Science is not neutral: The rubella vaccine and the attack on public health

Part two

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Plotkin and the rubella vaccine

As Dr. Stanley Plotkin recently explained to the WSWS, the mid-century vaccinologist worked with severely limited tools: “At that time we had only two ways to make vaccines: attenuation of the agent or inactivation of the agent.” Plotkin chose attenuation—the Pasteurian principle of weakening a pathogen until it can stimulate immunity without causing disease.

Plotkin executed this Pasteurian logic with mid-century precision but made one crucial departure from conventional practice: He chose to cultivate the rubella virus in human cells rather than animal substrates. Animal tissues—monkey kidneys, duck embryo cells—were notoriously prone to contamination with latent pathogens, including the cancer-associated SV40 virus that had contaminated early polio vaccines.

There was a deeper scientific logic at work as well. Unlike most pathogens, rubella has no known animal reservoir—It exists exclusively in human populations and replicates most faithfully in human tissue. A virus with no animal host, Plotkin must have reasoned, should be attenuated in the cells it targets. Growing it through animal substrates risked producing a strain mismatched to the human immune system it needed to train. Human cells were not merely cleaner; for this pathogen, they were demonstrated to be scientifically correct.

The essential substrate for Plotkin’s vaccine was a cell line known as WI-38. Developed in 1962 at the Wistar Institute by biologist Leonard Hayflick, WI-38 was derived from the lung tissue of a legally aborted fetus in Sweden. The woman who underwent the abortion—a mother who felt she could not manage another child—is known in historical accounts only as “Mrs. X.” Her name was never recorded in scientific literature, and she has declined, in the decades since, to be identified.

Hayflick’s cells were a breakthrough. Unlike the monkey tissues commonly used at the time, they were free of dangerous animal viruses, and they could divide reliably through approximately 50 generations in the laboratory before naturally reaching senescence—a phenomenon Hayflick himself had discovered and that now bears his name, the Hayflick limit.

Using the WI-38 cells, Plotkin isolated the rubella virus from the kidney of a fetus aborted during the epidemic. He designated the resulting viral strain RA 27/3—Rubella Abortus, the 27th specimen tested, the 3rd tissue explant—a naming convention that preserved in shorthand the precise conditions of the strain’s discovery.

To attenuate the virus, Plotkin grew it repeatedly in WI-38 cells while progressively lowering the incubation temperature—from 35 degrees Celsius down to 30. Each passage through these cooler, artificial conditions forced the virus to accumulate mutations favoring laboratory survival over replication in the human body. By the 25th passage, the strain had been sufficiently weakened: It could still stimulate the immune system, but it could no longer cause disease.

When it came time to test RA 27/3, Plotkin selected a setting rich in historical irony: St. Vincent’s Home for Children, a Philadelphia orphanage administered by Catholic nuns. The trial proceeded with the explicit written blessing of Archbishop John Joseph Krol. Decades later, it would be the Catholic Church’s own anti-abortion constituencies—along with broader right-wing anti-vaccine forces—who would attack the vaccine precisely because of its origins in fetal cell tissue, targeting a scientific legacy that the Archbishop had once endorsed.

The vaccine, however, ran immediately into regulatory resistance. Despite its demonstrated safety and immunogenicity, American regulators refused to approve RA 27/3 for a decade—a delay driven not by scientific evidence but by institutional prejudice against human cell substrates. The government’s Division of Biologics Standards, led by Roderick Murray, stubbornly favored vaccines grown in animal tissues, warning that human cell strains might harbor hypothetical cancer-causing agents—this from an agency that had authorized monkey kidney cells repeatedly shown to carry actual dangerous contaminants, including SV40.

While American regulators stalled, Plotkin’s vaccine was licensed and deployed across Europe, accumulating a decade of safety data. The impasse in the United States was finally broken by Dorothy Horstmann, a Yale virologist whose comparative field studies demonstrated conclusively that the animal-based rubella vaccines approved in the US failed to prevent reinfection at the rates Plotkin’s strain did. RA 27/3 produced higher and more durable antibody levels, better resistance to reinfection, and—critically—a stronger mucosal immune response in the nasopharynx, precisely where the virus first established itself.

