Wildfires, Asthma and Beyond:
Our journey incorporating climate change education into medical curriculum

Holly Rosencranz MD  Japhia Ramkumar MD
Objectives

1. **Identify** challenges to incorporating climate change education into medical school curriculum

2. **Develop** and apply strategies to incorporate climate change education into curriculum at your institutions

3. **Assess** impact and efficacy of curricular innovations
Imperative To Train Climate Aware and Active Physicians

“Supports educating the medical community on the potential adverse public health effects of global climate change and incorporating the health implications of climate change into the spectrum of medical education.” (2016)

“Physicians are encouraged to become educated about climate change, its effect on human health, and how to respond to future challenges. Medical schools and continuing medical education providers should incorporate climate change–related coursework into curricula.” (2016)
Medical Schools Are Pushed to Train Doctors for Climate Change

Movement backed by American Medical Association starts to grow, though content can be hard to fit into an already-packed curriculum.

At the University of Minnesota, medical, nursing and pharmacy schools have added content and tweaked existing classes to incorporate climate-related topics.
Medical societies endorse collaboration with and education of patients, businesses, communities, and governments to mitigate this public health crisis.
Despite Climate Change Health Threats, Few Medical Schools Teach It

Heat, mosquito-borne diseases and air pollution are medical issues that should be viewed through a climate lens, advocates say

By Maya Earls, E&E News on December 27, 2019
Some Medical Schools Are Incorporating Climate Change in Various Ways

• Inquiry course exploring the link between climate change and health

• Development of climate-related content/health problems incorporated into several M1 and M2 courses

• Climate Crisis and Clinical Medicine M3 & M4 Elective

• Graduate medical education fellowship: Climate and Health Science Policy

• Health Impacts of Climate Change for public health and medical students
Challenges

Scheduling & Resource Constraints

Competing Priorities

Leadership and Faculty Commitment

Politicization
Warming Up Lectures: Helping Medical Students See the Health Impacts of Climate Change

Monday 11.7.2016 Noon - 1:00 pm

Medical associations and experts across the globe are urging action by health care providers to mitigate the negative impacts of climate change on disease incidence, access to care, and quality of life.
ADD CONTENT TO *EXISTING CURRICULUM THROUGH ACTIVE LEARNING*
Evaluate our own institution

Trial of simulation exercises with medical students

Developed SP case and faculty materials

Published case

Internal Medicine Standardized Patient Encounter: Wildfire and Asthma

- Beta test
- AAIM workshop

- Syndemic Workshop
- Climate policy workshop
- Colloquium presentation

OUR JOURNEY
Simulation Based Education

“One of the most important steps in curriculum development is the introduction of simulation-based medical teaching and learning.” (Al-Elq AH, 2010)
1. List three types of climate related health threats for your patient

2. Select one of the threats you identified for your case.

3. Create a case scenario for portrayal by a standardized patient. Include:
   - Patient’s age, gender, and geographic location
   - Patient’s description of chief complaint/symptoms
   - History including
     - Exposure to climate related conditions
     - Vulnerability to climate related conditions including patients medical and socio-economic condition as well as community characteristics.
   - Physical exam, including vital signs and other key points.

4. Consider how a student will approach the clinical exam of the patient.
   - What additional source of information would you consult on the patient’s climate related health effects?
   - Possible recommendation for the patient to reduce the climate-related risks
Cases Developed By Students From Workshop:

**Adult Case**
65-year-old in Illinois experiencing worsening cough and shortness of breath; history of smoking and COPD controlled by medication; Recent travel to a music festival in California - exposed to dust, wildfire smoke, and smog.

**Pediatric Case**
5-year-old in Michigan experiencing sneezing, runny nose, coughing, wheezing, watery eyes, skin irritation; family lives in a basement apartment that was flooded by a heavy storm and developed mold.

**Mental Health Case**
43-year-old single mother living in Houston area suffering from anxiety and insomnia; living in disaster relief structure months after home destroyed by Hurricane Harvey; had no flood insurance because her house was outside of the area designated as floodplain.
M1-M2 Workshop With More Structure

Group 1 Excess Heat
Group 2 Poor Air Quality
Group 3 Vector Borne Disease
Group 4 Water Borne Disease
Group 5 Extreme Weather Events

1. Work in small groups
2. Use worksheet as a mini-template to develop your case
3. Reconvene in 20 minutes
4. Share and present your case with large group
Case Development Worksheet

Developing simulation training material to incorporate health impacts of climate change into medical education.

Case Scenario Development Instructions

You have been given a mini-template to develop a standardized patient case scenario. The scenario will connect climate related health risks to a chief complaint on one of the displayed exposure risks and health impacts.

