Int J Public Health (2014) 59:15–30
DOI 10.1007/s00038-013-0514-x

ORIGINAL ARTICLE

Which level of competence and performance is expected? A survey among European employers of public health professionals

Dejana Vukovic · Vesna Bjegovic-Mikanovic · Robert Otok · Katarzyna Czabanowska · Zeljka Nikolic · Ulrich Laaser

Received: 8 April 2013 / Revised: 2 September 2013 / Accepted: 4 September 2013 / Published online: 29 September 2013

Abstract
Objectives To explore largely unknown experience and expectations of European employers of public health professionals with regard to competences required to perform in the best way for the public health.
Methods A survey targeting employers in Europe was carried out September 2011–October 2012. The web-based questionnaire on public health competences and expected performance levels was returned by 63 organisations out of 109 contacted (57.8 %) as provided by Schools and Departments of Public Health (SDPH) in 30 European countries.
Results The assessment of the current and desired levels of performance did not show significant differences between employer categories. However, current and desired levels across all employers differ significantly ($p < 0.001$), varying around a difference of one rank of a five-point scale. On the other hand, SDPH rank the exit qualifications of their graduates with one exception (presumed competences in preparedness for public health emergencies) higher than the current performance level as determined by employers, i.e. closer to their expectations.
Conclusions SDPH should reconsider priorities and question their estimate of exit qualifications in close contact with potential employers of their graduates.

Keywords Public health professionals · Competences · European survey · Employers

D. Vukovic · V. Bjegovic-Mikanovic
Faculty of Medicine, Centre School of Public Health and Management, University of Belgrade, Belgrade, Serbia
e-mail: dvukovic@med.bg.ac.rs

V. Bjegovic-Mikanovic
e-mail: bjegov@med.bg.ac.rs

R. Otok
Association of Schools of Public Health in the European Region (ASPHER), Brussels Office, Brussels, Belgium
e-mail: robert.otok@aspher.org

K. Czabanowska
Department of International Health, Faculty of Health, Medicine, and Life Sciences, School for Public Health and Primary Care (CAPHRI), Maastricht University, Maastricht, The Netherlands
e-mail: kasia.czabanowska@maastrichtuniversity.nl

Z. Nikolic
Faculty of Medicine, Institute of Social Medicine, University of Belgrade, Belgrade, Serbia
e-mail: zeljkanikolic1985@yahoo.com

U. Laaser (✉)
Faculty of Health Sciences, University of Bielefeld, Bielefeld, Germany
e-mail: ulrich.laaser@uni-bielefeld.de

Introduction

Competences as learning objectives became important in that they have refocused the entire training, development, and human resource function around achieving organisational objectives (Nelson 2001). They provide an interface between essential functions or operations and health system performance in relation to the practice of public health—embracing the triangle of training institutions, employers, and professionals. In order to perform specific tasks in public health, usually a whole array of competences is required. The usual performance of a specific competence is defined by what is "necessary" and is driven by assigned tasks, therefore, rarely done on everyday basis or at least weekly. While there are different published

models of competence-based health system performance (World Health Organisation (WHO) 2006; Smith et al. 2009; Santric Milicevic et al. 2011; Kalinichenko et al. 2013), very few of them are developed in the field of public health (Public Health Foundation 2003; Birt and Foldspang 2011; Centers for Disease Control and Prevention, Office for State Local, Tribal and Territorial Support (CDC/OSTLTS) 2012; Centers for Disease Control and Prevention 2012; Scutchfield et al. 2012).

As we believe to have shown in a foregoing paper (Bjegovic-Mikanovic et al. 2013), analyzing the Survey of Schools and Departments of Public Health (SDPH) in the European Region, public health education in Europe suffers from deficits in modernity, especially as regards continuing education, use of English and widely applied accreditation standards. Nevertheless, in spite of a highly fragmented institutional infrastructure and grossly insufficient capacities, the harmonization of program content and thinking was impressive as regards the profiling of public health professionals—understood as professionals with specific public health competences, acquired in a formal training at bachelor, master or PhD level or their analogues (following World Health Organisation (WHO) 2012). On the other hand, the expectations and experience of—present and potential—employers of professionals, trained in public health, are largely unknown. In spite of differing institutional set-ups between countries the increasing mobility of the health workforce in general—and of the public health professionals specifically—supports a European-wide evidence-based approach. Correspondingly, the European Office of the World Health Organisation started a discussion process in 2010 leading to the adoption of a first version of 10 Essential Public Health Operations (EPHO) (World Health Organization (WHO) 2010, 2011) which has been used here for surveying European employers of public health professionals [a later version was adopted in late 2012 (World Health Organisation (WHO) 2012)]. Our objective is to explore experience and expectations of employers with regard to competences required to perform in the best way for the public health.

Methods

The survey targeting employers of public health professionals in Europe was carried out from September 2011 until October 2012. The target group was identified during a foregoing survey with the participation of 66 out of 80 (82.5 %) Schools and Departments of Public Health (SDPH) in 38 European countries (Bjegovic-Mikanovic et al. 2013) as a European database of present or potential public health employers is not available.

In the online questionnaire (available at:http://www.aspher.org/forms/quest10/main/question1, accessed 27 June 2013) SDPH were asked as a last question (no. 22.0) to provide at least three contacts of employers of public health professionals: "As part of this survey, ASPHER would like to contact employers regarding general (not personalised) assessment of public health workforce performance. It is very important that your School assists in this effort as performance is the ultimate parameter for public health education. Please identify at least three relevant employers in your country (if possible one of each: governmental and non-governmental, public and private, etc.). If the selected employers agree, please provide the name of the contact person, position, organisation, e-mail, phone, fax. If not, please advise ASPHER in which way they can be best approached."

Contacts were provided in 30 out of 44 countries of Europe (68.2 %); in six countries, SDPH being a member of ASPHER did not exist, in eight countries, the SDPH did not answer this request. The 34 SDPH responding to this question named between one and six employers accordingly, whom they knew as knowledgeable in the field of public health and capable of a *general* judgment regarding the professionalism of the public health workforce. In total 109 organisations employing public health professionals were identified and approached, including two reminders of ASPHER office staff by phone; 63 questionnaires were returned (57.8 %). In case of multiple memberships, the reminders were supported by the European Public Health Association (EUPHA) and the International Association of National Public Health Institutes (IANPHI).

