WFPHA World Federation of Public Health Associations

Review of the Australasian Public Health Competencies

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CAPHIA Council of Academic Public Health Institutions Australasia
Advancing Public Health Education, Research and Workforce Development

Contents

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Glossary

AQF	Australian Qualifications Framework
ASPHER	Association of Schools of Public Health in the European Region
BPH	Bachelor of Public Health
CAPHIA	Council of Academic Public Health Institutions Australasia
CEPH	Council on Education for Public Health
DrPH	Doctor of Public Health
GPHC	Global Public Health Curriculum
MPH	Master of Public Health
NZQF	New Zealand Qualifications Framework
PET	Public Health Professionals' Education and Training Working Group
PHAC	Public Health Agency of Canada
PHANZ	Public Health Association of New Zealand
RACP	Royal Australasian College of Physicians
UKFPH	UK Faculty of Public Health
WFPHA	World Federation of Public Health Associations
WHO	World Health Organization

Executive Summary

Background

The Council of Academic Public Health Institutions Australasia (CAPHIA) is the peak organisation currently representing 35 tertiary teaching institutions and other education providers throughout Australasia, Papua New Guinea and Fiji. CAPHIA seeks to maintain and protect high public health academic standards.

Local public health competencies are built in part around the 2016 Foundation Competencies for Public Health Graduates in Australia, currently in its second edition.

Public health education originally was designed to be provided at a Master degree level, however in recent years the number of public health Undergraduate and Doctoral level programmes has grown. A need was identified to be able to distinguish which competencies are appropriate for students at all levels, and not only for Master students.

The specific terms of the review were to:

- benchmark both the Australian and Aotearoa New Zealand public health competencies against what is occurring internationally;
- analyse the ways in which the differing levels of competency are structured in the relevant frameworks; and
- map the results against the standards set nationally to appropriately reflect the applicable qualification levels.

This report contains the results of this review, noting that both the *Australian Qualifications Framework* (AQF) and *New Zealand Qualifications Framework* (NZQF) categorise education requirements for all levels of education, including Bachelor to Doctoral qualifications.

Mapping competency frameworks

The domains from the CAPHIA and Public Health Association of New Zealand (PHANZ) frameworks were mapped against the elements of the World Health Organization-endorsed *Global Charter for the Public's Health* and six other public health frameworks identified internationally. Both the CAPHIA and PHANZ competencies cover all elements of the Global Charter. Previous work has already identified three gaps in the Charter which are also not covered in the two local frameworks: *Systems Thinking*, *Human Rights*, and *One-Health* (soon to be rectified).

One of the six other frameworks, namely the Global Public Health Curriculum (GPHC) competencies framework, includes *Structural and Societal Violence* which, whilst not specifically identified in the CAPHIA competencies is implied in the *Prevention* domain but missing in the Global Charter and not included in the PHANZ framework.

The two Australasian competency frameworks deal with cultural competencies (missing from the Global Charter and some of the other international frameworks), although the integrated nature of Aboriginal and Torres Strait Islander health competencies in the CAPHIA framework to some extent renders them less visible than the more explicit domain of *Te Tiriti o Waitangi* in the PHANZ framework.

Several discrepancies and inconsistencies were identified, with ten recommendations for remediation.

As PHANZ will be substantially revising the Aotearoa New Zealand competency set in 2022, the PHANZ competencies were not included in the rest of this review, however the overall results of this review will be considered during the PHANZ revision process.

Analysing levels of competencies

Four of the international competency sets have been designed using different levels of proficiency in their frameworks. We analysed the different approaches used and outcomes expected at different competence levels and compared these with the CAPHIA set.

Education frameworks, including those for public health, are often built using Bloom's Taxonomy. This taxonomy uses levels of learning to build and embed knowledge structures to stabilise learning and skills. The language – mainly verbs – behind each skill level is commensurate with levels of learning. In this analysis we extracted verbs from the relevant competency statements – international as well as the CAPHIA set – and organised them according to Bloom's Taxonomy.

Although this should have enabled the identification of expected outcomes at different degree levels, most competency frameworks do not include verbs related to knowing and remembering (which may be because as a previously delivered Postgraduate discipline, a great deal of embedded knowledge was assumed), and there are discrepancies between the inclusion of expected levels between the service and function competency elements. The CAPHIA *Health Protection* domain does not include any verbs indicating competence in evaluation, clearly a gap. In general though, the CAPHIA competency statements can be organised to reflect competency levels.

Our recommendations are that the CAPHIA *Health Protection* domain is revised to include an evaluation level verb, and that the CAPHIA competencies are reorganised and revised to reflect competencies expected at different skill levels.

Defining levels of competencies

To identify how such a restructure might be achieved, we were mindful of the inflexible structure of the AQF, which currently covers from Undergraduate degrees (level 6) to Doctoral degrees (level 10). In addition, a 2019 review of the AQF has identified several problems with the current framework mainly related to its inflexible structure and lack of recognition of the inclusion of content from 'adjacent' qualifications. A proposed restructure takes this into account, reorganising the current levels 6-10 into a revised set of bands 5-8 covering Undergraduate to Doctoral degrees, to allow for the portability of content between bands. Of note, the proposed new AQF structure does not include any provision for short-form ('micro-credential') qualifications, because of difficulties in ensuring quality and outcomes.

We have taken these complications into account in identifying four options for the restructure of the CAPHIA competencies. These range from doing very little (which we are not recommending because the problems with the current document would not be addressed), to an overhaul which would serve CAPHIA well for many years.

Of note, it is not predominantly the content of the competencies which need revision, but the structure. The development of degree qualifications at multiple levels can be incorporated into a redesigned framework; examples are provided of each identified restructure option for clarification.

Lastly, because the revision of the competencies framework provides an opportunity to include the areas identified as content gaps, we provide suggestions at four levels for *Systems Thinking*, *Human Rights*, and *One-Health* competencies.

Summary of Recommendations

That the CAPHIA framework by revised to:

1. Add competencies related to *Systems Thinking*, *Human Rights* and *One-Health*.
2. Consider adding, or strengthening the language for, competencies designed to address violence.
3. Add reference to 'quantitative' research methods in the *Health Monitoring and Surveillance* domain.
4. Add reference to 'non-infectious' and 'chronic' diseases in the *Disease Prevention and Control* domain.
5. Add reference to 'protection' and 'health security' in the *Health Protection* domain.
6. Add reference to 'health literacy' and 'health education', and the need to counteract 'industry' influence in the *Health Promotion* domain.
7. Dedicate a domain to *Universal Cultural Competencies*.
8. Dedicate a domain to *Aboriginal and Torres Strait Islander Health* competencies.
9. Consider including theories or models of behaviour change as a knowledge competency.
10. Revisit language used in the *Health Promotion* domain regarding community engagement to ensure the language used in the competencies reflects the intended graduate outcome(s).
11. The *Health Protection* domain is revised to include an 'evaluate' level verb from Bloom's Taxonomy.
12. Consideration should be given to including additional 'generic' skills based on competencies related to the Bloom's Taxonomy 'affective' domain that outline essential qualities for public health practice.
13. The CAPHIA competencies are revised using a combination of the ASPHER and UKFPH approaches whereby the descriptors for the competency levels are worded consistently like the UKFPH framework, but the level of acquisition increases like the ASPHER framework, based on the level of cognitive skill required to apply the competency at different levels of practice.
14. The CAPHIA framework is revised based on option 3 or 4 outlined in Table 12.

1. Introduction

Council of Academic Public Health Institutions Australasia

The Council of Academic Public Health Institutions Australasia (CAPHIA) is the peak organisation that represents tertiary public health education providers throughout Australasia. Its purpose is to:

> *"maintain high quality academic standards in the education and development of public health practitioners and researchers, to lead and represent public health education in the tertiary sector and to be a respected voice and advocate for the development of public health professionals and researchers within Australasia."* (1)

The current membership of CAPHIA includes 35 educational institutions from Australia, Aotearoa New Zealand, Papua New Guinea, and Fiji.

Foundation Competencies for Public Health Graduates in Australia

In 2016, CAPHIA published a second edition of the *Foundation Competencies for Public Health Graduates in Australia* (2), first produced in 2009 by the Australian Network of Academic Public Health Institutions (3). The revised framework is intended to be used as a guide to inform curriculum development for public health education programmes and enable benchmarking against international practice standards for the public health workforce. It is structured to provide:

- an outline of the underpinning knowledge that all public health graduates are expected to obtain prior to graduation;
- a minimum set of competencies all graduates are expected to be able to demonstrate on graduation; and
- examples of specialised areas of practice that can be provided through elective components of public health education programmes, or as additional training through a specialised degree.

These specialised areas of practice may include (but are not limited to) biostatistics, epidemiology, health protection and promotion, or public health policy.

Background to the Review

During 2019-20, the World Federation of Public Health Associations (WFPHA) Public Health Professionals' Education and Training Working Group (hereafter referred to as the PET) mapped eight public health competency framework documents, including the CAPHIA competencies (2), against the Global Charter for the Public's Health (4), henceforth referred to as the Global Charter. The Global Charter is endorsed by the World Health Organization (WHO) as a framework for describing and understanding the key elements of public health practice. The Global Charter thus provides an overview of the functions (i.e., *Governance*, *Information*, *Advocacy* and *Capacity*) and services (i.e. *Protection*, *Prevention* and *Promotion*) delivered by public health programmes (4).

The PET competencies mapping project highlighted that whilst all the competency frameworks mapped to the Global Charter, there were elements of emerging public health practice that were not included in the Global Charter (5), including *Human Rights*, *Cultural Responsiveness*, *Systems Thinking* and *One-Health*. The WFPHA is currently revising the Global Charter to include the elements of emerging practice that have been identified as gaps.

Another outcome of this study was the identification of several competency frameworks that contain differing levels of expected graduate competencies (5). As aforementioned, the CAPHIA document

currently differentiates between foundation and specialization competencies, whilst others varied in regard to proficiency (6-8) and degree levels (9). Although in Australia public health education was initially delivered at a Master degree level, as is occurring elsewhere across the globe there is an increasing number of Undergraduate and Doctoral public health degrees emerging (10, 11).

As a public health organisation, CAPHIA identified the need to benchmark the current Australian competencies framework against international standards and review the existing document to take these differing levels of competency into account. This benchmarking accordingly needs to account for the standards set nationally for different degree levels as prescribed in the national qualifications framework (12). It was also recognised that any review of the CAPHIA document needs to ensure the revisions being made to the Global Charter to include emerging areas of public health practice, are appropriately integrated as part of the revision process.

As institutional members of CAPHIA in Aotearoa New Zealand have a separate locally-contextualised competency framework, some of these members requested that this project also include a similar mapping of the Public Health Association of New Zealand (PHANZ) *Generic Competencies for Public Health in Aotearoa—New Zealand* (13) so they can advocate for appropriate changes to their public health graduate competencies.

In July 2021, CAPHIA announced a review of the competency frameworks in the Australasian region. The project would be led by the two co-chairs of the PET, who have also been authors of one or more editions of the Australian public health competency frameworks (2, 3, 14); and supported by a team from Aotearoa New Zealand.

Specifically, the contractors were required to:

- benchmark both the Australian and Aotearoa New Zealand public health competencies against what is occurring internationally;
- analyse the ways in which the differing levels of competency are structured in the relevant frameworks; and
- map the results against the standards set nationally to appropriately reflect the applicable qualification levels.

Outline of Comparative Frameworks

The previous work undertaken by the PET has shown that public health competency frameworks in general include to a lesser or greater extent the elements of the Global Charter. However, the Global Charter is currently being updated to include several identified competency areas from these frameworks which the Global Charter does not currently include.

