Data Details - Drinking Water

Arsenic

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of arsenic in community water systems.
- These data represent two metrics for arsenic in drinking water: the mean (average) measurement of arsenic in drinking water for the year, and the maximum amount of arsenic measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to arsenic for individuals. How much arsenic in water, an individual is exposed to, depends on many things, including how much tap water a person drinks each day, if a water filtration system is used in the home and consumption of water outside of the home.
- The value measured for arsenic when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to arsenic in drinking water do not necessarily mean the arsenic is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

These data only give us information on community water systems. They do not give us any information about drinking water from private wells or public water systems (*any public or privately owned waterworks system which provides drinking water for human consumption, except those serving a single private residence or dwelling.*) that are not used the whole year. Levels of arsenic are likely to be higher in private drinking water wells.

For most community water systems, arsenic samples are taken once a year or less. This may not accurately capture variations in arsenic levels, but since health concerns are due to long-term exposure infrequent testing is considered safe.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for arsenic more or less often based on how many people get water from that community water

system, the source of the water for that system, and if testing has detected levels of arsenic above the EPA maximum contaminant level (MCL) in the past.

About these Measures

How does arsenic get into my drinking water?

The major sources of arsenic in drinking water are erosion of natural deposits; runoff from orchards; and runoff from glass & electronics production wastes.

Measures included

This indicator is comprised of two measures: the annual mean concentration of arsenic measured in community water systems (CWSs), and the annual maximum concentration of arsenic measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water (*water at the land surface*) test for arsenic once a year. Those that use ground water (*water below the land surface in a zone of saturation*) sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for arsenic once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of arsenic?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for arsenic in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to arsenic in drinking water are the result of exposure to levels above the MCL for many years.

The EPA's MCL for arsenic in drinking water was recently lowered to 10 micro-grams per liter (µg/L), which is the same as 10 parts per billion (10 ppb). CWSs that get their water from surface water started meeting this MCL standard in 2006,

and CWSs that get their water from groundwater started meeting this standard in 2007. Before then, the MCL for arsenic in drinking water was 50 µg/L.

Calculations Methods

When testing did not detect any arsenic, a value of half the detection limit was used as the value of the annual measure. It is assumed there may be some level of arsenic in the water sample even if the amount is so low it cannot be detected by the test.

Because of wide variability in arsenic sampling schedules and reduced sampling frequency in systems with low detection values, arsenic data does not exist for all CWSs for each year.

Data Details - Drinking Water (Continued)

Disinfection Byproduct (DBP) Data –TTHM and HAA5

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of two kinds of disinfection byproducts in community drinking water systems. The two kinds of disinfectant byproducts for which measurements are included are total trihalomethanes (TTHM) and haloacetic acids (HAA5).
- These data represent three metrics for TTHM and HAA5 in drinking water: the mean (average) value for each calendar quarter, the mean (average) value for the year, and the maximum amount measured in drinking water for the year.

What these data do not tell us:

- These data do not tell us how much TTHM or HAA5 an individual person is actually exposed to. The amount of TTHM or HAA5 an individual is exposed to depends on many things, including how much tap water a person

drinks each day, if a water filtration system is used in the home, amount of time spent bathing and showering, and consumption of water outside of the home.

- The value measured for these disinfection byproducts when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to TTHM or HAA5 in drinking water do not necessarily mean that these disinfection byproducts are causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

Levels of disinfection byproducts (DBPs) change with the seasons. A sample taken every three months might not accurately represent short-term levels or the maximum level that was in the water. If a water system is tested for DBPs only

once a year and the sample is taken during the warmest month of the year, then this test may lead to an overestimation of the average DBP level in the water.

Levels of DBPs change depending on how long ago the water was treated and how far it has traveled through the water distribution system. A measurement taken at one point in a distribution system usually isn't accurate for the entire system. Some DBPs increase with time, so they are higher farther away from the treatment plant. Others increase or decrease over time depending on the conditions in the distribution system.

These data only give us information on community water systems**.** It does not give us any information about drinking water from private wells or public water systems that are not used the whole year.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for DBPs more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of DBPs above the EPA maximum contaminant level (MCL) in the past.

About these Measures

How does DBPs get into my drinking water?

Trihalomethanes (THM) and Haloacetic Acids (HAA5) are a group of four chemicals that are formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water.

