“Don’t do anything for us without us”
Evaluating environments with citizen scientists to improve local health

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Agenda

- Why environment matters in public health research
- Methods for community engaged environmental assessment to improve local health
  Case Example Harm Reduction Vending Machines
    - Our Voice methodology
    - Iterative implementation
    - Results outlining the value in each step
  Case Example Engaging community members in walking audits to improve local health
    - Walk audits in the context of epidemiological research
    - Recruiting and training community members
    - Dissemination of walk audit data
Context Matters

How do contextual factors influence naloxone distribution from syringe service programs in the USA: a cross-sectional study

Barrot H. Lambdin1,2,3*, Lynn Wenger1, Ricky Bluthenthal4, Tyler S. Bartholomew5, Hansel E. Tookes5, Paul LaKosky6, Savannah O’Neill7 and Alex H. Kral1
7 key invested partners in Patient Centered Outcomes and Comparative Effectiveness Research

- Patients and the Public
  - Providers
  - Purchasers
  - Payers
- Policy makers
- Product makers
- Principal investigators

7 Ps Framework

8th P is for Place

- First Narcan Vending Machine in Kentucky
- Who will this reach?

Access to Resources

• Walking environments can impact physical activity but also transportation mobility by providing safe access to public transit stops.
Context matters in implementation science: a scoping review of determinant frameworks that describe contextual determinants for implementation outcomes

Per Nilsen¹ and Susanne Bernhardsson²,³

ACCORDS
ADULT AND CHILD CENTER FOR OUTCOMES RESEARCH AND DELIVERY SCIENCE
UNIVERSITY OF COLORADO CHILDREN’S HOSPITAL COLORADO
Environmental Factors to Consider in Program Implementation

• Macro level features: community layout and land use (e.g. access to public transit)
  • Well suited to inform expansion (example to come)
• Micro level features: observable in a setting (e.g. lighting, cameras)
  • Natural (vegetation, weather)
  • Social (people and culture)
  • Built environment-man made features (benches, buildings)
Using P for Place to Increase Reach: The Case of Harm Reduction Vending Machines
Naloxone Distribution Disparities

• Take home naloxone is a safe and effective strategy to prevent opioid overdose deaths
• Low rates of distribution in pharmacies to high risk groups (<2%)
• Disparities in naloxone distribution
  • Geographic regions
  • People of color
  • Low socioeconomic status
  • Rural communities

McDonald, Rebecca, and John Strang. "Are take-home naloxone programs effective? Systematic review utilizing application
The Biden-Harris Administration Takes Critical Action to Make Naloxone More Accessible and Prevent Fatal Overdoses from Opioids Like Fentanyl

Today, the U.S. Food and Drug Administration (FDA) approved the first nonprescription, “over-the-counter” (OTC) naloxone nasal spray, Narcan. Naloxone – a medicine that can reverse an opioid-related overdose – has been shown to be a critical tool to prevent fatal overdoses, connect more people to treatment for substance use disorder, and save lives. This action by the Biden-Harris administration to make this naloxone product available without a
HRVM Background

• Europe
  • Nearly 40 years of syringe exchange using vending machines
  • Reaches hard to reach populations
    • Younger than in-person needle exchange program
    • Shorter duration of injection drug use than in-person needle exchange program
  • Limited current contact with drug treatment or assistance agencies
  • Increased geographic availability (such as rural areas where syringe exchange services are not available)
  • Increased temporal availability (24 hours)

• United States (continental US since 2017)
  • Associated with decrease in opioid overdose death (naloxone)
Interviews with Young Adults Who Use Opioids

• Barriers to naloxone uptake
  • Privacy, Convenience, Knowledge
• Supportive of vending machine
• Macro and microlevel environmental features key to perceived use of HRVM
  • Convenience (e.g. near drug access points)
  • 24/7 access
    • Outdoor preference
• Limited law enforcement presence
• Safety-such as lighting (female respondents)

Real world implementation

• Trac B Exchange–First machine in continental U.S.
  • Feasible: in current building with business hours 9:30-1pm, 1:30-5pm.
  • New resource for population currently using the program

• Saranac Lake, New York, Police Department. Pat Brady from WAMC Northeast public radio reported:

  the police chief “noticed some hesitation to come into the lobby and use the machine, which he attributes to addiction stigma”
VEnding machine Naloxone Distribution in Your community (VENDY)