Horstmann’s data persuaded Maurice Hilleman, Merck’s chief virologist, to abandon his company’s duck-embryo formulation and adopt Plotkin’s strain. In 1979, the Food and Drug Administration (FDA) finally approved RA 27/3, making it the standard rubella vaccine in the United States—10 years after it had been in use in Europe.

Elimination of rubella

The introduction of routine rubella vaccination in the United States in

1969 produced an immediate and dramatic reduction in infections and congenital tragedies. The delivery mechanism that made this population-wide protection possible was the measles-mumps-rubella (MMR) vaccine, a combination formulation developed by Maurice Hilleman at Merck in 1971 that united measles, mumps and rubella immunization in a single shot. By 1979, Plotkin's RA 27/3 strain had replaced earlier animal-substrate formulations as the rubella component of the MMR. It remains so today, in every MMR vaccine administered anywhere in the world.

On October 29, 2004, the CDC (Centers for Disease Control and Prevention) convened an independent panel of internationally recognized public health authorities to assess the nation's rubella status. After reviewing the clinical, laboratory and epidemiological evidence, the panel concluded unanimously that the continuous chain of transmission had been broken—that rubella was no longer endemic in the United States.

The measure of what was achieved is contained in two numbers. In 1964 and 1965, the rubella epidemic produced 20,000 infants born with congenital rubella syndrome in just two years. In the 13 years between 2005 and 2018, the entire United States recorded 15 such cases—from 20,000 to 15! That is the measure of Plotkin's vaccine.

As the researchers who followed Norman Gregg's original patients for six decades observed, this cohort had "illuminated our understanding of viral teratogenesis"—but more than that, they had helped prove that the disease causing their lifetimes of deafness, blindness and heart failure was now preventable. Future generations would not have to suffer as they had.

Reflecting on the rubella vaccine's history in a 2006 retrospective, Plotkin closed with a statement that would prove tragically optimistic: "We have the tools to do it, and only the political will is required." That sentence now reads as the high-water mark of a postwar public health consensus—written at the moment before the political will it called for began its long, structural dissolution.

Why public health is always political

The great public health achievements of the mid-20th century—among them the elimination of rubella and measles in the United States—were not the natural, inevitable triumph of scientific progress. George Rosen's foundational 1958 work *A History of Public Health* established what the dominant narrative of scientific advancement consistently obscures: that public health infrastructure is not an inevitable product of civilization but the accumulated, institutionalized expression of working people's demand for a better life.

Hospitals, medical science, vaccination programs—These did not descend from enlightened governance. They are the consequence of class struggle, the social product of the value generated by the working class and the long fight to direct that value toward human need. The threads connecting that struggle to its institutional results are invisible in the way that historical causation is always invisible to those who inherit its benefits without understanding its origins. Rosen restored those threads to visibility. When Thomas Jefferson wrote that "all men are created equal and possess inalienable rights to pursue happiness," he was giving political expression to a social demand already being fought for from below. Public health was never a gift. It was a conquest.

The British historian of social medicine Dorothy Porter's *Health, Civilization and the State* extended Rosen's argument to its necessary and unsettling conclusion. Because public health is the product of class struggle rather than the benevolence of institutions, it is always subject to the historical motions of capitalism. The social contract of healthcare, Porter demonstrates, is perpetually being renegotiated—and when the class pressures that extracted its concessions subside, when the ruling class shifts its priorities toward market deregulation and austerity, public health infrastructure does not simply stagnate. It is dismantled.

But Porter's analysis of reversibility, acute as it is, must be sharpened to meet the present moment. What is occurring now under the Trump administration, with the anti-vaccine fanatic Robert F. Kennedy Jr. taking the lead, is not merely the withdrawal of a concession. It is an ideological war on the accumulated sum of social knowledge itself—on science, on expertise, on the concept of objective truth as a social inheritance. Fascism and dictatorial rule do not simply defund public health. They attack the consciousness that produced it.

