

Groundwater nitrate contamination poses threat to Nebraskans' health

By Martha Stoddard
Sower Reporter

Glen Huebert doesn't drink the water from his well any more.

He used to. For years, Huebert and his brother, Ron, drank the pure, clean water that flowed from underground into their farm home north of Henderson. Even when a test four years ago showed the water contained more than three times as much nitrate as health officials recommended, the brothers continued to drink from their well.

They drank it right up to the time, a little more than two years ago, when Ron was diagnosed as having pancreatic cancer. Ron died a few months later, at age 27.

Glen believes the nitrates in their farm well contributed to his brother's death. There is mixed support for his opinion. But if researchers disagree on the effects of chronic exposure on adults, there is almost universal agreement that nitrates threaten the health of babies.

Glen Huebert no longer drinks from his well. Babies in many Nebraska towns no longer drink from the public water supplies. And increasingly Nebraskans are becoming concerned about possible health threats from nitrates in their water.

How much danger is there? No one is certain. What should be done about the nitrate problem? Again, there is disagreement. So far the proposed solutions are both costly and controversial. They could, if adopted, have an enormous economic impact on already troubled Nebraska farmers.

All of this is somewhat of a strange turn for Nebraskans. For years, the state's abundant groundwater has been considered one of its major resources. Nebraska sits squarely atop the Ogallala Aquifer, one of the world's largest and purest underground water supplies. Every day, Nebraskans use 7.2 billion gallons of groundwater. That's more than any other state, except California and Texas.

All but two Nebraska communities rely on that underground reservoir for drinking water, as do most private wells.

The Nebraska Safe Drinking Water Act of 1976 made the state Health Department responsible for regulating the safety of public drinking water. The department tests the water yearly for nitrates.

Ten parts per million of nitrates is the red-flag level.

At 10 ppm, water containing nitrates can produce methemoglobinemia — "blue-baby syndrome" — a dangerous, even fatal, condition in infants 6 months old or younger. Because the metabolism of babies is not as developed as that of adults, nitrates can react with the oxygen-carrying hemoglobin in babies' blood. The resulting methemoglobin is unable to carry oxygen.

In essence, the baby would suffocate, explained Cliff Summers, director of the Health Department's Environmental Engineering Division.

However, if caught early enough, a doctor can inject the baby with methylene blue and quickly reverse the process.

A survey of doctors in Nebraska found eight

cases of blue-baby syndrome between 1973 and 1978 in the state. None of the infants in the study died, but deaths did occur in Nebraska during the 1940s and 1950s, Summers said.

A much-cited 1951 study found 39 deaths of babies in the United States occurred with nitrate levels below 10 ppm, so it was accepted as the federal standard for drinking water.

"The 10 ppm standard was established from actual human experience," Summers said, "not animal data."

But the standard is not accepted by everyone. Trent Nowka, the director of public affairs for the Farm Bureau, said that a lot of farmers feel the standard is too low.

As of November, public water supplies in 38 Nebraska communities contained nitrates above the 10 ppm level. A year ago, only 22 towns were in that category.

If the Health Department's yearly tests find nitrates over eight parts per million in a public water supply, the department begins monthly tests. That way, Summers said, the department will know it "pretty quick" if the nitrates go above 10 ppm.

When the water has more than 10 ppm of nitrates in two consecutive tests, the Health Department puts the community on administrative order. Officials must provide bottled water for all infants 6 months old and younger and notify the public of the potential danger.

Hickman village officials, for example, have been providing bottled water to babies in that community since August. One of the town's two working wells had been at 12 ppm for several months. In July and again in August, the second well tested out at 10.4 ppm, so the town was added to the nitrate orders list.

In Hickman, parents are responsible for picking up the water themselves. If the nitrate level goes over 20 ppm, however, the town is responsible for searching out threatened infants and getting bottled water to them.

And at 40 ppm, Summers said, the Health Department would likely require bottled water for everyone in town. So far, none of the towns on the nitrate orders list has reached that level.

A town can get off administrative order if nitrate levels fall below 10 ppm and stay there for six months. Seven have been removed so far. Many of them reduced nitrate levels by digging new wells or mixing uncontaminated water with the high nitrate water. On the average, Summers said, nitrate levels increase 0.2 ppm a year in the wells the department is watching.

Neither the federal government nor the state government have set limits on the amount of nitrate that adults can tolerate.

No adult cases of methemoglobinemia have ever been reported, said Candy Jacobs, a toxicologist with the Health Department. Summers said adults are considered safe because of their size and more developed metabolism.

Pregnant women probably are safe, Jacobs said, but they should check with their doctors about nitrates in their drinking water. She said that nursing mothers are also safe, because nitrates do not pass into the milk.

The long-term effects of nitrates on adults are less certain.

A 1978 report on nitrates and related compounds done for the U.S. Environmental Protection Agency says that nitrates can be converted into nitrosamines. The conversion can happen almost anywhere, including the human body.

Nitrosamines, the report says, cause cancer in every species tested, including rats, mice, guinea pigs, rabbits, dogs, monkeys, grass parakeets, pigs, hamsters, hedgehogs, mink and trout. A few studies have been done on the link between human cancer and nitrates/nitrosamines. Those studies are inconclusive.

There's little such doubt in Glen Huebert's mind. He is convinced the nitrates, combined with other agricultural chemicals, are the likely cause of his brother's death.

