

INTERNATIONAL PERSPECTIVES

A National Profile of Environmental Health Practice in Slovenia: Assessing the Impact of Curriculum Reform

Andrej Ovca, PhD
Faculty of Health Sciences,
University of Ljubljana

Nevenka Ferfila, MSc
Faculty of Health Sciences,
University of Ljubljana

Mojca Jevšnik, PhD
Faculty of Health Sciences,
University of Ljubljana

Matic Kavčič, PhD
Faculty of Health Sciences,
University of Ljubljana

Sara Tajnikar, MSc
Institute of Public and
Environmental Health, Slovenia

Aleš Krulec
Institute of Public and
Environmental Health, Slovenia

Gregor Jereb, PhD
Faculty of Health Sciences,
University of Ljubljana

Abstract For our study, we included 332 graduates from a sanitary engineering program (broadly equivalent to environmental health practitioners) in an analysis comparing graduates who completed their studies before the degree program reform with graduates who completed their studies after the reform. Most of the respondents (72%) were employed in their profession. Graduates who completed their degree after the reform, however, were more likely ($p \leq .001$) to report being employed in the private sector (44%) and/or outside the profession (25%). Hygiene and epidemiology were confirmed as the two main pillars of the profession in both groups. It was also confirmed that the last reform of the degree program has met the needs of the labor market. Higher employment in the private sector and topics of continuous professional development after employment, however, require special attention. Based on our study findings, we see the potential in microcredits for lifelong learning and employability, which will allow workers in the environmental health field to adapt more quickly to changes and needs.

Keywords: environmental health, public health, sanitary engineers, curriculum reform, Bologna Process, public health workforce, professional development, Slovenia

Introduction

The environmental health workforce is not a homogeneous profession, neither abroad (Fitzpatrick & Bonnefoy, 1998) nor in Slovenia. Therefore, in this article we focus only on sanitary engineers, one of the widely interdisciplinary profiles capable of recognizing environmental health risks and taking preventive measures. Although sanitary engineers are categorized as public health professionals (Petrič & Maresso, 2018), they are also classified as environmental health professionals (Fitzpatrick & Bonnefoy, 1998), because their professional focus also includes many environmental

health activities. The profession in the geographical region now known as Slovenia was first mentioned in a World Health Organization (WHO) report after World War II (Petrik, 1956) and later evolved according to country-specific challenges. Mostly they filled the role of generalist in their function, which is more feasible in small countries such as Slovenia (Ferfila et al., 2005), although this practice is also reported for larger countries such as the U.S. (Gerding et al., 2019).

In Slovenia, until 1964, formal education took place at a level below undergraduate education. Undergraduate education began in

1964, and a unified 4-year bachelor's degree program was introduced in 1996 (Ferfila et al., 2005). The tendency to build on specialized knowledge, as well as basic and applied research dictated the last improvements in 2009 in line with the Bologna Process, which is a system to ensure compatibility of higher education qualifications across the European region (Ovca et al., 2011).

Today, Slovenia maintains a strong training program for sanitary engineers with regard to the public health workforce (World Health Organization [WHO], 2017), with a 4-year bachelor's degree program that covers general hygiene principles, epidemiology, and environmental topics that can be extended by an additional year (master's level) to deepen knowledge with a focus on risk assessment and risk management.

To identify current challenges and future needs, researchers have assessed the environmental health workforce in the UK (Chartered Institute of Environmental Health, 2015), the U.S. (Gerding et al., 2019), and Australia (Whiley et al., 2023)—but only for the public sector. The first, and so far last, systematic assessment of graduates at the national level in Slovenia was conducted more than a decade ago (Turk, 2005).

The aim of our survey, therefore, was to gain a deeper insight into the situation of graduates who have completed their graduate and/or postgraduate studies in the last 25 years. To understand how the last reform has affected program outcomes, the main research question was if there is a significant difference between graduates who completed their studies before the reform and those who completed their studies after the reform in Slovenia. Through this survey, we also asked about which organizations the graduates are employed by, in which area(s) they work, what work experiences they have had, what their needs are, and how satisfied they are with their work.

