



Planetary Health Report Card (Medicine):

*University of Pennsylvania
Perelman School of Medicine*



Perelman
School of Medicine
UNIVERSITY of PENNSYLVANIA

2023-2024 Contributing Team:

- Students: Jessica Campanile, Catherine Shen, Isha Thapar, Elizabeth Whidden, Sarah Wornow
- Faculty Mentors: Dr. Farah Hussain
- Primary Contact: Jessica Campanile,
jessica.campanile@pennmedicine.upenn.edu

Summary of Findings

Overall	C+
<u>Curriculum</u>	C+
<ul style="list-style-type: none"> Though the University of Pennsylvania Perelman School of Medicine (PSOM) includes some planetary health education, it is limited and inconsistent, led by few faculty champions with support of numerous students. After the first 18 months, students have no mandatory exposure to planetary health content. Recommendations: Incorporate planetary health throughout the degree. PSOM must also address topics absent in current curriculum (ex. cardiovascular risks of climate change, worsening health disparities). 	
<u>Interdisciplinary Research</u>	B+
<ul style="list-style-type: none"> PSOM has some faculty who primarily research planetary health, and it supports several institutes for interdisciplinary planetary health research. There is a clear, centralized website through the medical school devoted to planetary health, though it is limited in scope and not consistently updated. Recommendations: Update the Planetary Health website with research and advocacy involvement opportunities, a list of faculty mentors, and a clear commitment to planetary health and climate justice. 	
<u>Community Outreach and Advocacy</u>	C
<ul style="list-style-type: none"> PSOM partners with community organizations to promote planetary health through student-led groups, but the medical school itself does not engage meaningfully with the Philadelphia community about planetary health. The medical school does not routinely communicate with the student body about planetary health. Recommendations: Establish formal opportunities for students to conduct community-based climate research and advocacy. Include planetary health news and communications in routine emails sent to students and faculty. 	
<u>Support for Student-Led Initiatives</u>	B
<ul style="list-style-type: none"> PSOM has multiple student-led planetary health initiatives. The Healthcare Sustainability Group creates waste reduction initiatives, and engages in advocacy, patient education, and research on climate topics. Philly TREES aims to improve tree equity and community wellness in Philadelphia. The PennMed One Health Club raises awareness of interdisciplinary approaches to human, animal, and planetary health. Recommendations: Include student sustainability representatives on key school committees (curriculum, facilities, policy). Update the Planetary Health website with information regarding student-led initiative successes and methods for gaining funding and increased institutional support for these groups. PSOM administrative efforts should uplift and empower these student-run organizations, as these provide most, if not all, of the climate-focused programming specific to the medical school. 	
<u>Campus Sustainability</u>	C-
<ul style="list-style-type: none"> PSOM has a designated planetary health faculty member, follows sustainable building practices, and supports climate-friendly transportation options. However, the school lacks clear sustainability guidelines, has not fully divested from fossil fuel, and sources minimal energy from renewable sources. Recommendations: Assess laboratory- and research-related sustainability. Introduce clear sustainable guidelines for event planning as well as procurement within the medical school. The broader university has plans and goals related to its divestment efforts and sourcing of renewable energy. 	

Statement of Purpose

Planetary health is human health.

The Planetary Health Alliance describes planetary health as “a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth’s natural systems on human health and all life on Earth.” This definition is intentionally broad, intended to encompass the multitude of ways that the environment can affect health, including water scarcity, changing food systems, urbanization, biodiversity shifts, natural disasters, climate change, changing land use and land cover, global pollution, and changing biogeochemical flows. The health of humanity is dependent on our environment, and our environment is changing rapidly and in disastrous ways. Although the World Health Organization has called climate change “the greatest threat to global health in the 21st century,” many medical school’s institutional priorities do not reflect the urgency of this danger to human health.

As future health professionals, we must be prepared to address the impacts of human-caused environmental changes on our patients’ health. This preparation is in the hands of the institutions providing our medical training. It is imperative that we hold our institutions accountable for educating medical students about the health impacts of climate change and other anthropogenic environmental changes, generating research to better understand health impacts and solutions, supporting related student initiatives, embracing sustainable practices as much as possible, and engaging with surrounding communities that are most affected by environmental threats. Because climate change and environmental threats disproportionately affect vulnerable populations (for example, communities of color, older adults sensitive to health threats, and individuals in low-resource settings), these issues are inherently ones of equity and justice.

With the purpose of increasing planetary health awareness and accountability among medical schools, we have created a Planetary Health Report Card that medical students internationally can use to grade and compare their home institutions on an annual basis. This medical-student-driven initiative aims to compare medical schools nationally and internationally on the basis of discrete metrics in five main category areas: 1) planetary health curriculum, 2) interdisciplinary research in health and environment, 3) university support for student planetary health initiatives, and 4) community outreach centered on environmental health impacts 5) medical school campus sustainability.

Definitions & Other Considerations

Definitions:

- **Planetary Health:** is described by the Planetary Health Alliance as “the health of human civilization and the state of the natural systems on which it depends.” For example, topics such as climate change, declining biodiversity, shortages of arable land and freshwater, and pollution would all fall under the realm of planetary health. Both planetary health and traditional ‘environmental health’ examine the relationship between human health and the external environment, including extreme temperatures, chemicals, vector-borne diseases, etc. Planetary health explicitly concerns itself with the potential health harms associated with human-caused perturbations of natural systems. Therefore, the human health focus of planetary health makes the field well-adapted for the context of medical school education. Throughout this report card, we use the term planetary health to refer to this broad swath of topics, but resources do not need to explicitly include the term “planetary health” to satisfy the metric.
- **Sustainable Healthcare:** As defined by the Academy of Royal Colleges, sustainable healthcare involves ensuring the ability to provide good quality care for future generations by balancing the economic, environmental, and social constraints and demands within health care settings. A sustainable healthcare system maintains population health, reduces disease burden and minimises use of healthcare services.
- **Education for Sustainable Healthcare (ESH):** is defined as the process of equipping current and future health professionals with the knowledge, attitudes, skills and capacity to provide environmentally sustainable services through health professional education, thus working to decrease the enormous environmental impact of the healthcare industry. Planetary Health Education is an integral part of this education rather than an end in itself. This is because knowledge on Planetary Health is required to be able to fully understand the necessity of sustainable healthcare as well as being part of the broader knowledge needed to fully protect and promote health. In summary, ESH is covered by the three Priority Learning Outcomes of the Centre of Sustainable Healthcare below, and Planetary Health Education is embraced in the first learning objective and is a fundamental requirement to achieve learning outcomes 2 and 3:
 1. Describe how the environment and human health interact at different levels.

2. Demonstrate the knowledge and skills needed to improve the environmental sustainability of health systems.
3. Discuss how the duty of a doctor to protect and promote health is shaped by the dependence of human health on the local and global environment.

- **Medical School vs. Institution:** When “medical school” is specified in the report card, this only refers to curriculum and resources offered by the School of Medicine and does not include offerings from other parts of the university (e.g. undergraduate departments (USA), other related departments (e.g. Public Health, Population Health departments)). In contrast, when “institution” is specified in the report card, we are referring to the university more broadly. Any resource reasonably accessible by medical students, no matter where in the institution the resource comes from or if it is specifically targeted for medical students, can meet this metric.
- **Environmental history (Metric #19 in Curriculum Section):** This is a series of questions providers are taught to ask during medical encounters that elicits patients’ exposures and environmental risk factors. Historically, this has included consideration of exposures like pesticides, asbestos, and lead, though in the modern era shaped by climate change, it can be expanded to include things like wildfire smoke exposure, air pollution and mold after flooding. Key components include place of residence over the lifecourse, occupational history, food and water sources (e.g. meat from industrial feeding operations, regular fishing in contaminated water, access to clean drinking water), and exposure to air pollution.
- **Elective:** The word “elective” refers to an optional course or lecture series that a medical student can opt to take part in but is not a requirement in the core curriculum. Generally, these elective courses take place in the preclinical curriculum but vary by school.
- **Clerkship:** This is a term used in the USA to refer to placements that medical students go on e.g. Pediatrics, General medicine, Psychiatry. In the UK these are referred to as rotations or placements.

