

“How do we stop this exposure?”

Academics & communities collaborating to communicate risk

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“A professor who studied wildlife at a nearby lake found that 19 of the local fish species had become extinct since the 80s...I wanted to let him know that our people were dying too.”

“How do we stop this exposure?”

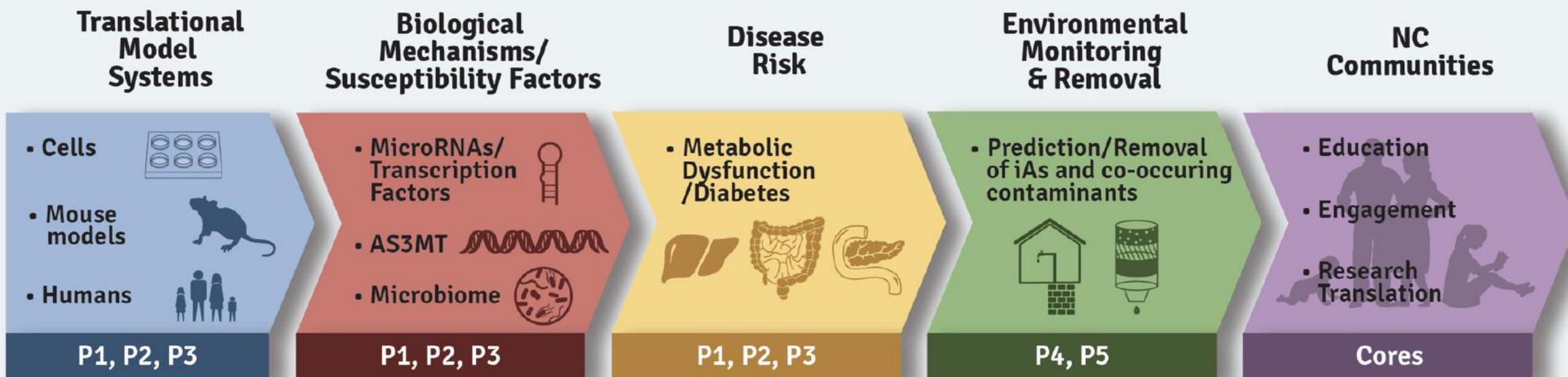
How the UNC SRP team partners with community organizations and scientists to share information about risk

- Three environmental exposures
 - PCBs & mercury in fish
 - Toxic metals in well water
 - PFAS in public waterways & air
- Longer-term interactions versus urgent communication



Developing solutions to reduce iAs exposure and prevent iAs-induced metabolic disease