Methods

Questionnaire

A special questionnaire was designed with 39 questions on the following topics: demographic characteristics, educational profile, employment, field of expertise, job satisfaction, and the impact of COVID-19. Specific questions on employment and area of expertise were asked only of respondents who indicated that they were employed in their profession. A pilot test was conducted with 8 alumni who had graduated at different times and were employed in different private and public sector organizations. Based on the comments from these 8 alumni, the final version of the questionnaire was refined.

Sampling Procedure, Data Collection Process, and Inclusion Criteria

The invitation to participate was sent by email in June 2022 and contained a brief description of the purpose of the survey and a link to the online questionnaire. The email invitation was sent to 730 available email addresses from a list of alumni. We also tried to reach potential participants via social media in closed professional groups (i.e., LinkedIn and Facebook). By completing and submitting the questionnaire, participants gave their consent for their data to be included in the survey. In September 2022, a reminder was sent out with a second request to complete the questionnaire. The last entry of the respondents was made on October 24, 2022. The department chair of environmental health at the College of Ljubljana approved the research protocol.

A total of 699 graduates responded to the invitation, with a response rate of 50.0% and a completion rate of 97.0%. After excluding invalid entries, 332 respondents were included in the further analysis. Of these, 53.0% were graduates of the pre-Bologna Process degree program (pre-reform) who were enrolled before the 2009–2010 academic year, and the remainder of the participants (47.0%) were graduates of the new Bologna Process degree program (post-reform) who were enrolled in the 2009–2010 academic year or later.

A comparison of these figures with the official register showed that the sample in this survey represents 28.8% of all pre-reform graduates and 49.5% of all post-reform graduates who completed their graduate studies by the end of the 2021–2022 academic year.

Methods of Analysis

The data were evaluated and analyzed using SPSS (version 25.0). A chi-square test of independence for categorical (nominal) variables and a Mann–Whitney *U* test for ordinal variables (5-point Likert measurement scale) treated as continuous variables were used to examine relationships among and between variables. The main independent variables were type of graduate program and completion of the postgraduate program.

Results

Sample Description

The majority (86.0%) of respondents self-identified as female and the average age was 37.5 years (*SD* = 10.5). The mean age of pre-reform respondents was 45 years (*SD* = 8.5) and was significantly higher ($p \leq .001$) than the mean age of post-reform respondents, which was 29 years (*SD* = 4.8). Some of the respondents (3.6%) held a leadership position at the institutional level, 21.2% at the work unit level, and 19.1% at the work group level. The remainder (56.1%) of respondents held a position that did not require leadership of others. The difference between pre- and post-reform respondents was not significant ($p = .136$).

Educational Profile

Almost three quarters (73.8%) of respondents (most often pre-reform respondent) had completed ≥ 1 professional certifications

(Table 1), and 38.0% of respondents (most often pre-reform respondents) had completed some form of postgraduate education, with the exception of the Bologna Process MSc option, which became available after the Bologna Process (i.e., post-reform) (Table 1).

Employment

Most respondents (72.1%) were employed in their profession. The percentage of respondents who are not employed in their profession, however, was higher ($p \leq .001$) for post-reform respondents (25.3%) than for pre-reform respondents (13.6%). A minority of respondents (3.8%) were unemployed, with more post-reform (6.0%) than pre-reform (1.8%) respondents being unemployed.

Respondents who were employed worked mostly in the public sector (69.3%), followed by the private sector (28.3%), self-employed (1.0%), and nongovernmental organizations (0.3%). The ratio between respondents pre-reform (81.3% in the public sector and 15.6% in the private sector) differed significantly ($p \leq .001$) from post-reform (54.6% in the public sector and 43.8% in the private sector).

The majority (63.2%) of respondents had never worked in another sector, and those who had changed jobs were more likely to have moved from the private to the public sector (62.4%) than vice versa (36.3%), with no significant difference between pre- and post-reform respondents ($p = .457$). The largest proportion of professionals (more often pre-reform respondents) were employed in hospitals or other healthcare settings, followed by nurseries or schools, and the National Institute of Public Health (NIPH), with a higher proportion of pre-reform respondents at NIPH (Table 2).

