



Design for environmental health risk communication: lessons from the EPA flooded homes website project

Keely Maxwell, Mary Reynolds U.S. EPA
NEHA webinar, Oct. 17, 2023

Disclaimer: This document has been reviewed in accordance with U.S. Environmental Protection Agency policy and approved for publication.

Today's talk

1. EPA SALT framework for risk communication
2. The flooded homes risk communication problem
3. Human-centered design of the flooded homes website



The EPA SALT framework for risk communication



What is risk communication?



Strategies
Action
Learning
Tools

“Communication intended to provide a general or specific audience with the information they need to make informed, independent judgments about risks to their health, safety and the environment.” (EPA 2021)

4 components of the EPA SALT framework

Strategies



Action

Consider factors: hazard, audience, relationship, communication, science

Learning

Reflective practice throughout

Tools

See <https://www.epa.gov/risk-communication/risk-communication-tools>

Risk communication principles



Strategies
Action
Learning
Tools

- Clear goals & objectives
- Meaningful
- Understandable
- Actionable
- Trusted
- Attention to **format & content**
- Know your audience

The flooded homes risk communication problem



Flooded homes are an environmental health concern



Photo credit: FEMA/ Hans Pennick

Indoor air quality and other environmental health hazards

Lead Bacteria
Asbestos Mold

Residents need to get back in to clean out and fix up their homes

How can they do so safely and effectively?

Electrical shock or gas leak

Animal encounters

Carbon monoxide from generators

Use of cleaning & disinfectant products

Mismatch between the technical and the social inputs into risk communication

The technical science

EPA: 103 pp. technical guidance *Safely Clean, Decontaminate, and Reoccupy Flood-Damaged House*

Use a combination of wet and dry cleaning methods as appropriate. Wet cleaning methods include washing with water and a cleaner, steam cleaning, cleaning with foaming detergent, hot water extraction, low pressure flushing, and high pressure washing. Dry cleaning methods include

The social science

What information do flood survivors find useful?

What are their values, priorities, and risk perceptions?

How do different social and cultural groups experience flooded homes-- and home repair-- differently?

