

Developing Ethical Research on Environmental Exposures in Cuyahoga County's Unhoused Populations

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Background

Exposure to ambient air pollution is a major driver of morbidity and mortality and a growing contributor to health disparities. Individuals experiencing homelessness (IEH) face heightened exposure due to extended time outdoors and limited access to protective environments. Current stationary air monitoring networks often fail to capture the lived exposure of IEH.

Building on prior work with the Tulare County HUD and in partnership with CWRU and CCF, this project explores how local knowledge mapping (LKM) can be used to identify where IEH spend time and how this correlates with air pollution exposure. By combining geospatial data, community insights, and pulmonary function screening, we aim to address a key data gap and inform more equitable public health and environmental planning in Cleveland.

Population

This project focuses on adults (18+) experiencing unsheltered homelessness in Cuyahoga County. Participants are recruited through partnerships with local organizations, including the Metanoia Project, to ensure engagement with individuals who frequently reside in high-exposure environments.

Learning Objectives

1. Develop an Institutional Review Board (IRB) application that clearly outlines study objectives, methodology, and ethical considerations for research on air pollution exposure. (Apply)
2. Design study deliverables, including participant recruitment materials, data collection tools, and community outreach plans, ensuring clarity and accessibility. (Create)
3. Explain the Institutional Review Board (IRB) process, including protocol submission, informed consent procedures, and risk mitigation strategies. (Understand)

Activities

- Developed an IRB protocol that clearly outlined study objectives, methodology, and ethical considerations.
- Assessed potential risks and benefits associated with conducting research in underserved populations and proposed strategies to minimize harm.
- Designed study deliverables, including participant recruitment materials, data collection tools, and informed consent documents.
- Completed all required modifications to IRB protocol and communicated study updates amongst the research team.

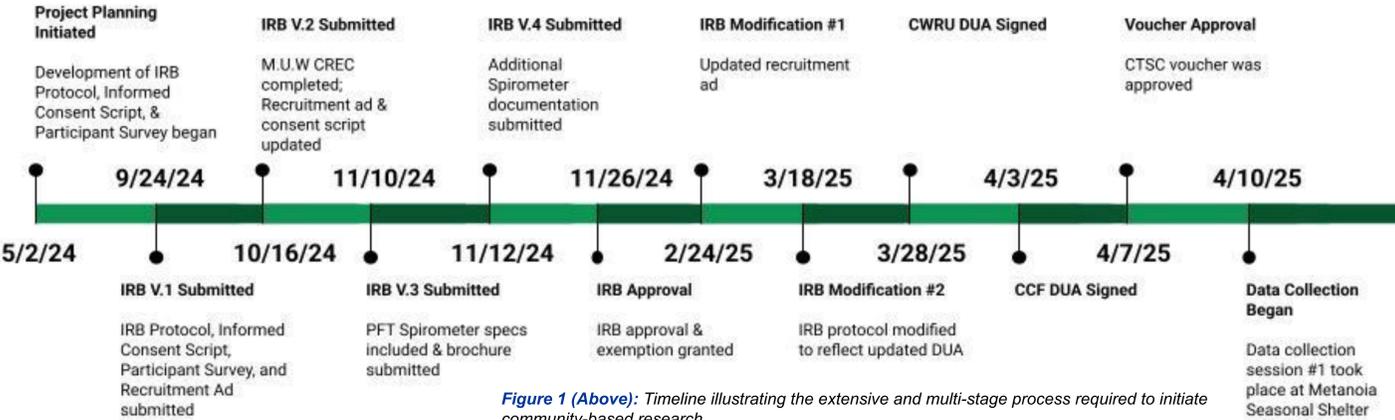


Figure 1 (Above): Timeline illustrating the extensive and multi-stage process required to initiate community-based research.