Instructions:

Conceptualize a case scenario and its connection to climate change and develop specifics of a unique backstory related to climate including:

- Exposure to the environmental health risk
- The vulnerability to environmental health in relation to your patient’s socioeconomic status.
- Interventions customized to address the individual patient and the climate risk.
Chief Complaint/Concern: (description of physical or mental health concern)

History of the present illness:

- Demographics: (age, gender, family structure, geographic location)
- Vulnerabilities/Exposure history: (e.g., underlying asthma or cardiovascular disease, proximity to sources of air or water pollution)

Past Medical History: (e.g., intermittent asthma, hypertension)

Social History/Occupation/Employment/Home: (e.g., own or rent/homeless)

Lifestyle/Behavioral Risk: (e.g., Tobacco/Alcohol/Illlicit drugs)

Other Relevant History: (e.g., medications, allergies, physical limitations, family history)

ROS:

Relevant Physical Exam:

Impression & Plan: Including mitigation and/or adaptation strategy

Determine 1-2 key climate and health impact takeaways
Inspired By Our Students - Taking Our Own Advice...

Asthma exacerbation from exposure to wildfire smoke in the context of climate change

A Case Scenario developed for a standardized patient student simulation training exercise
**CASE CHIEF COMPLAINT:**  Difficulty breathing and chest tightness  

**CASE NAME:**  asthma exacerbation- Ms Baker  

**PRESENTING SITUATION:**  65-year-old woman with a history of intermittent asthma presents with worsening difficulty breathing and chest tightness and dry cough which began 2 weeks ago while working outdoors in her garden. She lives in Sacramento (Ca) about 200 miles from the recent raging wildfires. She is now forced to stay indoors and use her inhaler more often.  

**KEYWORD DESCRIPTIONS:**  worsening difficulty breathing  nocturnal difficulty breathing  dry cough  wheezing  wild fire, smoke  poor air quality  

**DIFFERENTIAL DIAGNOSIS:**  COPD  Bronchitis  Pneumonia  

**ACTUAL DIAGNOSIS:**  Acute asthma exacerbation of moderate severity due to poor air quality from wildfire/air pollution
Faculty Development:

- Providing feedback to learners
- Develop cases tailored to specialty and learner needs
A Convenient Truth
It’s Easy to Integrate Climate Change Into Medical Simulation

Holly A Rosencranz, MD, FACP
Japhia Ramkumar, MD, FACP

AAIM
April 2019
Faculty Development Workshop AAIM

Common Chief Complaints
- Allergy
- Anxiety
- Cough
- Chest pain
- Depression
- Diarrhea
- Dizziness
- Shortness of breath
- Skin rash

Impact of Climate Change on Human Health

Climate Exposure Risks

Heat
- Lack of cooling centers
- Outdoor workers
- Urban heat island

Poor Air Quality
- Ozone
- Particulates
- Pollen & Mold
- Wildfire

Vector Borne Diseases
- Lyme & others

Water Borne Illness
- Algal Blooms
- Sewage contaminated water
- Flooding

Mental Health Risks
- Property damage & loss
- Displacement
Curriculum Changes at Our Institution: 
Adding Content To existing Core Content

Objective Structured Clinical Examination (OSCE) for M3
Deployment of SP Case Scenario Encounter

Group Setting

One on One
Survey

Pre and Post survey used same questions and offered a text box for comments

Describe how this session will impact your future behavior with respect to patient care, patient education and climate advocacy.
Survey Results

• Simulation encounters increased the participants' recognition of the impacts of climate change on patient health and potential for them to consider proactive measures.

• Students recognized that the information they gathered from medical history helped them focus on exposures and risks and recognize the health impacts of climate change.

• Students demonstrated awareness of the importance of being climate-aware providers who could include patient education in their management plans.

• Students expressed appreciation of the exercise.
Asthma Exacerbation Triggered by Wildfire: A Standardized Patient Case to Integrate Climate Change Into Medical Curricula

Published: January 4, 2021

Japhia Ramkumar, MD, Holly Rosencranz, MD, MPP, Leslie Herzog, MBA, MEd

Preview Abstract ▲
Ongoing M1-M2 Workshops

Developing Simulated Case Scenarios to Reflect a Climate Risk and Health Impacts
Holly A Rosencranz, MD, FACP
Japhia Ramkumar, MD, FACP
AUA GLOBAL MD PROGRAM
July 2019

On Becoming a Climate Aware Physician
AUA Global MD Program
January 2020
Japhia Ramkumar , MD
Holly Rosencranz, MD

OUR CLIMATE, OUR HEALTH.
COVID-19 and Climate Change Health Impacts: A Syndemic

Global Threats and Opportunities

AUA GLOBAL MD WORKSHOP
July 2020
Japhia Ramkumar, MD
Holly Rosencranz, MD
Syndemic Workshop Worksheet

**Group 1** Heat

**Group 2** Air pollution

**Group 3** Deforestation and agriculture disruption

**Group 4** Extreme weather and disruption of infrastructure

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Conceptualize a Patient.

