Climate Resources for Health Education Implementation Guide

A co-creation model for students and educators implementing and adapting CRHE resources

Contents

Introduction

Thank you for your interest in the Climate Resources for Health Education (CRHE), an expert-reviewed repository of learning objectives, case studies, and slides. More resource banks and tools exist now than ever before to support educators seeking to incorporate climate and health content. The collaborative work of hundreds of individuals in 11 countries, the CRHE adds to these resources to accelerate the incorporation of climate change and planetary health information into health education curricula. CRHE aims to bolster climate and health education efforts, equip our health educators with high quality problem based learning (PBL) cases and slides, and prepare our students for the challenges they will face in the climate crisis.

While much of the approach outlined in this implementation guide is applicable to other climate and health education tools and resources, this guide will introduce educators and students to the CRHE specifically and help you tailor these resources to suit your own local needs. Our team will be cheering for you on your climate and health education journey!

We welcome your feedback! Please reach out if questions arise on the CRHE as you use our resources or launch your curriculum. To contact us, email climateresourceshealthed@gmail.com. If you would like to contribute to our resource bank, click “become a contributor” on our website for more information.

General Tips for Teaching Health Professions Students about Climate Change

We're so glad you're here! Just by downloading this implementation guide, you have joined the movement of students and educators committed to adapting our teaching and our health systems to the challenges ahead from the climate crisis. Even as society aims to mitigate carbon emissions and reduce future harm from climate change, we know that climate change is already harming our patients.

Over the last decade, the evidence base on the health effects of climate change has been steadily accumulating. We cannot teach our students all of the research that already exists on climate and health. At the same time, much work remains in elucidating best practices in preventing, recognizing, and responding to climate-driven exposures that affect health. Our goal is to give learners a framework for understanding known challenges and adapting their clinical practice to those challenges of climate change that are not yet fully characterized.

Some faculty may feel out-of-place teaching students about climate change when you did not learn about it at all during your own medical training. And some students, though you've been learning about climate change for almost as long as you can remember, may feel overwhelmed with the sheer urgency of this crisis. Climate change can seem distant from anatomy and other traditional topics in which students are immersed at the outset of their training. CRHE can help.

Figure 1 shows some general principles to guide you when implementing climate and health content. Health education curricula are already packed with content and time for instruction is tight. On the other hand, the climate crisis brings urgency that warrants attention. Educators will need to recognize the urgency of the moment while working within very real time constraints to meet the needs of our learners. Uncertain where to start? If you teach one didactic session or have one student with you on rounds or in clinic, you can start incorporating climate change and health content in your realm. If you direct a course or a curriculum, you will have more power to incorporate a broader range of topics. All faculty can take that first step and simply start where you are—with your next teaching session-- and build upon content over time.

By integrating content into existing curricular topics (like asthma) or types of session (like a pre-clinic chalk talk for residents), educators can contextualize climate and health knowledge within familiar and

essential content and structures for students. This content may best be thought of as an update to the medical evidence base over a broad range of topics rather than a separate topic entirely. The climate and health content may serve to reinforce those topics already covered—from pathophysiology to patient history taking--and vice versa. Employing an integrated approach when including climate and health content also saves time in the tight curriculum and promotes the sustainability of climate and health curricular efforts year-over-year.

Lastly, joining forces - faculty and students partnering together -- is a powerful way to bridge deep medical knowledge and passion about the climate crisis; experience navigating the status quo and innovation to solve future challenges; and applicability to clinical practice and opportunities to nestle content within the existing curriculum. This moment calls for unprecedented and novel collaboration. We are, quite literally, all in this together.

Using a Single Resource

CRHE includes learning objectives, PBL cases and slides sets organized into curricular domains (organ systems and specialties, health system science, and humanities). All CRHE resources can be tailored to the needs of different stages of learners and different teaching settings. The individual resources were created to "plug and play" by faculty and students in local settings. However, many faculty and students may want to adapt the CRHE resources for their local context and for the needs of their local learners. As you plan your teaching session, some general questions to consider include:

- What content on climate change and health have my learners previously received?
- What are touchpoints between this content and my students' existing curriculum and required learning?
- How much time do I have for this session?
- How many learners will be participating in this session?
- Will the CRHE content make up the entirety of the session or will I integrate it with existing slides or content?
- What instructional methods will I use?
    - Will I be lecturing to the students or facilitating student implementation of the content?
    - Will I use break-out groups or small group discussion and report-back?
    - How can I engage my learners in this session?
- Will I assign pre-reading or pre-work?
- How (if at all) will I be evaluating this session?

Additionally, starting with the learning objective for your session, consider:

- Does this objective match my teaching format (lecture, small group, etc)?
- Will this objective be a stand-alone main objective or a learning point under another main objective for my presentation or session?

You can edit the objectives to fit your needs. All CRHE resources were drafted by students and/or faculty and then went through a standard review process prior to inclusion in our resource bank. The rubric for review of CRHE learning objectives is shown here (Table 1).