The answers under the “Other” option, which was chosen more frequently by post-reform respondents, included the following organizations: pharmaceutical industry; state ministries; inspection services not listed in the table; private companies providing services in the areas of occupational health and safety, environmental protection, and fire prevention; laboratories other than the National Laboratory for Health, Environment, and Food; and the Slovenian Environment Agency.

Areas of Expertise

Although we offered 22 different areas of expertise, the “Other” option was chosen most often, especially by post-reform respon-

TABLE 1

Percentage of Respondents Who Completed Postgraduate Degrees and/or Obtained Professional Certifications

Category	Subcategory *	All (<i>n</i> = 329) %	Pre-Reform Degree Program (<i>n</i> = 174) %	Post-Reform Degree Program (<i>n</i> = 155) %	Chi-Square	<i>p</i> -Value
Postgraduate program	None	62.0	65.5	58.1	1.933	.164
	Short specialization	2.2	3.4	0.6	3.093	.079
	Master of science (MSc), pre-reform **	6.4	10.3	1.9	9.701	.002
	Master of science (MSc), post-reform ***	28.3	17.8	40.0	19.896	.000
	Doctor of philosophy (PhD)	1.8	2.3	1.3	0.466	.495
	Other	2.1	2.3	1.9	0.052	.820
Professional certifications	None	26.2	14.4	39.7	26.936	.000
	Sanitary engineering	64.9	73.6	55.0	12.277	.000
	Official control	12.9	21.3	3.3	23.155	.000
	Health and safety at work	11.4	14.9	7.3	4.699	.030
	Education	1.2	1.7	0.7	0.750	.387
	Chartered engineer	5.5	8.6	2.0	6.801	.009
	Other	5.8	9.2	2.0	7.632	.006

* Respondents could select more than one answer.

** Research-oriented MSc degree that was available prior to the reform.

*** Structured, course-based MSc degree that was introduced with the 2009 Bologna Process reform.

Note. Bolded *p*-values indicate statistically significant differences ($p < .05$).

dents (Table 3). A closer look at the responses under “Other” shows that this option was mainly used to indicate a combination of different areas of expertise, but also some additional areas such as public contracts, different types of work organization, quality management, environmental protection, playground safety, different types of environmental sampling, environmental measurements, and professional consulting.

When asked to rate the importance of soft skills in their current workplace, respondents ranked them in the following order, starting with the most important: communication skills, professional ethics, adaptability to change, initiative, resolving disagreements, teamwork, creativity/innovation, leadership. Although there was no significant difference between pre- and post-reform respondents, and both groups rated professional ethics as very important, pre-reform respondents rated this element significantly higher than did post-reform respondents ($p \leq .001$).

In the last 5 years, 81.3% of respondents (85.0% for pre-reform and 75.6% for post-

reform) reported having attended additional professional development, most frequently in the areas of nutrition and food safety, hospital hygiene, and law. Next in frequency were topics related to drinking and/or bathing water, health and safety in the workplace, fire prevention, digitalization, and communication skills.

Job Satisfaction

The majority of respondents, regardless of their degree program, reported high (62.3%) or very high (19.6%) confidence in their work (expressed as a feeling of being up to the task). Respondents in the pre-reform group were the most satisfied with the stability of their employment and the least satisfied with their salary (Table 4). The reported net salary was higher ($p \leq .001$) for pre-reform respondents than it was for post-reform respondents. The observed difference is related to years of service and type of employment, with respondents who are employed in the profession having a higher income than did respondents who are otherwise employed ($p = .009$). A managerial position ($p = .007$) or

employment in the private sector ($p = .013$) was associated with a higher income.

Impact of COVID-19

During the pandemic, one quarter (26.5%) of all respondents were appointed as a member of the expert group for the management of COVID-19 in the institution where they were employed, and 16.0% of respondents were appointed as a leader of the group at their institution. The difference between the groups was not statistically significant ($p \geq .399$).

In this section of the survey, a statistically significant difference between the groups was found only with regard to the perception of job requirements. When asked about the importance of various areas of expertise in their work during the pandemic, respondents ($n = 107$) typed in epidemiology (31.3%), hygiene (12.7%), and microbiology (5.8%) as the top three answers in their open-ended responses.