Describe:
- Demographic
- Vulnerability to climate change and COVID19
- Describe the personal and health impact of both threats.

How would you approach mitigation and adaptation on an individual level?

How would you approach mitigation and adaptation on the community level?
Likert Survey

Survey to follow presentation and workshop
Climate Change and COVID-19 Syndrome

1. How aware were/are you of the connection between COVID-19 and climate change?
   Before: not at all 1 2 3 4 5 a lot
   After: not at all 1 2 3 4 5 a lot

2. How aware were/are that the same population groups are highly vulnerable to the health risks of both COVID-19 and climate change?
   Before: not at all 1 2 3 4 5 a lot
   After: not at all 1 2 3 4 5 a lot

3. How aware were/are you that climate change increases the vulnerability of some population groups to COVID-19?
   Before: not at all 1 2 3 4 5 a lot
   After: not at all 1 2 3 4 5 a lot

4. How much do you believe that economic recovery from COVID-19 should prioritize actions which address climate change and sustainability?
   Before: not at all 1 2 3 4 5 a lot
   After: not at all 1 2 3 4 5 a lot
Survey Results

The results indicated that the workshop significantly increased the participants’ awareness of the connection between COVID-19 and climate change, shared vulnerabilities and the need to prioritize actions that address both elements of the syndemic. The improvements were statistically significant.
1. Overview

**Issue:** Climate change is negatively impacting individuals’ physical and mental health. Yet, medical trainees are generally not trained to consider its impacts in patient encounters. Compounding this, COVID-19 presents personal and planetary health challenges, with many common risks and vulnerabilities to climate change, thereby creating more dire situations.

Climate change and COVID-19 have created a syndemic. A syndemic occurs when two or more concurrent epidemic-level diseases with shared drivers cluster in a population. The social and biological interactions worsen the prognosis and impact of each disease. Therefore, treatment and mitigation involves addressing the shared forces and drivers.

**Objectives:**
- Review basic climate science
- Understand its human health impacts
- Recognize the pathology, transmission and clinical presentation of COVID-19
- Identify common vulnerabilities for climate change and COVID-19
- Inspire actions to mitigate the impact of both climate change and COVID-19

**How:** We created a virtual workshop for medical students to consider the public health impact of the shared drivers of climate change and COVID-19 as well as strategies for mitigation and adaptation.

2. Methodology

**Didactic:** Facilitators reviewed health impacts of climate change and alignment with COVID-19

**Assignment:** Students were placed in breakout rooms, identified by a climate change threat: heat, air pollution, extreme weather, or environmental degradation. Students then conceptualized a patient vulnerable to both the threat and COVID-19.

**Deliverable:** Students presented their hypothetical patient (demographics, vulnerabilities, and health impacts of the syndemic). They then identified both individual-level therapies for their patient as well as community-level mitigation and adaptation strategies

3. Data

**Data Collection:** Each student completed a 3-question survey before and after the workshop. The survey compared the student’s pre-workshop and post-workshop awareness and opinions of the impact of climate change on patients’ health risks in the context of the COVID-19 pandemic.

- #1 / #4: How aware were you of the connection between COVID-19 and climate change [before/after] the session?
- #2 / #5: How aware were you that the same populations groups are highly vulnerable to the health risks of both COVID-19 and climate change [before/after] the session?
- #3 / #6: Please indicate your opinion of the following statement [before/after] the session: “Efforts for economic recovery from COVID-19 should prioritize actions which also address climate change and sustainability.”

4. Results

Pre-workshop and post-workshop results were compared using a paired samples t-test.

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**Paired Differences**

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The COVID19 & Climate Change Syndemic: Recognizing Global Threats and Opportunities

Holly A Rosencranz, MD, Japhia Ramkumar, MD, Leslie Herzog, M.Ed., MBA
Department of Medicine, College of Medicine, University of Illinois at Urbana-Champaign

5. Conclusion

**Data:** The results indicated that the workshop significantly increased the participants’ awareness of the connection between COVID-19 and climate change, shared vulnerabilities and the need to prioritize actions that address both elements of the syndemic. The improvements were statistically significant.

**Next Steps:**
Train providers to be effective educators and advocates on personal and planetary health in the context of both climate change and COVID-19:

**References:**
Earls M. Despite Climate Change Health Threats, Few Medical Schools Teach It. Scientific American. Published August 24, 2009.


