



HAL
open science

Is environmental sustainability training fundamental to healthcare leadership? State of the art with health students and health leaders

Marine Sarfati, Alessia Lefébure, Cyrille Harpet, Estelle Baurès, Laurie Marraud

► To cite this version:

Marine Sarfati, Alessia Lefébure, Cyrille Harpet, Estelle Baurès, Laurie Marraud. Is environmental sustainability training fundamental to healthcare leadership? State of the art with health students and health leaders. *Management in Healthcare*, 2023, 8 (1), pp.57-69. hal-04156871

HAL Id: hal-04156871

<https://ehesp.hal.science/hal-04156871>

Submitted on 5 Oct 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Is environmental sustainability training fundamental to healthcare leadership? State of the art with health students and health leaders

Received (in revised form): 26th January, 2023



Marine Sarfati

Rheumatologist, University of Medicine Lyon 1 Claude Bernard, France

Marine Sarfati, MD, MSc, is a French rheumatologist. She has overseen the teaching of Environment Health at the University of Medicine Lyon Est since 2022 and has organised a 45-hour course on this theme at the university for medical students. She was mandated in 2022 by the French National Council of Deans to create a 6-hour online course over the links between Environmental and Climate Issues and human health for all the French medical students.

University of Medicine Lyon 1 Claude Bernard, 8 Av. Rockefeller, 69003 Lyon, France
Tel: +33 (0)6 17 03 35 12; E-mail: sarfati.marine@gmail.com



Alessia Lefébure

Dean, L'Institut Agro Rennes Angers, Senior Researcher, Arènes, France

Alessia Lefébure, PhD, is the Dean of L'institut Agro Rennes Angers, a French University part of the largest French Life Science, Agriculture and Food ensemble, in Higher Education and Research. She previously held several managerial and teaching positions at the French School for Public Health (EHESP), Columbia University, in New York; Tsinghua University, in Beijing; and Sciences Po Paris. A sociologist and a recognised expert in Comparative Higher Education Policies, Alessia is the author of the book 'Globalization of the Chinese Higher Education' (Les mandarins 2.0. Presses de Sciences Po, Paris, 2020).

L'Institut Agro Rennes Angers, Arènes — UMR 6051, F-35000 Rennes, France
Tel: +33 (0)7 85 00 91 65; E-mail: alessia.lefebure@institut-agro.fr



Cyrille Harpet

Senior Researcher, University of Rennes, France

Cyrille Harpet has been a teacher-researcher at the Ecole des Hautes Etudes en Santé Publique de Rennes (EHESP) since 2010. His work focuses on risk analysis in occupational health and environment. He has followed an interdisciplinary path in philosophy of science, social anthropology and biological anthropology. Trained in environmental management, Cyrille continued his activities in urban planning and environmental health and currently in climate change and public health risks.

University of RENNES — Ecole des Hautes Etudes en Santé Publique EHESP, Rennes/High School of Public Health, Environmental Health Sciences Department, ARENES Unit of Research — CNRS – UMR 6051, France
Tel: +33 (0)6 40 95 14 56; E-mail: cyrille.harpet@ehesp.fr



Estelle Baurès

Dean, Sustainability and Social Responsibility, Institut Agro, France; Research Fellow, CNRS, France

Estelle Baurès is Environmental Health researcher (PhD, HDR) and Sustainability and social responsibility Dean at Institut Agro. She pilots the inclusion of ecological transition and sustainable development issues in institution global strategy and in the curricula of all students. Her research, teaching and consulting also focus on environment quality and global and climate changes in a risk assessment context in the field

of environmental health. Currently, Estelle is also a member of the CIRSES (national network of higher education sustainable development leaders) board of directors.

Institut Agro, Paris, France; CNRS, Inserm, Arènes — UMR 6051, U 1309, F-35000 Rennes, France
Tel: +33 (0)6 17 39 32 16; E-mail: estelle.baures@agrocampus-ouest.fr



Laurie Marraud

Assistant Professor, University of Rennes, France

Laurie Marraud, PhD, is a lecturer at the Ecole des Hautes Etudes en Santé Publique (EHESP) specialising in the use of digital technologies in health. She is a teacher and a researcher in management sciences and focuses her research on the transformation of healthcare organisations in the context of ecological, epidemiological, demographic and socio-technical transition. Since 2019, Laurie has been piloting the 'decarbonizing health for sustainable care' project of the French Economic Transformation Plan within the think tank The Shift Project.

Management Institute of the French School of Public Health, University of Rennes, EHESP, CNRS, Inserm, Arènes — UMR 6051, RSMS (Recherche sur les Services et Management en Santé) — U 1309, F-35000 Rennes, France
Tel: +33 (0)6 10 97 69 72; E-mail: laurie.marraud@ehesp.fr

Abstract This paper addresses the relevance of climate change and environmental learning in health professional training. Recent publications have shown the importance of understanding sustainability and environmental issues in healthcare management. Indeed, after years of underestimation, medical and public health professionals today acknowledge that the environment has a strong effect on human health. Conducted between April and June 2021, a quantitative study among 3,384 French medical and health students shows that the need for training on energy and climate issues is urgent and crucial. The findings are consistent with the international literature. The contrast is sharp between students' expectations about environmental skills and the reality of the available course offer. Learning about energy, climate and environment is currently not a priority in the curriculum of healthcare professionals, including managers. Sustainability, however, clearly appears as a 'must' among the essentials in healthcare leadership. What these findings suggest is that healthcare managers can no longer afford to ignore environmental sustainability as an essential skills domain in their long-term capacity to contribute to the necessary healthcare environmental adaptation, mitigation and resilience.

