Rudy Owens
Case No. 8, Day 1
Date Due: 110106

Learning Objective: Examine water safety regulations for public and private water systems in the United States

U.S. Drinking Water Systems Face Strains from Weak Regulatory Enforcement and Oversight, Underfunding, More Contaminants, and Privatization

Abstract: Providing safe, reliable drinking water is a hallmark of a sound public health system. In fact, modern-day epidemiology can be traced to Dr. John Snow's noted investigations of cholera outbreaks in London in 1853 and 1854, linked to a privately run water company, whose tainted water supplies killed hundreds.[1] In the United States and its territories, federal, state, and local authorities oversee the safety of drinking water for more than 155,000 public water systems, serving most Americans.[2] Despite the breadth of this oversight to ensure the health and safety of the public under the 1974 federal Safe Drinking Water Act (SDWA), more than 62 million U.S. residents since 2004 have been exposed to unsafe drinking water.[3] What's more, mounting budget crises in the United States at the local level are forcing local authorities to consider selling water utilities to private firms, which is pitting the profit imperative of private enterprise against the public mission of public drinking water utilities to produce secure, clean drinking water.

A Fair Outbreak: Scenario for Waterborne Pathogens?: Beatrice Ready's epidemiological investigation of incidents of diarrheal illness, linked to *E. coli 0157:H7* and/or *C. jejuni*, at the Washington County Fair in New York is not a rare occurrence. The U.S. Centers for Disease Control and Prevention, which provides surveillance of water-borne disease outbreaks (WBDOs), counted 28 such outbreaks in 2005-'06, of which 20 were associated with drinking water, causing 4 deaths.[4] According to the CDC, the top 5 causes for drinking water disease outbreaks are: giardia intestinalis, shigella, norovirus, hepatitis A, and copper.[6]

While the number of WBDOs may appear low according to the CDC's last count, the population's exposure to potential contaminants in public water supplies is great. Since 2004, more than 20 percent of the nation's water systems have violated provisions of the SDWA,[7] the 37-year-old federal law to protect public health by ensuring the integrity and safety of the nation's public drinking water supplies. For this case, it is not clear if this investigation will trace the outbreak to contaminated water, from either a public or private system. But, this hypothesis is probable. Pesticides, animal waste, chemicals (including cancer-causing agents) parasites, viral diseases, and bacteria are commonly found in U.S. drinking water supplies consumed by humans.

One study found that waterborne pathogens are responsible for 12-19.5 million illnesses in the country each year.[8] Though the United States and other developed nations have made great strides to promote public health by investing heavily in sanitation infrastructure and by passing safety legislation that has improved drinking water, pathogens still harm public water supplies.[8]

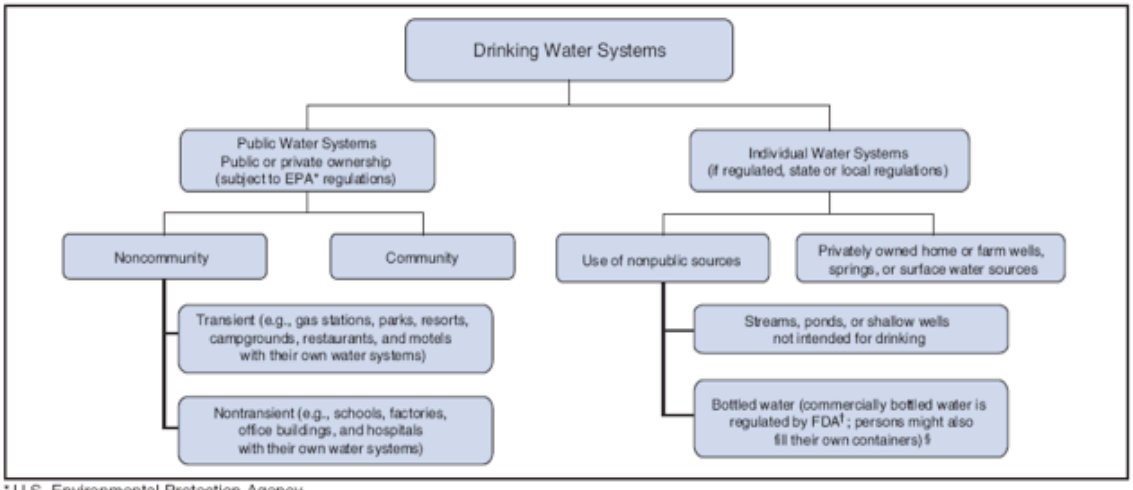
Since its passage by Congress, the SDWA has been amended twice, in 1986 and 1996, and still serves as the nation's primary tool to safeguard public drinking water.[1] The U.S. Environmental Protection Agency (EPA) is empowered as the federal agency with regulatory oversight for implementing the law. Currently, the law identifies only 91 contaminants (chemical, microbiologic, radiologic, and physical contaminants). The EPA sets what it calls "maximum contaminant level goals" based on risks, to ensure such levels are not exceeded. The EPA's goals promoting protection and health require states and water suppliers to assess public water supplies for contaminants. However, the law does not ensure blanket protection for the public. In some mid-size U.S. cities, such as Reno, Nev., and El Paso, Tex., public drinking water contains arsenic at concentrations linked with cancer, though that water is SDWA compliant.[3]

