



Public Health Workforce in Switzerland: A National Census

February 2013

Martina W. Frank¹
Alison Weihofen¹
Margreet Duetz Schmucki²
Sandra Nocera¹
Fred Paccaud¹

¹Swiss School of Public Health, Zurich, Switzerland

²Federal Office of Public Health, Bern, Switzerland

Publisher:

Foundation Swiss School of Public Healthplus
Seilergraben 49
8001 Zürich
Ph: +41 (0)44 634 47 02
E-mail: info@ssphplus.ch

Print and Design:

ETH Druckzentrum
Martin Mühlethaler

Reprints:

Swiss School of Public Healthplus
www.ssphplus.ch/downloads

Zurich, February 2013

Swiss School of Public Health

The Foundation Swiss School of Public Health (SSPH+) is the national coordinating body for the promotion of postgraduate university education and research in the fields of public health. SSPH+ was founded in July 2005 by an agreement between the Universities of Basel, Bern, Geneva, Lausanne, Lugano and Zurich. In January 2008, the six supporting universities turned SSPH+ into a Foundation. In August 2008, the University of Neuchâtel also joined the Foundation.

SSPH+ aims at developing an interdisciplinary workforce with the public health skills and competencies to meet population health needs in Switzerland. It coordinates and promotes university-based continuing and postgraduate education programs for individuals working in the health system, by facilitating exchange and collaboration, supporting quality assurance mechanisms, strengthening integrated approaches, and by educating the educators. To date, 850 individuals have completed a Masters of Advanced Studies (MAS) program in public health or related fields at our partner universities. Of these, approximately one third are top leaders in their field. In addition, 60 students have obtained a PhD in public health, of whom the majority is working in academia.

Federal Office of Public Health

The Federal Office of Public Health (FOPH) is part of the Federal Department of Home Affairs (FDHA). As the national authority in health matters, the FOPH represents Switzerland in international organizations and in dealings with other countries. Within Switzerland it is responsible – together with the 26 cantons – for public health and the development of national health policy.

Acknowledgments

Many individuals and organizations have contributed to the Public Health Workforce Study in Switzerland. Above all, we are very grateful to the participating organizations, the organizational point persons and the survey participants. Without their interest, time and diligence, the study would not have been possible.

We also want to thank the following groups and individuals who provided invaluable advice and strategic guidance: the SSPH+ directorate (Luca Crivelli and Charlotte Braun-Fahrländer) and SSPH+ Program Leaders, the LINK Institute (Christine Gerber), Study Advisory Board Members and the individuals who field tested the survey.

In addition, we would like to thank and recognize the many individuals from the Swiss and international public health communities for their advice and contributions to the study (in alphabetical order): Christoph Aluttis (Maastricht University), Eva Bazant (Johns Hopkins University), Jean-Yves Camain (CHUV), Kerri Clough-Gorr (NICER), Karin Faisst (SSPH+), Sina Henrichs (SSPH+), Rolf Heusser (NICER), Marielle Jambroes (University of Amsterdam), Robert Otok (ASPHER), Sabine Rohrmann (ISPM Zürich), Daniel Volken (Groupe Mutuel) and Pascal Zurn (WHO).

For their invaluable project assistance, we want to acknowledge and sincerely thank Marisa Clemenz, Ursula Erni, Anita Feller, Steve Frei, Radoslav Panczak and Renata Testaz.

Table of Contents

Swiss School of Public Health and Federal Office of Public Health	III
Acknowledgments	IV
List of Acronyms	VI
List of Tables and Figures	VII
1. Executive Summary	1
2. Background	3
2.1. Swiss School of Public Health and Study Rationale	3
2.2. What Do We Know About the Public Health Workforce in Switzerland	4
3. Methodology	4
3.1. Literature Review	4
3.2. Study Objectives and Research Design	6
3.3. Sampling Methodologies	7
3.4. Data Collection	8
3.5. Estimated Size of Public Health Workforce	9
3.6. Limitations	10
4. Results	11
4.1. Demographics	11
4.2. Education	12
4.3. Professional Areas	15
4.4. Public Health Competency Needs	17
5. Discussion	19
6. Conclusions and Recommendations	20
7. Appendices	21
Appendix I: Questionnaire	21
Appendix II: List of Advisory Board Members	30
Appendix III: List of Participating Organizations by Professional Sector	31
Appendix IV: Reference List/Bibliography	35

List of Acronyms

CAS	Certificate of Advanced Studies
CHUV	Centre hospitalier universitaire vaudois
DAS	Diploma of Advanced Studies
FOPH	Federal Office of Public Health
FSO	Swiss Federal Statistical Office
GAVI	Global Alliance for Vaccines and Immunization
HUG	Hopitaux Universitaires de Genève
MAS	Masters of Advanced Studies
MPH	Masters of Public Health
NGO	Non-Governmental Organization
SER	State Secretariat for Education and Research
SSPH+	Swiss School of Public Healthplus
UAS	University of Applied Sciences
WHO	World Health Organization
WHO-EPHO	World Health Organization - Essential Public Health Operations

List of Tables and Figures

Table 1.	Organizational Response Rate by Professional Sector
Figure 1.	Identified Public Health Workforce and Study Respondents by Organization Sector
Figure 2.	Study Methodology and Estimated Size of Public Health Workforce
Figure 3.	Respondents' Distribution by Canton per 100'000 Population
Figure 4.	Age Distribution by Gender
Figure 5.	Years of Experience in Public Health
Figure 6.	Highest Education
Figure 7.	Public Health Education by Age
Figure 8.	Respondents' Educational Level by Public Health Education
Figure 9.	Professional Sector by Public Health Education
Figure 10.	Professional Sector Affiliation
Figure 11.	Geographic Reach of Public Health Services and Activities
Figure 12.	Public Health Specialty
Figure 13.	Public Health Competency Needs
Figure 14.	Public Health Competencies by Gender

1. Executive Summary

Planning and developing an effective public health workforce is essential to establishing and maintaining a high-performance health system. However, despite the importance of strengthening the capacities of the public health workforce, training and educational opportunities for the public health workforce have not been developed in Switzerland until recently, and little has been known about the workforce's composition, including size, distribution and qualifications.

The Swiss School of Public Health, in partnership with the Federal Office of Public Health (FOPH), conducted a national study to create a profile of the core public health workforce in Switzerland. This workforce is focused primarily on services or activities other than individual care, and devoted to health protection, health promotion or disease prevention of a population or specific groups within a population. We defined the core public health workforce as individuals providing at least one of the following four essential public health services, as adapted from major international public health institutions:

1. **Population-based interventions** against diseases and their consequences, mainly in the field of prevention and health promotion
2. **Interventions on the structure and activity of the health system**, including management and planning of health care, health policy work and health law
3. **Research** on any public health discipline, including international/global health and aspects of primary care
4. **Education and training** on any public health discipline

The specific study objectives are: a) to estimate the size of the workforce, b) to obtain demographic information, c) to assess the formal and continuing education of the workforce, d) to identify professional areas, and e) to identify public health competency needs.

Methodology

An online survey was designed to gather data on the public health workforce in Switzerland. This cross-sectional, descriptive and observational design focused on identifying and mapping key demographic, educational and professional characteristics of the public health workforce. The survey targeted individuals who, through their organizations, provide one or more of the four essential public health services or activities (noted above). We applied two organizational sampling methodologies:

- 1) *Inviting/recruiting* all Swiss-based organizations from key public health sectors (government, education/research, NGOs and professional organizations), and
- 2) *Sampling* Swiss-based organizations that represent large professional sectors, but employ a relatively small proportion of the public health workforce (hospitals, health insurances, pharma/biotech companies, consulting firms and international organizations).

Of the 430 organizations that met our study criteria, 188 organizations participated. Each participating organization selected a point person, who was to identify all individuals within the organization who provide at least one of the four public health services, and invite them to participate. A total of 1'598 individuals were recruited and completed the survey (response rate 36%).

Results

Estimated Size

- We estimate the public health workforce in Switzerland is comprised of at least 8'342 individuals.
- The workforce is likely larger, between 9'000 and 10'000, based on data gathered and the number and size of organizations meeting the study criteria, but from whom we were not able to obtain data.
- To calculate the estimated size, we used three sources of data: 1) the number of forwarded survey links to individuals meeting the study criteria in the 188 organizations, 2) summary data provided by organizations, and 3) estimated additional public health workforce data based on website research, from the 242 organizations that did not participate.

Demographics

- Women are in the majority of the public health workforce. Nearly two thirds (61%) of all respondents are women.
- Over two thirds of all respondents are over the age of 40.
- Nearly half of all respondents have less than 10 years of experience in public health.

Education

- Overall, the public health workforce has a high level of formal education in highly diverse disciplines.
- Over 2/3 of the respondents (69%) have an academic education, with a master's degree or higher.
- Respondents, irrespective of educational level, have diverse educational backgrounds.
- Nearly one third (32%) of all respondents have an education in public health.
- Of the 69% with a master's degree or higher, over 1/3 of this group also have a public health education.
- Of the 31% with a bachelor's degree or vocational training, less than 1/5 of this group have a specific public health education.
- With respect to continuing education in public health, over 3/4 of all respondents (78%) have had some type of continuing education.
- Over half of the respondents (54%) attended at least one non-degree, public health-related training in 2011, with a median of 20 hours of training.

Professional Sector

- The largest represented sector is the government sector, which employs 44% of respondents.
- 68% of the public health workforce (including respondents with more than one employer) have employers in other sectors, such as education/research (23%), NGOs/professional associations (19%), hospitals/in/out-patient facilities (14%), and consulting (10%).
- Regarding public health specialty, the largest percentage of respondents are involved in health promotion and prevention (40%), followed by health administration and management (20%), epidemiology (15%) and population and family health (13%).

Public Health Competencies

- The largest percentage of respondents identified communications as a needed competency (28%), followed by policy development (27.5%) and public health sciences (27%).

Conclusions and Recommendations

This study is the first profile of the core public health workforce in Switzerland – a glimpse of how many there are, who they are, and what they do. We estimate the public health workforce in Switzerland is comprised of between 9'000 and 10'000 individuals. While the concept of public health is relatively new in Switzerland, the public health workforce is actively engaged in a broad range of professional areas, implemented through various sectors.

This profile can assist in developing targeted strategies to strengthen the capacities of the public health workforce in Switzerland. Based on the findings and observations from this and other studies, we recommend the following:

- **Training the public health workforce** – Focus on training the 2/3 of the Swiss public health workforce that do not have a formal or continuing public health education.
- **Adopting country-specific public health competencies** – Identify, in conjunction with international partners, what public health competencies are required for the Swiss public health workforce, to enable it to implement essential public health services/operations.
- **Strengthening “public health visibility” in Switzerland** – Increase the awareness of the importance of public health in Switzerland, among institutions and individuals providing public health services and activities, and also within the general Swiss population.
- **Defining the public health workforce** – Build consensus within the Swiss public health community on the definition of the public health workforce, so tracking the composition of the workforce over time is possible and systematic.
- **Conducting further research/assessments into the capacities of the public health workforce** – Identify the various public health stakeholders in Switzerland, including different subgroups of the public health workforce, such as individuals with a partial public health role (i.e., health care professionals) and individuals who should have an awareness of public health issues, but are not public health workers.

2. Background

2.1. Swiss School of Public Health and Study Rationale

The concept of public health is relatively new in Switzerland. In the 1960s, the five Swiss faculties of medicine set up chairs in social and preventive medicine for the undergraduate education in medicine. In 1986, a FMH specialty “prevention and public health” was offered. Yet, specific public health training, a required part of the “prevention and public health” specialization, had to be completed abroad because it did not yet exist in Switzerland. It was not until 1992, when the Faculty of Medicine of the University of Geneva and, independently, the three Faculties of Medicine of the Universities of Basel, Bern and Zurich, offered a Master of Public Health targeting medical and non-medical professionals. These MPH programs were initially supported by the Federal Office of Public Health. Shortly after, additional post-graduate public health programs were offered at different Swiss universities. Since early 2000, the State Secretariat for Education and Research (SER) has funded the promotion and coordination of public health training programs offered by Swiss universities. Until 2005, SER supported two networks: Public Health and Health Economics. That year, the two networks merged into the Swiss School of Public Health (SSPH+), which in 2008 became a foundation of six (and later of seven) Swiss universities.¹ Because the funding period was set to expire at the end of 2012, in 2010 SER mandated SSPH+ to analyze the future need for public health resources in Switzerland and to make a proposal for the post-2012 era. As a result, SSPH+ set up a Task Force that explored the mission and structure of a nationwide school focused on the needs of public health education, research and practice in Switzerland.

As discussed in the Task Force Report,² one of the main goals of SSPH+ is to promote and coordinate education and research in public health in order to maintain a fully competent public health workforce. The underlying assumption is that efforts to improve the effectiveness of the public health workforce will improve health system performance and finally population health.³ Planning and developing an effective public health workforce is therefore essential to establishing and maintaining a high-performance health system. This is particularly important given the increased demands of changing health risks and chronic disease in Switzerland and other European countries. The 2006 World Health Report states that there is a “mismatch” between population health needs and the available public health workforce in terms of overall number, practical competencies and relevant training.⁴ A shortage in the public health workforce has also been documented in various developed and developing countries.⁵ There is a general consensus within the international public health community that multifaceted efforts are needed to strengthen the capacity of the global public health workforce, as public health challenges are increasingly global in nature.

However, despite the importance of strengthening the capacities of the public health workforce, the education of the public health workforce has not been developed in Switzerland until recently, and little has been known about the workforce’s composition, training or performance (Task Force Report, 2011). Without an understanding of the parameters of the public health workforce – its size, individuals’ qualifications and professional sector engagements, among other metrics – it is difficult to implement targeted strategies to strengthen its capacities. Yet, enumerating the public health workforce has been challenging, primarily because of the difficulty in defining public health professionals⁶ and lack of a clear professional licensing system or formalized career ladder in most European countries.⁷

The present study is a first profile of the public health workforce in Switzerland. Because of the interdisciplinary nature of public health practice and the difficulty of defining members of the public health workforce, we focused on identifying the core public health workforce, utilizing individuals’ provision of essential public health services or activities as the main criterion for the workforce.⁸ We choose this criterion because it is broader than identifying individuals solely through their occupational public health categories (e.g., health economist, environmental engineer, public health program manager, etc.), public health education (e.g., MPH, Diploma or Certificate in Public Health) or professional affiliations with government public health agencies (e.g., Cantonal Departments of Health, Federal Office of Public Health, etc.) – the sector that employs the largest number of public health professionals in most countries.