KEYWORDS: professional training, public health, healthcare, environmental sustainability, climate change, leadership skills

INTRODUCTION

The climate emergency and the healthcare sector

The impact of healthcare on climate change has been studied both at the country level.¹⁻⁷ and at the multi-regional level.⁸⁻¹⁰ According to the estimate issued by the think tank The Shift Project in 2021,¹¹ French healthcare institutions (public hospitals, private health establishment of collective interest — Espic

— private clinics) and private practices are responsible for more than 6 per cent of national carbon emissions. The figure reflects the socio-economic weight of the healthcare sector, which employed (directly and indirectly) 3.9m people in 2017 (ie 14.7 per cent of French employment). Healthcare relies on a highly diversified network of actors in strong interaction, involved with consumption of products, energy use (2

per cent of national consumption), waste production (700,000 t/year) and travel (patients and professionals). According to some observers, training in environmental sustainability issues is deficient in France.¹² This is the case with health students too.

Greenhouse gas emissions (GHGs) can be traced for each ambulance or helicopter transporting a patient, for each drug or vaccine, leaving a complex production and delivery chain, for each meal served to a patient, for each heated office, for each home-to-work journey made by professionals in the sector, for all the buildings constructed and for each waste treated. Thus, in our society, the health workforce, committed to improving the health and the care for all, are suddenly facing a cruel paradox: the healthcare system contributes to a long-term threat to the health of the population, to which they nevertheless devote all their efforts.

It is therefore inevitable that the health sector, like all the others, should take its share of responsibility in the necessary 5 per cent annual reduction in emissions by 2050 that would enable us to stay below the +2°C limit, the basis of climate negotiations since the 2009 Copenhagen conference (COP15). The decarbonisation effort will have a positive externality: it will contribute to the resilience of the health sector by limiting its dependence on fossil fuels and the resulting vulnerabilities at a time when Europe's oil supply is under pressure.¹³

Any commitment to reducing GHG emissions, however, requires awareness that we are emitting them and the level of GHG. Indeed, how can regional health agencies, in charge of steering every hospital's budget, integrate an effective decarbonisation plan into their public health policy without perfectly understanding the effect of the healthcare system on the environment?

Nevertheless, the study presented in that paper, conducted among health students in 2021, emphasises that health professionals, whether they are caregivers or not, express

a strong interest in the environment. This interest is often coupled with a concern for the future of the healthcare system confronted with climate, energy and environmental issues. These results are consistent with the situation of higher education, where a significant imbalance can be observed between the strong demand from health students, including senior executives in the health and social sector,¹⁴ to be trained in environmental issues, and an often insufficient supply of relevant courses.¹⁵

Yet we know that public health was historically designed to encompass sustainability.¹⁶ C. E. A. Winslow noted, in 1953, that 'public health is not a branch of medicine or of engineering, but a profession dedicated to a community service which involves the cooperative effort of a dozen different disciplines. The essence of the schools of public health is the bringing together of various disciplines and teaching them to work together to solve problems by approaching them as total problems'. According to Harpet,¹⁷ the links between health and the environment have since become a 'blind spot' in our social perception of health risks. 'This gap is due to a separatism inherited from our model of science construction and teaching system, both based on the separation between humanities, life sciences, earth sciences. To the point that health and the environment have been apprehended as belonging to two distinct scientific domains and, as a result, to political decisions without any real articulation'.¹⁸ Yet we know that health and environmental problems have common determinants and solutions. It became clear that the ecological transition is a public health challenge. Not to think of the ecological transition as a public health problem appears to be not only a scientific nonsense but also a waste of time in relation to the urgent climate and environmental issues. In recent years, most French public health institutions have developed information missions on the environment

and health, pointing out the lack of knowledge of current healthcare actors (Appendix 1). The authors therefore propose a teaching and training content that provides fundamental knowledge on the functioning of ecosystems (functional ecology, geoclimatic mechanisms), on environmental health risks (emerging infectious diseases, vector-borne diseases, contamination of environments and resources at risk of health hazards) and on the conditions for the sustainability of our healthcare organisations coping with global changes.

State of the art of the need for ecological training for healthcare professionals

A study conducted in March 2021 by the Times Higher Education, in partnership with the University of Auckland on 2000 students in New Zealand, shows that 80 per cent of them agree on the importance of living their lives in a way that is consistent with being a citizen living in a sustainable way.¹⁹ Among the respondents, 75 per cent have heard of the SDGs (sustainable development goals), and 79 per cent believe that universities have an important role to play in achieving these goals.