This project aims to develop a naloxone vending machine program using an iterative process and engagement with people who use opioids to maximize naloxone reach and program sustainability in 3 diverse communities.
VENDY Program

**Intervention Components**
- Vending machine naloxone distribution
- Overdose Education (video, flyer, phone, in-person)

**Implementation Components (User Centered Design)**
- Multilevel invested partner engagement
- Iterative program development
- Built and social environment evaluation
- Iterative advertising development

**PRISM Contextual Barriers to Naloxone Uptake and VENDY Implementation**
- **Patient Perspective**
  - Convenience
  - Privacy
  - Location
  - Knowledge

- **Organization Perspective**
  - Navigating multilevel partners
  - Location identification

- **External Environment**
  - National and local policies (e.g. pharmacy regs)

**RE-AIM Outcome Target**
- Reach Effectiveness
- Adoption Implementation Maintenance
- Reach Effectiveness
Our Voice Methodology

Active involvement of citizen scientists to improve the health of communities

• Capitalizing on technology to support “citizen scientist” to be change agents in their community to improve physical activity

https://med.stanford.edu/ourvoice.html

Our Voice Methodology

• Step 1-Discover: What about your community impacts healthy living
  • Walks using Discovery Tool application
  • Take photos, record thoughts
  • What can we improve?

• Step 2-Discuss: Discuss with other citizen scientists

• Step 3-Active: Advocating for local improvements

• Step 4-Change: Change your community for the better
  • Evaluate outcomes
  • Track activities
  • Celebrate success

https://med.stanford.edu/ourvoice.html
Take photos of things around you that would impact using a Naloxone vending machine here.
Our Voice Use

https://med.stanford.edu/ourvoice.html
One approach, endless applications.

Our Voice is proud to partner with institutions around the world to launch citizen science projects ranging from environmental justice to age-friendly walking paths.

Though the Our Voice approach can be tailored to nearly innumerable project topics, recent research topics have included walking environments, food environments, biking environments, social environments, mental health, physical activity, safety and violence prevention, wellbeing and quality of life, age-friendly environments, school & campuses, parks and green spaces, transportation, housing, disability access, work environments, substance abuse, and civic engagement.

https://med.stanford.edu/ourvoice.html
Levels of Impact

By using their own data and working with others, even small groups of citizen scientists can successfully make positive changes happen for the whole community.

We typically think of these change happening at four levels: individual, community, built environment, and policy.

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Implementation Considerations

• Evidence based program may already be identified
  • Not what…where and how

• Multilevel
  • Patient Level (End user)
    • Substance use stigma and willingness to engage with others
  • Organization level
    • Organization Perspective
      • “We won’t get this approved if it’s outside”
    • Implementation and Sustainability Infrastructure
      • Risk aversion: “how do we do this so we are not on the front page of the [local newspaper]”

• External Environment
  • Policies (e.g. pharmacy regulations)
Human-Centered Design

Investigate
Goals and preferences of implementation team and end users

Ideate
Generate concepts and ideas for product design

Prototype
Create iterative options for product design

Evaluate
Test prototype with implementation team

Refine & Develop
Optimize the design

Validate
Test in practice


Effective, Adaptable and Sustainable for Your community-
Operationalizing Program Sustainability (EASY-OPS)

Step 1: Investigate and Discuss
- Meeting: Feasibility of desired features
- Knowledge gaps (what do we need to sustain this program)

Step 2: Prototype and Activate
- Meeting: Iterate to maximize program design for sustainability and impact (reach and effectiveness)

Midpoint Adaptation (3 mths):
- Assess knowledge gaps and preliminary outcomes

Step 3: Pilot test Prototype
- Refine program to improve value (iterative RE-AIM)

Program evaluation (6 mths):
- Assess value (RE-AIM) to stop, refine, expand, pilot new features

Step 4: Evaluate

External Factors:
- Local and National Policies

Mtg: Organization Identify required features for feasibility/alignment

Walking audit/Interviews:
- Desired Program Features

Organization team + End-Users = Implementation team
Methods: Investigate and Discuss

• Step 1: Investigate and Discuss
  • Organization (Discover): Where are we able to implement this program?
  • End-User (Discover): Within this range of options where should we implement this program and why?
    • Step 1: Map (macro level) Identify best and worst 5 locations on a campus map and why
    • Step 2: Walk (micro level) “Take photos of things around that would impact using a naloxone vending machine here.”
    • Step 3 (Discuss): How should we implement this program?
      • Step 3 Interviews vs group discussion to inform ideal program features and locations
  • Organization (Discuss): Here is what we've heard from patients, what is feasible? What do we need to know to figure out if we should/can sustain this program (knowledge gaps)?
Methods: Activate and Evaluate

• Step 2: Prototype (Activate)-(Minimum viable product)
  • Implementation team (including representative citizen scientist)
    • Balance end users desires and feasibility to build a program for pilot testing
    • Determine appropriate methods for pilot testing (how do we best answer those knowledge gaps?)

