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School of Nursing



# Rapid Review: What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?

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Date: October 12, 2023

## Suggested Citation:

National Collaborating Centre for Methods and Tools. (2023, October 12). What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation? <https://nccmt.ca/pdfs/res/core-competencies>.

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The authors declare they have no conflicts of interest to report.

The Public Health Agency of Canada has commissioned the National Collaborating Centres for Public Health to engage with the Canadian public health community in order to update the 2008 Core Competencies for Public Health in Canada. To inform this work, the NCCMT produced a rapid review on what is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation.

# Executive Summary

## Background

Core competencies for public health have been established for many years. Once these core competency frameworks are developed, they are intended for implementation in practice environments. Evidence related to the settings, contexts and methods by which core competencies are implemented and evaluated will shed light on the uses and impact of core competencies in the field. In addition, evidence that addresses strategies and approaches for implementation of core competencies may be valuable for those seeking to enhance the practice impact of core competencies.

This rapid review was produced to support future revisions to and implementation of core competencies for public health in Canada. This review seeks to identify, appraise, and summarize evidence on this topic to support evidence-informed decision making.

This rapid review includes evidence available up to June 1, 2023 to answer the question: **What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?**

## Key Points

- Core competencies for public health have been implemented in public health educational contexts, including in the design of curricula, courses, and assignments. Overall, there are many examples in which core competencies provide a framework and structure for the design of educational components. Generally, faculty are supportive of the use of core competencies as a frame for curriculum, and students provide positive evaluations of courses designed around competencies.
- The effectiveness of educational programs to increase core competencies has only been reported in a small number of studies (n=4). All of these studies demonstrated an increase in self-assessed student competency after an educational intervention (specifically, an MPH program, a public health nursing course or courses, and an interactive public health nursing simulation). The certainty of the evidence is very low (GRADE); findings are likely to change as new data emerges. Three qualitative studies of graded classroom assignments found evidence of demonstrated competencies.
- Barriers and facilitators to the integration of core competencies in educational contexts have been identified, including variable priorities of the programs, course materials presented from the perspectives of system actors rather than people with lived experience, the complexity of public health issues that make the design of assignments challenging, and ensuring that employment opportunities are available for students with developed core competencies.
- Core competencies for public health have been implemented in workforce contexts, including in the design of workforce training programs, assessments of workforce competency, and the structure of job descriptions. In general, core competencies provide a structure for public health workplaces to develop training programs, assess relevant competencies, and describe roles.
- The effectiveness of workplace training based on core competencies was explored in four studies, all of which reported improvements in competencies among the public

health workforce. The certainty of the evidence is very low (GRADE); findings are likely to change as new data emerges.

- Core competencies for public health have been used as the basis for development of discipline-, role- or topic-specific sets of competencies within public health, including social determinants of health (BeLue, 2023), leadership (Strudsholm, 2021) entry-to-practice nursing (Schofield, 2018) and occupational health (INSPO, 2013).
- Tools and resources have been developed to support the use of core competencies, including examples of teaching and training strategies, self-assessment tools, job description templates and guidance documents for workforce development.
- Limited evidence exists to identify relevant indicators or evaluate the outcomes and/or impacts of core competencies on students or the public health workforce.
- The studies included in this review provide very limited evidence for the experiences of populations who live with social and structural inequities, such as Indigenous or racialized communities. Further research is required to ensure representation of the perspectives of these populations.
- Barriers and facilitators to the implementation of core competencies in workforce contexts have been identified at structural and organizational levels, as well as related to the content and dissemination of core competency frameworks.

## Overview of Evidence and Knowledge Gaps

### Public health educational contexts

- Ways that core competencies have been integrated into, or used as the basis for, curricula are described in nine studies. Three of these curricula were in public health nursing programs (Joyce, 2019; Kinnard Campbell, 2014; Schoneman, 2013) and three in MPH programs (Coombe, 2019; Greece, 2019; Sathiakumar, 2019), with one each related to health administration (BeLue, 2023), preventive medicine (Wells, 2015) and dental public health (Brondani, 2015). Of the curriculum-focused studies, three applied the US Quad Council nursing competencies, with one of these evaluating increases in nursing student competencies through the program (Joyce, 2019), one assessing awareness of the competencies among directors (Kinnard Campbell, 2014), and one assessing curriculum content relative to the competencies, finding that competencies are not comprehensively covered in all public health programs (Schoneman, 2013). In the context of MPH program curricula, one addressed the competency outcomes of practice-based teaching (Greece, 2019), and one described a competency-based program (Sathiakumar, 2019). In other discipline programs, one described the incorporation of integrative medicine competencies in a preventive health curriculum (Wells, 2015) and one described the incorporation of dental public health competencies in dental education (Brondani, 2015). With respect to equity considerations, one focused on the incorporation of social determinants of health concepts across a health administration curriculum (BeLue, 2023) and one focused on the integration of Australian Indigenous competencies (Coombe, 2019). Faculty support the use of core competencies as a frame for curriculum (Kinnard Campbell, 2014) and they have increased their knowledge and incorporation of the competencies into curriculum through orientation and training (Joyce, 2019). Students provide positive evaluations of courses based on competencies (Chen-Edinboro, 2019; Jakeway, 2006; Papadopoulos 2013), and preceptors and

placement sites provide positive evaluations of competency-based practica (Greece, 2019; Wells, 2015).

- The uses of core competencies as the basis for course design were described in six studies. One explored practice-based teaching across three modes of course delivery (in-person, virtual and online), finding similar achievement of competencies regardless of modality (Cunnington, 2023). Integration of core competencies into the development of new courses was explored by Chen-Edinboro (2019) and Jakeway (2006). In the context of practice-based learning, practicum-based nursing in a global setting was described by Brown (2017), a business plan capstone course was described and evaluated by Papadopoulos (2013), and a nurse-managed wellness centre placement was described by Thompson (2013).
- The assessment of student competencies relative to core competencies was described in six studies, using self-assessment instruments. Disciplines and roles addressed included nursing (Brown, 2023; Larsen, 2019; Siemon, 2017), MPH (Britten, 2014), dentistry (Gaunkar, 2016), and veterinary medicine (Haas, 2023). In four of these studies, competencies were assessed in a pre-post design, showing improvements in self-rated competencies following a course or program of study (in Gaunkar (2016), competencies were only assessed at the end of a public health dentistry course, and Haas (2023) did not report findings). The assessment of student competencies through self-assessment instruments has limitations typically associated with self-reports, such as recall and reporting bias (Gaunkar, 2016; Britten, 2014), and ideally would be augmented with interviews to determine the precise reasons for perceived lack of competence (Gaunkar, 2016).
- Teaching strategies for entry-to-practice competency-based public health nursing were described in a resource from the Canadian Association of Schools of Nursing (Schofield, 2018). In one example of a course assignment design, Rohlik (2020) described a poster assignment designed to demonstrate understanding of core competencies, including evidence-based action to reduce social inequalities in health.

#### Workforce contexts

- The uses and impacts of competency frameworks in workforce contexts were described in one review and two studies, which provided an analysis of the development and/or implementation of core competency frameworks. INSPQ (2021) conducted a review of framework implementation, and interviews to explore framework implementation in the Quebec context. Their analysis provided several structural, organizational, process and content factors associated with implementation of core competency frameworks, including the lack of a planned dissemination strategy as a barrier common to most frameworks. INSPQ (2011) provided a structure for the development and implementation of core competency frameworks, including the critical step of ownership at the implementation stage. In the UK context, Bornioli (2020) evaluated the use of the UK Public Health Skills and Knowledge Framework, and provided recommendations on ways to enhance the use of the framework, including greater clarity on purpose and audience, the need for more support from employers, clear career progression opportunities, and stronger links with other competency frameworks.
- Workforce development strategies based on core competencies were described in one review and two studies. Wall and Underwood (2013) provided an analysis of the ways in which core competencies for public health have been used in workforce development,

and provided several recommendations for ways to strengthen the competencies and their link to workforce development, including regular re-assessment of the competencies for relevance and applicability. Burkin (2023) proposed that public health competencies should be transdisciplinary, with corresponding needs for changes to public health education. Hunter (2023) described a 'roadmap' for building a competent public health workforce, including changes to educational programs and workforce strategies.