1 University of Basel, University of Bern, University of Geneva, University of Lausanne, University of Lugano, University of Neuchatel, University of Zürich.

2 Swiss School of Public Health. A proposal for a Swiss School of Public Health: Task Force Report. Zürich, Switzerland, 2011. (www.sspplus.ch/downloads).

3 Beaglehole, R., & Dal Poz, M.R. (2003). Public health workforce: challenges and policy issues. *Human Resour. Health* 2003;1(1):4.

4 World Health Organization (2006) Working together for health: World Health Report 2006. Geneva, Switzerland.

5 Association of Schools of Public Health (2008). Confronting the Public Health Workforce Crisis: ASPH Statement on the Public Health Workforce. Washington, USA; 2008.

6 Tilson, H., & Gebbie, K. M. (2004). The public health workforce. *Annu. Rev. Public Health*, 25, 341-356.

7 Bjegovic-Mikanovic, V. et al. Addressing needs in the public health workforce in Europe. Draft consultation. Malta, November 2012.

8 Tilson, H., & Gebbie, K. M. (2004). The public health workforce. *Annu. Rev. Public Health*, 25, 341-356.

With a clearer understanding of the workforce's functions and composition, its training and continuing education needs can be better met.

2.2. What Do We Know About the Public Health Workforce in Switzerland

The concept of public health is relatively new in Switzerland. While data on the health care workforce in Switzerland exist,⁹ there is no national data on the size, distribution or qualifications of the public health workforce in Switzerland. To our knowledge, there has been no systematic effort to assess national population health needs in Switzerland, which would further inform specific needs and related strategies to strengthen the capacity of the public health workforce. What we currently know about the size of the public health workforce is primarily from student and alumni data reported by educational institutions providing public health training and from health workforce data focused on prevention and health management from the Swiss Federal Statistical Office (FSO).

Two main types of educational institutions have been providing training related to public health in Switzerland: Universities and Universities of Applied Sciences (UAS). To date, 1'342 individuals have obtained, or are currently obtaining, a formal public health degree from Swiss universities (1'234 MAS and 108 PhDs from SSPH+ coordinated programs).¹⁰

Since 1998, a number of UAS have also offered degree training in different public health disciplines. According to available data from ten UAS, 637 individuals have earned MAS degrees in public health, including Health Care Management, Prevention & Health Promotion and Mental Health, among others.¹¹

The Swiss FSO collects data on individuals employed in the Swiss health sector.¹² In its 2008 data on employees in the health system, the FSO divided the health workforce into three major categories: health services, industry and trade, and management and prevention. While all these sectors employ individuals from the public health workforce, there is no specific public health category within the health system data. The category that most closely reflects the activities of public health workforce members, is management and prevention, which in 2008 employed 2'465 individuals or 0.5% of the Swiss health workforce.

The roughly 2'000 individuals who have a formal or continuing education in public health from a Swiss educational institution¹³ and the nearly 2'500 individuals who work in management or prevention constitute a part of the public health workforce in Switzerland. However, these data are incomplete, overlap and only provide a glimpse of the actual size of the public health workforce. Our study is a first attempt to provide an overall profile of the core public health workforce, including its estimated size, in Switzerland.

3. Methodology

3.1. Literature Review

We conducted an extensive literature review of public health workforce studies and concept papers to establish the scope definition and study methodology. Several studies focus on public health workers and capacity in specific organizations, examining strengths and gaps in training, geographic differences, racial and ethnic disparities, and critical shortages.^{14,15} Other researchers analyzed existing, secondary data, or survey data, to map individual public health workers across many organizations and sectors.^{16,17,18,19,20,21}

-
- 9 The Organisation for Economic Co-operation and Development (OECD) (2011). *Reviews of Health Systems: Switzerland*. World Health Organization/OECD, 2011.
 - 10 Cumulative data from individuals obtaining a CAS and DAS are currently not available.
 - 11 UAS alumni and student data collected by SSPH+. Zürich, Switzerland, 2012.
 - 12 Federal Statistical Office (2007) *Beschäftigte im Gesundheitswesen: Fakten und Trends auf der Basis der Betriebszählung von 1995-2005*. Neuchâtel, Switzerland, 2007.
 - 13 Individuals who obtained an MPH abroad and currently work in Switzerland are not counted in this summary data.
 - 14 Hanusaik N, O'Loughlin J.L., Kishchuk N, et al. (2009). Organizational capacity for chronic disease prevention: A survey of Canadian public health organizations. *European Journal of Public Health* 20:195-201.
 - 15 Leep, Carolyn J. (2010). *National Profile of Local Health Departments*. Inter-university Consortium for Political and Social Research.
 - 16 Bureau of Health Professions (2005). *Public Health Workforce Study*. Health Resources and Services Administration, January 2005.
 - 17 Tilson, H., & Gebbie, K. M. (2004). The public health workforce. *Annu. Rev. Public Health*, 25, 341-356.
 - 18 Sim F, Schiller G., Walters R. (2002). *Public health workforce planning for London. Mapping the public health function in London, a report to the DHSC London*. London: Department of Health; 2002.
 - 19 Gebbie, K., Rosenstock, L., & Hernandez, L. M. (2003). *Who will keep the public healthy? Educating public health professionals for the 21st century*. Washington (DC): Institute of Medicine.
 - 20 Hendrickson, J., Haas, T., Hanauer, E., & Institute of International Education (New York, NY). (2004). *Population Experts in Developing Countries: A Directory*. Institute of International Education West Coast Center.
 - 21 Jambroes M, Essink-Bot M.L., Plochg T, Stronks K. (2012) Public healthcare occupations--insight into size and composition is limited *Ned Tijdschr Geneeskd*. 2012;156(31):A4529.

Additional studies focus on workers in a specific public health sector (e.g., chronic disease, nursing, diabetes).^{22,23,24} While the above studies sought to enumerate the public health workforce, related studies put forward frameworks, strategic plans and tools to guide further public health workforce research and development.^{25,26,27,28, 29,30,31,32,33,34,35} Finally, it is important to note that several papers include public health workforce mapping as a high priority for the field.^{36, 37, 38,39,40,41} Tilson et al. (2004) even provide a list of unanswered workforce research questions, including how to track/monitor accurately the public health workforce in terms of size, composition, distribution, career path, and credentialing.⁴²

The process of mapping the public health workforce presents several challenges. The studies listed above highlight several, and many themes intersect. A common thread was difficulty defining “public health worker.”^{43,44,45,46} Determining the scope and conceptual boundaries of public health workers is problematic, particularly in nontraditional settings. In addition, the multidisciplinary nature of the public health workforce also presents a challenge for researchers mapping across organizations and sectors. Many skills are needed to perform public health work (medical, mental health, communication, management, economic, technological) and it is a challenge to find workers in less visible settings for whom public health might only be a small part of their job.^{47,48,49} Finally, population health needs and public health responses are changing with increased globalization, migration and improved technologies, among other reasons. New fields (e.g., e-health) and new health needs (e.g., aging population) are emerging. Therefore, the profile and parameters of the workforce are not static and often practitioners and leaders do not see themselves as “public health workers” (PAHO).

In essence, the current literature on the public health workforce highlights the necessity of collecting data on the workforce for planning and development purposes. It also illustrates the complexity of these efforts within the context of differing health systems, definitions of the public health workforce and who “belongs” to it, and changing population health needs.

-
- 22 Hanusaik N, O’Loughlin J.L., Kishchuk N, et al. (2009) Organizational capacity for chronic disease prevention: A survey of Canadian public health organizations. *European Journal of Public Health* 20:195-201.
 - 23 Gebbie K, Merrill J. (2000). *The Public Health Workforce: Enumeration 2000*. Bureau of Health Professionals, National Center for Health Workforce Information and Analysis, Dec. 2000.
 - 24 Satterfield, D. W., Murphy, D., et al (2004). Using the Essential Public Health Services as strategic leverage to strengthen the public health response to diabetes. *Public Health Reports*, 119(3), 311.
 - 25 Lancashire Public Health Network (2012). *The new public health workforce – post-White Paper*. Retrieved from: <http://www.clph.net/page.aspx?pageid=737&ParentID=79>
 - 26 Perlino, C. (2006). *The Public Health Workforce Shortage: Left Unchecked, Will We Be Protected?* American Public Health Association.
 - 27 Aluttis, C. et al. (2010). Mapping public health capacity in the EU *European journal of public health* vol:20:235-235.
 - 28 Pan American Health Organization (2007). *Public Health Capacity in Latin America and Caribbean: Assessment and Strengthening*, August 2007.
 - 29 *Task Force Report on Public Health Workforce Development*. (2000). CDC/ATSDR Strategic Plan for Public Health Workforce Development: *Toward a life-long learning system for public health practitioners*. Centers for Disease Control.
 - 30 Joint Task Group on Public Health Human Resources. (2005). *Building the Public Health Workforce for the 21st Century. A Pan-Canadian Framework for Public Health Human Resources Planning*. Ottawa: Public Health Agency of Canada.
 - 31 Association of Schools of Public Health (2008) *Confronting the Public Health Workforce Crisis Policy Brief* December 2008
 - 32 Ridoutt L. et al. (2002). *Planning Framework for the Public Health Workforce*, Discussion paper, June 2002.
 - 33 Ridoutt L et al. (2004). *Calculating the demand for an effective public health workforce*. Human Capital Alliance July 2004.
 - 34 Walters, R., Sim, F., & Schiller, G. (2002). *Mapping the public health workforce I: a tool for classifying the public health workforce*. *Public Health*, 116(4), 201-206.
 - 35 Public Health Functions Project (US). (1997). *The Public Health Workforce: An Agenda for the 21st Century: a Report of the Public Health Functions Project*. DIANE Publishing.
 - 36 World Health Organization (2006) *Working together for health: World Health Report 2006*. Geneva, Switzerland.
 - 37 The Council on Linkages Between Academia and Public Health Practice (2010) *Crosswalk: Core Competencies for Public Health Professionals & the Essential Public Health Services*, Dec. 2010.
 - 38 Swiss School of Public Health. (2011). *A proposal for a Swiss School of Public Health: Task Force Report*. Zürich, Switzerland.
 - 39 Association of Schools of Public Health. (2008). *Confronting the Public Health Workforce Crisis: ASPH Statement on the Public Health Workforce*. Washington, USA; 2008.
 - 40 Committee on Assuring the Health of the Public in the 21st Century (2002). *The Future of the Public’s Health in the 21st Century*, Institute of Medicine.
 - 41 Rosenstock L, Helsing K, Rimer BK. (2011). Public Health Education in the United States: Then and Now. *Public Health Reviews*. 2011;33:39-65.
 - 42 Tilson, H., & Gebbie, K. M. (2004). The public health workforce. *Annu. Rev. Public Health*, 25, 341-356.
 - 43 Birt CA., Foldspang A. (2009). Public health capacity building – not only the property of the medical profession. *Eur J Public Health*19(3):232-235.
 - 44 Gebbie K, Merrill J. (2000). *The Public Health Workforce: Enumeration 2000*. Bureau of Health Professionals, National Center for Health Workforce Information and Analysis, Dec. 2000.
 - 45 Agency for Healthcare Research and Quality Innovations and Exchange Team (2012) *Public Health Workforce Faces New Challenges and Opportunities* U.S. Department of Health and Human Services. September 12, 2012.
 - 46 Ridoutt L et al. (2002) *Planning Framework for the Public Health Workforce*, Discussion Paper, June 2002.
 - 47 Birt C.A., Foldspang A. (2009). Public health capacity building – not only the property of the medical profession. *Eur J Public Health* 19(3):232-235.
 - 48 Agency for Healthcare Research and Quality Innovations and Exchange Team (2012) *Public Health Workforce Faces New Challenges and Opportunities* U.S. Department of Health and Human Services. September 12, 2012.
 - 49 Ridoutt L et al. (2002) *Planning Framework for the Public Health Workforce*, Discussion Paper, June 2002.

3.2. Study Objectives and Research Design

The overall goal of the study is to create a profile of the public health workforce in Switzerland in order to strengthen the planning, development and training of this workforce. The specific objectives are: a) to estimate the size of the workforce, b) to obtain demographic information, c) to assess formal and continuing education, d) to identify professional areas, and e) to identify public health competency needs.

Findings from the literature review informed the study methodology and scope definition. We synthesized the ten essential public health services/operations adopted by major international public health institutions, including the WHO,^{50,51} into four categories:

- 1. Population-based interventions** against diseases and their consequences, mainly in the field of prevention and health promotion:
 - **Activities** include monitoring health status; planning, implementing, monitoring and evaluating health programs; and managing and overseeing programs (e.g., HIV/AIDS prevention programs, nutrition and physical education programs for students, youth alcohol prevention programs, occupational health management, etc).
- 2. Interventions on the structure and activity of the health system**, including management and planning of health care, health policy work and health law:
 - **Activities** include advocating for health; linking people to health services, developing partnerships and collaborations; building leadership and capacity; administering and managing health care systems; analyzing legal structures and systems; enforcing health and safety laws and regulations; and planning health finances and health insurance policy.
- 3. Research** on any public health discipline, including international/global health and aspects of primary care:
 - **Activities** include the planning and completion of studies related to any discipline of public health, including the analyses and publication in scientific journals.
- 4. Education and Training** on any public health discipline:
 - **Activities** include developing curricula at the graduate, postgraduate, doctoral and continuing education levels; educating the public health workforce; linking training to practice; and building national and international networks.

We focused on the core public health workforce, comprised of individuals who are involved in providing at least one of the four public health services or activities. Their work is primarily focused on services or activities other than individual care, and devoted to health protection, health promotion or disease prevention of a population or specific groups within a population (e.g., school children, new mothers, individuals affected by weight problems).