In 2020, Lee *et al* stated that the accuracy of reported knowledge about the effects of climate change varies according to the method employed and that many people have erroneous ideas and misconceptions about causes of climate change.²⁰ This results in the fragmentation and lack of integration of the knowledge on different aspects of climate issues, greatly affecting its usability in the policymaking process.²¹ In 2016, Middleton said that while not every public health professional needs to become an expert in climatology and ecology, all graduates certainly need to understand the basics, be able to communicate knowledgeably, and form partnerships and alliances in multidisciplinary settings with experts in these areas.²²

In 2018, Rich *et al* (p. 10) stated in their book *Sustainability for healthcare management: a leadership imperative* that healthcare professionals' understanding of sustainability issues is not just about being a good environmentalist but also about being a good healthcare leader. They argue that hospitals and other healthcare organisations have 'enormous impacts on communities and the environment'.²³ Indeed, that is one way in which healthcare delivery relates to public health, because sustainability, in its essence, promotes that preventive, do-no-harm mindset. So, if in health-care delivery 'we refocus upstream on prevention rather than treatment, life cycle rather than upfront costs, then by default we embrace public health concerns'.²⁴ The authors emphasise a few main lessons. The first is that sustainability is an essential component of the emerging wellness paradigm that results. Another lesson is that sustainability is a unifying element of the healthcare organisational culture. Finally, if healthcare leaders care about physician recruitment and engagement, process redesign, workforce engagement, facility investments and cost structure, and so on, then they should care about sustainability as well.

In 2020, researchers presented the results of a survey that included responses from 84 health professions institutions internationally.²⁵ Among them, 63 per cent reported offering education on climate change and health, most commonly as part of a required fundamental course. It is, however, important to note that adding the topic is under discussion at most institutions, with respondents reporting challenges in trying to change the curriculum and receiving a positive response to adding the content.

Also in 2020, another study showed that 91.7 per cent of survey respondents believe that the need for public health professionals trained in climate change effects may grow in the next 5–10 years.²⁶

The current employers value skills and competencies such as the knowledge of climate mitigation/adaptation, climate health justice, direct/indirect and downstream effects of climate on health, health impact assessment, risk assessment, pollution-health consequences and causes, Geographic Information System (GIS) mapping, communication/writing, finance/economics, policy analysis, systems thinking and interdisciplinary understanding. The current state of the job market for public health graduates trained in climate change is indeed 'emerging' but is showing signs of a rapid increase. Indeed, according to the same study, a majority of employers anticipate a growing need for graduates with training in climate change and health, even though 'climate-related competencies are not yet at the core of public health degrees in the United States'.²⁷ The employers survey lists a number of interconnected important themes focusing on these areas such as communication (especially persuasive communication), finance/budgeting, cross-disciplinary collaboration and systems thinking, analytical skills and an understanding of climate effects on mental health, which resonate with Frankson *et al's* work about one health competency.²⁸ These competencies are particularly useful for public health leaders or policymakers. In that sense, higher education can play a 'pivotal role in turning society toward sustainability'.²⁹

In a recent study among European public health schools (ASPHER network),³⁰ 64 per cent of the responding schools declared they provide climate health educational offerings, while 63 per cent consider implementing these courses for the future. Additionally, most climate actions taken by the public health schools were ad hoc actions. These findings show that a systematic approach is missing and that most of public health schools lack a general strategy. Climate action starts by recognising

the urgency of the problem and the responsibility that the public health field, including schools, carries.

The study presented in that paper was conducted in 2021 in order to estimate the level of awareness of French medical students about energy-climate-health issues. The study included a quantitative component through a survey administered to 193 higher education institutions in the health sector and 3384 respondents. The study aimed at establishing an inventory of the Training over the Environment and Climate Issues (T.E.C.I.) in France and to understand the alignment with the current needs of the students.

A QUANTITATIVE STUDY AMONG HEALTH STUDENTS

The study was conducted between April and May 2021 in France on the training of medical and health students on climate change issues in 193 higher education institutions in the health sector. Data collection included the following information:

1. Existence of Training over the Environmental and Climate Issues (T.E.C.I.) in the overall curriculum of the student (yes/no)
2. If yes, whether the course was mandatory or optional
3. Duration of the T.E.C.I.
4. Existence of an exam at the end of the training
5. Focus of the course (energy-climate transition or environmental health)

Data collection, which was entirely digital, was handled by various actors: national student associations in medical sciences and health care (eg ANEMF,³¹ ANEPF,³² UNECD,³³ FNESI,³⁴ FNEK³⁵), higher education institutions' websites, teaching staff and students on the basis of an online questionnaire.

The health field is diverse, with public and private organisations. It includes occupations in the care sector and in the health sector globally. Because this field is diverse and complex, we decided to focus our data collection over a few specific sectors: medical students (including students in their first year of medical school (PACES, PASS, LASS³⁶)), pharmacy students, dental students, students in physical therapy, midwife students, nursing students, dietetic students, occupational therapy students and public health students (at EHESP³⁷ and ISPED³⁸).

Data collection in these sectors was possible thanks to the existence of national student associations or student unions, and to the presence of a national and homogeneous training programme. The study did not cover lifelong training. In addition to the data collection, we also conducted a national survey for all the health students in France to find out more about their expectations and the content of the lessons. This survey was distributed in April and May 2021 by the national student associations and by a national student network via an online questionnaire. The aim was to collect students' opinion on being trained in the Environmental and Climate Issues during their studies. The survey involved eight questions listed in Table 1.

Table 1: The national student survey.

Q1. What is your field of study within Health?
Q2. What is your degree?
Q3. In which city do you study?
Q4. Do you think climate change is among the most important challenges of the XXIst century? (YES/NO/DK ^a)
Q5. Do you think climate issues (global warming, environmental health) should be taught in the health field? (YES/NO/DK)
Q6. bis – If yes, in a mandatory or elective way?
Q7. Do you think opening Shared Teaching Resources within the different health fields over those topics would be interesting? (YES/NO/DK)
Q8. Were you ever offered a course about climate or environmental issues during your studies so far? (YES/NO/DK)

^aDo not know or no opinion.

