



# Risk Communication Practices to Address the Quandary of Pharmaceuticals, Endocrine Disruptors and Emerging Contaminants

Lisa Ragain  
Aqua Vitae



*Domestic water supplies should protect the health and promote the well-being of individuals and communities.*

Advisory Committee, USPHS Drinking Water Standards, 1962.

# Overview



Introductions

Risk Communication

Discussion

Break

PPCPs and Emerging Contaminants

Exercise

Summary

# Objectives



- Identify and discuss risk communication principles
- Relate principles to specific drinking water contaminants
- Describe of risk communication in the context of regulatory framework
- Apply risk communication framework to specific contaminants



# What is Risk Communication?

# Risk Communication is Not



- Crisis Communication
- Media Strategies
- Public Relations
- Brochures and other written products

These are tools that are a part of a comprehensive risk communication strategy.

# What is Risk Communication?



- Risk Management
- Complex science
- Uncertainty
- Risks and Benefits
- Research and data
- Strategic
- Discourse

# What is Risk Communication?



## Evolved risk management

- NOT from communication or health communication

## The context has changed

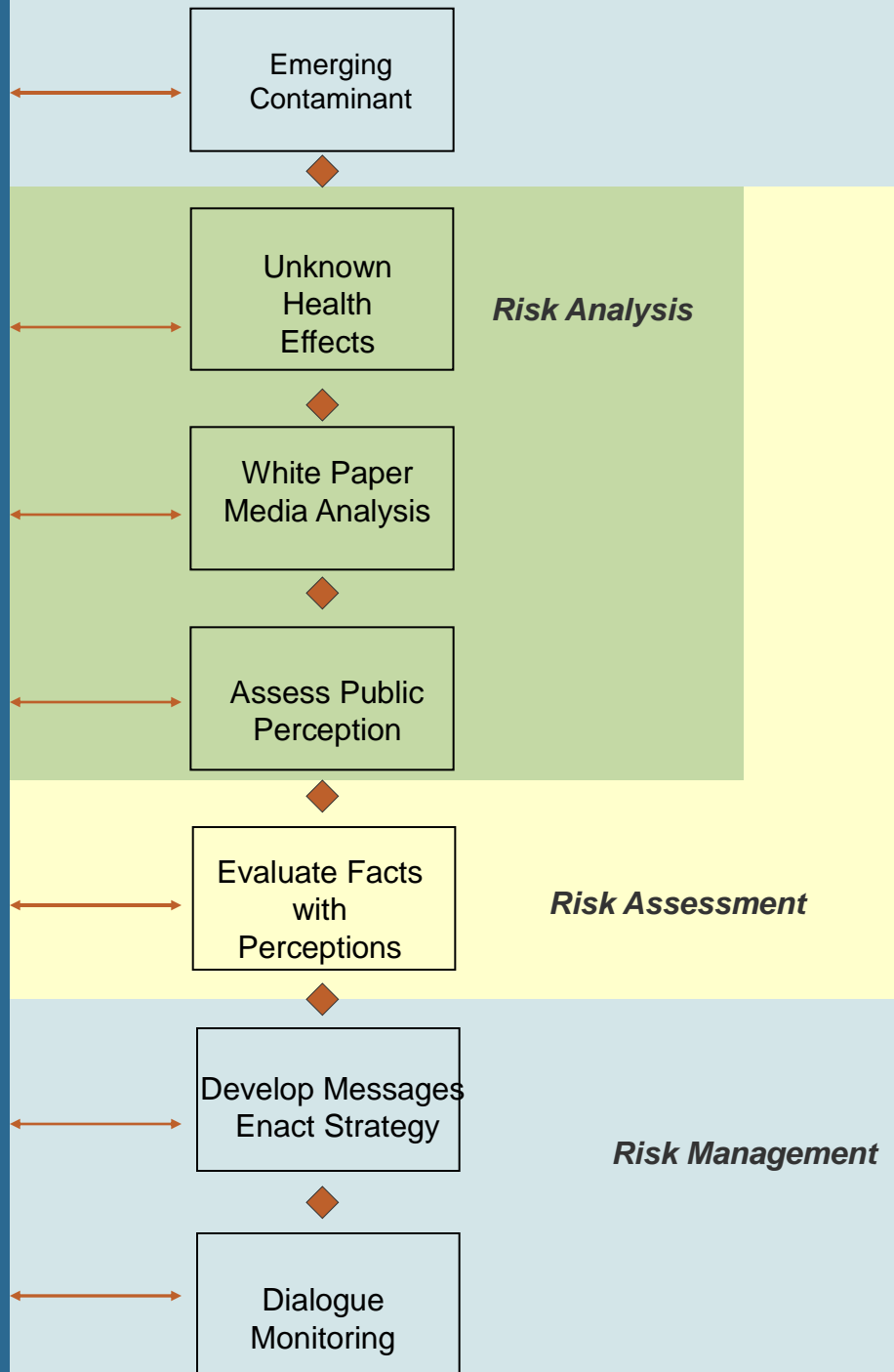
- How safe is “safe enough?” (late 1960’s)
- Natural, technological hazards (1970’s)
- Add-on to risk assessment (1980’s)
- Integrated into risk management processes (1990’s)





How do risk communication and risk management relate?