Special thanks to Leslie Walwyn, MD Director Global MD Program, American University of Antigua
Assessing Our Impact And Further Innovation

Next Steps
Other Workshop Formats

Patient Case Studies

Community Health Case Studies

Students Consider Actions Beyond Clinical Skills
Case Studies *Given To Medical Students:*

- A 29-year-old woman, migrated from Puerto Rico to New York City following Hurricane Maria. The patient complains of wheezing, coughing, a rash, and a runny nose. Also, she states that she is experiencing **anxiety and difficulty sleeping.**

- A 9-year-old boy seen at a clinic in Chicago. He complains of coughing and shortness of breath during outdoor physical activity. His chart reveals **his sensitivity to pollen and past asthmatic symptoms.**
You and your colleagues want to help improve the Climate Action Plan and decide to testify at the public hearing.

• What research would you want to do before writing your testimony?

• Describe why as medical students you are interested in the Climate Action Plan.

• Develop the key points in your testimony on the Climate Action Plan (consider facts presented, recommendations, and benefits).

• In seeking support for your points, what stakeholders in the community should you contact about collaboration?

• How will you advocate for your positions with these stakeholders?

• Which groups in the community would likely oppose your recommendations?

• How will you try to convince them to support your positions?
Climate Change Harms Your Patients and Community

Suppose that you see a news article about an upcoming vote on the bill in your state senate and decide to recommend that your state senator vote in favor of passage. You arrange to meet with your state senator and invite a few medical students to join you.

• What points would you make in your meetings?
• What graphics and text would you include in a factsheet for the meetings?
ACTIVITY

**Breakout Room 1**
Hawaii Senate Bill 2077 (2020) Tree Planting Program

**Breakout Room 2**
New Mexico House Bill 217 (2020) Electric Vehicle Income Tax Credit

**Breakout Room 3**
South Carolina Senate Bill 259 (2020) Disaster Relief and Resilience Act

**Breakout Room 4**
Illinois Senate Bill 2132/House Bill 3624 (2020) Clean Energy Jobs Act
**ACTIVITY**

- Describe the bill and why you are interested

- Help the legislators connect the bill to improving health in your state

- Respond to possible objections to the bill

- Summarize and call for passage of the bill to promote health for your patients and community

**Examples**
1. Who we are
2. Highlights of bill
3. Opportunity

**Examples**
1. Current illnesses
2. Worsening conditions
3. Vulnerable communities
4. Personal stories

**Examples**
1. Exaggerated concerns
2. Costs
3. Insignificant impacts
Worksheet: Developing a Policy Statement

1. [Intro] Describe the bill (provided in the email) and why you are interested in it
   - Introduce yourself and why you are in front of them today (consider: Who are we? What are the highlights of the bill? Why is this an important opportunity?)

2. Help the legislators connect the bill to improving public health in your state
   - Address the issue as a public health professional (consider current illness rates, worsening conditions, vulnerable communities, etc.)

3. Respond to possible objections to the bill
   - Acknowledge and respond to opposing arguments (consider exaggerated cost estimates, public concerns, opposition down of potential impacts)

4. [Conclusion] Summarize your strongest point and call for passage of the bill to promote health for your patients and community
Looking Ahead
Another Program Innovation on the Horizon

1. **Medical students should learn how to practice medicine in the context of the current health impacts of climate change.** Throughout the U.S. and globally, climate change contributes to increasing morbidity and mortality, including heat illness, respiratory and cardiovascular disease from air pollution, vector and water borne diseases, food and water insecurity, mental stress, and injuries. We highlight health threats, policies, and actions for physicians, engineering/medical researchers, and medical students. Students will (1) improve their ability to diagnose and treat patients in the context of changing climate/environmental determinants of health; (2) learn how to fulfill their professional responsibilities for community health by contributing to sustainable healthcare systems, community resilience, and policy advocacy; and (3) engage in problem solving and design exercises using engineering and data analytics perspectives to address sustainability challenges.

2. **Learning Objectives**
   - Improve learners' medical knowledge and clinical skills regarding the health impacts of climate change
   - Encourage learners to analyze planetary health systems and propose actions for healthcare professionals to strengthen climate resilience!
   - Apply PBL for learners to outline innovative engineering and data analytics approaches to the climate/health nexus
Teaching on climate change, health and sustainable healthcare is being introduced to a range of medicine and allied courses in the UK

Oct. 2020
Take home lessons

1. **Core curriculum clinical simulation exercises** can be enhanced by incorporating a backstory that includes climate change related risks and vulnerabilities.

2. Such exercises can be modified to address emerging threats and risks and to highlight hot-button issues such as climate justice, the pandemic, and shared drivers that impact public health.

3. Exercises can be used as a springboard for discussions of policy and advocacy strategies to improve community health.

4. Students will continue to inspire your journey as educators.
Questions and Comments


5. https://ncse.ngo/