An online survey was designed to gather data on the public health workforce in Switzerland (Appendix I). The cross-sectional, descriptive and observational design focused on identifying and mapping key demographic, educational and professional characteristics of the public health workforce. The survey targeted individuals who, through their organizations, provide one or more of the four essential public health services or activities. The survey was available in four languages (German, French, Italian and English). Participants were screened online (at the beginning of the survey) as to whether they met the study criteria, by their selecting at least one of the four public health areas or by self-identifying as a public health workforce member.

To gain deeper insight about the various professional sectors involved in public health in Switzerland, an Advisory Board for the study was established (Appendix II). Board members are experts in their fields and represent the various professional sectors of the study, such as government agencies, non-governmental organizations (NGOs), professional associations, education and research institutions, pharmaceutical/biotech companies, health insurance companies, and international organizations. The seven Advisory Board members assisted with identifying a) organizations to be recruited for the study, b) organizational point persons, and c) individuals to field test the survey instrument. Eleven individuals from the public health sector field tested the survey and provided feedback. Program directors of the seven partner universities of SSPH+ also provided input on organizations to be surveyed, organizational point persons and the survey design.

50 National public health performance standards program (1993) 10 Essential Public Health Functions. Centers for Disease Control/US Department of Health and Human Services.

51 World Health Organization Regional Office for Europe (2011) The 10 Essential Public Health Operations (EPHOs).

3.3. Sampling Methodologies

To identify core public health workforce members in Switzerland, we compiled a comprehensive list of organizations based in Switzerland that met our study criteria of providing public health services or activities. The list included institutions in the government sector (federal, cantonal and county levels), education and research institutions, non-government organizations, professional associations, hospitals, health insurances, consulting firms, pharma/biotech companies and major international organizations.

Because of the scope of the study, we used two organizational sampling methodologies: 1) *inviting/recruiting* all Swiss-based organizations from key public health sectors, and 2) *sampling* Swiss-based organizations that represent large professional sectors, such as hospitals, but employ a relatively small proportion of the public health workforce. Specifically:

- 1) We invited/recruited all organizations from: a) professional associations, b) government institutions on federal, cantonal and city levels, c) non-government organizations, and d) education and research institutions.
- 2) We sampled organizations from the sectors below, applying the following sampling methods:
 - Hospitals⁵²: Those with a total number of staff ranked in the top 30 nationally, all cantonal and university hospitals as well as the largest hospital per canton, if no cantonal or university hospital existed in the given canton.
 - Health Insurances: Santé Suisse members.
 - Consulting and Pharma/Biotech companies: Swiss Society for Public Health members.
 - International Organizations: Major international, public health organizations.⁵³

Given the global nature of many public health challenges,⁵⁴ for this study, we used the *location* (Switzerland) of the organizations and their public health workforce members as the criterion for study inclusion, rather than the *reach* of the public health activities and services provided by these members, which are focused not only on the Swiss population (e.g., WHO).

Table 1. Organizational Response Rate by Professional Sector

Organization Sectors	# of Contacted Organizations	# of Participating Organizations	Organizational Response Rate
Fully Surveyed			
Educational / Research	41	31	76%
Government Institutions	64	43	67%
Non-Governmental Organizations	90	42	47%
Professional Associations	167	52	31%
Sampled			
Hospitals	39	13	33%
Health Insurance	13	4	31%
Consulting	7	2	29%
International Organizations	4	1	25%
Pharma / Biotech Industry	5	0	0%
Total	430	188	

⁵² Wüst E (2011) Krankenhausstatistik, Statisches Lexikon der Schweiz Bundesamt für Statistik.

⁵³ WHO, GAVI, UNAIDS and the Global Fund to Fight AIDS, Tuberculosis and Malaria.

⁵⁴ Brundtland, G. H. (2005). Public health challenges in a globalizing world. The European Journal of Public Health, 15(1), 3-5.

3.4. Data Collection

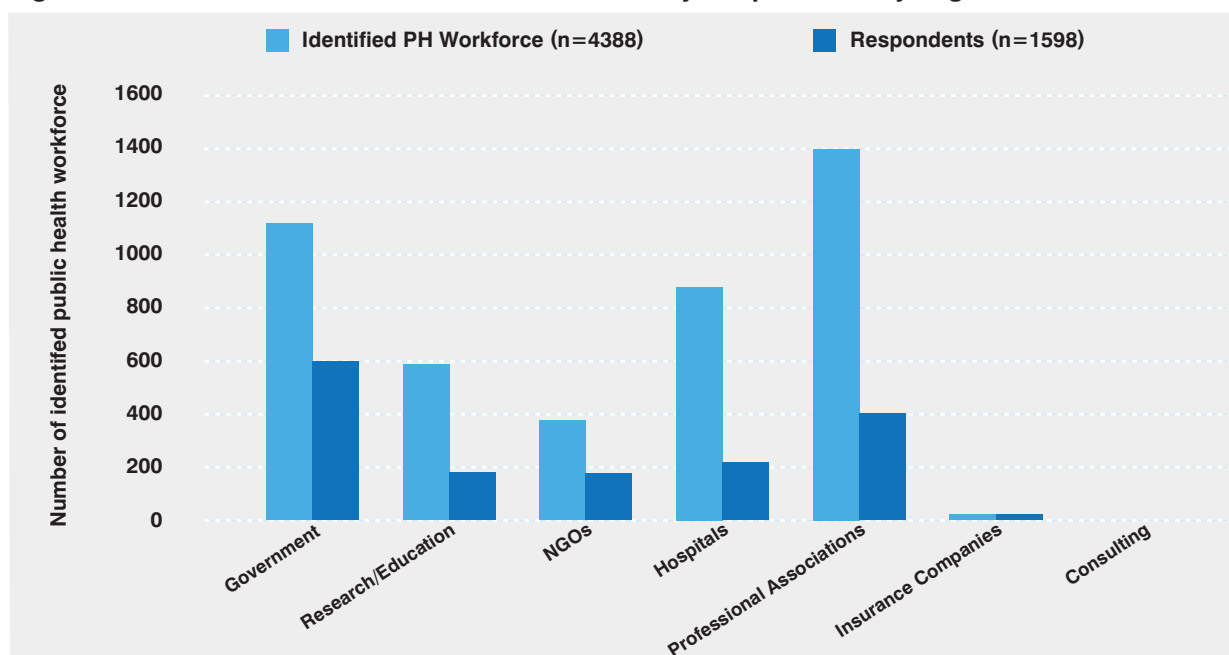
Data were collected from January 3 to May 31, 2012. The first phase consisted of contacting by phone the 430 organizations that met the study criteria to explain the study and obtain agreement to participate. Formal study invitation letters were sent to the heads of organizations if requested, and one point person per organization was identified. During the second phase, the survey link and a detailed study description were sent to the point person of each participating organization. Each point person was to identify all individuals within the organization who provide at least one of the four public health services or activities, and invite them to participate. Point persons were to report the number of individuals who received the survey link within the organization. Two follow up email reminders were sent to point persons.

Of the 430 organizations contacted, 188 organizations participated in the study (Table 1 and Appendix III). An organization was counted as participating if it either provided the number of individuals who received the survey link and thus met the study criteria, and/or had individuals who completed the survey. Of the fully surveyed organizations, education and research organizations had the highest response rate (76%), followed by government institutions (67%), non-government organizations (47%) and professional associations (31%). The response rate for the sampled organizations ranged between 25% and 33%. None of the five contacted pharma/biotech companies participated in the study.

The 188 organizational point persons recruited a total of 4'388 individuals from their organizations. Of these, 1'598 individuals completed the survey, with a response rate of 36% (Figure 1).

On an individual participation level, the response rate was highest among individuals in the government sector (53%), followed by NGOs (46%), research/education institutions (30%), professional associations (29%), and hospitals (26%). Insurance companies had a high individual response rate, but the absolute number of participants was relatively low (22 responses).

Figure 1. Identified Public Health Workforce and Study Respondents by Organization Sector



3.5. Estimated Size of Public Health Workforce

To calculate the estimated size of the core public health workforce in Switzerland, we used three sources of data (Figure 2). The first source was the number of forwarded survey links to individuals meeting the study criteria ($n=4'388$). As a second source, we obtained summary data on the number of public health workforce members from larger organizations that were not in a position to forward the survey link to eligible study participants within their organizations. Such organizational summary data was provided by SUVA, WHO and the Swiss Red Cross. Third, we collected and estimated additional public health workforce data from the 242 organizations that met the study criteria, but did not participate. We also estimated the number of public health workforce members working in the remaining Swiss hospitals and health insurance companies we did not survey.

For the 242 non-participating organizations, we used online research of employees' profiles to assess the number of individuals per organization meeting the study criteria.⁵⁵ If an online staff profile was unavailable for an organization, we omitted an estimate for such an organization. With this method, we estimate that a minimum of 1'489 additional individuals from non-participating organizations are part of the public health workforce.

To estimate the size of the public health workforce in the 300 non-participating Swiss hospitals, we used the available data on the number of hospitals from the FSO, and hospital staff indicators from the FOPH.⁵⁶ We clustered hospitals into four categories: university hospitals, cantonal hospitals, small hospitals (500 or fewer staff) and large hospitals (more than 500 staff). Of the five university hospitals in Switzerland, three participated in the survey (CHUV, Zürich and HUG). We took the average of the three university hospitals' participation rates, which was 1.76%, and applied this percentage to the two remaining, non-participating university hospitals (Bern and Basel). For the cantonal hospitals, we used a similar method, taking the average participation rate (.86%) of the participating hospitals and applied this rate to the cluster of non-participating cantonal hospitals. We estimated one public health workforce member for each small hospital, and used a rate of 0.5% for the large hospitals, assuming that larger hospitals employ more individuals in health care management and planning than smaller hospitals. Using this method, we arrived at a total of 840 estimated public health workforce members at non-participating hospitals.

For the non-participating health insurance companies,⁵⁷ we used the number of insured individuals per health insurance company or health insurance group as indicators to estimate the overall number of public health workforce members in such companies. We clustered the 81 health insurances into five groups and estimated the number of public health workforce members per cluster as follows: 1) 900'000 and above insured = 20 public health workforce members (phwm), 2) 500'000 and above = 8 phwm, 3) 200,000 and above = 3 phwm, 4) 100,000 and above = 2 phwm, and 5) remaining small health insurances with less than 100'000, a total for all 11 insurances of 2 phwm. With this method, we estimated a total of 93 public health workforce members in non-participating health insurance companies in Switzerland.

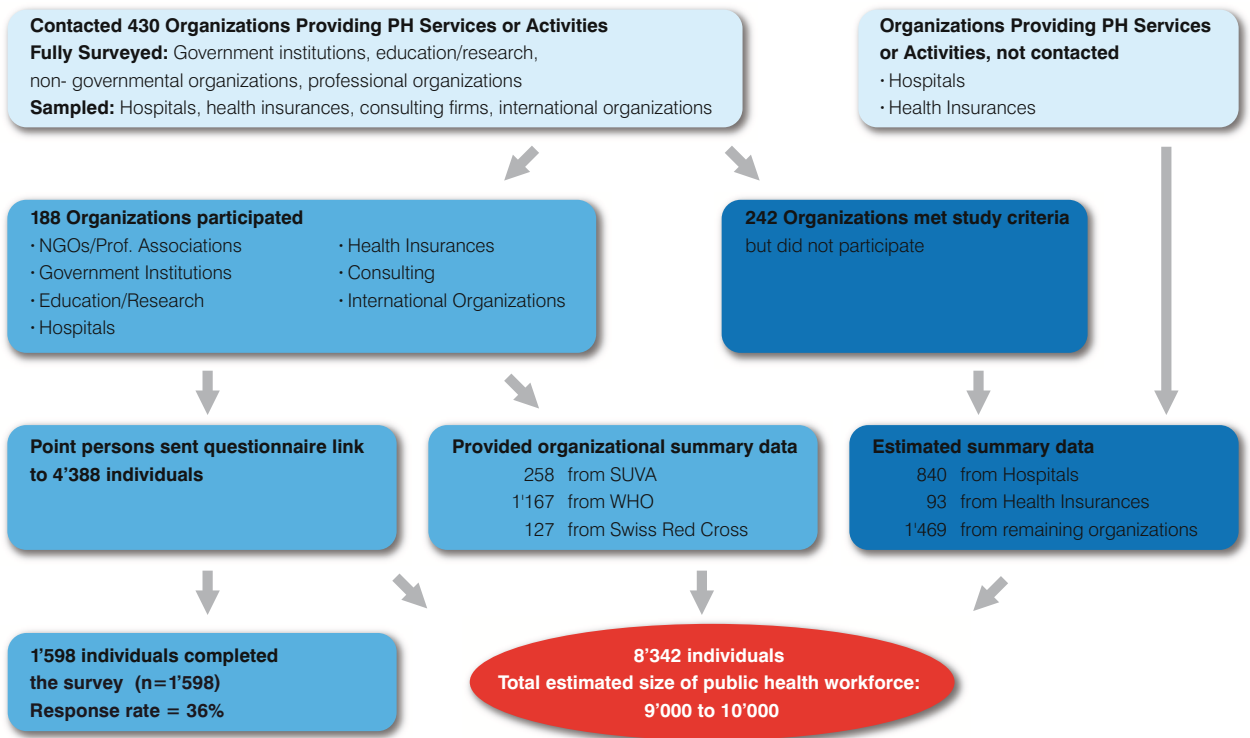
Based on this methodology, we estimate the public health workforce in Switzerland is comprised of at least 8'342 individuals (Figure 2). The workforce is likely larger, between 9'000 and 10'000, given that major international organizations, such as UNAIDS, GAVI and Global Fund did not participate and were not included in our estimate.

55 Hospitals and health insurances that were part of our initial sample, but did not participate, are included in the 242 non-participating organizations. However, we used separate methodologies to estimate the number of public health workforce members working for hospitals and health insurances.

56 According to the hospital data from 2009 from the FSO (<http://www.bag.admin.ch/hospital/index.html?lang=de>), the total number of hospitals in 2009 in Switzerland was 313. Of the 39 sampled hospitals, 13 participated in the study, leaving individuals working in the 300 non-participating hospitals to be estimated for inclusion in the public health workforce.