Measures included

This indicator is comprised of measures for two kinds of disinfection byproducts (DBPs) in community water systems: total trihalomethanes (TTHM) and haloacetic acids (HAA5). For each of these, the following measures are included:

- the mean (average) concentration for each year
- the maximum concentration measured for each year

All these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Community water systems (CWSs) that add chemical disinfectant are required to measure levels of disinfection byproducts (DBPs). All CWSs that treat or receive chemically disinfected water from another water system are required to monitor for DBPs starting in April 2012.

Frequency of measurement

How often community water systems (CWSs) test for DBPs depends on:

- how many people get water from that CWS
- where the system gets water (for example, ground water (*water below the land surface in a zone of saturation*) or surface water (*water at the land surface*))

Routine monitoring for larger systems, including systems that use groundwater and serve more than 10,000 people and systems that use surface water and serve more than 500 people, requires collecting a sample each calendar quarter on a routine schedule. These samples must also be collected from a place in the system where the water has been in the system the longest (typically furthest from the treatment plant).

CWSs may qualify for reduced monitoring to test for DBPs less frequently if past testing shows consistently low levels of DBPs. Small water systems that use surface water cannot qualify for reduced monitoring; these systems must test for DBPs at least once a year.

What is considered to be a high measure of TTHM and HAA5?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for TTHM and HAA5 in drinking water

is considered to be too high, although exposure to a concentration about the MCL does not necessarily mean a person will get sick.

TTHM have been regulated by EPA since 1978, however, HAA5 were not regulated by EPA until 2004, so there is no data available for these measures before then. The EPA's MCL for TTHM in drinking water is 80 µg/L. The EPA's MCL for HAA5 is 60 µg/L.

Calculations Methods

When testing did not detect any DBPs, a value of half the detection limit was used as the value of the annual measure. It is assumed there may be some level of DBPs in the water sample even if the amount is so low it cannot be detected by the test.

In this dataset some water systems do not have data reported for some years. Missing values are coded as 'not reported.' Missing values may not have been reported for a variety of reasons, so they do not necessarily indicate a violation in reporting. Often that particular water system may not have been required to report for that year. (Sampling schedules are complex and vary depending on the water source, treatment technology and size of population served.)

Data Details-Drinking Water (continued)

Nitrates

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of nitrate in community drinking water systems.
- These data represent two metrics for nitrate in drinking water: the mean (average) measurement of nitrate in drinking water for the year, and the maximum amount of nitrate measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to nitrate for individuals. How much exposure to nitrate in water an individual has depends on many things, including how much tap water is consumed, if a water filtration system is used in the home and consumption of water outside of the home.
- The value measured for nitrate when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to nitrate in drinking water do not necessarily mean the nitrate is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

Nitrate levels in groundwater can vary significantly over time. Testing might not happen frequently enough to detect high levels of nitrate that may be present for a short time.

These data only give us information on community water systems. It does not give us any information about drinking water from private wells or public water systems that are not used the whole year.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for nitrate more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of nitrate above the EPA maximum contaminant level (MCL) in the past.

About these Measures

Measures included

This indicator is comprised of two measures: the annual mean concentration of nitrate measured in community water systems (CWSs), and the annual maximum concentration of nitrate measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water test for nitrate test once a year. Those that use groundwater sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for nitrate once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of nitrate?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for nitrate in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to nitrate in drinking water are the result of exposure to levels above the MCL for many years.

The EPA's MCL for nitrate in drinking water is 10 parts per million (10 ppm), which is the same as 10 milligrams per liter (10 mg/L).

Calculation Methods

When testing did not detect any nitrate, a value of half the detection limit was used as the value of the annual measure. It is assumed there may be some level of nitrate in the water sample even if the amount is so low it cannot be detected by the test.

In this dataset some water systems do not have data reported for some years. Missing values are coded as 'not reported.' All community water systems test for nitrate annually. There are two possible reasons that a community water system might be missing data in this dataset for some years:

- Nitrate test results can be reported in different ways. Sometimes nitrate is reported alone. In this case the data is stored as such in the database of record and is readily extracted for tracking purposes. Sometimes water systems report nitrate levels in combination with test results for nitrite as total nitrogen or nitrate/nitrite. (Nitrate can turn into nitrite, and vice versa, but nitrate is the form nitrogen usually takes in water.) When nitrate and nitrite are reported together the data cannot be included in the Colorado Environmental Health Tracking dataset for technical reasons.