Unsafe Public Drinking Water: Critics point out that more 60,000 chemicals are used in the United States, thousands of which have been studied and hundreds of which have cancer risks in even small concentrations in drinking water. No new chemicals have been added to the SDWA contaminant list since 2000.[3] The New York Times in 2009-'10 ran a 10-part series ("Toxic Waters") critical of the EPA for its lax enforcement of the SDWA and for the alleged failure by the agency to protect citizens from unsafe drinking water provided by public water systems.[3]

The series claims that the SDWA has not been a federal priority for more than a decade. The agency failed to bring fines or enforcement actions against cash-strapped municipalities, which EPA administrators claimed could not afford the expenditures or penalties. Civil penalties range from $5,000 to $25,000, for daily violations or for exceeding limits. Since 2004, reports the Times, most drinking water violations occurred in public water systems serving less than 20,000

people.[7] The EPA's efforts have stalled to expand the list of banned chemicals, such as a commonly found contaminant in drinking water, a rocket fuel additive called perchlorate, though it has been found in the bodies of every person examined by researchers. The U.S. military's lobbying and industry -led efforts to head off a ban on the chemical, as well as efforts to set more stringent limits on arsenic levels in drinking water, succeeded.[3] In March 2010, the EPA announced "a new approach" to expand protection of public health by studying contaminants as groups, data sharing, better technologies, and greater legal authorities, but with no commitment to increase the list of known contaminants.[9]

FIGURE 1. Types of drinking water systems — United States



* U.S. Environmental Protection Agency.
† Food and Drug Administration.
§ In certain instances, bottled water is used in lieu of a community supply or by noncommunity systems.

Public Water Systems and Private Water Systems: According to the EPA, all public water systems must have at least 15 service connections and serve 25 or more people for more than 60 days a year. Of the more than 155,000 public water systems, two-thirds are non-community systems, and a third community based. [2] What's more, community systems serve the largest numbers of persons, or 287 million persons. Of these, a mere 8% percent provide more than 80 percent of water to the U.S population through large municipal systems.[4] (See Figure 1 for outline of drinking water systems; source, CDC.[4])

About 15% of all U.S. residents, or 45 million persons, rely on private water supplies, normally well water. Such systems are outside the scope of EPA regulation, though governments at the state and local level provide technical assistance to prevent contamination of water sources and set rules to protect well water users. This may be problematic. The CDC notes that its 2005-'06 WBDO investigations found that 25% of the waterborne disease outbreaks originated from contaminated private water supplies.[4]

Oversight of Public Water Systems: Federal oversight of public drinking water safety, through the EPA, is delegated to all states, territories, and some tribal governments under the SDWA. Designated agencies in these jurisdictions are provided what the EPA calls primary enforcement responsibility, or "primacy." These bodies receive funding disbursed from the federal government via grants to ensure enforcement of the SDWA and to make sure local public water systems comply with national primary drinking water regulations.[10] Only Wyoming and the District of Columbia have not received primacy.