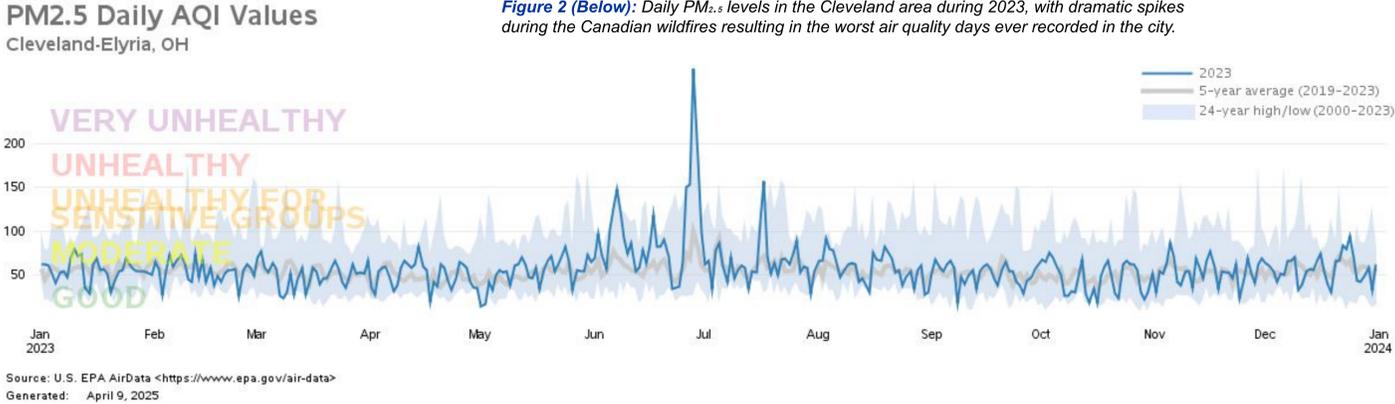


Figure 2 (Below): Daily PM_{2.5} levels in the Cleveland area during 2023, with dramatic spikes during the Canadian wildfires resulting in the worst air quality days ever recorded in the city.

Are you experiencing homelessness?

We want to understand how being unhoused impacts the health of your lungs.

If you are currently experiencing homelessness in Cuyahoga County, you can participate in the study.

Requirements:

- Complete "breathing tests" to see how healthy your lungs are
- Answer questions about your health and where you spend your time

All results are anonymous and you will not need to provide your name or other identifying details.

You will get the results of your breathing tests, and a doctor can explain what they mean.

You will get a gift card for your time.

This is a joint effort with:

If you have more questions about this study, please contact:
Dr. Maeve MacMurdo
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(v3.0, 2.21.2025)

HOMELESSNESS IN OHIO 2024 POINT IN TIME COUNT

Ohio Homelessness 2011 - 2023

Overall Homelessness since the Pandemic

+33%

+10%

● January 2020 | Overall homeless population = 10,655
● January 2024 | Overall homeless population = 11,759

Figure 3 (Left): Recruitment ad used to invite IEH in Cuyahoga County to participate in the study.
Figure 4 (Above): Trends in homelessness in Ohio based on the 2024 Point-in-Time Count with notable increases in unsheltered individuals and homeless families.

References

1. U.S. EPA AirData (2025, April 9). *PM_{2.5} Daily AQI Values in Cleveland-Elyria, OH (2023)*
2. Coalition on Homelessness and Housing in Ohio. (2025, February 25). *Homelessness in Ohio – 2024.*

Deliverables

1. Institutional Review Board (IRB) protocol
2. Informed consent script
3. Survey instrument for assessing exposure patterns
4. Participant recruitment ad

Results

1. Institutional Review Board (IRB) approval
2. Secured project funding (NIH CTSC voucher)
3. DUA approval from CWRU & CCF

Lessons Learned

- The importance of tailoring research materials for accessibility to improve participation & informed consent.
- Challenges of balancing research feasibility with ethical considerations in working with vulnerable populations.
- The value of interdisciplinary collaboration in addressing environmental health disparities.
- The need for additional research to validate LKM as a tool for public health intervention planning.
- Including populations of focus to be collaborators can help create more meaningful research.
- The complexities of applying for IRB approval.

Public Health Implications

This project highlights the need for more precise exposure assessment methods for IEH, who may face significant health risks due to unmonitored air pollution exposure. By integrating LKM with existing air quality data, public health officials can make more informed decisions regarding service delivery, emergency preparedness, and air quality monitoring expansion. This work lays the foundation for future research and policy aimed at reducing environmental health disparities among IEH.

Acknowledgements

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Poster Tips and Tricks (Print this page for reference)

Page Size:

- The page size is already set up to scale.

Layout Tips:

- The non-printing *Guides* can be turned on under the *View* menu. Use them for aligning items. To create a new guide, hold down the *Control* key while click-dragging an existing guide.
- Multiple items can be aligned or spaced evenly using the *Align* menu on the *Draw* pop-up box. Turn off *Snap-to-Grid* for fine adjustments.
- Zoom in to align your work and check details. Use *View > Zoom* menu, or the *Zoom* box on the *Main Toolbar*.
- To import and scale a figure you created in another PowerPoint presentation, select all pieces of the figure and *Copy*, then in the poster choose *Edit > Paste Special > Picture*. Now the pieces of your figure will scale correctly.

Backgrounds, Styles & Color Schemes:

- Light backgrounds must be used!**
- To change background, select *Format > Background*, click on the color swatch & choose *> More colors* or *> Fill Effects*.

Fonts:

Note: Font errors are *the most common problem in printing from files*.

- If you use fonts other than those in the template, make sure we have them!
- If we *don't* have them, here are your options:
 - Copy the font(s) to your disk. To open the Fonts Folder, go to *Start > Settings (or Control Panels) > Fonts*, or...
 - Use the *File > Pack and Go* feature when saving to a disk. Be sure to choose *Embed TrueType Fonts* under *Links*.
- Use the **Symbol font for math and Greek characters**. If you use the optional characters found in other fonts, they may re-map to a symbol you didn't expect.
- Bullets can also remap to wrong characters. **Be sure to check *all* special characters in the proof file you receive from Printing Services.**
- PowerPoint's *Word Art* function may pixelate when printing. It is not supported.