Our study also included a qualitative dimension. Six interviews of professionals of the health system were conducted (within or outside healthcare). Those professionals were in charge of the training of the medical students or public health students. They were contacted by e-mail, and several questions were sent to them to prepare for the interview, which took place on either a phone or a video call. All collected data was processed anonymously.

RESULTS

Data (existence of a T.E.C.I.) was collected over 193 organisations in France (Table 2).

The representativeness of our sample was calculated based on the total number of existing organisations in France for each sector (Table 3). The representativeness varied from 15 per cent for the nursery institutes to 100 per cent for the dental faculties. The overall representativeness (all fields) was 37 per cent (Table 3).

Over the 193 organisations, 60 offered a T.E.C.I., representing 31 per cent. The percentage offering a T.E.C.I. varied too, from 0 per cent for the dental faculties to 78 per cent for the pharmacy faculties.

When provided, the mean share of the duration of the T.E.C.I. in the total duration of the whole training represents 0.4 per cent and minimal number of hours (0) for dental medicine and maximal number of hours (66) for physical therapy (Table 3).

Table 2: Data collection from the institutions.

Programme	Identified organisations
Medicine	22
Pharmacy	23
Dental	16
Physiotherapy	32
Nursery	50
First Year of Medical School	24
Midwifery	26
Total	193

Table 3: Identified T.E.C.I. among the fields.

	Identified institutes	Representativeness (%)	Number of institutes offering a T.E.C.I.	Identified institutes offering a T.E.C.I. (%)	Total duration of the training (hours)	Mean duration of the T.E.C.I. (hours)	Mean share of the T.E.C.I./ total duration training (%)
Dental	16	100	0	0	1,700	0	0
Physical therapy	32	64	3	9	2,555	1.66	0.1
Nursery	50	15	8	15	1,800	4	0.2
Medicine	22	63	7	32	5,000	17	0.3
First year of medicine	24	65	11	46	500	5	1
Midwife	26	70	13	50	2,500	4.33	0.2
Pharmacy	23	96	18	78	2,500	17.5	0.7
Total	193	37	60	31	2,365 (m)	9	0.4

m = mean.

When provided, 97 per cent of the T.E.C.I. was about environmental health and 69 per cent about energy-climate transition. Because of missing data, the percentage of mandatory or elective courses or the exams at the end of training could not be calculated.

NATIONAL SURVEY

At the national level 3,384 students responded to our survey. More than half of the respondents were medical students (Figure 1). The rest were dental, physical therapy, pharmacy, nursery, midwifery students or were in their first year of medical school. Five percentage of the respondents were students at one of the public health schools (EHESP³⁹ and ISPED⁴⁰).

Unsurprisingly, 96 per cent of student respondents believe that climate change is one of the major issues of the 21st century. If 84 per cent believe that climate change issues should be a central part of the health curriculum (Figure 2), 54 per cent of them call for a mandatory curriculum. Asking for more transdisciplinarity, 78 per cent of the students surveyed would like to see cross-specialisation courses on this

topic. Only 21 per cent of the students acknowledge they have been taught about climate and environmental issues during their studies. Several of these results are represented in Figure 1.

Regarding the particular case of nutrition and occupational therapy students, data was collected from the representatives of each field, and none of them were found to include any reference about environmental issues in their official programme. There is no reference about sustainable food in the nutrition programme.

The results of our quantitative study highlight two main findings:

- A strong desire of the health students to be taught about climate and environmental issues during their studies.
- An insufficient course offer: if one-third of the 193 identified organisations offered a T.E.C.I., the mean share of the duration of the T.E.C.I. in the total duration of the whole training represented only 0.4 per cent (9 hours out of 16,555).

The study clearly shows a mismatch between the students' requests and the course offering.

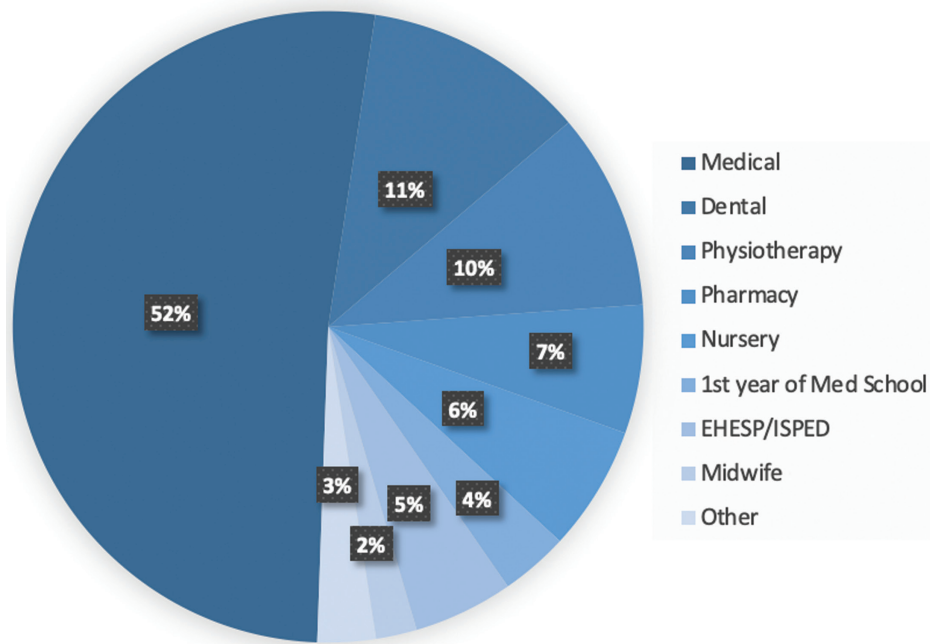
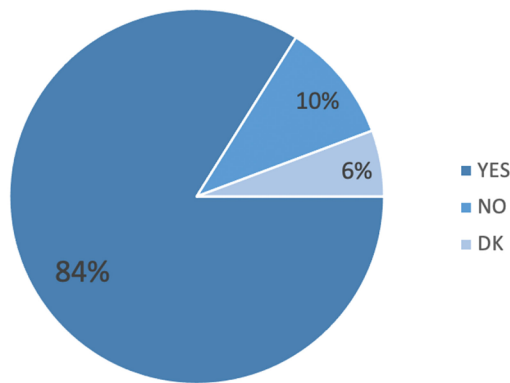
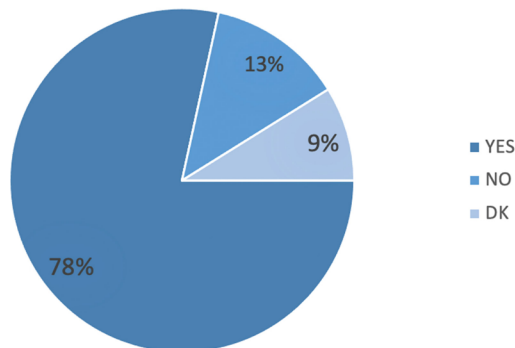


