

Revised Total Coliform Rule (RTCR)

Division of Drinking Water Staff

In Brief: What are the RTCR Requirements PWSs Need to Comply with?



Rule Construct

TCR

- Maximum Contaminant Level (MCL) for Total Coliform (TC) including fecal coliform/*E. coli*
- Acute violation based on fecal coliform and *E. coli*
- Routine monitoring required based on system size and type
- No assessment or corrective action required
- PN required for monthly TC and acute *E. coli* violations
- No seasonal system start up
- Quarterly base frequency for seasonal non-community systems

RTCR

- Treatment Technique based on TC and *E. coli* and an MCL for *E. coli*
- Acute violation based on *E. coli* only
- Routine monitoring required based on system size and type
- Assessment and corrective action required based on monitoring results
- PN required for failure to assess/correct and for acute *E. coli* violations
- Seasonal system start up procedures & documentation
- Monthly base frequency for seasonal non-community systems

Common Misconceptions and Clarifications

- Systems must sample on a certain day.
 - All systems have the entire month (monitoring period) to collect the required sample
 - Division recommends sampling in the first half of the month to facilitate any follow up samples if needed
- All systems must sample every month even when the system is closed
 - Samples are required for each month the system is in operation
 - Based on the operating period the system has relayed to the Division and is listed in the database.
- Assessments are required on each Total Coliform positive sample
 - Assessments are only required on the “confirmed” positive or previous violation condition and any “confirmed” E.coli condition

Requirements for a single Total Coliform positive sample

- Lab will analyze for E. Coli
- System will collect 3 REPEAT samples at certain locations
- System will sample all Groundwater sources in use at the time (Groundwater Rule requirement)
- Systems sampling monthly will no longer need to collect additional samples the following month

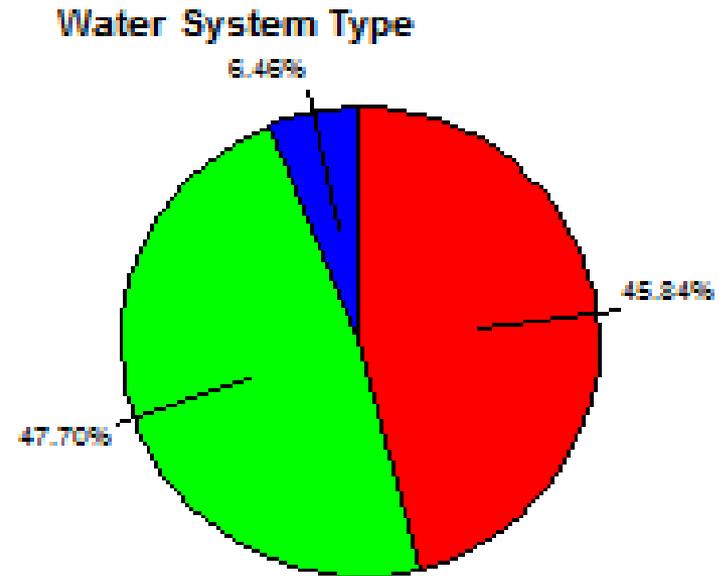
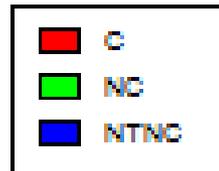
What will trigger an Assessment?

- Level 1 Assessment
 - If the system has more than 1 Total Coliform ROUTINE sample
 - If any of the REPEAT samples are Total Coliform positive
 - If the system doesn't collect any REPEAT samples
- Level 2 Assessment
 - If the system has any combination of an E. coli positive and Total Coliform positive ROUTINE and REPEAT (at least 2)
 - If the system has a ROUTINE E coli positive sample and doesn't collect any REPEAT samples
 - System has two Level 1 assessments triggered in a rolling 12 month period