57 Statistic of compulsory health insurance, Federal Office of Public Health, Switzerland, 2010.

Figure 2: Study Methodology and Estimated Size of Public Health Workforce



3.6. Limitations

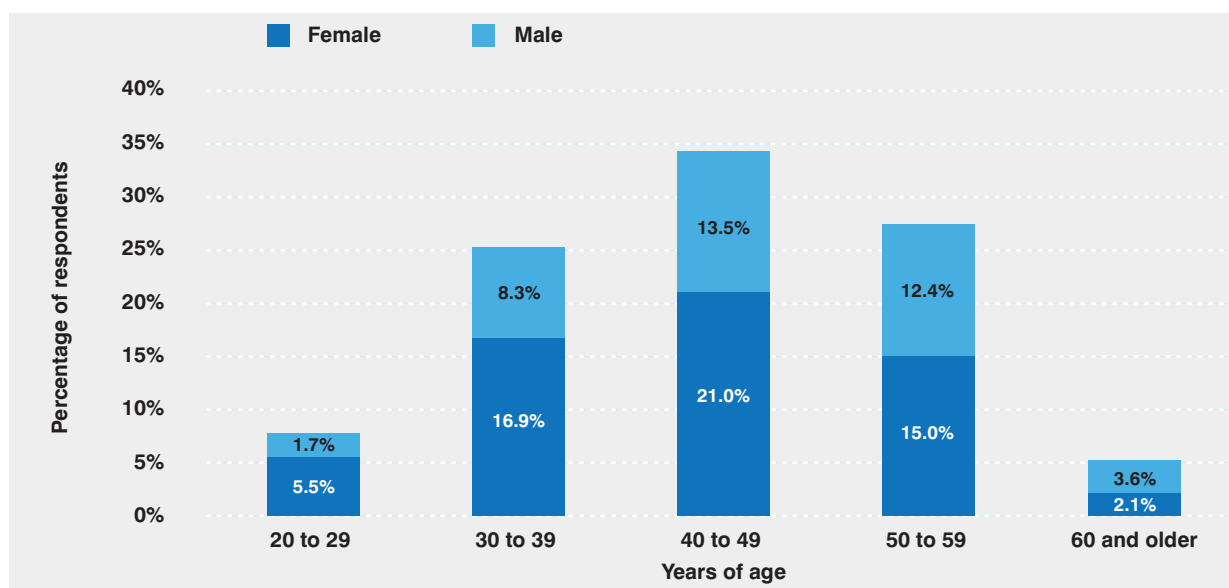
Several factors might have affected the participation of organizations and individuals in the study. First, the concept of public health is relatively new in Switzerland. Some organizations, specifically from the pharma/biotech sector, might not have seen themselves as organizations employing individuals with a public health role. None of the contacted organizations from this sector participated and therefore are not represented in the study. Second, the organizational participation rate of NGOs (47%) and Professional Associations (31%), is lower than among research/education institutions (76%) and government organizations (67%). This might have resulted from resource constraints among NGOs and Professional Associations and/or a greater familiarity with the concept of public health work among research and government organizations. Consequently, public health workforce members at government and education/research institutions might be overrepresented. Nevertheless, the fact that the individual response rates of participants from NGOs (46%) and Professional Associations (29%) are within a close range of their respective organizational response rates for each sector, could indicate the findings are generally representative for these sectors.

There are also possible selection and response biases: individuals with some type of public health education or a more visible role in public health might have been more likely to be recruited for the study by their organizational point persons and might therefore be overrepresented. Similarly, individuals who were not familiar with the concept or practice of public health (even if they do provide public health services or activities), might have been less likely to participate in the study and therefore could be underrepresented.

The goal of this study was to create a profile of the core public health workforce in Switzerland. Accordingly, health care professionals such as nurses, physicians, pharmacists, psychologists, social workers, and the like were only included in the study if they provide public health services or activities through their organizations (i.e., cantonal departments of public health, NGOs with a public health mandate, etc.). In addition, because of the scope of the project and the diverse community services offered by Spitex,⁵⁸ we did not survey Spitex nurses or other staff as part of this study. Further research is needed to create a profile of the role of health care professionals in public health in Switzerland.

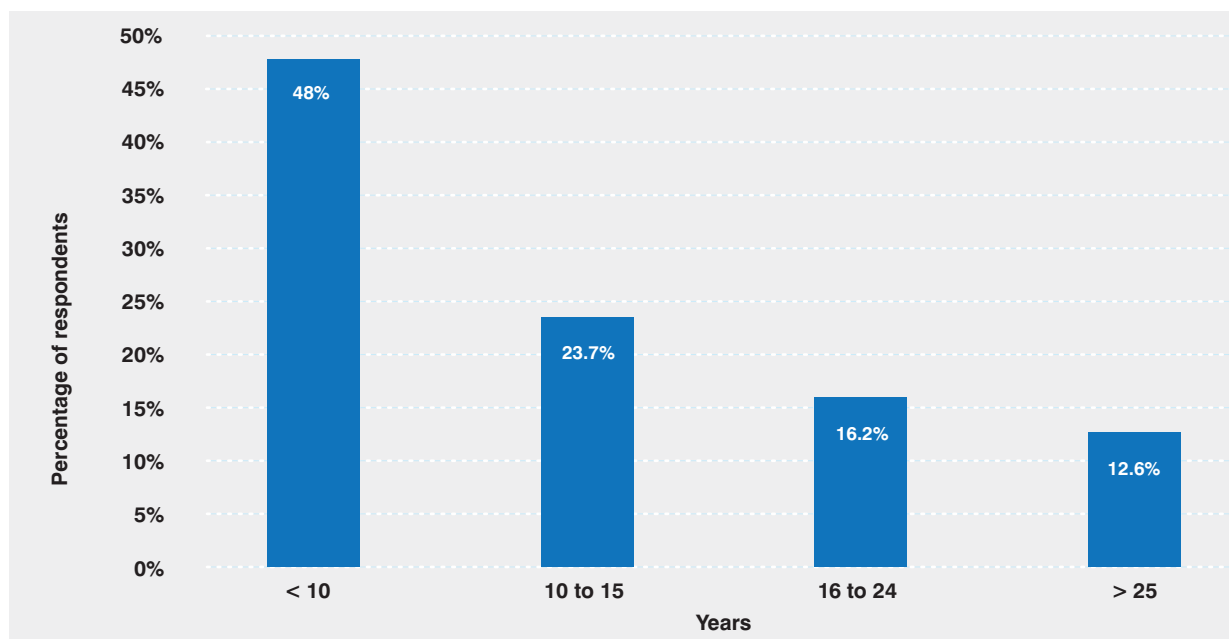
⁵⁸ According to data from 2010, a total of 36'409 individuals are employed by Spitex. Of these, 89% work in health care and patient support, and 4% are in leadership positions. Federal Statistical Office. Spitex-Statistik 2010. Neuchatel, Switzerland, 2011.

Figure 4. Age Distribution by Gender



Note: Percent based on available data. Gender and age n=1598

Figure 5. Years of Experience in Public Health



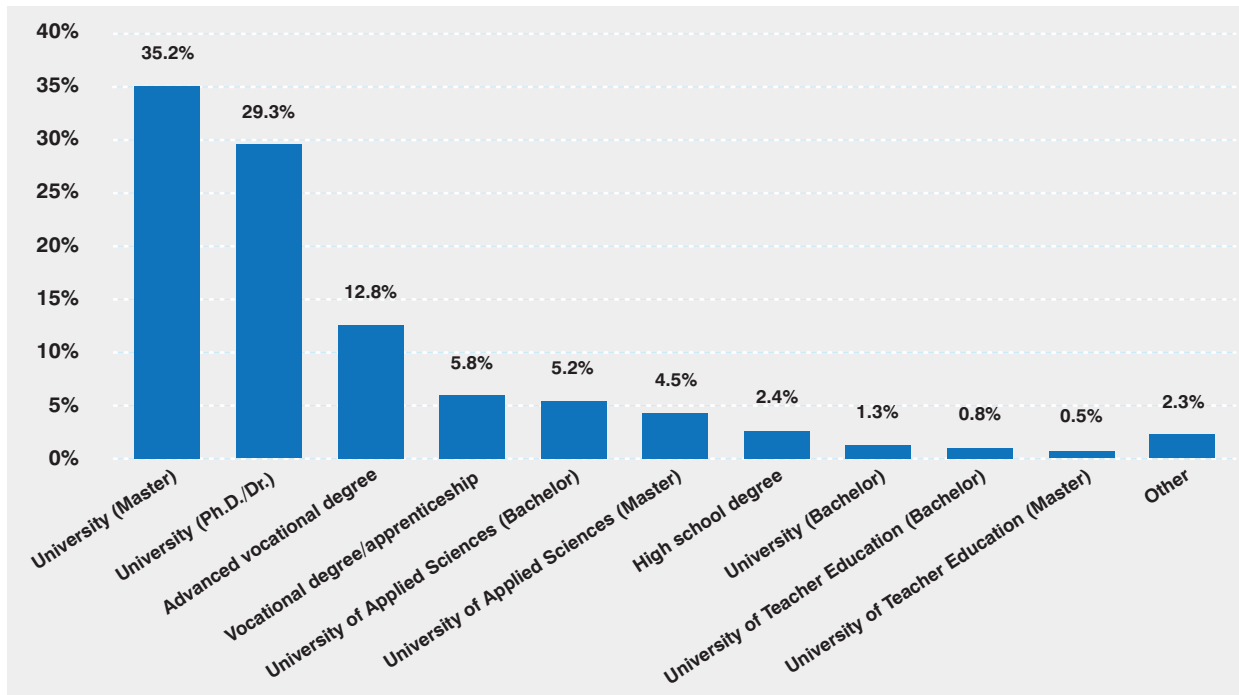
Note: Percent based on available data. Years of experience n= 1'598

4.2. Education

Formal Education

Overall, the public health workforce has a high level of formal education in highly diverse disciplines (Figure 6). Over 2/3 of the respondents (69%) have an academic education, with a master's degree or higher. Respondents, irrespective of educational level, have varied educational backgrounds. For example, for respondents with a master's degree or higher, educational disciplines range from medicine (21%), psychology (9%), biology (7%), economics (7%), law, sociology, engineering, geography, and nursing, among others. Respondents with a bachelor's degree or vocational training also have a highly diverse educational background, including nursing, business administration/finance, coaching and counseling, nutrition and therapy.

Figure 6: Highest Education

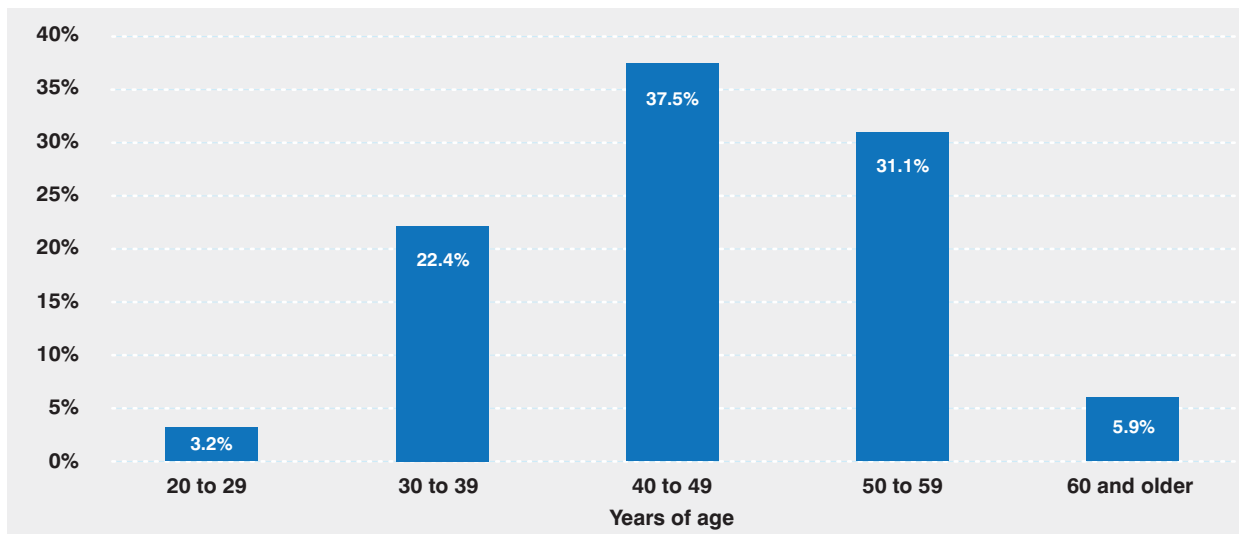


Note: Percent based on available data. Highest education n=1'598.

Public Health Education

The age distribution of respondents with a public health education (Figure 7) closely reflects the age distribution of survey respondents overall (Figure 4). Considering the percentage of respondents who have a public health education and applying such percentage to the estimated size of the public health workforce (32% of 10'000), we estimate 3'200 members of the public health workforce have a specific public health education. During the past four years, about 200 individuals each year obtained a master's or PhD degree in public health from Swiss universities or UAS. If we would continue to educate 200 individuals in public health every year, supposing an attrition rate of 2% per year and the natural retirement of the workforce at age 65 (using the age distribution in Figure 7), we could increase the share of public health workers with a public health education from 32% to 40% over the next 20 years. We would also be able to maintain this share for the following 10 years.