Figure 1 Distribution by professional fields of respondents

Q1: what is your field of study within health?



Q5. Do you think climate issues (global warming, environmental health) should be taught in the health field? (YES/NO/DK)



Q6. Do you think opening Shared Teaching Resources within the different health fields over those topics would be interesting? (YES/NO/DK)

Figure 2 National students' survey

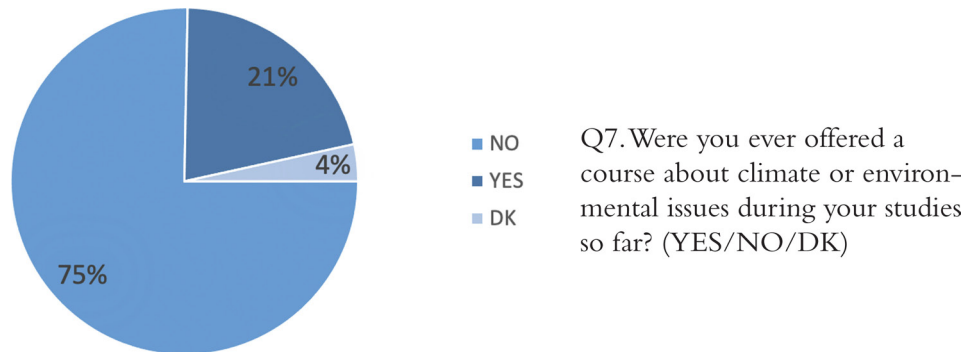


Figure 2 (continued)

THE POINT OF VIEW OF HEALTH EDUCATION LEADERS WHO TAKE RESPONSIBILITY IN CURRICULUM CHANGE

One of the objectives of the study was to better understand how and to what extent medical education integrates environmental topics. Towards this end, the survey was supplemented by six qualitative interviews with a broad range of healthcare and nonhealthcare professionals in France. It included one French professor of medicine and dean of a faculty of medicine, one public health professor, one professor of pharmacy, one microbiologist professor and two academic deans of the two French public health schools.

These interviews highlight several common threads. All these professionals consider environmental health as an essential component of the training. All healthcare institutions and national authorities are, to their knowledge, favourable to the development of T.E.C.I. Finally, they all believe those courses should be taught throughout the training process of the student, right from the undergraduate level.

A few obstacles were identified regarding the global lack of T.E.C.I. On the one hand, the curriculum of the health students is already extensive and demanding. Adding a course would require removing other courses. On the other hand, environmental health is a complex topic. It requires faculty members that are trained on this topic. Finally, it demands a

decompartmentalisation of the different research fields that is not easy to implement.

ENVIRONMENTAL SUSTAINABILITY SHOULD BE A PRIORITY IN BOTH MEDICAL AND HEALTH MANAGEMENT TRAINING

The study shows an urgent and crucial need for training on energy and climate issues. This is consistent with the international literature. The contrast is sharp between students' expectations about these environmental skills and the actual course offer. Learning about energy, climate and environment issues is currently not a priority in the curriculum of healthcare professionals, including managers. For these themes are not strictly in the domain of health in the sense of medical practice or 'primary care' in health. Sustainability, however, clearly appears as a 'must' among the essentials in healthcare leadership. The apparent paradox can be explained in different ways.

Learning about energy-climate-environment issues is not a priority in the curriculum of healthcare professionals or managers

The healthcare and management professions are becoming increasingly complex. The amount of knowledge to be acquired is growing and many issues — at the clinical, ethical, economic and social levels — are

constantly intertwined. In addition, health education is strictly regulated in most countries, including France.⁴¹ In this context, learning hours are limited, and training courses focus on what is considered as a priority by the national authorities. This vicious circle is difficult to break because the less environmental issues are taught, the less professionals make the link with their activity and the less they will consider it as a priority. Today, however, as the results of the study show, more and more young graduates are expressing their desire to be taught about the challenges of the 21st century.