Dr. Henry Lemon, a cancer specialist and professor at the University of Nebraska Medical Center also sees a possible tie. Although cautioning against judging from only one case, he said it is unusual to have someone so young develop pancreatic cancer.

In an article printed in the August Nebraska Medical Journal, another UNMC professor, Dr. Dennis Weisenburger, suggested that a combination of nitrates and atrazine can produce leukemia. Atrazine is a commonly used pesticide in Nebraska. Lemon said that if the combination causes leukemia, it could cause other types of cancer also.

Lemon was one of the researchers who surveyed leukemia cases from 1957 to 1967 in six counties in the Central Platte area. The study found the rate of leukemia was 13.9 cases for every 100,000 people in the area, nearly twice the expected figure. The figures prompted some to dub the area Nebraska's "leukemia belt."

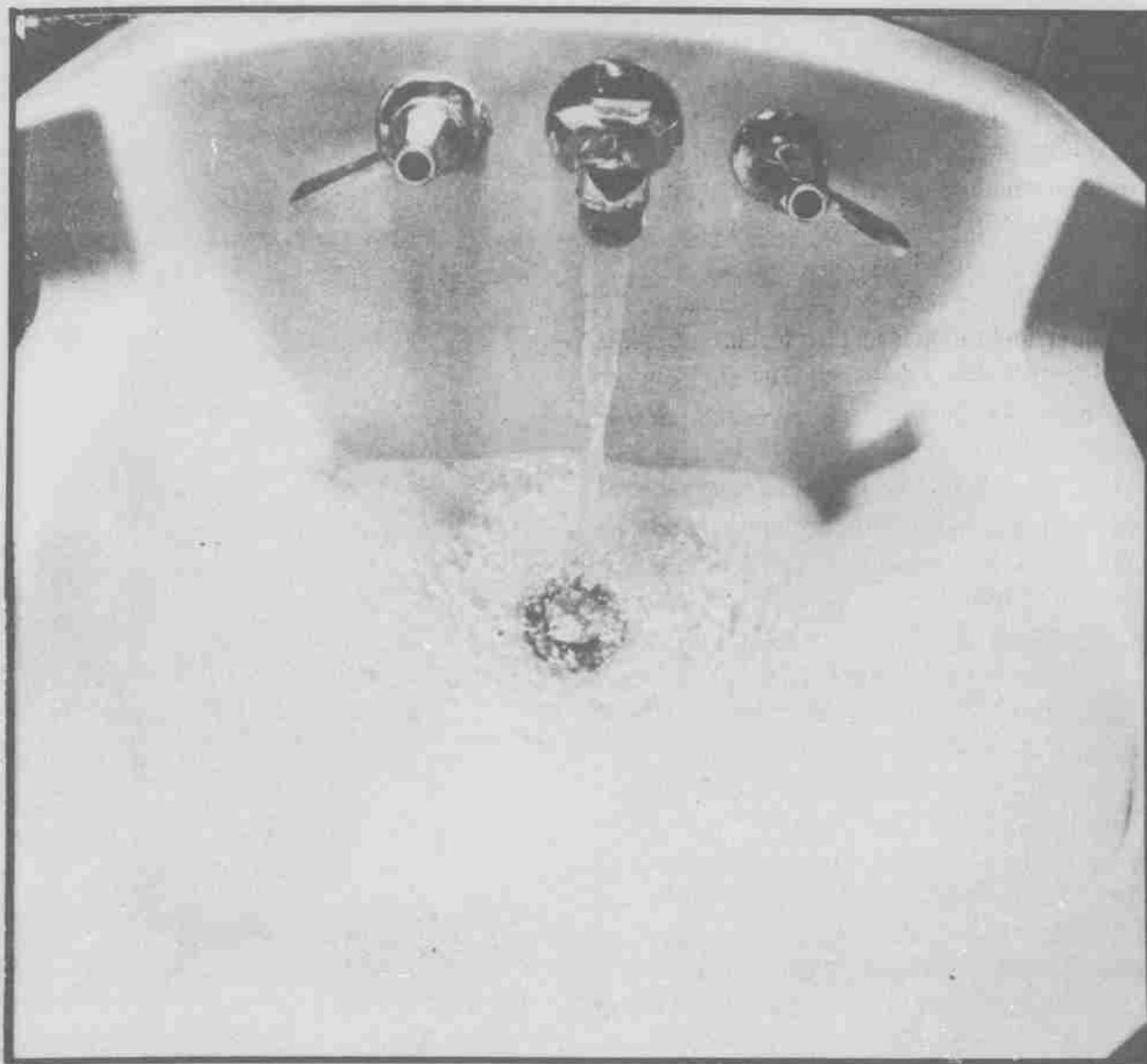
Nitrate levels in the six-county area have been high for several years. Weisenburger reports a high mortality rate for leukemia in Holt County and in southeast Nebraska, two other areas where nitrate-contaminated water is common.

"It's kind of embarrassing to be sitting here after 40 years of nitrate problems and not be able to say anything about it," she said.

Lemon said that another study he worked on found the increased incidence of leukemia starts just this side of the Wyoming border. So too does nitrate contamination of groundwater.

Nitrates have been linked with stomach cancer and esophageal cancer in some studies. Most, like the Nebraska studies on leukemia, have shown that high nitrate levels in the environment and high cancer rates occur in the same places. Whether the nitrates actually cause the cancer is controversial.

Jacobs said there are no good studies on the effects of chronic exposure to nitrates in drinking water.



David Creamer/Sower