When asked which areas of expertise they missed the most in their work during the pandemic, the majority of respondents ($n = 57$, 31.6%) answered “none.” The other top three

TABLE 2

Work Organizations Where Respondents Were Employed

Work Organization	All (<i>n</i> = 220) %	Pre-Reform Degree Program (<i>n</i> = 132) %	Post-Reform Degree Program (<i>n</i> = 88) %	% Point Difference *
Hospital or other medical institution	18.2	23.5	10.2	1
Kindergarten or school	17.3	19.7	13.6	2
National Institute of Public Health (NIPH)	14.5	9.8	21.6	1
Health Inspectorate of the Republic of Slovenia	9.1	13.6	2.3	1
Food production plant	6.8	3.0	12.5	2
National Laboratory for Health, Environment, and Food	5.9	6.8	4.5	3
Research institute other than NIPH	4.5	3.8	5.7	3
Administration for Food Safety, Veterinary Sector, and Plant Protection	3.2	4.5	1.1	3
Public utility service	3.2	0.8	6.8	2
Cleaning company	2.3	0	5.7	2
Private company for consulting and training on food hygiene	1.8	3.0	0	3
Industrial plant in environmental protection department	1.8	0.8	3.5	3
Home for older adults and other social welfare institutions	1.4	1.5	1.1	3
Public pools	0.9	1.5	0	3
Other	9.1	7.6	11.4	3

* Percentage point difference categories: 3 is ≤5.0; 2 is from 5.1 to 10.0; and 1 is ≥10.1.

answers were epidemiology (10.5%), law (8.8%), and communication skills (8.8%).

Discussion

Based on a reliable sampling frame and a high response rate, we can assume a good generalizability of the results. We found that the ratio between men and women had shifted to more women than in a previous survey, in which 70% of respondents self-identified as female (Turk, 2005). A comparison with our data on graduates also revealed a shift in the gender ratio from 80% women among pre-reform graduates to almost 90% women among post-reform graduates. The distribution of all respondents in terms of their professional position, with nearly 50% holding one of the leading positions, is quite comparable to results from the U.S. survey by Gerding et al. (2019) and shows the importance of organizational and leadership skills.

The high educational profile of respondents with a postgraduate degree is comparable to the survey in the U.S. by Gerding et al. (2019). In our survey, however, pre-reform

respondents reported a much broader range of postgraduate course content, because it was not possible to enroll in a master's degree program in sanitary engineering until the 2012–2013 academic year. When the opportunity arose, the majority of respondents chose to study in this direction, which shows that they are not looking for a specialization that they might have missed during their graduate studies and confirms the desire expressed in the survey by students planning a master's degree.

In terms of professional certifications, the one in sanitary engineering is required by law for graduates working in healthcare, but not for graduates employed in the private sector. Post-reform respondents reported working more often in the private sector or outside the profession, which could explain why they are less likely to apply for professional certification after graduation than are their more experienced pre-reform counterparts.

In general, the low unemployment rate is comparable to the results of previous surveys (Turk, 2005), suggesting that there is a bal-

ance between the number of graduates and the demand in the labor market. The percentage of respondents who were employed outside the profession, however, was higher ($p \leq .001$) for post-reform respondents than for pre-reform respondents in our study. In the Turk survey, the ratio between the public and private sectors was 83% and 13%, respectively. A similar ratio was observed in our survey, but only for pre-reform respondents, whereas the ratio among post-reform respondents tended to be more balanced (54.6% in the public sector and 43.8% in the private sector). The latter result shows a clear reversal in the trend toward a higher level of employment in the private sector, as was typical of the previous period, even though the majority of graduates are still employed in the public sector.

It is also important to note that younger (post-reform) respondents are more likely to choose employment outside the profession. This finding requires a more detailed analysis of the underlying reasons; for now, we can make assumptions based only on the results collected in this survey. We do, however,