Our solution: EPA flooded homes website

Pdf



Mobile friendly

Detailed guidance



How-to videos

Technical jargon



Empathetic language

Human-centered design of the flooded homes website



What is human-centered design



Creative approach to problem solving

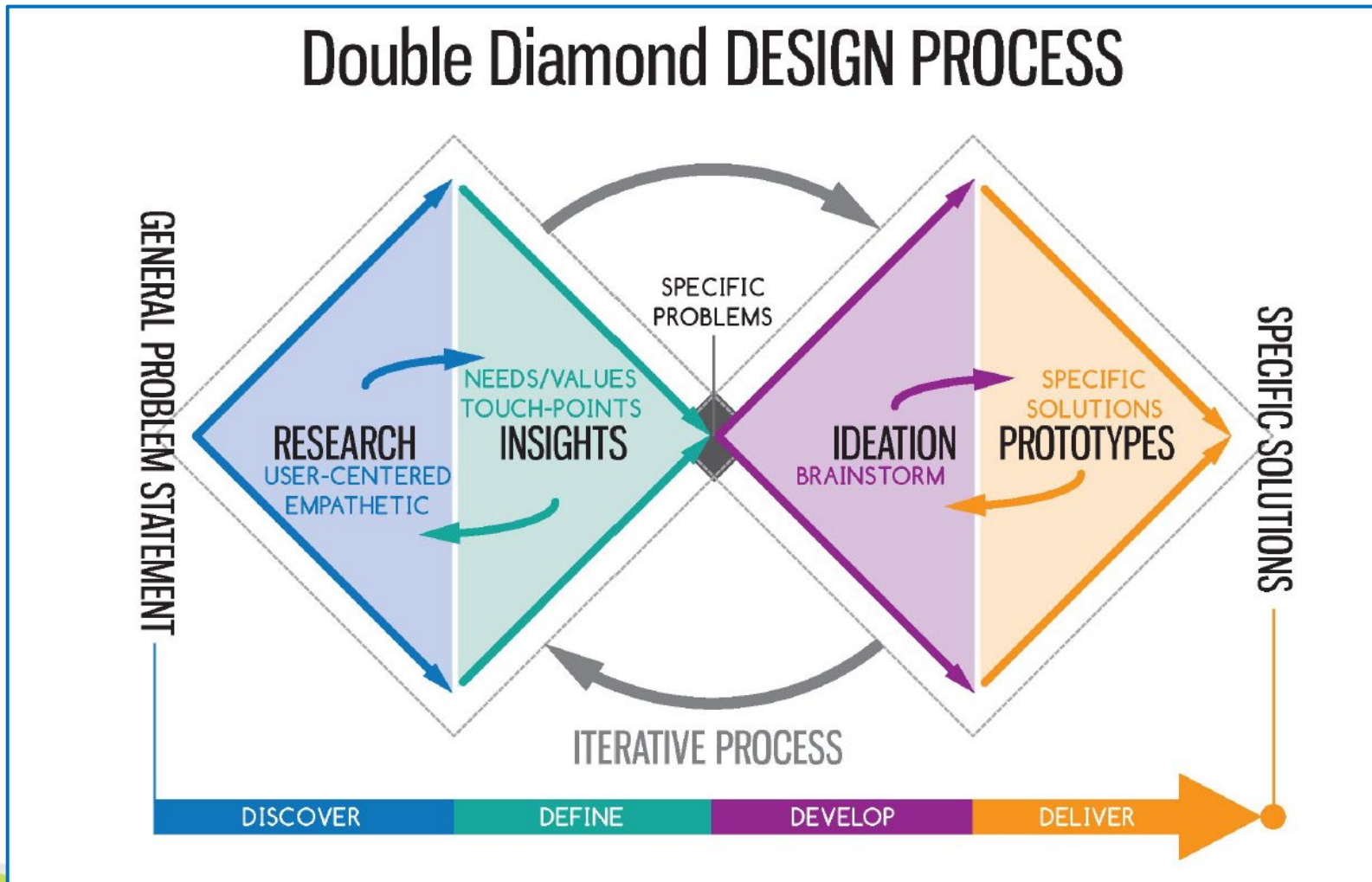


Techniques for understanding people's behaviors, values, needs, aspirations



Participatory methods for developing products and services

Human-centered design process



I. Establish design principles

How can the website become a trusted source of technical information that *meets people where they're at* after a flood— socially, technologically, emotionally, culturally, economically— and *helps them take action*?



II. Hold focus groups

1. External to EPA

- Solicit disaster social scientist input working with flood survivors
- Held off on engaging communities directly until we knew what questions to ask

2. Internal to EPA

- Build constituencies and learn from staff

Key feedback from the focus groups:

- Need to address renter- homeowner differences
 - Mistrust and frustration affect survivor decisions
- 

III. Review video scripts

Interagency technical review +

Social science review using:

PBJ Logic: step-by-step instructions, from perspective of audience

Theory of behavior change: choose language, organize information to encourage health protective behaviors

Empathy, respect, realistic



Video scripts: before and after

“Divide materials into three categories based on their moisture absorption and drying nature and how sensitive they are to moisture damage ... Nonporous materials do not absorb water at all or absorb water at a negligible rate.”

Empathy

“An important and difficult part of cleaning up after a flood is separating materials and items in your home that you can save from what you need to throw away. Let’s take a look at how to decide what to keep and clean and what to remove to protect you and your family’s health from continued exposure to germs, bacteria, and mold.”

PBJ Logic

Theory of
behavior change

IV. Interviews with flood survivors, volunteers

Key insights

1. Senior family member needs were a priority, along with children.
2. Limited information for decisions- family outside the area helped search
3. Lots of mistrust and frustration... and lots of helpers
4. Repair is a long, emotional process

"The main thing was getting Pa and Ma out of the house."

"We looked on Facebook and Twitter."

"All of a sudden they just started showing up."

"There are things to this day that are not right and are never going to be right."

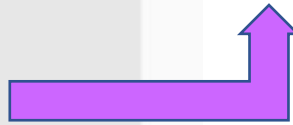
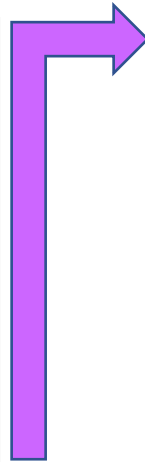
V. Card sorting activity

How interviewees ranked website topics
EPA topical priorities

high to low



- ★ Mold Tips high
- ★ Floor Cleanup and Removal
- Remove Standing Water
- ★ Drywall Cleanup and Removal
- Information About Flooding
- ★ Sorting and Cleaning Your Belongings
- Drying Everything Out
- What to Wear
- Staying Safe During Cleanup
- ★ Entering Your Home



- ★ Entering Your Home
- Installing Roof, Window, and Door Tarps
- Before You Enter Your Home
- Repairing Your Home Toolkit
- Generator Tips
- Setting Up a First-Aid Area
- Trash Disposal low
- ★ Lead Paint Tips zero
- ★ Asbestos Tips

VI. Website prototype

New topic!
Renter
specific info

Coming Home



- [Before You Enter](#)
- [Entering Your Home](#)
- [What to Wear](#)
- [Tools Needed for Repair](#)
- [Renter Specific Information](#)

Doing it Yourself



- [Roof, Window, and Door Tarps](#)
- [Removing Standing Water](#)
- [Wall Cleanup and Removal](#)
- [Floor Cleanup and Removal](#)
- [Drying Everything Out](#)