- Ways that core competencies have been used in the context of workforce training programs were described in seven studies. PHAC (2016) conducted an evaluation of training developed for the public health workforce, concluding that the various programs have contributed to the knowledge and skills of the public health workforce in Canada. Espina (2016) conducted a training needs assessment among public health nursing leaders. Zahner (2014) presented a competency program for public health nurses and nursing students, which produced increases in self-assessed competencies. However, the program consisted of many diverse activities, such as continuing education courses, conferences, and resources for faculty and practitioners, and it is not clear which were the most effective components of the program. Hawley (2011) described a leadership program that resulted in competency improvements. Stewart (2010) described an interdisciplinary workforce development program based on the Council of Linkages competencies and reported a subsequent increase in self-assessed competencies. Demers (2008) assessed the alignment between the professional development needs of MPH graduates and employer support for continuing education. Turnock (2001) described the development of a credentialing program for public health administrators.
- Assessments of workforce competencies were described in four studies. Bashkin (2022) described the development of competencies in the Israeli context, and the use of those competencies to assess the adequacy of the existing workforce to fulfil those needed competencies, finding a gap between the current competencies and what is needed. Bartee (2003), Bigbee (2010) and Harmon (2020) each reported on self-assessments of competencies in US public health workforce samples. Bartee (2003) found that self-reported competency among public health nurses, mental health professionals, and environmental health specialists was highest on the Communication skills domain; perceived low skills domains included financial planning and management skills and policy development/program planning skills. Bigbee (2010) found a moderate level of competence among public health nursing staff, with higher competencies among leaders. Awareness of the competencies may be a gap among public health employees: Harmon (2020) demonstrated that the majority of nurses they surveyed had no or minimum knowledge of the Quad Council core competency framework.
- Three studies described core competencies in the context of job descriptions, including one that described a process for developing public health job descriptions based on competencies (Council on Linkages, 2022), and two that explored the extent to which core competencies are represented in public health director (Polivka, 2014) or nursing (Issel, 2012) job descriptions. Analyses of job descriptions have found mismatches between the position description and core competencies among public health nurses (Issel, 2012) and public health nursing directors (Polivka, 2014). Greater competencies have been associated with more years of experience, and leadership roles (Bigbee, 2010). Bartee (2003) found that management/administration level staff reported their lowest perceived proficiency in basic public health science skills.

## Tools and Resources

- Tools and resources have been developed to support the use of core competencies, including examples of teaching and training strategies and assignments (BeLue, 2023; PHAC, 2016; Papadopoulos, 2013; Schofield, 2018; Stewart, 2010), self-assessment tools (ASHPER, 2020; Bigbee, 2010; Brown, 2023;), job description templates (Council on Linkages, 2021a,b and 2022) and guidance documents for workforce development (ASHPER, 2020; Council on Linkages, 2021a,b and 2022; Hunter, 2023; INSPQ, 2021; Wall, 2013).

## Barriers and Facilitators

### Educational Contexts

- Interdisciplinary education/training was proposed as a desirable approach to building a competent public health workforce (Burkin, 2023).
- As a facilitator for implementation of core competency frameworks in an educational context, Joyce (2019) found that orienting preceptors and clinical placement staff resulted in improved student experiences.
- The development of new curricula based on competencies can encounter challenges: Sathiakumar (2019) found that lack of political will, limited resources for training, and funding for research were barriers to implementation of a competency-based MPH program. Challenges were associated with advocating for the new program approach with a broad range of influencers, enrolling diverse student populations, building student leadership skills and ensuring that employment opportunities would be available for new graduates with these competencies. Jakeway (2006) reported that a population health course was difficult to implement because of staff shortages, limitations to student proficiency in technology, and cross-college collaboration challenges. Wells 2015 described challenges associated with competency-based preventive medicine curricula, including limited time available for practica and difficulty developing strong local community partnerships. Brown (2017) also identified challenges associated with developing interprofessional collaboration with peers in another country.
- BeLue (2023) noted that social determinants of health course materials tended to be presented from the perspectives of system actors rather than people with lived experience.
- Coombe (2019) found that the inclusion of Indigenous core competencies in Australian MPH program curricula was variable across programs, and was influenced by external factors, such as the proportion of Indigenous people in the local population, and internal factors, such as university priorities and program orientation.
- Chen-Edinboro (2019) reported that because public health concepts and issues are complex, course assignments that ask students to incorporate these issues are difficult to implement.

### Workforce contexts

- INSPQ (2021) provided a comprehensive analysis of the use of competency frameworks in public health workforce contexts, and described influential factors at many levels.
  - Structural factors:

- Overall, it was noted that there are few levers that could promote framework use within government.
  - Accreditation systems requiring the preparation of continuing professional development plans based on frameworks is one facilitating factor.
  - Competency frameworks can be a facilitating tool for recognizing and professionalizing the different areas of public health.
- Organizational factors include:
  - the alignment of organizational and national objectives,
  - the availability of resources, mechanisms and tools,
  - the amount of time devoted to competency development,
  - the role of managers in encouraging framework use.
- Content gaps exist in existing competency frameworks, such as inequities in health and the analysis of public policy.
- Lack of a dissemination and knowledge translation strategy is a limiting factor for promotion and use. INSPQ (2011) similarly noted the need for ownership of the core competency framework to facilitate implementation of a competency framework.
- Readability factors can be barriers to implementation, including presence of jargon, text length and quantity, and the availability of translations into the language of minority groups.
- A core competency framework may be helpful in guiding professional development, recruiting and training new staff, and developing new organizational structures (described in the context of occupational health by INSPQ (2013)).
- The development of an established template for core competency-based job descriptions was suggested as a way of creating more consistency across the field (Issel 2012).
- Competency assessments can identify continuing education programs needed in the public health workforce, which may be addressed, in part, through partnerships with schools of public health (Stewart, 2010).
- Tiering of competencies, to apply appropriately to entry-to-practice versus advanced level staff, is a consideration raised by Schofield (2018).
- Perceived barriers to workforce training included funding cuts and privatization of workforce resources that may lead to less availability of paid training opportunities (Demers 2008).
- Inconsistent intervention doses may pose a challenge for determining the contributions of various workforce training opportunities (Zahner, 2014).
- Use of core competencies in a workforce may be limited because of existing shortages of staff and the desire not to create further barriers to participation in the field (Harmon 2020). Similarly, concerns were documented about competency-based certification programs becoming mandatory, and thereby reducing the number of qualified applicants in the field (Turnock, 2001).
- As a barrier to implementing public health competencies in practice, many dentistry students and dentists were unwilling to work in public health settings, preferring a private practice model (Brondari, 2014).
- Polivka (2014) found a lack of fit between public health nursing position descriptions and nationally recognized standards of nursing practice and competencies, and suggested

that public health nursing may be undifferentiated as a public health discipline and as a nursing specialty.

- Wall (2013) provided several recommendations for the continued relevance of core competencies in the Canadian public health workforce:
- Revisit the Core Competencies for Public Health in Canada every 3 years to determine their continued relevance and applicability.
- Strengthen the language in the Core Competencies for Public Health in Canada to reflect the attributes of social justice and social determinants of health.
- Include an additional competency domain to acknowledge the competencies required to facilitate and work within ever-changing social, cultural and political contexts.
- Include additional competency domains: “Public Health Informatics” and “Health Literacy”
- Strengthen language to reflect competencies required to: translate knowledge into performance improvement or action; identify and mitigate risk; reflect competencies required for interprofessional collaboration.

## Evidence Gaps

### University Program Accreditation Contexts

- Although core competency frameworks are the basis for educational program accreditation, and organizations supporting programs with accreditation are represented in the findings of this review (ASPHER, 2020; Council on Linkages, 2021a,b and 2022), little is known about the specific impacts of core competency frameworks on accreditation. INSPQ (2021) identified the presence of these accreditation requirements as a facilitator for core competency framework uptake. Chen-Edinboro (2019) described a practice-based course designed to respond to credentialing requirements.

### Outcomes of Core Competency Frameworks for Students, Workforce or Practice

- Limited evidence exists to identify relevant indicators or evaluate the outcomes and/or impact of core competencies on students or the public health workforce. PHAC (2016), in an evaluation of a suite of training programs, identified this gap, saying that “the extent to which these programs have resulted in the public health workforce having the abilities to execute their public health functions is unclear,” given that the exact nature of the needed skills and gaps is not well documented. Although this review has identified several examples of ways that core competencies have been incorporated into educational and workforce settings, there is a gap in evidence linking core competency implementation, self-assessed competencies, and outcomes in public health practice.
- Only two studies reported practice outcomes in public health associated with core competencies. The contribution of core competencies to practice outcomes has been demonstrated in a family health program (Susanto, 2021), in which there was a demonstrated correlation between the nursing competencies and the achievement of program outcomes in Indonesia, and in an assessment of equity outcomes (Andruszkiewicz, 2019), in which core competencies used by local public health organizations to share data effectively with community partners resulted in advances in health equity.