UNC-SRP Project and Core Integration



Enrichment Cores

A. Administration



B. Community Engagement



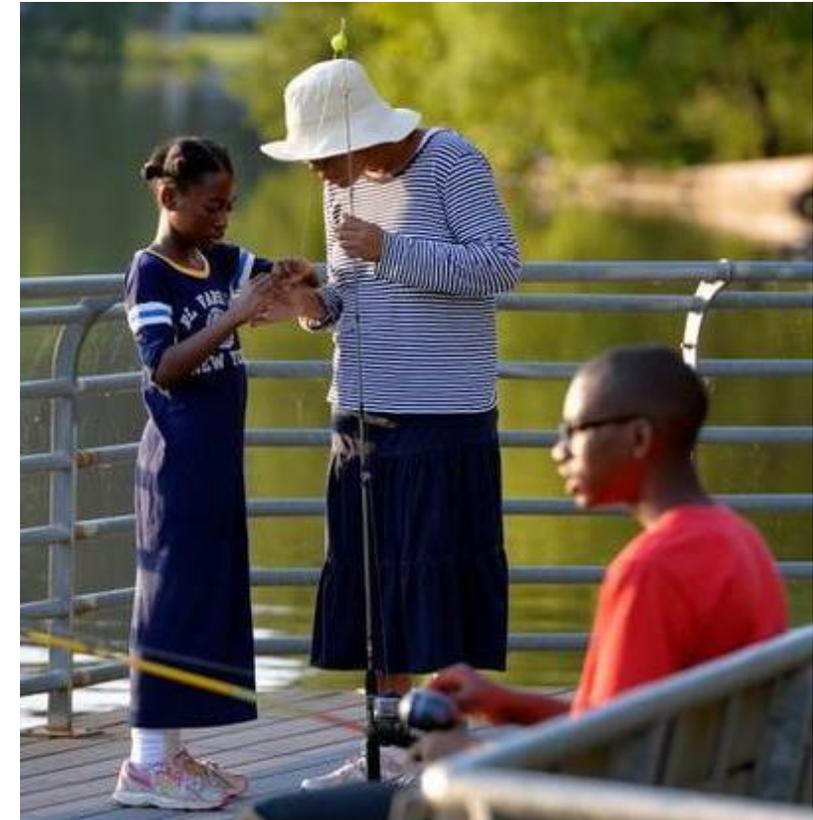
C. Data Management & Analysis

D. Chemistry & Analytical

E. Research Experience & Training Coordination

Our approach: Leveraging engagement and translation





Advocates & park staff shared concerns about consumption of contaminated fish



**Convened
advocates, state &
local agencies,
anglers**

**Engaged vulnerable
populations**

Created & tested multiple versions

CHECK YOUR CATCH



Eating the fish you catch can be healthy for you and your family, but some fish in North Carolina lakes and rivers are polluted with harmful chemicals, like mercury and PCBs. Eating some fish, while avoiding others, is a healthy choice!

<p>SERVINGS per week 2</p>  <p>PREGNANT AND OTHER WOMEN age 15-45</p> <p>CHILDREN under 15</p> <p>SERVINGS per week 0</p>	<p>CHOOSE THESE FISH:</p> <table style="width: 100%; text-align: center;"> <tr> <td>CRAPPIE</td> <td>WHITE BASS</td> <td>SUNFISH/BRIM</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>WHITE PERCH</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	CRAPPIE	WHITE BASS	SUNFISH/BRIM					WHITE PERCH					<p>4 SERVINGS per week</p>  <p>MEN over 15</p>  <p>WOMEN over 45</p> <p>1 SERVING per week</p>												
CRAPPIE	WHITE BASS	SUNFISH/BRIM																								
																										
	WHITE PERCH																									
																										
	<p>AVOID THESE FISH:</p> <table style="width: 100%; text-align: center;"> <tr> <td>BASS</td> <td>CATFISH/BULLHEAD</td> <td>CARP</td> <td>WALLEYE</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>CHAIN PICKEREL (JACKFISH)</td> <td>WARMOUTH</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>BOWFIN (BLACKFISH)</td> <td></td> <td></td> <td>YELLOW PERCH</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	BASS	CATFISH/BULLHEAD	CARP	WALLEYE							CHAIN PICKEREL (JACKFISH)	WARMOUTH					BOWFIN (BLACKFISH)			YELLOW PERCH					
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WARNING FOR WOMEN AND CHILDREN

LOOK BEFORE YOU EAT
HARMFUL CHEMICALS ARE IN THESE FISH





BASS	CATFISH	CARP	WALLEYE
			
		CHAIN PICKEREL (JACKFISH)	WARMOUTH
			
BOWFIN (BLACKFISH)			YELLOW PERCH
			

WHY ONLY WOMEN AND CHILDREN? LEARN MORE AT:

go.ncsu.edu/SafeFish

Gray, LePrevost, & Cope. (2020). Anglers Views on Using Signs to Communicate Fish Consumption Advisories, *Fisheries*, 45(10), 307-316.