TABLE 3

Areas of Expertise and Frequency of Use in Work Organizations by Respondents

Area of Expertise	All (<i>n</i> = 210)		Pre-Reform Degree Program (<i>n</i> = 125)		Post-Reform Degree Program (<i>n</i> = 85)		<i>p</i> -Value *
	$\bar{x}$	<i>SD</i>	$\bar{x}$	<i>SD</i>	$\bar{x}$	<i>SD</i>	
Other	2.55	1.424	2.42	1.418	2.73	1.437	.307
Internal control	2.50	1.289	2.68	1.291	2.25	1.250	.025
Epidemiology	2.45	1.085	2.60	1.092	2.24	1.043	.017
Educational and/or research work	2.41	0.964	2.41	0.922	2.42	1.028	.912
Cleaning procedures	2.39	1.222	2.50	1.252	2.21	1.162	.106
Drinking water safety	2.38	1.165	2.50	1.130	2.20	1.200	.048
Statistical data processing	2.30	0.988	2.18	0.987	2.47	0.971	.029
Prevention of healthcare-associated infections	2.29	1.214	2.47	1.235	2.01	1.135	.006
Waste and/or wastewater	2.28	1.111	2.34	1.078	2.18	1.160	.235
Food safety	2.27	1.303	2.31	1.294	2.20	1.323	.558
Disinfection and pest control	2.23	1.123	2.30	1.142	2.14	1.095	.361
Health and safety at work	2.13	1.044	2.24	1.073	1.98	0.988	.083
Hazardous substances	1.93	0.978	2.01	1.021	1.82	0.907	.233
Health promotion	1.87	1.030	1.97	1.060	1.73	0.974	.082
Nutrition planning	1.81	1.204	1.82	1.240	1.78	1.159	.985
Items of general use	1.68	0.995	1.85	1.094	1.45	0.782	.013
Official control	1.62	1.090	1.81	1.232	1.35	0.782	.018
Air quality	1.56	0.837	1.52	0.786	1.61	0.908	.633
Construction or renovation of buildings	1.54	0.733	1.61	0.702	1.44	0.766	.022
Bathing water	1.41	0.885	1.44	0.917	1.38	0.841	.710
Laboratory work	1.39	0.881	1.25	0.684	1.61	1.076	.004
Noise control	1.37	0.685	1.35	0.655	1.40	0.730	.174
Ionizing or non-ionizing radiation	1.18	0.441	1.21	0.499	1.13	0.339	.376

* Mann-Whitney *U*-test.

Note. The average value ($\bar{x}$) is based on a 4-point Likert scale: 1 = never, 2 = occasionally, 3 = often, 4 = very often. Bolded *p*-values indicate statistically significant differences ($p < .05$).

believe that financial reasons are not the cause, as respondents working within the profession reported a higher income on average than did respondents working outside the profession.

We found that the majority of respondents are employed within the national health system and that the younger respondents (post-reform) cite NIPH as their main employer, indicating the importance of the profession to the public health system. The latter, however, is not an entirely new trend that we are observing. At the end of 2015, NIPH employed 457 people (Petrič & Maresso, 2018), with physicians repre-

senting the largest group (21.0%) and sanitary engineers as the second largest group (15.7%), both of which account for a large share of the NIPH workforce. When looking at employers, we also identified a trend that could explain the higher proportion of post-reform respondents in the private sector. Instead of official inspection bodies, which are typical of pre-reform respondents, post-reform graduates are more often employed in private food production companies, public utilities, and private cleaning companies. In addition, post-reform respondents are more likely to report new employment

opportunities in the private sector related to their occupation.

Despite the broad spectrum of professions, our results show that it is even broader than in the past. Internal controls in various hygiene-sensitive work environments continue to rank highly compared with the Turk (2005) survey, confirming general hygiene as one of the professional pillars, followed by epidemiology. The high value placed on epidemiology expertise was also noted in the WHO assessment, which reported that public health workers at NIPH (e.g., epidemiologists, sanitary engineers) are well-trained in