- If a community water system purchases all of its water from another community water system, the purchaser does not test the water because the seller already has. In this case, no data is reported for the community water system purchasing the water.

Data Details - Drinking Water (Continued)

Atrazine

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of atrazine in community water systems.
- These data represent two metrics for atrazine in drinking water: the mean (average) measurement of atrazine in drinking water for the year, and the maximum amount of atrazine measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to atrazine for individuals. How much atrazine in water, an individual is exposed to, depends on many things, including how much tap water a person drinks each day, if a water filtration system is used in the home and consumption of water outside of the home.
- The value measured for atrazine when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to atrazine in drinking water do not necessarily mean the atrazine is causing that health

outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

These data only give us information on community water systems. They do not give us any information about drinking water from private wells or public water systems (*any public or privately owned waterworks system which provides drinking water for human consumption, except those serving a single private residence or dwelling.*) that are not used the whole year. Levels of atrazine are likely to be higher in private drinking water wells.

For most community water systems, atrazine samples are taken once a year or less. This may not accurately capture variations in atrazine levels, but since health concerns are due to long-term exposure infrequent testing is considered safe.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for atrazine more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of atrazine above the EPA maximum contaminant level (MCL) in the past.

About these Measures

Measures included

This indicator is comprised of two measures: the annual mean concentration of atrazine measured in community water systems (CWSs), and the annual maximum concentration of atrazine measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water (*water at the land surface*) test for atrazine once a year. Those that use ground water (*water below the land surface in a zone of saturation*) sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for atrazine once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of atrazine?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for atrazine in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to atrazine in drinking water are the result of exposure to levels above the MCL for many years.

Based on the Safe Drinking Water Act of 1974 the EPA set the MCL for atrazine in drinking water to 3 µg/L, which is the same as 3 parts per billion (3 ppb). The Phase II Rule, the regulation for atrazine, became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if

appropriate. EPA reviewed atrazine as part of the Six Year Review and determined that the 0.003 mg/L or 3 ppb MCL for atrazine are still protective of human health.

Calculations Methods

When testing did not detect any atrazine, a value of half the detection limit was used as the value of the annual measure. It is assumed there may be some level of atrazine in the water sample even if the amount is so low it cannot be detected by the test.

Because of wide variability in atrazine sampling schedules and reduced sampling frequency in systems with low detection values, atrazine data does not exist for all CWSs for each year.

Data Details - Drinking Water (Continued)

PCE (tetrachloroethylene)

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of PCE (tetrachloroethylene) in community water systems.
- These data represent two metrics for PCE (tetrachloroethylene) in drinking water: the mean (average) measurement of PCE (tetrachloroethylene) in drinking water for the year, and the maximum amount of PCE (tetrachloroethylene) measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to PCE (tetrachloroethylene) for individuals. How much PCE (tetrachloroethylene) in water, an individual is exposed to, depends on many things, including how much tap water a person drinks each day, if a water filtration system is used in the home and consumption of water outside of the home.

- The value measured for PCE (tetrachloroethylene) when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to PCE (tetrachloroethylene) in drinking water do not necessarily mean the PCE (tetrachloroethylene) is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

These data only give us information on community water systems. They do not give us any information about drinking water from private wells or public water systems (*any public or privately owned waterworks system which provides drinking water for human consumption, except those serving a single private residence or dwelling.*) that are not used the whole year. Levels of PCE (tetrachloroethylene) are likely to be higher in private drinking water wells.

For most community water systems, PCE (tetrachloroethylene) samples are taken once a year or less. This may not accurately capture variations in PCE (tetrachloroethylene) levels, but since health concerns are due to long-term exposure infrequent testing is considered safe.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for PCE (tetrachloroethylene) more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of PCE (tetrachloroethylene) above the EPA maximum contaminant level (MCL) in the past.

About these Measures

How does tetrachloroethylene get into my drinking water?

The major source of tetrachloroethylene in drinking water is discharge from factories and dry cleaners.