Well Empowered

Community leaders shared concerns

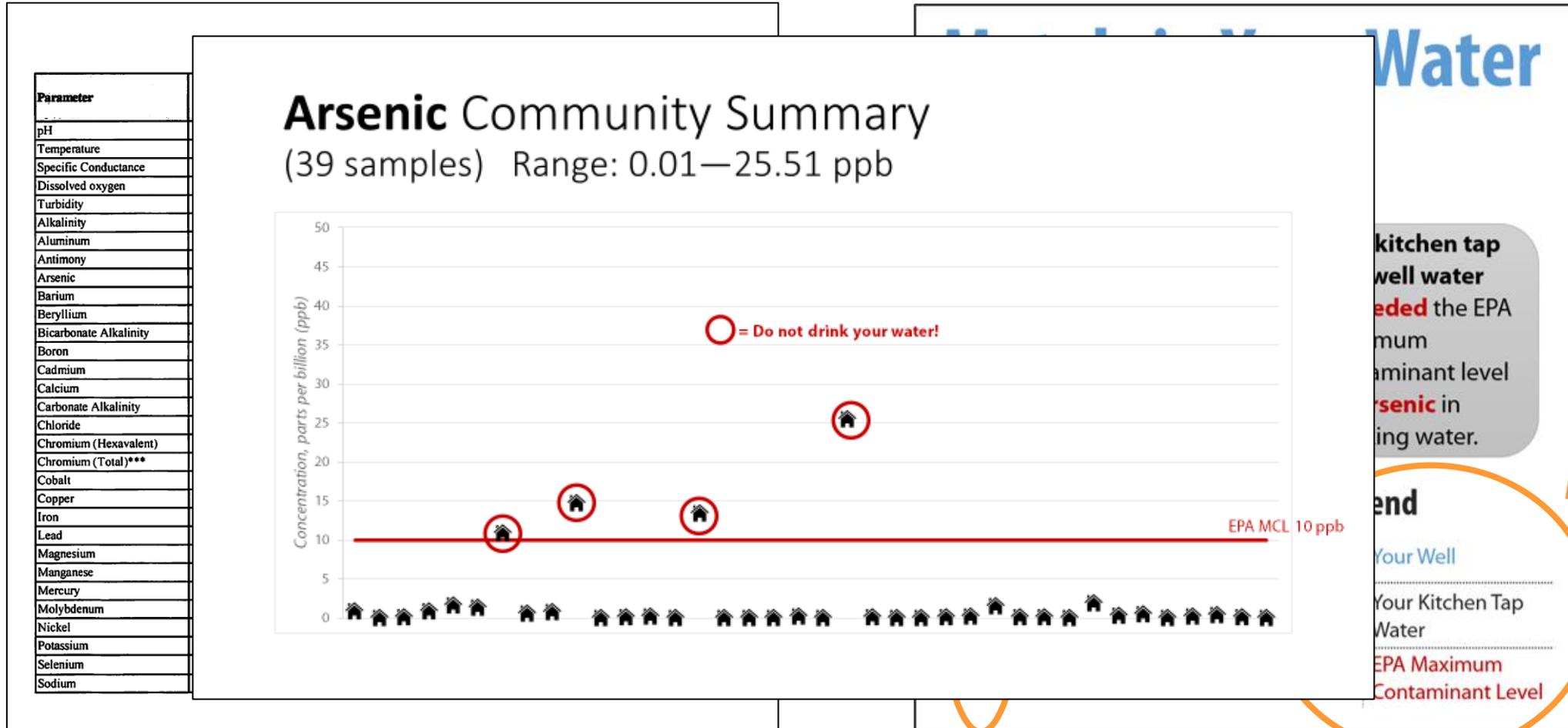
- Exposure to toxic metals in well water
- Confusion over well test results



Developed & revised sampling plan with communities/scientists



Sought input, revised well test reporting



Examined understanding of well test results

parts per billion

25

15

10

5

High arsenic

Low arsenic

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Self-Efficacy Assessment

ID _____

For the items below, **please rate how certain you are that you can complete each action.** Rate your degree of confidence by circling a number from 0 to 10 on the scale.