- The first objective in benchmarking the Australian and Aotearoa New Zealand public health competency frameworks against other international frameworks was to determine whether there are notable existing gaps in content within the Australasian frameworks.

The previous work identified six other public frameworks developed for: Association of Schools of Public Health in the European Region (ASPHER) (8), Council on Education for Public Health (CEPH) (9), Global Public Health Curriculum (GPHC) (15), Public Health Agency of Canada (PHAC) (16), Royal Australasian College of Physicians (RACP) (6) and the UK Faculty of Public Health (UKFPH) (7). These six frameworks were used in the mapping discussed in Section 2.

During the previous mapping work, four competency frameworks were identified which (a) are used for accreditation of public health education programmes, and (b) define different levels of competencies expected of graduates. These frameworks included those used in: public health schools that are

members of ASPHER (8) and CEPH (9); and public health medicine colleges within the RACP (6) and UKFPH (7). These four frameworks were used for the mapping outlined in Sections 3.

- The second objective in this project was to analyse how the varying levels of competency expected of graduates are defined and how these might apply to the Australasian frameworks.

National Qualifications Frameworks

The *Australian Qualifications Framework* (AQF) defines the essential requirements of different types of qualifications issued in Australia, ranging from the senior secondary certificate of education, through to the vocational education and training sector, and finally the higher education system (12). Whilst the AQF framework does not prescribe disciplinary content or teaching and assessment methods, it does define the relationship between the varying qualification types and provides a framework for the design and quality assurance of education and training programmes.

Like Australia, the education system in Aotearoa New Zealand is defined by the New Zealand Qualifications Authority standards (17). Both qualification frameworks currently categorise higher education qualifications in the top four levels as outlined in Table 1.

Table 1. Qualification type by level in the AQF and NZQF

	Level 7	Level 8	Level 9	Level 10
AQF	Bachelor Degrees	Bachelor Honours Degrees Graduate Certificate Graduate Diploma	Master Degrees	Doctoral Degrees
NZQF	Bachelor Degrees, Graduate Diplomas and Certificates	Postgraduate Diplomas and Certificates, Bachelor Honours Degrees	Master Degrees	Doctoral Degrees

- The third objective in this project was to analyse the applicable levels of competency used in the international frameworks to determine how they could be applied to define their use for the different qualification levels outlined in the qualification frameworks.

2. Mapping Competency Frameworks

The first objective of this project was to benchmark the Australian and Aotearoa New Zealand public health competencies against international developments in thinking about competencies, to identify specific and potential gaps in content. To achieve this, we mapped the CAPHIA and PHANZ competency sets against the Global Charter (4) and the six aforementioned public health competencies frameworks (6-9, 15-16).

Mapping Against the Global Charter

Firstly, the domains from each of the CAPHIA and PHANZ competency frameworks were mapped against the elements of the Global Charter. The previous work of the PET illustrated that most domains contain subsets of competencies that cut across multiple elements of the Global Charter. For simplicity however, a minimalistic summary of this mapping has been provided in Appendix 1. In most cases, the domain names mapped obviously to one or more elements of the Global Charter. For example, the CAPHIA domain of *Health Protection* maps directly to the *Protection* service, whereas the *Health Policy, Planning and Management* domain maps to both the *Governance* and *Capacity* functions.

Where the correlation between the competency domains and elements of the Global Charter was not as immediately obvious (e.g., the PHANZ domain of *Planning and Administration*) the competencies within the domain were examined to determine which element(s) of the Global Charter the competencies primarily mapped to. For this example, it was predominantly the *Governance* and *Capacity* functions, although there was also limited relevance to the *Protection* service element.

As aforementioned and as Appendix 1 illustrates, both competency frameworks cover all elements of the Global Charter. Given the previous study identified areas of practice not initially included in the Global Charter, the mapping was expanded to benchmark these two frameworks against the other six competency sets included in the previous study, to illustrate where these gaps occur.

Identified Gaps

The emerging areas of practice that were identified as gaps in the Global Charter and are clearly not incorporated in either the CAPHIA or PHANZ frameworks include:

- *Systems Thinking,* which is included in the domains of both the ASPHER (8) and CEPH (9) competencies against the *Governance* function.
- *Human Rights,* which is included in the GPHC (15) competencies against the *Governance* function.
- *One-Health,* which is included in the ASPHER competencies with competencies mapped predominantly against both the *Protection* and *Prevention* services. The previous PET project recommended *One-Health* be added to the *Protection* service in the Global Charter, along with the already included elements of environmental health and climate change.

Structural and Social Violence was another domain included in the GPHC framework, mapped against the *Prevention* service, which is not contained in the Global Charter. While this terminology is not explicitly used in either the CAPHIA or PHANZ competencies, the CAPHIA framework does include competencies which potentially address this area of practice, using terminology such as ensuring public safety and/or preventing injury. The PHANZ framework on the other hand does not include any such competencies. Consideration should therefore be given to adding competencies deigned to address violence or strengthening the language of existing related competencies to cover this area of practice more explicitly.

Universal Cultural Competencies

An additional area of practice identified as a significant gap in the Global Charter, was the domain titled *Universal Cultural Competencies* included in the RACP (6) competencies. The competencies in this domain tend to cut across all elements of the Global Charter. However, a recommendation from the previous PET study was that this area of practice be incorporated into the *Capacity* element of the Global Charter, given it relates to a practitioner's capability to practice in a culturally responsive manner when working interculturally (5).

Like the RACP framework, the PHANZ document similarly includes a domain that addresses universal cultural competencies, titled *Working Across & Understanding Cultures*, and the PHAC framework (17) also includes a domain titled *Diversity & Inclusiveness* which identifies the socio-cultural competencies required to interact effectively with diverse individuals, groups and communities, both of which mapped to the *Capacity* function in the Global Charter. The ASPHER document also contains a domain that refers to cultural competencies, titled *Communication, Culture & Advocacy* which mapped to the *Advocacy* function in the Global Charter.

In contrast, the CAPHIA framework does not signpost the importance of intercultural competencies by separating it out as a specific domain. Alternatively, intercultural practice is embedded across applicable domains, although there is a particular focus on cultural safety in the *Evidence-based Professional Population Health Practice* domain. To benchmark the CAPHIA document against other competency frameworks, separating universal cultural competencies into a separate domain is required.

The RACP framework not only includes the universal cultural competencies domain but also includes additional domains that specifically prioritise health for specified subpopulation groups, namely ethnic minority communities. Although it does not include a domain for universal cultural competencies, the GPHC framework also includes domains that prioritise the health of subpopulation groups, specifically immigrant and gender health. While the CAPHIA framework does not have separate domains for subpopulation groups it does refer to working with marginalised and vulnerable populations in relevant domains. Whether or not the needs of priority populations should be included as part of a universal cultural competencies domain, integrated across relevant domains or specifically allocated to separate domains, is likely to be informed by local contexts, which vary considerably across countries and regions as highlighted in the previous PET study (5).

Working interculturally with any priority population group requires practitioners to apply universal cultural competencies (18). However, working with Indigenous populations requires an additional understanding of the impact of colonisation on Indigenous peoples and the importance of Indigenous sovereignty. The RACP framework clearly signals this importance by including domains dedicated to both Aboriginal and Torres Strait Islander, as well as Māori and Pasifika communities, separate from other ethnic minority communities.

The PHANZ framework also includes a domain dedicated to *Te Tiriti o Waitangi*. While the competencies in this domain map across all elements of the Global Charter, it has been mapped against both the *Governance* and *Capacity* functions in Appendix 1 given: (a) Te Tiriti o Waitangi was signed as a contractual agreement between the British Crown and Tangata Whenua, recognising the rights of Māori people and obligations of the Crown; and (b) it provides a framework for public health in Aotearoa New Zealand whereby practitioners are expected to apply Te Tiriti o Waitangi to their practice.

As with the *Universal Cultural Competencies* domain discussed above, CAPHIA on the other hand has not dedicated a separate domain to Aboriginal and Torres Strait Islander health, instead embedding individual competencies across applicable domains. Although Aboriginal and Torres Strait Islander health is arguably covered within the CAPHIA document, it is largely invisible due to the integrated nature of the structure of the document, ultimately undervaluing the importance this area of practice should receive (19). It is therefore recommended that the competencies for Aboriginal and Torres Strait Islander health be restructured into a separate domain as in the RACP and PHANZ frameworks.

Mapping Against other Competency Frameworks

Secondly, the competencies from the CAPHIA and PHANZ frameworks were mapped against the four frameworks that included differentiations between levels of competency. Although this was undertaken primarily to inform the analysis of different levels of competency against the degree levels, which will be discussed in the next section of the report, it also allowed a further comparison of content and terminology at a more detailed level than the mapping against the Global Charter.

The competencies within each domain from the CAPHIA and PHANZ frameworks were compared with each framework separately and mapped the competencies in sections by domain, rather than directly matching individual competencies, as summarised in Appendix 2 (CAPHIA) and Appendix 3 (PHANZ). Note some competencies in the other frameworks mapped to competencies in more than one domain within the CAPHIA and PHANZ documents. There were also some competencies from the other frameworks that did not directly map to competencies in either of the CAPHIA and PHANZ documents.

A comparison of terminology used in each framework was subsequently undertaken to assess common or interchangeable terms (synonyms) used, to identify any gaps in content overlooked during the broader mapping stage against the Global Charter.

Comparing the CAPHIA Framework

Overall, the CAPHIA framework was reasonably comparable to the other four competency frameworks in terms of coverage (see Appendices 2a and 2b). The CAPHIA document is comprised of 6 domains and 108 competencies. Compared to the other four frameworks, the RACP framework similarly had 6 domains, although the average across the other four documents was 8.5 domains, and the average number of competencies was 78.5 (calculated against the number of MPH competencies in the CEPH framework as it had the most of the three degree levels). In addition to the already noted gaps in terms of *Systems Thinking*, *Human Rights* and *One-Health* there were several other gaps identified during this stage of analysis.

Competencies that mapped directly to the CAPHIA Framework

The first identified gap was regarding the research methods described in the *Health Monitoring and Surveillance* domain. Although the CAPHIA document refers to epidemiology, statistics and data, it only names qualitative and mixed methods research. There is no reference to 'quantitative' research as a methodology as specified in the ASPHER and CEPH documents. For completeness, all three research methods should be included.

The second is in relation to the *Disease Prevention and Control* domain. The CAPHIA document uses the term 'disease' in its broadest sense as there is no differentiation between different types of disease. However, the wording in this domain alludes to prevention of infectious diseases given the focus on surveillance, contact tracing, immunisation, emergency response and disease control. In contrast, the RACP framework differentiates between 'infectious', 'non-infectious' and 'chronic' diseases - indeed it separates infectious and chronic diseases into two separate domains. Given the increasing prevalence of non-infectious and chronic diseases in our aging population, it would be prudent to at least include reference to the prevention of non-infectious and chronic diseases in the *Disease Prevention and Control* domain. Of the three domains dedicated to the public health services, this domain notably has the least competencies, so could easily accommodate additional competencies to adequately cover this topic.

In the *Health Protection* domain, while not a gap per se, it was noteworthy that the term 'protection' is not used in any of the competencies within the CAPHIA domain, whereas the ASPHER, RACP and UKFPH all clearly use this term, with ASPHER additionally using the term 'health security', particularly in relation to the *One-Health and Health Security* domain.