Other considerations:

- If there are more than one “tracks” at your medical school with two different curricula (for example, Harvard Medical School has a Pathways and HST curriculum track), you can choose to fill out a report card for each track, or fill out just one report card and average the scores received by each track in cases

where the scores are different (see the 2021 Harvard or Oxford report cards as examples).

Added to our resources in 2022, the Planetary Health Report Card [Literature Review by Metric](#) collates the evidence behind each of the metrics in the Planetary Health Report Card. It serves as a collection of references for further learning and a resource for those advocating for increased planetary health engagement at their institutions.

Planetary Health Curriculum

Section Overview: *This section evaluates the integration of relevant planetary health topics into the medical school curriculum. Today's medical students will be on the frontlines of tackling the health effects of climate and other environmental changes. Therefore, it is critical that medical students are trained to understand the health effects of these changes, as well as planetary health issues and principles more broadly. Topics like the changing geography of vector-borne diseases, the health consequences of air pollution, environmental health inequities, and disaster response principles must be part of every medical school's core curriculum.*

Curriculum: General

1.1. Did your <u>medical school</u> offer elective courses (student selected modules) to engage students in Education for Sustainable Healthcare or Planetary Health in the last year?	
3	Yes, the medical school has offered more than one elective whose primary focus is ESH/planetary health in the past year.
2	Yes, the medical school has offered one elective whose primary focus is ESH/planetary health in the past year.
1	The medical school does not have any electives whose primary focus is ESH/planetary health, but there are one or more electives that include a lecture on planetary health.
0	No, the medical school has not offered any electives on planetary health or electives that include ESH/planetary health topics in the past year.
<p><i>Score explanation:</i></p> <p>The Perelman School of Medicine (PSOM) offers one elective whose primary focus is ESH/planetary health, entitled Climate Change and Health. The course is lecture-based, with speakers from Penn as well as other institutions, and challenges students to connect their basic science, clinical, and social knowledge to understand the impact of climate change on human health. Most sessions focus on the implications of climate change on conditions seen by different medical specialties, such as an endocrinologist giving a lecture on endocrine-disrupting chemicals and the impact of changing temperatures and air pollution on glycemic control and diabetes epidemiology. Student leaders within the climate movement at the Perelman School of Medicine are also invited to give lectures if they have a specific area of expertise or interest.</p> <p>Starting in 2023, the medical school also offers the One Health elective. This course focuses on the interconnectedness of people, animals, and the environment, and climate-related issues make up 5 out of the 9 total lectures. The following lectures in</p>	

the One Health elective contain information regarding climate change: Introduction to One Health, Galápagos Education and Research Alliance (discussion of climate anxiety), Design for Health (sustainable design), Sustainable Development Goals, and Biodiversity.

Curriculum: Health Effects of Climate Change

1.2. Does your medical school curriculum address the relationship between extreme heat, health risks, and climate change?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score Explanation:

The MS1 core curriculum course “Doctoring” includes a session titled “Lived Environment.” This session consists of a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health at the Perelman School of Medicine) followed by a 2-hour interactive small group discussion. This lecture includes extensive discussion of extreme heat, including rising temperatures and heat-related deaths in Philadelphia, vulnerable populations, urban heat islands, the importance of green spaces, and a description of Philadelphia’s heat health emergency protocol. The small group session also instructed students to view the [Philadelphia Heat Vulnerability Index map](#) and discuss relationships between heat exposure and socioeconomic status. A [required reading](#) for the small-group session discussed the effect of extreme heat on health outcomes in Pennsylvania. While this lecture is in the core curriculum, attendance is not mandated for the plenary lecture – though it is recorded – while attendance is required for the small group.

Additionally, during the MS1 preclinical “Brain and Behavior” block in the core curriculum, there is brief discussion of Uhthoff’s phenomenon (worsening symptoms of demyelinating diseases due to extreme heat). During the MS2 preclinical Renal block, supplemental/self-study material is provided covering renal implications of climate change and the effect of planetary health on patients with kidney disease.

1.3. Does your medical school curriculum address the impacts of extreme weather events on individual health and/or on healthcare systems?

3 This topic was explored **in depth** by the **core** curriculum.

2 This topic was **briefly** covered in the **core** curriculum.

1 This topic was covered in **elective** coursework.

0 This topic was **not** covered.

Score explanation:

The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session consists of a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health, Perelman School of Medicine) followed by a 2-hour interactive small group discussion. This lecture includes extensive discussion of extreme weather events, including heat waves, cold waves, wildfires, flooding, tornadoes, and hurricanes. The health effects of flooding are covered in depth, including waterborne pathogens, mental health effects, and disruptions in access to care. The lack of infrastructure to cope with these extreme weather events is also discussed, as well as the combined sewage system in Philadelphia that can result in sewage contamination of local waterways in the event of a flood. One of the listed [required readings](#) for the small-group session also discussed the effect of severe floods on air/water quality and emergency services in Pennsylvania. Please note that while this session is a part of the core curriculum, attendance is not mandated for the lecture but is recorded for the small group. Additionally, during the MS2 preclinical Endocrine block, there is provided supplemental/self-study material discussing how extreme weather affects patients with diabetes.

1.4. Does your medical school curriculum address the impact of climate change on the changing patterns of infectious diseases?

3 This topic was explored **in depth** by the **core** curriculum.

2 This topic was **briefly** covered in the **core** curriculum.

1 This topic was covered in **elective** coursework.

0 This topic was **not** covered.

Score explanation:

The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session consists of a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health, Perelman School of Medicine) followed by a 2-hour interactive small group discussion. In this lecture, there are slides on the increased

range of the vector for lyme disease, as well as the increased length of tick season. Additionally, there are slides on the impact of climate change on waterborne illnesses, with emphasis on enteric viruses and bacteria. One of the listed [required readings](#) for the small-group session also the impact of climate change on increased rates of mosquito-borne and tick-borne infections. The effects of climate change on the spread of Lyme disease is also covered in two slides in a lecture titled “Infectious Arthritis” within the “Mechanisms of Disease and Therapeutic Intervention (MDTI)” block of the first-year, preclinical curriculum. These slides discuss how warming temperatures increase the range of tick habitat and thus drive the spread of Lyme. Additionally, the preclinical microbiology course includes a lecture titled “Parasitology” with one slide on the effects of climate change on the spread of malaria. Lastly, the “Climate Change and Health Elective” offered to medical students every semester includes a dedicated lecture on Infectious Diseases.

1.5. Does your medical school curriculum address the respiratory health effects of climate change and air pollution?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session includes a 2-hour interactive small group discussion on the health effects of climate change. One of the listed [required readings](#) for the small-group session discusses the impact of climate change on worsened air quality and increased rates of asthma in Pennsylvania, as well as longer and more severe allergy seasons. There is also content on climate change and air pollution specifically within the Philadelphia community during the Health System Science course as part of the MS4 core curriculum. Additionally, the preclinical MS2 pulmonary block includes a lecture on Environmental Exposures, covering basic mechanisms of particulate clearance in the lung, the components of a thoughtful occupational history, and a few common occupational/environmental lung diseases. During the MS2 preclinical Endocrine block, there is provided supplemental/self-study material discussing the connection between air pollution and diabetes, hypothyroidism, and pregnancy. Lastly, the “Climate Change and Health Elective” offered to medical students every semester includes a dedicated lecture on the relationship between climate change and the pulmonary system.

1.6. Does your medical school curriculum address the cardiovascular health effects of climate change, including increased heat?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

Dr. Farah Hussain’s lecture in the second-year “Health Systems Sciences” course touches upon the cardiovascular impacts of climate change, focusing on the relationship between air pollution and atherosclerotic disease. The specific impact of increased heat on cardiovascular health is not mentioned. The “Climate Change and Health Elective” offered to medical students every semester includes a dedicated lecture on the relationship between climate change and cardiology.