Without a clear statement from national authorities, some students might be reluctant to take these courses, 'outside' the field of medicine. The large exclusion of environmental health from traditional health learning is today all the more unjustified as our environments represent a crucial part of our health.⁴²

Sustainability clearly appears as an 'leadership imperative' in health management

Sustainability does not only concern the physical and ecological dimensions of structures and ecosystems but also addresses the social and financial dimensions and, for clear reasons, represents a leadership imperative in health organisations. Indeed, it is likely that sustainability is the only way to successfully manage and transform health in the 21st century. This approach addresses the limited resources and supplies on which health systems are highly dependent. Furthermore, sustainability takes into account the effects of the environment on health in preventive and therapeutic approaches. Conversely, sustainability is also particularly useful for understanding the effects of the health system on the environment and the resulting vulnerabilities.⁴³ Moreover, the environmental theme is recognised as a motivation for professional teams and would stimulate recruitment in a sector that is struggling to find skills and human resources.

In addition, sustainability and environmental issues allow for the engagement of patients in a global approach to access to care, taking into consideration the environments outside the hospital walls. Finally, sustainability gives institutions the possibility to adopt a global and systemic strategy that makes sense for care, from its conception to its delivery.

RECOMMENDATIONS AND CONCLUSION

Social and environmental responsibility is an emerging theme that has a strong effect on the future of the public health and care system.⁴⁴ In France, academic hospitals, because of their dual teaching and research missions, are doubly concerned. Given their activity, hospitals have a significant environmental footprint, but they must also face the pathological consequences of this disruption in the exercise of their mission of care.⁴⁵ The health sector must therefore be exemplary and take leadership on the educational challenges in order to provide 'momentum'. Health professionals are ready to act but lack the appropriate and sustainable resources to carry out their public health mission. Drawing lessons from the Covid-19 crisis, it is essential not to reduce action to one-off solutions that are likely to generate other negative externalities. The School also offers a 6-day professional training module (named ChanCES) to accelerate the transformation with in-position professionals who want to get more competencies.

The study's results and the work already carried out internally in our institutions lead us to propose three courses of action to participate in the deployment of training in environmental sustainability in the health sector:

First, we need to work on the teaching content to be included in the initial curriculum. In the initial training of all health professionals and, more broadly, at university entrance, we propose a common foundation on the issues of environmental

sustainability of societies and organisations. This foundation mobilises workshops such as the climate collage, the biodiversity collage and the planetary health collage; furthermore, conferences or content on the foundations of scientific ecology and knowledge of ecosystems as well as on climate disruption and its anthropic origins should be proposed. As an example, the French School of Public Health (EHESP) implemented, in 2020, 30 hours in the curriculum about environmental and sustainability issues for healthcare.⁴⁶ Also, regarding medical education, elective 30- to 60-hour courses on Environmental Health were created from 2020 to 2022 in the medical faculties such as Lyon, Dijon, Paris Cité or Limoges. Furthermore, a French Report published in 2020 by the French Minister of Higher Education and Research⁴⁷ recommends that 100 per cent of the students should be trained in ecological transition in their initial training. As a consequence, the Conference of Deans of the Faculties of Medicine decided to implement a new course, 'Introduction to Environmental Health'. This course should include a 6-hour online module mandatory for all the 36 Faculties of Medicine in France and should be released in 2023.

Regarding the format of the training courses to be included in the curricula, there should be a minimum number of 'core' hours to provide the fundamentals: for example, a minimum of 48 hours, with the possibility of an extension or a proportion (5 per cent) of the number of hours of targeted training (eg, in dentistry, 85 out of the 1,700 hours of the curriculum. In medicine, 250 out of the 5,000 hours of the curriculum). Given that students going into medical and paramedical training spend a preparatory year, a common foundation should include this teaching on climate, transitions and public health from the outset (with a minimum of 50 hours, for example).

Secondly, we propose a foundational training course on climate change and health transitions through continuous education

for professionals. This training is useful for acquiring content in health management and sustainability: it includes the global cost approach including prevention, the 'life cycle' approach of products, equipment and services, buying policies and sustainability criteria; risk factors in health and the environment with synthetic chemical agents (endocrine disruptors), the risk of antibiotic resistance (use of antibiotics), but also health promotion factors (physical activities, nonmedicinal practices, etc), which are in line with the decarbonisation of health-care services. As an example, the French School of Public Health also offers a 6-day professional training module to accelerate the transformation with in-position professionals who want to get more competencies.

Thirdly, these issues must be included in cross-disciplinary training programmes that mobilise several profiles of professionals who are not necessarily health specialists. As an example, we participate in the ecological transition core curriculum for senior civil servants. This training has existed since 2021 but must be strengthened and generalised: the training is partly provided by a digital platform named MENTOR, common to all senior civil servants, and is intended to be deployed for all institutional decision makers, from local elected officials to ministerial officials, including the heads of companies and groups, of which the National State is a stakeholder.

In conclusion, the literature and present study suggest that future health professionals are made aware of the major global issues and the impacts on their future activity. But they feel under-informed because of the lack of curriculum dedicated to that issues in their training. There is a growing demand from health students to understand how to be consistent with environmental challenges. It is now time to integrate environmental sustainability as a fundamental component of healthcare leadership that must form an essential part of health students' training.