• Step 3: Pilot test prototype -3 mths
  • Patients: users and nonuser interviews (repeat Discovery Tool walking audit)
  • Preliminary RE-AIM outcome evaluation including knowledge gaps
  • Implementation team: refine program based on data from evaluation (iterative RE-AIM)
Methods: Activate and Evaluate

• Step 4: Evaluate (Change): 6 mths
  • RE-AIM outcome evaluation
  • Implementation team: stop, refine, expand, pilot new features
Methods Cont’d

Setting
• Federally Qualified Health Center in urban location in Colorado

Citizen Scientists
• At least 18 years of age and opioid use in the last year

Recruitment
• Flyers in clinic, providers, and through substance use community engagement program

Discuss and Discover Methods
• 2 hour in person interview

Organization Team
• Organization leaders (approving program implementation)
• Organization program managers (overseeing program implementation)

Implementation team
• Organization team + citizen scientist representative (in Discuss phase invited to participate)
Results: Value of each step in the process with citizen scientists

Step 1: macro level map: best and worst 5 locations for VENDY
Step 2: microlevel Discovery Tool walk to explore top 5 locations
Step 3: discuss and identify other ideal program features
Citizen Scientist characteristics n=7

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age average, (range)</td>
<td>42 (30-55)</td>
</tr>
<tr>
<td>Witness or experienced an opioid overdose</td>
<td>100%</td>
</tr>
<tr>
<td>Housing (n=5)</td>
<td></td>
</tr>
<tr>
<td>40%: own house/apartment</td>
<td></td>
</tr>
<tr>
<td>60%: shelter, rehab, halfway house</td>
<td></td>
</tr>
<tr>
<td>Nonwhite* (Black, Nijji)</td>
<td>43%</td>
</tr>
<tr>
<td>Male</td>
<td>57%</td>
</tr>
<tr>
<td>Education (some college or more)</td>
<td>57%</td>
</tr>
<tr>
<td>&lt;200% below poverty line</td>
<td>67%</td>
</tr>
</tbody>
</table>

*No Latinx representation
Step 1: Macro level map evaluation with citizen scientist “Bob”
When thinking about program expansion consider these themes when selecting locations for VENDY placement:

- **Privacy**: For me personally, I like to keep a low profile about my addiction. I wouldn’t really want it to be in an obtrusive place because I might be like embarrassed about going up to get it. I don’t know. There is like a little bit of a stigma with it.

- **Convenience**: ...whether you are on the bus, walking, or driving it makes it convenient, it is easy because it is never congested or real packed that way.
Step 2: Microlevel walk.

Walk to location ranked #1

5 and 1 switched

When you look at it from a convenience perspective, I think, it would be inconvenient because there is so much traffic and the construction makes it even worse so it is hard to get over there.
Step 2: Microlevel (context) specific features of the environment

• Social: Privacy was not the quantity of people (foot traffic), but the type of people
  • Security (negative)
  • Other people who use drugs (positive)
• Natural: nice outdoor landscaping was appealing and offered cover
• Built: convenience and privacy
  • next to a bus stop supported convenience
  • Lighting (security-one female noted importance)
  • Cameras directly above the machine were a deterrent, but many cameras on campus so cameras in general or near by were not a concern.
Step 3: Discuss. Bob’s picture and quote where much better than my description of results.
Results: Importance of an iterative process

- Organization team initial location thoughts
  - ED (24 hour access, easily accessible, lots of foot traffic)
  - Outpatient clinic
  - Pharmacy
  - Let’s see what patient’s say, no restrictions on where on campus it will go

- Initial 2 interviews (1 male, 1 female, both White)
  - Macro and Micro evaluations: only liked outdoor locations
  - ED #1 worst (24 hr access, but high foot traffic and security at the door)

Is outdoor feasible (security/policy)?
Discuss with the organization team:

1. Organization team surprised by the initial results
   “[naloxone] confidentially and privacy was more of a 5-10 year old concern”
   “I’m surprised its not in the main hospital. I’ve seen other locations….they try to find places with high foot traffic….I would think that [the hospital] would be a key place.”