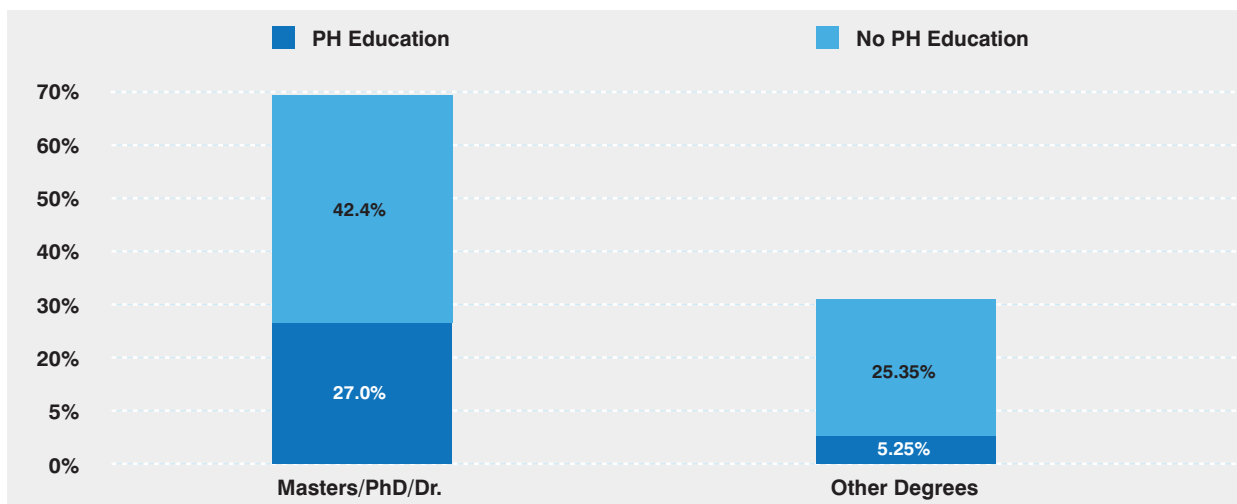
Figure 7. Public Health Education by Age



Note: Percent based on available data. Public health education n=516. Public health education is defined as public health focus in formal training (MPH abroad, Masters or PhD with public health focus, including epidemiology), FMH (specialty) in prevention, or a continuing education degree that is public health-related (CAS, DAS, or MAS).

Nearly one third (32%) of all respondents have an education in public health (Figure 8). Of the 69% with a master's degree or higher, over 1/3 of this group also have a public health education. Of this group, 127 respondents (8%) are currently obtaining or have obtained their master's in Public Health (MPH) abroad. Public health training is less prevalent among individuals with vocational training or a bachelor's degree ("other degrees"). Less than 1/5 of this group have a specific public health education.

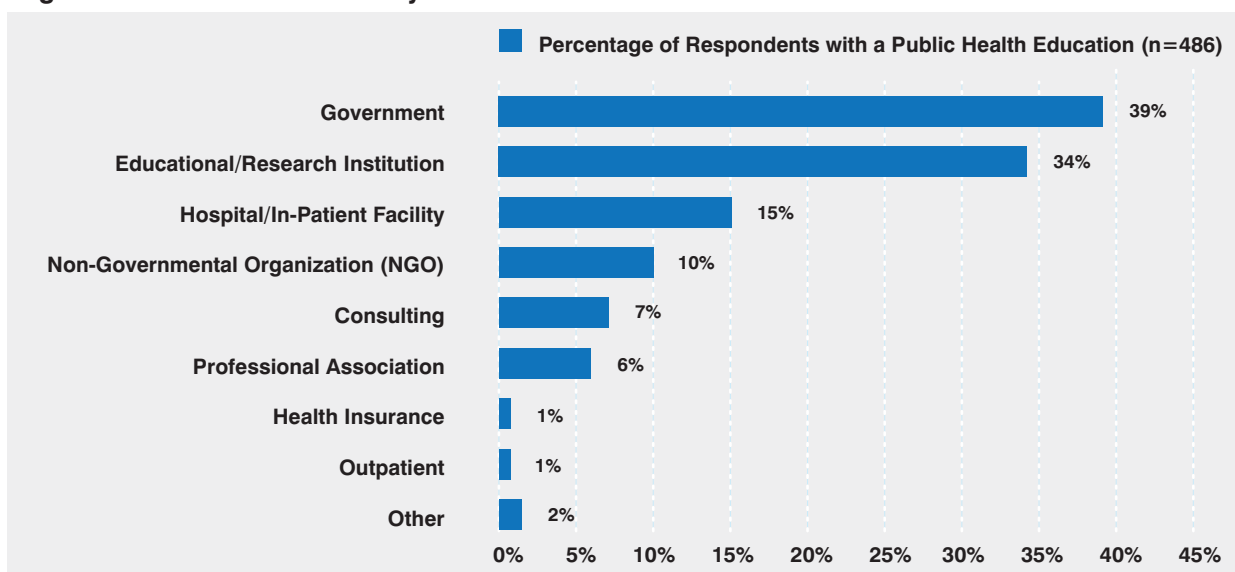
Figure 8. Respondents' Educational Level by Public Health Education



Note: Percent based on available data. Public health education n=516, no public health education n=1082. Masters/PhD/Dr (includes MDs) n=1109, Other Degrees n= 486.

Individuals with a specific public health education also work in several different sectors (Figure 9.).The highest percentage of respondents with a public health education work in government institutions (39%), and nearly one third (34%) work in education/research institutions. A smaller representation of individuals with a public health education work in the NGO, hospital or professional association sectors, which also had lower individual response rates than government and education/research institutions. Within the government sector, there was no significant difference between individuals with public health education working at federal, cantonal or city/county institutions (data not shown separately).

Figure 9. Professional Sector by Public Health Education



Note: Percent are based on available data n=1483 (primary or secondary employer). Public Health Education n=486 (see definition in Figure 8). Percentage add up to more than 100% because 15% of respondents (n=226) have two employers in public health.

Continuing and Post-Graduate Education

The public health workforce is actively seeking opportunities for continuing education. Continuing education is defined as further education after obtaining a formal education. Over 2/3 of all respondents (78%) have had some type of continuing education (data not shown separately). Over half of the respondents (54%) attended at least one non-degree, public health-related training in 2011, with a median of 20 hours of training. Non-degree public health-related training include workshops, in-house organizational training and seminars.

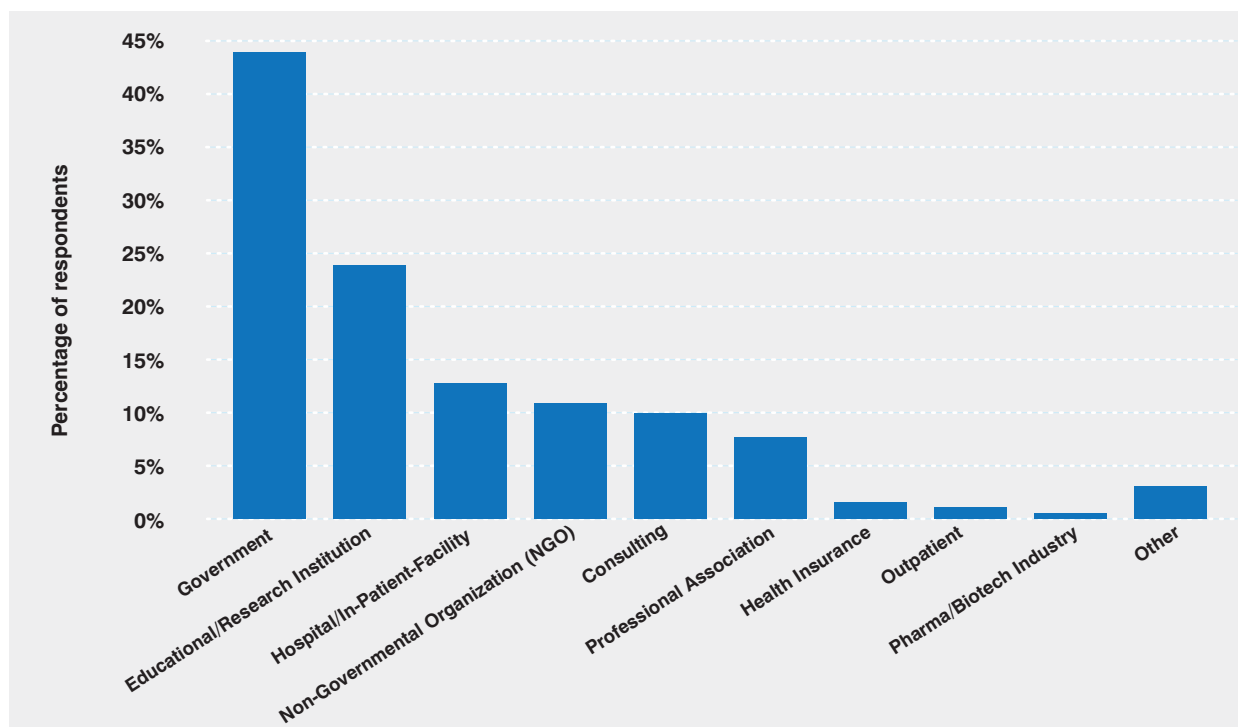
Nearly one quarter of respondents (24%) have completed at least one form of public health-related post-graduate education with a formal degree, such as a Certificate of Advanced Studies (CAS), Diploma of Advanced Studies (DAS) or Master's of Advanced Studies (MAS). MAS are the most frequently obtained degrees in a variety of public health disciplines, including the Masters of Public Health (MPH, which is a type of MAS degree in Switzerland), followed by health economics and management, occupational health, epidemiology and biostatistics.

4.3. Professional Areas

Professional sectors

The public health workforce in Switzerland provides its services and activities through various professional sectors (Figure 10). The largest represented sector is the government sector, which employs 44% of respondents. Sixty eight percent of the public health workforce (including respondents with more than one employer) have employers in other sectors, such as education/research (23%), NGOs/professional associations (19%), hospitals/in/out-patient facilities (14%), and consulting (10%), among others.

Figure 10. Professional Sector Affiliation



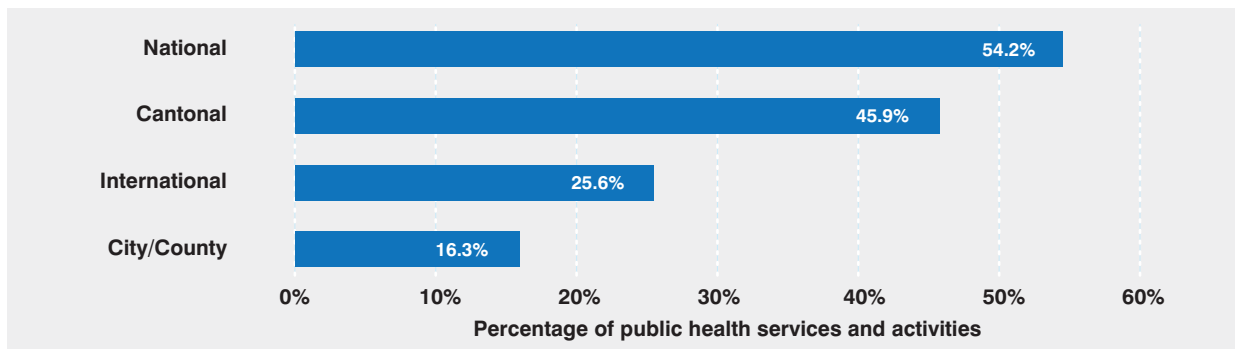
Note: Percent based on available data. Professional sector/type of organizational affiliation, primary and secondary employer data, n=1661. Percent add up to more than 100%. Primary employer n=1462, secondary employer n=248

Geographic Reach

Public health services and activities are provided by the Swiss public health workforce within a broad geographic reach (Figure 11). The largest percentage of such activities are provided on a national level (54%), followed by the cantonal level. Within the government sector, due to the scope of the project, the study focused primarily on institutions on the federal and cantonal levels, and to a much lesser extent on those on the city/community level.

Consequently, it is likely that the city/county-level reach is underrepresented with this set of data. This possible underrepresentation is further supported by the fact that many NGOs implement their public health activities on a city/county level, yet only 47% of the NGOs meeting our study criteria participated in the study. One quarter (25.6%) of public health activities and services are also implemented on an international level. This number is likely also higher, given that WHO summary data and information from non-participating, international organizations, such as GAVI, UNAIDS and the Global Fund, are not included in these data.

Figure 11: Geographic Reach of Public Health Services and Activities

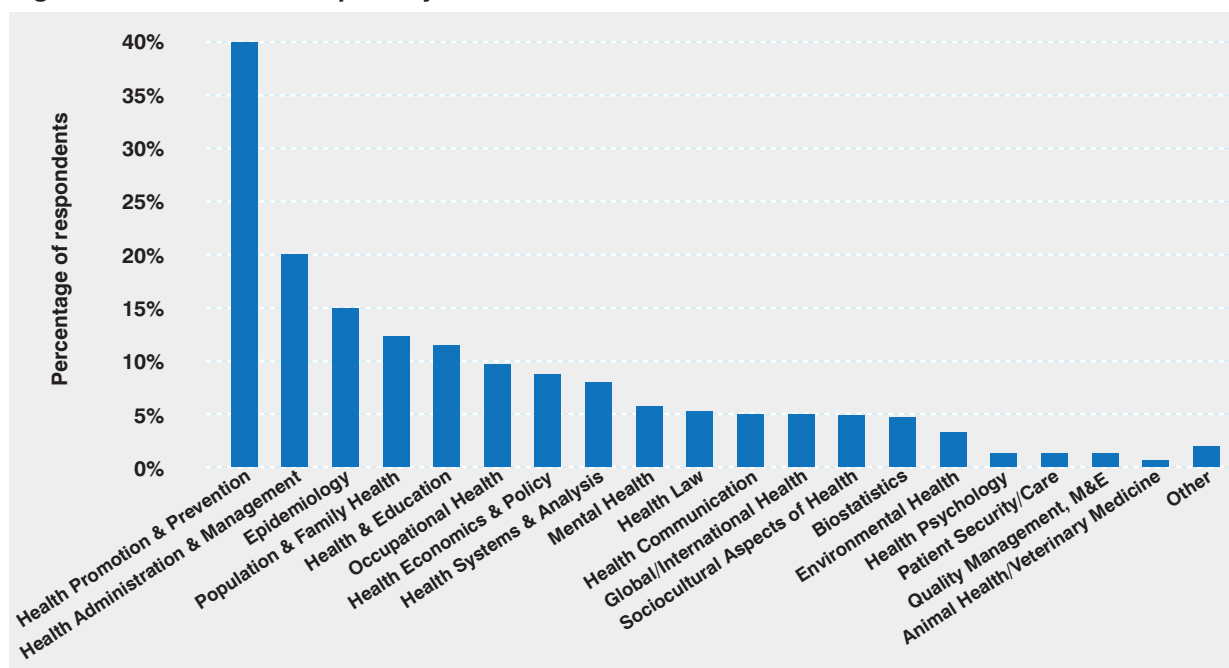


Note: Percentage based on available data. Geographic reach of PH services and activities, primary and secondary employer n=2105. Percent add up to more than 100%, because respondents could choose up to two responses.

