

**N**OWING WORKER FOR THE RECORD, OVER this Cohen desperately tried one antibiotic after another on his 17-year-old kidney patient, but to no avail: penicillin, tetracycline, erythromycin. The doctor gave him—first, glass-needle injections of heavy experimental tetracycline—the man's blood was still flooded with enterococcal bacteria, which were slowly poisoning his red blood cells. "We tried six or seven different medications. Some were in combination. Some we didn't think would work, but we had nothing else to try," says Cohen, an infectious-disease specialist at the Veterans Affairs Medical Center in Washington. Sometimes her patient's blood turned clear, but within days the infection came roaring back: a few more bacteria, or more determined by the antibiotic than an urban gang by a pop diva.

penicillin, erythromycin (both poisoning) erythromycin and other bacterial infections that look back to a time of high-bacterium counts were resuscitated. The people died—and still die—(penicillin, but not tetracycline, and not those who began antibiotics before the antibiotic worked) some vital system. "The perception in the 1950s was that we had conquered almost every infectious disease," says Dr. Thomas Tenover of the Buffalo, N.Y., VA Medical Center. Science was more the real challenge would lie in the conquest of cancer, heart disease and other chronic ailments. Instead, "infectious" resuscitated through every infectious disease that became an epidemic," writes Dr. Thomas Tenover in his book called "How We Die." Instead, it looks like medicine declared victory and went home too soon. Every disease-causing bacterium now has weapons that exist at least one of medicine's antibiotic arsenal. Some resist all but one drug, page 48. Drug-resistant tuberculosis now re-

# The End of Antibiotics

SCIENCE THOUGHT IT HAD VANQUISHED INFECTIOUS DISEASES. BUT NOW THE BUGS ARE FIGHTING BACK.

hided their time until their more virulent cousins had been killed. Then they multiplied by the billions. In one morning last year, Cohen gathered her courage and walked softly into the man's room. "I guess you're coming to tell me I'm dying," he said. Nothing had worked, she explains; they had run out of options. Attribution, the miracle drug of the 20th century, had been beaten by bacteria, the most primitive organisms on earth. Several days later the man died of a massive bacterial infection of the blood and heart.

Even since 2005, when Alexander Fleming serendipitously discovered penicillin outgrowth of mold in a laboratory dish, "massive antibiotic have been in a boom," says Dr. Richard Tenover of the University of Iowa. It's a boom in which the lead keeps changing. In 1940, just five years after penicillin came into wide use with World War II, doctors discovered streptomycin that was invulnerable to the drug. No problem: smart pharmacologists invented a diacetyl-succinylolactam in samples of soil they collected from swamps where they visited newly founded new antibiotics. The drug (combined the molecule into sulbactam) was again, but the bacteria resurged, and makes capable of binding of the latest drug appeared. New drugs, newer bacteria, and so it went. Overall the drug resistance is slight lead and, slowly occupies such as tuberculosis, bacterial

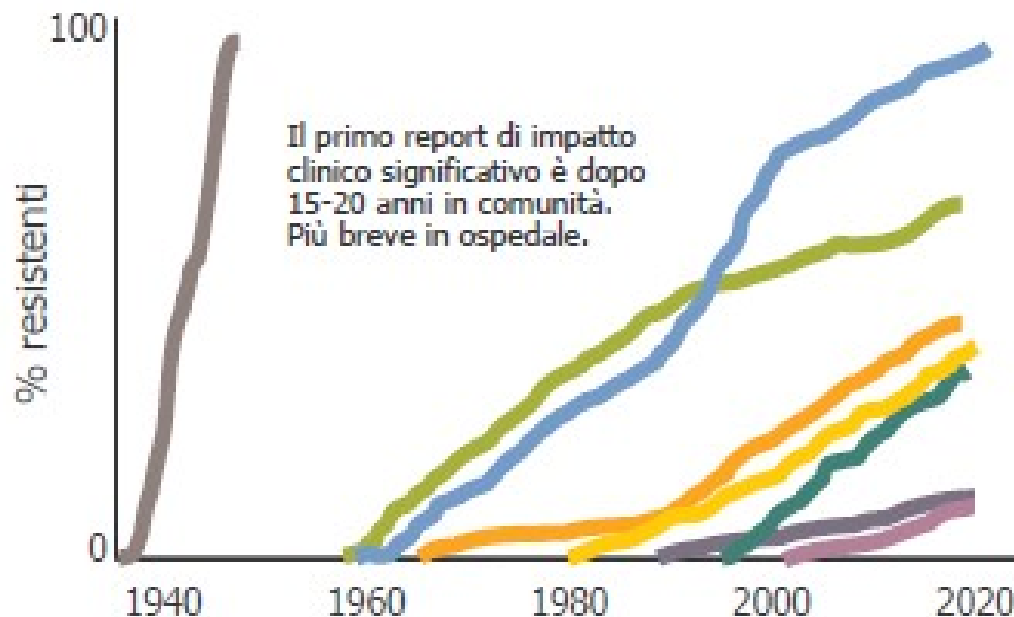
BY ANDREW HENLEY

resists for use in even new cases. 5 percent of those patients are dying. Several resistant strains of pneumococci, the bacteria responsible for infected surgical wounds and some children's ear infections and meningitis, appeared in South Africa in the 1970s, spreading Europe and now are taking up in the United States. In January the National Center for Disease Control and Prevention (CDC) reported an epidemic of resistant pneumococci in rural Kentucky and in Memphis. The bugs had spread through day-care centers like a chain letter, leaving toddlers with ear infections, pneumonia and, in six cases, meningitis. In 1992, 25,000 hospital patients died of bacterial infections that resisted the antibiotic doctors had at their disposal. It was not that they had infectious disease to every single drug but rather that, like the case doctors found an antibiotic that worked, the remaining bacteria had poisoned the patient's blood, swarmed the lungs or clogged some other vital organ.

The bacterial toll is steep, too, because the first antibiotic prescribed often fails, the patient has to try several, this with some 100 million to 150 million to the nation's health-care bill. "Right now the microorganisms are winning," says James Tenover, "they're so much older than we are... and wiser." "They've learned what we've learned to do," says Tenover.

MARCH 10, 2004 | NEWSWEEK 47

## Da Fleming al Newsweek



ESBLs  
*H. influenzae* TEM  
 Pen-R *S. aureus*

MRSA in ospedale  
 MRSA in comunità  
 VRE

PRP  
*E. coli* TEM