### Experiences of populations living with social or structural inequities

- The studies included in this review provide very limited evidence for the experiences of populations who live with social and structural inequities, such as Indigenous or



racialized communities. Although core competency frameworks generally include aspects of cultural safety, anti-racism and local population health, little is known about the specific ways that the implementation of these competencies influences public health practice (although this review excluded studies focused on a single competency). One article, Coombe (2019), explored Indigenous public health competencies in Australian MPH programs, finding that the integration of these competencies varied across programs and was related to the proportion of Indigenous people in the local population, and to the university program orientation and priorities. Brown (2017) found that a lack of culturally relevant health education materials for a Belizean setting was a barrier to developing a practice-based course for US students in this setting.

## Methods

A description of the development of the National Collaborating Centre for Methods and Tools' Rapid Evidence Service has been published (Neil-Sztramko *et al.*, 2021). The paper provides an overview of the review process with rationale for methodological decisions.

### Research Question

What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?

### Search

On June 1, 2023, the following databases were searched using key terms [evaluation study, organization, administration, process assessment, health care, program evaluation, establish, evaluate, impact, measure, monitor, framework, federal, American Public Health Association, education, public health professional, environment, public health, public health administration, public health dentistry, public health nursing, public health practice, public health systems research, schools, students, United States Public Health Service, professional competence, competencies, competency, expertise, and skill]:

- [Pubmed](#)
- [CINAHL](#) database
- [ERIC](#) database

A copy of the full search strategy is available in [Appendix 1](#).

## Study Selection Criteria

Syntheses, single studies and grey literature were included. English-language, peer-reviewed sources and sources published ahead-of-print before peer review were included. Guidance documents and expert opinion were included. Surveillance sources were excluded.

	Inclusion Criteria	Exclusion Criteria
Population/Context	Public Health, including public health discipline- or role-specific (e.g., epidemiology, environmental health, health promotion, community health, public health nursing, public health nutrition)	Health care outside of public health; primary care, hospitals
Intervention	<ul style="list-style-type: none"> <li>• Core, essential, or foundational core competencies for public health across multiple disciplines and roles</li> <li>• Implementation, use, application, evaluation of core competencies (e.g., incorporation into curricula or job descriptions)</li> <li>• Barriers and facilitators to implementation of core competencies</li> </ul>	<ul style="list-style-type: none"> <li>• Core competencies in fields outside of public health</li> <li>• Analyses only of the <b>content</b> of core competencies</li> <li>• Focus only on <b>organization-level</b> competencies, or a <b>sole</b> competency (e.g., leadership) unless based on broad core competencies, or public health <b>function</b> (e.g., emergency preparedness and response)</li> </ul>
Comparisons	None or pre-implementation	
Outcomes	Implementation (use, application) or evaluation (process, outcome, impact) of core competencies	

## Data Extraction and Synthesis

Data relevant to the research question were extracted, such as study design, setting, location and specific role of core competencies. For quantitative studies, evaluation outcomes were extracted when reported. For qualitative studies, key findings and facilitators and barriers were extracted when reported.

Due to the nature of the research question, the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) (Schünemann et al, 2013) approach was only used for quantitative findings related to effectiveness of interventions in educational and workplace settings. Qualitative findings were reviewed for trends across studies. We synthesized the results narratively due to the variation in methodology and outcomes for the included studies. Quantitative and qualitative data were synthesized simultaneously, using a convergent integrated approach (Lizarondo, 2020).

## Appraisal of Evidence Quality

We evaluated the quality of included evidence using critical appraisal tools as indicated by the study design below. Quality assessment was completed by one reviewer and verified by a second reviewer. Conflicts were resolved through discussion. We did not assess the methodological quality of non-systematic reviews, or studies that were descriptive in nature and/or did not have a specific methodological design. Studies for which quality appraisal has not been conducted are noted within the data tables.

Study Design	Critical Appraisal Tool
Cross-sectional	Joanna Briggs Institute (JBI) <a href="#">Checklist for Analytical Cross Sectional Studies</a>
Qualitative	Joanna Briggs Institute (JBI) <a href="#">Checklist for Qualitative Research</a>
Quasi-experimental	Joanna Briggs Institute (JBI) <a href="#">Checklist for Quasi-Experimental Studies</a>
Mixed Methods	Mixed Methods Appraisal Tool (MMAT) <a href="#">Checklist for Mixed Methods Studies</a>

Completed quality assessments for each appraised study are available on request.

The Grading of Recommendations, Assessment, Development and Evaluations ([GRADE](#)) (Schünemann *et al.*, 2013) approach was used to assess the certainty in the quantitative findings, when reported, based on eight key domains.

In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence, and this assessment can be further reduced based on other domains:

- High risk of bias
- Inconsistency in effects
- Indirectness of interventions/outcomes
- Imprecision in effect estimate
- Publication bias

and can be upgraded based on:

- Large effect
- Dose-response relationship
- Accounting for confounding.

The overall certainty in the evidence for each outcome was determined by taking into account the characteristics of the available evidence (observational studies, some not peer-reviewed, unaccounted-for potential confounding factors, different tests and testing protocols, lack of valid comparison groups). A judgement of 'overall certainty is very low' means that the findings are very likely to change as more evidence accumulates.

## Findings

### Summary of Evidence Quality

This document includes 2 non-systematic reviews and 48 single studies for a total of 50 publications included in this review.

What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?

Setting or Context	Evidence included		Quality of evidence	Overall certainty in evidence (GRADE)
	Type of Evidence	n		
<ul style="list-style-type: none"> <li>Educational contexts</li> </ul>	Syntheses Cross-sectional Qualitative Quasi-experimental Mixed Methods Descriptive	0 4 1 4 1 13	3 High 6 Moderate 1 Low 13 Not Assessed	⊕○○○ <sup>1</sup> based on n=4 studies: Britten (2014) Brown (2023) Larsen (2019) Siemon (2017)
<ul style="list-style-type: none"> <li>Workplace contexts</li> </ul>	Syntheses (non-systematic) Cross-sectional Qualitative Quasi-experimental Mixed Methods Descriptive	2 5 1 3 1 11	1 High 4 Moderate 5 Low 13 Not Assessed	⊕○○○ <sup>1</sup> based on n=4 studies: Hawley (2011) PHAC (2016) Stewart (2010) Zahner (2014)
<ul style="list-style-type: none"> <li>Practice outcomes</li> </ul>	Syntheses Cross-sectional Qualitative Quasi-experimental Mixed Methods Descriptive	0 0 0 1 1 0	0 High 0 Moderate 2 Low	
<ul style="list-style-type: none"> <li>Other competencies</li> </ul>	Syntheses Cross-sectional Qualitative Quasi-experimental Mixed Methods Descriptive	0 0 0 0 0 2	0 High 0 Moderate 0 Low 2 Not Assessed	

<sup>1</sup> In the GRADE approach to quality of evidence, observational studies, as included in this review, provide low quality evidence. The quality of evidence was downgraded to very low, given high risk of bias, indirectness of interventions/outcomes, and imprecision in effect estimate.