Measures included

This indicator is comprised of two measures: the annual mean concentration of PCE (tetrachloroethylene) measured in community water systems (CWSs), and the annual maximum concentration of PCE (tetrachloroethylene) measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water (*water at the land surface*) test for PCE (tetrachloroethylene) once a year. Those that use ground water (*water below the land surface in a zone of saturation*) sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for PCE (tetrachloroethylene) once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of PCE (tetrachloroethylene)?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for PCE (tetrachloroethylene) in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to PCE (tetrachloroethylene) in drinking water are the result of exposure to levels above the MCL for many years.

Based on the Safe Drinking Water Act of 1974 the EPA set the MCL for PCE (tetrachloroethylene) in drinking water to 5 µg/L, which is the same as 5 parts per billion (5ppb). The Phase II Rule, the regulation for PCE (tetrachloroethylene), became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed PCE (tetrachloroethylene) as part of the Six Year Review and determined that the 5 µg/L or 5 ppb MCL for PCE (tetrachloroethylene) are still protective of human health.

Calculations Methods

Because of wide variability in PCE (tetrachloroethylene) sampling schedules and reduced sampling frequency in systems with low detection values, PCE (tetrachloroethylene) data does not exist for all CWSs for each year.

Data Details - Drinking Water (Continued)

TCE (trichloroethylene)

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of TCE (trichloroethylene) in community water systems.
- These data represent two metrics for TCE (trichloroethylene) in drinking water: the mean (average) measurement of TCE (trichloroethylene) in drinking water for the year, and the maximum amount of TCE (trichloroethylene) measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to TCE (trichloroethylene) for individuals. How much TCE (trichloroethylene) in water, an individual is exposed to, depends on many things, including how much tap water a person drinks each day, if a water filtration system is used in the home and consumption of water outside of the home.
- The value measured for TCE (trichloroethylene) when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to TCE (trichloroethylene) in drinking water do not necessarily mean the TCE (trichloroethylene) is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are

levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

These data only give us information on community water systems. They do not give us any information about drinking water from private wells or public water systems (*any public or privately owned waterworks system which provides drinking water for human consumption, except those serving a single private residence or dwelling.*) that are not used the whole year. Levels of TCE (trichloroethylene) are likely to be higher in private drinking water wells.

For most community water systems, TCE (trichloroethylene) samples are taken once a year or less. This may not accurately capture variations in TCE (trichloroethylene) levels, but since health concerns are due to long-term exposure infrequent testing is considered safe.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for TCE (trichloroethylene) more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of TCE (trichloroethylene) above the EPA maximum contaminant level (MCL) in the past.

About these Measures

How does TCE (trichloroethylene) get into my drinking water?

The major source of trichloroethylene in drinking water is discharge from metal degreasing sites and other factories. Wastewater from metal finishing, paint and ink formulation, electrical components, and rubber processing industries may also contain trichloroethylene.

Measures included

This indicator is comprised of two measures: the annual mean concentration of TCE (trichloroethylene) measured in community water systems (CWSs), and the annual maximum concentration of TCE (trichloroethylene) measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water (*water at the land surface*) test for TCE (trichloroethylene) once a year. Those that use ground water (*water below the land surface in a zone of saturation*) sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for TCE (trichloroethylene) once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of TCE (trichloroethylene)?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for TCE (trichloroethylene) in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to TCE (trichloroethylene) in drinking water are the result of exposure to levels above the MCL for many years.

Based on the Safe Drinking Water Act of 1974 the EPA set the MCL for TCE (trichloroethylene) in drinking water to 5 µg/L, which is the same as 5 parts per

billion (5 ppb). The Phase I Rule, the regulation for trichloroethylene, became effective in 1989. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed trichloroethylene as part of the second Six Year Review and determined that it is appropriate to revise the regulation based on changes in analytical feasibility.

Calculations Methods

Because of wide variability in TCE (trichloroethylene) sampling schedules and reduced sampling frequency in systems with low detection values, TCE (trichloroethylene) data does not exist for all CWSs for each year.

Data Details - Drinking Water (Continued)

PCE (tetrachloroethylene)

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of PCE (tetrachloroethylene) in community water systems.
- These data represent two metrics for PCE (tetrachloroethylene) in drinking water: the mean (average) measurement of PCE (tetrachloroethylene) in drinking water for the year, and the maximum amount of PCE (tetrachloroethylene) measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to PCE (tetrachloroethylene) for individuals. How much PCE (tetrachloroethylene) in water, an individual is exposed to, depends on many things, including how much tap water a person drinks each day, if a water filtration system is used in the home and consumption of water outside of the home.