The third area with identified gaps was the *Health Promotion* domain. There were three aspects to this domain that were noted. The first was regarding 'health literacy' and 'health education'. Although education is mentioned in the CAPHIA document in terms of disease prevention measures, it is not included in the *Health Promotion* domain, whereas it is in both the ASPHER and RACP documents. The second was reference to the need to counteract 'industry' influence (particularly regarding nutrition, alcohol, tobacco and illicit drugs) within the ASPHER document. The RACP document also refers to this issue, but in the *Chronic Disease, Mental Illness & Injury Prevention* domain rather than the *Health Promotion & Community Development* domain. The third was reference in the UKFPH framework to application of theories or models of [behaviour] change. It is noted however, that this is included in the CAPHIA document as an area of underpinning knowledge, rather than a competency, but may need to be considered as an inclusion when adjusting for knowledge, skills and application across differing degree levels.

While not a gap necessarily, another notable difference across the frameworks in the *Health Promotion* area, was the language used regarding community engagement. In addition to using the term 'engagement', the ASPHER and UKFPH documents also use the terms 'empowerment' and 'participation', which are not used in the CAPHIA framework. Instead, the CAPHIA document refers to 'leadership' in association with the term community 'engagement'. It is therefore recommended that the language used in the relevant competencies is revisited, potentially with reference to the work of Arnstein (20) and Rocha (21) to ensure the language used in the competencies reflects the intended graduate outcome(s).

Competencies that did not map directly to the CAPHIA Framework

For those competencies in the other frameworks that did not map directly to the CAPHIA competencies, they essentially fell into three categories:

- Competencies related to areas of practice previously identified as gaps against the Global Charter (e.g., Systems Thinking);
- Medical-oriented skills relevant to public health physicians rather than the broader public health workforce; and
- Generic skills that cut across all domains (e.g., evidence-based and ethical professional practice).

For the first of these categories, as previously stated, it is recommended that competencies be added to the CAPHIA framework to address these gaps. For the second category, it is acknowledged that these competencies are not relevant to the broader public health workforce, and it is therefore not recommended that the framework be updated to include such competencies. For the third category, this needs to be considered in the review of the competencies against the AQF and usage of knowledge, skills and application for differing degree levels.

Comparing the PHANZ Framework

The initial mapping stage highlighted that the PHANZ framework contains a limited number of competencies in each domain (see Appendices 3a and 3b) compared to the other frameworks. Although the PHANZ document is comprised of 12 domains, the most domains compared to the other frameworks, it only consists of 34 competencies. Only the CEPH framework had comparatively less competencies when accounting for each degree type, with a total of 2 for the Bachelor, 22 for the Master, and 20 for the Doctoral levels respectively.

At this point, the Aotearoa New Zealand team questioned the value of continuing with the analysis given the list of gaps was likely to be considerable. Instead, several colleagues were consulted, from both academia and the PHANZ, on the issue. It was decided that rather than have CAPHIA leading a review process, and in line with the principles of self-determination and Te Tiriti o Waitangi, the preference was to internally organise a series of hui across Aotearoa New Zealand in 2022 to determine a way forward. Based on this advice, the mapping of the PHANZ framework concluded at this point.

Recommendations

That the CAPHIA framework by revised to:

1. Add competencies related to *Systems Thinking*, *Human Rights* and *One-Health*.
2. Consider adding, or strengthening the language for, competencies designed to address violence.
3. Add reference to 'quantitative' research methods in the *Health Monitoring and Surveillance* domain.
4. Add reference to 'non-infectious' and 'chronic' diseases in the *Disease Prevention and Control* domain.
5. Add reference to 'protection' and 'health security' in the *Health Protection* domain.
6. Add reference to 'health literacy' and 'health education', and the need to counteract 'industry' influence in the *Health Promotion* domain.
7. Dedicate a domain to *Universal Cultural Competencies*.
8. Dedicate a domain to *Aboriginal and Torres Strait Islander Health* competencies.
9. Consider including theories or models of behaviour change as a knowledge competency.
10. Revisit language used in the *Health Promotion* domain regarding community engagement to ensure the language used in the competencies reflects the intended graduate outcome(s).

3. Analysing Levels of Competency

The second objective of this project was to compare how the ways of defining levels of competency vary across the four international public health competency frameworks that use this approach. We compared the four frameworks which were structured in terms of educational outcome levels (6-9). We also used Bloom's Taxonomy (19) to identify verbs associated with education outcome levels.

Applying Bloom's Taxonomy

Bloom's Taxonomy (20) has allegedly been widely used in the development of competency sets internationally (21). This is important, because the six levels of cognitive learning (knowledge, comprehension, application, analysis, synthesis and evaluation) theoretically build on each other to stabilise and embed learning. Recent reviews of the taxonomy have concentrated on the importance of the meaning of the verbs used in intended learning and practice outcomes. In 2001, the Bloom's Taxonomy was revised to shift the language from nouns to verbs and to reorder some of the higher levels (remember, understand, apply, analyse, evaluate and create) (22). More recently, these levels have been organised into three domains (cognitive, affective, and psychomotor), again each with a hierarchical taxonomy (23). Of note, the cognitive domain that focuses on intellectual skills, still consists of the six levels from Bloom's Taxonomy, while the affective domain refers to attitudes and values, and the psychomotor to physical skills.

The CAPHIA competencies were therefore mapped against Bloom's Taxonomy and compared with the four frameworks. In our analysis, we first extracted verbs from the respective competency statements and organised them according to the levels of learning as delineated in the revised Bloom's Taxonomy (22), or the cognitive domain in the later revision (23) (data are shown in detail in Appendix 4). Note the verbs were only extracted from the competency statements and not from the descriptors of the competency levels associated with each statement. This analysis showed that the CAPHIA competencies are relatively evenly spread in terms of cognition levels in Bloom's Taxonomy, except for an evaluation competency in the *Health Protection* domain, as outlined in Appendix 4.

The first notable observation is that the ASPHER framework is the only one that uses verbs associated with knowing or remembering. Presumably the other frameworks have not deemed it necessary to use this category as the underpinning knowledge that informs each of the competencies is assumed, and the focus is instead on the application of this knowledge – or the levels of understanding, intellectual skills such as critical thinking or problem solving, and application to practice. In contrast, the ASPHER framework appears to equally value knowledge as an indicator of levels of competency or expertise.

The second notable observation is the absence of competencies in the CEPH framework that map directly to the three domains in the CAPHIA document that relate to the 'service' elements of the Global Charter (i.e., prevention, protection and promotion). The comparable competencies in the CEPH document are almost exclusively related to the domains that map to the 'function' elements of the Global Charter (i.e., governance, information, advocacy and capacity), which support the delivery of the services. However, given the CEPH document clearly mapped to all elements of the Global Charter in the previous stages of mapping, this is likely due to structural and terminology differences between the two documents. Nevertheless, it indicates a delineation in focus on areas of practice.

Somewhat unexpectedly, the third observation is that in the frameworks that do not delineate competencies to degree levels (i.e., excluding CEPH), the spread of verbs across the taxonomy is relatively balanced, with verbs allocated to most levels of the Bloom's Taxonomy for each of the competencies that are comparable to the CAPHIA domains. Although there is the occasional level without an allocated verb, this may be the result of the mapping of individual competencies against the

CAPHIA domains rather than a reflection of what is occurring in the whole domains within each individual document, when those competencies that did not map to the competencies in the CAPHIA domains are also included. Of note however, is the clear gap in terms of the lack of 'evaluate' verbs in the CAPHIA domain of *Health Protection*.

Thus, the competency statements appear to reflect the staged learning intended in the Bloom's Taxonomy, rather than relying on the descriptors of the levels of competency for each statement to achieve this. The implication of this finding is that the CAPHIA competency statements do not necessarily need to change to accommodate differentiations between competency levels – the development of descriptors of competency levels therefore becomes critical. The next stage of analysis was to explore the different approaches used in the individual frameworks to achieve this aim.

In terms of the recent revisions of Bloom's Taxonomy, it is also worth pausing here to reflect on the outcomes of the recent CAPHIA Teaching and Learning Forum, hosted in 2021 by the University of the Sunshine Coast. One of the calls to action from the Forum was to ensure public health curriculum fosters the key qualities (or 'affective' skills) essential for effective public health practice (e.g., empathy, cultural humility, agility, global citizenship). Consideration should therefore be given to including additional 'generic' skills that fulfill this responsibility.

Differentiating between Approaches

All four documents have taken different approaches to defining the levels of competency, although there are essentially two models used across the four documents:

- defining specific competencies to various degree levels (CEPH); and
- describing the extent to which competencies are mastered (ASPHER, RACP and UKFPH).

Although the two public health physician frameworks indicate different levels of competency that can be achieved, they dictate the level of competency graduates are expected to demonstrate for each competency at the end of the training programme, whereas the ASPHER framework does not, leaving interpretation and application flexible. A more detailed description of the approach in each document is provided below.

CEPH Level of Degrees

As previously outlined, the CEPH document dictates the competencies expected of different degree levels, rather than outlining different levels of competency acquisition. However, it also provides an outline of the required 'knowledge' domains and potential experiential learning activities (or 'application'). The Bachelor of Public Health (BPH) level has a unique set of both knowledge and application expectations, whereas the knowledge domains for the Master of Public Health (MPH) and Doctor of Public Health (DrPH) degrees are the same with differing application expectations. If considered in combination, examples from the different degree levels could be structured as outlined in Table 2, which clearly indicate the intended progression of learning between degree levels.

Considering this example, and given the differences between the documents noted above, the allocation of verbs in the CEPH framework against the Bloom's Taxonomy also warranted further scrutiny, particularly given the BPH competencies only mapped to the *Evidence-based Professional Population Health Practice* domain in the CAPHIA document. In this example, the verbs imply a transition from using/'applying' information, to 'analysing' information, to designing projects that will be 'creating' information between different degree levels. Taking all competencies into account, and not just those that mapped to those in the CAPHIA domains, the allocation of verbs in the CEPH document against Bloom's Taxonomy is summarised in Table 3.

Table 2: Examples of CEPH knowledge domains and experiential activities for relevant competencies by degree level

Degree Level	Knowledge Domain	Competency	Experiential Activity
Bachelor	Basic concepts, methods and tools of public health data collection, use and analysis and why evidence-based approaches are an essential part of public health practice	Ability to locate, use, evaluate and synthesize public health information	Advocacy for protection and promotion of the public's health at all levels of society
Master	Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health	Analyse quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Course-based activities (e.g., performing a needed task for a public health or health care organization under the supervision of a faculty member as an individual or group of students)
Doctoral		Design a qualitative, quantitative, mixed methods, policy analysis or evaluation project to address a public health issue	The applied practice experience should take place within an organization external to the student's school or programme so that it is not merely an academic exercise, but application of learning to a "real world" setting

Table 3: Examples of verb usage in the CEPH framework against Bloom's Taxonomy

Bloom's Taxonomy	CEPH (BPH)	CEPH (MPH)	CEPH (DrPH)
Understand	Communicate (1)	Communicate (1) Describe (1) Explain (1) Interpret (1)	Communicate (2) Explain (4)
Subtotal	**1**	**4**	**6**
Apply	Use (1) Locate (1)	Apply (5) Assess (1) Identify (1) Implement (2) Perform (1) Select (4)	Access (1) Act (1) Address (7)
Subtotal	**2**	**14**	**9**
Analyse		Analyse (1) Compare (1)	Analyse (2) Assess (2) Monitor (1) Organise (1)
Subtotal	**0**	**2**	**6**
Evaluate	Evaluate (1) Synthesise (1)	Advocate (1) Evaluate (2) Influence (1) Interpret (1) Propose (2)	Evaluate (3) Influence (1) Promote (1) Propose (2)
Subtotal	**2**	**7**	**7**
Create		Build (1) Design (3) Discuss (2)	Create (2) Cultivate (1) Design (3) Facilitate (2) Integrate (4)
Subtotal	**0**	**6**	**12**

When mapped against Bloom's Taxonomy, the verbs used definitively indicate a progression of competency expected at different degree levels illustrating how CAPHIA could potentially use Bloom's Taxonomy to differentiate between competency levels for different qualifications. However, this approach is very rigid with limited flexibility built in for intermediary levels such as Bachelor (Honours) or Graduate Certificate programmes for example.

