



## Polio: A Cultural History Professor Joanna Bourke

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The Great Cat Massacre in New York City began in July 1916. By the end of that month, 72,000 cats and around 8,000 dogs had been slaughtered. A headline in the *New York Times* screamed out the news that the cats had been 'Killed in Paralysis Fear'. The *Times* reported that this fear was due to an epidemic of 'infantile paralysis', or poliomyelitis, a viral inflammation (*itis*) of the grey (*polios*) anterior matter of the spinal cord (*myelos*), which we now know comes in three serotypes or viral strains. This Great Cat Massacre was not a workers' protest, as in Robert Darnton's famous exposition of the massacre of the feline population in Paris in the 1730s. Rather, it was a panic sparked by epidemic levels of polio in New York City as well as throughout the U.S. 'The crippler', as polio was often crudely referred to, was engraved in ancient Egyptian tablets but soared to epidemic levels in the twentieth century, peaking in the U.S. in 1952 with nearly 14 cases per 100,000 people. The 1916 polio epidemic, however, was believed to be the largest in the developed world – more than 27,000 Americans were infected, of whom one-third resided in New York City. Terror of the disease was intensified by the fact that 80 per cent of those infected were children under the age of five. One quarter died.

Ironically, the mass killing of cats and dogs was orchestrated by the Society for the Prevention of Cruelty to Animals (SPCA). Thomas F. Freel, Superintendent of the SPCA, complained that his Inspectors were being required to work from seven o'clock in the morning to one o'clock the following morning in order to entrap and exterminate scores of unwanted cats; their lethal gas chambers were working at maximum capacity. The city's panic was fueled by uncertainty about what spread the crippling disease. Theories proliferated. Were blueberries, unpasteurized milk, sugar, ice-cream, or Italian immigrants to blame or, as we now know, was the virus spread person-to-person through droplets or fecal-oral contamination of hands, water, or food? Freel sought to reassure New Yorkers that their *cats* were innocent. He told the *New York Times* that despite 'the statement issued by Health Commissioner [Haven] Emerson that cats do not carry the germs of the disease', people were afraid. Since 'the beginning of the alarm over infantile paralysis', he complained, 'we have been receiving on an average 800 requests a day for our men to call for unwanted domestic pets, mostly cats'. 'Animal guardians' (as animal rights activists called themselves in the early decades of the twentieth century) were surprised to observe that, on hearing the alarming statistics on the spread of polio throughout the city, families 'turned their cats out of doors immediately, and some who had dogs did the same'. Their actions not only resulted in the massacre of 72,000 cats: it also led to the appearance of 'pirate cats', the leader of whom was thought to be Wang, a 'tailless mauve cat from Formosa'. Wang and his gang of between 50 and 100 other 'pirate cats' terrorized the 'pious people' of the West Eightieth Street and other residents of the West Upper Side. The cat-gang were not only accused of spreading the paralyzing disease, but also of stealing legs of mutton, frightening dogs, and keeping people awake at night by their screeches. The SPCA promised residents that SPCA officers were 'working as hard as they can' to ensure that 'Wang and his band of cats will be rounded up in due course with the other nocturnal nomads in the city.' The Great New York Cat Massacre of July 1916 fused fears of wild cats who had been cast adrift by their owners with itinerants and morally suspect night-workers.

New Yorkers were not wrong to panic. Polio was a disease to fear. Around one-quarter of people diagnosed with polio woke up to find that their limbs were permanently paralyzed and/or that they had difficulties breathing or swallowing. Between two and ten per cent of them died. Philip Lewin, a noted American expert on polio, reflected that an attack of the polio virus 'may be as inconsequential as measles or more agonizing than death'. In his 1941 textbook on the disease, he maintained not only that 'every family shudders at the thought that any of its members might become crippled', but that doctors also 'dread having a patient who

might become a cripple'. He believed that, in contrast to diseases such as pneumonia, diphtheria or typhoid fever, 'it is not death that is feared so much as the crippling aftermath of the disease, a *physical crippling* which may last a lifetime and impair the activities of an otherwise healthy person'. In the 1950s, when Americans were asked what kept them awake at night, fear of polio was second only to the atomic bomb.

Such fears were stoked by media representations of the disease. Although at least 150 movies directly referenced polio, the most famous was Alfred Hitchcock's 'Rear Window'. It was released in 1954, just before the massive vaccine campaigns against polio were instigated. The film contributed to the stigma and terrors associated with polio. Ironically, even organizations dedicated to funding public health education and vaccine research stoked up terror. In 1947, for example, the National Foundation for Infantile Paralysis released 'In Daily Battle'. The film, which was unofficially known as 'The Crippler', used techniques drawn from horror movies, especially typical of German expressionist cinema with its use of shadows as the embodiment of 'Virus Poliomyelitis'. This ominous shadow says: 'I specialize in grotesques, twisting and deforming human bodies. That's why I'm called the Crippler'. The Shadows moves from the countryside to the city, striking down people as it goes, laughing in a sinister manner. 'Virus Poliomyelitis' says, 'As you probably know, I'm very fond of children, especially little children'.