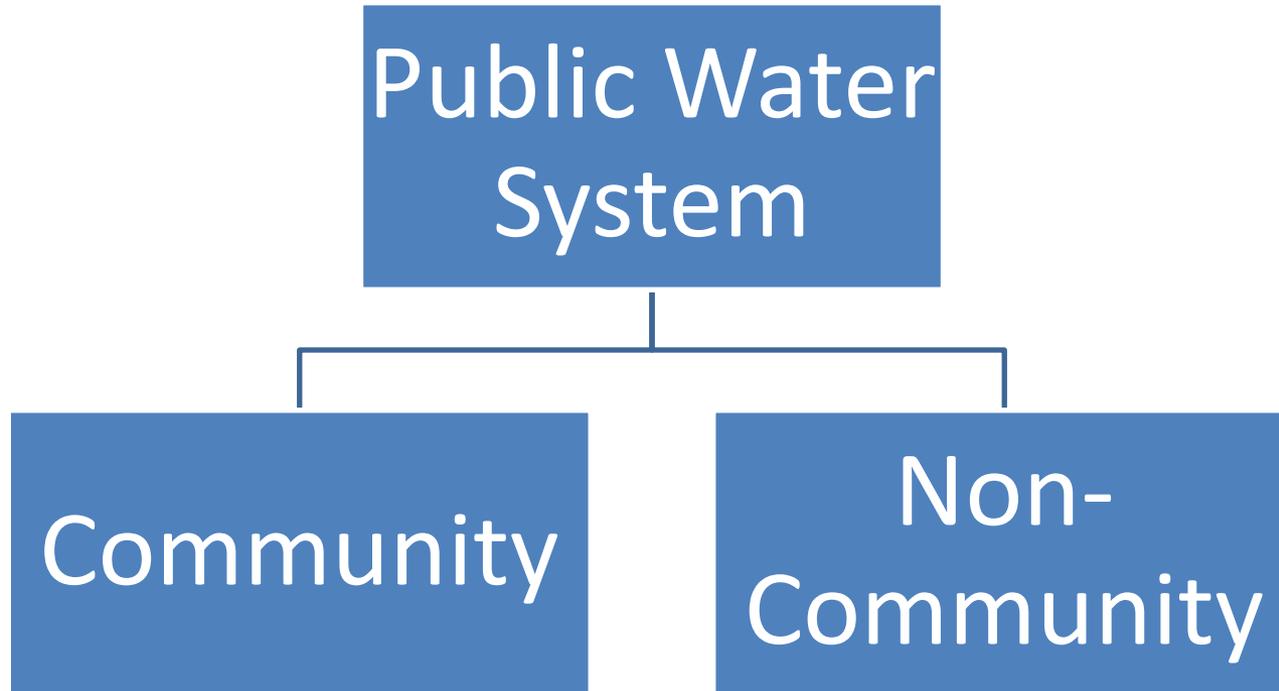
Utah Public Water Systems

Active Water System Counts

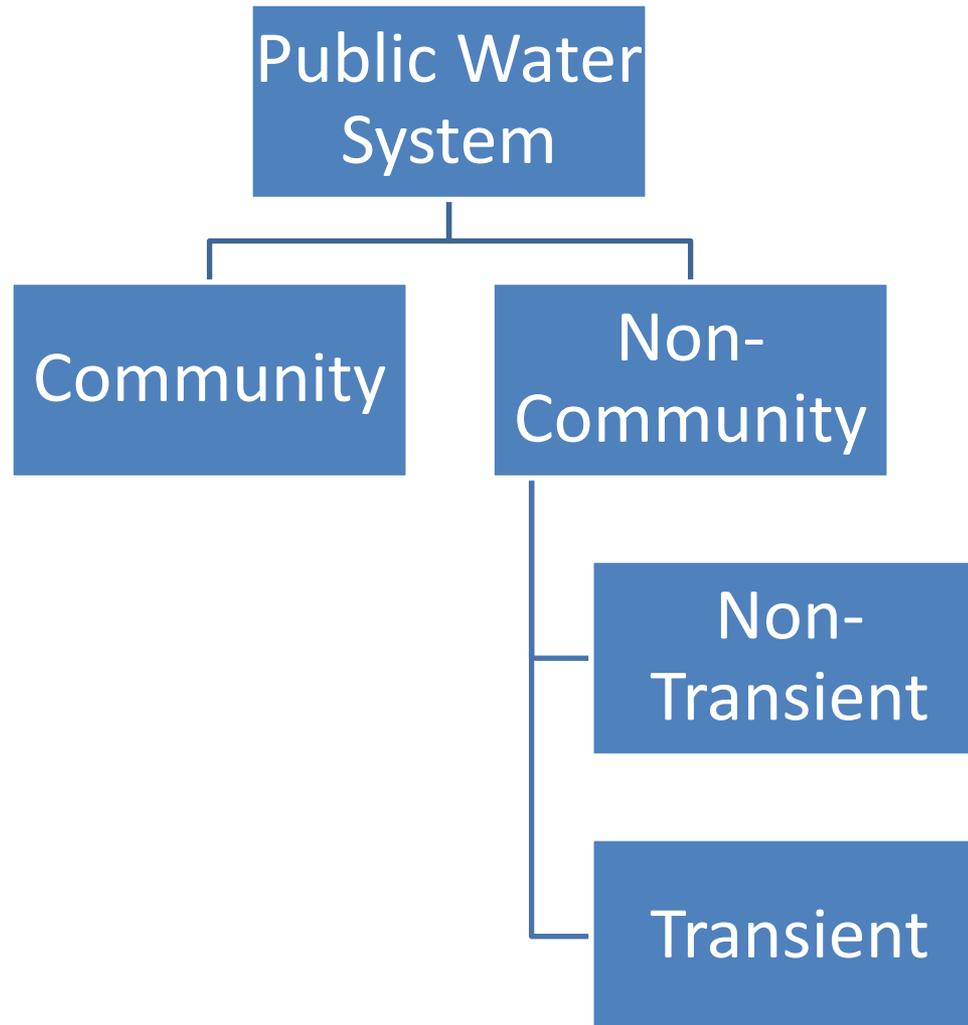
Type of System	System Count
Non-transient non-community	66
Community	468
Transient non-community	487
Total	1021