The Research instrument for the exploration of the employers' opinion was designed by the ASPHER Working Group of Innovation and Good Practice in Health Education (WGIGP) as web-based questionnaire (Appendix 1), to contain four sets of data: (1) basic information about the employer's organisation, (2) indication of the frequency of specific public health competences needed to perform a certain task, (3) estimation of the current level of performance of employed public health professionals, and (4) estimation of the desired/needed level of their performance. The same set of basic and advanced competences selected for each Essential Public Health Operation (EPHO) of WHO was used for the data sets 2, 3, and 4, duplicating the table used in the earlier ASPHER Survey of SDPH. In order to check for coherence, vertical and horizontal lists of core competences have been extracted and evaluated through ten pilot assessments and a workshop on Public Health Competences in Belgrade (ASPHER WGIGP 2010). It had to be assumed that English is an adequate medium for public health employers as translation into the multiple European languages was not affordable and the public health terminology is usually best

defined in the English language. In the questionnaire, we used the terms staff, public health professionals, and employees interchangeably, in order to comprise the widest possible group performing public health tasks. For details of the version of EPHO's used (World Health Organization (WHO) 2010), and the selection of relevant competences see Bjegovic-Mikanovic et al. 2013.

The Statistical package STATISTICA (Stat-Soft, Inc., Tulsa, OK, USA) was used for data analysis. Potential differences by type of organisation were determined by analysis of variance (ANOVA). Significance of differences between current and desired levels of performance was assessed using T test for paired samples. All tests were considered statistically significant at $P < 0.05$.

Results

As only 12 employers classified their own organisation according to the categories offered in part 1 of the questionnaire, the authors categorized the remaining organisations task-based accordingly to the same four groups: Research and Education Sector (university departments and research institutes, $N = 21$), Non-Governmental Organisations (NGOs, public health associations or other civil society groups, $N = 11$), Health Care Sector (engaged in health care delivery, e.g. hospitals, $N = 11$), and Local/State Governmental Organisations (including their agencies and regulating bodies, $N = 20$). The employers were asked to determine how often specific public health competences are needed in their job environment as follows: daily, weekly, monthly, as necessary, never. In order to indicate the current and desired levels of performance we used a five-point scale. We consider the distances between 1-Not needed; 2-low; 3-Medium; 4-Fairly high; 5-Very high as sufficiently equal for the applied statistics. Reliability was tested using Cronbach's *alpha* for the assessment of internal consistency of scales. *Alpha* > 0.75 has been reached across all ten EPHO indicating sufficient internal consistency of scales ($p < 0.05$, Hotelling's T-Squared Test) both for current and desired levels of performance (see Table 1). After confirmation of reliability, the information within each EPHO (see Table 2) was aggregated into only two aggregate variables, for current and desired level of performance.

Regarding the frequency of utilisation of specific competences, the most frequent answer or mode was "as necessary" (for details see Appendix 2). For eight competences out of the total of 66, the most frequent answer was "not at all". This was the case regarding the questions on "Interpret the Gini-coefficient", and "Apply the concept of salutogenesis" in EPHO 1, "Forecast social disasters" in EPHO 3, "Enforce control regulations of food safety" and "Initiate legal procedures to develop proper sports facilities" in EPHO 4, "Make use of problem-oriented learning as part of public health education programs" and "Execute a needs assessment for lifelong learning of the health workforce" in EPHO 7, and "Deal with planning and management of measures against air pollution" in EPHO 8.

Table 1 Alpha coefficient for current and desired levels of the Essential Public Health Operations (EPHO) by the World Health Organisation in 30 European countries

EPHO	Current level of performance Alpha	Desired level of performance Alpha
1	0.778	0.898
2	0.830	0.772
3	0.941	0.957
4	0.850	0.857
5	0.783	0.848
6	0.903	0.879
7	0.903	0.915
8	0.941	0.928
9	0.878	0.888
10	0.840	0.819

Data extracted from the responses to the 2011–2012 survey of the Association of Schools of Public Health in the European Region on employers of public health professionals

Analysis by type of organisation showed that for most competences, there was no significant difference in the frequency of use except for three competences pertaining to EPHO 4, 8, and 9. "Enforce control regulations of food safety" is mostly performed by Local/State Governmental Organisations; more than half of them indicated that their employees performed it at least monthly. Similarly, in most organisations to "Deal with planning and management of measures against air pollution" is rarely performed if at all, except for one-third of the Governmental Organisations which indicated performance at least monthly. Finally even though most employers stated that their employees "Manage Health Conferences with policy makers/stakeholders" as necessary, only half of the employers from the Research and Education Sector indicated that their employees performed it at least monthly (see Appendix 2).

Regarding current levels of performance, employers from Governmental Organisations estimated the level of performance of their employees somewhat better than most of the other employer organisations for all EPHO, except EPHO 10 on health-related research, but the differences are not statistically significant (see Table 2). Accordingly, the employer specific levels of current performance range only between 2.11 (NGOs on EPHO 3 for preparedness) and 3.54 (Governmental Organisations on EPHO 5 for disease prevention). Employers of all types of organisation were

Table 2 Assessed current level of performance of public health employees by type of organisation in 30 European countries