ASPHER Levels of Acquisition

In total contrast, the ASPHER framework is based on the Dreyfus model of adult skill acquisition (24, 25). For simplicity, only three (rather than five) levels have been used: competent, proficient and expert, as outlined in Table 4.

Table 4: Levels of competency acquisition as outlined in the ASPHER framework (8)

Level 3 (Competent)	Level 2 (Proficient)	Level 1 (Expert)
• Foundational training in a health discipline • Relies heavily on their core public health competencies • Recognizes that complex work requires non-routine decision-making, to which hard and fast rules do not clearly apply • May supervise smaller groups of staff	• Makes decisions via intuition and analytical thinking • Sees the situation and the interconnectedness of the decisions they make • Assumes leadership roles • Has supervisory responsibility	• Focuses on the central aspects of a problem • Performs intuitively and only occasionally needs deliberation • Reflects on how the system works • Assesses the quality of the work done in their organization • Assumes leadership roles • Develops strategies and assigns leadership responsibilities to others • Has substantial authority and responsibility • Supervises multiple tiers of staff

Given the above comment about valuing knowledge as well as skills and application, an example of how these levels of acquisition are applied to competencies based on each cognitive level from Bloom's Taxonomy is provided in Table 5. Regarding the knowledge domain, the extent of the knowledge base clearly increases as levels of competency acquisition increase.

Table 5: Examples of levels of acquisition as applied to levels in Bloom's Taxonomy from the ASPHER framework (8)

Bloom's Taxonomy	Competency Examples	Level 3 (Competent)	Level 2 (Proficient)	Level 1 (Expert)
Remember	**Promoting Health:** Knows the basis of secondary prevention and screening programmes	I am aware of the rationale for the main screening programmes offered in my locality.	I know the circumstances when screening can be an effective strategy for identifying disease at an early stage when treatment is more effective. I am aware of the main screening programmes offered in my locality.	I know the principles that are used in my country to decide whether to establish or continue a screening programme. I know the quality control procedures for screening programmes. I know the main screening programmes offered in my locality. I know the difference between primary, secondary and tertiary prevention and the circumstances relevant to each.
Understand	**One-Health & health security:** Understands the local implications of the One-Health approach, its global interconnectivity and how it affects health conditions in the population	I understand the value of improving health and well-being via the One-Health approach by preventing risks and mitigating the effects of crises that originate at the interface between humans, animals and environments."	I understand and apply the One-Health approach in my professional practice to improve health and well-being by preventing risks and mitigating the effects of crises that originate at the interface between humans, animals and environments. Although One-Health is typically used in the context of communicable diseases and environmental health, I apply the principles across the public health functions for which I am responsible.	I have expertise in the One-Health approach. In my role as a leader, I improve health and well-being by preventing risks and mitigating the effects of crises that originate at the interface between humans, animals and environments. Although One-Health is typically used in the context of communicable diseases and environmental health, I apply the principles across the public health functions for which I am responsible.

Bloom's Taxonomy	Competency Examples	Level 3 (Competent)	Level 2 (Proficient)	Level 1 (Expert)
Apply	**Law, policy & ethics:** Applies scientific principles and concepts to inform discussion of health-related, fiscal, administrative, legal, social and political issues in the workplace	I endeavour to use and understand the importance of evidence to back up arguments relevant to legal, social and political issues within public health.	I am proficient in using evidence and scientific principles to underpin my public health arguments relevant to legal, social and political issues within my role.	I have expertise in political and influencing skills. The credibility of my arguments is strengthened by having a strong evidence base and using scientific principles and concepts to inform the legal, social and political debate.
Analyse	**Promoting Health:** Assesses the focus and scope of initiatives to promote health by assessing the need to achieve positive changes in individual and community health I have responsibility for health-promoting activities that are informed by assessments of need.	I am competent in health promotion theory and the options for delivering health promoting initiatives.	I am proficient in using health promotion theory and the options for delivering health promoting initiatives.	I have responsibility for health-promoting activities that are informed by assessments of need. I have expertise in using health promotion theory and use this knowledge when appraising options for delivering health-promoting initiatives.
Evaluate	**Promoting Health:** Evaluates the effectiveness of activities to promote health geared toward producing changes at the community and individual levels, in public or social policy to benefit health and quality of life	I am competent in contributing to evaluating the effectiveness of activities to promote health.	I am proficient in evaluating the effectiveness of activities to promote health. The outputs of these evaluations are used to influence change.	I have expertise in evaluating the effectiveness of activities to promote health and use this to lead change at various levels across different sectors.
Create	**Science and practice:** Designs and conducts qualitative and/or quantitative research that builds on existing evidence and adds to the evidence base for public health practice, involving relevant stakeholders in this process	I am not an active researcher, but I have responsibility for data collection and analysis. I have had some training in research methods.	I am proficient in research. I have day-to-day project management responsibilities and lead small research, evaluation or audit projects. I am involved in data collection and analysis. I have in-depth knowledge of research methods and analysis techniques.	I have expertise in research. I design and coordinate research and supervise a research team. I also collaborate with research led by others. I have in-depth knowledge of research methods and analysis techniques.

Note that for the lower applied cognitive levels the higher levels of acquisition include verbs from the higher levels of cognition. The reverse is the case as the levels of cognition increase. Arguably, this approach means that for those competency statements designed for higher cognitive levels, individuals who acquire competency at a competent and/or proficient level are not actually achieving the required level of competency expected for this area of practice (e.g., the example for the 'analyse' level of Bloom's Taxonomy); rather they are attaining a level of achievement towards fully demonstrating the competency like the approach used in the UKFPH framework described below.

Also of note is the combination of skills described in the highest levels of cognition and acquisition. If the lower levels of acquisition (i.e., competent and proficient) were to accurately reflect the level of cognition indicated in the competency statement, these examples show it is still possible to increase the levels of acquisition by combining the discipline-based competency with high-order generic 'skills' in the 'application' of the competency.

RACP Knowledge vs Application

Like the ASPHER framework, the RACP framework also outlines levels of competency acquisition, although it uses five levels as outlined in Table 6. However, it states that the "levels that are relevant to public health medicine trainees are levels 1 and 2. The more advanced levels are relevant for the continuing professional development of public health physicians."(6) Trainees are therefore expected to demonstrate level 1 'knowledge' for all competencies, and level 2 'application' (at least in a supported

environment), only for the selected competencies, to obtain a Fellowship. We therefore limited our analysis to the two levels applicable to trainees.

Table 6: Description of levels of performance used in the RACP framework (6)

Level	0	1	2	3	4
Description	Has not developed competency	Understands key concepts and important factual knowledge	Demonstrates effective application of the competency, at least in a supported environment	Maintains a high level of competency through regular use or exercises	Leads the sector in this competency by instructing others, reviewing and researching the area, and contributing to performance improvements

Based on the descriptors of these two levels, level 1 requires the 'remember' and 'understand' cognitive levels and level 2 requires the levels of 'apply', 'analyse', 'evaluate' and 'create'. Yet the verbs used in the descriptors for the competency levels do not necessarily reflect this, as illustrated in the two examples provided in Table 7.

Table 7: Examples of the descriptors for competencies requiring different levels of acquisition in the RACP framework.

Competency Examples	Level 1	Level 2
Advise on health sector workforce planning	• *understand* workforce needs, including suitable cultural composition • *understand* planning methods • conduct a workforce analysis • prepare a workforce development plan	
Analyse surveillance data to support to the management of environmental health risks		• *describe* the distribution of environmental health hazards • detect trends and events requiring an immediate response • *understand* how environmental health guidelines are set and applied • use data to select optimal prevention and control measures

If the descriptors for the competencies requiring a higher level of acquisition in level 2 were intentionally structured to include the underpinning knowledge also required, the inclusion of relevant verbs (*italicised*) would be understandable. However, there are numerous examples of level 1 descriptors that also include verbs indicating higher level cognitive skills (underlined) are also required. This inconsistency was notable in a majority of the level descriptors. Given this inconsistency in the descriptors, further analysis of the use of verbs in the descriptors against the cognitive level indicated in the competency statements was not progressed.

UKFPH Level of Achievement

Although the UKFPH framework outlines three levels of competency achievement: minimal, partial and full; these are used for assessment purposes rather than indicating different competency levels for practice. Registrars must fully demonstrate all competencies to graduate as a Public Health Consultant. An example is provided in Table 8.

Table 8: Example of levels of achievement matrix from the UKFPH framework (7)

Competency Example	Minimal	Partial	Full
Identify, advise on and implement public health actions with reference to local, national and international policies and guidance to prevent, control and manage identified health protection hazards.	Is **not able** to identify, advise on or implement public health actions relating to health protection hazards.	**Understands** the importance of identifying, advising on, and implementing public health actions in relation to health protection hazards.	**Demonstrates** effective identification, advice and implementation of public health actions to prevent, control and manage identified health protection hazards.

Although the approach does not align with the intent of this project to define different levels of competency, it is nevertheless a useful approach in that the wording of the descriptors does not significantly change from that in the competency statement, unlike the ASPHER and RACP frameworks. Instead, the level of cognitive skill required to apply the competency changes – in this case, understand and demonstrates. This could be supplemented with higher level verbs to describe higher cognitive levels (e.g., "effectively leads a team responsible for the…"). This approach is recommended in developing the descriptors for the CAPHIA document.

Notably, the training programme itself has been structured on Miller's "Triangle" model of learning (26), to illustrate the increasing level of learning required to transition from 'knowledge' acquisition to the integration and 'application' of all competencies for consultant practice (the final domain in the framework) as illustrated in Figure 1. Aside from the medical-based competencies, arguably this would be equivalent to the ASPHER 'expert' level if all public health competencies were achieved.