- The value measured for PCE (tetrachloroethylene) when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to PCE (tetrachloroethylene) in drinking water do not necessarily mean the PCE (tetrachloroethylene) is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

These data only give us information on community water systems. They do not give us any information about drinking water from private wells or public water systems (*any public or privately owned waterworks system which provides drinking water for human consumption, except those serving a single private residence or dwelling.*) that are not used the whole year. Levels of PCE (tetrachloroethylene) are likely to be higher in private drinking water wells.

For most community water systems, PCE (tetrachloroethylene) samples are taken once a year or less. This may not accurately capture variations in PCE (tetrachloroethylene) levels, but since health concerns are due to long-term exposure infrequent testing is considered safe.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for PCE (tetrachloroethylene) more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of PCE (tetrachloroethylene) above the EPA maximum contaminant level (MCL) in the past.

About these Measures

How does tetrachloroethylene get into my drinking water?

The major source of tetrachloroethylene in drinking water is discharge from factories and dry cleaners.

Measures included

This indicator is comprised of two measures: the annual mean concentration of PCE (tetrachloroethylene) measured in community water systems (CWSs), and the annual maximum concentration of PCE (tetrachloroethylene) measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water (*water at the land surface*) test for PCE (tetrachloroethylene) once a year. Those that use ground water (*water below the land surface in a zone of saturation*) sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for PCE (tetrachloroethylene) once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of PCE (tetrachloroethylene)?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for PCE (tetrachloroethylene) in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to PCE (tetrachloroethylene) in drinking water are the result of exposure to levels above the MCL for many years.

Based on the Safe Drinking Water Act of 1974 the EPA set the MCL for PCE (tetrachloroethylene) in drinking water to 5 µg/L, which is the same as 5 parts per billion (5 ppb). The Phase II Rule, the regulation for PCE (tetrachloroethylene), became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed PCE (tetrachloroethylene) as part of the Six Year Review and determined that the 5 µg/L or 5 ppb MCL for PCE (tetrachloroethylene) are still protective of human health.

Calculations Methods

Because of wide variability in PCE (tetrachloroethylene) sampling schedules and reduced sampling frequency in systems with low detection values, PCE (tetrachloroethylene) data does not exist for all CWSs for each year.

Data Details - Drinking Water (Continued)

Radionuclides (Uranium and Combined Radium-226/-228)

Interpreting the Data

What these data tell us:

- These data can be used to identify measures of Radionuclides (Uranium and Combined Radium-226/-228) in community water systems.
- These data represent two metrics for Radionuclides (Uranium and Combined Radium-226/-228) in drinking water: the mean (average) measurement of Radionuclides (Uranium and Combined Radium-226/-228) in drinking water for the year, and the maximum amount of Radionuclides (Uranium and Combined Radium-226/-228) measured in drinking water for the year.

What these data do not tell us:

- These data do not give us measures of actual exposure to Radionuclides (Uranium and Combined Radium-226/-228) for individuals. How much Radionuclides (Uranium and Combined Radium-226/-228) in water, an individual is exposed to, depends on many things, including how much tap water a person drinks each day, if a water filtration system is used in the home and consumption of water outside of the home.
- The value measured for Radionuclides (Uranium and Combined Radium-226/-228) when the water system is tested may not be an accurate measure of the average value present in a person's home tap water throughout the year. Water distribution systems are often large and complex, and changing conditions at the water source and throughout the water distribution system can change the level of contaminants in tap water.
- Comparison of water quality data to health measures is done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates of certain health effects in areas with potentially higher exposure to Radionuclides (Uranium and Combined Radium-226/-228) in drinking water do not necessarily mean the Radionuclides (Uranium and Combined Radium-226/-228) is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets maximum contaminant levels (MCLs) or standards allowed in drinking water. MCLs are levels of chemicals that can be in water that EPA still finds safe (i.e., acceptable) to drink and are determined per liter (about a quart) of water. Current drinking water MCLs are based on someone drinking two liters of water per day for a lifetime (70 years) and can be expressed as parts-per-billion (ppb).

How much is ppb? Consider the following: ppb = 1 part per 1,000,000,000 parts which is equivalent to 1 drop of water dissolved in a 13,200 gallon swimming pool.