Public Health Specialty

The public health workforce addresses a broad range of health issues within its professional focus (Figure 12). The largest percentage of respondents are involved in health promotion & prevention (40%), followed by health administration and management (20%), epidemiology (15%), and population and family health (13%). Because of the breadth of public health work within these areas of specialization, respondents who checked working in either “health promotion & prevention” (n=626), “health administration & management” (n=322), or “population & family health” (n=202), were asked to further specify the nature of their work. Responses for each area varied widely, and the descriptions below highlight the tremendous diversity and interdisciplinary work of public health workforce members in Switzerland.

Figure 12. Public Health Specialty



Note: Percentage based on available data. Public health specialty n=2649 (up to two responses).

Health Promotion & Prevention

The “health promotion & prevention” group had a large number of respondents who reported providing counselling and advice on health matters. Many such respondents focus on parents with young children, but others counsel on chronic disease, poisoning, nutrition, dental health, occupational health and patient safety. Another group in this section reported their work as program planning, development and/or evaluation in fields such as mental health, immigration, addiction and obesity. A small group reported working in data collection and management, and/or information dissemination. Still another sub-sector works in education, training and research on topics such as asthma, addiction, parenting and arthritis. In this education/training subgroup, some work with online resource platforms (e-health), some by telephone, and others with face-to-face counselling.

Several respondents work in program management in settings such as government, aging services, child health or obesity. Others reported working on outreach, networking and advocacy in government, international health, and other agencies. Many respondents reported working in screening or surveillance in areas such as diabetes, breast cancer, school health or chemical safety. Finally, a group of respondents indicate that they work in general prevention around a diverse group of topics such as HIV/AIDS, sun protection, smoking cessation, obesity prevention and treatment, nutrition, physical activity, aging, domestic violence, international women’s rights issues, child and family health, addiction, radiation, arthritis, sexual health, and natural disaster preparation.

Health Administration & Management

Many respondents with a “health administration & management” specialty reported working in general administration and management, or project management, for health related institutions such as health insurances, hospitals, government, assisted living facilities, or schools. Several reported working in human resources departments in health service organizations. Other respondents combined clinical work with administration, management or leadership, in areas such as smoking cessation projects, school health, parenting, lung health, or reproductive health. Many others work in health communication roles addressing topics such as cyber health, animal and food safety or pharmaceuticals. Still others reported that they work in development, implementation, planning or evaluation/reporting roles for governmental institutions, health law organizations, clinical settings, health technology, or aging (among others).

A large number of survey respondents specified that they work on health care finance for hospitals or other health services. One group of respondents reported working in regulation, legislation, policy or advocacy. Settings include health insurances, government, food safety and non-profit organizations. Finally, a large portion of respondents reported working specifically in quality assurance/control for hospitals (patient safety), school health, health insurances and other health organizations.

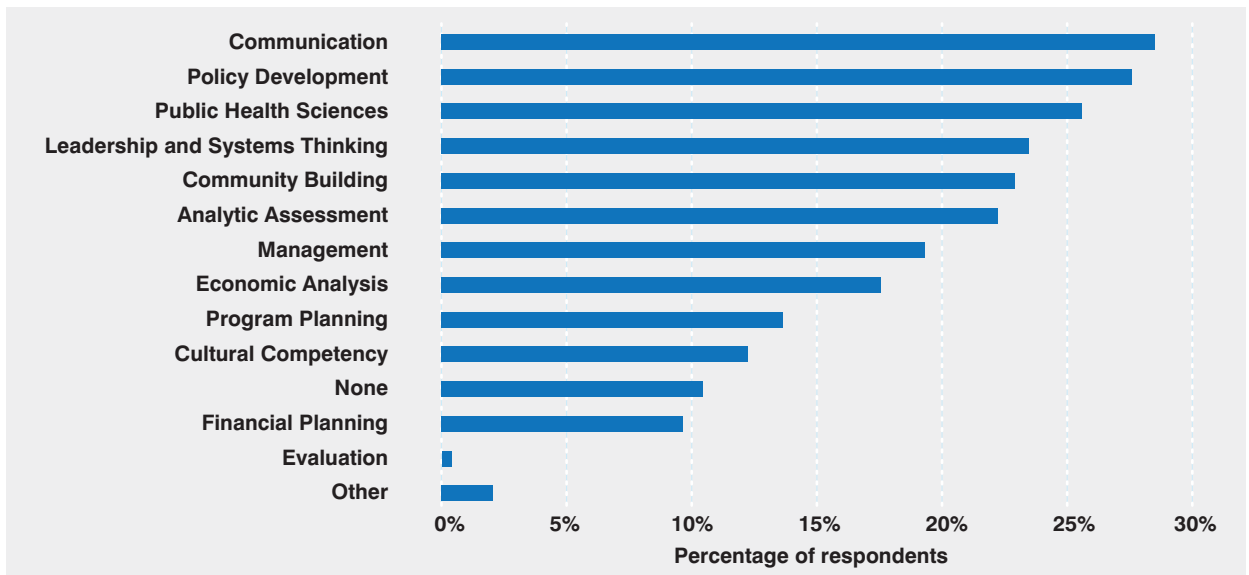
Population & Family Health

In the “population & family health” group, a large number of respondents reported that they counsel parents, specifically those with young children age zero to five. This result might be reflective of the inclusion of the parents counselling services in our study. The group reported giving advice on topics related to childrearing, including breast-feeding, nutrition, development, dental health and accident prevention. Another group in this section reported providing education and training in various health topics including, asthma, exercise, nutrition, tobacco, mental health and school health. Many others reported doing general health promotion, information dissemination, and prevention work in fields such as obesity, immigration, addiction, child health, radiation, domestic violence, and measles. Yet another subsector reported monitoring, controlling, regulating and screening in various areas such as infectious and chronic diseases, mental health, and occupational health.

4.4. Public Health Competency Needs

The public health workforce believes that a variety of public health competencies could improve their work capabilities (Figure 13). The highest percentage of respondents identified communications as a needed competency (28%), followed by policy development (27.5%) and public health sciences (27%).

Figure 13. Public Health Competency Needs

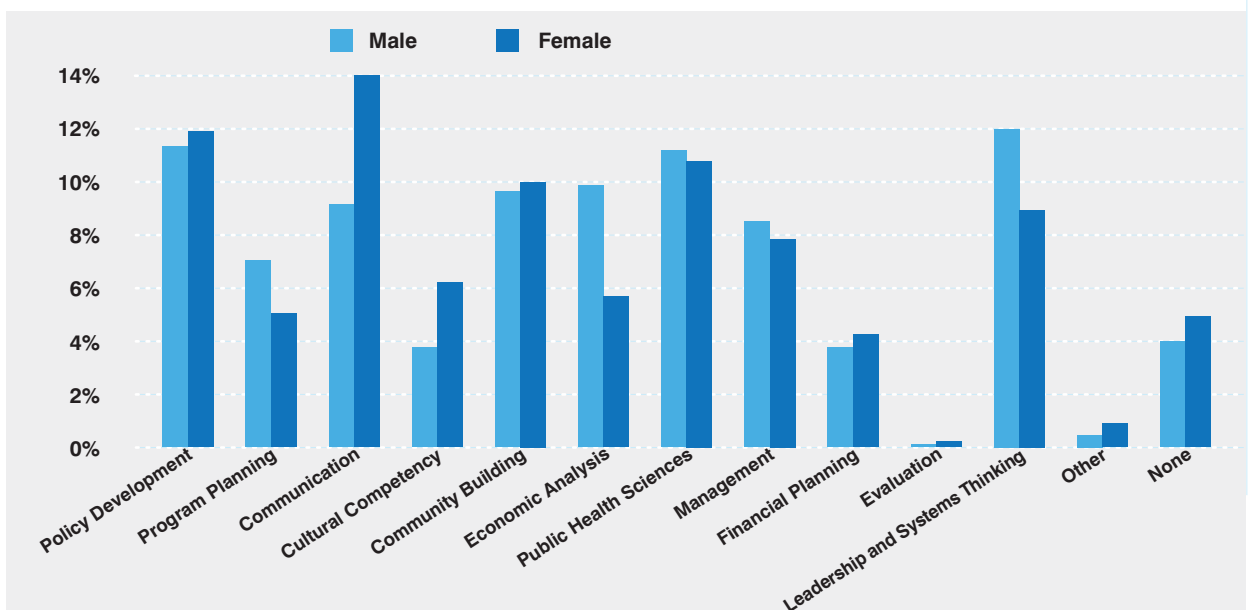


Note: Percentage based on available data. Public health competency n=3727. Percent add up to more than 100%, because respondents could check more than one answer.

Gender, Age and Education

There is a slight difference in identified competency needs between female and male respondents (Figure 14.). For example, of the female respondents, the highest percentage want more communication skills (14%), while of the male respondents only 9% believe that communications is a competency that could strengthen their work. In contrast, 12% of male respondents and 9% of female respondents want more leadership skills. Overall, 51% of male respondents are in leadership positions while only 29% of female respondents are in such positions.⁶¹ In addition, public health workforce competency needs vary by age and education of respondents (data not shown separately). For example, 31% of respondents aged 30-39 marked communication skills as a public health competency need while 18% of those aged 60 and older identified this need. Of respondents with a master’s degree or higher, only 10% want more communication skills while 19% of respondents with another educational level marked communications as a needed competency.

Figure 14. Public Health Competencies by Gender



⁶¹ Respondents in leadership positions are defined as individuals who describe their primary, current position as “senior managers/leaders” or as an “employee in a supervisory position.”

5. Discussion

We estimate between 9'000 and 10'000 individuals comprise the core public health workforce in Switzerland. This estimate is based on the number of individuals who meet the study criteria of providing at least one of the essential public health services or activities. The estimate was derived from three sources: the 4'388 individuals who received the survey link, organizations that provided summary data, and estimated public health workforce data from non-participating organizations. For Switzerland, this means there are approximately 125 public health workers per 100'000 population. Compared to the roughly projected needs of the public health workforce in the United States (220/100'000 population),⁶² the number is relatively low, and presents the question whether 125 public health workers per 100'000 Swiss population are sufficient to address the current and future population health needs. To answer this question, further research is needed to have more insight into the projected numbers of needed public health workers in Switzerland.

However, data from this study suggest that efforts to strengthen the public health workforce capacity should be primarily vertical, and to a lesser extent also horizontal: vertical because findings indicate that only 1/3 of the public health workforce in Switzerland has a specific public health education, and horizontal, because the global nature of public health, with the increasing demands of changing health risks and chronic disease, requires a broad public health education across different professional sectors. For example, 2/3 of study respondents with a master's degree or higher do not have a specific public health education, and over 4/5 of respondents with a bachelor's degree or vocational training do not have a public health education or training.

Vertical efforts should focus on increasing the number of public health-educated individuals of the existing public health workforce. Currently, about 200 individuals obtain an MAS or PhD degree in public health each year at Swiss universities or UAS.⁶³ If we would continue to educate 200 individuals each year, assuming an attrition rate of 2% per year and the natural retirement of the workforce at age ⁶⁵, we could increase the share of educated public health workers from 32% to 40% over the next 20 years. Utilizing the same calculation formula, if we include the additional estimated 200 individuals who annually obtain a CAS or DAS in public health, the share of educated public health workers would increase to over 2/3 (73%) of the current estimated public health workforce (7'276 of the 10'000).⁶⁴

The ongoing debate about defining the public health workforce – who “belongs” to it – not only highlights the challenges of delineating the public health workforce on a conceptual basis, but also mirrors the nature of public health work, which is interdisciplinary and provided by a variety of actors. Public health education should therefore also be horizontal, and include individuals from various sectors and professional areas. Results from this study show that public health workers are employed in a wide range of sectors, including government, education/research, NGOs/professional associations, hospitals and health insurances. However, organizations from certain professional sectors, such as NGOs/professional associations, health insurances, hospitals and pharma/biotech companies, had lower participation rates in the study as compared to other sectors. Many organizations from these less responsive sectors met the study criteria (providing public health services or activities), yet fewer than half the contacted organizations from such sectors participated. One likely reason was resource constraints, but another might have been that many of these organizations do not identify themselves as being part of the public health workforce, or are unfamiliar with the concept of public health.⁶⁵ Nevertheless, the highly interdisciplinary work of study participants, irrespective of their educational backgrounds, highlights that a broad range of professional sectors and their workers are part of the public health workforce, and that a broad group of individuals could benefit from public health training and education.

Public health competencies are essential to providing high-quality public health services and activities. Our study assessed the needs for public health competencies on a self-assessed basis. In the study, needed competencies in communications and policy development were rated highest, for individuals to strengthen their current public health work. Communication and leadership skills were also rated highest among women and men, respectively.

62 Bjugovic-Mikanovic V et al. Addressing needs in the public health workforce in Europe. Draft consultation. Malta, November 2012

63 It is important to note that only individuals obtaining a MAS in public health are counted in the 200; annualized data on individuals obtaining a CAS or a DAS in public health are not available. However, based on the data from our study, the number of individuals obtaining a MAS in public health is about equal to the number of individuals obtaining a CAS or DAS.

64 For purposes of calculating this projection, we assumed that the workforce would remain at an estimated size of 10'000 during the coming 20 years.

65 Of the respondents (n=1'598), 88% identified themselves as being part of the public health workforce. However, we also observed that individuals working in health protection are less likely to identify themselves as being part of the public health workforce as compared to those working in health promotion and prevention.

It appears difficult to reach consensus regarding core and emerging competencies, yet there is growing recognition that for public health workforce members to effectively address the health challenges of today and tomorrow, schools must go beyond training in traditional public health areas such as health sciences, policy development, biostatistics and environmental sciences.⁶⁶ Our study found that the public health workforce wants both more “soft” skills, such as leadership and communication skills, and more “technical” competencies, such as public policy and public health sciences. Different groups also identified different needs. For example, younger individuals want more communication skills, and more experienced public health workforce members (60 and older) want more policy development competencies. This might reflect that more senior public health workers likely hold positions with higher policy impact than the younger group and therefore identify policy development competencies as more important for their work. Public health competency needs should therefore focus not only on the needs of students, but also, by way of continuing education, on the needs of existing members of the public health workforce with their varied levels of experience and expertise.

