

## BUCKING THE HERD

*Parents who refuse vaccination for their children may be putting entire communities at risk*

Boulder, Colorado, a university town of 96,000, lies in a sequestered valley on the western edge of the Great Plains. Both geographically and culturally it is a place apart. Ralph Nader won more than 10 percent of Boulder's vote in the most recent presidential election. Natural-food groceries outnumber Safeways; chiropractors' offices line the main drag; and the city council recently declared that dog owners would henceforth be referred to as "dog guardians." A popular bumper sticker reads, WELCOME TO BOULDER, 20 SQUARE MILES SURROUNDED BY REALITY. Boulder is, in short, an experiment-oriented city.

A particularly interesting experiment, from a public-health perspective, has taken shape at the Shining Mountain Waldorf School, a campus of one-story wooden buildings set amid cottonwood and willow trees hard by the foothills of the Rockies. By their parents' choosing, nearly half of the 292 students at Shining Mountain have received only a few, and in some cases none, of the twenty-one childhood vaccinations mandated by Colorado state law in accordance with federal guidelines. The shunning of one of the vaccines, against diphtheria, tetanus, and pertussis, has resulted in a revival of whooping cough, the illness that occurs when colonies of the bacteria *Bordetella pertussis* attach to the lining of the upper respiratory passages, releasing toxins that cause inflammation and a spasmodic cough. The high-pitched whoop is a symptom heard mainly in younger children; it's the sound of a desperate attempt to breathe.

Shining Mountain exemplifies a growing movement in American life: the challenge to childhood vaccination. According to a survey published in the November 2000 issue of *Pediatrics*, one fourth of all parents are skeptical of some or all of the standard vaccines. Some states grant exemptions to the law so that parents can refuse vaccina-

tions for their children. In Colorado parents who don't want their children vaccinated have only to sign a card stating as much. In Oregon the rate of religious exemptions—which are granted to all parents who choose not to have their children immunized for philosophical reasons—tripled, from 0.9 percent in the 1996–1997 school year to 2.7 percent in 2001.

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Those skeptical of vaccines have various reasons. Some believe that vaccines are responsible for otherwise unexplained increases in conditions such as autism, asthma, and multiple sclerosis. Others, including the conservative activist Phyllis Schlafly, see government attempts to track and enforce immunization as an intrusion on privacy. Still others—parents whose recollections of their own bouts of chickenpox or measles are bathed in nostalgia—argue that the elimination of traditional childhood illnesses is an attack on childhood itself. The parents at Shining Mountain are influenced by the philosophy of Rudolf Steiner, a turn-of-the-century Austrian philosopher who founded the Waldorf movement. Steiner (who was not a medical doctor) believed that children's spirits benefited from being tempered in the fires of a good inflammation.

The critics have concluded that the dangers of vaccination outweigh the risks of vaccine-preventable disease. Like all medical interventions, vaccination entails some risk, although the extent and gravity of potential side effects are matters of debate. For example, febrile seizures occur in roughly one in 10,000 children—perhaps 1,000 a year in the United States—who receive the current whooping-cough vaccine. Such seizures rarely, if ever, lead to permanent brain damage, however, and in any case febrile seizures are triggered just as easily by a run-of-the-mill infection as by a vaccine. Suspicions that mercury preservatives

used in vaccines inflicted neurological damage on children are worrisome but unproved (mercury has largely been phased out of vaccines over the past three years).

To some extent vaccination is a victim of its own success. Owing to vaccination campaigns, smallpox no longer exists in man, and polio has been driven from the Western Hemisphere. Measles, diphtheria, and invasive hemophilus bacterial disease (such as meningitis) are rare in the United States, and even whooping cough is unusual enough that few parents consider it a threat. All these diseases, with the exception of smallpox, still infest various corners of the world, but in most of the United States even those who have not been vaccinated against them, or in whom the vaccine is not effective, are protected, because most of the people we meet have been vaccinated. Epidemiologists call this phenomenon "herd immunity": the more vaccinated sheep there are, the safer an unvaccinated one is. When vaccination rates drop, disease returns.

Precisely at what point herd immunity fails is difficult to calculate, but there is ample evidence that it does. Since the collapse of the Soviet public-health system diphtheria has returned to Russia with a vengeance, killing thousands. Sweden suspended vaccination against whooping cough from 1979 to 1996 while testing a new vaccine. In a study of the moratorium period that was published in 1993, Swedish physicians found that 60 percent of the country's children got whooping cough before they were ten. However, close medical monitoring kept the death rate from whooping cough at about one per year during that period.