Essential Public Health Operations (EPHO)	Type of organisation				Significance
	Research and education sector	Non-governmental organisations	Health care sector	Local and state governmental organisations	
EPHO 1. Surveillance of diseases and assessment of the population's health	2.8047	2.6094	3.2639	3.2317	0.150
EPHO 2. Identification of priority health problems and health hazards in the community	2.8444	2.9762	3.1852	3.2056	0.560
EPHO 3. Preparedness and planning for public health emergences	2.1467	2.1143	2.2722	2.9143	0.251
EPHO 4. Health protection operations (environmental, occupational, food safety and others)	2.4267	2.8000	3.0500	3.1067	0.165
EPHO 5. Disease prevention	2.7833	3.1429	3.3056	3.5389	0.142
EPHO 6. Health promotion	3.0000	3.1714	3.1556	3.5000	0.496
EPHO 7. Assuring a competent public health and personal health care workforce	2.7059	2.6429	2.5926	2.6056	0.991
EPHO 8. Core governance, financing and quality assurance for public health	2.4470	3.0571	2.9619	3.0381	0.228
EPHO 9. Core communication for public health	2.8222	3.2143	3.1481	3.3822	0.372
EPHO 10. Health-related research	3.1196	3.0286	3.2944	2.8933	0.801

Data extracted from the responses to the 2011–2012 survey of the Association of Schools of Public Health in the European Region on employers of public health professionals; ANOVA

Table 3 Desired level of performance of public health employees by type of organisation in 30 European countries

Essential Public Health Operations (EPHO)	Type of organisation				Significance
	Research and education sector	Non-governmental organisations	Health care sector	Local and state governmental organisations	
EPHO 1. Surveillance of diseases and assessment of the population's health	3.8105	3.3750	4.0972	4.2639	0.123
EPHO 2. Identification of priority health problems and health hazards in the community	3.8667	3.9619	4.1481	4.3000	0.334
EPHO 3. Preparedness and planning for public health emergences	2.9857	3.2286	2.7778	3.9179	0.190
EPHO 4. Health protection operations (environmental, occupational, food safety and others)	3.0000	3.7429	3.7889	4.0489	0.071
EPHO 5. Disease prevention	3.5536	4.2500	4.1667	4.3556	0.134
EPHO 6. Health promotion	3.9833	4.4000	4.2889	4.5267	0.384
EPHO 7. Assuring a competent public health and personal health care workforce	3.6157	3.8333	3.3889	3.4111	0.862
EPHO 8. Core governance, financing and quality assurance for public health	3.3308	4.2135	3.8106	3.8956	0.225
EPHO 9. Core communication for public health	3.7238	4.2857	4.2037	4.2889	0.377
EPHO 10. Health-related research	4.0971	4.2286	4.3630	4.0933	0.884

Data extracted from the responses to the 2011–2012 survey of the Association of Schools of Public Health in the European Region on employers of public health professionals; ANOVA

Table 4 Desired vs. current level of performance of public health employees in 30 European countries

Essential Public Health Operations (EPHO)	Mean desired level of performance	Mean current level of performance	Mean difference	Significance (2-tailed)
1	3.94	3.03	−0.91	0.000
2	4.09	3.05	−1.04	0.000
3	3.28	2.43	−0.84	0.000
4	3.62	2.86	−0.76	0.000
5	4.05	3.21	−0.84	0.000
6	4.23	3.24	−0.99	0.000
7	3.54	2.64	−0.90	0.000
8	3.74	2.86	−0.88	0.000
9	4.10	3.18	−0.92	0.000
10	4.16	3.07	−1.10	0.000

Data extracted from the responses to the 2011–2012 survey of the Association of Schools of Public Health in the European Region on employers of public health professionals; ANOVA)

least satisfied with performance in the area of "Preparedness and planning for public health emergencies" (EPHO 3), where all means are below 3.0.

Regarding desired levels of performance means ranged from 2.78 to 2.99 (Health Care Sector and Research and Education Sector on EPHO 3 for preparedness) to 4.53 (Governmental Organisations on EPHO 6 for health promotion). However, again none of the differences becomes statistically significant (see Table 3). Analysis by type of organisation shows that levels of performance desired by most employers are highest in the areas of disease prevention, health promotion, public health communication, and health research (EPHO 5, 6, 9, and 10).

In Table 4, all rankings across the different categories of employers are summarised. The differences between desired and current levels for all EPHO are highly significant and vary around a difference of 1 point of the scale (from 1 to 5). Differences between desired and current levels remain significant also when broken down by category of employers with the only exception of EPHO 1 and 3 as determined by NGOs with a near significance of 0.09.

Discussion

Nowadays, tailoring the education and training for public health to meet the expectations of actual and potential employers regarding job performance, becomes increasingly important. So far, contrary to other disciplines (such as medicine), only limited evidence does exist on supply and demand in this field (Biesma et al. 2008; Frenk et al. 2010/Web appendix 3; e.g. Scott et al. 2011; Paccaud et al. 2013).

Despite the performance of competences within EPHO is most often described according to what is necessary, some competences, which are selected to present complex knowledge and skills within certain operations, are not performed at all—according to almost half of the employers. Typical examples are found within EPHO 1 (Surveillance of diseases and assessment of the population's health): Applying the concept of Salutogenesis (Antonovsky 1995) and interpreting the Gini-coefficient are not required at all for performance of job tasks in half and more than half of the job-environments, respectively. Such situation could be understandable for the application of specific knowledge and skills to interpret the Gini-coefficient, which is commonly used as a measure of "the extent to which income distribution in a country differs from a hypothetical uniform distribution" (e.g. Navarro et al. 2003). In the case of application of the concept of Salutogenesis it is less clear, why it should not be relevant, taking into account an overall public health approach, particularly in health promotion, which is focusing on factors that support health and quality of life, rather than on factors that cause disease. Therefore it could be that employers responding to the questionnaire were not aware of the specific meaning of both terms. On the other hand, it was expected, that legal tasks requiring certain competences such as "Enforce control regulations of food safety", or "Deal with planning and management of measures against air pollution" would be performed with quite different frequency by type of organisation. Therefore it is no surprise that these tasks were mostly performed in Governmental Organisations, and much less e.g. in the Research and Education Sector.