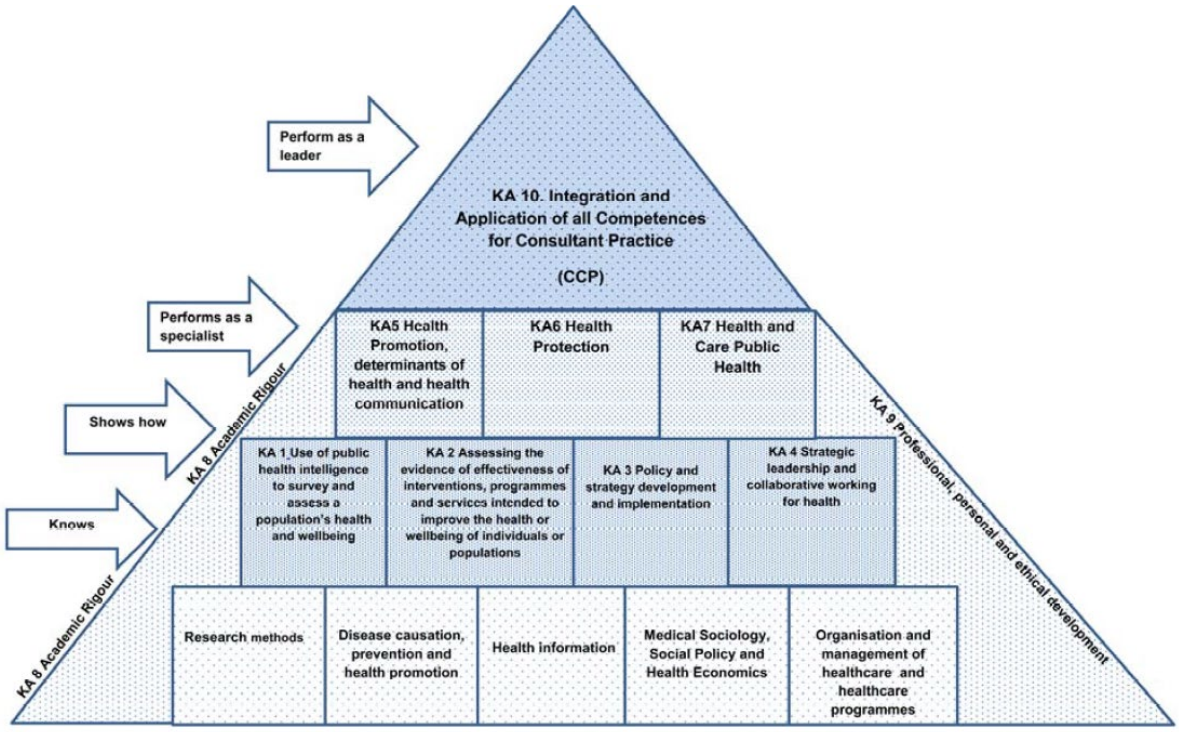

Figure 1: Miller's adapted model of learning for public health used by the UKFPH (7)

Recommendations

11. The *Health Protection* domain is revised to include an 'evaluate' level verb from Bloom's Taxonomy.
12. Consideration should be given to including additional 'generic' skills based on competencies related to the Bloom's Taxonomy 'affective' domain that outline essential qualities for public health practice.
13. The CAPHIA competencies are revised using a combination of the ASPHER and UKFPH approaches whereby the descriptors for the competency levels are worded consistently like the UKFPH framework, but the level of acquisition increases like the ASPHER framework, based on the level of cognitive skill required to apply the competency at different levels of practice.

4. Defining Levels of Competency

The third objective of this project was to ascertain how the competencies might be restructured to include levels of acquisition according to qualification levels.

AQF Architecture

As previously outlined, the current AQF framework is a rigid structure, with progression through ten educational levels, from school leavers to Doctoral degrees, each of which is defined by a set of criteria based on the three key areas of knowledge, skills, and application (of both knowledge and skills) (12). The AQF currently categorises higher education qualifications in the top four levels, each of which is defined using 'qualification type' descriptors. The current AQF levels cover Undergraduate degrees at level six through to Doctoral degrees at level ten.

The results of the 2019 AQF Review (21) identified several problems associated with the current structure, with a criticism that at times the structure does not consistently reflect competence in the qualifications gained. One common criticism of this structure is that it does not recognise or allow for the inclusion of content from adjacent levels. The existence of both level criteria and qualification type descriptors also results in a lack of clarity and confusion that hinders compliance.

The proposed new framework allows for the transportability of content between bands and reduces the number from ten 'levels' to eight 'bands'. It also proposes one set of descriptors, which focus on the qualification type rather than the educational levels/bands. The intention is that degrees can be designed on descriptors that consist of knowledge, skills and application features from one or more bands. For example, a Bachelor (Honours) degree might have knowledge competencies that relate to bands 5 and 6, given it is essentially an expanded Bachelor programme, and skills or application competencies from bands 6 and 7, in regard to conducting research.

The AQF Review suggests three possible options for restructuring the qualification type alignment to the eight bands as summarised in Table 9.

Table 9: Options for qualification type realignment from AQF Review (21)

	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6	Band 7	Band 8
Option 1	Pre-vocational Certificates Initial Vocational Certificates	Vocational Certificates	Advanced Vocational Certificates	Diploma Associate Degrees	Bachelor Degrees Higher Diplomas	Graduate Certificates Graduate Diplomas Bachelor Honours Degrees	Master Degrees	Doctoral Degrees
Option 2	Pre-vocational Certificates	Initial Vocational Certificates	Vocational Certificates	Advanced Vocational Certificates	Diploma Associate Degrees	Bachelor Degrees Higher Diplomas Bachelor Honours Degrees	Graduate Certificates Graduate Diplomas Master Degrees	Doctoral Degrees
Option 3	Pre-vocational Certificates	Initial Vocational Certificates	Vocational Certificates	Advanced Vocational Certificates	Diploma Associate Degrees	Bachelor Degrees Higher Diplomas Graduate Certificates	Graduate Diplomas Bachelor Honours Degrees Master Degrees	Doctoral Degrees

For the purposes of thinking about the revision of the CAPHIA framework for application across different degree levels, the first option spanning four levels was chosen for the following reasons:

- Despite the government approving the recommendations from the review, related to higher education, in December of the same year, the recommendations are yet to be implemented and it is unclear when they will be. Therefore, by structuring the competencies into four levels of acquisition it allows for flexibility to apply them to the qualification types in either the current or proposed model.
- Four levels allows for greater flexibility to design programmes that include features across the bands when selecting the knowledge, skills and application features for qualification type descriptors, avoiding the rigid structure of the CEPH model that is purely qualifications based.
- It allows for a similar progression of learning illustrated in the UKFPH framework's adaptation of the Miller's Triangle.
- Option 1 most closely resembles the progression of learning for existing public health degrees in Australian universities.

Of note, the AQF does not include ('short form') micro-credentials, although in the AQF Review report these are discussed at length with respect to ensuring sufficient educational standards, including assessment requirements.

Generic Skills Alignment to the AQF Domains

As aforementioned, the current AQF uses descriptors based on three separate domains: knowledge, skills, and application of knowledge and skills (which the AQF Review recommends should be simplified to application). The AQF Review has also recommended that focus areas be incorporated to provide clarity around what knowledge and skills are intended across the bands to differentiate between qualification types. The report also recommends including general capabilities for incorporation into qualification design. These are summarised in Table 10.

Table 10: Proposed AQF domains and focus areas (20)

Knowledge	Skills	Application	General Capabilities
Scope & complexity Inquiry Information Management	Learner self-management skills Problem-solving & decision-making skills Communication, cooperation & collaboration skills Psychomotor skills	Context of learning Assessment conditions	Language, literacy& numeracy Core skills for work Digital literacy skills

As mentioned previously, one of the categories of competencies that did not map directly to those in the CAPHIA framework were those outlining generic skills. Table 11 illustrates how these align with the proposed AQF domains and focus areas. If the recommendations from the AQF Review are enacted, it is therefore likely the AQF will cover these kinds of competencies but if not, it may be necessary to consider including the more important of these competencies in any revision of the CAPHIA framework potentially in the *Evidence-based Professional Population Health Practice* domain to ensure they are captured.

Table 11: Generic skills alignment to proposed AQF domains

	ASPHER	CEPH	RACP	UKFPH
Skills	– Leadership & systems thinking – Communication, culture & advocacy – Professional development & reflective ethical practice	– Education & workforce development	– Communication, leadership & teamwork – Professional development & self-management – Advocacy	– Strategic leadership & collaborative working for health – Professional personal & ethical development – Integration & Application of Competences for Consultant Practice
General Capabilities	– Organizational literacy & adaptability		– Public health research & teaching – Development & operation	– Academic public health

Realigning the CAPHIA Competencies

There are several options for how to approach the revision of the CAPHIA competency framework as outlined in Table 12. For simplicity the four cognitive levels outlined in the following table refer to:

- Level 1 = current AQF Level 7 or proposed Band 5.
- Level 2 = current AQF Level 8 or proposed Band 6.
- Level 3 = current AQF Level 9 or proposed Band 7.
- Level 4 = current AQF Level 10 or proposed Band 8.

Table 12: Options for revising the CAPHIA framework

Option	Considerations	Comment for recommendation
Option 1: Minimal Change	Given the CAPHIA framework is already structured into sections for *Underpinning Knowledge*, *Elements of Competencies* and *Examples of Specialised Elements*, these could be applied directly to the different levels. The *Underpinning Knowledge* would be expected of learners at all levels from Undergraduate to Doctoral students. The foundational *Elements of Competencies* would apply to levels 1-2, and the *Specialised Elements* to levels 3-4. The knowledge and understanding based competencies (i.e., describe, understand etc) currently in the *Specialised Elements* would require amendment using Bloom's taxonomy to higher level skills and application-based verbs.	This option is not recommended because it fails to solve the current problem with ambiguity between levels.
Option 2: Restructure existing competencies	Reorganise the existing competencies into levels based on levels of acquisition. The levels must reflect building levels of knowledge and reflect increasing expertise and skills.	This is the simplest and quickest option for short-term implementation, but not ideal as different levels may miss out on important competencies, particularly if the levels are applied rigidly.
Example from *Disease Prevention and Control*	– Describe key elements of a population-based disease prevention strategy such as screening, immunisation and contact tracing [level 1] – Identify local, national and international mechanisms (including legislative and regulatory frameworks) for responses to public health emergencies [level 2] – Assess the relative merits (e.g., considering suitability to target group, resource requirements, etc.) of alternative disease prevention measures (e.g., education, immunisation, incentives, legislation, policies, standards, screening) [level 3] – Design a population-based disease prevention / control strategy [level 4]	

Option	Considerations	Comment for recommendation
Option 3: Change based on combination of ASPHER and UKFPH models	Use the existing competencies and add a descriptor to define the different levels. Descriptors could be merely added as an appendix to the existing document, as is the case with the ASPHER framework.	This is the simpler of the two recommended options.
Example from *Health Monitoring & Surveillance*	**Competency Statement:** Generate and interpret simple inferential statistics **Descriptors:** – Knows how to generate and interpret simple inferential statistics [level 1] – Uses appropriate software to generate and interpret simple inferential statistics [level 2] – Generates and interprets simple inferential statistics to identify emerging public health issues [level 3] – Generates and interprets simple inferential statistics to identify emerging public health issues in large population groups [level 4]	
Option 4: Change to also reflect AQF Review domains (i.e., knowledge, skills, application and generic skills)	Given the AQF descriptors are based on knowledge, skills, and applications, the competencies could also be separated into these categories. A generic skills category could also be used to separate those skills that apply across all domains as recommended in the AQF Review e.g., communication and leadership. This would require re-categorisation of existing competencies as well as adding the level descriptors. The resulting model would be quite complex, with four levels and four focus areas, but would have the advantage of providing a structure for learning design based both on potential AQF changes and take into account the recognition that public health education is not simply about the accumulation of knowledge but includes a grasp of how knowledge is applied in practice.	This is the most complex option, but probably the most useful option for a long-term solution to all the current problems of ambiguity.
Example from *Health Promotion*	**Knowledge Competency Statement:** Describe Aboriginal and Torres Strait Islander health in historical context and understands the impact of colonial processes on health outcomes **Descriptors:** – Describe Aboriginal and Torres Strait Islander health in historical context and understands the impact of colonial processes on health outcomes [level 1] – Understands Aboriginal and Torres Strait Islander health in historical context and acts to reduce the impact of colonial processes on health outcomes [level 2] – Etc… **Skills Competency Statement:** Critically evaluate an Aboriginal and Torres Strait Islander health promotion programme **Descriptors:** – Knows how to critically evaluate an Aboriginal and Torres Strait Islander health promotion programme [level 1] – Applies outcome-based evaluation methods to critically evaluate an Aboriginal and Torres Strait Islander health promotion programme [level 2] – Etc… **Application Competency Statement:** Develop criteria to prioritise health problems for a specific population/community **Descriptors:** – Outlines a process to develop criteria to prioritise health problems for a specific population/community [level 1] – Applies intercultural competencies when developing criteria to prioritise health problems for a specific population/community [level 2] – Etc…	

Option	Considerations	Comment for recommendation
	Generic Skills Competency Statement: Demonstrate a reflexive public health practice for Aboriginal and Torres Strait Islander health contexts	

Recommendations

14. The CAPHIA framework is revised based on option 3 or 4 outlined in Table 12.

5. Addressing the Key Content Gaps

As previously outlined, *Systems Thinking*, *Human Rights* and *One-Health* are identified gaps in the current CAPHIA framework. To address this gap, the following draft competency statements are provided for consideration.