6. Conclusions and Recommendations

This study provides a first profile of members of the core public health workforce in Switzerland – a glimpse of how many there are, who they are, and what they do. We estimate the public health workforce in Switzerland is comprised of 9'000 -10'000 individuals. While the concept of public health is relatively new in Switzerland, the public health workforce is actively engaged in a broad range of professional areas, implemented through various sectors. The largest numbers of individuals work in the government sector, but public health workers also provide their services and activities through other organizations, such as education/research institutions, NGOs, professional associations and hospitals. The workforce is specialized in different public health areas, with the highest percentage of individuals working in health promotion and prevention and health administration and management. Overall, the public health workforce in Switzerland has a high level of general education. However, the majority of individuals do not have a specific public health education and the workforce is also relatively junior in terms of practical public health experience.

This profile can assist in developing targeted strategies to strengthen the capacities of the public health workforce in Switzerland. Based on the findings and observations from this and other studies, the following recommendations emerge:

- **Training the public health workforce** – Focus on training the 2/3 of the Swiss public health workforce that do not have a formal or continuing public health education. Consider primarily vertical approaches to strengthening the public health workforce capacity in Switzerland.
- **Adopting country-specific public health competencies** – Identify, in conjunction with international partners, what public health competencies are required for the Swiss public health workforce, to enable it to implement the essential public health services/operations.
- **Strengthening “public health visibility” in Switzerland** – Increase the awareness of the importance of public health in Switzerland, among institutions and individuals providing public health services and activities, and also within the general Swiss population.
- **Defining the public health workforce** – Build consensus within the Swiss public health community on the definition of the public health workforce, so tracking the composition of the workforce over time is possible and systematic.
- **Conducting further research/assessments into the capacities of the public health workforce** – Identify the various public health stakeholders in Switzerland, including different subgroups of the public health workforce, such as individuals with a partial public health role (i.e., *health care* professionals) and individuals who should have an awareness of public health issues, but are not public health workers.

66 Bjegovic-Mikanovic V et al. Addressing needs in the public health workforce in Europe. Draft consultation. Malta, November 2012

Appendix I: Questionnaire

Wählen Sie Ihre Sprache
Choisissez votre langue
Scelga la lingua desiderata
Choose your language

- Deutsch
- Français
- Italiano
- English

1.1 Public Health Workforce Study

Welcome to Our Survey

While you complete the online survey, please **do not** use **the back button on your browser**. Please only use the “prev” and “next” buttons, which are placed at the lower left corner.

Do you consider yourself part of the public health workforce? (By „workforce“ we mean all types of workers including employees or volunteers who provide public health services or participate in public health related activities)

Only one answer possible.

- Yes
- No
- I do not know

For this survey, **we define “public health workforce”** as individuals providing at least one of the public health services and activities outlined below. Such work is mainly focused on improving the health (or preventing a disease) of the entire population or specific groups (e.g. vaccination campaigns, school children, new mothers, individuals affected by weight problems, HIV-positive people, etc.).

Please review each of the four public health services and activities below and check any of the services you provide.

Population-based interventions against diseases and their consequences, mainly in the field of prevention and health promotion, addressing issues related to lifestyle (individual behavior), mental health, work (occupational health) and living conditions (environmental health).

- **Activities** include monitoring health status; planning, implementing, monitoring and evaluating health programs; managing and overseeing programs (e.g. HIV/AIDS prevention programs, nutrition and physical education programs for students, youth alcohol prevention programs, occupational health management, etc).

Only one answer possible.

- Yes
- No

Please indicate whether the following paragraph describes your work.

Interventions on the structure and activity of the health system, including management and planning of health care and hospital administration, reporting on health status, health outcomes and goals, policy work and health law.

- **Activities** include advocating for health; linking people to health services, developing partnerships and collaborations; building leadership and capacity; administering and managing health care systems; analyzing legal structures and systems; enforcing health and safety laws and regulations; planning health finances and health insurance policy.

Only one answer possible.

Yes

No

Please indicate whether the following paragraph describes your work.

Research (basic and applied) on any public health disciplines, including international and global health, as well as parts of primary care.

- **Activities** include the planning and the completion of studies related to any discipline of public health, including the analyses and the publication in scientific journals.

Only one answer possible.

Yes

No

Please indicate whether the following paragraph describes your work.

Education and training in any public health discipline.

- **Activities** include developing curricula at the graduate, postgraduate, doctoral and continuing education levels; educating the public health workforce; linking training to practice; building national and international networks.

Only one answer possible.

Yes

No

Please indicate your gender:

Only one answer possible.

male

female

What is your age?

Only one answer possible.

- 19 years and under
- 20 to 29 years
- 30 to 39 years
- 40 to 49 years
- 50 to 59 years
- 60 and older

How many years have you been providing the above mentioned public health services?

Please enter your answer in the text window.

Years

Which group best describes your **primary, current** position?

Only one answer possible.

- Consultant/specialist
- Senior manager/leader
- Employee with supervisory function
- Employee without supervisory function
- Apprentice/Intern/Student

Other(please specify)

How many workers directly or indirectly report to you?

Please enter your answer in the text window.

persons

What is the name of your **primary, current** employer (organization)?

Only one answer possible.

Do you provide public health services through your **primary** employer?

Only one answer possible.

Yes

No

What is the location of your **primary** employer? Please give the post code.
Please enter your answer in the text window.

Outside of Switzerland

If outside of Switzerland, please check the continent on which your primary employer is located.

Only one answer possible.

Africa

Asia

Australia

Europe

North America

South America/Latin America

What is the geographic reach of your **primary** work?

You can only give 2 Responses.

International

National

Cantonal

City/ County

Do you have a **secondary, current** employer?

(Even with self-employment or volunteer work in addition to your main job, please answer "Yes")

Only one answer possible.

Yes

No

What is the name of your **secondary, current** employer (organization)?
Please enter your answer in the text window.

Do you provide public health services through your **secondary** employer?

Only one answer possible.

Yes

No

What is the location of your **secondary** employer? Please give the postcode.
Please enter your answer in the text window.

Outside of Switzerland

If outside of Switzerland, please check the continent on which your primary employer is located.

Only one answer possible.

Africa

Asia

Australia

Europe

North America

South America/Latin America

What is the geographic reach of your **secondary** work?

You can only give 2 Responses.

International

National

Cantonal

City/ County

For which **type of organization** do you work? (please answer for each column when relevant)

Please give one answer per column.

	Primary employer	Secondary employer
Government (federal, cantonal, county, city)	<input type="checkbox"/>	<input type="checkbox"/>
Educational/Academic/Research Institution	<input type="checkbox"/>	<input type="checkbox"/>
Non-Governmental Organization (NGO)	<input type="checkbox"/>	<input type="checkbox"/>
Hospital/In-Patient Facility	<input type="checkbox"/>	<input type="checkbox"/>
Professional Association	<input type="checkbox"/>	<input type="checkbox"/>
Health Insurance	<input type="checkbox"/>	<input type="checkbox"/>
Pharma/Biotech Industry	<input type="checkbox"/>	<input type="checkbox"/>
Consulting	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/> <input type="text"/>	<input type="checkbox"/> <input type="text"/>

In which of the following public health areas do you currently work? Please select a maximum of two areas in the table below.

You can only give 2 Responses.

- Biostatistics
- Environmental Health
- Epidemiology
- Global/International Health
- Health & Education
- Health Administration & Management
- Health Communication
- Health Economics & Policy
- Health Law
- Health Promotion & Prevention
- Health Psychology
- Health Systems Analysis
- Mental Health
- Occupational Health

- Population & Family Health
- Sociocultural Aspects of Health
- Other (please specify)

Did you obtain or are you currently obtaining an **MPH degree abroad**?

Only one answer possible.

- Yes
- No

What is your **highest** level of education?

If you have an **MPH from Switzerland**, or are currently an MPH student in Switzerland, then please give further information about this later.

Only one answer possible.

- High school degree
- Advanced vocational degree
- Vocational degree/apprenticeship
- University of Applied Sciences (Bachelor)
- University of Applied Sciences (Master)
- University of Teacher Education (Bachelor)
- University of Teacher Education (Master)
- University (Bachelor)
- University (Master)
- University (Ph.D./Dr.)
- Other (specify)

In what discipline is your degree?
Please enter your answer in the text window.

In this survey, **“continued education”** is defined as further education after obtaining your formal education, as indicated in the prior question. Continued education includes courses, workshops, seminars, on-campus, institutional, or online training. Please only include training that was **profession-related**.

Have you attended at least one professional development course/activity?

Several answers possible.

- Yes, at least one **non-degree** training (workshops, seminars, etc.)
- Yes, at least one training **with** a formal degree (CAS,DAS, MAS, etc.)
- No

For the past year (2011), overall, how many **hours** did you attend public health related non-degree training (i.e., workshops, in-house organizational training, seminars etc.)?

Please enter your answer in the text window.

hours

Please indicate **all public health related continued education degrees** you **ever** obtained, or are currently registered to obtain.

Please indicate for any given course, how many degrees you have made in this category.

Please give one answer per row.

University of Applied Sciences CAS	<input type="text"/>
University of Applied Sciences DAS	<input type="text"/>
University of Applied Sciences MAS	<input type="text"/>
University CAS	<input type="text"/>
University DAS	<input type="text"/>
University MAS	<input type="text"/>
Other	<input type="text"/>

For all your training, please indicate when, in what field/discipline of study, and at which training facility you completed the degrees/courses.

Please give one answer per row.

	GraduationYear	Field/Discipline	Name of the Training Institution
University of Applied Sciences CAS	<input type="text"/>	<input type="text"/>	<input type="text"/>
University of Applied Sciences DAS	<input type="text"/>	<input type="text"/>	<input type="text"/>
University of Applied Sciences MAS	<input type="text"/>	<input type="text"/>	<input type="text"/>
University CAS	<input type="text"/>	<input type="text"/>	<input type="text"/>
University DAS	<input type="text"/>	<input type="text"/>	<input type="text"/>
University MAS	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other	<input type="text"/>	<input type="text"/>	<input type="text"/>

In your opinion, what public health competencies (which you could obtain through “continued education”) could improve your current work capabilities?

Several answers possible.

- Analytic Assessment
- Policy Development
- Program Planning
- Communication
- Cultural Competency
- Community Building
- Economic Analysis
- Public Health Sciences
- Management
- Financial Planning
- Leadership and Systems Thinking
- Other
- None

You have now completed the questionnaire! Many thanks for your participation!

Best regards,

Swiss School of Public Health (SSPH+)

Appendix II: List of Advisory Board Members

1. **Beck, Konstantin**: CSS
2. **Hafen, Martin**: Institut für Sozialmanagement und Sozialpolitik, Hochschule Luzern, Soziale Arbeit
3. **Kaufmann, Markus**: Vereinigung der kantonalen Beauftragten für Gesundheitsförderung in der Schweiz
4. **Kickbusch, Ilona**: Global Health Programme, Graduate Institute; Kickbusch Health Consult
5. **Koch, Ursula**: Federal Office of Public Health
6. **Sandmeier, Heiner**: Interpharma
7. **Stuker, Rahel**: Schweizerisches Rotes Kreuz

Appendix III: List of Participating Organizations

Educational/Research Institutions

Berner Fachhochschule für Gesundheit
Careum
Centre de documentation en santé publique (CDSP)
Eidgenössische Hochschule für Sport Magglingen (EHSM)
Fachhochschule Nordwestschweiz, Hochschule für Soziale Arbeit
Graduate Institute of International and Development Studies, IHEID, Global Health Programme
Haut Ecole de santé Vaud
Healthevidence GMBH
Hochschule für angewandte Wissenschaften St.Gallen, Fachbereich Gesundheit
Hochschule Luzern, Departement Soziale Arbeit
Institut de médecine sociale et préventive, Genève
Institut d'Economie et Management de la Santé
Institut für Bewegungswissenschaften und Sport, ETH Zürich
Institut für Pflegewissenschaft, Universität Basel
Institut für Pharmazeutische Medizin ECPM, Universität Basel
Institut für Sport und Sportwissenschaft, Universität Basel
Institut universitaire romand de Santé au Travail, Université de Lausanne
Istituto di Economico Politica (IDEP)
ISPM Institut für Sozial- und Präventivmedizin, Universität Bern
ISPMZ Institut für Sozial- und Präventivmedizin, Universität Zürich
IUMSP Institut universitaire de médecine sociale et préventive, Lausanne
La Scuola universitaria professionale della Svizzera italiana (SUPSI)
La Scuola universitaria professionale della Svizzera italiana (SUPSI) Dipartimento Santità (DSAN)
National Institute for Cancer Epidemiology and Registration (NICER)
Schweizerisches Tropen- und Public Health-Institut (Swiss TPH)
Swiss School of Public Healthplus
Universität Luzern, Seminar Health Sciences and Health Policy
Winterthurer Institut für Gesundheitsökonomie
Wirtschaftswissenschaftliche Fakultät, Abteilung Health Economics, Universität Basel
Zentrum für Organisations- und Arbeitswissenschaften (ZOA)
Zürcher Hochschule für angewandte Wissenschaften, Departement Gesundheit

Government Institutions

AG Gesundheit und Soziales
AI Gesundheit- und Sozialdepartement
BE Gesundheits- und Fürsorgedirektion
BL Volkswirtschafts- und Gesundheitsdepartement
BS Gesundheitsdepartement
Beratungsstelle für Unfallverhütung (BFU)
Bundesamt für Gesundheit (BAG)
Bundesamt für Sport (BASPO)
Bundesamt für Statistik (BFS)
Bundesamt für Umwelt (BAFU)
Bundesamt für Veterinärmedizin (BVET)
Direktion für Entwicklung und Zusammenarbeit (DEZA)
eHealth
Eidgenössische Koordinationskommission für Arbeitssicherheit (EKAS)
FR Direktion für Gesundheit und Soziales
Gesundheit Schwyz
GL Gesundheitsdepartement
JU Département de la Santé, des Affaires sociales, du Personnel et des Communes
Krebsregister St. Gallen–Appenzell
LU Gesundheits- und Sozialdepartement