# What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?

**Table 1: Educational Settings**

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<b>COURSE AND CURRICULUM DESIGN</b>							
BeLue, R., Rozier, M., Howard, S., Schuchart, C.V., Walter, M., Enard, K. (2023). <a href="#">Teaching Social Determinants of Health to Future Health Care Leaders</a> . <i>Journal of Health Administration Education</i> , 39(2), 311-328.	2023	United States	Curriculum design (and Other Competencies)	Integrated aspects of social determinants of health (SDOH) across all courses in a Master of Health Administration program based on a competency model. The competencies include leadership, critical thinking and analysis, management, culture and community engagement, and communication. Teaching strategies are included.	NR	Most of the readings, guest speakers, and activities in the discussed curriculum still come from the perspective of those who are modifying the SDOH rather than from people with lived realities.	Descriptive  Not Quality Appraised
Coombe, L., Lee, V., & Robinson, P. (2019). <a href="#">Educating for Indigenous public health competence - how do we stack up in Australia?</a> <i>Australian and New Zealand journal of public health</i> , 43(2), 143-148.	2019	Australia	Curriculum design	Australian MPH programs were assessed to see whether Indigenous public health core competencies were integrated.	In the 7 universities that participated, 65 teaching staff provided data for 73 subjects. Results showed varying levels of relevant content in both core and elective subjects. Not all reviewed universities taught all the competencies in their core curriculum and some universities did not cover all the competencies in either the core or elective subjects.	External factors influenced the integration of Indigenous core competencies. Geographically, universities located in regions with higher proportions of Aboriginal and Torres Strait Islander people appear to have better integration. The increasing number of international students could potentially be a barrier to Indigenous health integration in the future. Internally, institutional priorities such as teaching methods, student quotas, cross-institutional support, and program orientation	Descriptive  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
						affected the integration. Additional factors included program length, curriculum structure, awareness of Indigenous health, access to teaching materials, student interest, staff capacity, and financial constraints.	
Greece, J.A., Wolff, J., & McGrath, D. (2019). <a href="#">A Framework for Practice-Based Teaching in Public Health</a> . <i>Journal of public health management and practice</i> , 25(5), E30–E38.	2019	United States	Curriculum design	Evaluate the use of a practice-based teaching framework to design, implement and evaluate practice-based teaching in enhancing MPH students' technical competencies.	All students (n = 12) reported increases in ability with the technical and professional competencies addressed in the course, although no further data were reported. The placement agency reported high satisfaction with the deliverables and anticipated utility of them in practice.	NR	Mixed Methods  Low
Joyce, B.L., Harmon, M.J., Johnson, R.G.H., Hicks, V., Brown-Schott, N., & Pilling, L.B. (2019). <a href="#">Using a quality improvement model to enhance community/public health nursing education</a> . <i>Public health nursing (Boston, Mass.)</i> , 36(6), 847–855.	2019	United States	Curriculum design	A collaborative team applied community/public health competencies to nursing education to enhance community/ public health nursing education. The project involved using the Quad Council Competencies for Public Health Nurses (QCC-PHN) competencies to standardize community/public health nursing education and practice and evaluate learning outcomes.	The faculty that participated in the orientation to the competencies saw improved knowledge and greater application of the competencies in their practice as clinical faculty. Students moved from awareness at pre-test to being knowledgeable or proficient about the QCC-PHN at post-test.	Orienting clinical site staff liaisons and preceptors increased the support of the competencies in education and practice and the success of the student experiences, thereby enhancing team-based outcomes.	Descriptive  Not Quality Appraised
Sathiakumar, N., Tipre, M., Wickremasinghe, R., Bhat, V., Kadir, M.M., Coggon, D., ... Delzell, E. (2019). <a href="#">Building global partnerships through shared curricula for an MPH</a>	2019	India and Sri Lanka	Curriculum design	A competency-based MPH curriculum was developed with two specialty tracks in applied epidemiology and environmental and occupational health, emphasizing applied practice and research.	The program has graduated 7 cohorts of students. Students were diverse and graduates have been successfully placed in leadership positions at	The main barriers to establishing such programs are lack of political will, limited resources in terms of trained professionals and funding for research.	Descriptive  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<a href="#">programme in India and Sri Lanka</a> . <i>Global public health</i> , 14(9), 1360–1371.					governments or private institutions.	Some of these challenges included presenting the importance of the initiative beyond the program planners to the board of directors and academic advisors, expanding public health education to students that did not demonstrate diversity in background, and imparting skills that readied the MPH students to transition into leadership roles. Producing a critical mass of public health professionals also led to the challenge of ensuring that job opportunities for the new MPH students were available.	
Wells, E.V., Benn, R.K., & Warber, S.L. (2015). <a href="#">Public Health and Preventive Medicine Meet Integrative Health: Applications of Competency Mapping to Curriculum Education at the University of Michigan</a> . <i>American journal of preventive medicine</i> , 49(5 Suppl 3), S270–S277.	2015	United States	Curriculum design	Integrative medicine competencies approved by the Society of Teachers of Family Medicine were used to develop a preventive medicine residency curriculum. The curriculum aimed to enhance physicians' skills in complementary and alternative medicine (CAM) and integrative medicine (IM). The curriculum spanned the entire 2-year training program and covered various aspects of integrative medicine.	11 residents, 3 faculty members, and more than 20 public health graduate students were exposed to the integrative medicine curriculum. The curriculum was generally well received by the residents. Preceptor evaluations of the 4 residents who rotated within integrative medicine were all at least above average.	Based on evaluation and feedback, the curriculum was adjusted to incorporate an overview of the various systems and therapies subsumed under CAM or IM, emphasizing the epidemiology of CAM uptake by individuals. The emphasis on the practice of self-care was also decreased.  Another challenge was scheduling and the limited time in the program for	Descriptive  Not Quality Appraised



Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
						required practicum rotations. Another challenge was gaining public health experience in integrative medicine due to the inability to develop a project in partnership with the local health department because of the timeframe.	
Brondani, M.A., Pattanaporn, K., & Aleksejuniene, J. (2015). <a href="#">How can dental public health competencies be addressed at the undergraduate level?</a> <i>Journal of public health dentistry</i> , 75(1), 49–57.	2015	Canada	Curriculum design	Assesses the extent to which dental public health competencies are addressed by the undergraduate dental module "Professionalism and Community Services" (PACS). The four years of the PACS module involve integrated teaching of six competencies related to dental public health. The multifaceted pedagogical approach employed to discuss aspects of dentistry related to dental public health includes guest lectures, community activities, small group activities, self-reflection, and reports.	NR	As a barrier to using the core competencies, many students and dentists are unwilling to work outside of a private practice model to attend to the needs of the public.	Qualitative Moderate
Kinnard Campbell, D. (2014). <a href="#">Program Evaluation: Use of Core Competencies in College and Universities with Community/ Public Health Programs in Master's and Doctorate Curricula.</a> <i>The Journal of Chi Eta Phi Sorority</i> , 58(1), 1-5.	2014	United States	Curriculum design	Deans and directors of community/ public health nursing master's and doctoral programs throughout the United States assessed the implementation of public health Quad Council Coalition nursing core competencies in their curricula.	67% of the respondents were familiar with the core competencies. Of the respondents who were not familiar, 93.8% had plans to become familiar. 86.7% already taught core competencies, and 61.5% percent had plans to teach core competencies in future.	NR	Cross-sectional Moderate
Schoneman, D., Simandl, G., Hansen, J.M., & Garrett, S. (2014). <a href="#">Competency-based project to review community/public health</a>	2013	United States	Curriculum design	Competency domains in the Quad Council Coalition nursing competencies were used to assess public health nursing program curricula from 8 programs.	Most programs covered at least 75% of the competencies in domains 1 to 6. The coverage of individual competencies within these	NR	Descriptive Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<a href="#">curricula</a> . <i>Public health nursing (Boston, Mass.)</i> , 31(4), 373–383.					domains was inconsistent.  Few programs addressed more than 75% of the competencies in domain 7 (financial planning/management) and 8 (leadership/systems thinking).		
Cunnington, S., Codner, A., Nelson, E., McGrath, D., & Greece, J.A. (2023). <a href="#">The Shifting Public Health Landscape and Virtual Learning Environment: The Effectiveness of Practice-Based Teaching Delivered In-Person, Virtual, and Hybrid</a> . <i>International journal of environmental research and public health</i> , 20(4), 2867.	2023	United States	Course design	The competencies were used as metrics to compare different modes of course delivery (in-person, hybrid, and virtual) for a practice-based public health course.	Boston University students taking the Communication Strategies for Public Health course achieved similar levels of competency development regardless of the modes of course delivery. They reported that the practice-based teaching nature of the course directly contributed to their workforce readiness.	NR	Quasi-experimental  Moderate
Chen-Edinboro, L.P., Figueroa, J., Cottrell, R., Catalano, H.P., & Whipple, K. (2019). <a href="#">Applied Learning for Undergraduates: Integrating NCHC Competencies and CEPH Public Health Domains in a Public Health Practice Course</a> . <i>Journal of community health</i> , 44(3), 519–524.	2019	United States	Course design	A new course, Public Health Practice, was developed for undergraduate public health students to introduce them to selected Council on Education for Public Health Domains of Public Health and National Commission for Health Education Credentialing competencies.	Students were receptive to the course based on positive course evaluations and student comments.	Many public health issues are large and complex, which posed significant issues for the students to design feasible programs and interventions as part of their assignments.	Descriptive  Not Quality Appraised
Brown C.L. (2017). <a href="#">Linking public health nursing competencies and service-learning in a global setting</a> . <i>Public health nursing (Boston, Mass.)</i> , 34(5), 485–492.	2017	United States and Belize	Course design	A practical course with an innovative approach was developed to facilitate public health nursing competencies. Students collaborated with Belizean communities to meet health-related needs and to engage in health promotion activities.	NR	There was a lack of culturally appropriate and country-specific health education materials. It was initially difficult to promote interprofessional collaboration with their peers prior to departing for	Descriptive  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
				The course was aligned with 6 of 11 entry-level public health nursing competencies and all five domains of entry-to-practice public health nursing competencies. Students also gained practice in developing public health nursing competencies for entry-level nursing practice. Implementation of service-learning principles provided students with opportunities for civic engagement and self-reflection.		Belize.	
Papadopoulos, A., Britten, N., Hatcher, M., & Rainville, K. (2013). <a href="#">Using business plan development as a capstone project for MPH programs in Canada: validation through the student perspective</a> . <i>Journal of community health, 38</i> (5), 791–798.	2013	Canada	Course design	A business plan as a capstone project for Guelph's MPH program integrates all 36 core competencies developed by the Public Health Agency of Canada.	Students reported that the business plan project not only imparts core competencies but also develops critical skills in research, collaboration, advocacy, leadership, and lifelong learning.	NR	Descriptive  Not Quality Appraised
Thompson, C.W., & Bucher, J.A. (2013). <a href="#">Meeting baccalaureate public/community health nursing education competencies in nurse-managed wellness centers</a> . <i>Journal of professional nursing: official journal of the American Association of Colleges of Nursing, 29</i> (3), 155–162.	2013	United States	Course design	To assess whether community health competencies (Association of Community Health Nurse Educators core knowledge basic competencies) have been met for baccalaureate nursing education through clinical placements in nursing-managed wellness centres.	The nursing-managed wellness centres provide a clinical practice setting for baccalaureate nursing students in community health nursing, in which they learned clinical practice competencies through providing care to low-income individuals, families, and populations.	NR	Descriptive  Not Quality Appraised
Jakeway, C.C., Cantrell, E.E., Cason, J.B., & Talley, B.S. (2006). <a href="#">Developing population health competencies among public health nurses in Georgia</a> . <i>Public health nursing</i>	2006	United States	Course design	The Quad Council PHN Competencies were used to develop a population health online course. The course aimed to aid nurses in developing and enhancing skills essential to population-focused practice in	92% of participants were either "Satisfied" or "Very Satisfied" with the course. However, only 40% reported that the program positively influenced them to pursue	Some of the barriers to the implementation of the course included limited budgets leading to staffing shortages, limited technology proficiency for	Descriptive  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<i>(Boston, Mass.), 23(2), 161–167.</i>				conjunction with clinical prevention skills already applied in the workforce.	<p>higher education and 34% would not recommend the program or would recommend some changes to the program. Some dissatisfaction stems from the time required to participate and the limited staff and time available to address population health practices in the workplace.</p> <p>The level of activity in the competencies varied. Most students reported at least an adequate amount of experience of less time- and resource-intensive competencies.</p>	<p>the students and difficulties collaborating between different colleges and universities.</p> <p>To address budget constraints, a 3-day Introduction to Population Health Continuing Education Program was developed for those who would not have been able to participate in the online course. To address concerns around technology knowledge for the nurses, the program began offering a 1-day and a multiple-day basic computer skills orientation before taking the population health online course.</p>	
Rohlik, L., & Krumwiede, K. (2020). <a href="#">Transforming learning: Applying community and systems level interventions through a poster project</a> . <i>Public health nursing (Boston, Mass.), 37(6), 900–908.</i>	2020	United States	Course assignment design	Designed and implemented a poster project for evaluating students' ability to meet Quad Council Coalition Competency Review Task Force competencies for public health nursing. The assignment offered an opportunity for students to identify a societal health concern, define a community construct, and identify community and systems-level evidence-based interventions. The Quad Council Domains of competency are: I: Assessment and Analytic Skills; II: Policy Development/Program Planning Skills;	Overall, faculty evaluation showed that the posters submitted met one or more competencies in six out of eight domains. Domains I–IV, VI, and VIII were met by 100%, domain V was met by 60%, and domain VII was met by 25% of the teams.	NR	Descriptive  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
				III: Communication Skills; IV: Cultural Competency Skills; V: Community Dimensions of Practice Skills; VI: Public Health Sciences Skills; VII: Financial Planning, Evaluation, and Management Skills; VIII: Leadership and Systems Thinking Skills.			
<b>STUDENT COMPETENCIES</b>							
Brown, R., Plemmons, C., Abuatiq, A., Hultman, C., Currier, D., Schmit, M., ... Mennenga, H. (2023). <a href="#">Evaluating Knowledge of Public Health Nursing Competencies in Baccalaureate Nursing Students</a> . <i>Nursing education perspectives</i> , 44(4), 237–240.	2023	United States	Student competencies	Used a self-assessment instrument to document competence both before and after participants participated in an interactive public health nursing simulation intervention.	154 senior-level BSN students completed both pre-test and post-test survey. There were significant improvements for all self-assessed public health competencies (assessment of the population, population-based planning, implementing interventions, evaluation of process and outcomes), with scores on the assessment instrument moving from a score of 405 before the public health nursing content (a score slightly above the scale median) to 455 afterwards, $p < .001$ .	NR	Quasi-experimental  High
Haas, S., Walker, R., & Mulcahy, E.R. (2023). <a href="#">Incorporating Public Health Competencies into Veterinary Medical Education</a> . <i>Journal of veterinary medical education</i> , e20220106. Epub ahead of print.	2023	United States	Student competencies	Core competency assessment was used for DVM/MPH dual degree students and MPH students to self-evaluate their public health capability before and after the program.	Following program completion, competencies relating to epidemiology, biostatistics, and social and behavioral public health were perceived to be most valuable to students.  Competency knowledge results from the exit survey or a comparison before and after the program were not reported.	NR	Cross-sectional  Moderate

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
Larsen, R., & Reif, L. (2019). <a href="#">Leveling the core competencies of public health nursing to evaluate senior baccalaureate nursing students</a> . <i>Public health nursing (Boston, Mass.)</i> , 36(5), 744–751.	2019	United States	Student competencies	Used Quad Council Coalition Competency Review Task Force nursing competencies to assess nursing students' public health competencies before and after taking a course on public health nursing.	Nursing students increased their self-assessed public health competency from pre- to post- course intervention. Self-reported competency scores ranged across domains from 3% - 43% pre-intervention to 80% - 95% post-intervention.	NR	Quasi-experimental  High
Siemon, M., Gallegos, C., & Gehrke, P. (2018). <a href="#">Assessment of public health core competencies in prelicensure baccalaureate nursing students</a> . <i>Public health nursing (Boston, Mass.)</i> , 35(2), 150–156.	2017	United States	Student competencies	Use of the Competency Assessment Tool for Tier 1 Public Health Professionals to self-assess nursing student's competencies before and after taking community health nursing courses.	Pre-course scores showed a lack of self-reported public health competency in all domains (range of 6% - 31% competency pre-course), as compared to increased self-reported competency post-course and overall good public health competency (range 57% - 82% competency post-course).	NR	Quasi-experimental  High
Gaunkar, R.B., Basavarajappa, P., Raheel, S.A., & Kujan, O.B. (2016). <a href="#">Perception of Dental Public Health Competency among recent graduates</a> . <i>Journal of International Society of Preventive &amp; Community Dentistry</i> , 6(Suppl 2), S137–S142.	2016	India	Student competencies	Self-perception of dental public health competency gained through the public health dentistry course undertaken during dental studies.	Recent dental graduates at the Institute perceived themselves competent in managing oral and dental health problems at the public level.	Competency-based surveys yield useful information for curriculum review, however, neither they nor any single method of reviewing the curriculum should be used alone. Competency-based evaluations should be clarified and amplified by focus group interviews to tease out the precise reason for the perceived lack of competence in any area.	Cross-sectional  Moderate
Britten, N., Wallar, L.E., McEwen, S.A., & Papadopoulos, A. (2014).	2014	Canada	Student competencies	Core Competencies for Public Health in Canada was used as an evaluative framework to determine whether MPH	The proportion of respondents who scored their proficiency as very good or outstanding in	Recall bias and reporting bias were potential barriers to using the competencies.	Cross-sectional