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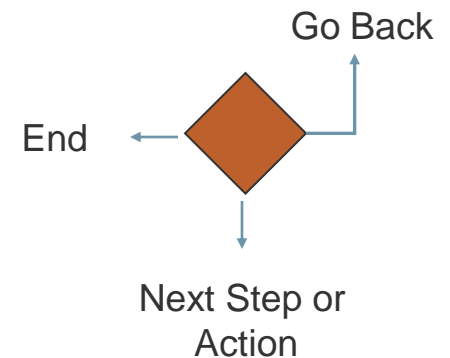


# Risk Management Paradigm



Adapted from CSA (1997)

## Detail of Decision Points



# Risk Communication Principles



Perceptions and belief have **equal** status with data and facts

- Trust
- Audience specific
- Previous experience
- Messages



# Foundations

- Built from data
  - Qualitative
  - Quantitative
- A component of risk management
- Reliant on dialogue and discourse



# Role of Scientific Evidence

- Understanding of scientific process
  - Proving a negative
- Demonstrate the benefit of fluoridation
- Weight of the evidence

# Risk Communication Perspective



What perceptions drive audience reaction?

- Involuntary risk
- Very familiar vs. “exotic”
- Understand some, not all aspects of a risk
- Trust
- Scare words: toxic, convulsive, sex hormone

# Risk Communication Perspective



Perceptions are valid and must be addressed *equally* in relation to scientific data

# What does the public want to know?



- Is the drinking water safe for my family?
- What is the utility doing about it?
- Can I trust the experts?
- Where can I get information
- What are my options?
- **What can I do?**



# Audience Considerations



- Staff
- Public officials
- Concerned customer
- Customers
- Advocates

Who can be persuaded, is there real discourse?

# Drinking Water and Risk



- Involuntary risk
- Persistent and pervasive controversy
- Trust
  - Government and institutions
- Toxicity and sources
- Ethics

# We Know that for drinking water and health...



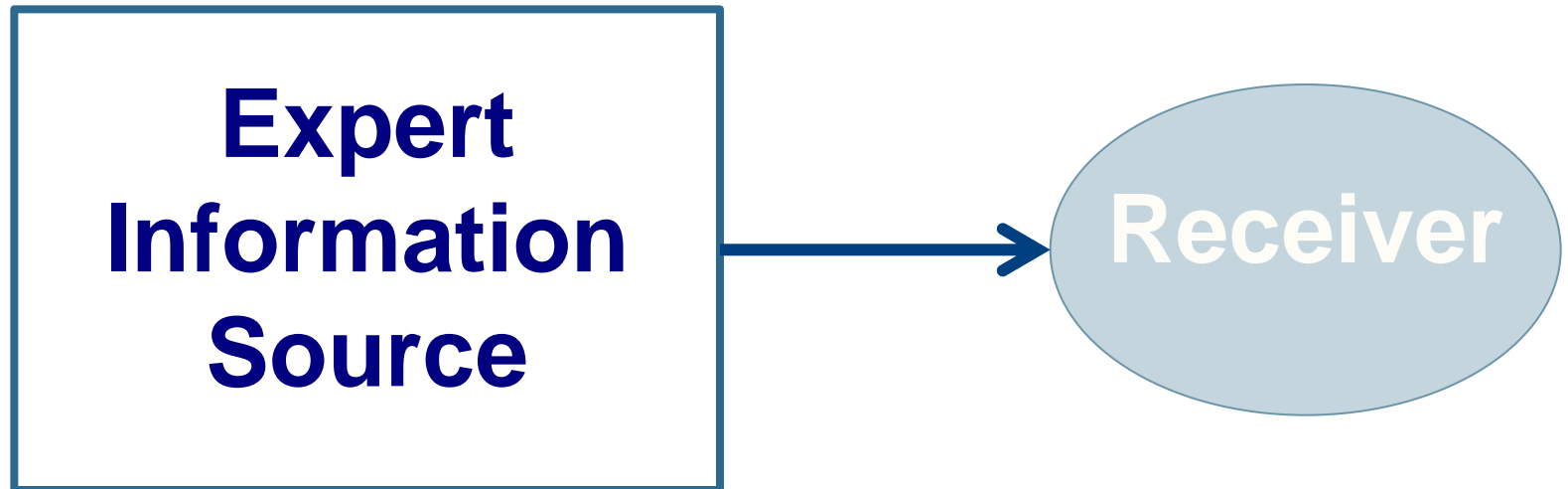
## Emerging and re-emerging contaminant issues

- Are complex
- Involve serious consequences for utilities
- Trigger public interest