NE Département de la santé et des affaires sociales
NW Gesundheits- und Sozialdirektion
Observatoire Valaisan de la santé
OdASanté
OW Finanzdepartement (Gesundheitsamt)
Registre fribourgeois des tumeurs
Schweizerische Konferenz der kantonalen Erziehungsdirektoren (EDK)
Schweizerische Konferenz der kantonalen Gesundheitsdirektorinnen- und direktoren (GDK)
Schweizerisches Gesundheitsobservatorium (Obsan)
SG Gesundheitsdepartement, ZEPRA
SH Département des Inneren (Gesundheitsamt)
SO Département des Inneren (Gesundheitsamt)
Staatssekretariat für Wirtschaft (SECO)
Stadt St. Gallen, Schulgesundheitsdienst
Stadt Zürich, Gesundheits- und Umweltdepartement
SZ Département des Inneren (Amt für Gesundheit und Soziales)
TG Département für Finanzen und Soziales
TI Dipartimento della sanità e della socialità
UR Gesundheits-, Sozial- und Umweltdirektion
VD Département de la Santé et de l'action sociale
Vereinigung der kantonalen Beauftragten für Gesundheitsförderung in der Schweiz (VBGF)
VS Département für Finanzen, Institutionen und Gesundheit
ZH Gesundheitsdepartement

Non-Governmental Organizations (NGOs)

Action D
Afro-European Medical and Research Network (AEMRN)
Aids-Hilfe beider Basel
Aids-Hilfe Bern
Aids-Hilfe Graubünden
Aids-Hilfe Luzern
Aids-Hilfe Zug
Aids-Infostelle Winterthur, Winterthur
Aiuto Aids Ticino
Antenne Sida du Valais romand
Arche Zürich
Beratungszentrum Baden
Berufsverband für Gesundheit und Bewegung
Bildung + Gesundheit Netzwerk Schweiz
CIOMAL, Comité International de l'Ordre de Malte
EcoSolidar
Enfants du Monde
Groupe Sida Jura
Groupe Sida Neuchâtel
IBG Schaffhausen
International Federation of the Blue Cross
ISGF Institut für Sucht- und Gesundheitsforschung Institute for Addiction and Health Research Zurich
Medair
Médecins du Monde-Switzerland
Parkinson Schweiz
Point Fixe, Lausanne
Pro Senectute Switzerland
Sante-sans-papier
Schweizerische Fachstelle für Alkohol und andere Drogenprobleme, Sucht Schweiz
Schweizerische Gesellschaft für Ernährung

Schweizerische Gesellschaft für Tropenmedizin und Parasitologie
Service Allergie Suisse
Stiftung für Patientensicherheit
Suisse Balance
Tox Zentrum
Verein für Jugendfragen, Prävention und Suchthilfe (VJPS)
WHI Women Hope International
World Vision Switzerland
Zöliakie der deutschen Schweiz
ZüFAM
Zürcher Aids-Hilfe, Zürich
Zuri Rauchfrei

Professional Associations

aha! Allergiezentrum Schweiz
Ärztinnen und Ärzte für Umweltschutz
Blaues Kreuz der deutschen Schweiz
Blaues Kreuz Kantonalverband Aargau/Luzern
Diabetesgesellschaft GL GR FL
Diabetesgesellschaft Zürich
Ente Ospedaliero Cantonale (eoc) del Ticino, Generaldirektion
Fachstelle für Suchtprävention
Fachstelle für Suchtprävention DFI Luzern
Fachverband Sucht
Fondation 02
GELIKO – Schweizerische Gesundheitsligen-Konferenz
Gesundheitsförderung Prävention
Gesundheitsförderung Schweiz
Gesundheitsförderung und Prävention, Suchtberatung, Gesundheitsdirektion, Zug
Gesundheitsförderung Wallis
Groupement Romand de médecine, hygiène et sécurité au travail (GRMHST)
H+ Die Spitäler der Schweiz
Kinderkrebshilfe Schweiz
Kindernothilfe Schweiz
kraftwerk arbeit-gesundheit
Krebsliga Aargau
Krebsliga beider Basel
Krebsliga Graubünden
Krebsliga Ostschweiz
Krebsliga Vaudoise
Ligues de la santé Vaud
Lungenliga Zürich
Nutrinet
OdA G ZH Organisation der Arbeitswelt Gesundheit Zürich
OdA Gesundheit und Soziales Graubünden
Organisation du monde du travail des domaines de la santé et du travail social en Valais
Public Health Schweiz
RADIX Schweizer Kompetenzzentrum für Gesundheitsförderung und Prävention
Rheumaliga beider Basel
Rheumaliga Bern
Rheumaliga St.Gallen
Rheumaliga Thurgau Geschäftsstelle
Rheumaliga Uri und Schwyz
Rheumaliga Vaudoise
Rotkreuz-Kantonalverband St. Gallen
Rotkreuz-Kantonalverband Thurgau
Rotkreuz-Kantonalverband Zürich

Schweizerische Alzheimervereinigung
Schweizerische Gesellschaft für Arbeitshygiene (SGAH)
Schweizerische Gesellschaft für Arbeits- und Organisationspsychologie (SGAOP)
Schweizerischer Verband für Betriebliche Gesundheitsförderung (SVBGF)
Schweizerischer Fachverband Adipositas im Kindes- und Jugendalter (AKJ)
Schweizerischer Verband der Mütterberaterinnen
Schweizerisches Rotes Kreuz
Suissepro
Swiss Network of Health Promoting Hospitals and Health Services (HPH)

Hospitals

Centre hospitalier universitaire vaudois (CHUV)
Hôpital du Jura, soins aigus
Hôpital du Valais - Centre Hospitalier du Centre du Valais (CHCVs), Soins aigus
HUG - Soins aigus
Kantonsspital Glarus
Klinik Hirslanden AG
Ospedale Regionale di Lugano
Solethurner Spitäler AG, Akutspital
Spital Thun-Simmental-Saanenland AG
Spitäler Kantonsspital Schaffhausen
Stadtspital Waid
Universitätsspital Zürich
Zuger Kantonsspital AG

Health Insurances

CSS
Groupe Mutuel
Schweizerischer Versicherungsverband (SW)
SUVA

Consulting Firms

healthFORUM
Fit im Job

International Organization

World Health Organization

Appendix IV: Reference List/Bibliography

- Ackermann-Liebrich, Nocera, S., Merten, S. (2007). *A solution for creating competent health-care specialists: the Swiss School of Public Healthplus*. Bulletin of the World Health Organization December 2007, 85 (12).
- Agency for Healthcare Research and Quality Innovations and Exchange Team. (2012). *Public Health Workforce Faces New Challenges and Opportunities* U.S. Department of Health and Human Services. September 12, 2012.
- Aluttis C., Brand H., Michelsen K. et al. (2009). *Reviewing Public Health Capacities in the EU: Preliminary Findings*. Maastricht University.
- Aluttis, C., Van den Broucke, S. (2010). *Reviewing Public Health Capacity in the EU: Assessment Tool for Public Health Capacity in the EU Member States*. Maastricht University July 2010.
- Aluttis, C. et al (2010). *Mapping public health capacity in the EU*. European Journal of Public Health 20:235.
- Association of Schools of Public Health in the European Region (ASPHER). (2008). *Provisional Lists of Public Health Core Competencies Programme (EPHCC) for Public Health Education*, ASPHER October, 2008.
- Association of Schools of Public Health (2008) *Confronting the Public Health Workforce Crisis: ASPH Statement on the Public Health Workforce*. Washington, USA; 2008.
- Beaglehole, R., & Dal Poz, M.R. (2003). *Public health workforce: challenges and policy issues*. Human.Resour.Health 2003;1(1):4.
- Birt C.A., Foldspang A. (2009). *Public health capacity building – not only the property of the medical profession*. Eur J Public Health 19 (3):232-235.
- Broder, M.S. (2005). *Building the Public Health Workforce*. UC Berkeley Public Health Magazine Fall 2005.
- Brundtland, G. H. (2005). *Public health challenges in a globalizing world*. The European Journal of Public Health, 15(1), 3-5.
- Bundesamt für Gesundheit. (2005). *Das schweizerische Gesundheitswesen*. December 2005.
- Bureau of Health Professions. (2005). *Public Health Workforce Study* Health Resources and Services Administration, January 2005.
- Committee on Assuring the Health of the Public in the 21st Century (2002). *The Future of the Public's Health in the 21st Century*, Institute of Medicine.
- Dawson A. (2011). *Consent, Choice and the Ends of Health Promotion*.
- European Health Policy Forum (2011) *Strengthening Public Health Capacities and Services in Europe: A Framework for Action*. World Health Organization.
- Federal Statistical Office (2007) *Beschäftigte im Gesundheitswesen: Fakten und Trends auf der Basis der Betriebszählung von 1995-2005*. Neuchatel, Switzerland, 2007.
- Frenk, J. (2009). Strengthening health systems to promote security. *The Lancet*, 373(9682), 2181- 2182.
- Gebbie K, Merrill J. (2000). *The Public Health Workforce: Enumeration 2000*. Bureau of Health Professions, National Center for Health Workforce Information and Analysis, Dec. 2000.
- Gebbie, K. M. (1999). *The public health workforce: key to public health infrastructure*. *American Journal of Public Health*, 89(5), 660-661.
- Gebbie, K., Rosenstock, L., & Hernandez, L. M. (2003). *Who will keep the public healthy? Educating public health professionals for the 21st century*. Washington (DC): Institute of Medicine.
- Hanusaik N, O'Loughlin J.L., Kishchuk N., et. al. (2009). *Organizational capacity for chronic disease prevention: A survey of Canadian public health organizations*. European Journal of Public Health 20:195-201.
- Hendrickson, J., Haas, T., Hanauer, E. (2004). *Population Experts in Developing Countries: A Directory*. Institute of International Education West Coast Center.
- Heusser R., Christen L., Christen S. (2002). *Befragung von Teilnehmenden und Diplomierten des interuniversitären Weiterbildungsprogramms Public Health*. Bern und Zürich, März 2002.
- Heusser R, Christen L, Christen S. (2002). *Zukünftige Public Health-Weiterbildung in der Schweiz aus der Sicht von Arbeitgeberinnen und Arbeitgebern, Public Health-Fachleuten und Verantwortlichen aus dem Bildungsumfeld*. Bern und Zürich, März 2002.
- Jambroes M., Essink-Bot M.L., Plochg T., Stronks K. (2012) *Public healthcare occupations-insight into size and composition is limited*. Ned Tijdschr Geneesk. 2012;156(31):A4529.
- Joint Task Group on Public Health Human Resources. (2005). *Building the Public Health Workforce for the 21st Century. A Pan-Canadian Framework for Public Health Human Resources Planning*. Public Health Agency of Canada.
- Lancashire Public Health Network (2012) *The new public health workforce – Post white paper*.

- Leep, Carolyn J. (2010). *National Profile of Local Health Departments*, Inter-university Consortium for Political and Social Research.
- National public health performance standards program (1993) *10 Essential Public Health Functions*. Centers for Disease Control/US Department of Health and Human Services.
- Paccaud, F., Weihofen, A., & Nocera, S. (2011). *Public health education in Europe: old and new challenges*. *Public Health Reviews*, 33(1), 66-86.
- Pan American Health Organization (2007). *Public Health Capacity in Latin America and Caribbean: Assessment and Strengthening*, World Health Organization, August 2007.
- Perlino, C. (2006) *The Public Health Workforce Shortage: Left Unchecked, Will We Be Protected?* American Public Health Association.
- Plochg T., Sieds Klayinga N., Schoenstein M., Starfield B. (2011). *Reconfiguring Health Professionals in Times of Multi-Morbidity: Eight Recommendations for Change*. OECD Conference on Health Reform. 22 June 2011.
- Public Health Agency of Canada (2007). *Core Competencies for Public Health in Canada*, Public Health Agency of Canada. Ottawa, September 2007.
- Public Health Functions Project (US). (1997). *The Public Health Workforce: An Agenda for the 21st Century: a Report of the Public Health Functions Project*. DIANE Publishing.
- Public Health Reviews on Public Health Education*, Vol. 3(1), 2011.
- Ridoutt L. et al. (2002) *Planning Framework for the Public Health Workforce, Discussion Paper*, June 2002.
- Ridoutt L et al. (2004). *Calculating demand for an effective public health workforce. Final report for the National Public Health Partnership*. Human Capital Alliance.
- Rosenstock L, Helsing K, Rimer B.K. (2011) *Public Health Education in the United States: Then and Now*. *Public Health Reviews*. 2011;33:39-65.
- Satterfield, D. W., Murphy, D., et al (2004). *Using the Essential Public Health Services as strategic leverage to strengthen the public health response to diabetes*. *Public Health Reports*, 119(3), 311.
- Sim F, Schiller G, Walters R. (2002). *Public health workforce planning for London. Mapping the public health function in London, a report to the DHSC London*. London: Department of Health; 2002.
- Task Force Report on Public Health Workforce Development (2000). *CDC/ATSDR Strategic Plan for Public Health Workforce Development: Toward a life-long learning system for public health practitioners*. Centers for Disease Control.
- The Council on Linkages Between Academia and Public Health Practice (2010) *Crosswalk: Core Competencies for Public Health Professionals & the Essential Public Health Services*, Dec. 2010.
- The Organisation for Economic Co-operation and Development (OECD) (2011). *Reviews of Health Systems: Switzerland* World Health Organization/OECD, 2011.
- Tilson, H., & Gebbie, K. M. (2004). *The public health workforce*. *Annu. Rev. Public Health*, 25, 341- 356.
- Walters, R., Sim, F., & Schiller, G. (2002). *Mapping the public health workforce I: a tool for classifying the public health workforce*. *Public Health*, 116(4), 201-206.
- World Health Organization. (2006). *Working together for health: World Health Report 2006*. Geneva, Switzerland.
- World Health Organization Regional Office for Europe. (2011). *The 10 Essential Public Health Operations (EPHOs)*.
- Wüst E. (2011). *Krankenhausstatistik, Statisches Lexikon der Schweiz* Bundesamt für Statistik.