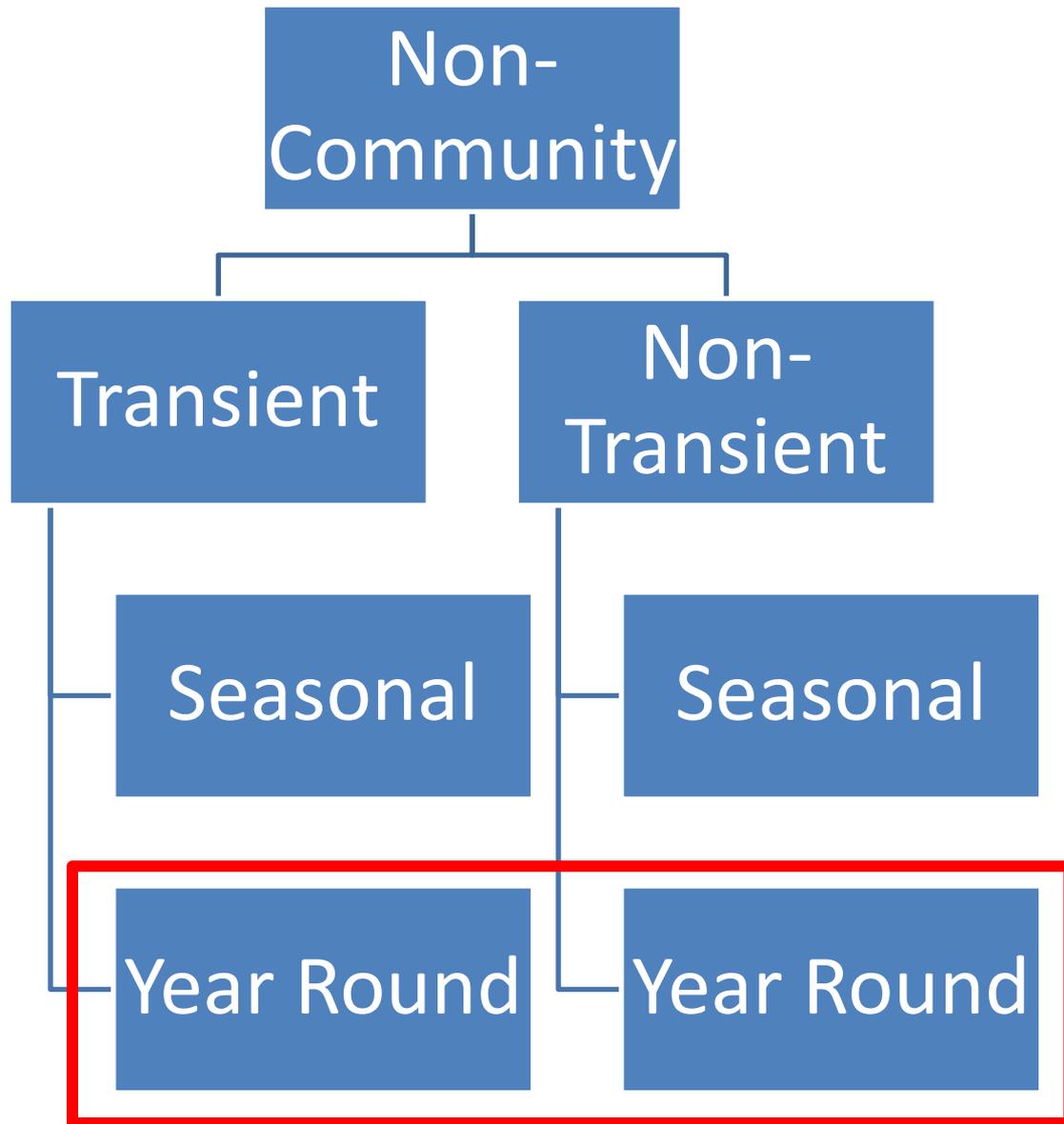
Pre 1986 Safe Drinking Water Act Amendments