The COVID-19 pandemic and the ruling elite's response to it across six years of normalized mass death demonstrated conclusively that Kennedy and Trump are not aberrant individuals who happen to hold power. The groundwork was laid across multiple administrations, parties and countries. The attacks on public health are the political expression of capitalism in terminal crisis—a system that can no longer afford even the limited concessions it once found expedient and that now deploys irrationalism as a weapon against the working class it can no longer pacify.

This has a founding American precedent, and as the nation marks the 250th anniversary of its independence, the contrast could not be starker. As Andrew Wehrman documents in *The Contagion of Liberty*, the fight against smallpox was inseparable from the fight for independence itself. Ordinary colonists—sailors, farmers, mothers and militia members—did not wait for authorities to protect them. They demanded inoculation from below, pressuring towns and assemblies to build public hospitals at collective expense, understanding that their individual vulnerability was a shared social condition.

On February 5, 1777, General George Washington ordered the mandatory smallpox inoculation of the entire Continental Army, establishing what historians consider the first mass immunization mandate in American history. For the revolutionary generation, liberty meant interdependence, not isolation—shared vulnerability required collective action.

The demand for public health was not a medical preference. It was a revolutionary demand, rooted in the same understanding of collective necessity that drove the fight for independence, and it became part of the social DNA of American democratic tradition. In 2026, the financial oligarchy is dismantling that tradition, weaponizing the language of "health freedom" to leave working people defenseless against returning plagues, erasing at breakneck speed the democratic traditions that working people fought to establish.

It is this history that Plotkin now forgets—or rather, was never equipped politically to truly understand. The institutions he built his career within, and now watches being dismantled, were not the starting point of the story. They were a way station in a struggle that long preceded them and that their dismantling now demands be taken up again. The rubella vaccine did not emerge from the benevolence of capital or the wisdom of regulators. It emerged from publicly funded science, in a publicly supported institution, under historical conditions extracted from ruling elites by the organized struggle of working people. To despair at its dismantling without understanding that history is to mistake the institution for the struggle that produced it.

From elimination to resurgence of diseases

The explosive resurgence of measles in the United States is the leading indicator of a catastrophic collapse of MMR vaccination coverage. National kindergarten coverage has fallen to 92.5 percent, with 39 states

now below the 95 percent threshold required to sustain herd immunity against measles—and with it, the coverage that also prevents rubella's return.

This mounting pool of unvaccinated children represents a growing accumulation of susceptibility—the precise biological precondition for the return of CRS. As Dr. Plotkin recently warned in *STAT*: "The important difference is that measles is about four times more infectious than rubella. So, it takes more susceptibles to accumulate before you get an outbreak. We've been fortunate thus far that rubella has not come back to the U.S. But it certainly could, if unvaccinated people begin to accumulate."

This erosion of population-level immunity is being actively accelerated by the Trump-Kennedy administration's assault on public health infrastructure. By purging the entire ACIP (Advisory Committee on Immunization Practices) and replacing it with vaccine skeptics and anti-science ideologues, Health and Human Services Secretary Kennedy has directly targeted the mechanisms that sustain rubella immunity. The recent decrees of the committee, since its takeover by the ultra-right, include voting against the combined measles-mumps-rubella-varicella (MMRV) shot for children under four and pushing for the separation of the MMR vaccine components. These are deliberate maneuvers to lower immunization rates. Responding to the ACIP's new doctrine elevating "individual autonomy" over communal survival, Plotkin told the WSWS: "The principle now is 'I will accept what I'm willing to accept and to hell with everybody else.' To tell people that they don't need to be vaccinated is simply promoting disease. Not only is it stupid, but it's immoral."

This unraveling is greatly compounded on the global stage. The capitalist political establishment's normalization of mass death across six years of the COVID-19 pandemic has paved the way for the abandonment of international public health cooperation. Today, 19 countries still lack a routine rubella vaccination program. Universal introduction of the vaccine in these vulnerable nations could prevent an estimated 986,000 cases of CRS between 2025 and 2055, sparing nearly a million children from preventable blindness, deafness and brain damage.