Systems Thinking

As already noted, *Systems Thinking* is included within the domains of both the ASPHER (8) and CEPH (9) competencies against the *Governance* function. Suggestions for competencies are provided in Table 13.

Table 13: Suggested competencies for Systems Thinking

Elements of Competencies	• Knows the history and development of systems thinking • Understands the meaning of systems thinking • Explains public health in terms of a major system
Level 1	• Knows the history and development of systems thinking • Understands the meaning of systems thinking • Explains public health in terms of a major system
Level 2	• Knows the history and development of systems thinking and explains how it can be applied in public health • Understands the meaning of systems thinking and how to apply it in public health • Explains how public health works as a complex interactive system
Level 3	• Promotes the value of systems thinking and its application in public health • Evaluates public health programmes using the principles of systems thinking • Considers how to address public health problems within a complex interactive system
Level 4	• Runs public health programmes using systems thinking in planning and execution • Designs new public health programmes using the principles of systems thinking • Addresses wicked public health problems through a collaborative intersectoral approach

Human Rights

As stated above, *Human Rights* is included in the GPHC (16) competencies against the *Governance* function. Suggested levels of competencies are provided in Table 14.

Table 14: Suggested competencies for Human Rights

Elements of Competencies	• Knows the history of human rights development, including the protections and threats to them. • Understands the basic rights and freedoms which belong to all peoples, regardless of race, religion, or nationality. • Knows where data banks related to human rights are stored. • Knows the local and international laws and agreements which protect human rights.
Level 1	• Knows the history of human rights development, including the protections and threats to them. • Understands the basic rights and freedoms which belong to all peoples, regardless of race, religion, or nationality. • Knows where data banks related to human rights are stored. • Knows the local and international laws and agreements which protect human rights.
Level 2	• Knows the history of human rights development and identifies the protections and threats to them. • Promotes basic rights and freedoms which belong to all peoples, regardless of race, religion, or nationality. • Knows where data banks related to human rights are stored, what they contain, and how to access and use them when appropriate. • Knows the local and international laws and agreements which protect human rights and provides examples of when rights have been enacted.
Level 3	• Understands the history of human rights development, protections and threats to human rights, and how they apply in public health protections and provisions for communities. • Knows and names the basic rights and freedoms related to freedom of opinion, access to education, a family and private life, and understands individuals do not have these freedoms arbitrarily. • Accesses data banks related to human rights are stored and evaluates the reliability of the data. • Knows how to apply local laws and agreements which protect human rights and understands mechanisms for international human rights protections.
Level 4	• Applies human rights to the design of protections to eliminate threats to human rights for specific communities. • Contribute to programmes designed to protect human rights and freedoms to improve public health. • Collects data on infringements to human rights. • Applies local laws and agreements which protect human rights to advance international human rights protections.

One-Health

As aforementioned, *One-Health* is included in the ASPHER competencies with competencies mapped predominantly against both the *Protection* and *Prevention* services, but the PET has recommended it be included in the *Health Protection* domain along with environmental health and climate change. Suggested levels of competencies are provided in Table 15.

Table 15: Suggested competencies for One-Health

Elements of Competencies	• Understands how environmental health, animal health, and human health intersect in One-Health. • Understands how One-Health theories contribute to public health protection. • Uses One-Health ideas to communicate the effectiveness of programmes.
Level 1	• Understands how environmental health, animal health, and human health intersect in One-Health. • Understands how One-Health theories contribute to public health protection. • Uses One-Health ideas to communicate the effectiveness of programmes.
Level 2	• Can identify One-Health concepts used in public health strategies for improvements in environmental health, animal health, and human health. • Understands the theory and science of One-Health and can identify examples of One-Health in action. • Explains how One-Health strategies contribute to the effectiveness of programmes.
Level 3	• Can apply One-Health concepts to evaluate public health strategies for improvements in environmental health, animal health, and human health. • Uses One-Health theories to design initiatives for public health protection. • Applies One-Health strategies to implement health protection programmes.
Level 4	• Monitors and evaluates One-Health programmes to improve environmental health, animal health, and human health. • Proposed evidence-based solutions to One-Health problems. • Runs multifaceted health protection programmes related to One-Health.

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Appendices

Appendix 1: Mapping competency domains against the Global Charter elements

Global Charter	CAPHIA (2)	PHANZ (13)	ASPHER (8)	Canada (16)	CEPH (9) MPH / DrPH	Global PH (15)	RACP (6)	UKFPH (7)
Governance: public health legislation; health and cross-sector policy; strategy; financing; organisation; assurance: transparency, accountability and audit.	– Health Policy, Planning & Management	– Health Systems – Policy, Legislation, & Regulation – Planning & Administration – Te Tiriti O Waitangi	– Law, Policies & Ethics – Leadership & Systems Thinking – Governance & Resource Management – Organizational Literacy & Adaptability	– Policy & Programme Planning, Implementation & Evaluation	– Public Health & Health Care Systems – Policy In Public Health – Systems Thinking – Leadership, Management & Governance – Policy & Programmes	– MDG & SDG – Global Financial Crisis & Health – Global Governance of Population Health & Wellbeing – Civil Society Organisation in Health – Global Health Law – Human Rights & Health – Global Financial Management for Health	– Policy Analysis, Development and Planning – Development And Operation – Organisational Management	– Policy & Strategy Development & Implementation
Information: surveillance, monitoring and evaluation; monitoring of health determinants; research and evidence; risk and innovation; dissemination and uptake.	– Health Monitoring & Surveillance – Evidence-Based Professional Population Health Practice	– Public Health Science – Research And Evaluation	– Science & Practice	– Assessment & Analysis – Policy & Programme Planning, Implementation & Evaluation	– Evidence-Based Approaches to Public Health – Data & Analysis	– Demographic Challenges – Burden Of Disease	– Public Health Information and Critical Appraisal – Public Health Research and Teaching – Health Care and Public Health Programme Evaluation	– Use Of Public Health Intelligence to Survey & Assess A Population's Health & Wellbeing – Assessing The Evidence of Effectiveness of Interventions, Programmes & Services – Academic Public Health
Advocacy: leadership and ethics; health equity; social-mobilization and solidarity; education of the public; people-centred approach; voluntary community sector engagement; communications; sustainable development.	– Evidence-Based Professional Population Health Practice	– Communication – Leadership, Teamwork & Professional Liaison – Advocacy	– Law, Policies & Ethics – Collaboration & Partnerships – Communication, Culture & Advocacy	– Partnerships, Collaboration & Advocacy – Communication – Leadership	– Leadership – Communication – Leadership, Management & Governance	– Public Health Leadership in A Globalised World – Public Health Ethics	– Communication, Leadership and Teamwork – Advocacy	– Strategic Leadership & Collaborative Working for Health

Global Charter	CAPHIA (2)	PHANZ (13)	ASPHER (8)	Canada (16)	CEPH (9)	MPH / DrPH	Global PH (15)	RACP (6)	UKFPH (7)
Capacity: workforce development for public health, health workers and wider workforce; workforce planning: numbers, resources, infrastructure; standards, curriculum, accreditation; capabilities, teaching and training.	– Health Policy, Planning & Management	– Working Across & Understanding Cultures – Te Tiriti O Waitangi – Professional Development & Self-Management – Planning & Administration	– Governance & Resource Management – Professional Development & Reflective Ethical Practice	– Diversity & Inclusiveness	– Interprofessional Practice – Policy & Programmes – Education & Workforce Development		– Global Public Health Workforce – Education & Training of Professionals for Global Public Health – Blended Learning	– Professional Development & Self-Management – Universal Cultural Competencies – Public Health Research & Teaching – Development & Operation	– Professional Personal & Ethical Development – Integration and Application of Competences for Consultant Practice
Protection: international health regulation and co-ordination; health impact assessment; communicable disease control; emergency preparedness; occupational health; environmental health; climate change and sustainability.	– Health Protection	– Health Systems – Policy, Legislation & Regulation	– One-Health & Health Security	– NA	– Public Health & Health Care Systems – NA		– Environmental Health – Disaster Preparedness – Global Migration & Migrant Health	– Māori & Pacific Islander Health – Aboriginal & Torres Strait Islander Health – Ethnic Minority Health – Health Protection & Risk Management	– Health Protection
Prevention: primary prevention: vaccination; secondary prevention: screening; tertiary prevention: evidence-based, community-based, integrated, person-centred quality healthcare and rehabilitation; healthcare management and planning.	– Disease Prevention & Control	– Community Health Development	– One-Health & Health Security	– NA	– Public Health & Health Care Systems – Leadership, Management & Governance		– Structural & Social Violence – Universal Health Coverage – Health Programme Management	– Māori & Pacific Islander Health – Aboriginal & Torres Strait Islander Health – Ethnic Minority Health – Organisational Management Infectious Disease Prevention & Control – Chronic Disease, Mental Illness & Injury Prevention	– Health & Care Public Health

Global Charter	CAPHIA (2)	PHANZ (13)	ASPHER (8)	Canada (16)	CEPH (9)	Global PH (15)	RACP (6)	UKFPH (7)
Promotion: inequalities; environmental determinants; social and economic determinants; resilience; behaviour and health literacy; life-course; healthy settings.	– Health Promotion	– Community Health Development	– Promoting Health	– NA	**MPH** – Planning & Management to Promote Health – Public Health & Health Care Systems **DrPH** – NA	– Social Determinants of Health & Inequalities – Gender & Health – Health & Wellbeing	– Māori & Pacific Islander Health – Aboriginal & Torres Strait Islander Health – Ethnic Minority Health – Health Promotion & Community Development	– Health Improvement, Determinants of Health & Health Communication
Legend: Green = term maps directly to indicated Global Charter element; Orange = term maps directly to an alternate Global Charter element; Red = emerging area of practice not currently included in the Global Charter; Purple = specified priority populations								

Appendix 2a: Number of competencies comparable to CAPHIA competencies by domains (ASPHER, RACP, UKFPH)