Post 1986 Safe Drinking Water Act Amendments

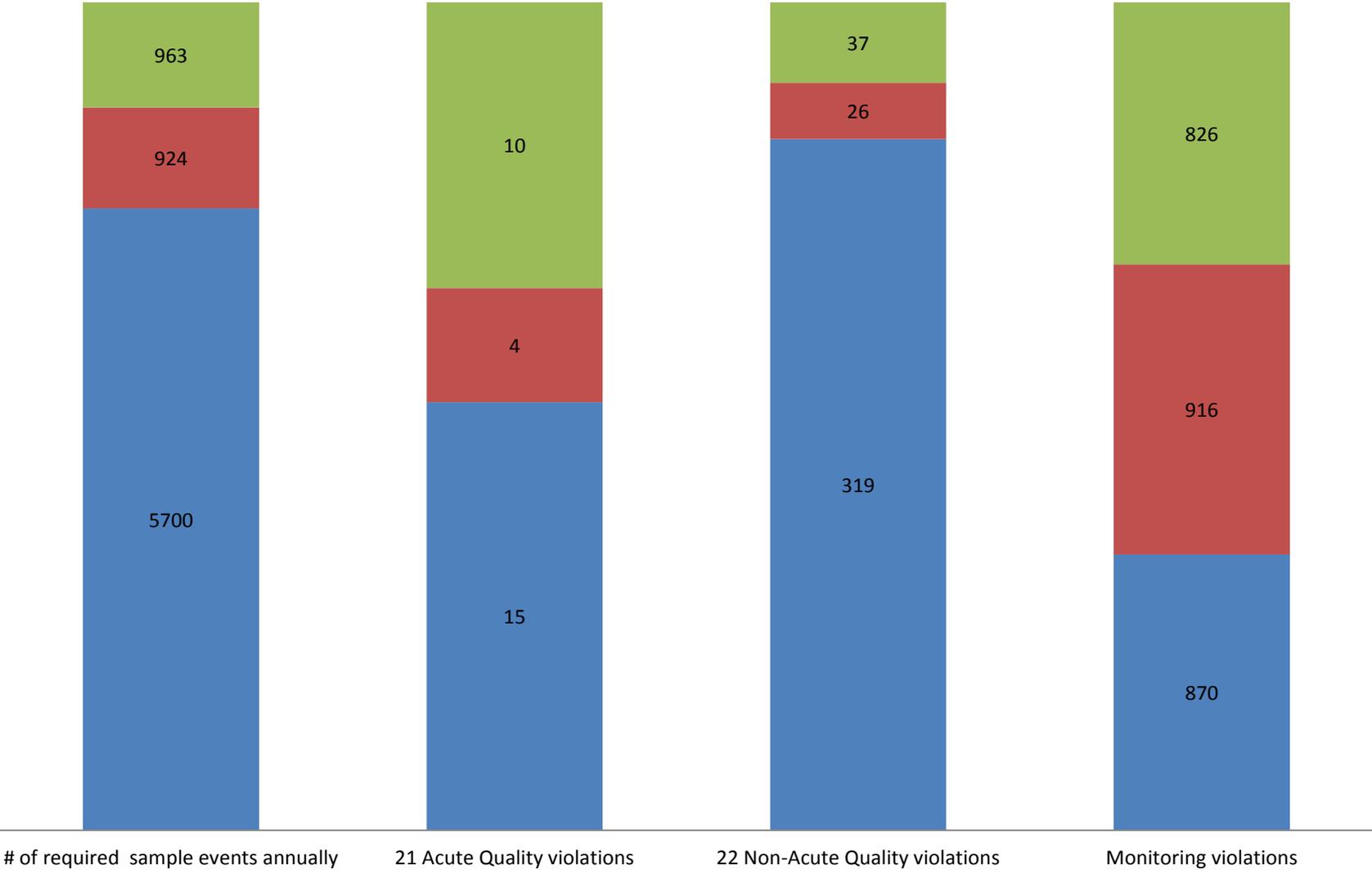






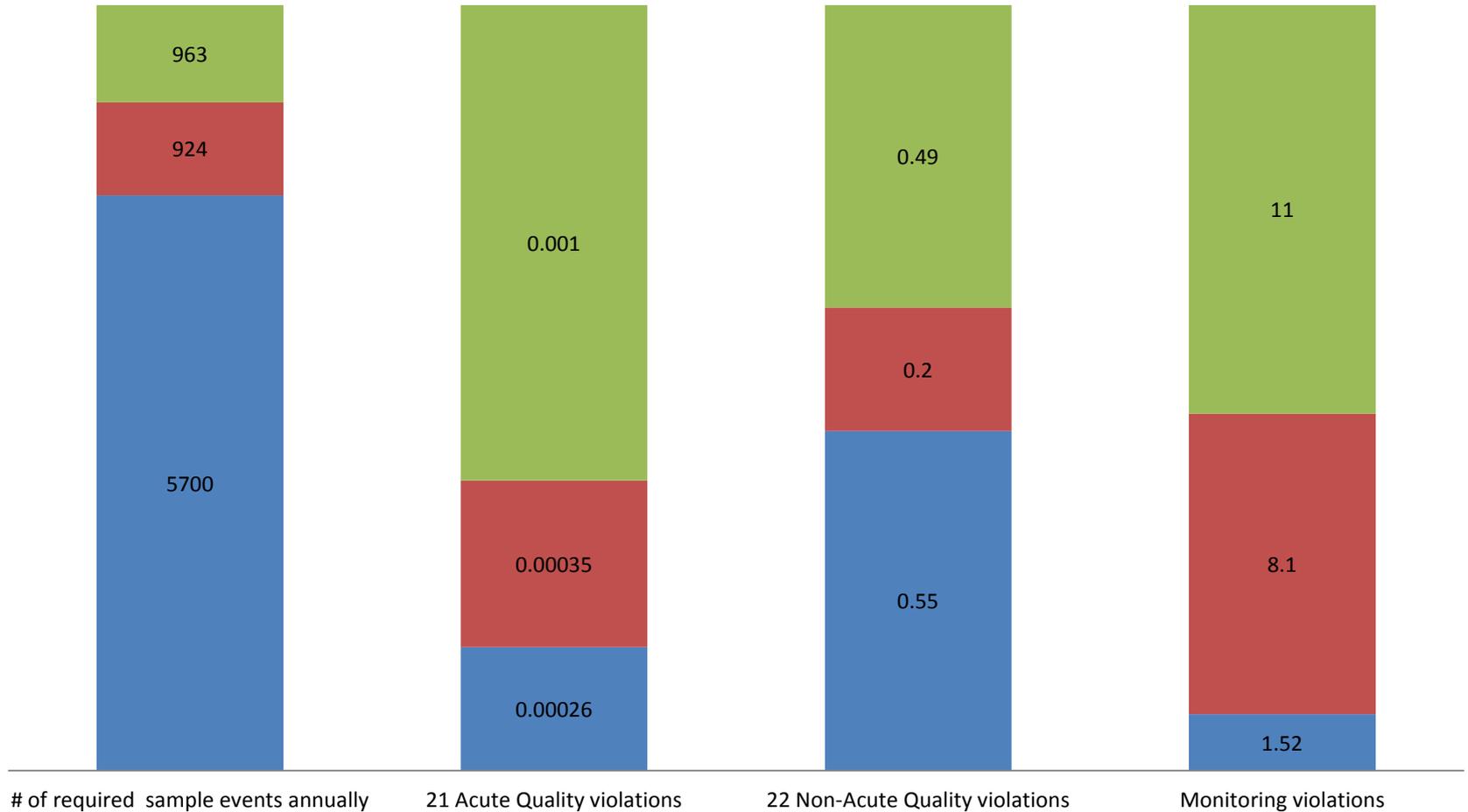
Total Coliform Rule Compliance - 10 Years