References and notes

- Weisz, U., Pichler, P. P., Jaccard, I. S., Haas, W., Matej, S., Bachner, F., et al. (2020), 'Carbon emission trends and sustainability options in Austrian health care', *Resources, Conservation and Recycling*, Vol. 160, Article 104862.
- Nansai, K., Fry, J., Malik, A., Takayanagi, W., Kondo, N., (2020), 'Carbon footprint of Japanese health care services from 2011 to 2015', *Resources, Conservation and Recycling*, Vol. 152, Article 104525.
- Eckelman, M., Sherman, J., (2016), 'Environmental impacts of the U.S. health care system and effects on public health', *PLoS ONE*, Vol. 11, No. 6, p. e0157014.
- Tennison, I., Roschnik, S., Ashby, B., Boyd, R., Hamilton, I., Oreszczyn, T., et al. (2021), 'Health care's response to climate change: A carbon footprint assessment of the NHS in England', *The Lancet Planetary Health*, Vol. 5, pp. e84–e92.
- Eckelman, M. J., Sherman, J. D., MacNeill, A. J., (2018), 'Life cycle environmental emissions and health damages from the Canadian healthcare system: An economic–environmental–epidemiological analysis', *PLoS Med*, Vol. 15, Article e1002623.
- Malik, A., Lenzen, M., McAlister, S., McGain, F., (2018), 'The carbon footprint of Australian health care', *The Lancet Planetary Health*, Vol. 2, pp. e27–e35.
- Wu, R., (2019), 'The carbon footprint of the Chinese health–care system: An environmentally extended input–output and structural path analysis study', *The Lancet Planetary Health*, Vol. 3, pp. e413–e419.
- Lenzen, M., Malik, A., Li, M., Fry, J., Weisz, H., Pichler, P. P., et al. (2020), 'The environmental footprint of health care: A global assessment', *The Lancet Planetary Health*, Vol. 4, pp. e271–e279.
- Pichler, P. P., Jaccard, I. S., Weisz, U., Weisz, H., (2019), 'International comparison of health care carbon footprints', *Environmental Research Letters*, Vol. 14, Article 064004.
- Health Care Without Harm, (2019), 'Health care's climate footprint', available at: https://noharm-global.org/sites/default/files/documents-files/5961/HealthCaresClimateFootprint_092319.pdf (accessed 15th January, 2023).
- The Shift Project, (2021), 'Décarbonons la santé pour signer durablement !', Dans le cadre du Plan de transformation de l'économie française, Rapport intermédiaire, 172 pp, available at: https://theshiftproject.org/wp-content/uploads/2021/06/PTEF_Decarbonons-la-sante-pour-soigner-durablement_RI_Juin-2021.vf_.pdf (accessed 15th January, 2023).
- Marrauld, L., Baurès, E., Lefébure, A., (2021), 'Comprendre l'impact environnemental du secteur de la santé : Pour un leadership partagé en faveur d'un système de santé durable et résilient', *La Presse Médicale Formation, Elsevier Masson SAS*, Vol. 2, No. 9, pp. 628–633.
- The Shift Project, (2021), 'Approvisionnement pétrolier futur de l'union européenne: État des réserves et perspectives de production des principaux pays fournisseurs', Rapport pour la Direction Générale des Relations Internationales et de la Stratégie (DGRIS), Ministère des Armées, 181 pp, available at: https://theshiftproject.org/wp-content/uploads/2021/05/Approvisionnement-petrolier-futur-de-lUE_Shift-Project_Mai-2021_RAPPORT-COMPLET.pdf (accessed 15th January, 2023).
- Collectif d'élèves issus des écoles de la haute fonction publique, (2021), 'Nous, élèves de la haute fonction publique, demandons à être formés à la transition écologique', Tribune Publiée dans Le Monde le 21 juin 2021, available at: https://www.lemonde.fr/idees/article/2021/06/21/nous-eleves-de-la-haute-fonction-publique-demandons-a-etre-formes-a-la-transition-ecologique_6085085_3232.html (accessed 15th January, 2023).
- Lefébure, A., (2020), 'Ecological aspirations of youth: How higher education could fall between two stools', in: Henry, C., Rockström, J., Stern, N. (eds.). 'Standing Up for a Sustainable World. Voices of Change', Edward Elgar Publishing, pp. 239–246, 9781800371774. <10.4337/9781800371781.00040>. <hal-03126415>
- Sustainability as a policy concept has its origin in the Brundtland Report of 1987. That document was concerned with the tension between the aspirations of mankind towards a better life, on the one hand, and the limitations imposed by nature, on the other (Kuhlman and Farrington, 2010).
- Harpet, C., (2021), 'Entre crises et transitions: Quel enseignement dispenser en santé publique?', in: 'Revue Responsabilité & Environnement', n°101-janvier 2021, Annales des Mines, pp. 12–17.
- Ibid.*, p. 12.
- Students, sustainability, and study choices, Exclusive analysis of findings from a survey of 2,000 prospective students, Elizabeth Shepherd, THE Consultancy, May 2021.
- Lee, K., Gjersoe, N., O'Neill, S., Barnett, J., (2020), 'Youth perceptions of climate change: A narrative synthesis', *WIREs Climate Change*, Vol. 11, p. e641.
- Williams, D. S., Rosendo, S., Sadasing, O., Celliers, L., (2020), 'Identifying local governance capacity needs for implementing climate change adaptation in Mauritius', *Climate Policy*, Vol. 20, pp. 548–562.
- Middleton, J., 'ISIS, crop failure and no antibiotics: What training will we need for future public health?', *European Journal of Public Health*, Vol. 26, pp. 735–736.
- Rich, C. R., Singleton, J. K., Wadhwa, S. S., (2018), 'Sustainability for Healthcare Management: A Leadership Imperative', Routledge, London, 250 pp.
- Ibid.*, p. 12.
- Shea, B., Knowlton, K., Shaman, J., (2020), 'Assessment of climate–health curricula at international health professions schools', *JAMA Network Open*, Vol. 3, No. 5, p. e206609. <https://doi.org/10.1001/jamanetworkopen.2020.6609>
- Krasna, H., Czabanowska, K., Jiang, S., Khadka, S., Morita, H., Kornfeld, J., et al. (2020), 'The future of careers at the intersection of climate change and public health: What can job postings and an employer survey tell us?', *International Journal of Environmental Research and Public Health*, Vol. 17, No. 4, p. 1310. <https://doi.org/10.3390/ijerph17041310>