Table 1. Public Drinking Water and Systems and Private Source Water Sources. (Note, the SDWA does not regulate private water sources like wells that serve less than 25 persons.[1)]

	Regulated Public Water Systems	Private Water Sources
United States	155,000+[1]	15%, U.S. population[4]
Washington State	16,900[5]	340,000[5]

In Washington for instance, the state, through the Division of Environmental Health, oversees public water systems under state law and via a formal agreement with the EPA for carrying out minimum provisions of the SDWA. The state is the actual authority for setting and enforcing minimum standards for drinking water quality and for the proper operations of water systems.[11] The Office of Drinking Water notes its first line of defense is prevention. Its responsibilities include: technical assistance, construction plan reviews, compliance, water system operator training, enforcement strategies, and emergency responses. The office also provides the public with a yearly confidence report on drinking water quality. The office's highest priorities are disruptions of clean water supplies.[5]

Lack of funding to update outdated water and sewage systems: In the midst of the severe recession, many local governments are considering the sale of their water utilities to generate funding. Two major Midwest cities, Milwaukee and Indianapolis, already have privately run systems. As of October 2010, 39 communities were considering the sale of their publicly owned water infrastructure, up five times the number of deals in 2008.[12] Many of these possible sales are in the Rust Belt, where the recession has hit hardest, though the trend is national in scope. In theory, profits from water sales can balance local budgets, while offloading the costs of repairing and expanding infrastructure—and the unpopular politics of rate hikes—to firms that promise jobs and profits.[13] Critics claim the sale of these public assets leads to higher rates—hikes up to 20 percent.[12] A 2010 study of the public health challenges posed by private drinking water supplies notes that while utility operators for public drinking water systems mandate is to guard public health, private entities have no such mandate, and they often lack trained operators and expertise.[14]

The Pacific Institute's study of the debate surrounding the privatization of water services found no evidence that private companies offer more economical efficiencies.[15] Still, efforts to raise utility rates to cover infrastructure upgrades and improvements, and thus improve public health, have been opposed by skeptical ratepayers in cities like Los Angeles and Washington, DC, who are more worried about costs than health benefits.[3] The EPA estimates that $335 billion would be needed to just maintain the nation's tap water in coming decades, compared to just $10 billion allocated under a Democratic Congress and the Obama administration in 2009.[16] The new Republican-led House of Representatives in Congress opposes stimulus-style funding and is calling for smaller government. The question remains how well aging public water systems can maintain public health, without adequate federal resources to minimize contaminants in public drinking water and to support public water systems whose failures could lead to greater public health risks.

Back to the Case/Questions: Snow's classic epidemiological study utilized a system of hypothesis testing to show how a disease spreads through water supplies, all of which were managed privately. If one flash-forwards a century and a half, our case of an epidemiological investigation still highlights that similar techniques are used to measure exposure-disease relationships. Then, and now, the potential human health risks posed by tainted drinking water systems and the prevalence of waterborne pathogens remain serious public health concerns. Despite advances, strains in ensuring drinking water safety are readily apparent in the EPA's inability to provide greater regulatory oversight. Deepening economic woes locally, and the prevalence of chemical contamination of all drinking water sources, will clearly exacerbate one of the most important public health missions—the delivery of safe drinking water.

1. How can a skeptical public, worried about taxes, joblessness, and rate hikes, be mobilized to support additional charges to fund needed water utility improvements to boost the safety of public drinking water?
2. Should the public be concerned about public water systems being run by for-profit companies? For instance drinking water in London today is, again, provided by a private utility.

REFERENCES:

1. Hennekens C, Burning J. *Epidemiology in Medicine*. Toronto: Little, Brown and Company; 1987.

2. U.S. Environmental Protection Agency. *Understanding the Safe Drinking Water Act*. June 2004; http://water.epa.gov.offcampus.lib.washington.edu/lawsregs/guidance/sdwa/upload/2009_08_28_sdwa_fs_30ann_sdwa_web.pdf. Accessed January 4, 2011.