■ Monthly COM - 475
 ■ Year Round NC - 231
 ■ Seasonal NC - 321



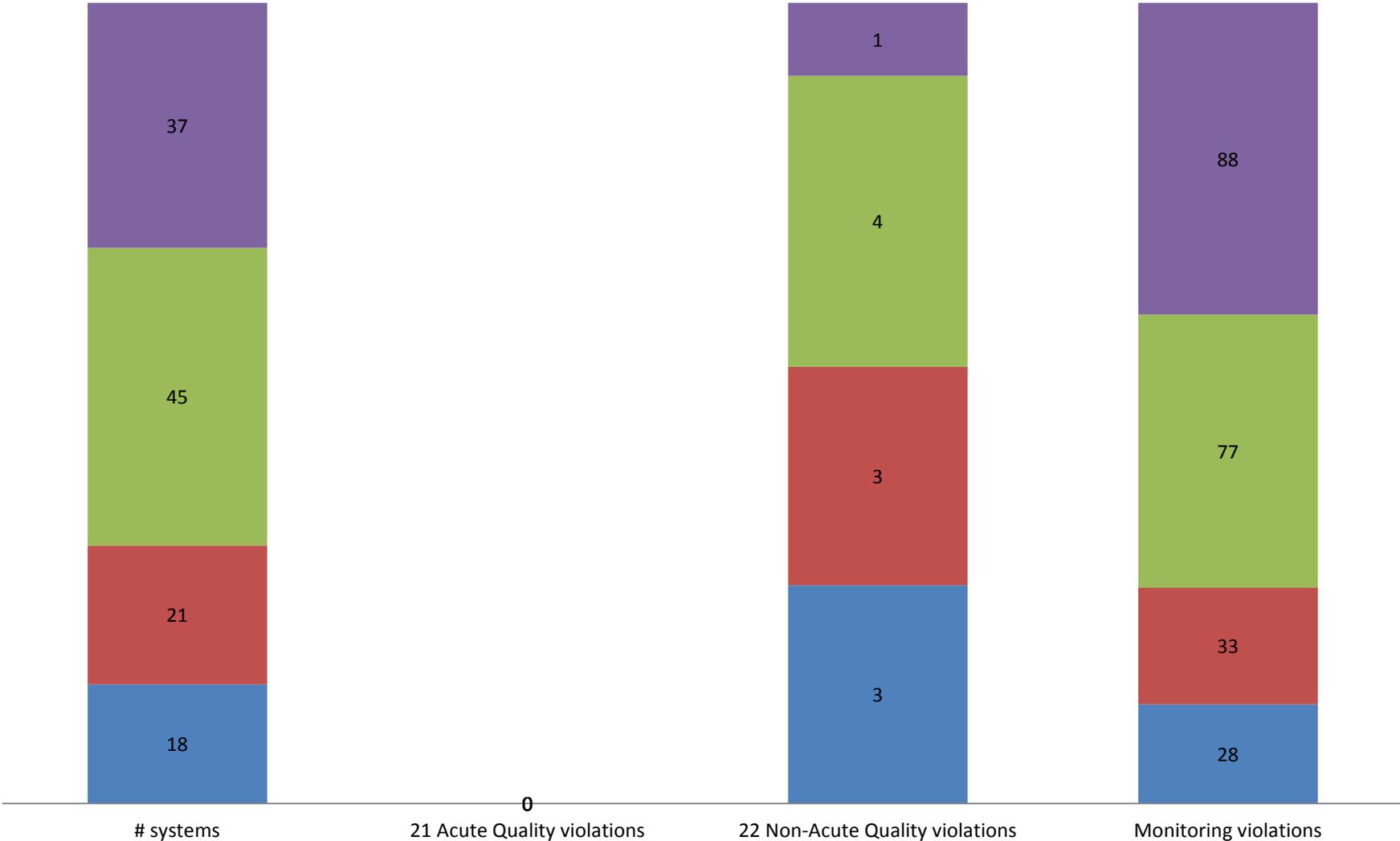
Annualized Violation Occurrence Percentage by Sample Frequency and System Operating Period

■ Monthly COM - 475
 ■ Year Round NC - 231