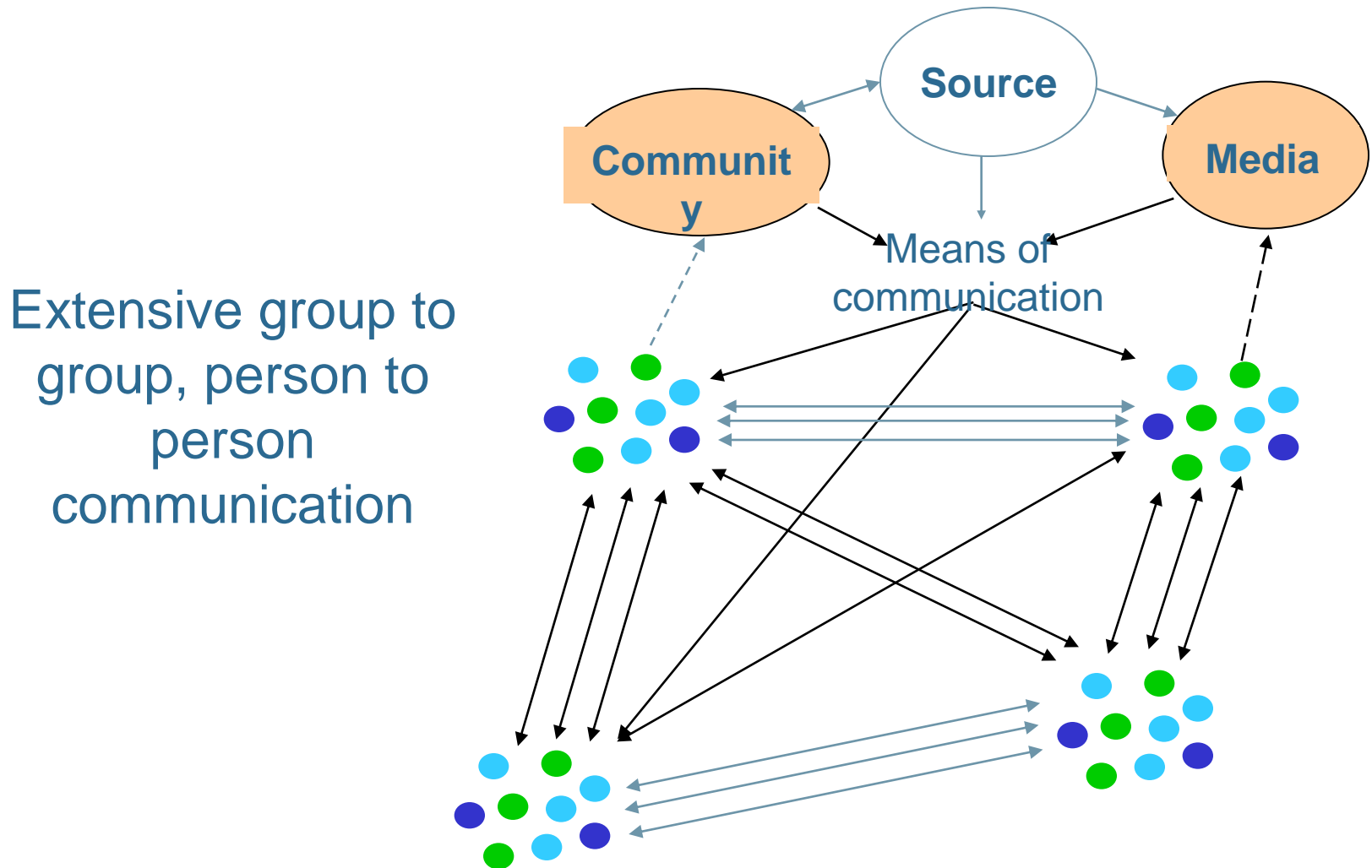
## Responding transparently to public concerns is very important

- Builds trust and credibility

# “Tell” Model



# “Network” (Discourse) Model



# Utilities and Public Health



- Drinking water is a part of public health
  - Unique role in communities
- Not health experts
- Public health *promotion*
- Regulatory framework vs. public health guidance

# What should utilities say?



- Local issue, local decision
- Why/not is the drinking water fluoridated?
- Action related to research
- Change in guidance, what does it really mean?

Respond with public health and community partners

# What should an agency say?



- Local issue, local decision
- Why/not
- Action related to research
- Change in guidance, what does it really mean?

Respond with public health and community partners



# Example of Effective Practices



- Consistent communication
- Relates water to public health
- Local expert
- Personal
- Additional information and context provided

# Risk Communication is



The set of strategies & approaches used to develop

An *interactive* process of exchange of information and opinion among various interested individuals, groups, and institutions about risk

Risk management decisions & actions flow from that exchange.

Adapted by Dr. Rebecca Parkin from NRC, 1989

# Risk Perception Drives Risk Communication



## Risk Perception

- Shapes judgments, preferences, & decisions
- Is influenced by personal, social and cultural factors

## Central Questions

- How do people *think* and *feel* about the risk?
- *Why* do they view the risk that way?

# To understand in risk perception...



## Public Concern $\neq$ Scientific Concern

Public concern is valid, real and must be addressed

*via risk communication*

# Risk Perception Parameters



Extent to which the hazard is feared

**DREAD**

Extent to which the hazard is know or unknown

**KNOWLEDGE**

Number of people exposed

**Public Health Significance**

least important of the three

# Understanding risk perceptions



## Questions to answer:

- What do they want to know?
- How do they want to know it?
- When do they want to know it?

# Attributes of public concern



Attribute	Definition	Scoring Range	Example	Rationale <sup>1</sup>
Proximity	Place – Closeness to the utility customers	0 = No mention 1 = Local 2 = State 3 = Region 4 = Country <sup>2</sup>	Des Moines Iowa Midwest U.S.	The closer the media is to the consumer, the more public concern it can be assumed to have within a community.
Frequency	Time – The number of media items mentioning a specific contaminant	Number of articles per 36-month period (e.g., 2001-2004)	19 media items featured coliform bacteria during the period reviewed	The more recent, and the more a community hears about a contaminant, the more likely they are to have elevated levels of concern.
Concern	Dread – The words that represent different levels of concern	0 = No mention 1 = Neutral 2 = Concern 3 = Dread	“Hydration” “Unknown effect” “Cancer” or “Toxic”	Certain words can create a perception of dread. This scale used different levels to reflect public concern.
Population	Person – Specific communities	0 = No mention 1 = Not specified 2 = Personal 3 = Concern 4 = Dread	No population mentioned Private well or specific neighborhood Elderly Children, pregnant women	Specific groups affected by a contaminant may cause a greater level of public concern. Additionally, if people think an issue is more likely to affect them, they also demonstrate a higher level of concern.