Among all operations, it seems that EPHO 3 (Preparedness and planning for public health emergences) is the least performed, which is also to be expected. However, that does not mean that public health professionals would not need solid knowledge and skills in the related competences: To prepare a disaster management plan, prepare the community for emergency situations, forecast social disasters, and cope with the consequences of disasters. In fact many recent examples provide evidence that possession of such knowledge and skills is necessary (Walsh et al. 2012). Actually, regarding EPHO 3, SDPH and employers

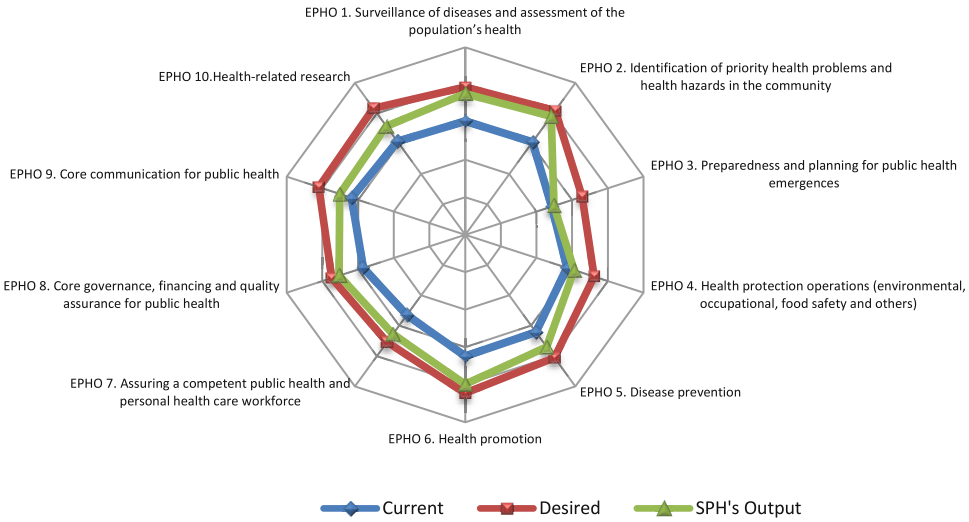

Fig. 1 Current and desired level of performance of the Essential Public Health Operations (EPHO) in 30 European countries, as determined by employers in comparison to the estimate by Schools and Departments of Public Health of their training output (data extracted from the responses to the 2011–2012 survey of the Association of Schools of Public Health in the European Region on employers of public health professionals, and the survey on Schools and Departments of Public Health in 2011)

agree on a severe competence gap (Bjegovic-Mikanovic et al. 2013).

Interestingly, there are no significant differences regarding current or desired levels of performance between the various categories of employers which seems to indicate a surprisingly homogenous task profile as regards required competences. But it is evident that significant gaps are present between current and desired levels of performance on the job for all EPHO (see Fig. 1).

The survey on European employers presented here has several achievements, but also limitations which are discussed regarding their potential impact on our results:

1) This survey deals with one dimension of performance only, the judgement on professional competences which, however, constitute a precondition of performance in terms of availability, responsiveness and productivity (World Health Organisation (WHO) 2006). Especially, responsiveness and productivity are determined also by a supportive work environment. Therefore employers in their judgments may overestimate the contribution of competence to less than expected performance. Nevertheless, as they represent so different types of organisation and work environments as research and education, non-governmental organisations, health care, and local and state governmental organisations, the minor differences between their estimates are in no case significant. Therefore we conclude that their judgement on competence and competence-based performance is not biassed to a relevant degree.
2) The selection of basic and advanced competences to characterize each EPHO has been done with the support of the entire ASPHER Working Group of Innovation and Good Practice in Public Health Education, which as expert validity may not fully caution against bias. The same applies to the categorization of employers, which may be result of a preoccupation with public health. On the other hand, the ten members of the working group at that time represent a broad spectrum of affiliation, experience, as well as expertise in public health, and were free of any conflict of interest regarding their own environment (see acknowledgement). As the employers were approached on the basis of addresses provided by ASPHER members under the directive to nominate such employers of public health professionals capable of a general estimation, they represent a group related to the outcome of SDPH teaching programs, and therefore a most valuable feedback channel to further adapt teaching content/acquired competences across Europe.
3) Usually the head of the organisation or institution filled in the questionnaire or confirmed the information, therein, an employer bias cannot be excluded in terms of leaving the opinion of the performing employees potentially aside. However, in this survey we had only the option to explore the opinion of employers which is certainly of essential relevance and importance. Future research hopefully will find ways to include the opinions of employees directly which, however, would require much more resources than were available for this study.

Public health employees have been trained even decades ago. It could be on the one hand that the observed gap between desired and current qualifications is smaller than indicated here, as the SDPHs' estimates of present exit expertise are closer to the employers ranking of desired performance than to the current one. Even, 6 of the 10 EPHO show almost identical rankings in this regard (see Fig. 1), which can be interpreted as conceptual agreement between training and practice as of today. On the other hand whereas the employers are likely to refer to

qualifications of staff acquired in the past, SDPH refers to their own estimate of the presently achieved qualifications. The question arises to what degree SDPH provide continuing training for earlier graduates. According to our foregoing publication (Bjegovic-Mikanovic et al. 2013) only up to one-third of SDPH offer more or less regular courses.

SDPH should reconsider their priorities for EPHO 3, 4, 9, and 10 if they want to improve the chances of their graduates on the labour market and increase employability. Likewise, they should check their estimates as regards EPHO 1, 2, 5, 6, 7, and 8 because of the considerable difference between their estimates and the employers' determination of current abilities. These considerations may provide guidance for curricula development and implementation, especially also for continuing training programmes. The latter is not only required to update older graduates but also to provide and improve the specific skills necessary in widely varying professional environments. Furthermore, there is also a need for stronger marketing of programmes and activities of SDPH to reach public health professionals, potential employers and the general public. In all these regards, the promotion of alumni organisations can be extremely helpful but only one half of SDPH conduct alumni surveys (Bjegovic-Mikanovic et al. 2013).

Conclusions

The survey among European employers of public health professionals uniformly revealed a highly significant gap between current and desired performance as determined by employers. The differences largely remained significant also when broken down into four categories of employers, whereas the SDPH estimated their present output as coming closer to the employers' expectations.