TABLE 4

Factors of Job Satisfaction or Dissatisfaction in Respondents

Factor	All (n = 266)		Pre-Reform Degree Program (n = 150)		Post-Reform Degree Program (n = 117)		p-Value *
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
Stability of employment	4.33	0.902	4.52	0.654	4.09	1.098	.002
Freedom and independence at work	4.10	0.842	4.19	0.757	3.98	0.931	.092
Safety at work	4.01	0.738	3.97	0.735	4.06	0.742	.284
Interesting work	3.97	0.851	3.95	0.853	4.00	0.852	.580
Relationships with coworkers	3.97	0.890	3.90	0.920	4.05	0.849	.205
Working conditions	3.82	0.937	3.70	1.003	3.96	0.828	.036
Availability of professional literature	3.66	0.966	3.61	0.972	3.72	0.960	.401
Work reputation	3.64	0.903	3.59	0.910	3.70	0.895	.338
Opportunities to use my talents and expertise	3.61	1.059	3.66	1.017	3.53	1.111	.316
The possibility to follow emerging trends in the profession	3.59	1.048	3.56	1.009	3.63	1.099	.366
Working assets	3.57	1.033	3.59	0.982	3.54	1.101	.863
Work demands	3.55	0.864	3.51	0.869	3.61	0.858	.362
Professional development	3.52	1.150	3.46	1.136	3.59	1.168	.251
Opportunity to demonstrate leadership skills	3.44	1.026	3.47	1.007	3.40	1.054	.509
Impact on changing the existing situation in the work organization	3.20	1.015	3.20	0.970	3.20	1.078	.979
Possibilities of promotion	2.97	1.156	2.96	1.113	2.97	1.213	.893
Salary and other material benefits	2.92	1.122	2.99	1.101	2.83	1.147	.217

* Mann-Whitney U-test.

Note. The average value ($\bar{x}$) is based on a 5-point Likert scale: 1 = very dissatisfied, 2 = dissatisfied, 3 = neither satisfied nor dissatisfied, 4 = satisfied, 5 = very satisfied. Bolded p-values indicate statistically significant differences ($p < .05$).

disease surveillance at regional and national levels (WHO, 2017).

The fact that the majority of post-reform respondents are employed by NIPH could explain why statistical data processing is more commonly reported in this group. Other respondents who are not employed by NIPH, however, also frequently apply an epidemiological approach to their work (often in combination with other areas of expertise, as listed in Table 3), confirming that epidemiology is another important professional pillar. Respondents ranked communication skills as the most important soft skill and also ranked it as the third most important skill they lacked during the COVID-19 pandemic. Communication skills are crucial, whether in the role of leader or for communicating risks effectively (Brooks et al., 2019).

Confidence in work (expressed as the feeling of being able to cope with work tasks)

remains at a high level compared with the results from the Turk (2005) survey. The relatively low average score for the opportunity to demonstrate leadership skills, however, requires attention, because despite our survey showing that approximately 50% of the respondents indicated holding a leadership position, this score was low. Further, despite the many opportunities for formal education (Table 1) and training for graduates who are already employed, our survey results showed that opportunities for promotion are limited (Table 4), and it is one of the factors that contributes to job dissatisfaction.

Reports from the pandemic have shown that sanitary engineers have been very active but silent (not highlighted by the media) in different areas of their professional presence (Ovca, 2021). Their appointment to the COVID-19 management expert groups in the organization where they were employed also

confirms their reports that their knowledge, skills, and previous experience generally were an adequate basis for dealing with the pandemic, regardless of which degree course they had completed. Although collaboration at an average level was not among the highest scores, collaboration with other professionals within their institution and with colleagues of the same profession from other institutions has been previously identified as a unifying element between the different work environments (Ovca, 2021). Multinational collaboration was also cited in an Australian survey as key to the success of the COVID-19 response (Whiley et al., 2023).

Conclusion

The results of our survey show a high educational profile and a high employment rate, with the majority of graduates employed in the public sector (i.e., nearly 50% of all grad-

uates work in the national health system). Of note, we also found a clear reversal in the trend toward a higher employment rate in the private sector, which was typical and shown in the survey by Turk 20 years ago. This reversal was even more pronounced among post-reform graduates. Our results also show that the spectrum of the profession has become even broader than in the past. What has remained consistent is that hygiene and epidemiology were confirmed as still being the two most important professional pillars, as reported by respondents of our survey.

The differences between graduates are not so great that a new reform to the existing degree program is needed. Our survey results confirm that the renovation of the degree program in 2009 has met the needs of the labor market. Our survey did identify, however, a gap in the area of leadership skills. Because a further expansion of the content of the already broad-based degree program would not make sense, we see the potential in flexible, inclusive, and short learning opportunities (i.e., microcredits) for lifelong learning and employability, which are also more

adaptable more quickly to changing needs of this profession. 🌸

Acknowledgment: The authors thank all respondents who accepted the survey invitation, completed the survey, and made our study possible.