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<a href="#">Using core competencies to build an evaluative framework: outcome assessment of the University of Guelph Master of Public Health program.</a> <i>BMC medical education</i> , 14, 158.				graduates are receiving adequate training and identify areas for improvement.	each of the Core Competencies ranged from 35.3-97.1% at the end of their program, compared to 5.7% at the beginning of the program.		Moderate
<b>TEACHING STRATEGIES</b>							
Schofield, R., Chircop, A., Baker, C., Dietrich Leurer, M., Duncan, S., & Wotton, D. (2018). <a href="#">Entry-to-practice public health nursing competencies: A Delphi method and knowledge translation strategy.</a> <i>Nurse education today</i> , 65, 102–107.	2018	Canada	Teaching strategies; Other competencies	The Canadian Association of Schools of Nursing developed 5 core, national entry-to-practice competencies in public health nursing for undergraduate nursing students, with 19 accompanying indicators Fifty corresponding teaching strategies, covering each of the domains, are included in the online resource at <a href="https://publichealth.casn.ca/">https://publichealth.casn.ca/</a> .	NR	Applying the competencies to entry-to-practice, as opposed to an advanced level, enhanced their application to undergraduate nursing education.	Descriptive  Not Quality Appraised

NR: Not reported.

**Table 2: Workforce Contexts**

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<b>USE AND IMPACTS OF COMPETENCY FRAMEWORKS IN THE PUBLIC HEALTH WORKFORCE</b>							
Institut national de santé publique du Québec. (2021). <a href="#">Advisory on the Use of Competency Frameworks in Public Health.</a>	2021	Canada	Implementation, use and impacts	Implementation, use and impacts of competency frameworks across public health departments in Québec.	<p>The overall satisfaction with frameworks reported in the literature was quite positive, and it was considered very positive in the interviews. Frameworks were considered to strengthen/instill confidence in a person’s competencies and to structure their learning and career path. It also clarifies a person’s professional identity and sense of community in each area, such as health promotion.</p> <p>At the organizational level, frameworks identify knowledge needs during knowledge transfer and may facilitate communities of practice. Frameworks help to implement population-based responsibility by providing operational definitions and fostering a shared vision of change.</p> <p>This study revealed that frameworks have many different uses: analysis of needs and research data, advocacy, human resource management (hiring process and work organization), strategic management (focused on organizational directions, organizational change, etc.), competency development (supervision of interns, preparation of professional development plans, mentoring, continuing education, etc.) and, lastly, support for career paths inside and outside organizations</p>	<p>Structural factors:</p> <ol style="list-style-type: none"> <li>1. Difficult to institutionalize within government (lack of levers that could promote framework use).</li> <li>2. Presence of accreditation systems requiring the preparation of continuing professional development plans based on frameworks</li> </ol> <p>Organizational factors:</p> <ol style="list-style-type: none"> <li>1. the alignment of organizational and national objectives,</li> <li>2. the availability of resources,</li> <li>3. the amount of time devoted to competency development.</li> <li>4. Managers play an important role, including the steps they take to encourage framework use.</li> <li>5. Mechanisms and tools that facilitate the use of frameworks (coaching, training, collective</li> </ol>	<p>Grey Literature</p> <p>Not Quality Appraised</p>



Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
					(promotion of transferable competencies with a view to job mobility)	<p>development plans, etc.) can also contribute.</p> <p>Factors related to content: 1. Some content is not sufficiently addressed, such as the operationalization of taking inequities in health into account and the analysis of public policy.</p> <p>Factors associated with the implementation process: 1. structured strategy for promoting frameworks and encouraging their use. All participants said that their dissemination was inadequate. The transfer plan provided for initially to promote them was never implemented.</p> <p>Factors related to readability of competency frameworks: 1. presence of jargon, text length and quantity, and the availability of translations into the language of minority groups.</p>	

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
						Facilitator: 1. Competency frameworks can be a “political tool” for recognizing and professionalizing the different areas of public health.	
Bornioli, A., Evans, D., & Cotter, C. (2020). <a href="#">Evaluation of the UK Public Health Skills and Knowledge Framework (PHSKF): implications for international competency frameworks.</a> <i>BMC public health</i> , 20(1), 956.	2020	United Kingdom	Implementation, use and impacts	The UK Public Health Skills and Knowledge Framework (PHSKF) (2016) was evaluated for uses and impact in the UK public health workforce.	Most respondents had used the PHSKF occasionally or rarely, and most users found it useful (87%) and easy to use (82%). Main reasons for use included team/ workforce development, professional development and to support organizational redevelopments.	Barriers and areas for improvement included greater clarity on purpose and audience, the need for more support from employers, clear career progression opportunities, and stronger links with other competency frameworks.	Mixed-method  Low
Institut national de santé publique du Québec. (2011, February). <a href="#">The Competency-based Approach A Lever for Changing Public Health Practices in Québec.</a>	2011	Canada	Development and implementation	Proposes a frame of reference for developing a competency framework using e-learning tools and based on learning theories.	The framework has an eight-step process for developing a competency framework.	Getting the actors to take ownership of the framework is a necessary step, but is often overlooked	Grey Literature  Not Quality Appraised
<b>WORKFORCE DEVELOPMENT</b>							
Wall, H., Underwood, J. (2013, March 18). <a href="#">Core Competencies for Public Health.</a>	2013	Canada	Workforce development	Review of use of core competency-based approaches for public health workforce development in Canada.	Competency based approaches strengthen workforce capacity and contribute to advancing the quality of practice, education and training.	Considerations: revisit the Core Competencies for Public Health in Canada every 3 years to determine their continued relevance and applicability.	Review  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
						<p>Strengthen the language in the Core Competencies for Public Health in Canada to reflect the attributes of social justice and social determinants of health.</p> <p>Include an additional competency domain to acknowledge the competencies required to facilitate and work within ever changing social, cultural and political contexts.</p> <p>Include an additional competency domain "Public Health Informatics" and "Health Literacy"</p> <p>Strengthen the language to reflect the competencies required to: translate knowledge into performance improvement or action; identify and mitigate risk; reflect competencies required for interprofessional collaboration.</p>	
Bürkin, B.M., Venticich, P.M., Adongo, P.B., De Almeida-Filho, N., Magaña, L., Middleton, J., ...	2023	NR	Workforce development	The authors suggest that there is a need for more generalist and transdisciplinary	Suggested changes include: 1. Linguistic competence - to be able to use the native language and the lingua franca of contemporary science.	Development of the competencies requires interdisciplinary education and training,	Review  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
Czabanowska, K. (2023). <a href="#">Revolutionizing the Public Health Workforce-A Policy Brief in Retrospect of the World Congress on Public Health Rome 2020</a> . <i>Public health reviews</i> , 44, 1604807.				education within universities to develop a competent workforce. Changes in public health competencies are necessary to tackle hyper-specialization.	2. Training in research - analytical reasoning and interpretation skills to produce knowledge. 3. Pedagogical competence - learning skills necessary to share knowledge. 4. Technical - critical technological competence and mastery of the means and tools of practice and their implications. 5. Sensitivity to Eco-social issues - empathy and ability to listen sensitively and be respectful of human diversity, ethics, and solidarity.	as well as transformative learning strategies.	
Hunter, M.B., Ogunlayi, F., Middleton, J., & Squires, N. (2023). <a href="#">Strengthening capacity through competency-based education and training to deliver the essential public health functions: reflection on roadmap to build public health workforce</a> . <i>BMJ global health</i> , 8(3), e011310.	2023	NR	Workforce development	The 'Building a Public Health Workforce: A Roadmap' document was developed by WHO and partners for the public health workforce to structure education programs and implement actions and activities aimed at developing public health workforce.	Effective public health is not the exclusive preserve of any one professional group but requires multisectoral and interdisciplinary collaboration across a broad range of occupations.  Competency-based education is proposed as an approach to developing the skills and abilities of diverse multidisciplinary teams.	Early career professionals should be involved in the development of competencies and workforce strategies.	Descriptive  Not Quality Appraised
Zahner, S.J., & Henriques, J.B. (2014). <a href="#">Public health practice competency improvement among nurses</a> . <i>American journal of preventive medicine</i> , 47(5 Suppl 3), S352–S359.	2014	United States	Workforce development	Linking Education and Practice for Excellence in Public Health Nursing Project (LEAP) was designed to improve competency for public health practice among students in baccalaureate nursing education programs, nurses new to public health, and PHNs employed in local health	Baseline competency levels were low in most domains. Managers reported higher competency in all domains compared to staff. Factors associated with higher competency in some domains included expected frequency of performance, higher degree, and younger age. Participation in LEAP had a positive effect on competencies at 4-year follow-up: In four domains (linking, policy and planning, evaluating, and ensuring workforce), LEAP participants reported higher mean	LEAP activities varied across the state and over time, resulting in an inconsistent "intervention dose."  As a method of increasing competency for a specific set of services, LEAP may have been less efficient than a more concentrated	Quasi-experimental  Moderate