If you want to reply "I don't know" please choose a number at the lower end of the scale that best represents your uncertainty.

1. I can learn whether my well water contains arsenic...
 - a. If a water testing facility is nearby (within a one-hour drive).

0	1	2	3	4	5	6	7	8	9	10
not at all certain			moderately certain				highly certain			
 - b. If a water testing facility is far away (more than a one-hour drive).

0	1	2	3	4	5	6	7	8	9	10
not at all certain			moderately certain				highly certain			
 - c. If a water test costs \$50 or less.

0	1	2	3	4	5	6	7	8	9	10
not at all certain			moderately certain				highly certain			
 - d. If a water test costs more than \$50.

0	1	2	3	4	5	6	7	8	9	10
not at all certain			moderately certain				highly certain			

What is arsenic?

Chemical that is found in soil and rocks naturally
 Mining, and industry
 EPA has set an unsafe level for arsenic in drinking water at 10 parts per billion

How does arsenic get into drinking water?

From soil and water from industry

How does arsenic enter the body?

- Swallow water, food, or soil with arsenic
- Breathe in smoke or dust with arsenic
- Rarely taken up through the skin

What are the short-term health effects?

Stomach pain, vomiting, diarrhea, weakness, and weight loss

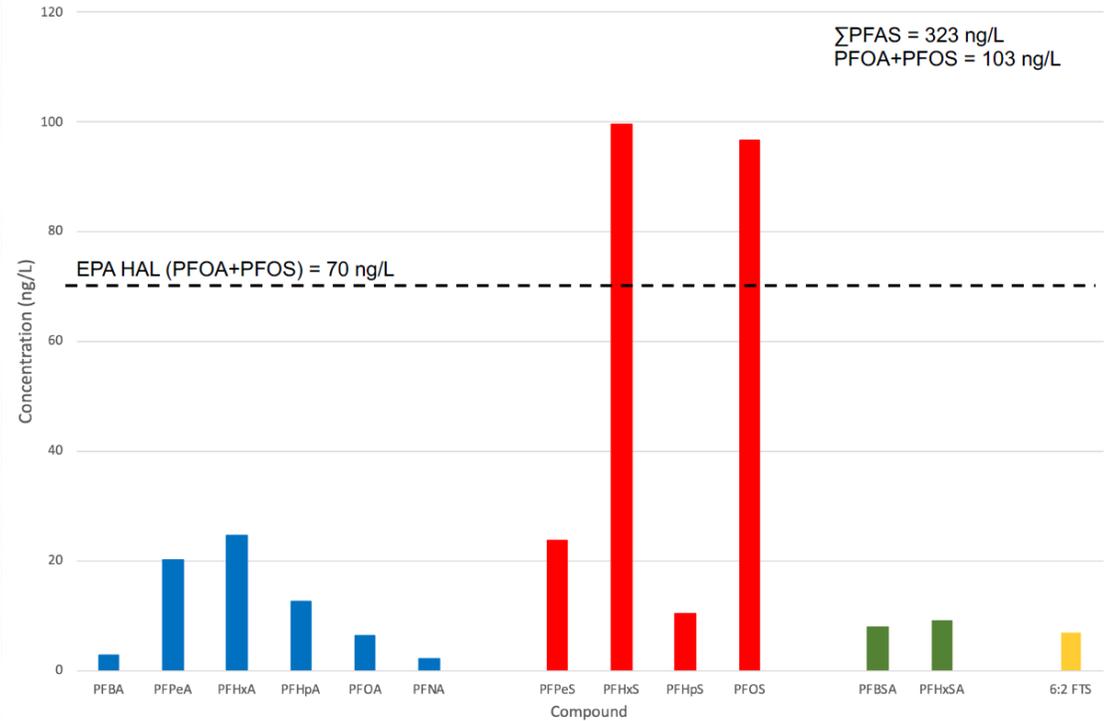
What are the long-term health effects?