1.7. Does your medical school curriculum address the mental health and neuropsychological effects of environmental degradation and climate change?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session includes a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health, Perelman School of Medicine). In this lecture, there is a slide on the health effects of flooding, one of which is mental health effects. Additionally, during the MS1 preclinical “Brain and Behavior: block in the core curriculum, there is brief discussion of Uhthoff’s phenomenon (i.e. worsening symptoms of demyelinating diseases due to extreme heat) as well as climate related mental health effects (climate anxiety, post-disaster PTSD).

1.8. Does your medical school curriculum address the relationships between health, individual patient food and water security, ecosystem health, and climate change?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.
<p><i>Score explanation:</i> During the MS2 preclinical Endocrine block, there is provided supplemental/self-study material discussing how food insecurity is associated with diabetes.</p>	

<p>1.9. Does your <u>medical school</u> curriculum address the outsized impact of climate change on marginalized populations such as those with low SES, women, communities of color, Indigenous communities, children, homeless populations, and older adults?</p>	
3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.
<p><i>Score explanation:</i> The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session consists of a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health, Perelman School of Medicine) followed by a 2-hour interactive small group discussion. In this lecture, there is discussion of vulnerable populations especially in the context of extreme heat and lack of green spaces, including the elderly, low-income populations, and communities of color. In the small group session, there is a discussion point instructing students to use a structural competency framework to brainstorm policies, economic systems, and social hierarchies that contribute to the environmental exposures that influence health disparities. Additionally, there is a discussion on intersectionality and how climate change fits into this framework. Dr. Hussain’s lecture in the “Health Systems Sciences” course also briefly touched upon the disproportionate impact of poor air quality and increased asthma prevalence in communities with lower socioeconomic status. Lastly, the “Climate Change and Health Elective” offered to medical students every semester discusses populations most vulnerable to climate-related health effects throughout the course.</p>	

1.10. Does your medical school curriculum address the unequal regional health impacts of climate change globally?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation: This topic was not covered.

Curriculum: Environmental Health & the Effects of Anthropogenic Toxins on Human Health

1.11. Does your medical school curriculum address the reproductive health effects of industry-related environmental toxins (e.g. air pollution, pesticides)?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

The “Climate Change and Health Elective” offered to medical students every semester includes a dedicated lecture on the relationship between climate change and reproductive health.

In addition, in the Reproduction course taken in the M1 year, students are encouraged – though not required – to self-study topics, one of which is the connection between air pollution and pregnancy.

1.12. Does your medical school curriculum address important human-caused environmental threats that are relevant to the university’s surrounding community?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.

1	This topic was covered in elective coursework.
0	This topic was not covered.
<p><i>Score explanation:</i></p> <p>The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session consists of a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health, Perelman School of Medicine) followed by a 2-hour interactive small group discussion. This lecture includes discussion of extreme heat and heat-related deaths specifically in Philadelphia, a description of Philadelphia’s heat health emergency protocol, and discussion regarding the combined sewage system in Philadelphia that can result in contamination of local waterways in the event of a flood. The small group session also instructed students to view the Philadelphia Heat Vulnerability Index map and discuss trends noted. One of the listed required readings for the small-group session also discussed the effect of extreme heat, worsened air quality, and severe floods on health outcomes in Pennsylvania.</p> <p>There is also content on climate change and air pollution specifically within the Philadelphia community during the “Health Systems Sciences” course. Dr. Hussain’s lecture in this course explores the Philadelphia Energy Solutions Refinery fires, which caused considerable pollution, disproportionately in areas with more families of color or lower socioeconomic status.</p>	

<p>1.13. To what extent does your <u>medical school</u> emphasize the importance of Indigenous knowledge and value systems as essential components of planetary health solutions?</p>	
3	Indigenous knowledge and value systems are integrated throughout the medical school’s planetary health education
2	Indigenous knowledge and value systems as essential components of planetary health solutions are included briefly in the core curriculum.
1	Indigenous knowledge and value systems as essential components of planetary health solutions are included in elective coursework.
0	This topic was not covered.
<p><i>Score explanation:</i></p> <p>The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session includes a 2-hour interactive small group discussion on the health effects of climate change. One of the listed optional readings for the small-group session discusses the recent use of Indigenous knowledge to protect more than 200 miles of coastline in the state of California.</p>	

1.14. Does your medical school curriculum address the outsized impact of anthropogenic environmental toxins on marginalized populations such as those with low SES, women, communities of color, children, homeless populations, Indigenous populations, and older adults?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

This topic is covered in a lecture in the “Climate Change and Human Health” elective which focuses on environmental exposures, how to assess a patient’s risk or sequelae of an exposure, and relevant treatment/lifestyle recommendations.

Curriculum: Sustainability

1.15. Does your medical school curriculum address the environmental and health co-benefits of a plant-based diet?

3	This topic was explored in depth by the core curriculum.
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

The human health benefits of a plant-based diet was covered, but the environmental health benefit was not mentioned.

1.16. Does your medical school curriculum address the carbon footprint of healthcare systems?

3	This topic was explored in depth by the core curriculum
2	This topic was briefly covered in the core curriculum.
1	This topic was covered in elective coursework.
0	This topic was not covered.

Score explanation:

The preclinical core curriculum course “Doctoring” includes a session for MS1’s titled “Lived Environment.” This session includes a 1-hour lecture by Dr. Farah Hussain (Director of Planetary Health, Perelman School of Medicine). In this lecture, there are slides on the healthcare system’s carbon footprint including the statistic that the healthcare system contributes to 1/10th of US greenhouse gas emissions, and if the US healthcare system were a country, it would rank 7th globally in terms of emissions. Dr. Hussain’s “Health System Sciences” lecture covered similar material regarding the outsized impact of healthcare on our changing climate, highlighting federal and international initiatives to reduce healthcare-related emissions.

Additionally, during the MS2 preclinical Renal block, self-study material was available covering the climate effects of kidney replacement therapies and mitigation strategies. Lastly, the “Climate Change and Health Elective” offered to medical students every semester includes a dedicated lecture on healthcare system sustainability.

1.17. Does your medical school curriculum cover these components of sustainable clinical practice in the core curriculum? (points for each)

0	<p>The health and environmental co-benefits of avoiding over-medicalisation, over-investigation and/or over-treatment</p> <p><i>Score Explanation:</i> At Perelman School of Medicine, US, during the orientation for clerkships, students engage in discussions on how excess medical tests exhaust resources but don’t contribute to high value care. However, we do not discuss the environmental impacts of this practice.</p>
0	<p>The environmental impact of pharmaceuticals and over-prescribing as a cause of climate health harm. Alternatively teaching on deprescribing where possible and its environmental and health co-benefits would fulfill this metric.</p> <p><i>Score Explanation:</i> This is not discussed in our curriculum.</p>
0	<p>The health and environmental co-benefits of non-pharmaceutical management of conditions where appropriate such as exercise or yoga classes for type 2 diabetes; social group activities such as gardening for mental health conditions; active transport such as bicycle schemes. This is commonly known as social prescribing in the UK.</p> <p><i>Score Explanation:</i> This is not discussed in our curriculum.</p>
0	<p>Environmental impact of surgical healthcare on planetary health and the climate crisis, and how can it be mitigated</p> <p><i>Score Explanation:</i> This is not discussed in our curriculum.</p>

0	The impact of anesthetic gasses on the healthcare carbon footprint and ways to reduce anesthesia environmental impacts, such as total intravenous anesthesia or choosing less environmentally harmful anesthetic gas options with reduced greenhouse gas emissions <i>Score Explanation:</i> This is not discussed in our curriculum.
0	The impact of inhalers on the healthcare carbon footprint and the environmental benefit of dry powdered inhalers over metered dose inhalers. <i>Score Explanation:</i> This is not discussed in our curriculum.
0	Waste production within healthcare clinics and strategies for reducing waste in clinical activities (e.g. single use items in the inpatient or outpatient setting) <i>Score Explanation:</i> This is not discussed in our curriculum.
	<i>Score explanation:</i> None of the above were discussed in our curriculum.