# Dread Characteristics



- Not controllable
- High dread
- Catastrophic globally
- Fatal consequences
- Not equitable
- Population affected
- High risk to future generations
- Not easily reduced
- Risk is increasing
- Involuntary exposure



# Drinking Water Dread Characteristics



Not controllable AND Involuntary exposure

High dread

Poison

Toxin

Interpretation

Difference between  
exposure and toxicity

Health Effects

Cancer

Population At Risk

Children

Pregnant women

# **Secrecy shrouds water test results**

**By Martha Mendoza/AP National Writer**

**Article Launched: 03/11/2008 08:16:18 AM PDT**

# Organizational Characteristics



- Risk Management
- Select priorities and develop in steps
- Regular business practice
- Exercise and training
- Build collaborations over time
- Establish and support dialogue

# Risk Communication for Emerging Contaminants 2776



- Recognition of emerging issues as a communication challenge
- Need for
  - Risk perception data on drinking water and trust in utilities
  - Role of the web
  - Links between scientific and perception data

# Perception Challenges



If water was safe yesterday,

**Why isn't it safe today?**

Was water really safe yesterday?

How safe is safe enough?

# Risk Perception Applied



People tend to

Simplify risk information

I was told to boil my water once. Should I always boil my water?

Find it difficult to change their minds

Regaining credibility and trust

Remember what they see

Strong visuals, positive or negative

Disagree more about what risk is and how extensive

# Public Concern



- I. Scientific and public concern
- II. Scientific concern, no public concern
- III. Public concern, no scientific concern
- IV. No scientific or public concern

## Public Concern

Yes

No

I arsenic	II antimony
III MTBE	IV vanillin

# Understanding risk perceptions



## Identify audiences through...

- Community - General
- Susceptible populations - contaminant specific
- Partners
- Demographics
- Community presence



# Barriers to Risk Communication



- Resources
  - Personnel
  - Time
  - Monetary
- Mutual understanding
- Communication
- Professional and agency relationships
- Roles and responsibilities



# Internal Process

- Commitment to risk communication
- Develop process
- Strategic process rather than reactive measures
- Identify specific areas and tasks
- Look full range of employees

# Academia to Practice



- Remove intimidation
- Focus on application in the field
- Demonstrate applications
- Revise based on field experience

# 2776 Findings



- “Emerging” linked with inevitable
- Storm water and wastewater negatively affected drinking water perceptions
- Frequency and population attributes had strongest affect on classification
- Risk Communication needs to be a strategic priority within a utility

# Pharmaceuticals

## Why?



- Low levels, detected through better technology
- No documented human health effects
- Modern water treatment *has improved* public health
- Competing concerns of infrastructure, known health effects, new regulations

“Drinking water is personal. It is what we use to bathe, prepare food and make formula to feed our babies. It touches every aspect of our lives.

What we do as water professionals is intimately related to the health and well-being of our friends - our families - our communities.”



# Risk Management Quandary

## Sampling, Monitoring and Regulation of Emerging Contaminants



# Regulation

- Regulation is a form of risk management
- Public may or may not care
- Public officials



# What Are the Challenges?



- Rules
  - LCR
  - DBP
  - TCR
- Monitoring Precision and Accuracy
  - Perchlorate
  - Pharmaceuticals
  - Endocrine Disruptors
  - Microbes
- Simultaneous Compliance -
  - complex and technical
- Public Awareness and Concern
- Undefined Health Effects
- Limited Resources

March 12, 2008 -- Updated 1701 GMT (0101 HKT)

## Few guidelines, treatments for contaminated water

### STORY HIGHLIGHTS

- There are no national m
- EPA official: We have ca
- A year ago government
- EPA scientist: "There isn

[Next Article in Health](#) »

 READ

 VIDEO

 MAP

11:01 2/20

**PHILADELPHIA, Pennsylvania (AP)** – Just a century ago, this historic city notched by the Delaware and Schuylkill treated these rivers as public sewers, but few cared until the waters ran black with stinking filth that spread cholera and typhoid. Today, municipal drinking water is cleansed of germs – but not drugs.



AP/PHOTO

While operators monitor the groundwater system at a plant in California, there are no testing mandates.

Traces of 58 human and veterinary pharmaceuticals or their byproducts – like the active ingredients in medicines for pain, infection, high cholesterol, asthma, epilepsy, mental illness and heart problems – have been detected in Philadelphia's drinking water. Starting their winding journey in medicine cabinets and feed bins, they are what's left of drugs excreted or discarded from homes and washed from farms upriver.