27. *Ibid.*
28. Frankson, R., Hueston, W., Christian, K., Olson, D., Lee, M., Valeri, L., *et al.* (2016), 'One health core competency domains', *Frontiers in Public Health*, Vol. 4, p. 192.
29. Wals, A. E. J., Corcoran, P. B., (2012), 'Learning for Sustainability in Times of Accelerating Change', Wageningen Academic Publishers, Wageningen, The Netherlands.
30. Orhan, R., Middleton, J., Krafft, T., Czabanowska, K., (2021), 'Climate action at public health schools in the European Region', *International Journal of Environmental Research and Public Health*, Vol. 18, No. 4, p. 1518. <https://doi.org/10.3390/ijerph18041518>
31. Association Nationale des Étudiants en Médecine de France — *National Association of French Medical Students.*
32. Association Nationale des Étudiants en Pharmacie de France — *National Association of French Students in Pharmacy.*
33. Union Nationale des Étudiants en Chirurgie Dentaire — *National Association of French Dental Students.*
34. Fédération Nationale des Étudiants en Soins Infirmiers — *National Association of French Nursing Students.*
35. Fédération Nationale des Étudiants en Kinésithérapie — *National Association of French Students in Physical Therapy.*
36. PACES: First year of Medical Study in France is a competitive entrance exam with a 20 per cent chance of success. It includes PACES, PASS and LASS.
37. École des Hautes Études en Santé Publique — *French School of Public Health – Rennes, France.*
38. Institut de Santé Publique d'Épidémiologie et de Développement — *Public Health and Epidemiology Institute – Bordeaux, France.*
39. École des Hautes Études en Santé Publique, note 37 above.
40. Institut de Santé Publique d'Épidémiologie et de Développement, note 38 above.
41. Bonner, T. N., (2000), 'Becoming a physician: Medical education in Britain, France, Germany, and the United States, 1750–1945', JHU Press.
42. World Health Organization, (2017), 'Determinants of Health', available at: <https://www.who.int/news-room/questions-and-answers/item/determinants-of-health> (accessed 15th January, 2023).
43. Marraud, Baurès, Lefébure, ref. 12 above.
44. Harpet, C., Baurès, E., Marraud, L., Peretti-N'Diaye, M., Vinot, D., (2022), 'Santé publique en transition', éd. 'Les liens qui libèrent', Presses de l'EHESP, Paris-Rennes.
45. Bourdon, D., (2018), 'Le développement durable et le cahier des charges pour l'architecture hospitalière', Dans architecture et ingénierie à l'hôpital, le défi de l'avenir sous la direction de François Langevin, Presses de l'EHESP, Paris-Rennes, 336 pp.
46. Marraud, Baurès, Lefébure, ref. 12 above.
47. Jouzel, J., (n.d.), 'Sensibiliser et former aux enjeux de la transition écologique et du développement durable dans l'enseignement supérieur', available at: <https://www.vie-publique.fr/rapport/283872-former-aux-enjeux-de-transition-ecologique-dans-enseignement-superieur> (accessed 15th January, 2023).

APPENDIX 1

A growing institutional concern

Environmental health is part of our daily lives and is a growing concern: 7 out of 10 French people are convinced that the environment has an impact on health.

The health crisis has accelerated this awareness, revealing the impact of ecosystem degradation on human health and our vulnerability to the emergence of zoonoses. It thus gives substance to the 'One Health' concept, which associates human health, animal and plant health and the quality of living environments, and renews the contemporary approach to environmental health, which originated in the hygienist movement of the 19th century.

The marginalisation of environmental health in a health system focused on curative care is no longer in phase with these expectations and with the reality of the challenges of reducing health inequalities.

Noting that the management of these cross-cutting issues has been carried out in silos and that they are not sufficiently supported politically, they call for operational and proactive management, for action as close as possible to the territories in order to promote a positive and integrated local approach to environmental health and for a deepening of knowledge through a reinforced and coordinated research effort.

Information report by Mr. Bernard JOMIER and Mrs. Florence LASSARADE, on behalf of the Social Affairs Commission no. 479 (2020–2021) — 24th March, 2021.

2021.Q5. Do you think climate issues (global warming, environmental health) should be taught in the health field? (YES/NO/DK)Q6. Do you think opening Shared Teaching Resources within the different health fields over those topics would be interesting? (YES/NO/DK)Q7. Were you ever offered a course about climate or environmental issues during your studies so far? (YES/NO/DK)