Curriculum: Clinical Applications

1.18. In training for patient encounters, does your <u>medical school's</u> curriculum introduce strategies to have conversations with patients about the health effects of climate change?	
2	Yes, there are strategies introduced for having conversations with patients about climate change in the core curriculum.
1	Yes, there are strategies introduced for having conversations with patients about climate change in elective coursework.
0	No, there are not strategies introduced for having conversations with patients about climate change
<i>Score explanation:</i> The “Climate Change and Health Elective” offered to medical students every semester includes a dedicated lecture on talking to patients about climate change.	

1.19. In training for patient encounters, does your <u>medical school's</u> curriculum introduce strategies for taking an environmental history or exposure history?	
2	Yes, the core curriculum includes strategies for taking an environmental history.
1	Only elective coursework includes strategies for taking an environmental history.

0	No, the curriculum does not include strategies for taking an environmental history.
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Score explanation:

The “Introduction to Clinical Medicine (ICM)” course in the core curriculum for second-year medical students includes some content on taking an environmental history, per slides created by students in 2021. Additionally, the ICM course includes content on taking a Climate Emergencies history.

For this course, students have a pre-reading document that includes the following:

“Exposures – The general exposure history includes the following:

Environmental: chemicals, dusts, and fumes?

Animal exposure (pets, livestock, lab animals)?

Travel outside the country?

Blood transfusions? When and why?

These questions are usually generated as part of a symptom-triggered part of taking the history. You won’t ask this a lot unless it seems clinically relevant.”

Curriculum: Administrative Support for Planetary Health

1.20. Is your medical school currently in the process of implementing or improving Education for Sustainable Healthcare (ESH)/planetary health education?

4	Yes, the medical school is currently in the process of making major improvements to ESH/planetary health education.
2	Yes, the medical school is currently in the process of making minor improvements to ESH/planetary health education.
0	No, there are no improvements to planetary health education in progress.

Score explanation:

The University of Pennsylvania Perelman School of Medicine is currently in the process of making major improvements to planetary health education. We recently appointed Dr. Farah Hussain as Director of the Planetary Health Curriculum; her responsibilities include collaborating with PSOM faculty and staff to ensure that medical students are receiving instruction on the health effects of climate change and the disproportionate effects on disadvantaged communities.

1.21. How well are the aforementioned planetary health/Education for Sustainable Healthcare topics integrated longitudinally into the core curriculum?

6	Planetary health/ESH topics are well integrated into the core medical school curriculum.
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4	Some planetary health/ESH topics are appropriately integrated into the core medical student curriculum.
2	Planetary health/ESH is not integrated and is primarily addressed in (a) standalone lecture(s) .
0	There is minimal/no education for sustainable healthcare.

Score explanation:

Some planetary health/ESH topics are appropriately integrated into the core medical student curriculum. Planetary Health topics have been integrated in core lectures for Pulmonology, Brain and Behavior, Infectious Disease, Dermatology, ICM, and Health System Science courses. Supplemental material has been provided for the Renal and Endocrine courses. Core courses such as GI and Cardiology still lack key climate-related content.

Additionally, there is a session in the “Doctoring” course titled “Our Lived Environment, Climate Consequences on Human Health” to prepare students to recognize climate change and its impacts on human health and disease, gain familiarity with the mechanisms by which climate change impacts the environment, and understand how vulnerable populations are disproportionately affected by the consequences of climate change.

However, there is no mandatory incorporation of planetary health content in the clinical years. After the first 18 months of medical school, students have to purposefully opt in to electives or extracurriculars to continue learning planetary health content.

1.22. Does your medical school employ a member of faculty to specifically oversee and take responsibility for the incorporation of planetary health and sustainable healthcare as a theme throughout the course?

1	Yes , the medical school has a specific faculty/staff member responsible for overseeing curricular integration of planetary health and sustainable healthcare
0	No , the medical school does not have a specific faculty/staff member responsible for overseeing curricular integration of planetary health and sustainable healthcare.

Score explanation:

The Perelman School of Medicine recently appointed Dr. Farah Hussain as Director of the Planetary Health Curriculum. This faculty member’s responsibilities include collaborating with PSOM faculty and staff to ensure that medical students are receiving instruction on the health effects of climate change and the disproportionate effects on disadvantaged communities.

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Are there additional curriculum resources offered at your medical school or institution not yet asked about that you would like to describe? If so, please do so below.

Interdisciplinary Research

Section Overview: *This section evaluates the quality and quantity of interdisciplinary planetary health research at the medical school and broader institution. Interactions between health and the environment are complex and multifactorial. While climate change has been extensively studied from an environmental science perspective, planetary health is an emerging field. As leading health institutions with talented researchers and research resources, medical schools should fund research studying the health effects of climate change and anthropogenic environmental toxins. This obligation is particularly strong because the public and policymakers are more attentive to climate change when its implications for human health are emphasized.*

2.1. Are there researchers engaged in planetary health research and healthcare sustainability research at your medical school ?	
3	Yes, there are faculty members at the medical school who have a primary research focus in planetary health or healthcare sustainability.
2	Yes, there are individual faculty members at the medical school who are conducting research related to planetary health or healthcare sustainability, but it is not their primary research focus.
1	There are planetary health and/or healthcare sustainability researchers at the institution , but none associated with the medical school.
0	No, there are no planetary health and/or healthcare sustainability researchers at the institution or medical school at this time.
<p><i>Score explanation:</i></p> <p>There are researchers affiliated with the University of Pennsylvania medical school who are conducting research related to planetary health. Many of these faculty members have extensive publications related to planetary health.</p> <ul style="list-style-type: none"> ● Dr. Misha Rosenbach (dermatology) has researched the impact of climate change on skin conditions <ul style="list-style-type: none"> ○ Wang S-P, Stefanovic N, Orfali RL, et al. Impact of climate change on atopic dermatitis: A review by the International Eczema Council. <i>Allergy</i>. 2024;00:1-15. doi:10.1111/all.16007 ○ Philadelphia study links tree canopy growth to decrease in human mortality. US Forest Service Research and Development. (2023, September 1). ● Dr. Gregory Tasian (nephrology) has studied the relationship between population density and temperature affect the transmission of SARS-CoV-2 	

- The Association of Social Distancing, Population Density, and Temperature with the SARS-CoV-2 Instantaneous Reproduction Number in Counties Across the United States. David Rubin, Jing Huang, Brian T. Fisher, Antonio Gasparrini, Vicky Tam, Lihai Song, XiWang, Jason Kaufman, Kate Fitzpatrick, Arushi Jain, Heather Griffis, Koby Crammer, Gregory Tasian. medRxiv 2020.05.08.20094474; doi:<https://doi.org/10.1101/2020.05.08.20094474>
- Dr. Eugenia South (Emergency Medicine) has investigated ways to improve environment health justice
 - Ashcraft, L. E., Cabrera, K. I., Lane-Fall, M. B., & South, E. C. (2024). Leveraging implementation science to advance environmental justice research and achieve health equity through neighborhood and policy interventions. *Annual Review of Public Health*, 45(1). <https://doi.org/10.1146/annurev-publhealth-060222-033003>
- Dr. Sameed Kahtana (cardiology), has recent papers on CV effects of climate change on marginalized communities
 - Khatana, S. A., Eberly, L. A., Nathan, A. S., & Groeneveld, P. W. (2023). Projected change in the burden of excess cardiovascular deaths associated with extreme heat by Midcentury (2036–2065) in the contiguous United States. *Circulation*, 148(20), 1559–1569. <https://doi.org/10.1161/circulationaha.123.066017>

2.2. Is there a dedicated department or institute for interdisciplinary planetary health research at your <u>institution</u>?	
3	There is at least one dedicated department or institute for interdisciplinary planetary health research.
2	There is not currently a department or institute for interdisciplinary planetary health research, but there are plans to open one in the next 3 years.
1	There is an Occupational and Environmental Health department , but no interdisciplinary department or institute for planetary health research.
0	There is no dedicated department or institute.
<p><i>Score explanation:</i> The Perelman School of Medicine holds the Center of Excellence in Environmental Toxicology (CEET) is a multidisciplinary resource for examining environmental health risks and exposures through the lens of environmental toxicology. Additionally, there exists the Institute for Environmental Medicine, a program that studies the cellular, biochemical, and molecular aspects of environmental issues through biomedical research.</p>	

However, the mission and research activities of these institutes do not completely fulfill the definition of “planetary health.” The CEET’s mission is “to elucidate the mechanistic links between environmental exposures and human disease and translate its findings into action to improve the health of vulnerable individuals, and local, national and global communities.” However, this program is lacking in research around the population and individual health impacts of climate change, beyond toxicology (i.e. anthropogenic global change to Earth’s natural systems). Similarly, The Institute for Environmental Medicine fails to directly explore how large-scale communities are impacted by environmental factors.