2. Came to understand the importance of privacy
   “I would say the stigma isn’t around the naloxone its around being a user”
   “I think the idea off having it close to [methadone clinic] makes sense…that’s a safe place where people know they can get support….they do hang out there….but its also mostly that population.”

3. Feasibility concerns
   “what we wouldn’t want to have happen is have the machine off in a corner somewhere so far away that no one sees when someone vandalizes the machine”
Ideate for solutions to meet citizen scientist preferences

1. Organization team ideas
   • Let’s see if security cameras on location will be sufficient
   • In next interviews: “If VENDY had to be placed inside somewhere on campus, where would be the best indoor location.”

2. Go back to end-users for additional feedback (n=4)
   • Successfully identified 2 consistent indoor locations that were deemed acceptable by all 4 patients.
   • 1 Outdoor location was in the top 3 for all.
Discussion

Macro and Microlevel environmental evaluations provided something unique

1. Macro key for program expansion
2. Micro identified environmental features critical to the context

Iterative process with the organization team allowed for ongoing exploration and ideation to ensure program feasibility while integrating the community perspective anonymously

**Next steps:** Bring implementation team (including citizen scientists) together to develop program prototype meeting feasibility and patient preferences
Limitations

• Currently limited to 1 site
• Modifications to methods may be needed to appropriately address other topics and environments
• Latinx persons make up almost 30% of the population and was not represented in this cohort of citizen scientists.
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THANK YOU
Engaging community members in walk audits
Evaluating health impacts of zero-fare bus transit in Kansas City

Transit use

Health benefits

↑ Physical activity from walking to/from bus
↑ Access to healthy foods
↑ Access to health services
↓ Economic barriers to health
↓ BMI, blood glucose, blood pressure
Barriers to transit use

- Culture
- Personal circumstances
- Access
- Neighborhood conditions
Barriers to transit use

- Neighborhood conditions
- Pedestrian infrastructure
- Availability and quality of amenities
- Safety from traffic
- Safety from crime
**Research question**

How do neighborhood walking conditions relate to bus use?

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<th>Pre zero fare</th>
<th>Post zero fare</th>
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<td>Sidewalk conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>Poor</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Crossing conditions</td>
<td></td>
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<tr>
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Mean number of bus users boarding at bus stop (N=257 bus stops)

Statistical models will adjust for macro-level environmental variables such as population density, area income and poverty, etc.
Considerations in designing data collection approach

- Data were needed for research aims
  - Relation of neighborhood factors with bus use
- Data should benefit community
  - Education and engagement
  - Advocacy
  - Informing practice

Prior community led walk audits informed this infrastructure project that was part of Kansas City's Vision Zero initiative.
Framing within Our Voice Framework

• Step 1-Discover: What about your community impacts healthy living
• Step 2-Discuss: Discuss with other citizen scientists
• Step 3-Activate: Advocating for local improvements
• Step 4-Change: Change your community for the better

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Citizen Scientist engagement

• Community members:
  • Inform audit tool refinement
  • Conduct data collection
  • Use the data
  • Disseminate their findings
  • Advocate for their neighborhoods
Citizen Scientists

• 36 community members
• 4 meetings
  1. Training and refinement
  2. Certification
  Complete audits on own
  3. Reflections
  4. Celebration
• 2 groups
Audit tool

• Adapted from Microscale Audit of Pedestrian Streetscapes (MAPS)
• 3 tools: street segments (blocks), intersections, and bus stops
  • Street and land use characteristics
  • Pedestrian infrastructure
  • Physical/social characteristics
  • Bus stop characteristics
  • Perceptions
    • Safety from traffic; safety from crime; aesthetics.
Locations

- 3 routes around each selected bus stops.

Sample:
- 106 clusters of bus stops
- 318 walking routes
- 257 total bus stops
- ~1/3 of the bus stops in the 10 zip codes

300 hours of walk audits!
Dissemination

• Citizen Scientists’ report of findings
  • Refined through project meetings

Contents:
• Background & Purpose
• Key Findings
• Maps
• Reflections
• Recommendations
Findings:
- 29% of walking routes near the bus stops had poor quality sidewalks (Figure 1).
- 5% of the street blocks near the bus stops did not have a sidewalk on either side of the street, and 12% had a sidewalk on only one side (Figure 2).
- 77% of intersections on street blocks that had a bus stop had poor crossing quality (Figure 3).
- When considering all intersections along the walking routes near each bus stop, 64% had no crosswalks and 12% had no traffic control (Figure 4).