- Thick and discolored skin
- Damage to liver and kidneys
- Cancer

Infants, pregnant women, and those with pre-existing conditions such as cancer and diabetes are more at risk of health problems.

Source: U.S. Environmental Protection Agency. © 2019 The University of North Carolina at Chapel Hill/The University of Arizona. All Rights Reserved. UNC/UA Arsenic in Drinking Water Project

Needed to communicate urgent results



Results of Municipal Well Test
Sample collected by NC PFAS Testing Network, 5/7/2019

NC PFAS Testing Network funded by NC legislature

About ▾ Research Team ▾ In the News Resources ▾ Publications Data and Tools ▾ Final Report ▾





The beauty of North Carolina's lakes and rivers is being threatened by a group of human-made chemicals, known as PFAS, including GenX.

What are PFAS?



To understand the extent of PFAS contamination across the state, the North Carolina General Assembly funded a statewide research study.

Learn about the study

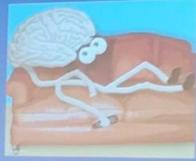


This study is a collaboration among universities to document the presence of PFAS and understand its impacts on the environment and our health.

Meet the Network teams



Cognitive Misers and Low Information Rationality



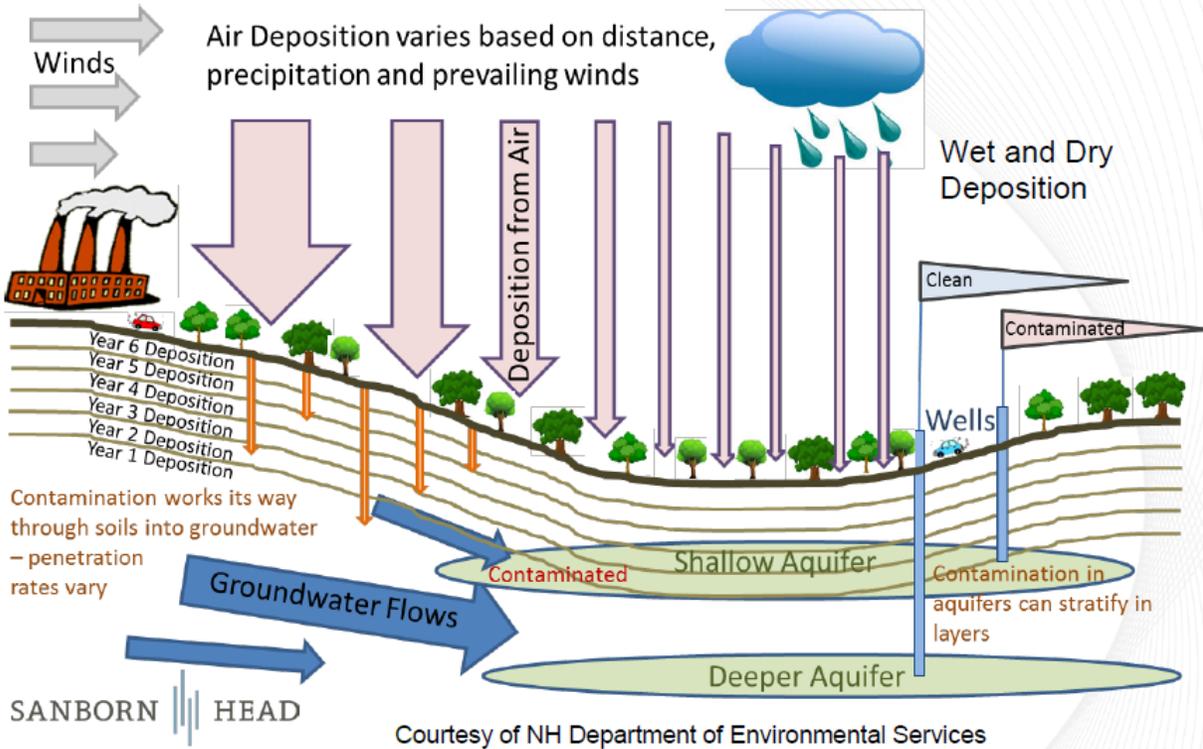
**ALL OF US ARE NON-EXPERTS
IN MOST SCIENTIFIC FIELDS**

Schulz, D.A. (2005). Messages and heuristics: How audience form affects about emerging technologies. In J. Dunfee (Ed.), *Managing science: Principles, ethics, analysis and action* (pp. 26-55). London: The Wellcome Trust.