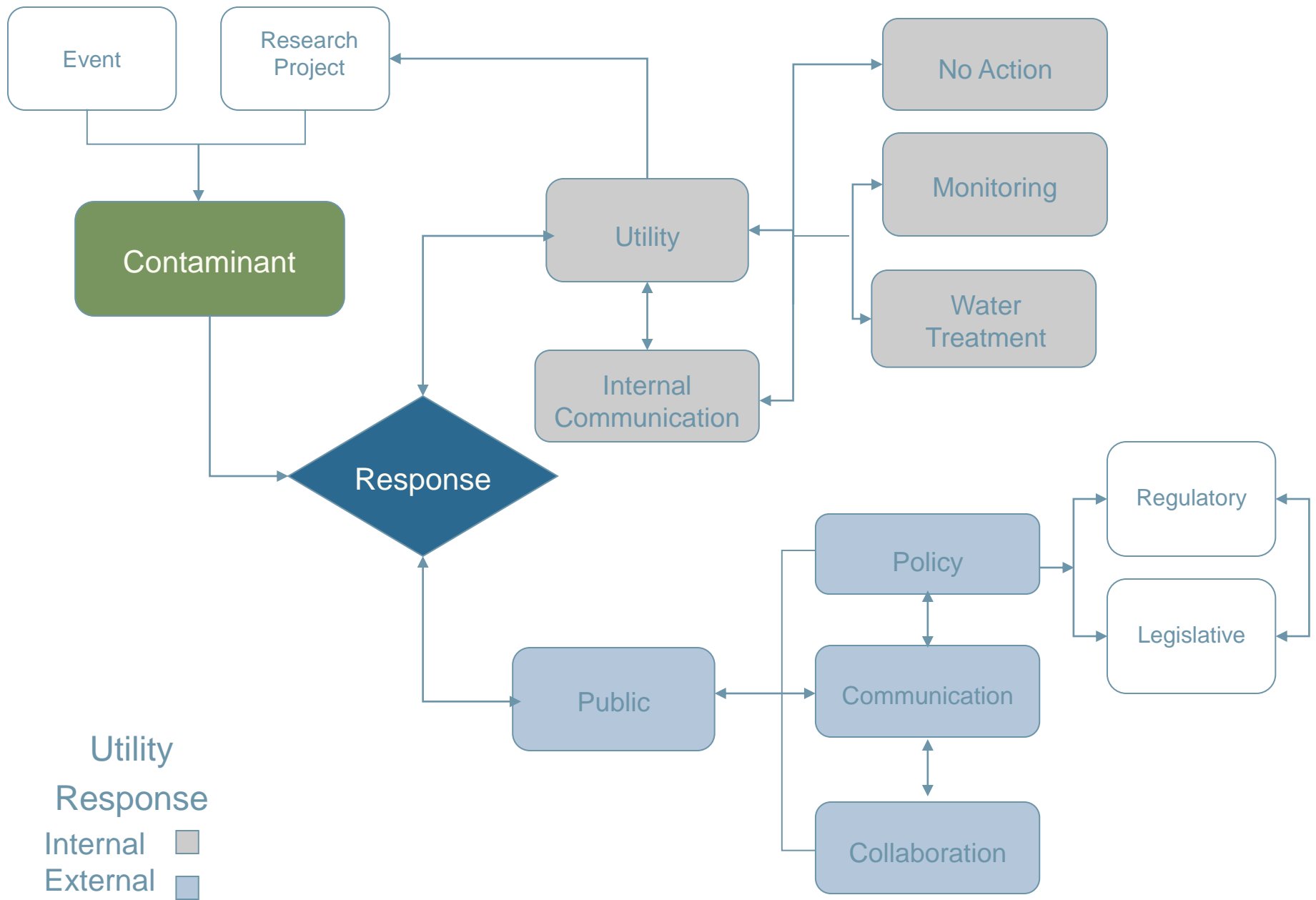
Is Philadelphia worried? Not so far. Tens of millions of Americans here and elsewhere drink water that has tested positive for minute concentrations of pharmaceuticals, and they don't even realize it. The Associated Press learned during a five-month investigation.

Though U.S. waterways coast to coast are

# Monitoring and Sampling



- If it isn't dangerous, why are you testing for it?
- Why are you monitoring or sampling?
- What will you do with the results?
- Plan communications and information exchange
- Technical Assistance





# Endocrine Disruptors, Pharmaceuticals, and Personal Care Products

Applying Risk Communication in

# Common PPCP Themes



- Toxicity
- Forced Medication
- Negative Health Effects
- Government intrusion
- Individual actions

# Contradictions of EDCs and PPCPS



## Medical

- Health benefits
- Familiar
- Control
- Individual health
- Regulation

## Water

- Health threat
- Familiar
- Population health
- No regulation

# AP Article Overview



- Developed as new “Investigative” initiative in AP
- National scope , utilities in all states queried
- Appearance of “scientific” review of data
- Highly promoted with AP subscribers





Pharmaceuticals, EDCs and...

How Did We Get Here Again?

# AP Investigation Method



- Review of hundreds of scientific reports, analyzed federal drinking water databases,
- Site visits at study sites and treatment plants
- Interviewed 230+ officials, academics and scientists
- Surveyed 50 largest US cities, other major water providers and smaller community water systems

# AP Probe Finds Drugs in Drinking Water

By *JEFF DONN, MARTHA MENDOZA*  
and *JUSTIN PRITCHARD*

The Associated Press

Monday, March 10, 2008; 9:17 AM

— A vast array of pharmaceuticals \_ including antibiotics, anti-convulsants, mood stabilizers and sex hormones \_ have been found in the drinking water supplies of at least 41 million Americans, an Associated Press investigation shows.