Findings:
- 44% of the bus stops had poor quality amenities (Figure 5).
- Less than half of the bus stops had a shelter, bench, or trash can, and 8% did not have a sidewalk (Figure 6).
Our Reflections as Citizen Scientists

Doing these neighborhood audits helped us become more aware of the conditions in our communities, though we feel sad about the conditions in many of the places we walked.

Neighborhood conditions are very different across communities and reflect a history of racism.

We need sidewalks, safe ways to cross streets, and lower traffic speeds to feel safe walking.

People don’t walk where it’s not safe, and we don’t feel safe when no one is out walking.

Bus stops need amenities; bus stops without amenities are a barrier to riding the bus.

We want to help and need to know more about how we can help.
Our Recommendations as Citizen Scientists

For Public Officials

• Improve walking safety around bus stops, parks, schools, and other places people walk.
• Expand Vision Zero to increase safety for all road users.
• Increase community engagement around walking safety.
• Connect walking safety improvements with housing opportunities, redevelopment projects, and transit projects.
• Combine neighborhood improvements with policies and programs that prevent gentrification and displacement.

For Community Leaders

• Organize volunteers to help with maintenance (e.g., trash/litter cleanup) where resources are limited.
• Educate community members on how to share their voice for neighborhood improvements.
• Support cross-sector collaboration among transportation, housing, business, education, and tourism (e.g., leverage World Cup resources).
• Support communities to seek funding for neighborhood improvements (e.g., Public Improvements Advisory Committee).
• Create a culture of safety for all road users, start with one person at a time.

For Community Members

• Share walking safety concerns with neighborhood leaders and city officials.
• Call or email your city councilmembers.
• Engage with your neighborhood association and community leaders.
• Keep spending time outside in your neighborhood walking and connecting with others and nature.
• Celebrate every accomplishment and do not give up.
• Use existing resources within your community. Find more here: BikeWalkKC Complete KC - DIY Guide
Data availability

Neighborhood Walking Environments Around Bus Stops

Project Summary:
This project included 38 Citizen Scientists who came together in 2023 to look at features of Kansas City, MO neighborhoods that impact health, physical activity, and ability to use the Kansas City bus system (RideKC). Citizen Scientists were members of the community, students, and community advocates who live in Kansas City, MO.

The goal of the project was to look at the quality of sidewalks, cross walks, and bus stops in the community. We targeted areas around bus stops to support a research study being led by the University of Missouri – Kansas City and Children’s Mercy Hospital. The study aims to evaluate health impacts of the free bus in Kansas City.

Citizen Scientists looked at street conditions for 218 routes and 267 bus stops. This spanned over 110 miles of streets in KC Mo. Their assessments took over 300 hours to complete.

Download Report Data
The data used in this report will be available for download using the link below.
Walk Audit Data CSV

We are currently cleaning the data to ensure its accuracy, please check back soon for the complete dataset.

Questions?
Contact Maddy Pillai at mpillai@cmh.edu

www.ciparesearchteam.org/walkingenvironments
Community-wide dissemination event

• Official release of report
• Citizen Scientists serve on moderated panel
• Advocacy presentation from local organization
• Community members and leaders invited to engage in discussion
  • Peers (community members)
  • Public officials (city council, public works)
  • Community leaders (local institutions, non-profits)
Summary of outputs

• Linkages were made among community members and community leaders
• Information was disseminated via report, community event, and project website
• Combination of high-level data summaries and specific/detailed data
• Maps were created to support decision making and advocacy
• Community members used their voices to inform and impact their communities
Lessons learned

• Plan for more resources than traditional data collection approach
• Simplify audit questions even more
  • Language
  • Complexity of questions and responses
• Pre-fill as much as possible (direction, street names)
• Move quickly to keep momentum
• Embrace the champions
Limitations and considerations

• Body of research on neighborhood advocacy curriculums
• Present project lacked formal evaluation
• Use of information in advocacy and decision making difficult to track
• Data accuracy and quality assurance
• Informing specific projects versus broader engagement (pros/cons)
• What next? – ways to continue engaging with community members
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