Corresponding Author: Andrej Ovca, PhD, Assistant Profession, Faculty of Health Sciences, University of Ljubljana, Zdravstvena pot 5, SI-1000, Ljubljana, Slovenia. Email: andrej.ovca@zf.uni-lj.si

References

- Brooks, B.W., Gerding, J.A., Landeen, E., Bradley, E., Callahan, T., Cushing, S., Hailu, F., Hall, N., Hatch, T., Jurries, S., Kalis, M.A., Kelly, K.R., Laco, J.P., Lemin, N., McInnes, C., Olsen, G., Stratman, R., White, C., Wille, S., & Sarisky, J. (2019). Environmental health practice challenges and research needs for U.S. health departments. *Environmental Health Perspectives*, 127(12), Article 125001.
- Chartered Institute of Environmental Health. (2015). *Environmental health workforce survey 2014/15: Phase 1 and 2—Summary report of findings*. https://www.cieh.org/media/1262/environmental-health-workforce-survey-2014_15.pdf
- Ferfila, N., Likar, K., Bauer, M., & Kovačič, D. (2005). *Education of sanitary engineers in Slovenia*. <https://hdl.handle.net/2099/213>
- Fitzpatrick, M., & Bonnefoy, X. (1998). *Environmental health services in Europe 3: Professional profiles*. World Health Organization, Regional Office for Europe. <https://iris.who.int/handle/10665/107325>
- Gerding, J.A., Landeen, E., Kelly, K.R., Whitehead, S., Dyjack, D.T., Sarisky, J., & Brooks, B.W. (2019). Uncovering environmental health: An initial assessment of the profession's health department workforce and practice. *Journal of Environmental Health*, 81(10), 24–33. <https://www.neha.org/workforce-and-practice-assessment>
- Ovca, A. (2021). Experiences of sanitary engineers in Slovenia during COVID-19 epidemic. *Environment and Health International*, 21(1), 58–64. https://www.ifeh.org/magazine/IFEH_Magazine_Vol21_No1_Dec_2021.pdf
- Ovca, A., Ferfila, N., Poljšak, B., Slabe, D., & Jereb, G. (2011). Renovation of sanitary engineering study programme. *Procedia—Social and Behavioral Sciences*, 15, 838–842. <https://doi.org/10.1016/j.sbspro.2011.03.195>
- Petrič, V.-K., & Maresso, A. (2018). Slovenia. In B. Rechel, A. Maresso, A. Sagan, C. Hernández-Quevedo, G. Williams, E. Richardson, E. Jakubowski, & E. Nolte (Eds.), *Organization and financing of public health services in Europe: Country reports* (Health Policy Series, No. 49). European Observatory on Health Systems and Policies. <https://www.ncbi.nlm.nih.gov/books/NBK507331/>
- Petrik, M., & World Health Organization. (1956). *The training of sanitary engineers: Schools and programmes in Europe and in the United States* (Monograph Series #32). World Health Organization. <https://iris.who.int/handle/10665/41667>
- Turk, R. (2005). *The employment of sanitary engineers in Slovenia* [Bachelor's dissertation]. College of Health Studies, University of Ljubljana, Slovenia.
- Whiley, H., Smith, J.C., Moore, N., Burton, R., Conci, N., Psarras, H., & Ross, K.E. (2023). Climate change and health: Challenges to the local government environmental health workforce in South Australia. *International Journal of Environmental Research and Public Health*, 20(14), Article 6384. <https://doi.org/10.3390/ijerph20146384>
- World Health Organization. (2017). *Joint external evaluation of IHR core capacities of the Republic of Slovenia* (WHO/WHE/CPI/REP/2017.32). <https://www.who.int/publications/i/item/WHO-WHE-CPI-REP-2017.32>

Did You Know?

Being a member of NEHA is being part of a family of fellow professionals working to protect the health of their communities. Anyone can benefit from joining the NEHA family at any stage of their career. Membership with us provides connections, education, and career advancement. Our nationally recognized credentials, extensive learning opportunities, and community of dedicated leaders position our members for greater professional success. Learn more at www.neha.org/membership.