CAPHIA	No.	ASPHER	No.	RACP	No.	UKFPHA	No.
		– Organizational literacy & adaptability	1	– Aboriginal & Torres Strait Islander Health	2	– Academic public health	2
		– Promoting health	2	– Ethnic Minority Health	1	– Use of public health intelligence to survey & assess a population's health & wellbeing	5
		– One-Health & health security	4	– Public Health Research & Teaching	2		
		– Science & practice	7	– Public Health Information & Critical Appraisal	5		
Health Monitoring & Surveillance	15	**Total**	**14**		**10**		**7**
		– Promoting health	1	– Health Protection & Risk Management	2	– Health Protection	3
		– Law, policy & ethics	1	– Public Health Research & Teaching	1	– Health & Care Public Health	1
		– One-Health & health security	6	– Infectious Disease Prevention & Control	5	– Health Improvement, Determinants of Health, & Health Communication	1
		– Communication, culture & advocacy	1	– Chronic Disease, Mental Illness & Injury Prevention	6	– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	1
				– Public Health Information & Critical Appraisal	1		
Disease Prevention & Control	13	**Total**	**9**		**15**		**6**
		– Law, policy & ethics	2	– Health Protection & Risk Management	9	– Health Protection	7
		– One-Health & health security	7	– Professional Development & Self-Management	2	– Health Improvement, Determinants of Health, & Health Communication	1
		– Communication, culture & advocacy	2	– Public Health Information & Critical Appraisal	2	– Use of public health intelligence to survey & assess a population's health & wellbeing	1
Health Protection	18	**Total**	**11**		**13**		**9**
		– Communication, culture & advocacy	2	– Communication, Leadership & Teamwork	1	– Health Improvement, Determinants of Health, & Health Communication	6
		– Law, policy & ethics	1	– Policy Analysis, Development & Planning	2	– Integration & Application of Competences for Consultant Practice	1
		– Promoting health	7	– Health Promotion & Community Development	6	– Use of public health intelligence to survey & assess a population's health & wellbeing	1
		– Science & practice	1				
Health Promotion	16	**Total**	**11**		**9**		**8**
		– Science & practice	4	– Organisational Management	7	– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	1
		– Promoting health	2	– Universal Cultural Competencies	1		
		– Law, policy & ethics	6	– Development & Operation	8		
		– One-Health & health security	3	– Advocacy	1		
		– Communication, culture & advocacy	4	– Policy Analysis, Development & Planning	6	– Health & Care Public Health	5
		– Governance & resource management	10	– Health Care & Public Health Programme Evaluation	2	– Policy & strategy development & implementation	7
		– Collaboration & partnerships	6				
		– Organizational literacy & adaptability	2	– Public Health Information & Critical Appraisal	1	– Integration & Application of Competences for Consultant Practice	2
				– Communication, Leadership & Teamwork	2	– Health Improvement, Determinants of Health & Health Communication	1
						– Strategic leadership & collaborative working for health	3
Health Policy, Planning & Management	22	**Total**	**37**		**28**		**19**

CAPHIA	No.	ASPHER	No.	RACP	No.	UKFPHA	No.
		– Science & practice	2	– Public Health Research & Teaching	5	– Health Protection	1
		– Law, policy & ethics	3	– Advocacy	1	– Health & Care Public Health	1
		– Leadership & systems thinking	6	– Universal Cultural Competencies	6	– Academic public health	6
		– Collaboration & partnerships	1	– Ethnic Minority Health	1	– Strategic leadership & collaborative working for health	3
		– Communication, culture & advocacy	3	– Aboriginal & Torres Strait Islander Health	1	– Professional personal & ethical development	6
		– Professional development & reflective ethical practice	3	– Public Health Information & Critical Appraisal	5	– Use of public health intelligence to survey& assess a population's health & wellbeing	2
		– Organizational literacy & adaptability	1	– Health Care & Public Health Programme Evaluation	2	– Integration & Application of Competences for Consultant Practice	7
				– Professional Development & Self-Management	2	– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	5
				– Communication, Leadership & Teamwork	3		
				– Policy Analysis, Development & Planning	1		
Evidence-based Professional Population Health Practice	23	**Total**	**19**		**27**		**31**
		– Communication, culture & advocacy	1	– Professional Development & Self-Management	6	– Strategic leadership & collaborative working for health	5
		– Professional development & reflective ethical practice	4	– Communication, Leadership & Teamwork	4	– Professional personal & ethical development	5
		– Organizational literacy & adaptability	6	– Máori & Pacific Islander Health	3	– Integration & Application of Competences for Consultant Practice	2
		– Leadership & systems thinking	3	– Public Health Research & Teaching	2	– Health Protection	1
				– Advocacy	1	– Health & Care Public Health	1
				– Development & Operation	1	– Academic public health	1
Competencies that didn't map		**Total**	**14**		**17**		**15**

Appendix 2b: Number of competencies comparable to CAPHIA competencies by domains (CEPH)

CAPHIA	No.	CEPH (BPH)	No.	CEPH (MPH)	No.	CEPH (DrPH)	No.
				– Evidence-based Approaches to Public Health	4	– Data & Analysis	3
Health Monitoring & Surveillance	15	**Total**	**0**	**Total**	**4**	**Total**	**3**
Disease Prevention & Control	13	**Total**	**0**	**Total**	**0**	**Total**	**0**
Health Protection	18	Total	**0**	**Total**	**0**	**Total**	**0**
				– Planning & Management to Promote Health	1		
Health Promotion	16	**Total**	**0**	**Total**	**1**	**Total**	**0**
				– Public Health & Health Care Systems	1	– Data & Analysis	2
				– Leadership	1	– Leadership, Management & Governance	9
				– Policy in Public Health	4	– Policy & Programmes	2
				– Planning & Management to Promote Health	4		
Health Policy, Planning & Management	22	**Total**	**0**	**Total**	**10**	**Total**	**13**
		Foundational Competencies	2	– Public Health & Health Care Systems	1	– Data & Analysis	2
				– Policy in Public Health	2	– Leadership, Management & Governance	4
				– Leadership	1	– Policy & Programmes	3
				– Communication	3		
				– Interprofessional Practice	1		
				– Planning & Management to Promote Health	1		
				– Evidence-based Approaches to Public Health	2		
Evidence-based Professional Population Health Practice	23	**Total**	**2**	**Total**	**11**	**Total**	**9**
				– Systems Thinking	1	– Education & Workforce Development	3
Competencies that didn't map		**Total**	**0**	**Total**	**1**	**Total**	**3**

Appendix 3a: Number of competencies comparable to PHANZ competencies by domains (ASPHER, RACP, UKFPH)

PHANZ	No.	ASPHER	No.	RACP	No.	UKFPHA	No.
		– Science & practice	3	– Public Health Information & Critical Appraisal	2	– Health Protection	1
		– Law, policies and ethics	1			– Health & Care Public Health	1
						– Policy & Strategy development & implementation	1
Health Systems	2	**Total**	**4**	**Total**	**2**	**Total**	**3**
		– Science & practice	5	– Policy Analysis, Development & Planning	2	– Health Protection	2
		– Promoting health	8	– Health Protection & Risk Management	1	– Health & Care Public Health	1
		– One-Health & health security	9	– Infectious Disease Prevention & Control	1	– Academic Public Health	2
		– Governance & resource management	1	– Health Promotion & Community Development	1	– Integration & Application of Competences for Consultant Practice	2
				– Public Health Information & Critical Appraisal	7	– Use of public health intelligence to survey & assess a population's health & wellbeing	2
Public Health Science	4	**Total**	**23**	**Total**	**12**	**Total**	**9**
		– Law, policies and ethics	6	– Policy Analysis, Development & Planning	8	– Policy & Strategy development & implementation	2
				– Health Protection & Risk Management	1		
				–		– Health Improvement, Determinants of Health & Health Communication	1
Policy, Legislation & Regulation	2	**Total**	**6**	**Total**	**9**	**Total**	**3**
		– Science & practice	3	– Public Health Research & Teaching	6	– Health & Care Public Health	1
				– Public Health Information & Critical Appraisal	3	– Policy & Strategy development & implementation	2
				– Professional Development & Self-Management	1	– Integration & Application of Competences for Consultant Practice	1
				– Health Care & Public Health Programme Evaluation	4	– Academic Public Health	5
						– Use of public health intelligence to survey & assess a population's health & wellbeing	2
						– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	6
Research & Evaluation	2	**Total**	**3**	**Total**	**14**	**Total**	**17**
				– Health Promotion & Community Development	3	– Health Improvement, Determinants of Health & Health Communication	1
						– Health & Care Public Health	1
						– Use of public health intelligence to survey & assess a population's health & wellbeing	1
Community Health Development	1	**Total**	**0**	**Total**	**3**	**Total**	**3**
				– Máori & Pacific Islander Health	**3**		
Te Tiriti o Waitangi	5	**Total**	**0**	**Total**	**3**	**Total**	**0**

PHANZ	No.	– ASPHER	No.	– RACP	No.	– UKFPHA	No.
		– Communication, culture & advocacy	1	– Universal Cultural Competencies	4	– Professional personal and ethical development	1
				– Ethnic Minority Health	2		
Working Across & Understanding Cultures	2	**Total**	**1**	**Total**	**6**	**Total**	**1**
		– Communication, culture & advocacy	6	– Health Protection & Risk Management	1	– Academic Public Health	1
				– Public Health Information & Critical Appraisal	1	– Strategic leadership & collaborative working for health	3
				– Communication, Leadership & Teamwork	4	– Policy & strategy development & implementation	1
				– Universal Cultural Competencies	1	– Use of public health intelligence to survey & assess a population's health & wellbeing	1
						– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	1
						– Professional personal & ethical development	1
						– Integration & Application of Competences for Consultant Practice	1
Communication	5	**Total**	**6**	**Total**	**7**	**Total**	**9**
		– Leadership & systems thinking	8	– Universal Cultural Competencies	2	– Policy and Strategy development and implementation	1
		– Collaboration & partnerships	6	– Communication, Leadership & Teamwork	3	– Strategic leadership and collaborative working for health	3
		– Governance & resource management	1			– Professional personal and ethical development	2
		–				– Integration and Application of Competences for Consultant Practice	1
		–					
		–					
Leadership, Teamwork & Professional Liaison	4	**Total**	**15**	**Total**	**5**	**Total**	**7**
		– Communication, culture & advocacy	1	– Advocacy	1	– Health and Care Public Health	1
		–		– Health Promotion and Community Development	1	– Strategic leadership and collaborative working for health	1
		–		– Professional Development and Self-Management	1	– Health Improvement, Determinants of Health, and Health Communication	1
		–				– Integration and Application of Competences for Consultant Practice	2
		–				– Assessing the evidence of effectiveness of interventions, programmes and services intended to improve the health or wellbeing of individuals or populations	1
Advocacy	2	**Total**	**1**	**Total**	**3**	**Total**	**6**
		– Professional development & reflective ethical practice	6	– Professional development & reflective ethical practice	3	– Professional personal and ethical development	3
				– Universal Cultural Competencies	1	– Health Protection	1
						– Integration and Application of Competences for Consultant Practice	1
Professional Development & Self-Management	1	**Total**	**6**	**Total**	**4**	**Total**	**5**

PHANZ	No.	– ASPHER	No.	– RACP	No.	– UKFPHA	No.
		– Governance & resource management	4	– Organisational Management	4	– Health Protection	2
		– Organizational literacy & adaptability	2	– Policy Analysis, Development & Planning	1	– Health and Care Public Health	2
		– One-Health & health security	1	– Communication, Leadership & Teamwork	1	– Strategic leadership & collaborative working for health	1
				– Health Protection & Risk Management	3	– Health Improvement, Determinants of Health & Health Communication	1
				– Development & Operation	1		
				– Public Health Information & Critical Appraisal	3	– Policy & strategy development & implementation	1
						– Integration and Application of Competences for Consultant Practice	1
						– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	1
Planning and Administration	4	**Total**	**7**	**Total**	**13**	**Total**	**9**
		– One-Health & health security	1	– Aboriginal & Torres Strait Islander Health	3	– Health Protection	3
		– Leadership & systems thinking	1	– Public Health Research & Teaching	2	– Health & Care Public Health	2
		– Governance & resource management	4	– Health Protection & Risk Management	5	– Academic Public Health	1
		– Professional development & reflective ethical practice	1	– Professional Development & Self-Management	5	– Health Improvement, Determinants of Health & Health Communication	3
		– Organizational literacy & adaptability	6	– Communication, Leadership & Teamwork	2	– Strategic leadership & collaborative working for health	3
				– Chronic Disease, Mental Illness & Injury Prevention	6	– Professional personal & ethical development	4
				– Health Promotion & Community Development	1	– Integration & Application of Competences for Consultant Practice	3
				– Infectious Disease Prevention & Control	4	– Use of public health intelligence to survey & assess a population's health & wellbeing	2
				– Development & Operation	8		
				– Organisational Management	3		
				– Advocacy	2	– Assessing the evidence of effectiveness of interventions, programmes & services intended to improve the health or wellbeing of individuals or populations	1
Competencies that didn't map		**Total**	**13**	**Total**	**41**	**Total**	**22**