Category	**Revisions Needed**	**Satisfactory for Review**
Evidence Base	□ One or more learning objectives is **not** accompanied by a reference to a high-quality evidentiary base	□ All submitted learning objectives highlighting links between climate-related exposures and health effects are accompanied by a reference to ≥ 1 high-quality study[a] that provides the evidence base to support the learning objective

Language	□ One or more learning objectives does **not** employ action verbs, or otherwise contains language that makes goals of LO unclear	□ All learning objectives fall into one of the levels of Bloom's Taxonomy.[1] They use higher order action verbs that are specific, observable, and evaluable. Examples include: define, interpret, locate, distinguish, design, and compare.
Level-appropriateness	□ One or more learning objectives is not appropriate for training level (i.e. attending-level complexity in a case study intended for pre-clinical medical student	□ All learning objectives are appropriate for health profession trainee's level of education and practice
Alignment with CRHE Structure and Mission	□ One or more learning objectives does **not** emphasize the link between climate and health, or otherwise fails to underscore the relevance of the climate topic to clinical practice	□ All learning objectives emphasize the links between climate and health and/or underscore the relevance of the topic to clinical practice
Qualitative Comments:		

This rubric provides a helpful guide for you in adapting the content for your own needs. In this rapidly evolving field, some areas may quickly become outdated. For other areas, so much knowledge already exists that it is impossible to cover it all. CRHE resources are meant to be flexible. While we will update these resources on a rolling basis, you may want to update and adapt them before your session. Here are some additional checkpoints that you may want to consider in your preparations to use CRHE PBLs or slides (see Appendix 1 for this worksheet):

- Are there *new additions* to the literature on this topic area since publication of this PBL/slides?
- Are there *geography-related* climate-health impacts for my location/community/hospital system that I need to include for my learners?
- Are there *population-specific* climate exposure risks (e.g. through occupation, activities, structural racism and discrimination, etc) and/or climate-health vulnerabilities (e.g. related to age, chronic health conditions, etc) for my patients that I need to consider for my learners?

The worksheet in Appendix 1 will guide you through checking the evidence base, language, level-appropriateness, and local context considerations of CRHE resources.

[1] Newton, Philip M., Ana Da Silva, and Lee George Peters. "A pragmatic master list of action verbs for bloom's taxonomy." *Frontiers in Education*. Frontiers, 2020. URL: https://www.frontiersin.org/articles/10.3389/feduc.2020.00107/full

Curriculum Implementation – Students

Students can be powerful advocates for change. At many institutions, students are leading efforts to incorporate climate and health content into health curricula. Students passionate about this topic are also clear-sighted and pragmatic: they know that climate change will affect their clinical practice throughout their career. Student energy and fresh perspective can lead to innovative approaches for integrating and delivering content. And, students are living the curriculum—sitting through lectures, small groups and other didactics. Their proximity to the "big picture" may give them insight on places to integrate content most meaningfully within the existing curriculum—where it fits most seamlessly and adds the most value to learners. Students also may have a sense of which of their faculty may be most amenable to updating lecture or small group sessions to include content on climate and health.

At the same time, students are still learning the basics of core health topics and clinical practice. They will need support in discerning how best to apply climate and health knowledge and skills to clinical care and patient scenarios. Students likely will not have as much experience navigating change within an institutional setting. Partnerships between faculty and students have proven effective and sustainable approaches to implementing climate and health curricula.

The worksheet in Appendix 2 contains key questions for students and faculty embarking on broader curricular change. These questions may help you organize your efforts to gain approval and buy-in to bring climate and health content to your school's curriculum:

- Who is the faculty mentor for this effort?
- Who are key student allies?
- Who are key allies within the academic medical center?
- Which curriculum/course do I want to start with?
- What mechanisms exist at my school to consider student/faculty proposals for new curricular content or updates to the curriculum (e.g. Curriculum Committee)?
- Who are stakeholders and leaders that I need to engage?
- When do I hope to implement this curriculum?
    - What can I do now?
    - What are key dependencies towards achieving my next steps?

The Planetary Health Report Card contains metrics from many schools working to implement climate and health curricula as well as additional curricular resources and tips from schools already integrating this content. The 2022 Medical Students for a Sustainable Future (MS4SF) Guide to Climate and Health Curricular Reform in Medical Schools provides two examples of letters to school leadership that students can adapt to "pitch" climate and health curricula to Deans and key faculty. These resources can help kick-start student efforts and link you to a network of students across the country engaged in similar efforts and willing to support yours.

Curriculum Implementation – Faculty

The guidance above for students seeking to initiate climate and health curricula also underscores how valuable faculty can be in supporting student efforts. The partnership itself serves as a tool for co-creation of curricular content and meaningful engagement of students in the curricular development and delivery process. The PBLs and slide sets already co-created through the generous effort of faculty and students for the CRHE lower the activation energy needed to implement content across multiple domains of the curriculum. These resources can help empower a small core group of faculty and students and prevent the feeling of "reinventing the wheel." They may save time and effort for that first step of preparing materials on climate and health topics for teaching faculty. These resources may also help the core climate and health implementation team at a school strategically plan a step-wise approach to adapting and implementing the most high yield materials for the local curriculum.