Yet this undertaking is now acutely imperiled. The Trump administration's reactionary withdrawal from the WHO (World Health Organization) and the gutting of foreign aid infrastructure threaten to collapse the institutional framework required to deliver the vaccine to those who need it most, guaranteeing that the devastating toll of congenital rubella syndrome will continue for decades. The broader context makes this still more alarming: the military escalation now driving the world toward a third world war has historically been the condition under which epidemic disease spreads most rapidly, as the wartime rubella epidemic that swept through Australian army camps in 1939 and ultimately reached Gregg's clinic in 1941 so grimly demonstrated.

Conclusion: against pessimism

When Dr. Plotkin surveys the dismantling of the public health infrastructure he spent his life building, his outrage is unmistakable—and entirely legitimate. In his *STAT News* profile and in responses to questions posed by the *World Socialist Web Site*—he declined a formal interview but responded to written questions—he conveyed the same verdict: that the field's achievements are slipping away, that vaccine nihilism is rising, and that he does not know how to counter it. Branswell's reporting rendered that despair with skill and sympathy. But sympathy without historical/political analysis has its own political function. Together, the *STAT* profile and Plotkin's own responses present a unified picture of defeat—moving, humane, and, from the standpoint of science and history, profoundly insufficient.

There is no dispute here about Plotkin's integrity as a scientist or the magnitude of what his work achieved. On the immediate moral question his judgment is direct and unsparing. Confronting the ACIP's elevation of "individual autonomy" over communal survival, he told the WSWS that to tell people they do not need to be vaccinated is to promote disease—foolish and immoral. But he does not address the political questions his own moral condemnation suggests.

Plotkin's youthful idealism emerged during a period of rabid anticommunism and carefully managed concessions to the working class. The teenager, who read *Arrowsmith* and *Microbe Hunters* in the Bronx and grasped that science could be a social mission, came of age precisely as McCarthyism was conducting its systematic destruction of left-wing thought in American intellectual and scientific life. The postwar institutions he entered—the CDC, the EIS, the Wistar lab—had already been purged of the class-conscious traditions that had shaped an earlier generation of scientists and public health workers.

The framework that could have given historical grounding to his enthusiastic embrace of medical science had been made systematically unavailable. What remained was a liberalism of expertise: science as a social good, delivered by enlightened institutions, contingent on nothing so uncomfortable as class conflict. When asked by the WSWS about the contradictions between public health and pharmaceutical profit, Plotkin defended the profit motive as the engine of American vaccine leadership—while its current demise is a contradiction that does not appear to register.

Pessimism of the kind expressed by Plotkin and amplified by *STAT News* is antithetical to science itself, and in particular to any serious understanding of how social progress has ever been made. It treats the working class as passive, as the object of policies handed down from above or withheld, rather than as the historical force that extracted those policies through struggle. The revolutionary generation that demanded inoculation from below understood what Plotkin's own education taught him to forget: Science serving human life and the organized power of working people are not separate causes. They are the same cause. Do we accept defeat? The answer to the history that this article undertakes—and that Plotkin's science deserves—is a resounding "no." Not naive optimism, but the recognition that what was won through struggle can only be defended the same way.

The ultimate stakes of this political struggle are best understood by looking back at the people Plotkin's vaccine was built to protect. In 2002, researchers followed up with the surviving members of Norman Gregg's original cohort—men and women then in their sixties who had endured lifetimes of deafness, blindness, heart failure and social isolation as the direct consequence of a virus their mothers could not have been vaccinated against. Reflecting on their lives, these survivors expressed satisfaction that the rubella vaccination means "today's young Australians do not have to cope with the problems they had to overcome."

That satisfaction, and the freedom from preventable suffering it represents, was the product of a hard-won social achievement. Whether the next generation of children inherits that freedom or loses it to the barbarism of a dying social order is no longer a scientific question. It is a political one.

Concluded