Most competences of public health employees were rarely used on daily basis as they need to employ many different competences to perform complex tasks only occasionally in response to today's public health challenges. SDPH should reconsider priorities and question their estimate of exit qualifications in close contact with potential employers of graduates. They have, as a priority, to strengthen their efforts on continuous professional development by designing and delivering of continuing training courses based on the needs of public health professionals and employers.

The results of the survey are relevant to SDPH and their further program development, but they are also relevant to European employers of public health professionals as so far according to the published literature they have not been asked about the capacity of their employees to perform job tasks and, therefore, rarely had a chance to participate in the discussion on study contents. In addition, the study hopefully will stimulate further European research in the same field, which is increasingly important for the development of public health professionals.

Acknowledgments We would like to thank all members of ASPHER and the responding employers for their commitment in answering to survey questionnaire. We would also like to thank all members of ASPHER Working Group on Innovation and Good Practice in Public Health Education (WGIGP) for their support and devotion: Milos Bajcetic, Jadranka Bozikov, Helmut Brand, Michael Jones, Aleksandra Jovic-Vranes, Marcin Kautsch, Kai Michelsen, Ehud Miron, Judy Overall, Milena Santric-Milicevic, supported by Tatjana Makovski, and Polina Putrik. Furthermore, we thank the European Public Health Association (EUPHA) and the International Association of National Public Health Institutes (IANPHI) for providing additional contacts with employers. This survey has been supported by ASPHER Operating Grant—ASPHER_FY2011; Agreement Number 2103202, DG SANCO as one of planned activities. No funding bodies had any role in study design, data collection and analysis, decision to publish or preparation of the manuscript.

Conflict of interest The authors declare that they have no conflict of interest.

Appendix 1: Web-based questionnaire on the employers' opinion (ASPHER Survey 2011–2012)

The Association of Schools of Public Health in the European Region (ASPHER) (Prepared by the Working Group on Innovation and Good Practice in Public Health Education).

Dear Employer of public health professionals,

Your contact address has been provided by a School or Department of Public Health in your country. Please be so kind to fill in the following questionnaire using your most objective judgment regarding selected public health competences:

1) How often are specific public health competences needed?
2) What is the current level of public health performance of your staff?
3) What is the desired/needed level public health performance of your staff?

The purpose of this survey is to evaluate the competences of public health professionals to guide their training and to identify required expertise for public health professionals in the 21st century. The results of the survey will be reported to ASPHER's Executive Board and be published on the ASPHER website.

The survey is confidential and will not be used to evaluate your institutional performance.

Your contact details:

Name of institution:

Your name:

Position in your institution:

Full address (country, city and street):

Telephone number:

E-Mail address:

Your organisation belongs to which of the following categories:

1. Governmental:
2. Education:
3. Health Service:
4. NGO:
5. Others, please specify:

How many employees do you have?

How many of your employees are male and how many of your employees are female? Male: Female:

Please fill in the following table using your most objective judgment (mark your answer with letter **x**).

European Public Health Operations	Competences	How often public health professionals in your job environment perform a task, which requires the selected competence?				
		Daily 1	Weekly 2	Monthly 3	As necessary 4	Not at all 5
1. Surveillance of diseases and assessment of the population's health	Analyse prevalence and incidence.					
	Do regression analyses					
	Interpret the Gini-coefficient					
	Apply the concept of Salutogenesis (Antonovski)					
	Contribute to a health impact assessment					
	Contribute to a health report					
	Prepare an option appraisal					
	Contribute to a health needs assessment					
2. Identification of priority health problems and health hazards in the community	Analyse epidemiological confounders					
	Calculate DALY's					
	Analyse the influence of social determinants on population health					
	Analyse the influence of physical, biochemical and biological determinants on population health					
	Develop efficient political and managerial health strategies					
	Apply the principles of the Ottawa Charter and the setting approach					
3. Preparedness and planning for public health emergences	Prepare a disaster management plan					
	Prepare the community for emergency situations					
	Forecast social disasters (e.g. language change)					
	Mobilize emergency response teams					
	Participate in disaster simulation exercises					
	Cope with the consequences of disasters					
4. Health protection operations (environmental, occupational, food safety and others)	Assure the quality of policy programmes					
	Communicate social regulations to target groups					
	Enforce control regulations on food safety					
	Strengthen and further develop public health relevant legislation					
	Initiate legal procedures to develop proper sports facilities for facilitating physical activity					
5. Disease prevention	Assess immunization and screening programmes					
	Provide information on behavioural and medical health risks					
	Maintenance of systems and procedures for involving primary health care in programmes on disease prevention					
	Plan, organise and evaluate evidence-based screening programmes					

continued

European Public Health Operations	Competences	How often public health professionals in your job environment perform a task, which requires the selected competence?				
		Daily 1	Weekly 2	Monthly 3	As necessary 4	Not at all 5
6. Health promotion	Perform effect evaluation of prevention and promotion programmes					
	Communicate evidence on social determinants to lay, professional and decision maker's audiences					
	Communicate evidence on physical/ biological determinants to lay, professional and decision makers' audiences					
	Analyse the environment for a setting approach (acc. to Ottawa Charter)					
	Plan and implement health prevention and promotion programmes					
7. Assuring a competent public health and personal health care workforce	Make use of Problem-Oriented Learning as part of public health education programmes					
	Execute a needs assessment for Life Long Learning of the Health Workforce					
	Organise the adequate representation of minorities in study programmes					
	Integrate new environmental issues into study programmes					
	Mobilize the academic and political authorities to increase the training capacity and quality in public health education					
	Design health promotion activities within the student population					
8. Core governance, financing and quality assurance for public health	Assess public health workforce capacity					
	Lead a group discussion and operationalise the outcome					
	Deal with planning and management of measures against air pollution					
	Provide policy counselling					
	Mobilize human capital for public health planning and management in cross-sectoral governance					
	Measure health indicators that reflect access to health services and health disparities					
	Empower of disadvantaged groups to demand equitable access					
	Plan distribution of health facilities and means of transport					
	Analyse financial barriers to access health care and models of health insurance					
	Integrate person-based health promotion and prevention into individual health care services					
	Update on national and international quality indicators					
	Involve stakeholders and respective community groups in defining quality indicators					
	Disseminate information about quality of care					
	Follow up on hospital acquired infections					
	Contribute expertise to evidence-based policy making					

continued

European Public Health Operations	Competences	How often public health professionals in your job environment perform a task, which requires the selected competence?				
		Daily 1	Weekly 2	Monthly 3	As necessary 4	Not at all 5
9. Core communication for public health	Conduct Focus Groups					
	Organise Health Household Surveys					
	Work with civil society and other organisations on social development					
	Work with civil society and other organisations on environmental issues					
	Manage Health Conferences with policy makers/stakeholders					
	Initiate community-based health promotion activities with the civil society					
10. Health-related research	Critically appraise research publications in public health					
	Integrate interdisciplinary research teams					
	Use indicators of air pollution to derive further research questions					
	Communicate successfully with funding agencies					
	Perform action research					

