Scientists nab water-polluting parasite

When students started pouring into her infirmary at a rate of 200 per day with diarrhea that lasted for weeks, physician Mary R. Miles, who directs the health center at West Georgia College in Carrollton, knew something was wrong. Most cases of "stomach flu" are caused by a virus and last just 24 hours, but this illness would flare and subside repeatedly for weeks.

Miles alerted state health authorities in mid-January 1987, triggering a state and federal investigation of what ultimately emerged as a widespread community illness caused by a parasite polluting the public water supply. Perhaps even more disturbing was the fact that Carrollton's water met safe-water standards set by the Environmental Protection Agency and the state.

"Even a filtered water system, operating under current EPA and state regulatory standards, can potentially be contaminated by this parasite," says Edward B. Hayes, the lead epidemiologist sent by the Atlanta-based Centers for Disease Control to investigate the case. Hayes and a team of state and federal scientists report in the May 25 NEW ENGLAND JOURNAL OF MEDICINE that the outbreak stemmed from a microscopic protozoan called *Cryptosporidium*. Lasting from Jan. 12 to Feb. 7, 1987, it struck an estimated 13,000 people in Carroll County, a community of about 65,000.

Hayes and his colleagues surveyed Carroll County residents by telephone from Jan. 31 to Feb. 2. They found that 299 (61 percent) of 489 household members exposed to the public water supply had experienced a bout of gastrointestinal illness in January. In contrast, only 64 (20 percent) of 322 people who lived or worked in areas not serviced by Carrollton's public water reported diarrhea during the same period.

Laboratory studies revealed *Cryptosporidium* in stool specimens taken from 58 of 147 patients with gastrointestinal illness during the outbreak. No other pathogen was implicated in the illness, the researchers say.

Hayes and his colleagues also identified *Cryptosporidium* in water samples obtained from the municipal water system on Jan. 28, Feb. 4 and Feb. 5. Three samples of treated water taken from a nearby town on a separate water system were negative for *Cryptosporidium*.

As for the source of the contamination, the probe never came up with a definitive answer. Hayes suspects the blame lay with infected cattle bathing in a river that supplies Carrollton's water. But an open sewage spill discovered later that winter near the treatment plant also contained *Cryptosporidium*, he notes.

The town's treatment plant met EPA safe-water standards during the entire episode, but the researchers believe inadequate filtering methods allowed the parasite to slip into the treated water, Hayes says. EPA requires plant personnel to measure water turbidity, a crude gauge of the particles floating in water. Carrollton's daily reading met EPA's standard, but the researchers suspect the plant's filters let occasional clumps of debris pass through. The clumps may have been diluted by the time they reached the turbidity monitor, allowing the plant to remain within EPA standards. Carrollton has since tightened its filtering methods and now gets high-quality water that far surpasses EPA standards.

The case fuels longstanding concerns about whether EPA's turbidity guidelines are tough enough to ensure that treatment plants snare passing microorganisms (SN: 7/6/85, p.4). "The Carrollton outbreak would seem to point out that if you're just meeting [EPA] standards, it's probably not adequate," says Dennis D. Juranek, an epidemiologist at the Centers for Disease Control and a coauthor of the paper. *Cryptosporidium* is an extraordinarily hardy microorganism with a tough, egg-like shell that makes it impervious to chlorine treatment, he says. Treatment plants must fine-tune their filtering methods to keep the parasite from contaminating public water supplies, he contends. Hayes adds that further research is needed to determine the extent of *Cryptosporidium* contamination in rivers and streams feeding public water systems elsewhere in the nation.

— *K.A. Fackelmann*

Deceptive successes in young children

Any parent knows young children can be cunning deceivers, flashing innocent eyes after raiding the cookie jar or feigning ignorance of a broken vase. Psychologists now report that children as young as 3 years old can mask their emotional expressions intentionally while attempting to deceive an adult, a finding that indicates humans adopt deceptive strategies in the first few years of life.

Adults have difficulty deciphering children's deceptive expressions and often cannot tell the liars from the truthtellers, says study director Michael Lewis of the University of Medicine and Dentistry of New Jersey in New Brunswick. He and his co-workers report their findings in the May DEVELOPMENTAL PSYCHOLOGY.

The researchers videotaped 15 boys and 18 girls, all about 3 years of age, during a laboratory test. Children sat in chairs with their backs to a table and were told that an experimenter was putting out a toy. They were instructed not to peek and told they could play with the toy when the experimenter returned. The experimenter then left the room and returned either when a child peeked at the toy or after 5 minutes. The child was asked, "Did you peek?" If no response was given, the experimenter asked the question once more.

Only four children — three girls and one boy — did not peek. A total of 11 children, nine of them boys, admitted to peeking. Another 11, eight of them girls, said they did not look at the toy. Seven children gave no response.

Overall, girls were no more likely than boys to peek, but girls were significantly more apt to deny their offense.

When researchers examined the videotapes, children who peeked and then denied it showed an increase in smiling and a relaxation of facial muscles, Lewis says. Their verbal and facial deceptions were highly persuasive, he notes.

No-response children were less organized in their deception. They did not smile but displayed an increase in nervous touching of their bodies. These youngsters may represent a transitional phase of development from truth-telling to deception, or they may be poor deceivers, Lewis says.

Sixty university students who viewed the videotapes could not distinguish between children who truthfully denied peeking, children who deceptively denied peeking and those who gave no response. Lewis and his colleagues plan to study parents' abilities to identify deception in their own children.

The sex differences in deception are poorly understood, Lewis maintains. Girls may experience more shame after committing a transgression and thus be more likely to deny the act. In addition, he says, evidence that females are more interested in social approval suggests they deceive so as not to displease an experimenter and, possibly, to avoid punishment.

Whatever the case, deception is an adaptive behavior that takes root early in life as part of a child's emerging moral code, Lewis asserts.

"Although parents tell their children not to lie, they also inform them directly and indirectly that deception is sometimes socially appropriate," he says. For instance, a child may be directly told to thank grandmother for buying him a sweater when he really wanted a toy. Indirectly, a child may observe her mother pretend to joyfully welcome a neighbor's visit, although just before the neighbor arrived mother said she did not want to see her.

— *B. Bower*