunities to develop competencies in these fields as part of generic provision.

The revision of the MPH in Hong Kong offered the opportunity to use the three domains as the basis for restructuring the course. The model was deemed to be appropriate to this setting because Hong Kong College of Community Medicine bases its professional standards on those of the UK FPH, and the specialist examination system is common for Part A, although Part 2 has been retained rather than Part B OSPHE^b. To inform the review, MPH courses within the existing school of public health were mapped to identify the range of modules already on offer within the school, with many modules, i.e. epidemiology and biostatistics, being common to multiple Masters programmes. A series of interviews with relevant local stakeholders were undertaken to establish the strength of support for

the proposed changes and their understanding of the conceptual framework.

The interviews established that stakeholders understood the concepts behind the three domains model, and believed that it could provide employers with a better understanding of the skills acquired by graduates during their course and their applicability to the practice environment. In general, interviews suggested that it was feasible that the MPH could support competency acquisition for specialist status in both public health and medical administration, if flexibility in choosing electives and modules were more fully developed. By broadening the base of teaching, linking across to other Masters courses for modules, the course would be able to attract a wider market of students and ensure the relevance of modules to the wider public health agenda. Fig. 1 shows the current course.

The restructured MPH is an integrated theory–practice curriculum that allows students to achieve professional public health competency. It provides broad public health perspectives and skills necessary to assume effective leadership in public health practice, reflecting the three domains of health improvement, health protection and health service quality. All students are expected to gain core competence in the three domains. Students can then select courses in their areas of interest, as well as elective courses relevant to their specialized area, including epidemiology, environmental

^bObjective Structured Public Health Examination.

health and communicable disease, health promotion, health policy and management, women's health and healthy ageing. This approach is congruent with that developed by the Association of Schools of Public Health (ASPH) in the USA, which recognizes five core areas with a set of common competencies.³⁸ It also includes occupational/workplace health as part of public health practice, reflecting the unique professional context for practice, as well as placing greater emphasis on communicable disease than in the US model.

Discussion

Public health is increasingly practiced globally; severe acute respiratory syndrome (SARS), avian flu, tobacco control and obesity are all challenges that are not unique to any one country. The Cochrane Collaboration reviews scientific evidence on an international basis, particularly in the evidence-based healthcare domain. Reflecting this complexity of practice within an educational context creates a substantial challenge for the public health education system. There is a significant risk that failure to do so will undermine the provision of a coherent, realistic and appropriate education for public health practice, which meets the needs of the widest conceptualization of the workforce.^{1,15,39} Increasing literature on disparities and inequalities and new or rediscovered policy approaches, e.g. social marketing, the increasing 'personal' focus of public health, pose challenges to the existing teaching provision, making it difficult for universities to keep pace with the rate of change.

With greater attention being given to accountability and outcomes in higher education,⁴⁰⁻⁴² a strong emphasis on competency-based training for public health and its subdisciplines,²⁸ and the incorporation of competencies into accreditation criteria for courses and schools of public health,⁴³ the challenges for providers of public health education have never been more explicit. Two key challenges have been identified in the literature for public health educationalists in relation to supporting their students to develop competency:

- to balance student needs to understand and apply the principles of public health with the need for them to be confident that they will be able to practice safely if they do so, with the role of education being the empowerment of students⁴⁴; and
- to support students in developing a broad range of knowledge and skills, which is related to the

practices and settings of service and programme delivery.^{10,15,45}

Paradoxically, the scope of the public health agenda has never been more diffuse, with new developments heralding changes in policy direction, in practice and in research directions. Structural changes,⁴⁶ concerns about sustainability²⁵ and the ever-evolving operational/policy agenda add to the complexity. Calman's definition of the three levels of the public health workforce⁴⁷ has, in many respects, been expanded with the introduction of the 'fully engaged scenario' envisaged by Wanless.²⁵ The introduction of 'Agenda for change', the knowledge and skills framework and the work on the National Occupational Standards for Public Health undertaken by Skills for Health in the UK have all combined to define the expected competencies of the workforce more clearly at each of these levels.

In the UK, it is recognized that effective public health practice requires drawing upon the skills of diverse professional groupings. The three domains approach offers a model to make sense of both the scale of the agenda and the relative contributions of groupings to the practice of public health. It establishes the boundaries of the field for which the competencies achieved through training and education can be applied to a framework based on the historical origins of public health. The Welsh Assembly Government and the National Public Health Service in Wales use the framework explicitly in strategic commissioning and providing public health services. Thus, the three domains approach could ground teaching practice, enabling the assimilation of new thinking into the curriculum. In itself, however, it does not validate the required competencies. To validate the importance of what is included in an MPH course, it is necessary to consider what graduates do, the challenges they face and the mix of skills they require in practice settings.^{15,45} As the National Public Health Partnership in Australia noted, any conceptualization of the core functions of public health needs to be relevant to the 'total public health effort and not just to those activities which government public health authorities are responsible for carrying out or funding'.¹

Whilst the approach was grounded within the UK system, the Hong Kong case study demonstrated that the course could be applied to other settings. The restructured programme was run for the first time in the 2006/2007 academic year. The conceptual fit between this model and the accreditation competencies used by the Association of Schools of Public Health for review of schools suggests that the model could be applied more widely.⁴³

Table 5 Operational overview of modular provision mapped to the three domains of public health.