European Public Health Operations	Competences	What is the current level of performance displayed by public health professionals in your job environment for this competence?					What is the desired level of performance for public health professionals in your job environment for this competence?				
		Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5	Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5
1. Surveillance of diseases and assessment of the population's health	Analyse prevalence and incidence.										
	Do regression analyses										
	Interpret the Gini-coefficient										
	Apply the concept of Salutogenesis (Antonovski)										
	Contribute to a health impact assessment										
	Contribute to a health report										
	Prepare an option appraisal										
	Contribute to a health needs assessment										
2. Identification of priority health problems and health hazards in the community	Analyse epidemiological confounders										
	Calculate DALY's										
	Analyse the influence of social determinants on population health										
	Analyse the influence of physical, biochemical and biological determinants on population health										
	Develop efficient political and managerial health strategies										
	Apply the principles of the Ottawa Charter and the setting approach										

continued

European Public Health Operations	Competences	What is the current level of performance displayed by public health professionals in your job environment for this competence?					What is the desired level of performance for public health professionals in your job environment for this competence?				
		Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5	Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5
3. Preparedness and planning for public health emergences	Prepare a disaster management plan										
	Prepare the community for emergency situations										
	Forecast social disasters (e.g. language change)										
	Mobilize emergency response teams										
	Participate in disaster simulation exercises										
	Cope with the consequences of disasters										
4. Health protection operations (environmental, occupational, food safety and others)	Assure the quality of policy programmes										
	Communicate social regulations to target groups										
	Enforce control regulations on food safety										
	Strengthen and further develop public health relevant legislation										
	Initiate legal procedures to develop proper sports facilities for facilitating physical activity										
5. Disease prevention	Assess immunization and screening programmes										
	Provide information on behavioural and medical health risks										
	Maintenance of systems and procedures for involving primary health care in programmes on disease prevention										
	Plan, organise and evaluate evidence-based screening programmes										
	Assess immunization and screening programmes										
6. Health promotion	Perform effect evaluation of prevention and promotion programmes										
	Communicate evidence on social determinants to lay, professional and decision maker's audiences										
	Communicate evidence on physical/biological determinants to lay, professional and decision makers' audiences										
	Analyse the environment for a setting approach										
	(acc. to Ottawa Charter)										
	Plan and implement health prevention and promotion programmes										

continued

European Public Health Operations	Competences	What is the current level of performance displayed by public health professionals in your job environment for this competence?					What is the desired level of performance for public health professionals in your job environment for this competence?				
		Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5	Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5
7. Assuring a competent public health and personal health care workforce	Make use of Problem-Oriented Learning as part of public health education programmes										
	Execute a needs assessment for Life Long Learning of the Health Workforce										
	Organise the adequate representation of minorities in study programmes										
	Integrate new environmental issues into study programmes										
	Mobilize the academic and political authorities to increase the training capacity and quality in public health education										
	Design health promotion activities within the student population										
8. Core governance, financing and quality assurance for public health	Assess public health workforce capacity										
	Lead a group discussion and operationalise the outcome										
	Deal with planning and management of measures against air pollution										
	Provide policy counselling										
	Mobilize human capital for public health planning and management in cross-sectoral governance										
	Measure health indicators that reflect access to health services and health disparities										
	Empower of disadvantaged groups to demand equitable access										
	Plan distribution of health facilities and means of transport										
	Analyse financial barriers to access health care and models of health insurance										
	Integrate person-based health promotion and prevention into individual health care services										
	Update on national and international quality indicators										
	Involve stakeholders and respective community groups in defining quality indicators										
	Disseminate information about quality of care										
	Follow up on hospital acquired infections										
	Contribute expertise to evidence-based policy making										

continued

European Public Health Operations	Competences	What is the current level of performance displayed by public health professionals in your job environment for this competence?					What is the desired level of performance for public health professionals in your job environment for this competence?				
		Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5	Not needed 1	Low 2	Medium 3	Fairly high 4	Very high 5
9. Core communication for public health	Conduct Focus Groups										
	Organise Health Household Surveys										
	Work with civil society and other organisations on social development										
	Work with civil society and other organisations on environmental issues										
	Manage Health Conferences with policy makers/stakeholders										
	Initiate community-based health promotion activities with the civil society										
10. Health-related research	Critically appraise research publications in public health										
	Integrate interdisciplinary research teams										
	Use indicators of air pollution to derive further research questions										
	Communicate successfully with funding agencies										
	Perform action research										

Thank you very much. Your support is highly appreciated

Prof. Vesna Bjegovic-Mikanovic MD, MSc, PhD

Appendix 2: Frequencies of tasks needing performance of competences by type of organisation (ASPHER Survey 2011–2012)