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
				departments (LHDs) in Wisconsin.	competency scores than those who did not participate (p<0.05). However, participation in more types of LEAP activities was not correlated with higher scores.	competency development program.	
Hawley, S.R., St Romain, T., Orr, S.A., Molgaard, C.A., & Kabler, B.S. (2011). <a href="#">Competency-based impact of a statewide public health leadership training program</a> . <i>Health promotion practice, 12</i> (2), 202–208.	2011	United States	Workforce development	Competency assessed pre- and post-statewide public health leadership training program.	Post-training, participants improved significantly (p<.001) in all competency domains. Participants reported the most skill improvement over the training year in the Community Dimensions of Practice domain (increased from 3.38 pre-training to 4.13 post-training, or 0.75 improvement) and the least in the Cultural Competency domain (increased from 3.8 pretraining to 4.0 post-training, or 0.2 improvement) Participants with lower education, fewer years of experience, and rural status improve more in core competency domains. Lower education and rural status correlate with greater improvement in leadership competency domains.	NR	Quasi-experimental  Moderate
<b>TRAINING DESIGN</b>							
Public Health Agency of Canada. (2016, July). <a href="#">Evaluation of the Public Health Agency of Canada's Public Health Workforce Development Activities 2010-2011 to 2014-2015</a> .	2016	Canada	Training design	Formal training developed for Canada's PH workforce, with modules based on core competencies.	Through the provision of opportunities for, and delivery of, formal training, mentoring, experiential learning, and practicum placements, Public Health Workforce Development programs have contributed to the improved knowledge and skills of public health professionals and students.	The extent to which these programs have resulted in the public health workforce having the abilities to execute their public health functions is unclear. Given that knowledge and skill deficiencies in the public health system are not well defined, the degree to which knowledge and skill improvements align with public health	Grey Literature  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
						workforce needs is unclear.	
Espina, C.R., Bekemeier, B., & Storey-Kuyl, M. (2016). <a href="#">Population-Focused Practice Competency Needs Among Public Health Nursing Leaders in Washington State</a> . <i>Journal of continuing education in nursing, 47</i> (5), 212–219.	2016	United States	Training design	Training needs assessment conducted to provide recommendations for future core competency centered trainings among public health nursing leaders from local governmental public health agencies in Washington State	PHN leaders identified the need to strengthen their own leadership skills and provide support to staff in transitioning to population-focused care.	NR	Qualitative  Low
Stewart, K.E., Halverson, P.K., Rose, A.V., & Walker, S.K. (2010). <a href="#">Public health workforce training: application of the Council on Linkages' core competencies</a> . <i>Journal of public health management and practice, 16</i> (5), 465–469.	2010	United States	Training development	Development of a workforce development program based on core competencies, to improve workforce competence of professionals at the Arkansas Department of Health.	Participants significantly increased their perceived competence in all or most the domains (depending on year). In year 1, absolute score increases ranged from an increase of 2.4 points for the Cultural Competency domain to 8.22 for the Financial Management domain. Similar results were found in year 2, other than no increase in cultural competency. The greatest reported increase in perceived competency was in policy development. Based on these findings, the Council on Linkages core competencies appear to be an effective tool in guiding workforce development programs and serve as an important framework for assessing comprehensive interdisciplinary training programs.	Competency-based performance programs would shed light on the continuing educational needs of the local public health workforce.  Partnerships between schools of public health and health departments are an option for development and implementation of workforce development programs.	Quasi-experimental  High
Demers, A.R., & Mamary, E. (2008). <a href="#">Assessing the professional development needs of public health educators in light of changing</a>	2008	United States	Training design	To assess the fit between the Institute of Medicine competencies, the newly adopted MPH program competencies, and current issues identified by health education	Primary areas for training were organization development, evaluation, and management. Although most employers were reported to support continuing education, fewer than two-thirds of respondents were reimbursed for expenses.	Concerns about funding cuts and privatization of resources emerged as a theme. Key trends reported were an increase in information technology, the need for	Cross-sectional  Low

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<a href="#">competencies</a> . <i>Preventing chronic disease</i> , 5(4), A129.				professionals, MPH alumni were assessed in a comparison between the self-identified training needs of public health educators relative to the updated competencies, and employer support for continuing education.		policy advocacy skills, and the importance of a lifespan approach to health issues.	
Turnock B.J. (2001). <a href="#">Competency-based credentialing of public health administrators in Illinois</a> . <i>Journal of public health management and practice</i> , 7(4), 74–82.	2001	United States	Training design	Five administration competencies were used to implement a competency-based credentialing program for public health managers and administrators.  An experiential pathway allows evidence of having demonstrated competencies in practice to be considered for certification.	As of January 2001, the board certified 5 applicants.	Barriers: While there was general support for the certification concept, some of the support was predicated on certification being purely voluntary. Many feared that the certification process would eventually become mandatory or quasi-mandatory, which would reduce the pool of qualified individuals.  Many believed that the existing requirements (a bachelor's degree and 2 years of experience) were sufficient.	Descriptive  Not Quality Appraised
<b>WORKFORCE COMPETENCIES</b>							
Bashkin, O., Otok, R., Kapra, O., Czabanowska, K., Barach, P., Baron-Epel, O., ... Mor, Z. (2022). <a href="#">Identifying the Gaps Between Public Health</a>	2022	Israel	Workforce competencies	Through a modified Delphi method, a Hebrew version of competencies were developed. The competencies were grouped under the ten	Findings suggested a deficiency between sufficient and needed competencies in the workforce. Advocacy communication and social mobilization for health, surveillance of population health and wellbeing, and	NR	Cross-sectional  Low

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<a href="#">Training and Practice: A Workforce Competencies Comparative Analysis</a> . <i>International journal of public health</i> , 67, 1605303.				Essential Public Health Operations. Public health managers in various organizations evaluated whether they have enough workers to fulfill each of the competencies.	monitoring and response to health hazards and emergencies had the highest deficiency (~30% gap between sufficient and needed workforce). Collaborations and Partnership and Leadership and System Thinking, were the most insufficient across all organizations. Collaboration and Partnership was the most insufficient among NGOs.		
Harmon, M., Joyce, B.J., Johnson, R.G.H., Hicks, V., Brown-Schott, N., Pilling, L., ... Brownrigg, W. (2020). <a href="#">An exploratory survey of public health nurses' knowledge, skills, attitudes, and application of the Quad Council Competencies</a> . <i>Journal of Public Health Nursing</i> , 4(37), 581-595.	2020	United States	Workforce competencies	Explored public health nurses' knowledge, skills, attitudes, and application of the 2011 Quad Council Competencies for Public Health Nurses (QCC-PHN) through an online survey.	Public Health nurses with greater years of experience in practice had significantly higher confidence of the knowledge and attitude domains of the QCC-PHN (p<0.05). Most nurses had no (38%) or minimal (40%) knowledge of the QCC-PHN.	An overall shortage of public health nurses is a barrier to the use of core competencies.	Cross-sectional  Low
Bigbee, J.L., Otterness, N., & Gehrke, P. (2010). <a href="#">Public health nursing competency in a rural/frontier state</a> . <i>Public health nursing (Boston, Mass.)</i> , 27(3), 270-276.	2010	United States	Workforce competencies	Core competency was self-assessed using an 8-domain questionnaire developed by the Council on Linkages Between Academia and Public Health Practice and the Quad Council of Public Health Nursing Organizations. The results of the questionnaire were correlated with demographic variables.	In public health nurses working in a community setting and state offices, including those in leadership roles, the overall mean competency was 3.28 (range 51.75-4.63, SD 0.60), suggesting a moderate level of competency in general. The overall level of competency was most strongly associated with the duration of professional experience. No major differences in the competency levels were found in relation to nurses' level of education or licensure. Nurses in leadership positions reported the highest levels of competency.	NR	Cross-sectional  Moderate



Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
Bartee, R.T., Winnail, S.D., Olsen, S.E., Diaz, C., & Blevens, J.A. (2003). <a href="#">Assessing competencies of the public health workforce in a frontier state</a> . <i>Journal of community health, 28</i> (6), 459–469.	2003	United States	Workforce competencies	Assessed the proficiency of the public health workforce, to determine what skills and competencies were currently strong among the state public health employees as well as which ones needed to be improved, with the ultimate goal of developing appropriate and effective training opportunities for public health employees at the in-service (state agency) and pre-service (university) levels.	All disciplines reported higher perceived proficiency in the Communication skills domain compared to the other seven skills domains. Perceived low skills domains included “financial planning and management skills” and “policy development/program planning skills” among public health nurses, mental health professionals, and environmental health specialists. Management/administration level staff reported their lowest perceived proficiency in Basic Public Health Science skills.	NR	Cross-sectional  Moderate
<b>JOB DESCRIPTIONS</b>							
Council on Linkages Between Academia and Public Health Practice. (2022, September 8). <a href="#">Determining Essential Core Competencies for Public Health Jobs: A Prioritization Process</a> .	2022	United States	Job descriptions	A process for developing job descriptions using core competencies.	This process is designed to help public health organizations determine essential core competencies for positions within the organization based on input from staff members who fill those positions. Through this process, the specific jobs present in the organization are grouped into categories based on similar responsibilities and activities, and representatives of these groups are asked to participate in a two-step voting process to identify the most important competencies for each job category.	NR	Grey Literature  Not Quality Appraised
Polivka, B.J., Chaudry, R.V., & Jones, A. (2014). <a href="#">Congruence between position descriptions for public health nursing</a>	2014	United States	Job descriptions	Study examined the presence of PHN standards and public health competencies in	Results indicate that position descriptions do not reflect compliance with professional mandates for the practice of PHN.	The lack of fit between position descriptions and nationally recognized standards of practice and	Descriptive  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
<a href="#">directors and supervisors with national professional standards and competencies</a> . <i>Journal of public health management and practice</i> , 20(2), 224–235.				the public health directors position descriptions.		competencies suggest that PHN may be undifferentiated as a public health discipline and as a nursing specialty.	
Issel, L.M., Ashley, M., Kirk, H., & Bekemeier, B. (2012). <a href="#">Public health nursing job descriptions: are they aligned with professional standards?</a> <i>Journal of public health management and practice</i> , 18(3), E1–E8.	2012	United States	Job descriptions	The study sought to assess the extent to which PHN job descriptions are aligned with the ANA’s PHN Scope and Standards and the Quad Council competencies.	The ANA Public Health Nursing Scope and Standards were unevenly integrated into the job descriptions reviewed.	One approach to achieving a more consistent application of the professional standards would be to make public a job description template incorporating all of the ANA PHN standard’s needs. Sharing a template across LHDs and with other health care organizations would also help PHNs and other RNs make more informed choices when seeking employment and career opportunities.	Descriptive  Not Quality Appraised
<b>TOOLS</b>							
Council on Linkages Between Academia and Public Health Practice. (2021, October 21). <a href="#">Core Competencies for Public Health Professionals</a> .	2021	United States	Tools	Examples of core competencies	Examples of:  1. competency-based workforce assessment  2. discipline-specific competency sets (provide examples of competency sets that have used the Core Competencies in their development)  3. Integrating the Core Competencies for	NR	Grey Literature  Not Quality Appraised

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
					<p>Public Health Professionals (Core Competencies) into job descriptions: to help ensure the recruitment and retention of public health professionals whose skills are well-matched to the needs of positions.</p> <p>4. mentoring and coaching provides examples of how organizations have used Core Competencies for Public Health Professionals (Core Competencies) to support this type of professional development for their staff</p> <p>5. Competency-based training: highlights how the Core Competencies for Public Health Professionals (Core Competencies) have been incorporated into learning management systems, educational programs, and other training initiatives</p> <p>6. Competency-based Workforce Development Planning</p>		
Council on Linkages Between Academia and Public Health Practice. (2021). <a href="#">Core Competencies Tools</a> .	2021	United States	Tools	Tools related to core competencies.	<p>The following tools have been developed:</p> <ol style="list-style-type: none"> <li>1. Workforce Development Tools</li> <li>2. Competency Assessments for Public Health Professionals (2021, Modified, 2014, and 2010 versions)</li> <li>3. Determining Essential Core Competencies for Public Health Jobs: A Prioritization Process (2021 Core Competencies)</li> </ol>	NR	<p>Grey Literature</p> <p>Not Quality Appraised</p>

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
					4. 3-Step Competency Prioritization Sequence  5. Competency-Based Workforce Development Plans  6. Competency-Based Job Descriptions  7. Competency to Curriculum Toolkit		
Association of Schools of Public Health in the European Region. (2023). <a href="#">ASPHER PROGRAMME FOR PUBLIC HEALTH COMPETENCIES.</a>	2020	Europe	Tools	Development of the WHO-ASPHER Competency Framework for public health workforce across the European region, and accompanying tools	The following tools have been developed: 1. <a href="#">The toolkit for a sustainable health workforce in the WHO European Region</a>  2. <a href="#">Self-assessment tool for the evaluation of essential public health operations in the WHO European Region</a>	NR	Grey Literature  Not Quality Appraised

NR: Not reported.

**Table 3: Practice Outcomes**

Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
Susanto, T., Susumaningrum, L.A., Rasni, H., & Yunanto, R.A. (2021). <a href="#">Validity and Reliability of Indonesian Public Health Nursing Competencies in Achieving Indonesian Healthy Program with a Family Approach: A Pilot Study</a> . Nurse Media Journal of Nursing, 11(1), 71-84.	2021	Indonesia	Measuring the coordinators of Public Health Nursing program' duties to predict the achievement of Indonesian Healthy Program with a Family Approach.	Coordinators of PHN programs from 50 public health centres were included to do an assessment on their competencies in a practice setting to achieve the objectives of the Indonesian Healthy Program with a Family Approach.	Significant correlation between five core Indonesian Public Health Nursing competencies and achievement of program outcomes (safe birth delivery, immunization, growth and development, management of tuberculosis, smoking, and access to clean water).	NR	Quasi-experimental  Low
Andruszkiewicz, N., Ogunniyi, C., Carfagnini, C., Branston, A., & Hirji, M.M. (2019). <a href="#">Utilizing public health core competencies to share data effectively with community organizations to promote health equity</a> . <i>Canadian journal of public health</i> , 110(3), 303–313.	2019	Canada	Effectively sharing data between local public health agencies and community partners	Utilized the Public Health core competencies to support data-sharing initiatives with community organizations, and advance health equity.	When local public health agencies utilize their core competencies of a) assessment and analysis, b) communication, and c) collaboration to share data with community partners, they can share data more effectively.	NR	Mixed-method  Low

NR: Not reported.

**Table 4: Other Competencies**

Table	Reference	Publication Date	Country	Context	Description of Core Competencies Use	Evaluative Findings	Barriers and Facilitators	Study Design and Quality Rating
Other Competencies	Strudsholm, T., & Vollman, A.R. (2021). <a href="#">Public health leadership: Competencies to guide practice</a> . <i>Healthcare management forum</i> , 34(6), 340–345.	2021	Canada	Development of interdisciplinary public health leadership competencies	Through literature review (including 2008 Core Competencies for Public Health in Canada), survey, consultation, and Delphi approaches, 49 leadership competencies for public health practice were identified, which were organized according to the LEADS Canada capabilities.	For public health leaders across seven professions in Canada, Core Competencies were used to develop a set of leadership competencies: managing self, building teams, achieving results, creating coalitions, and transforming systems.	NR	Descriptive  Not Quality Appraised
Other Competencies	Institut national de santé publique du Québec. (2013, August). <a href="#">Occupational Health Competency Framework for Public Health in Québec</a> .	2013	Canada	Developing Occupational Health competency framework for public health in Québec.	Developing an Occupational Health competency framework in Québec.	The development of the occupational health competency framework strengthens existing ties between the various occupational health bodies.	The framework is a tool for modeling a process of ongoing professional development, for recruiting and training new talent, and for integrating new forms of work structure.	Grey Literature  Not Quality Appraised

NR: Not reported.

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