The [Environmental Innovations Initiative](#) is another organization through the University of Pennsylvania that has research communities with an interdisciplinary focus, some of which encompass planetary health.

Other centers at Penn that are involved in planetary health are the Center for Public Health Initiative; Wharton Climate Risk Center; Center for Global Health; and Water Center at Penn.

2.3. Is there a process by which communities disproportionately impacted by climate change and environmental injustice give input or make decisions about the research agenda at your medical school?

3	Yes, there is a process in which community members impacted by climate and environmental injustice have decision-making power in the climate + environmental research agenda.
2	Yes, there is a process in which community members impacted by climate and environmental injustice advise the climate + environmental research agenda.
1	No , but there are current efforts to establish a process for community members to advise or make decisions on the research agenda.
0	There is no process, and no efforts to create such a process.

Score explanation:

[The Center of Excellence in Environmental Toxicology](#) includes a Community Engagement Core in which community concerns are used to guide environmental research ideas. This is done by conducting interviews in affected communities. While this does not provide these communities direct decision-making power, they influence and shape the climate and environmental research agenda for this institution.

The [Urban Health Lab](#), run by Dr. Eugenia South, functions as a community-academic collaborative with multiple initiatives to promote nature, prevent violence, and dismantle racism in its surrounding community.

2.4. Does your institution have a planetary health website that centralizes ongoing

and past research related to health and the environment?	
3	There is an easy-to-use, adequately comprehensive website that centralizes various campus resources related to health and the environment including all of the following: upcoming events, leaders in planetary health at your institution, and relevant funding opportunities.
2	There is a website that attempts to centralize various campus resources related to health and the environment, but it is hard-to-use, not updated, or not adequately comprehensive.
1	The institution has an Office of Sustainability website that includes some resources related to health and the environment.
0	There is no website.
<p><i>Score explanation:</i> Penn Sustainability has a robust website with details regarding campus initiatives, upcoming events, funding opportunities, and more. This website serves the entire university. The Perelman School of Medicine has a website for students to explore and engage with projects related to climate change and sustainability in health care. However, it is not comprehensive and has not been updated recently. See item 4.3 for additional description. https://www.med.upenn.edu/student/planetary-health-resources.html https://www.sustainability.upenn.edu/campus-initiatives/wellness https://environment.upenn.edu/</p>	

2.5. Has your <u>institution</u> recently hosted a conference or symposium on topics related to planetary health?	
4	Yes, the medical school has hosted at least one conference or symposium on topics related to planetary health in the past year.
3	Yes, the institution has hosted at least one conference or symposium on topics related to planetary health in the past year.
2	Yes, the institution has hosted a conference on topics related to planetary health in the past three years.
1	The institution has not hosted any conferences directly, but they have provided financial support for a local planetary health event.

0	No, the institution has not hosted a conference on topics related to planetary health in the past three years.
<p><i>Score explanation:</i> The University of Pennsylvania hosts Climate Week which hosts several symposiums on the various forms and effects of climate change. This will be hosted in 2023 from September 19th to 22nd. https://climateweek.provost.upenn.edu/event-archive Additionally, Penn Vet’s One Health Club hosts a symposium that provides interdisciplinary education and collaboration between the 12 graduate schools of the University of Pennsylvania. The week consists of lectures and discussions varying from current healthcare research to zoonotic disease outbreaks, topics related to planetary health. https://pennvetohc.wixsite.com/2019</p>	

2.6. Is your <u>medical school</u> a member of a national or international planetary health or ESH organization?	
1	Yes, the medical school is a member of a national or international planetary health or ESH organization
0	No, the medical school is not a member of such an organization
<p><i>Score explanation:</i> The Perelman School of Medicine is a member of the <u>Global Consortium of Climate and Health Education</u>. It is not a member of the Planetary Health Alliance.</p>	

Section Total (13 out of 17)	13
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Are there additional research resources offered at your medical school or institution not yet asked about that you would like to describe? If so, please do so below.

Community Outreach and Advocacy

Section Overview: *This section evaluates medical school engagement in community outreach and advocacy efforts associated with planetary health. Researching and teaching planetary health is necessary but not sufficient. It is critical that institutions also directly engage with communities most affected by environmental health harms. Although climate change is a problem largely created by those with power and resources, its impacts fall disproportionately on under-resourced populations and communities of color. Institutions should partner with local communities affected by climate change and pollution to share information about environmental health threats, advocate together for change, and provide opportunities for students to be a part of this work.*

3.1. Does your medical school partner with community organizations to promote planetary and environmental health?	
3	Yes, the medical school meaningfully partners with multiple community organizations to promote planetary and environmental health.
2	Yes, the medical school meaningfully partners with one community organization to promote planetary and environmental health.
1	The institution partners with community organizations, but the medical school is not part of that partnership.
0	No, there is no such meaningful community partnership.
<p><i>Score explanation:</i> Penn Medicine formally interfaces with multiple community organizations to promote planetary and environmental health through the Bridging the Gaps program. Students can take part in a Community Health Internship with community partners. Medical students can work with Sankofa Community Farm at Bartram’s Garden, working with adolescents on the farm to increase knowledge/access to nutritious food. Students can also work with UC Green, which empowers environmental stewardship in University City and its surrounding communities. Additionally, the Perelman School of Medicine’s student organization “Philly T.R.E.E.s (Towards Racial and Environmental Equity) focuses on environmental justice to coordinate plantings and prunings with many community partners in the Philadelphia community Point Breeze, including Point Breeze Tree Tenders and they Philadelphia Horticultural Society.</p>	

3.2. Does your medical school offer community-facing courses or events regarding planetary health?

3	The medical school offers community-facing courses or events at least once every year.
2	The medical school offers courses or events open to the community at least once per year, but they are not primarily created for a community audience.
1	The institution has offered community-facing courses or events, but the medical school was not involved in planning those courses or events.
0	The institution/medical school have not offered such community-facing courses or events.

Score explanation:

There are no free community-facing courses regarding climate change and the environment available at the University of Pennsylvania. However, there are a variety of events hosted by the University of Pennsylvania Office of Sustainability. A list of events can be found [here](#).

3.3. Does your medical school have regular coverage of issues related to planetary health and/or sustainable healthcare in university update communications?

2	Yes, all students regularly receive communication updates dedicated to planetary health and/or sustainable healthcare.
1	Yes, planetary health and/or sustainable healthcare topics are sometimes included in communication updates.
0	Students do not receive communications about planetary health or sustainable healthcare.

Score explanation:

The Perelman School of Medicine Communications, Collaborations, and Community Update Express email is distributed monthly and includes a link to the medical school's Planetary Health website, which is linked [here](#).

3.4. Does the institution or main affiliated hospital trust engage in professional education activities targeting individuals post graduation with the aim of ensuring their knowledge and skills in planetary health and sustainable healthcare remain up to date during their professional career?