Reference Appendix 2 for key questions to help organize your approach to implementing a broader curricular effort. Faculty may offer a different or broader perspective on core stakeholders and synergies between the climate and health effort and other areas of the academic medical center. For example, is there an Office of Sustainability at the university that could support your efforts? Are there interprofessional educational initiatives, or faculty in the School of Public Health or School of Nursing that may be a good resource for you? Are there individuals working in patient safety and quality or on quality improvement initiatives with whom you could synergize efforts? As you plan your approach to implementing the curriculum, think broadly about potential allies, even if you may not engage with these allies right away.

As the core faculty-student team approaches leadership, course directors, and teaching faculty, your outreach can build a community of educators supportive of and interested in this effort. While teaching faculty may not have "expertise" in the ways that climate change harms health, they will all have expertise in the specific topic area that they are teaching to students. Showing teaching faculty the intersection of their field of expertise with the growing evidence base on climate and health can demonstrate that this content is not separate and distinct from their field, but updated content squarely within their field—something that merits their attention as part of their own life-long-learning. As a part of your discussion with other faculty and leadership in medical education, explore faculty development opportunities or platforms through which you can engage many faculty at once.

Because time is often the limiting factor, it can be helpful to begin and build momentum with content and topics for which the intersection of climate and health and traditional medical topics is the strongest and the evidence base the most robust. As an example, the negative health effects of air pollution have been well-documented and these impacts span organ systems, with clinical implications. The climate crisis and air pollution share the same drivers, both worsen health inequities, and addressing the drivers of both offers enormous benefits to health harms from pollution and potential avoided health harms from climate change-related exposures. Air pollution as a climate-related exposure risk is woven throughout several CRHE topics, including pulmonary, cardiovascular, neurology, and reproductive health. These modules all contain high-yield resources that build upon each other and are relatively straightforward to integrate into most existing curricula.

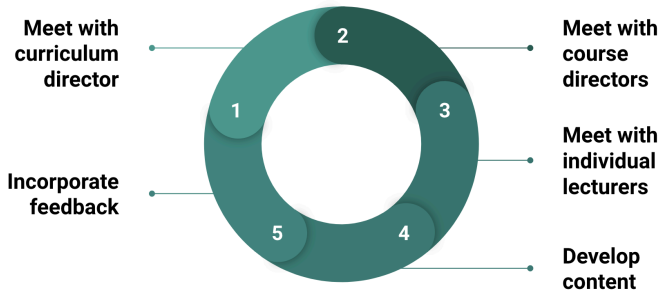

Figure 2: Co-creation and integration of climate and health content model

You can continue to use the co-creation of content model as you implement the curriculum (Figure 3). In Step 4 of this model, core faculty and students can come equipped with CRHE resources so that instead of developing new content for every scenario, you are using or adapting the most suitable CRHE content. As you go through the cycle for co-creation and integration of curricular content, ask for input at every stage. Ask the curriculum director for their perspective on best approaches for integrating content (e.g. lectures, small groups, etc) and their perspective on synergies between this effort and other curricular innovations. Ask course directors for their input on faculty who teach in their course who may have the most interest in and bandwidth to include climate and health content as well as those who are teaching content with which climate and health content fits most naturally. When you approach teaching faculty, ask them to apply their expertise to the learning objectives, PBLs and/or slides, adapting and updating these to fit within their style and content. The goal is for teaching faculty to "own" the content and make it their own.

Appendix 1 – Single Resource Worksheet

Educators may use this worksheet as you prepare to use a CRHE PBL or slide set.

Topic Name:

Time length	# of participants	Stand-alone or integrated content?	Instructional methods	Student prework?	Touchpoint topics with curriculum and prior climate learning

Learning objective checklist:

- Does the language (i.e. action verb) of this objective match my teaching format (lecture, small group, etc)?
- Is the objective appropriate for the training level of my students?
- Will this objective be a stand-alone main objective or a learning point under another main objective for my presentation or session?

Updating and adapting content checklist:

- Are there *new additions* to the evidence base on this topic area since publication of this PBL/slides?
    - New references:

- Are there *geography-related* climate-health impacts for my location/community/hospital system that I need to include for my learners?
    - Location-specific impacts:

- Are there *population-specific* climate exposure risks and/or climate-health vulnerabilities my patients that I need to consider for my learners?
    - Population-specific considerations:

Appendix 2 – Curriculum Implementation Worksheet

Who is the faculty mentor for this effort?	
Who are key student allies?	
Which curriculum/course do I want to start with?	
What mechanisms exist at my school to consider student/faculty proposals for new curricular content or updates to the curriculum (e.g. Curriculum Committee)?	
Who are stakeholders and leaders that I need to engage?	
What are areas of synergy and who are my potential allies across the academic medical center or broader university?	
When do I hope to implement this curriculum? ● What can I do now? ● What are key dependencies towards achieving my next steps?	