

lThe Water We Drink

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lPresenter Disclosures

lCherie Rector and Kathleen Gilchrist

lThe following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose

lU.S. Water Quality

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lSources of Contamination

lAgricultural Chemicals/Pollutants

l83 (54 unregulated) Ex: Fertilizers, Herbicides, Pesticides, Manure (Dairies, Feedlots)

lIndustrial Chemicals/Pollutants

l166 (94 unregulated) Ex: Plasticizers, Solvents, Propellants

lSprawl & Urban Area Pollutants

l59 (41 unregulated) Ex: Pharmaceuticals, Hormones, Chemical Compounds found in Toothpaste & Detergent

lWater Treatment, Storage & Distribution By-Products

l44 (24 unregulated) Ex: Chlorine by-products, Acrylamide

• Source: Environmental Working Group, 2005

lRx & Personal Care Products

lBackground of Study

lIn 2006, the Environmental Protection Agency (EPA) reduced Maximum Contaminant Level (MCL) for arsenic in drinking water from 50 to 10 mcg/L (Shaw, Walker, & Benson, 2005; USEPA, 2007).

lIn 2008, 11 CA public water systems were cited for not complying with new arsenic standards (American Water Works Association, 2008).

lSome Central San Joaquin Valley wells have high levels of naturally occurring arsenic.

lHealth Effects of Arsenic

lHigher incidences of:

lType 2 Diabetes

lCardiovascular Disease

lPeripheral Vascular Disease

lHematologic & Neurologic Disorders

lRenal Disease

lCancer (skin, lung, bladder)

Developmental Anomalies & Fetal Death

(Bates et al., 2004; Chen et al., 2006; Chiou et al., 2007; Guo, Wang, Hu, & Monson, 2004; Hopenhayn, 2006; Kousa et al., 2004; Rahman et al., 2007; Sambu & Wilson, 2008; Steinmaus, Yuan, Bates, & Smith, 2003; Tchounwou, Patiolla, & Centeno, 2003).

Agricultural Contamination

Fruit, vegetable, nut crops

Dairy products

Byproducts contaminate groundwater

Nitrates, Fertilizers, Pesticides, Herbicides

(Barbash, Thelin, Kolpin & Gilliom, 2001; Burow, Shelton & Dubrovsky, 2008; Dalton & Frick, 2008).

Urban pollution & medications flushed into water systems also a concern---cities also affected

(Berg, 2008)

Health Effects of Nitrates

Methemoglobinemia—"blue baby syndrome"

Most often found in bottle-fed infants/high nitrates in water

12,000 cases worldwide in last 25 years (ATSDR, 2007)

Pregnancy Complications----Anemia, Preeclampsia, Premature Birth, Possible Neural Tube Defects, etc.

(ATSDR, 2007; Ward et al., 2005)

Cancer----Digestive Tract, Non-Hodgkins Lymphoma, Bladder

Animal Carcinogen; Mixed-Results in Human studies (Powlson et al., 2008; Ward, 2005)

More research needed (Leads to Diabetes?; Protective for Cardiovascular & Gastroenteritis?)

Local Water Quality

Top 40 Most Polluted Communities in U.S. for Nitrates and Top 40 Most Polluted Communities in CA for Arsenic (Environmental Working Group, 2007)

Kern County (4 systems/Arsenic; 3 systems/Nitrates)

Kings County (3 systems/Arsenic)

Tulare County (2 systems/Nitrates)

CA 2007 Compliance Report of Public Water Systems:

Kern County (16 violations/Arsenic; 6 violations/Nitrates)

Kings County (1 violation/Arsenic)

Tulare County (8 violations/Arsenic; 161 violations/Nitrates)

lHungry Gulch Water System

lRanked 15th in US as most polluted*

lLocal Water System Report Lake Isabella, CA*

lServes: 30 people

lAn Environmental Working Group analysis of tap water tests from 2000 through 2003 shows that customers of Hungry Gulch Water System drank water containing up to 9 pollutants. It is one of 65,000 water suppliers across the country wrestling with treating water polluted by sprawl, sewage, factory farms, and industry.

lPublic Health Nursing

lDisaster Preparedness

l72-hour kits (water & food)

lResponse to Emergencies/Disasters

lPHNs teach clients to boil water before drinking, etc.