3. Duhigg C. That tap water is legal but may be unhealthy. *The New York Times.* December 16, 2009; http://www.nytimes.com.offcampus.lib.washington.edu/2009/12/17/us/17water.html?em=&pagewanted=all. Accessed January 5, 2011.

4. U.S. Centers for Disease Control and Prevention. *Surveillance for Waterborne Disease and Outbreaks Associated with Drinking Water and Water not Intended for Drinking--United States, 2005-2006*. September 12, 2008. Morbidity and Mortality Weekly Report, No. 5; http://www.cdc.gov.offcampus.lib.washington.edu/mmwr/preview/mmwrhtml/ss5709a4.htm. Accessed January 4, 2011.

5. Washington State Office of Drinking Water. *Fact sheet: the Office of Drinking Water.* March 2005; http://www.doh.wa.gov.offcampus.lib.washington.edu/ehp/dw/fact_sheets/331-287.pdf. Accessed January 5, 2011.

6. U.S. Centers for Disease Control and Prevention. *Drinking water*. 2010; http://www.cdc.gov/healthywater/drinking/index.html. Accessed January 4, 2011.

7. Duhigg C. Millions in U.S. drink dirty water, records show. *The New York Times.* December 7, 2009; http://www.nytimes.com.offcampus.lib.washington.edu/2009/12/08/business/energy-environment/08water.html. Accessed January 5, 2011.

8. Bridge JW, Oliver DM, Chadwick D, et al. Engaging with the water sector for public health benefits: waterborne pathogens and diseases in developed countries. *Bull World Health Organ.* Nov 1 2010;88(11):873-875.

9. The U.S. Environmental Protection Agency. *A new approach to protecting drinking water and public health*. March 2010; http://water.epa.gov/lawsregs/rulesregs/sdwa/dwstrategy/index.cfm. Accessed January 5, 2011.

10. U.S. Environmental Protection Agency. *Public drinking water systems programs*. 2010; http://water.epa.gov/infrastructure/drinkingwater/pws/index.cfm. Accessed January 4, 2011.

11. Washington State Department of Health. *Assuring safe and reliable drinking water*. 2010; http://www.doh.wa.gov/ehp/dw/Publications/331-215_assuring.htm. Accessed January 5, 2011.

12. Food & Water Watch. *Trends in water privatization: the post-recession economy and the fight for public water in the United States*. 2010; http://www.foodandwaterwatch.org/water/report/trends-in-water-privatization/. Accessed January 4, 2011.

13. Interlandi J. The new oil: should private companies control our most precious natural resource? *Newsweek.* October 8, 2010; http://www.newsweek.com/2010/10/08/the-race-to-buy-up-the-world-s-water.html#. Accessed January 5, 2011.

14. Charrois JW. Private drinking water supplies: challenges for public health. *CMAJ.* Vol 182. Canada2010:1061-1064.
15. Wolff G, Hallstein E. *Beyond privatization: restructuring water systems to improve performance.* Oakland: Pacific Institute, December 2005; http://www.pacinst.org.offcampus.lib.washington.edu/reports/beyond_privatization/Beyond_Privatization.pdf. Accessed January 5, 2011.
16. Duhigg C. Saving U.S. water and sewer systems would be costly. *The New York Times.* March 14, 2010; http://www.nytimes.com.offcampus.lib.washington.edu/2010/03/15/us/15water.html. Accessed January 5, 2011.

Key References

1. Duhigg C. That tap water is legal but may be unhealthy. *The New York Times*. December 16, 2009; http://www.nytimes.com.offcampus.lib.washington.edu/2009/12/17/us/17water.html?em=&pagewanted=all. Accessed January 5, 2011.

2. U.S. Centers for Disease Control and Prevention. *Surveillance for Waterborne Disease and Outbreaks Associated with Drinking Water and Water not Intended for Drinking --- United States, 2005-2006*. September 12, 2008. Morbidity and Mortality Weekly Report, No. 5; http://www.cdc.gov.offcampus.lib.washington.edu/mmwr/preview/mmwrhtml/ss5709a4.htm. Accessed January 4, 2011.