Protecting Your Health



- [Asbestos Hazards](#)
- [Lead Paint Hazards](#)
- [Mold and Bacteria](#)
- [Mosquitoes](#)
- [Generator Hazards](#)

Additional Resources & Help



- [Funding Resources](#)
- [Creating a Safe Workplace](#)
- [First-Aid](#)
- [Things to Keep, Clean, or Remove](#)
- [Trash Disposal](#)
- [Family Information](#)
- [Drinking Water and Food](#)

Grouped
asbestos, lead,
mold to better
attract interest

Search Flooded Homes

Enter topic or word:

Search

⚠ Current Declared Disasters

FEMA EXIT

Related Links

[Financial Assistance](#)

Address issues
important to flood
survivors

Have a Question?



VII. Usability testing of prototype website

Task: Coming Home After a Flood (7 mins, move on by 1:19)

Script: A river near your house flooded a week ago, causing you to evacuate to a friend's house. The news is reporting that the roads are now clear and you are anxious to get back to your home. You are trying to prepare yourself for what to expect and figure out what you need to bring. Someone told you about the EPA flooded homes webpage and you decide to check it out to see what you might need to know and bring with you before entering your home.

[ask participant to open Flooded Homes site]

Can you walk us through how you would find information about how to safely enter your home for the first time and what you might need to bring?

(Goals: Determine whether people can find key pieces of information, and if so, how?)

Additional prompt questions (ask as needed):

- What would you typically do in this situation? What did you previously do?
- What would you click on that might lead you to this information?
- What stands out on this page? What do you think it is about?



Flooded Homes Cleanup Guidance



EPA Center for Guidance and Tips to Safely Clean Your Flooded Home

Floods are the most common type of natural disaster affecting people across the United States.

Learn about [potential hazards in a flooded home](#).

What Can I Keep?