## THIS STORY

[Area Tap Water Has Traces of Medicines](#)

[The Drugs in the Area's Water](#)

[AP Probe Finds Drugs in Drinking Water](#)

[Drugs Found in Watersheds of 28 Areas](#)

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Duane Moser, an assistant research professor with Desert Research Institute, collects water samples from the Las Vegas Wash in Henderson, Nev., Thursday, Oct. 18, 2007. (Jae C. Hong - AP)

## TOOLBOX



Resize Text



Save/Share +

## New tests detect pharmaceuticals in more water

At least 46 million Americans are supplied water that has tested positive for trace concentrations of pharmaceuticals, up from 41 million in March. The original Associated Press reports prompted many more communities to test their water.



\* In Virginia Beach, pharmaceuticals were found in source water but not in treated drinking water.

# AP Article Analysis



- Pressured utilities for data
- Knew story had elements of “outrage”
- Promoted concerns rather than solutions

# AP Article Analysis Limitations



Did not explain or acknowledge:

- Why some utilities testing for unregulated contaminants
  - Why other utilities do not
- The differences in data collection from utility to utility
- Competing priorities

# AP Article Analysis Opportunities



- Sparked awareness of drinking water quality
- Initiated important policy and risk discussions
- Created a public awareness of the link between source water, drinking water and wastewater

# AP Article Analysis Effects



- Decisively created the biggest drinking water story of the year
- Set a precedent for future stories
- Underscored the need for stronger risk communication strategies and relationships with public health, health care providers, and other organizations





# Immediate Reactions

- Large volume of public comments relative to other drinking water stories
- Health department inquiries
- Utilities surveyed received few calls

## Bangor area water safe, district says

By Meg Haskel

Tuesday, March 11, 2008 - Bangor Daily News

BANGOR, Maine — In response to a national survey that includes Bangor on a list of small cities that do not test their public drinking water for the presence of pharmaceuticals, the water district's top official said Monday that consumers here have little to fear.

Kathy Moriarty, general manager of the Bangor Water District, said the city's water source, Floods Pond in Otis, is so well-protected that it's next to impossible for it to contain even minute traces of pharmaceuticals. Nonetheless, she said, she has already sent away to a California laboratory for a specialized testing kit and hopes to be able to demonstrate conclusively the lack of pharmaceutical contamination in Floods Pond.

"The risk is incredibly low," Moriarty said in a telephone interview. "I can't imagine a water supply that's better protected against this problem." The water district owns the entire perimeter of the 635-acre lake. It also owns 99 percent of the watershed that feeds the lake, Moriarty said, including more than 5,600 acres surrounding the lake.

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Kathy Moriarty General Manager of the Bangor Water District at the Floods Pond pumping station in Otis. The Bangor Water District pumps about 5 million gallons of water per day. The drinking water is periodically tested for over 200 contaminants and is also treated at a separate facility before entering the water supply. (Bangor Daily News/Gabor Degre) [Buy this photo](#)

nashua  telegraph  
an edition of The Telegraph .com

# DES suggests testing your well water for known health risks

By **TOM BURACK**

An alarm was recently sounded by the media alerting us to the potential dangers related to trace amounts of pharmaceuticals and personal-care products in drinking water.

While this announcement is certainly a reason for concern, it isn't a reason for panic, nor does it represent breaking news to the staff at the New Hampshire Department of Environmental Services.

The attention this announcement provides is a great reminder that we should all be concerned about the quality of our drinking water, especially if the water is provided by a private well.



# National Media

- Did not print full series of AP articles
- Did not interview utility/water experts, but academics or public officials.
- Published follow-up articles with details
- Often added links, multi-media and other information to put risk into perspective



# State and Local Media

- Spoke directly with local utility
- Used local “experts”
- OpEds and letters:
  - Used the term “wake-up call”
  - Supported source water protection and infrastructure improvement
  - Noted bottled water is not an answer

# Continued Coverage



- Sporadic reports as utilities and states release test results
- Hearings reported prior, but results are not widely covered after

# Legislative Reactions



- Congress - Senate hearing, bills in both houses
- New York City, Philadelphia City Council Hearings
- New Jersey, Massachusetts Legislative Hearing
- Texas State Attorney General request
- Illinois - State mandated sampling

# Public Comments



*I don't understand how utilities claim that their water is safe when clearly not enough testing is done in this aspect*



# What Worked



- Proactive strategy
- Open about uncertainty and results
- Trust within the community
- Consistent Messages

# What Did Not



*“revealing the name (of the pharmaceutical) in the post-9/11 world could cause a terrorist to intentionally release more of the drug, causing harm to residents”*

# What Did Not



- “The public won’t understand”
- Citing regulations
- “The water is absolutely safe”
- Reactive testing

## Standard Response

“For reference, a part per billion is equivalent to one drop in an Olympic-sized swimming pool, and a part per trillion is equivalent to one drop in 1000 Olympic-size swimming pools.”

## Better Response

All the results are in the parts per trillion range -- the equivalent of grains of sand in an Olympic-sized swimming pool --

## Less than one in a billion

It doesn't take much hexavalent chromium in the water to create a long-term health risk, new research shows. But you might not realize it's a problem if you rely on the consumer confidence reports mailed each year by your local water provider. Those reports typically mention only total chromium levels — including "hex chrome" and another kind that is beneficial.