	Core	Health improvement	Health protection	Health services
Theory	Introduction to epidemiology. Introduction to biostatistics. Foundations of public health: three domains and public health. Historical development. Evidence-based medicine. Professional ethics. Choice of study design.	Concepts of health. Determinants of health. Theories of health education and health promotion. Theories of social and behavioural sciences. Community development/ participation. Sociology and social sciences. Nutrition. Dental health. Health inequalities. Occupational health. Pharmacology.	Advanced epidemiology. Advanced biostatistics. Communicable disease. Environmental risk management. Preparedness in practice. Post-disaster management.	Health care management. Health care financing. Health care systems. Health policy. Law. Corporations (possible link to MBA). Concepts of Governance. Health economics. Change management. Power and Authority. Dental health. Partnerships. Pharmacology.
Accredited skills training	Communications. Influencing skills. Conflict management. Leadership. Negotiation. Dealing with politicians and the media. Critical appraisal. Study design. Literature searching. Personal development skills. Time management. Computer skills. Report writing.	Health needs assessment. Reports.	Data analysis and interpretation. Methodological awareness.	Quality approaches (audit). Priority setting. Financial management.

As Table 5 demonstrates, by grouping courses within thematic areas, the three domains approach provides a way of conceptualizing those underpinning skills and knowledge frameworks that are core to all aspects of public health practice. By grouping other topics within the three domains, explicit concentra-

tion domains are provided that can be updated as new knowledge and events dictate. For example, in the field of health protection, infectious diseases and post-disaster management have increased in profile since the advent of SARS and the 9/11 terrorist attacks, respectively.

Students can make informed choices about how to develop their skills within public health, choosing to focus on one aspect of public health practice or, alternatively, to 'drill down' in the skills of biostatistics and epidemiology, for example. This process is not dissimilar to that adopted in the USA, fitting conceptually with the redefined curriculum proposed by the ASPH competency project.

Developing curricula that support students in acquiring practice-based competencies could potentially result in greater uptake of courses, as it makes explicit the congruence between educational provision and practice.⁴⁸ Furthermore, because the competency framework is used by the public health professional standard setting bodies in the UK, it could potentially facilitate career progression for students, as they will be taught in a way that maps explicitly and transparently against the assessment criteria used by the standard setting bodies for practice. The value of this to those seeking FPH membership would be considerable and may make the courses more attractive and sustainable. In practice, there has been limited operationalization of the competency frameworks within MPH provision, with only 12 of the 35 courses currently on offer making explicit reference to the FPH and the competency frameworks.

However, much of the literature assessing the impact of competency-based training on practice has been unidisciplinary. It suggests that the process is at its most effective when assessment strategies reflect 'real-world observation' and consist of a 'portfolio' of assessment tools.⁶ This will be a challenge for public health, in particular, given the ill-defined workforce and portfolio of practice,⁴⁹ which reflects the disparate nature of people engaged in public health activity and the understanding that public health is 'everyone's business' (David Worthington, personal communication). Whilst there is literature available that provides a framework to match a curriculum to practice development,⁵⁰ it has not previously been applied to public health. Applying the model to the findings from this study suggests that competency in relation to public health is relatively well defined. However, as public health itself is less well defined and delineated,⁴⁹ the reference points that are informing the competencies and which would inform both practice and curriculum development to support practice would need some further study to ensure that the maximal potential of the evidence base is achieved and reflected within a curriculum. Ensuring that the perspective of practitioners, specialists and their employing agencies are reflected adequately within the framework will be key to achieving this goal.⁴⁵

Conclusion

This study has suggested that current MPH provision in the UK may not be reaching its full potential, as the dialogue between public health practice, public health policy and public health educational provision lacks transparency. Whilst the concept of competency has achieved a stage of relative definitional maturity, its functionality as a common foundation for academic and vocational work is debatable without further exploration to ensure that the competencies are grounded in the current context of practice, and reflect the experience of the specialist and practitioner workforces, and the current vision for practice articulated in policy documents. Models that incorporate competency-based learning within a more explicitly realized visualization of the delivery environment may better support students' future learning and adaptability to the workplace by enabling students to take a systemized approach to their learning, which is more responsive to the changing political and practical agendas. The three domains model, which has been found to be operationally robust in the UK and is endorsed by the FPH, its specialist body, could be easily adapted for use by providers of public health education, as evidenced by the UK and Hong Kong case studies.

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Competing interests

None declared.

Useful websites referred to in text

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Chinese University of Hong Kong, School of Public Health—www.sph.cuhk.edu.hk

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