Keep it & Clean it



Metal Furniture



China Dishware
Ceramics



Silverware &
Kitchen Utensils



Plastic Furniture



Jewelry



Glass

It's a Maybe



Photos & Books



Bedding & Blankets



Rugs



Solid Wood Furniture

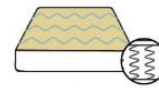


Clothing



Appliances &
Electronic Devices

Best to Remove It



Mattresses



Leather Furniture



Medicine



Cloth Upholstered
Furniture

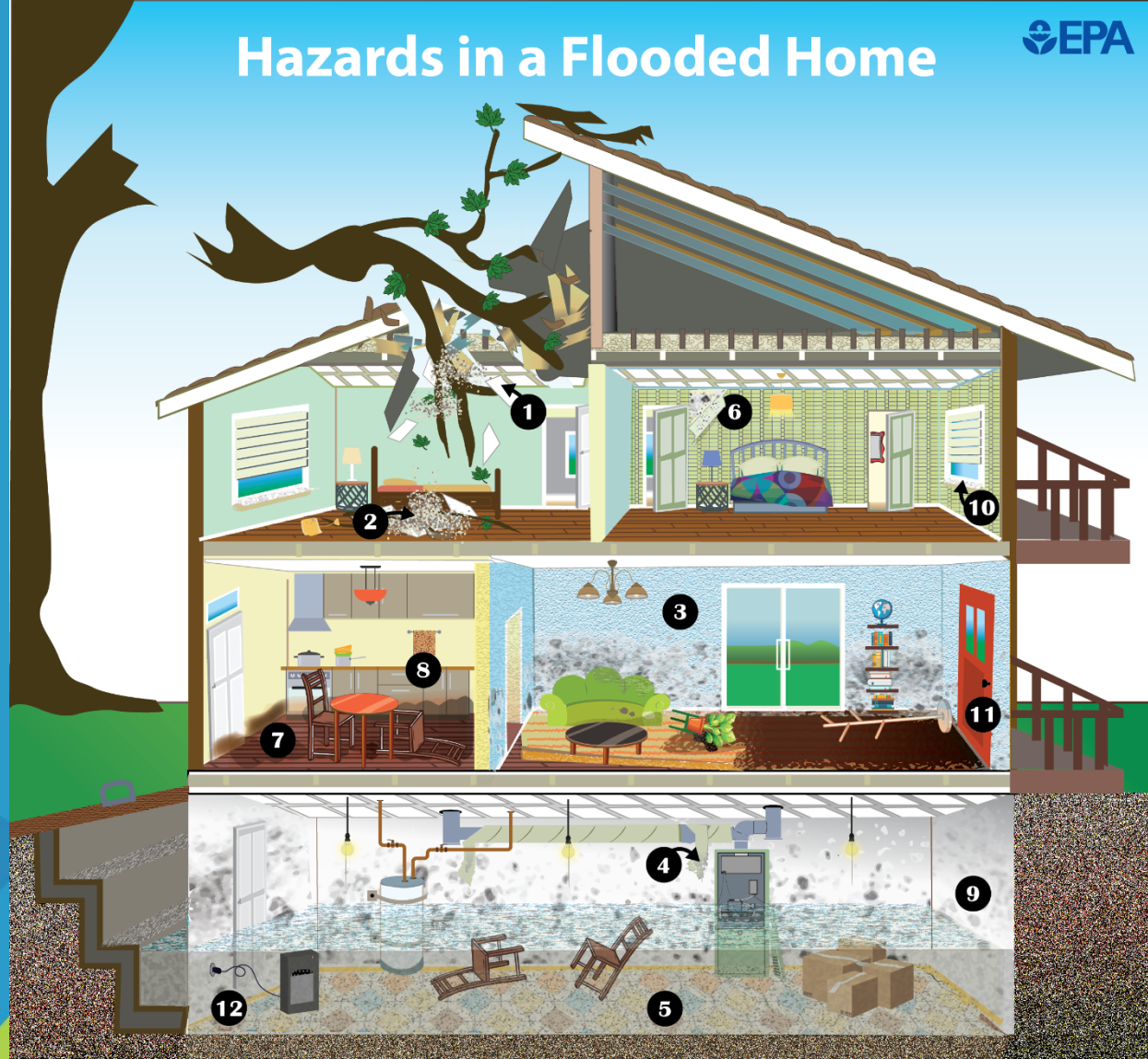


Cushions & Pillows



Wood Veneer Furniture

*Learn more here on how to treat and clean different material.



Asbestos

- 1 Acoustic ceiling tiles
- 2 Vermiculite insulation: gray-brown or silver-gold pebble-like
- 3 Textured coated walls and ceilings
- 4 Insulation on boilers, furnaces, and piping
- 5 Vinyl tiles and linoleum sheet flooring

Mold

- 6 Behind wallpaper or wood paneling
- 7 In and under flooring such as lifted wood floors, carpet, and cracked tiles
- 8 Hidden mold behind kitchen cabinets
- 9 Mold on furniture and walls

Lead

- 10 Interior and exterior windows and windowsills
- 11 Interior and exterior doors and door frames

Shock Hazard

- 12 Electrical shock hazard

Lessons learned for environmental health risk communication

Key to success

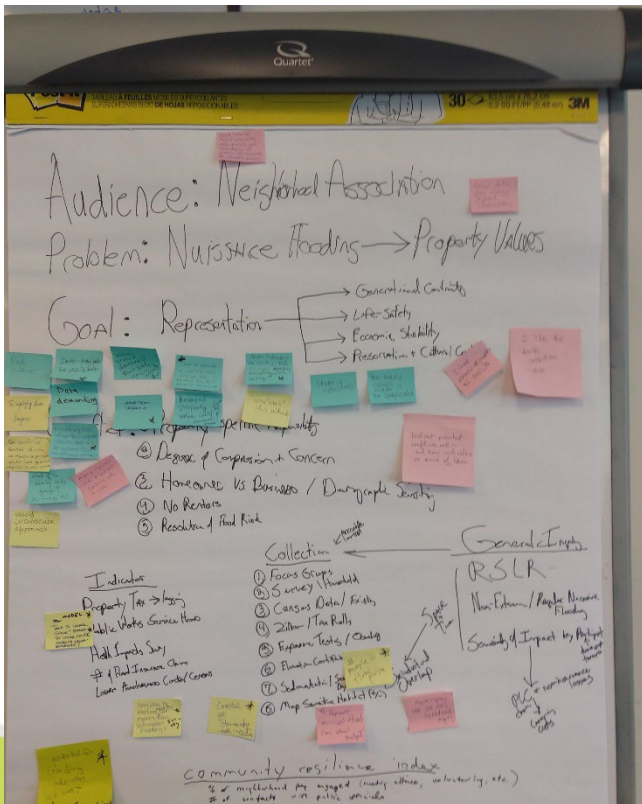
- Interdisciplinary team
- Open mindset
- Accept imperfection
- Check assumptions

Biggest challenges

- Recruitment takes a lot of time
- Virtual interviews, usability testing

Next time

- Combine technical & social science script reviews
- Add in community reviews



Thank you! Questions?

Contact

Maxwell.Keely@epa.gov

Reynolds.Mary@epa.gov



- Funders: Regional Sustainability and Environmental Sciences Research Program (RESES), Regional/State/Tribal Innovation Projects (RSTIP), and the Regional Research Partnership Program (R2P2)
- Federal partners: CDC, HUD, FEMA, and ATSDR, The Lab at OPM
- State partners: Florida Department of Health, University of Florida, and Louisiana State University Extension Office
- Collaborators: Saint Bernard's Project (SBP), participants in focus groups, interviews, and usability testing