 ■ Seasonal NC - 321



A Tale of 2 Owners

■ "A" Seasonal ■ "A" Year round ■ "B" Seasonal ■ "B" Year round



Health Impacts of the RTCR Rule

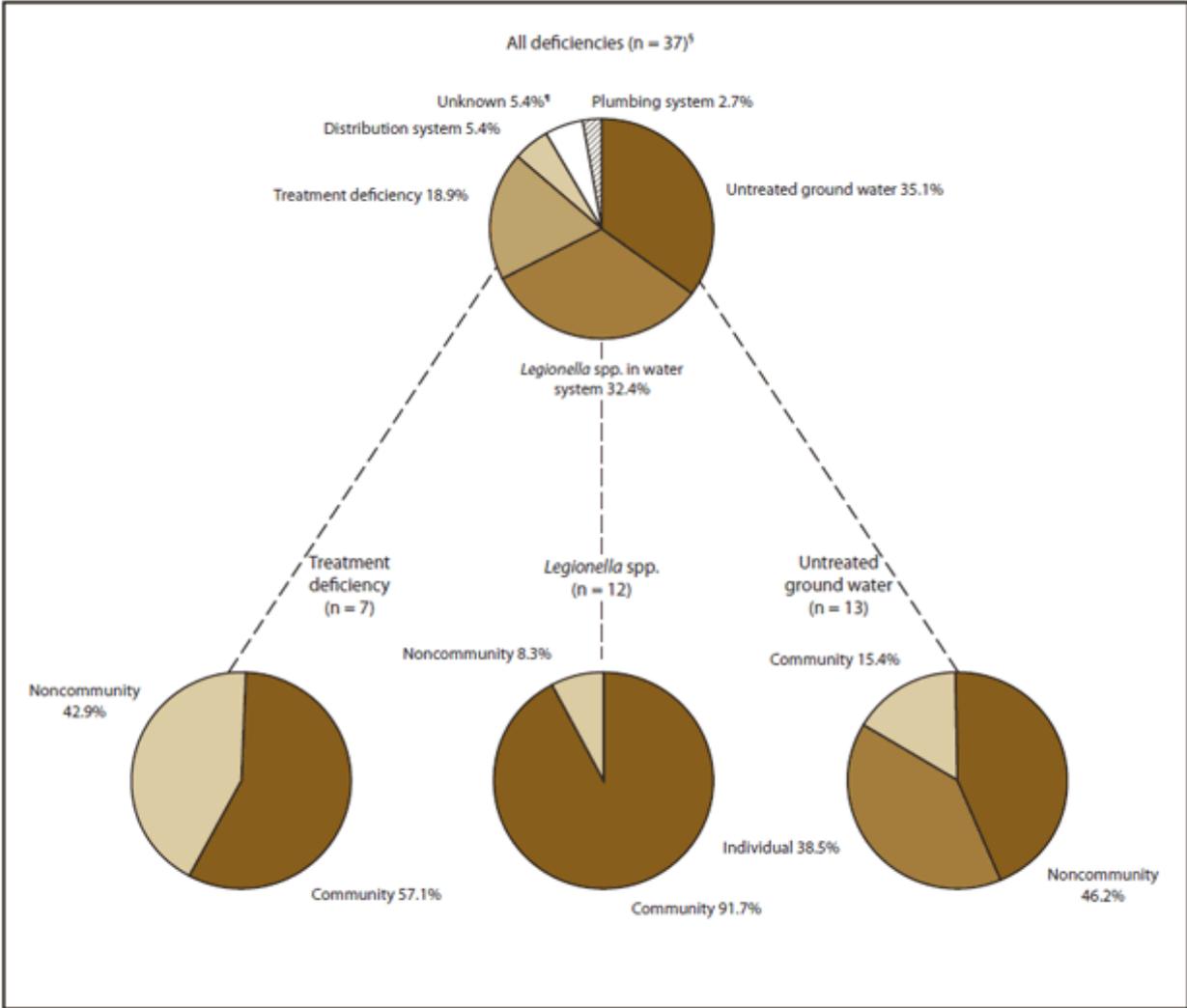
Nature of Waterborne Bacteriological Illnesses