Text:

- Keep contrast high between text and background colors or images! Color text on color backgrounds is almost always hard to read in print.
- Do not align columns using spaces in PPT!** Turn on *Rulers* in the *View* Menu and set tabs in the ruler. With your text box selected, simply click in the ruler to place a left, right, centered or decimal tab. Drag the tab to reposition it.

Tables, Charts and Vector Art:

- To retain editability for items from *Excel*, use either of these methods:
 - Create and save the work in *Excel*, then bring into PowerPoint using *Insert > Object > Excel (Worksheet or Chart Object) > From File*, or...
 - With your work open in *Excel* copy to the clipboard, then use *Edit > Paste Special > Microsoft Excel (Worksheet or Chart) Object*. Simply using *Paste* rather than *Paste Special* may degrade your object and break any links to data.
- If figure looks right in *Excel* but not in PowerPoint, use this method:
 - Copy figure in *Excel*, then in PowerPoint use *Edit > Paste Special > Picture (or Picture Enhanced Metafile)*, whichever preserves the figure best.
- Except for Excel or Word, do not use Copy and Paste to place items into PowerPoint.**
 - *The clipboard loses important print data!*
 - From the original program, *Export (or Save As)* a Windows Metafile or Enhanced Metafile for charts/tables. Use a JPG (best quality) for photos. Save the file.
 - In PowerPoint use *Insert > Picture > From File*.
- Vector graphics can be scaled or recolored in PowerPoint and print hi-rez.
- Chart and table figures (from other programs) work best when saved as a Windows Metafile (.wmp) or Enhanced Metafile (.emf), rather than a raster format (.jpg or .tif).

Scans, Photos and Bitmap Figures:

- Never use GIF files for posters.
- Never use the Set Background Transparent tool (*Picture Toolbar*), since this creates a nightmare GIF file!
- For image resolution, insert the figure into the template at the desired size (*e.g. without resizing in PowerPoint*) at 400 pixels per inch. You can fix your size and resolution in a program like *PhotoShop*. (See previous page for more details.)
- For a color bitmap (raster) image, use JPG files (maximum quality). Use RGB mode.
- Change black & white photos (scanned documents, Western Blots, X-Rays, MRI's, etc) to grayscale in *PhotoShop*.
- Use the *Picture Toolbar* to crop, adjust brightness/contrast, or to *Reset* a picture (undo settings after importing). To make a toolbar visible, use the menu: *View > Toolbars >*
- Never throw away your original images or scans, since PowerPoint doesn't export original-quality images!
 - Too late? If you lost your original and need to edit an image, try this: In PowerPoint, use the *Reset Image* button on the *Picture Toolbar*, zoom in to 400% and copy the image to the clipboard.
 - In *Photoshop*, select *File > New and Paste*. Save your changes as a new file, then bring back into PowerPoint using *Insert > Picture > From File*.

Poster Requirements

A poster should get your main points across effectively and attract people so that you can engage them in discussion.

Poster Session Logistics:

1. Plan to set up your poster on the morning of the Innovations Conference prior to the first presentation
2. Four foot by six foot standing boards and push pins will be provided
3. Plan to stand by your poster and answer questions for one hour; the poster session is typically over the lunch hour of Innovations
4. Please dress professionally
5. As a presenter, you may eat before or after – but not during – the poster session
6. Plan to introduce yourself and provide a ‘tour’ of your poster to your audience
7. Plan to leave your poster displayed through the remainder of Innovations
8. If you want to distribute handouts, please plan for about 40 copies
9. Recognition will be given to the top poster(s) as judged by faculty, alumni, and friends of the Program

Poster Design Guidelines:

- Your highest priority is a clear message with visual impact
- Limit your text • Use short, direct sentences, with no more than 5 sentences per text box
- Photographs or graphics are important – if they include people, you'll need a release form
- You must credit your sources for all photos or graphics
- The top row should include a title, your name, your preceptor's name, and their credentials
- Include the School of Medicine logo, the PQHS Department logo, and the logo of your host organization
- If your practicum project was funded in any way, acknowledge the funding source at the bottom of the poster
- Headers should be legible from a distance of 6 feet
- Fonts should be simple and no smaller than 20 point; use bold lettering on a white or light colored background
- Using a PowerPoint poster template provided by the MPH Program is recommended
- Dimensions of the finished product should be at least 36" x 48" with landscape orientation 15
- Organize the layout to guide the viewer through your poster in a logical fashion

It is the student's responsibility to have the poster printed.

Places to have the poster printed include oncampus options, Case Printing, FedEx Office (Kinko's), Office Max, etc.

Printing costs may vary widely. Printing/turnaround time can also vary, but plan for at least 48 hours.

Depending on how close to the annual CWRU-sponsored Research Show CASE the Innovations Conference falls, expect longer turnaround times for spring semesters.

Be sure to attend the CHRP session(s) that focus on poster design and logistics. Examples of past posters will be provided.

Students will also have the opportunity to practice presenting their posters at CHRP to get feedback and suggestions from fellow students, faculty, and staff.