Boulder, which has the lowest schoolwide vaccination rate in Colorado, has one of the highest per capita rates of whooping cough in the United States. The problem started in 1993, when fifty-two people in Boulder

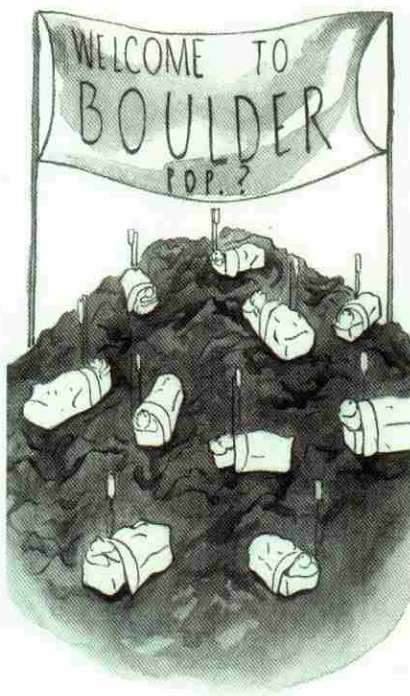
County contracted the disease. Since then the county has seen an average of eighty-one cases a year. Although unvaccinated children are six times as likely as vaccinated children to get whooping cough during an outbreak, about half the cases in Colorado have involved vaccinated children; the whooping-cough vaccine sometimes fails to produce effective immunity, and even successful pertussis immunity generally wanes by age ten. "At first we called it an outbreak; then we started calling it a sustained outbreak; now we just say it's endemic," Ann Marie Bailey, the county nurse epidemiologist when I visited Boulder last year, told me.

To many in Boulder, endemic pertussis is no cause for alarm. Shining Mountain's director, Robert Schiappacasse, says that his daughter, who had been immunized, got whooping cough but suffered no lasting effects. He became a little concerned, he told me, when the baby of one of the school's secretaries "coughed himself into a hernia" after visiting the school during an outbreak. Still, "parents here," Schiappacasse said, apparently including himself in the category, "are more likely to be worried about fumes from a new carpet than they are about any infectious disease."

I also spoke with Johnnie Egars, a Shining Mountain parent whose three children, all unvaccinated, got whooping cough in 1994. Her youngest child was particularly sick. Egars's description of the experience was harrowing. "It was a loud cough that went down to her toes, and the whoop was a sharp intake of breath," she recalled. "She coughed and coughed until she threw up; then she slept an hour or two. Then she'd wake up and start over again." The daughter, who was two at the time, was undergoing treatment for cancer; she was hospitalized for three days in the infectious-diseases ward of Children's Hospital in Denver. Nonetheless, Egars is comfortable with her decision not to vaccinate her chil-

dren. A niece was hospitalized with febrile seizures following a pertussis vaccination, and in her view, "immunization just weakens the immune system." She adds, "We have a history of cancer in my family, so we try to do everything we can to strengthen the immune system."

From its reservoir in the undervaccinated population of Boulder pertussis



has branched out: neighboring Jefferson and Denver Counties had more cases in 2000 than Boulder did. Some of the people who live near Boulder are angry. "There is a constant presence of whooping cough here, and it's because of Boulder Valley," says Kathy Keffeler, the chief school nurse for Longmont, a growing city just north of Boulder.

Pertussis is on the rise not just in Colorado but across the country: there were 7,600 cases last year, as compared with 4,600 in 1994. It can be fatal, especially in countries—like ours—with spotty health-care coverage. In 2000 it killed seventeen people in the United States, including two Colorado babies,

both of whom were taken to the hospital too late. "It was very sad," Tina Albertson, a pediatric resident who cared for one of the infants, told me. "She was a six-week-old girl with a sister and a brother, four and six. The family had chosen not to immunize, and the week she was born, her siblings both had whooping cough. When they're real little, the babies don't whoop—they just stop breathing. This little girl was septic by the time they got her here."

Like most in Boulder, Ann Marie Bailey, the nurse epidemiologist, is tolerant of the alternative health-care scene; she cedes nonvaccinating parents the right to decide what's best for their children. But she gently points out that they're fooling themselves if they think no one else is affected by their decisions. "We've been able to show very definitely that whooping cough spreads from these pockets in small communities. If they lived in a vacuum at Shining Mountain—if they never went out to go swimming or to church or the YMCA or the Boy Scouts—it would be a different ball game," she told me.

Jia Gottlieb, a family practitioner who offers acupuncture and breathing exercises along with traditional medicine, said, "When I get parents who don't vaccinate, I tell them, 'When your boy gets a vaccination he takes on a risk for the public good, just like the firemen [at the World Trade Center] who went back into the buildings.'" But Gottlieb's words usually fall on deaf ears. "These are probably people who donate a lot of money to good causes," he said, "but their view is 'I'm going to let everyone else's child take a risk but not my own.' That's not avant-garde. That's not enlightened. It's pretty primitive. And ironically, in a town like Boulder the selfish strategy is probably not in the best interests of your child either." ■

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