Engaged scientists in developing communications (& did some training)

Identified & highlighted key information

Atmospheric Deposition of Contaminants



HOW DO PFAS GET INTO THE AIR?

Manufacturing processes can release PFAS into our air. From there, PFAS particles can fall directly to the ground, or become part of a cloud and fall to the ground as rain.

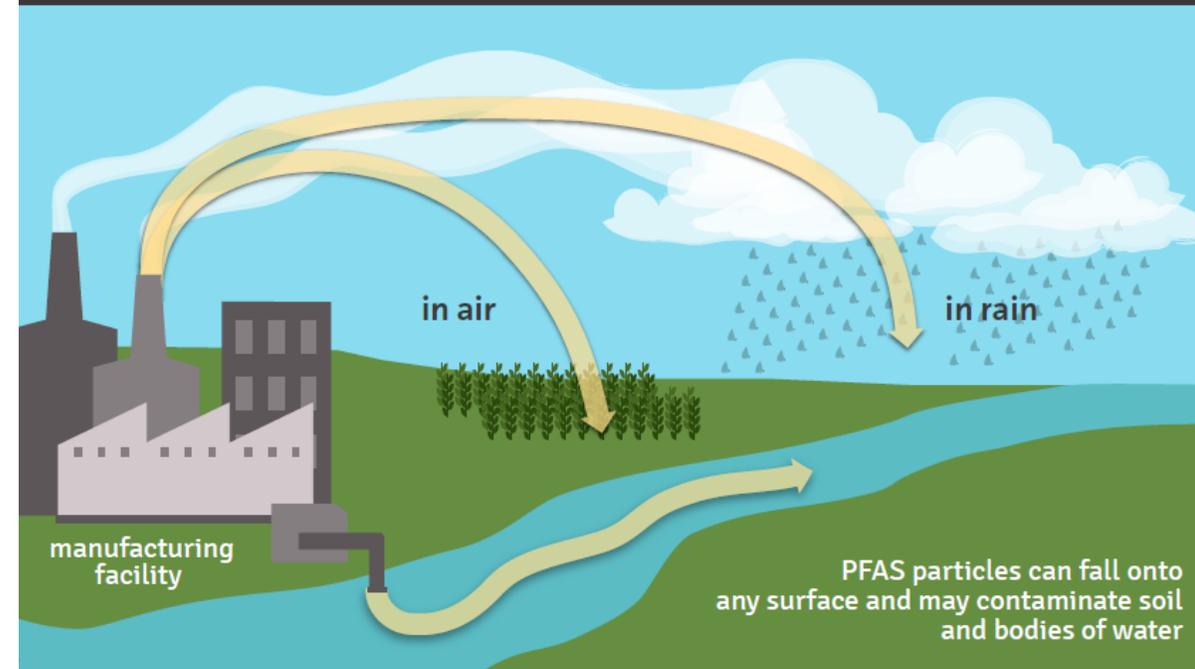


Image source: ncpfastnetwork.com

Sought community & scientist input

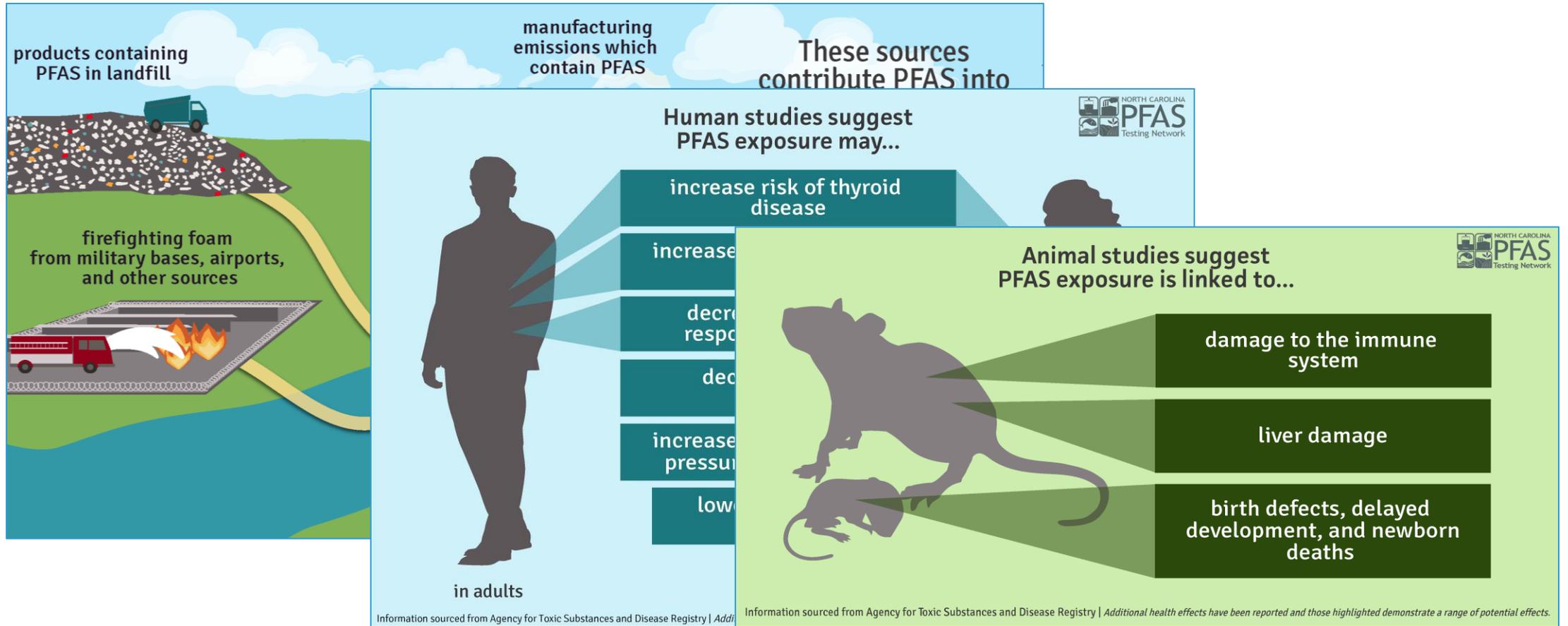


Image source: ncpfastnetwork.com

Lessons learned

Existing community relationships enabled responsiveness

Varied expertise was needed throughout process

The “final” draft was rarely final

Wealth of resources available through SRP and NIEHS networks bolstered our work

Thanks to
all who
contributed to
and supported
this work

Study participants

University collaborators

UNC-Chapel Hill

Rebecca Fry, Andrew George, Neasha Graves, Caroline Reed, Victoria Triana, Melissa Troester

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University of Arizona

Marti Lindsey, Ben Richmond, Barry Weiss

University of Kentucky: Anna Hoover

Duke University: Jory Weintraub

Community collaborators

Appalachian Voices: Amy Adams, Ridge Graham

Lake Crabtree County Park: Drew Cade

NC Museum of Natural Sciences: Lynn Cross, Erin Apple

Residents for Coal Ash Cleanup: Carolyn Armijo, David Caldwell

Sound Rivers: Matthew Starr

Funders

National Institute for Environmental Health Sciences
(P42 ES031007, P30ES010126)

NC Policy Collaboratory

sph.unc.edu/srp
ie.unc.edu/cpes



The amazing CPES team!