l(Ram et al., 2007)

lMinimal attention to environmental health issues in undergraduate nursing education

l(Hewitt, Candek & Engel, 2006)

lPHN Knowledge

lHow much do PHNs know about common drinking water contaminants and the serious health risks they pose?

lPurpose

lThe purpose of the study is to examine the level of public health nurses' knowledge, attitudes and behaviors related to drinking water quality and adverse health effects of arsenic exposure.

lMethods

lPHNs in 3 county public health departments in Central CA were surveyed regarding:

l Knowledge of their county's drinking water contaminants, adverse health effects that can result from exposure, and signs and symptoms that may require additional investigation.

lAttitudes and behaviors related to assessment and education of clients regarding sources of drinking water were assessed, along with collaborative efforts with other public health professionals to ensure safe drinking water.

lProcedures

lUniversity IRB approval

lWritten permission from 3 Public Health Departments

lResearchers attended PHN staff meetings—distributed consent forms, demographic forms, water questionnaire --OR--

lPHN Administrators/Supervisors emailed PHN staff with an invitation to participate in the online study (Survey Monkey®).

lAll information was anonymous (no names)

lDemographics

l60 Participants

l4 Male

l56 Female

l65% between ages of 41-60

l61.7% had BSN as highest degree

l85% possessed CA PHN Certificate

lNumber of years as PHN (range=1.5 to 51 years)

l55% reported some Environmental Health training

lAge

lEducation Level

(n=60)

lYears as RN

lYears as PHN

lHome Visiting

lCurrent PHN Assignment

(n=57)

l“Other” Assignments

(n=31)

l35.5% Generalist/Field or District PHN

l19.4% Combination of Programs (TB, CD, HRI, etc.)

l19.6% Family Nurse Partnership

l19.6% TCM or Women’s Health

l16.4% Communicable Disease/OCD

l16.4% Child Health & Disability Prevention (CHDP)

lRemainder N/A

lEnvironmental Health Training

(n=30)

lEver Consulted EH/Water

(n=59)

lProblems with EH/Water

lContacted EH Past Year

lIs There Problem with H₂O?

lHealth Effects—Arsenic

(n=52)

lS/S Health Effects--Pesticides

lHealth Effects--Nitrates

Interventions--Nitrates

Client Assessment/Education

(n=14-17)

Conclusions

1/3 of PHNs cited “not sure” or “no problem” with drinking water in their counties; All 3 counties had problems with Arsenic and Nitrates (Top 40 in U.S.).

Almost 58% of PHNs had never consulted EH about drinking water safety for clients.

Around 35% had ever worked with clients having problems with water quality/safety.

2/3 of PHNs had not consulted with EH on client problems within the past year.

Almost 73% had ever worked with clients having EH problems.

More Conclusions

Almost half of PHNs had no knowledge of adverse health effects of Nitrates; Almost 65% had no knowledge of interventions related to Nitrates.

Only 6.8% of PHNs were “knowledgeable” or “very knowledgeable” about S/S of adverse health effects r/t agricultural pollutants (pesticides, herbicides, fertilizers) and Nitrates.

Over 50% of PHNs could recognize 5 out of 9 adverse health effects of Arsenic.

Over 50% could not list areas in their County where Fluoride is not available in the water.

Impact on PHN

Water is #1 Environmental concern for U.S. public (Gallup Poll, 2009).

Chronic childhood diseases linked to toxic chemical exposure are increasing and cost around \$55 billion annually (Johnson, 2009).

PHN knowledge of water quality/safety in their communities is important for the public’s health.

PHNs can promote client health through Health Education and Referrals for water quality/safety.

Recommendations

Environmental Health is often minimized or not included in Nursing Curricula & needs to be given a greater emphasis, especially through the use of case studies and site-specific

examples (Hewitt, Candek, & Engel, 2006; Backus, Hewitt, & Chalupka, 2006).

Working PHNs could benefit from further education or inservices on EH issues, especially concerning water quality safety and adverse health effects of common contaminants and pollutants.

Promotion of interdisciplinary communication & training between PHNs and EH Specialists is needed in order to improve health outcomes and effectiveness.

1

To find out what might be in your tap water go to:

<http://www.ewg.org/tapwater/national/>

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