### Mandatory drinking water standards for chromium, and the new public health "goal"

- ▶ Federal government's mandatory standard for total chromium: **100 parts per billion (ppb)**
- ▶ State's mandatory standard for total chromium: **50 ppb**
- ▶ New proposed public health goal for hexavalent chromium (a part of total chromium): **0.02 ppb**
- ▶ Stockton last tested for hexavalent chromium in 2001-02, and found it in concentrations ranging from **4 to 6 ppb**



**One part per billion is roughly equivalent to one drop of ink in one of the largest trucks used to haul gasoline.**

**0.02 part per billion is roughly equivalent to two hundredths of that same drop of ink.**

# Public Comment Summary



- Concern, not panic
- Questions what to do
- Questions bottled water
- Outrage greater when utility had long standing water quality or public trust issues
- Question drug disposal/return problems and actions



# Strategies and Tools

## Risk Communication in Practice

# Drinking Water Communication Practice



## Preparation

- Regular communications
  - Partnerships and network
- X**
- Event or contaminant
    - Media, regulation

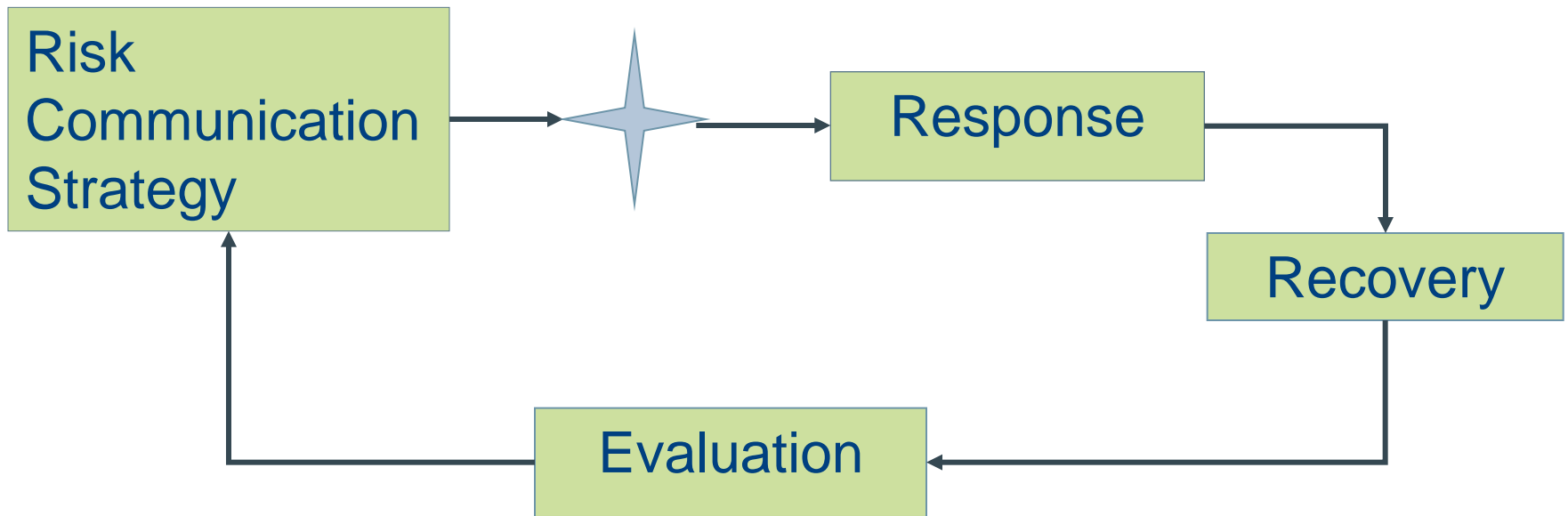
## Response

- Specific communication
- Audiences

## Assessment

- What else
- Enough
- Next time





= Media Event Concern unknown

# How should water professionals respond?



- Consistent communications from CCR, to customer tips to education
- Previous issues affect reactions
- Introducing or continuing fluoride?
- Preparation, evaluation of other efforts, institutional history

## Know your community

# Understanding Audiences



- “Publics”
- Boards
- Regulators
- Elected Officials
- Media



# Exercise

- AP is releasing another series in conjunction with USGS and EPA data release
- Use the given tool to craft a message

# What is a message?



The information an audience most needs to know



# Message Considerations

- Who you are
- What action individuals should take
- What occurred and description
- Where it occurred
- When it occurred
- Expected duration
- Why it happened
- Who is affected
- Basic information about the water system
- Current actions
- Where to get more information

# Single Overriding Communication Objective (SOCO) Worksheet

## PURPOSE

Advisories need to be a clear, consistent message. The Single Overriding Communication Objective (SOCO) Worksheet is a tool to create a specific message.

## DIRECTIONS

Work with water system staff and partners to complete the SOCO Worksheet. Use the best available information. First, think about the reason for the advisory and the actions needed. Next, answer each question. Use the results to develop all communication. As the situation changes, use this worksheet to update the message.

.....

### Key Message: Provides Meaning and Context

In one brief paragraph, state the key point or objective you want to communicate.

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### Key Facts

What are the three most important facts you need an individual to understand about the Drinking Water Advisory?

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### Target Audience

Who is the main audience or population segment you would like this message to reach? Who is the secondary audience?

Primary Audience: \_\_\_\_\_

Secondary Audience: \_\_\_\_\_

Tertiary Audience: \_\_\_\_\_

# What does the public want to know?



- Is the drinking water safe for my family?
- What is the utility doing about it?
- Can I trust the experts?
- Where can I get information
- What are my options?
- **What can I do?**



**Contamination suspected/found  
in tap water. Take action before  
drinking or cooking.**

LOGO

**Boil water for  
drinking and  
cooking.**

Fill pot with cold water. Heat until bubbles come from the bottom of the pot to the top.

Once the water reaches a rolling boil, let it boil for one minute.