- The risk of acute illness and death due to viral contamination of drinking water depends on several factors, including the age of the exposed individual.
- Infants and young children have higher rates of infection and disease from enteroviruses than other age groups (USEPA 1999).
- Several enteroviruses that can be transmitted through water can have serious health consequences in children. Enteroviruses (which include poliovirus, coxsackievirus, and echovirus) have been implicated in cases of flaccid paralysis, myocarditis, encephalitis, hemorrhagic conjunctivitis, and diabetes mellitus (Dalldorf and Melnick 1965; Smith 1970; Berlin et al. 1993; Cherry 1995; Melnick 1996; CDC 1997; Modlin 1997).

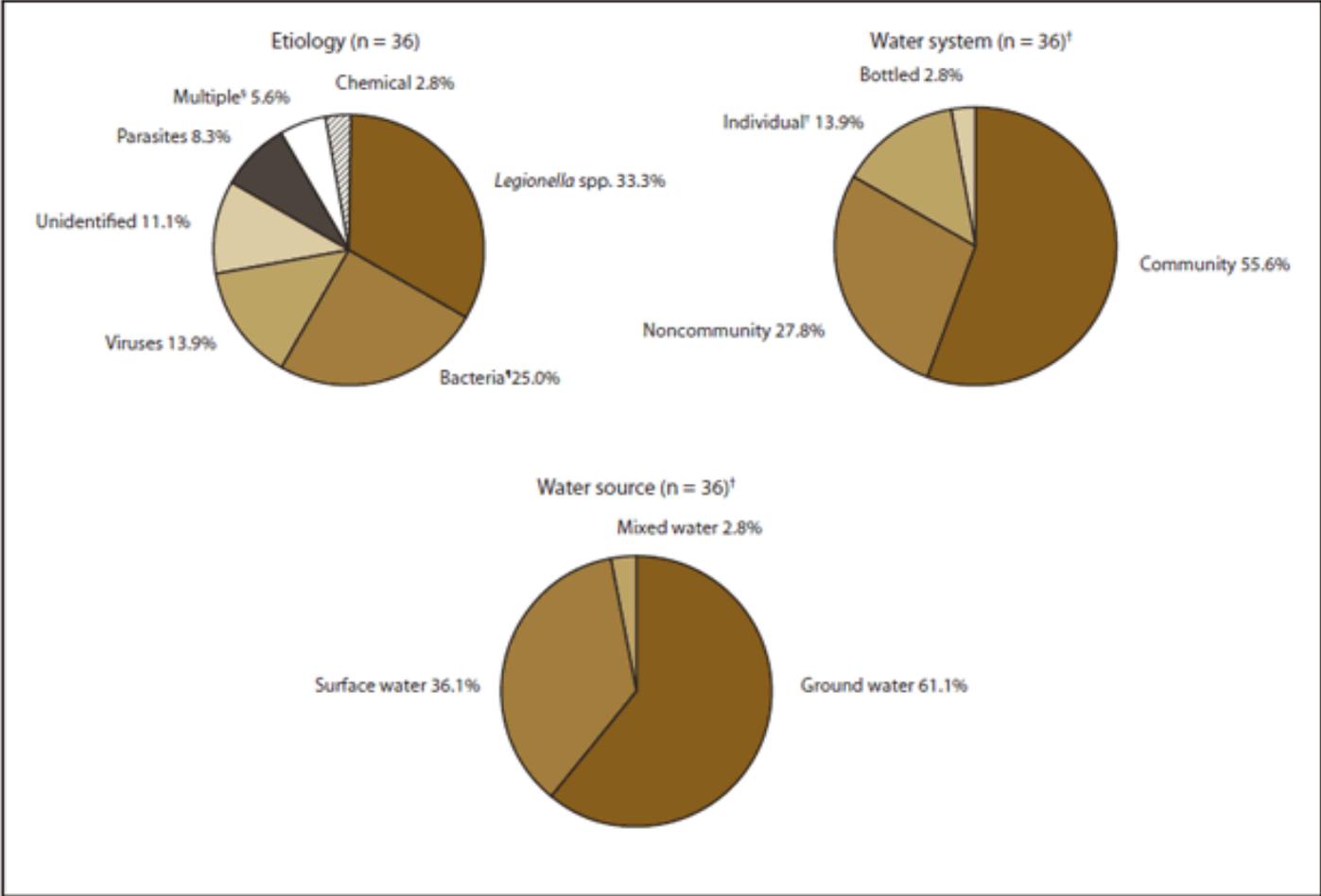
Alpine, Wyoming Case Study

- A 1998 outbreak of waterborne E.coli in a community water system in Wyoming resulted in 157 ill persons.
- During the time of the outbreak there was a large family reunion gathering being held in Alpine. This represented a statistically significant transient population to compare to the long time community residents of Alpine.
- Among the persons exposed to the tap water the attack rate was significantly lower in town residents than in visitors (23% vs 50%) and decreased with increasing age.
 - *“The lower attack rate among exposed residents, especially adults, is consistent with the acquisition of partial immunity following long-term exposure.” (Olsen, SJ).*
- When looking at the persons infected in the Wyoming outbreak by ages we see that the numbers of those infected from both a transient population and younger averages between 40%-60% of the population as opposed to those living in the community system ranging from 12%-33%, all correlating with those living there longest having the greatest odds of immunity preventing their contracting the illness.
- This is significant to the current request for monthly monitoring at seasonal transient systems as those drinking the water served will have no long term exposure and/or built up immunity, thus putting them at greater risk for contracting waterborne bacteriological diseases. The CDC’s study of the Alpine, Wyoming E. coli outbreak concludes.
- Alpine is a community system that was compliant with the monthly monitoring requirement. Had they been transient and quarterly the a positive TCR sample could have not been taken or reported for as long as 4 months.