Competences grouped according to EPHO 1-10	EO		NGO		HCS		GO		ALL	
	N	Mode	N	Mode	N	Mode	N	Mode	N	Mode
1:analyse prevalence and incidence	19	1	11	4	11	3	17	3	58	4
1:do regression analyses	19	4	11	4	11	4	17	4	58	4
1:interpret the Gini-coefficient	19	4	11	5	9	4	17	5	56	5
1:apply the concept of Salutogenesis (Antonovski)	19	4	11	5	10	5	17	4	57	5
1:contribute to a health impact assessment	18	4	11	4	10	4	18	4	57	4
1:contribute to a health report	19	4	11	4	11	3	18	4	59	4
1:prepare an option appraisal	19	4	10	4	10	4	17	4	56	4
1:contribute to a health needs assessment	19	4	11	4	10	4	18	4	58	4
2:analyse epidemiological confounders	19	4	11	4	11	2	18	4	59	4
2:calculate DALY's	19	4	11	5	10	4	17	4	57	4
2:analyse the influence of social determinants on population health	19	4	11	4	11	4	18	4	59	4

continued

Competences grouped according to EPHO 1-10	EO		NGO		HCS		GO		ALL	
	N	Mode	N	Mode	N	Mode	N	Mode	N	Mode
2:analyse the influence of physical, biochemical and biological determinants on population health	20	4	11	4	11	4	18	4	60	4
2:develop efficient political and managerial health strategies	19	4	11	4	11	3	18	4	59	4
6:apply the principles of the Ottawa Declaration and the setting approach	19	5	11	5	11	4	18	4	58	4
3:prepare a disaster management plan	19	5	11	5	11	5	17	4	59	4
3:forecast social disasters (e.g. language change)	19	5	11	5	11	4	18	4	58	5
3:mobilize emergency response teams	19	4	11	4	11	5	17	4	59	4
3:participate in disaster simulation exercises	19	4	11	4	11	5	17	4	58	4
3:cope with the consequences of disasters	19	4	11	4	10	4	17	4	58	4
4:assure the quality of policy programmes	19	5	11	4	10	4	18	4	57	4
4:communicate social regulations to target groups	19	5	11	5	10	5	18	4	58	4
4:enforce control regulations on food safety	19	4	11	4	10	4	18	4	58	5
4:strengthen and further develop public health relevant legislation	19	5	11	5	10	5	17	5	58	4
4:initiate legal procedures to develop proper sports facilities for facilitating physical activity	19	4	11	3	11	4	18	4	57	5
5:assess immunization and screening programmes	19	4	11	4	11	1	18	4	59	4
5:provide information on behavioural and medical health risks	19	4	11	5	11	1	17	3	59	4
5:maintenance of systems and procedures for involving primary health care in programmes on disease prevention	19	4	11	4	11	4	18	4	58	4
5:plan, organise and evaluate evidence-based screening programmes	19	4	11	4	11	1	17	1	59	4
6:perform effect evaluation of prevention and promotion programmes	18	4	11	3	11	4	17	4	57	4
6:communicate evidence on social determinants to lay, professional and decision maker's audiences	18	3	11	4	11	4	18	3	58	4
6:communicate evidence on physical/biological determinants to lay, professional and decision makers' audiences	19	4	11	4	11	4	18	4	59	4
6:analyse the environment for a setting approach (acc. to Ottawa Charter)	17	4	11	4	11	5	18	3	57	4
6:plan and implement health prevention and promotion programmes	18	4	11	1	11	4	18	1	58	4
7:make use of Problem-Oriented Learning as part of public health education programmes	20	1	11	5	10	4	18	4	59	5
7:execute a needs assessment for Life Long Learning of the Health Workforce	20	5	11	5	10	4	18	4	59	5
7:organise the adequate representation of minorities in study programmes	20	4	11	5	10	4	17	4	58	4
7:integrate new environmental issues into study programmes	21	4	11	4	9	4	17	4	58	4
7:mobilize the academic and political authorities to increase the training capacity and quality in public health education	20	4	11	4	9	4	17	4	57	4

continued

Competences grouped according to EPHO 1-10	EO		NGO		HCS		GO		ALL	
	N	Mode	N	Mode	N	Mode	N	Mode	N	Mode
7:design health promotion activities within the student population	19	4	11	5	8	4	18	4	56	4
8:assess public health workforce capacity	19	4	10	4	10	4	15	4	54	4
8:lead a group discussion and operationalise the outcome	19	4	11	4	10	4	16	4	56	4
8:deal with planning and management of measures against air pollution	20	5	11	5	10	5	17	4	58	5
8:provide policy counselling	19	4	10	4	10	4	17	4	56	4
8:mobilize human capital for public health planning and management in cross-sectoral governance	19	4	11	4	10	4	16	4	56	4
8:measure health indicators that reflect access to health services and health disparities	19	4	11	4	10	4	16	4	56	4
8:empower of disadvantaged groups to demand equitable access	19	4	11	5	9	4	16	4	55	4
8:plan distribution of health facilities and means of transport	19	4	11	5	10	4	17	4	57	4
8:analyse financial barriers to access health care and models of health insurance	19	4	10	5	10	4	16	4	55	4
8:integrate person-based health promotion and prevention into individual health care services	19	4	11	4	10	4	17	4	57	4
8:update on national and international quality indicators	20	4	11	4	10	4	17	4	58	4
8:involve stakeholders and respective community groups in defining quality indicators	20	4	11	4	10	4	16	4	57	4
8:disseminate information about quality of care	19	4	11	4	10	4	16	4	56	4
8:follow up on hospital acquired infections	19	4	11	5	10	5	18	4	58	4
8:contribute expertise to evidence-based policy making	19	4	11	4	10	4	17	4	57	4
9:conduct Focus Groups	19	4	11	4	10	4	17	4	57	4
9:organise Health Household Surveys	19	4	11	4	10	4	18	4	58	4
9:work with civil society and other organisations on social development	18	4	11	4	10	4	18	4	57	4
9:work with civil society and other organisations on environmental issues	19	4	11	4	10	4	18	4	58	4
9:manage Health Conferences with policy makers/stakeholders	19	3	11	4	10	4	18	4	58	4
9:initiate community-based health promotion activities with the civil society	19	4	11	4	10	4	18	4	58	4
10:critically appraise research publications in public health	20	4	11	4	10	4	18	4	59	4
10:integrate interdisciplinary research teams	19	4	11	4	10	4	18	4	58	4
10:use indicators of air pollution to derive further research questions	20	4	11	5	9	5	17	4	57	4
10:communicate successfully with funding agencies	21	4	11	4	10	4	17	4	59	4
10:perform action research	21	4	10	4	10	4	18	4	59	4