Let the water cool and store it in a clean container with a cover.

**Routine tests confirm  
the presence of *E. coli*  
bacteria in the water.**

Your risk of illness from drinking the water is low.

Everytown Water is increasing the disinfectant levels and flushing the distribution system to eliminate the problem.

Testing will continue until the problem is resolved. You will be informed of progress.

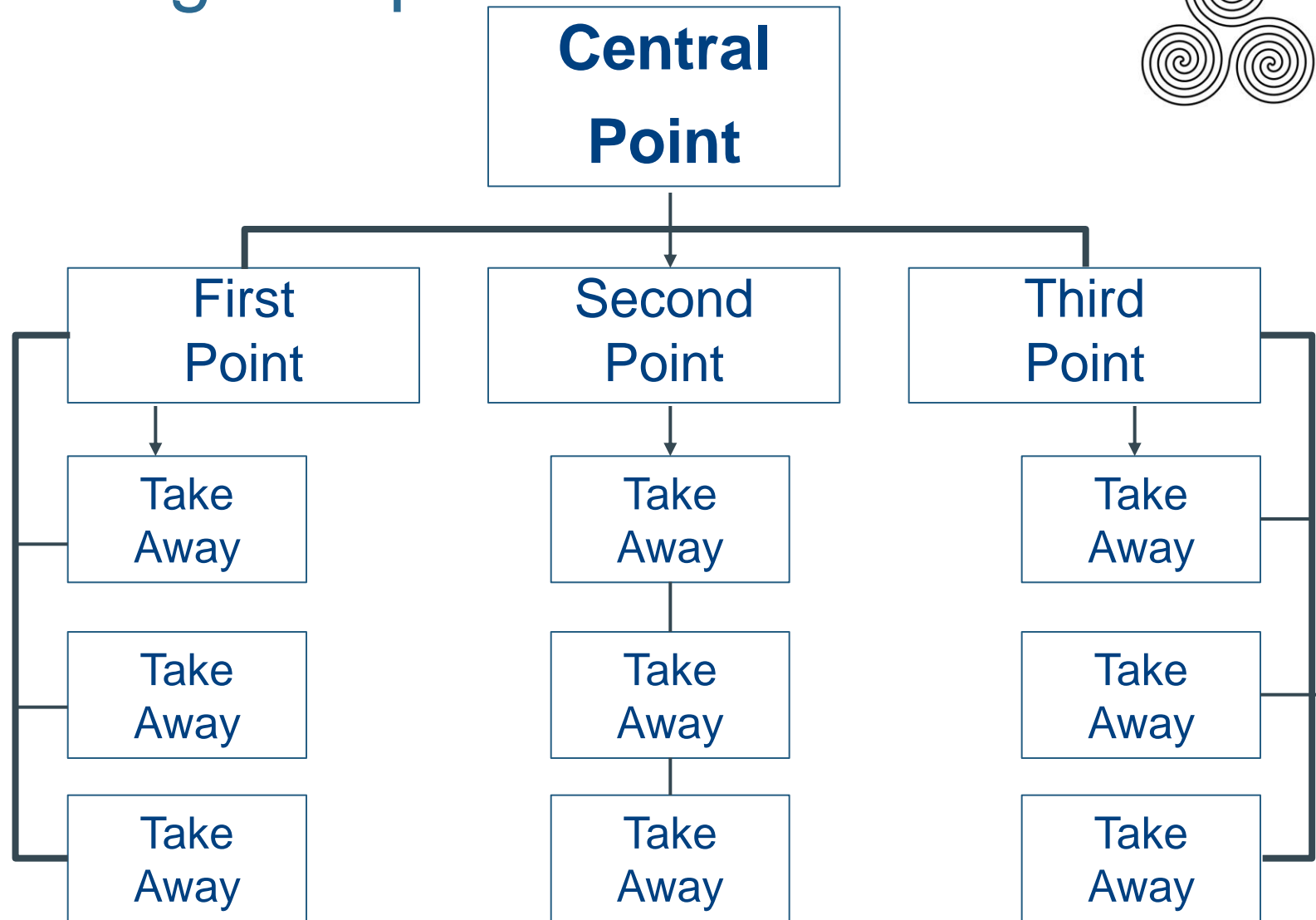
**If you cannot boil  
water, disinfect it.**

Add 8 drops (1/8 teaspoon) of unscented household bleach per gallon of water.

Allow the water to stand for 30 minutes. If the water is cloudy, repeat the procedure.

Store disinfected water in a clean container with a cover.

# Message Map



# Planning and Collaboration



## Primacy Agency

## Public Health Agencies

- Susceptible populations
- Translation
- Community organizations
- Health care providers
- Hospitals and clinics
- Food service
- Health expertise

## Water Systems

- Consecutive systems
- Regional groups
- Alternative water

## Local Government

- City or County Councils
- Public Works

## Academics

## Community Based Organizations

# What next?



- Recognize there will be another event
- Concern of the may not be expected or understood
- Proactive, strategic approach essential
- Develop relationships to build trust
- Identify both opportunities and challenges

# Tools for Collaboration



- Tools follow key points in collaboration process
  - Authorities
  - Roles and responsibilities
- Documentation of existing components to identify needs to expand or build collaboration
- Focused on public health and health care providers - foundation for any effort
- Evaluation

# Final Thoughts



Special thanks to PWD, GWU, the Water and Health Work Group and numerous other utility and public health colleagues

PNW AWWA 2009