- With the majority of E.Coli outbreaks in the United States being tied to foodborne sources of contamination an illness outbreak being tied to water is less likely to be identified without more frequent monitoring.

Percentage Of Waterborne Disease Outbreaks Associated With Drinking Water, By Predominant Illness And Etiology



Percentage Of Waterborne Disease Outbreaks Associated With Drinking Water, By Etiology, Water System, And Water Source



The Impact on Transient Populations

- The National Research Council strongly suggests that the number of identified and reported outbreaks in the CDC database for surface and ground waters represents only a small percentage of the actual number of waterborne disease outbreaks (NRC 1997; Bennett et al. 1987; Hopkins et al. 1985 for Colorado data).
- Underreporting occurs because most waterborne outbreaks in community water systems are not recognized until a sizable proportion of the population is ill (Perz et al. 1998; Craun 1996), perhaps 1 percent to 2 percent of the population (Craun 1996).
- EPA drinking water regulations are designed to protect against endemic waterborne disease and to minimize waterborne outbreaks. In contrast to outbreaks, endemic disease refers to the persistent low to moderate level or the usual ongoing occurrence of illness in a given population or geographic area (Craun et al. 2006).

A Waterborne Outbreak of Escherichia coli O157:H7 Infections and Hemolytic Uremic Syndrome: Implications for Rural Water Systems

- *Small water systems, defined as those that serve fewer than 3,300 people, collectively serve approximately 40 million people, or 15% of the United States population.*
- *Small drinking water systems may be less likely to be adequately chlorinated and to routinely monitor for contaminants.*
- *Stronger enforcement of existing regulations and perhaps broadening of current regulations...are needed to protect rural drinking water systems in the United States.*

The EPA's Cost Benefit Analysis

- ...Sensitivity analyses showed that the fundamental conclusions of the EA (benefit analysis)...that the RTCR provides benefits over the 1989 TCR.
- Under the RTCR, just two deaths would need to be avoided annually.
- Alternatively, approximately 3,000 or 8,000 non-fatal cases...respectively, would need to be avoided to break even with rule costs.
- As expected based on its costs, the lower cost of the RTCR relative to the Alternative option means that fewer cases need to be avoided in order to break even.