2	Yes, the institution or main affiliated hospital trust offers multiple in-person or online courses relating to planetary health and/or sustainable healthcare for post-graduate providers, including at least one with a primary focus of planetary health.
1	Yes, the institution or main affiliated hospital trust offers one course relating to planetary health and/or sustainable healthcare for post-graduate providers
0	There are no such accessible courses for post-graduate providers
<p><i>Score explanation:</i> While there are not CME courses explicitly designated for “planetary health,” there are CME courses that address planetary health themes. Environmental & Occupational Medicine Grand Rounds and Journal Club both count for CME credit and address themes of planetary health. Medical Education Journal Club also counts for CME credit, and a session in 2019 had as its paper a piece about including climate change in medical school curricula. Dr. Hussain has given Grand Rounds presentations for multiple departments, as well as an all-faculty lecture for physicians across the institution. Finally, there is an online CME offering titled Social and Environmental Determinants of Sleep which also addresses themes of environmental impacts on health.</p>	

3.5. Does your <u>medical school</u> or its <u>affiliated teaching hospitals</u> have accessible educational materials for patients about environmental health exposures?	
2	Yes, the medical school or all affiliated hospitals have accessible educational materials for patients.
1	Some affiliated hospitals have accessible educational materials for patients.
0	No affiliated medical centers have accessible educational materials for patients.
<p><i>Score explanation:</i> The medical center provides educational materials for patients about environmental health exposures through the Center of Excellence in Environmental Toxicology (CEET). Patients are able to learn more about environmental health through pages such as “How polluted is my environment?” However, these resources can be difficult to find without prior knowledge of CEET. CHOP pediatric practices also provide information on air pollution and asthma to patients, especially during times of worsened air quality.</p>	

3.6. Does your medical school or its affiliated teaching hospitals have accessible educational materials for patients about the health impacts of climate change?

2	Yes, the medical school or all affiliated hospitals have accessible educational materials for patients.
1	Some affiliated hospitals have accessible educational materials for patients.
0	No affiliated hospitals have accessible educational materials for patients.
<p><i>Score explanation:</i> The hospital provides two articles on the impact of climate change on health; one on climate change and headaches (linked here), and one on climate change and allergy season (linked here).</p>	

Section Total (7 out of 14)	7
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Are there additional community engagement and advocacy resources offered at your medical school or institution not yet asked about that you would like to describe? If so, please do so below.

Support for Student-Led Planetary Health Initiatives

Section Overview: *This section evaluates institutional support for student-led planetary health initiatives, such as funding, fellowships, programming, and student groups. Planetary health is a young field and, as young people facing a future deeply shaped by climate change, students are often some of the first at an institution to engage with it. Institutions should provide support for students to engage in sustainability quality improvement (QI) initiatives, discover mentors in their area of interest, and receive funding for planetary health projects.*

4.1. Does your <u>medical school</u> or your <u>institution</u> offer support for medical students interested in enacting a sustainability initiative/QI project?	
2	Yes, the medical school or institution <i>either</i> offers grants for students to enact sustainability initiatives/QI projects <i>or</i> sustainability QI projects are part of the core curriculum.
1	The medical school or institution encourages sustainability QI projects (to fulfill clerkship or longitudinal requirements) and offers resources to help students succeed in these projects, but there is no student funding available and there is no requirement to participate.
0	No, neither the medical school or the institution offer opportunities or support for sustainability initiatives or QI projects.
<p><i>Score explanation:</i></p> <p>The University of Pennsylvania Sustainability Office offers the Green Fund from which students can receive funding for sustainability initiatives. This initiative is a source of funding for students, faculty, and staff that have ideas for projects to “improve the university’s environmental performance and reduce campus emissions.” This grant is not specific to the medical school and can result in up to \$30,000 in funding. The grant is flexible insofar that applications are reviewed on a rolling basis and application support is offered through Penn Sustainability if applicants have questions or need assistance identifying University partners.</p> <p>The Perelman School of Medicine Medical Student Government offers the Impact Fund, to which students can apply for a smaller “Jump Start Grant” or a “Big Deal Award.” If a student wanted to design a planetary health initiative, it could potentially be funded through one of these grants, though neither is specific to the intersection of climate change and human health.</p>	

4.2. Does your <u>institution</u> offer opportunities for medical students to do research

related to planetary health and/or sustainable healthcare?	
2	The institution has a specific research program or fellowship for students interested in doing planetary health/sustainable healthcare research.
1	There are research opportunities for students to perform research related to planetary health/sustainable healthcare, but these require student initiative to seek these out and carry them out in their spare time.
0	There are no opportunities for students to engage in planetary health/sustainable healthcare research.
<p><i>Score Explanation:</i></p> <p>The University of Pennsylvania offers the Climate Leaders @ Penn fellowship for graduate and professional students. Each year, twenty students are selected as fellows, engaging in masterclasses and social events with climate leaders, and culminating in a capstone project. The fellowship is described as “tailoring educational, professional, and social initiatives that foster connections and knowledge-sharing across the entirety of the university.” The mission of the fellowship is to “not only enhance the climate-related expertise within the Penn graduate community but also to empower both the fellows and the broader community to effectively address the pressing climate crisis.”</p> <p>However, it is pertinent to understand that the fellowship is <i>not</i> a paid opportunity and does not result in any credit towards a student’s degree. While medical students are eligible to apply to this opportunity, they would have to seek out specific mentors and opportunities to focus their fellowship on planetary health and sustainable healthcare.</p>	

4.3. Does the <u>medical school</u> have a webpage where medical students can find specific information related to planetary health and/or sustainable healthcare activities and mentors within the medical school? For example, projects achieved, current initiatives underway at the medical school and/or contact of information of potential mentors.	
2	The medical school has a webpage with specific information related to planetary health or sustainable healthcare that includes up-to-date information on relevant initiatives and contact information of potential mentors.
1	There is a medical school webpage that features some information on projects and mentors within planetary health and sustainable healthcare within the medical school, but it lacks key information.
0	There is no medical-school specific webpage for locating planetary health and/or sustainable healthcare projects or mentors.

There is a [medical school webpage](#) that features information on planetary health resources. It includes a link to a [student-created website](#) encompassing funding sources, research, advocacy, continuing education opportunities, and more. The medical school website includes links to funding sources, supplementary planetary health courses students may take at other Penn schools, and planetary health events on campus. None of the linked websites from that page are managed by the medical school.

4.4. Does your medical school have registered student groups dedicated towards fostering a culture of planetary health engagement, scholarship, and advocacy on campus, supported by faculty advisors?

2	Yes, there is a student organization with faculty support at my medical school dedicated to planetary health or sustainability in healthcare.
1	Yes, there is a student organization at my medical school dedicated to planetary health or sustainability in healthcare but it lacks faculty support .
0	No, there is not a student organization at my institution dedicated to planetary health or sustainability in healthcare.

Score explanation: There are multiple student groups at the Perelman School of Medicine that focus and work on planetary health issues with support from faculty advisors. These include the following:

- Healthcare Sustainability Group: This group of students is specifically dedicated to educating the PSOM community about the impact of the changing climate on human health, creating quality improvement initiatives to reduce waste and the overall environmental impact of our health practice, and engage in advocacy, patient education, and research focused on these topics. The faculty advisor for this group is Dr. Farah Hussain, the Director of Planetary Health Curriculum at the Perelman School of Medicine.
- Philly TREES: This student-run organization aims to improve tree equity and community wellness in Philadelphia. [Philly TREES](#) plants trees in Philadelphia in areas with disproportionately less tree canopy, which, by virtue of tree inequity in urban environments, tend to be underserved populations. Their work includes tree planting, tree care, community education and outreach, and student leadership development in health equity.
- One Health: The PennMed One Health Club is a student group raising awareness of and supporting interdisciplinary approaches to the health of humans, animals, and the environment. This group focused on advocacy, education, outreach, and research on One Health topics and helps foster such connections across Penn and the greater Philadelphia community.

4.5. Is there a student liaison representing sustainability interests who serves on a

medical school or institutional decision-making council to advocate for curriculum reform and/or sustainability best practices?

1	Yes, there is a student representative that serves on a medical school or institutional decision-making council/committee.
0	No, there is no such student representative.
<i>Score explanation:</i> There is no sustainability-specific student representative at the medical school or institutional level.	