Appendix 3b: Number of competencies comparable to PHANZ competencies by domains (CEPH)

PHANZ	No.	CEPH (BPH)	No.	CEPH (MPH)	No.	CEPH (DrPH)	No.
				– Public Health & Health Care Systems	1	– Policy & Programmes	1
Health Systems	2	**Total**		**Total**	**1**	**Total**	**1**
		– Foundational Competencies	1	– Public Health & Health Care Systems	1	– Leadership, Management & Governance	2
				– Policy in Public Health	1		
				– Evidence-based Approaches to Public Health	1		
Public Health Science	4	**Total**	**1**	**Total**	**3**	**Total**	**2**
				– Evidence-based Approaches to Public Health	1	– Policy & Programmes	2
				– Policy in Public Health	2		
Policy, Legislation & Regulation	2	**Total**	**0**	**Total**	**3**	**Total**	**2**
				– Evidence-based Approaches to Public Health	3	– Data & Analysis	3
				– Planning & Management to Promote Health	1		
				– Policy in Public Health	1		
Research & Evaluation	2	**Total**	**0**	**Total**	**5**	**Total**	**3**
				– Planning & Management to Promote Health	1		
Community Health Development	1	**Total**	**0**	**Total**	**1**	**Total**	**0**
	5						
Te Tiriti o Waitangi		**Total**	**0**	**Total**	**0**	**Total**	**0**
				– Planning & Management to Promote Health	1	– Policy & Programmes	1
				– Communication	1	– Leadership, Management & Governance	1
Working Across & Understanding Cultures	2	**Total**	**0**	**Total**	**2**	**Total**	**2**
		– Foundational Competencies	1	– Communication	3	– Leadership, Management & Governance	1
						– Education & Workforce Development	1
Communication	5	**Total**	**1**	**Total**	**3**	**Total**	**2**
				– Policy in Public Health	1	– Policy & Programmes	1
				– Leadership	1	– Leadership, Management & Governance	2
Leadership, Teamwork & Professional Liaison	4	Total	**0**	– Interprofessional Practice **Total**	1 **3**	**Total**	**3**
				– Policy in Public Health	1	– Leadership, Management & Governance	1
				– Leadership	1		
Advocacy	2	**Total**	**0**	**Total**	**2**	**Total**	**1**
				–		– Leadership, Management & Governance	1
Professional Development & Self-Management	1	**Total**	**0**	**Total**	**0**	**Total**	**1**
				– Planning & Management to Promote Health	2	– Leadership, Management & Governance	5
Planning & Administration	4	**Total**	**0**	**Total**	**2**	**Total**	**5**
				– Systems Thinking	1	– Education & Workforce Development	2
Competencies that didn't map		**Total**	**0**	**Total**	**1**	**Total**	**2**

Appendix 4: Verbs (No.) used across frameworks for competencies comparable to the CAPHIA domains according to Bloom's Taxonomy

* = same as CAPHIA	CAPHIA	ASPHER	CEPH (BPH)	CEPH (MPH)	CEPH (DrPH)	RACP	UKFPH
Health Monitoring and Surveillance							
Remember		Aware (1) Know (4)					
Understand	Communicate (1) Demonstrate (1) Describe (4) * Interpret (6) * Outline (1)	Describe (2) * Understand (2)		Interpret (1) *	Explain (2)	Describe (1) *	Interpret (2) *
Apply	Calculate (1)	Address (1) Apply (1) Conduct (1) Contribute (1) Identify (2) Participate (1) Perform (1) Store (1) Use (1)		Apply (1) Select (1)	Address (3)	Perform (1) Use (1)	Access (1) Apply (2) Use (3)
Analyse	Analyse (3) * Assess (1) *	Analyse (1) * Manage (1)		Analyse (1) *	Analyse (2) * Assess (1) * Monitor (1)	Analyse (1) * Manage (1)	Assess (1) *
Evaluate	Evaluate (1) *				Evaluate (3) *	Advise (5) Evaluate (1) *	Appraise (1) Synthesise (1)
Create	Design (1) * Generate (2)	Design (1) * Lead (1)			Design (1) *	Design (1) *	Display (1)
Disease Prevention and Control							
Remember		Know (3)					
Understand	Describe (3) * Explain (1) Outline (1)	Communicate (1) Understand (1)					Demonstrate (1)
Apply	Identify (1) *	Apply (1) Identify (1) * Implement (1) Participate (1) Perform (1)				Implement (2)	Apply (1) Identify (1) * Implement (1)
Analyse	Assess (2) * Coordinate (1) *	Analyse (1) Coordinate (1) *				Analyse (3) Investigate (1) Manage (2)	Assess (2) * Monitor (1)
Evaluate	Evaluate (1) *	Advise (1)				Advise (5) Evaluate (1) *	Advise (1) Influence (1)
Create	Design (3) * Develop (1)	Develop (2) *				Design (1) * Develop (2) *	

* = same as CAPHIA	CAPHIA	ASPHER	CEPH (BPH)	CEPH (MPH)	CEPH (DrPH)	RACP	UKFPH
Health Protection							
Remember		Know (4)					
Understand	Describe (1) * Outline (3)	Communicate (1) Describe (1) * Understand (3)				Communicate (2)	Demonstrate (4)
Apply	Conduct (2) * Identify (5) *	Apply (3) Identify (2) *				Conduct (1) * Use (2) Work (1)	Apply (2) Gather (1) Identify (1) * Implement (1)
Analyse	Analyse (1) *	Analyse (1) * Coordinate (1)				Analyse (2) * Investigate (1) Manage (2)	Analyse (1) *
Evaluate		Advocate (1) Promote (1)				Advise (3) Advocate (1)	Advise (1)
Create	Design (1) Develop (2) * Formulate (1) Incorporate (1) Report (2) Specify (1)	Develop (1) *				Practise (1)	Document (1)
Health Promotion							
Remember		Know (2)					
Understand	Articulate (1) Describe (2)	Communicate (1) Understand (2)					
Apply	Conduct (1) * Engage (1) * Identify (1) Implement (1)	Address (1) Apply (1) Contribute (1) Engage (1) * Support (1) Use (1)				Apply (1) Conduct (2) * Establish (1)	Undertake (1) Use (1)
Analyse	Analyse (4) * Appraise (1) Compare (1) Manage (1)	Assess (1)		Assess (1)		Analyse (1) *	
Evaluate	Advocate (1) * Evaluate (1) * Present (1) Prioritise (1)	Advocate (1) * Evaluate (1) *				Advise (1) Advocate (1) * Consult (1)	Advocate (1) * Influence (4)
Create	Catalyse (1) Develop (2) * Strengthen (1)	Foster (1) Generate (1) Lead (1) Promulgate (1)				Develop (1) * Enable (1)	Build (1) Develop (1) *

* = same as CAPHIA	CAPHIA	ASPHER	CEPH (BPH)	CEPH (MPH)	CEPH (DrPH)	RACP	UKFPH
Health Policy, Planning and Management							
Remember		Aware (1) Know (3)					
Understand	Articulate (2) Describe (4) *	Communicate (2) Demonstrate (1) Describe (1) * Incorporate (1) Understand (6)		Explain (1)	Communicate (1) Explain (1)		Communicate (1) Demonstrate (3) Describe (1) * Show (1) Understand (1)
Apply	Apply (2) * Identify (1) *	Address (1) Apply (9) * Connect (1) Identify (3) * Implement (3) Maintain (1) Participate (1) Perform (1) Respond (1) Share (1) Submit (1) Use (1) Work (1)		Apply (2) * Identify (1) * Implement (1) Select (1)	Address (4)	Apply (1) * Contribute (1) Implement (2)	Apply (3) * Identify (2) * Select (1) Undertake (1)
Analyse	Analyse (6) * Conduct (1) *	Analyse (1) * Compare (1) Contrast (1) Coordinate (1) Manage (1) Monitor (1)		Compare (1)	Organise (1)	Analyse (2) * Conduct (1) * Investigate (1) Manage (8)	Appraise (5) Assess (1) Manage (1)
Evaluate	Evaluate (2) * Influence (1) * Reconcile (1)	Advocate (1) Evaluate (3) * Influence (1) *		Advocate (1) Evaluate (2) * Influence (1) * Propose (1)	Influence (1) * Promote (1) Propose (1)	Advise (6) Evaluate (1) * Influence (1) * Promote (1)	Criticise (1) Evaluate (1) * Influence (2) * Negotiate (1) Propose (1)
Create	Design (2) * Develop (2) * Facilitate (1) * Integrate (1) *	Build (1) Deliver (1) Design (1) * Develop (5) * Generate (1) Plan (2) Prepare (1) Set (1)		Build (1) Discuss (1) Design (2) *	Create (2) Cultivate (1) Design (2) * Facilitate (1) * Integrate (2) *	Develop (4) * Facilitate (1) * Plan (1)	Build (1) Design (1) * Develop (1) * Display (1) Lead (2) Produce (1) Solve (1) Write (1)

* = same as CAPHIA	CAPHIA	ASPHER	CEPH (BPH)	CEPH (MPH)	CEPH (DrPH)	RACP	UKFPH
Evidence-based Professional Population Health Practice							
Remember		Know (1)					
Understand	Articulate (3) Define (1) * Demonstrate (6) * Describe (2) *	Communicate (2) Demonstrate (2) Understand (2)	Communicate (1)	Communicate (1) Describe (1) *	Communicate (1) Explain (1)	Communicate (1)	Appreciate (1) Communicate (1) Define (1) * Demonstrate (6) * Respect (2) Show (2) Treat (1) Understand (3)
Apply	Apply (2) * Collect (2) Identify (2) * Locate (1) * Map (1) Seek (1) Work (2) *	Act (1) Address (1) Apply (3) * Conduct (1) Connect (1) Identify (3) * Implement (1) Participate (1) Store (1) Support (1) Use (1)	Use (1) Locate (1) *	Apply (2) * Implement (1) Perform (1) Select (2)	Access (1) Act (1)	Conduct (2) Contribute (2) Deliver (1) Identify (1) * Implement (1) Respond (1) Store (1) Support (1) Use (2) Work (3) *	Address (1) Apply (3) * Conduct (1) Give (1) Identify (2) * Implement (1) Maintain (1) Operate (1) Select (1) Submit (1) Use (5) Utilise (1)
Analyse	Analyse (3) * Assess (2) * Outline (2)	Analyse (2) * Manage (2)			Assess (1) *	Analyse (2) * Assess (2) * Manage (1) Monitor (1)	
Evaluate	Evaluate (1) * Justify (2) Present (1) Review (1) * Synthesise (1) *	Encourage (1) Evaluate (1) * Inspire (1) Motivate (1) Review (1) *	Evaluate (1) * Synthesise (1) *	Interpret (1) Propose (1)	Propose (1)	Advise (1) Evaluate (2) * Influence (1)	Advise (1) Advocate (2) Interpret (1)
Create	Develop (1) * Formulate (1) *	Design (1) Develop (1) * Improve (1) Lead (1) Model (1)		Design (1) Discuss (1)	Design (1) Facilitate (1) Integrate (2)	Design (2) Establish (2) Lead (1) Plan (2) Produce (1) Research (1)	Build (1) Document (1) Formulate (1) * Integrate (1) Make (1) Produce (1) Write (1)