Note: 1-daily, 2-weekly, 3-monthly, 4-as necessary, 5-never

EO educational organisations, *NGO* non-governmental organisations, *HCS* health care services, *GO* governmental organisations

References

Antonovsky A (1995) The moral and the healthy: identical, overlapping or orthogonal? http://www.ncbi.nlm.nih.gov/pubmed/?term=Antonovsky+A%3A+Salutogenesis Isr J Psychiatry Relat Sci 32/1:5–13

ASPHER WGIGP (2010) ASPHER Public Health Core Competencies Program, Report on a workshop. 22 October2010 Belgrade, Serbia. Available at: http://www.old.aspher.org/index.php?site=aspher_eur_network_on_life_long_ learning_in &PHPSESSID = f41e4abb6dfb772fcf60b6e06ccb63d9 (accessed 21 June 2012)

Biesma RG, Pavlova M, Vaatstra R, Van Merode GG, Czabanowska K, Smith T, Groot W (2008) Generic versus specific competencies of entry-level public health graduates: employers' perceptions in Poland, the UK, and the Netherlands. Adv Health Sci Educ 13:325–343

Birt Ch, Foldspang A (2011) European core competences for MPH education (ECCMPHE). ASPHER, Brussels

Bjegovic-Mikanovic V, Vukovic D, Otok R, Czabanowska K, Laaser U (2013) Education and training of public health professionals in the European region: variation and convergence. Int J Public Health. doi:10.1007/s00038-012-0425-2

Centers for Disease Control and Prevention (2012) A comparison between CDC's Essential Public Health Services and PAHO's essential public health functions. available at: http://www.health.gov.on.ca/english/public/pub/ministry_reports/walker04/appendices2.pdf (accessed 24 March 2013)

Centers for Disease Control and Prevention, Office for State Local, Tribal and Territorial Support (CDC/OSTLTS) (2012). The national public health performance standards program (NPHPSP): available at: http://www.cdc.gov/nphpsp/documents/factsheet.pdf (accessed 24 March 2013)

Frenk J, Chen L, Bhutta ZA, For the Global Independent Commission on Education of Health Professionals for the 21st Century et al (2010) Health professionals for a new century: transforming education to strengthen health systems in an independent world. Lancet 376:1923–1958 (and Web appendix 3)

Kalinichenko O, Amado CAF, Santos SP (2013) Performance assessment in primary health care: a systematic literature review. Centro de Estudos e Formacao Avancdo em Gestao e Economia (CEFAGE). CEFAGE-UE Working Paper 2013/03, Lisbon, Portugal: available at: http://bit.ly/1416eDv (Accessed 24.03.2013)

Navarro V, Borrell C, Benach J, Muntaner C, Quiroga A, Rodríguez-Sanz M, Vergés N, Gumá J, Pasarín MI (2003) The importance of the political and the social in explaining mortality differentials among the countries of the OECD, 1950-1998. Int J Health Serv 33(3):419–494

Nelson J (2001) The public health competency handbook: optimizing individual and organizational performance for the public's health. Centre for Public Health Practice of the Rollins School of Public Health, Atlanta

Paccaud F, Weihofen A, Frank M (2013) Public health workforce in Switzerland: are public health workers lacking? Int J Public Health. doi:10.1007/s00038-013-0481-2

Public Health Foundation (2003) Turning point performance management collaborative. From silos to systems. Using performance management to improve the public's health. Turning Point National Program Office: Washington DC, USA: available at: http://www.turningpointprogram.org/toolkit/pdf/Silos_to_Sytems.pdf (accessed 24 March 2013)

Santric Milicevic M, Bjegovic-Mikanovic V, Terzic-Supic Z, Vasic V (2011) Competencies gap of management teams in primary health care. European J Public Health 21:247–253

Scott KW, Powles J, Thomas H, Rechel B (2011) Perceived barriers to the development of modern public health in Bulgaria: a qualitative study. Int J Public Health 56:191–199

Scutchfield DF, Miron E, Ingram RC (2012) From service provision to function based performance—perspectives on public health systems from the USA and Israel. Israel J Health Policy Res 2012(1):46–55

Smith PC, Mossialos E, Papanicolas I, Leatherman S (eds) (2009) Performance measurement for health system improvement. Cambridge University Press, Cambridge

Walsh L, Subbarao I, Gebbie K, Schor KW, Lyznicki J, Strauss-Riggs K, Cooper A, Hsu EB, King RV, Mitas JA 2nd, Hick J, Zukowski R, Altman BA, Steinbrecher RA, James JJ (2012) Core competencies for disaster medicine and public health. Disaster Med Public Health Prep 6(1):44–52

World Health Organisation (WHO) (2006) The world health report: working together for health. World Health Organization, Geneva

World Health Organisation (WHO) (2012) European Action Plan for Strengthening Public Health Capacities and Services, Annex 1. Essential Public Health Operations (EPHO) and Services in Europe. Regional Committee for Europe, 62nd Session, Malta: 10–13 September 2012; EUR/RC62/R5: pp 27–39. Copenhagen, World Health Organisation

World Health Organization (WHO) (2010) Partnerships for health in the WHO European region. Regional Committee for Europe, Sixtieth Session. Moscow, 13–16 Sep 2010 (EUR/RC60/12 Add. 1), Copenhagen, World Health Organisation: Available at: http://www.euro.who.int/__data/assets/pdf_file/0011/121601/RC60_edoc12add1.pdf (accessed 21 June 2012)

World Health Organization (WHO) (2011) Strengthening public health capacities and services in Europe: a framework for action. Regional Committee for Europe, Sixty-first Session. Baku, Azerbaijan, 12–15 Sep 2011 (EUR/RC61/10? EUR/RC61/Conf.Doc./3), Copenhagen, World Health Organisation: Available at: http://www.euro.who.int/__data/assets/pdf_file/0008/147914/wd10E_StrengtheningPublicHealth_111348.pdf (accessed 16 Sep 2012)