4.6. In the past year, has the institution had one or more co-curricular planetary health programs or initiatives in the following categories? (1 point each)

1	<p>Projects where students are able to gain experience in organic agriculture and sustainable food systems, such as gardens, farms, community supported agriculture (CSA), fishery programs, or urban agriculture projects.</p> <p><i>Score explanation: The Penn Farm, a subset of the Penn Food and Wellness Collaborative, grows thousands of pounds of organic produce each year. This food supports food access initiatives. The group also hosts programming including courses, workshops, and volunteer opportunities.</i></p>
1	<p>Panels, speaker series, or similar events related to planetary health that have students as an intended audience.</p> <p><i>Score explanation: Penn Sustainability keeps a centralized calendar of climate-related events on their website, highlighting the yearly Earth Week celebration as well as panels, lecture series, and workshops that go on throughout the year.</i></p>
0	<p>Events in which students learn directly from members of a local environmental justice community about the climate and environmental challenges they face, and how health professionals can partner with their community to address these exposures and impacts.</p> <p><i>Score explanation: These do not exist or are not widely advertised to medical students.</i></p>
0	<p>Cultural arts events, installations or performances related to planetary health that have students as an intended audience.</p> <p><i>Score explanation: These do not exist or are not widely advertised to medical students.</i></p>
1	<p>Local volunteer opportunities related to building community resilience to anthropogenic environmental impacts.</p> <p><i>Score explanation: See description of the Philly TREES organization in Section 4.4.</i></p>

1	<p>Wilderness or outdoors programs (e.g., that organize hiking, backpacking, kayaking, or other outings for students)</p> <p><i>Score explanation:</i> The Penn Outdoors Club is a student-run organization that promotes trips, film screenings, skills courses, and more related to outdoor activities such as hiking, camping, and climbing. Anyone may join and there is a fee of \$25/year for rentals of gear such as tents, camping stoves, etc.</p> <p>The medical school also offers a Wilderness and Disaster Medicine course, where students receive traditional as well as hands-on didactic training on topics ranging from poisonous snake bites to mass casualty event triage systems. Students learn leadership and teamwork skills as well as how to react to medical emergencies in low-resource environments.</p>
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Section Total (11 out of 15)	11
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Are there additional student-led initiative resources offered at your medical school or institution not yet asked about that you would like to describe? If so, please do so below.

Campus Sustainability

Section Overview: *This section evaluates the support and engagement in sustainability initiatives by the medical school and/or institution. The healthcare industry is a major contributor to greenhouse gas emissions as well as pollution that harms local, regional, and global ecosystems. While healthcare is, by nature, a resource-intensive endeavor, the healthcare sector is well poised to lead the world to a more sustainable future. This will involve scrutinizing every aspect of how our systems operate, from where we source our energy, to how we build our infrastructure, to what companies we invest in. Our medical schools, clinics, and hospitals must set the standard for sustainable practices, and show other sectors what is possible when it comes to minimizing environmental impact.*

5.1. Does your <u>medical school</u> and/or <u>institution</u> have an Office of Sustainability?	
3	Yes, there is an Office of Sustainability with multiple full-time staff dedicated to campus sustainability. If the Office of Sustainability serves the entire campus, there is at least one designated staff member for sustainability at the hospital and/or medical school.
2	There is an Office of Sustainability with one or more full-time staff dedicated to campus sustainability, but no specific staff member in charge of medical school and/or hospital sustainability.
1	There are no salaried sustainability staff , but there is a sustainability task force or committee
0	There are no staff members or task force responsible for overseeing campus sustainability
<p><i>Score explanation:</i> The University of Pennsylvania has a Sustainability Office staffed with multiple full-time employees. While there is a Corporate Director of Sustainability for the University of Pennsylvania Health System, there is no dedicated full-time staff employed directly by the Medical School.</p>	

5.2. How ambitious is your <u>institution/medical school</u> plan to reduce its own carbon footprint?	
5	The institution/medical school has a written and approved plan to achieve carbon neutrality by 2030

3	The institution/medical school has a written and approved plan to achieve carbon neutrality by 2040
1	The institution/medical school has a stated goal of carbon neutrality by 2040 but has not created a plan to reach that goal or the plan is inadequate
0	The institution/medical school does not meet any of the requirements listed above

Score explanation:

The University of Pennsylvania committed to becoming carbon neutral by 2042 through the [Climate and Sustainability Action Plan \(CSAP\) 3.0](#), which the Perelman School of Medicine has signed on to.

5.3. Do buildings/infrastructure used by the medical school for teaching (not including the hospital) utilize renewable energy?

3	Yes medical school buildings are 100% powered by renewable energy
2	Medical school buildings source >80% of energy needs from off-site and/or on-site renewable energy.
1	Medical school buildings source >20% of energy needs from off-site and/or on-site renewable energy.
0	Medical school buildings source <20% of energy needs from off-site and/or on-site renewable energy.

Score explanation:

The University of Pennsylvania and the University of Pennsylvania Pennsylvania Health System has a 220 MW [solar Power Purchase Agreement](#) (completed in December 2023) with Community Energy (located in Central Pennsylvania). The agreement lasts 25 years and offsets 70% of the health system’s and undergraduate campus’ electricity usage.

5.4. Are sustainable building practices utilized for new and old buildings on the medical school campus, with design and construction of new buildings and remodeling of old buildings conforming to a published sustainability rating system or building code/guideline?

3	Yes, sustainable building practices are utilized for new buildings on the medical school campus and the majority of old buildings have been retrofitted to be more sustainable.
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2	Sustainable building practices are utilized for new buildings on the medical school campus, but most old buildings have not been retrofitted .
1	Sustainable building practices are inadequately or incompletely implemented for new buildings.
0	Sustainability is not considered in the construction of new buildings.

Score explanation:

The Pavillion, Penn Medicine’s newest hospital building opened in 2021, and the Perelman Center for Advanced Medicine, where the medical school is located, are LEED certified (gold and silver, respectively). All future Penn Medicine buildings and renovation projects are registered with the USGBC and aiming for at least a LEED silver [certification](#). In the construction of the Pavillion, sustainable practices included recycling material from the demolition of Penn Tower which previously occupied the Pavillion’s spot, installing a HVAC system that utilizes 100% outside air, and reducing water usage through low-flow sinks, toilets and showers. The Hospital of the University of Pennsylvania works with Student Eco-Reps to record improvements in energy efficiency at the [hospital](#). Lastly, the Perelman School of Medicine has construction standards outlined [here](#) and furniture standards outlined [here](#).

5.5. Has the medical school or institution implemented strategies to encourage and provide environmentally-friendly transportation options for students and reduce the environmental impact of commuting?

2	Yes, the medical school or institution has implemented strategies to encourage and provide environmentally-friendly transportation options such as safe active transport, public transport, or carpooling and these options are well-utilized by students. Alternatively, the campus location is not amenable to unsustainable forms of transportation by default.
1	The medical school or institution has implemented some strategies to provide environmentally-friendly transportation options, but the options are unsatisfactorily accessible or advertised.
0	The medical school or institution has not implemented strategies to encourage and provide environmentally-friendly transportation options.

Score explanation:

The University of Pennsylvania offers a [free on-demand evening shuttle service](#) for students (7:30pm-3am). In addition, 4 electric vans were added to the University’s transit fleet offered by the Penn Parking and Transportation unit. Students have free access to the Loop through University City (LUCY) Shuttle and discounted tickets for SEPTA, PATCO, NJ Transit, and Amtrak. Many students bike to school, and 352 bike

parking spots were added when The Pavillion was opened. The University of Pennsylvania is considered a Bike Friendly University.

5.6. Does your medical school have an organics recycling program (compost) and a conventional recycling program (aluminum/paper/plastic/glass)?

2	Yes, the medical school has both compost and recycling programs accessible to students and faculty.
1	The medical school has either recycling or compost programs accessible to students and faculty, but not both.
0	There is no compost or recycling program at the medical school.

Score explanation:

The Perelman School of Medicine does not have a compost program, but it does offer a conventional recycling program. Bins are located throughout the medical school and larger hospital system.

5.7. Does the medical school apply sustainability criteria when making decisions about the campus food and beverage selections (e.g. local sourcing, reduced meat, decreased plastic packaging)?