Limitations of the Data

These data only give us information on community water systems. They do not give us any information about drinking water from private wells or public water systems (*any public or privately owned waterworks system which provides drinking water for human consumption, except those serving a single private residence or dwelling.*) that are not used the whole year. Levels of Radionuclides (Uranium and Combined Radium-226/-228) are likely to be higher in private drinking water wells.

For most community water systems, Radionuclides (Uranium and Combined Radium-226/-228) samples are taken once a year or less. This may not accurately capture variations in Radionuclides (Uranium and Combined Radium-226/-228) levels, but since health concerns are due to long-term exposure infrequent testing is considered safe.

Estimates of the number of people served by a community water system might be inaccurate. These estimates are not updated every year. Water testing schedules are partially determined by how many people a community water system serves. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served, typically estimated by number of service connections or customer lists, changes enough to move into the next regulatory tier. So the estimate of the number of people exposed to any particular community water system may be low.

These data provide limited ability to compare between community water systems. This is because different community water systems test for Radionuclides (Uranium and Combined Radium-226/-228) more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of Radionuclides (Uranium and Combined Radium-226/-228) above the EPA maximum contaminant level (MCL) in the past.

About these Measures

How does Radionuclides (Uranium and Combined Radium-226/-228) get into my drinking water?

Most drinking water sources have very low levels of radioactive contaminants ("radionuclides"), which are not considered to be a public health concern. Of the small percentage of drinking water systems with radioactive contaminant levels high enough to be of concern, most of the radioactivity is naturally occurring. Certain rock types have naturally occurring trace amounts of "mildly radioactive" elements (radioactive elements with very long half-lives) that serve as the "parent" of other radioactive contaminants ("daughter products"). These radioactive contaminants, depending on their chemical properties, may accumulate in drinking water sources at levels of concern. The "parent radionuclide" often behaves very differently from the "daughter radionuclide" in the environment. Because of this, parent and daughter radionuclides may have very different drinking water occurrence patterns. For example, ground water with high radium levels tend to have low uranium levels and vice versa, even though uranium-238 is the parent of radium-226.

Measures included

This indicator is comprised of two measures: the annual mean concentration of Radionuclides (Uranium and Combined Radium-226/-228) measured in community water systems (CWSs), and the annual maximum concentration of Radionuclides (Uranium and Combined Radium-226/-228) measured in CWSs. Both these measures are presented by number of systems and by number of people served. All measures of water quality are conducted by laboratories certified by the U.S. Environmental Protection Agency (EPA).

Frequency of measurement

Community water systems, that use surface water (*water at the land surface*) test for Radionuclides (Uranium and Combined Radium-226/-228) once a year. Those that use ground water (*water below the land surface in a zone of saturation*) sources test once every three years. Water systems that have received a waiver from the SC Department of Health and Environmental Control test for Radionuclides (Uranium and Combined Radium-226/-228) once every nine years. The most recent measurement available is reported for each consecutive year until the next water test is scheduled to occur.

What is considered to be a high measure of Radionuclides (Uranium and Combined Radium-226/-228)?

A concentration above the maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) for Radionuclides (Uranium and Combined Radium-226/-228) in drinking water is considered to be too high, although exposure to a concentration above the MCL does not necessarily mean a person will get sick. Health concerns due to Radionuclides (Uranium and Combined Radium-226/-228) in drinking water are the result of exposure to levels above the MCL for many years.

Based on the Safe Drinking Water Act of 1974 the EPA set the MCL for Combined Radium-226/-228 in drinking water to 5 picocuries per liter (pCi/L). The Phase I Rule, the regulation for Combined Radium-226/-228, became effective in 1976. In 1991, EPA proposed an MCL of 20 µg/L for uranium. Based on human kidney toxicity data collected since that time and on its estimate of the costs and benefits of regulating uranium in drinking water, EPA determined that the benefits of a uranium MCL of 20 µg/L did not justify the costs. Instead, EPA determined that 30 µg/L is the appropriate MCL, because it maximizes the net benefits (benefits minus costs), while being protective of kidney toxicity and carcinogenicity with an adequate margin of safety.

Calculations Methods

Because of wide variability in Radionuclides (Uranium and Combined Radium-226/-228) sampling schedules and reduced sampling frequency in systems with low detection values, Radionuclides (Uranium and Combined Radium-226/-228) data does not exist for all CWSs for each year.