3	Yes, the medical school has adequate sustainability requirements for food and beverages, including meat-free days or no red-meat, and is engaged in efforts to increase food and beverage sustainability.
2	There are sustainability guidelines for food and beverages, but they are insufficient or optional . The medical school is engaged in efforts to increase food and beverage sustainability.
1	There are sustainability guidelines for food and beverages, but they are insufficient or optional . The medical school is not engaged in efforts to increase food and beverage sustainability.
0	There are no sustainability guidelines for food and beverages.

Score explanation:

The University of Pennsylvania is a member of the Sustainable Purchasing Leadership Council, but it is not clear if the medical school is also a member. Catering@Penn shows information on caterers' sustainability, but these guidelines are inaccessible.

5.8. Does the medical school or institution apply sustainability criteria when making decisions about supply procurement?

3	Yes, the medical school has adequate sustainability requirements for supply procurement and is engaged in efforts to increase sustainability of procurement.
2	There are sustainability guidelines for supply procurement, but they are insufficient or optional . The medical school is engaged in efforts to increase sustainability of procurement.
1	There are sustainability guidelines for supply procurement, but they are insufficient or optional . The medical school is not engaged in efforts to increase sustainability of procurement.
0	There are no sustainability guidelines for supply procurement.

Score explanation:

The University of Pennsylvania's Procurement Services Office has guidelines for sustainable [purchasing](#). Per the Climate and Sustainability Action Plan 3.0, these guidelines will be updated. No public information is available regarding sustainable purchasing guidelines specific to the medical school.

5.9. Are there sustainability requirements or guidelines for events hosted at the medical school?

2	Every event hosted at the medical school must abide by sustainability criteria.
1	The medical school strongly recommends or incentivizes sustainability measures, but they are not required .
0	There are no sustainability guidelines for medical school events.

Score explanation:

There are no current sustainability guidelines.

5.10. Does your medical school have programs and initiatives to assist with making lab spaces more environmentally sustainable?

2	Yes, the medical school has programs and initiatives to assist with making lab spaces more environmentally sustainable.
1	There are guidelines on how to make lab spaces more environmentally sustainable, but not programs or initiatives.

0	There are no efforts at the medical school to make lab spaces more sustainable.
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Score explanation:

There are no efforts at the medical school to make lab spaces more sustainable.

5.11. Does your institution's endowment portfolio investments include fossil-fuel companies?

4	The institution is entirely divested from fossil fuels and has made a commitment to reinvest divested funds into renewable energy companies or renewable energy campus initiatives.
3	The institution is entirely divested from fossil fuels.
2	The institution has partially divested from fossil fuel companies or has made a commitment to fully divest , but currently still has fossil fuel investments.
1	The institution has not divested from fossil-fuel companies, but faculty and/or students are conducting organized advocacy for divestment.
0	Yes, the institution has investments with fossil-fuel companies and there have been no efforts to change that.

Score explanation:

Penn's endowment currently does not include companies focused on [fossil fuel production](#). In 2021 they announced a plan to eliminate greenhouse gas emissions from [investments by 2050, though this does not state that they will divest from fossil fuel companies](#). In May 2023, the Office of Investments reported that 2% of the endowment was invested in [companies](#) focused on decarbonization.

Penn's endowment portfolio investments currently include fossil-fuel companies, but Penn does not hold and does not expect to hold going forward, any direct investment in companies focused on the production of thermal coal or bituminous (tar) sands. These efforts reflect partial divestment from fossil-fuel companies, leading to a score of 2.

Section Total (13 out of 32)	13
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Back to Summary Page [here](#)

Are there additional sustainability resources offered at your medical school or institution not yet asked about that you would like to describe? If so, please do so below.

Grading

Section Overview

This section focuses on the grading of the report card. The institution received a grade for each of the individual sections as well as an overall institutional grade. Section point totals were tallied, divided by the total points available for the section, and converted to a percentage. The overall institutional grade is a weighted average of the section grades, with curriculum receiving a higher weight owing to its larger number of metrics. Letter grades for each section and the institution overall were then assigned according to the table below.

Letter Grade*	Percentage
A	80% - 100%
B	60% - 79%
C	40% - 59%
D	20% - 39%
F	0% - 19%

Planetary Health Grades for the Perelman School of Medicine

The following table presents the individual section grades and overall institutional grade for the Perelman School of Medicine on this medical-school-specific Planetary Health Report Card.

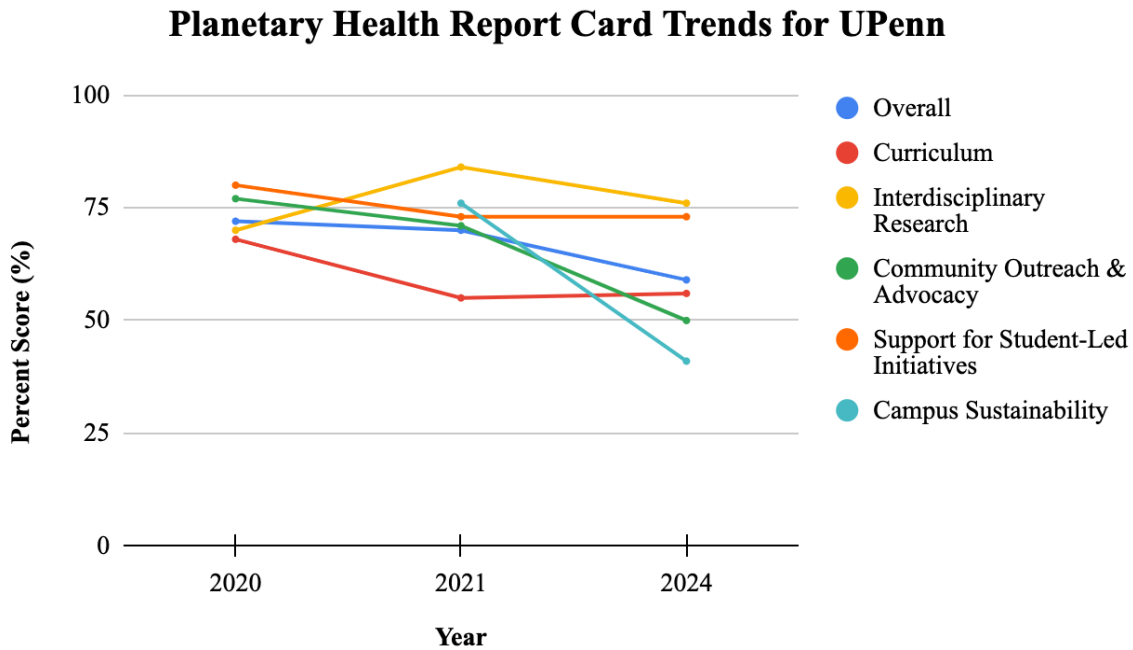
Section	Raw Score %	Letter Grade
Planetary Health Curriculum (30%)	$(40/72) \times 100 = 56\%$	C+
Interdisciplinary Research (17.5%)	$(13/17) \times 100 = 76\%$	B+
Community Outreach and Advocacy (17.5%)	$(7/14) \times 100 = 50\%$	C
Support for Student-led Planetary Health Initiatives (17.5%)	$(11/15) \times 100 = 73\%$	B

Campus Sustainability (17.5%)	$(13/32) \times 100 = 41\%$	C-
Institutional Grade	$(56 \times 0.3 + 76 \times 0.175 + 50 \times 0.175 + 73 \times 0.175 + 41 \times 0.175) =$ 59%	C+

Report Card Trends

Section Overview

This graph demonstrates trends in overall and section grades for the years in which The Perelman School of Medicine at the University of Pennsylvania has participated in the Planetary Health Report Card initiative.



(For those teams that have participated in the PHRC initiative for more than one year, we have created this Google spreadsheet which can be used to generate a graphical representation of the school's trends of section-based and overall scores. You can either plug the numbers into the table and then just copy and paste your graph into your report, or you can create a copy of the Google spreadsheet so you can have a version long term to update and edit. [Here is the link to the spreadsheet to create your graph if you would like to include one.](#))