As was the case during the Great Cat Massacre in New York in 1916, fear of polio was fuelled by uncertainty about its cause and, therefore, what steps people could take to protect themselves and their families. Was polio transmitted through the air? Through physical contact? Or by flies? In 1912, the author of an article entitled 'Paralysis: The New Epidemic', warned readers of *MacLean's Magazine* that

the fly is a carrier of infection. Kill the fly. Not one fly should ever be allowed in or round a house. This is imperative. Never let a fly touch a baby.

Or could the route of transmission be traced back to classrooms and playgrounds? Were schoolchildren who shared pencils passing on the disease, or were these children being infected through swimming in municipal pools? These were unanswered questions, until the mid-1940s.

Without reliable information about the transmission of the disease, authorities engaged in major public health campaigns. They targeted poor and marginalized communities. Although there was good evidence that polio was actually more prevalent in middle-class homes, the poor were stigmatized, especially Italian and Jewish immigrants as well as residents of 'urban slums'. Vegetables had to be washed before eating; unpasteurized milk, avoided. Playgrounds, swimming pools, and theatres were shut down. Library books were fumigated. Areas with high incidents of polio infections were placed under lockdown and patrols were set up to ensure that potentially infected people remained in their homes and immediate neighborhoods. 'Swat the fly' campaigns were instigated, because flies were believed to transmit the virus from the unhygienic homes of poor people to the wealthy suburbs. Flies never seemed to wing their way in the opposite direction!

In the midst of uncertainty, scientists worked to identify the cause of the devastating disease. Part of the reason they struggled for so long to identify the precise nature of polio was because the disease was caused by a virus, not a bacterium: it was too small to be seen under the microscopes available at the time. In the end, solving the mystery of polio was central to the growth of the scientific specialty of virology itself. The virus was only identified in 1900, by the Viennese physician Karl Landsteiner. The following year, Simon Flexner (laboratory director off the Rockefeller Institute for Medical Research) was able to show that it was infectious. Flexner believed it was spread through inhalation and did not circulate in the digestive tract or blood. He was wrong. He and his collaborator Hideyo Noguchi insisted that polio was a disease of the nervous system: they marveled at the 'innumerable bright dancing points' they saw through their microscope. A major step forward in the understanding of the transmission of the virus was made in the 1930s by John Paul and James Trask at the Yale University School of Medicine. They were the ones who established that the virus entered the body through the mouth, where it replicated in the lymphatic tissues of the intestines or oropharynx, before entering the blood stream and then the central nervous system.

These scientists also solved the mystery about why polio was more likely to infect middle-class children. As early as 1912, Canadian physician Helen MacMurchy informed readers of *MacLean's Magazine* that 'victims of this disease are not among the poor, or delicate. Often the vigorous and healthy are attacked and those who have comfortable homes and good care'. In the past, most children would have been infected with polio as infants, but they would have experienced only mild, flu-like symptoms. Being infected in infancy, however, would have given them immunity for life. The increased obsession with cleanliness in wealthier homes changed this: by cutting exposure in infancy, children were more at risk of developing polio in later life. In other words, polio outbreaks were a direct outcome of the sanitization of homes and workplaces, making polio a classic example of a disease made worse by 'progress'. A relative mild endemic disease became a

deadly epidemic one. As with tuberculosis (as we saw in my first lecture of this series), most patients were treated in their communities by local medical professionals. They watched with horror as young patients whom they might have treated since infancy appeared with symptoms typical of a summer cold – for example, headaches, upset stomachs, and fever – but then advanced with terrifying rapidity to paralysis or difficulties in breathing and swallowing. Many of these physicians would have found the task of distinguishing polio from other diseases, such as cerebrospinal meningitis, impossible. It could be done by examining spinal fluid, but lumbar puncture was well above the capabilities of most regional doctors: it was also a very painful procedure, making them reluctant to inflict it on already desperately ill patients. Not surprisingly, many polio sufferers and their families turned to alternative means of managing the disease. After all, treatments were expensive. At a time when the median annual wage was less than \$900, treatments ranged from \$2,000 to \$3,000 in the first year, and between \$75 and \$150 every year thereafter. In rural areas, desperate families might seek the expertise of ‘bone setters’, who would vigorously massage the affected limbs. Others were driven into the arms of unorthodox practitioners, who resorted to a vast range of unproven practices, such as rubbing the body with kerosene oil.

*Orthodox* medicine prescribed absolute rest and immobilization. Splints or braces were used to immobilize limbs, sometimes for nine months. Many patients underwent painful orthopedic surgeries aimed at straightening their limbs. From 1928, severely paralyzed patients were encased in ‘iron lungs’ – most commonly the Drinker tank respirator (named after Philip Drinker of Harvard University) – which was a negative pressure ventilator. Patients were sealed into these heavy, bulky cylinders from the neck down while alternating positive and negative air pressure enabled them to breathe. They remained in the device until the recovered muscle strengthened; many died. Imprisonment inside an ‘iron lung’ meant that patients were thrown overnight into a situation where they were entirely dependent on nurses, family members, and other caregivers for their everyday survival. Marshall Barr, who developed polio in 1949 when he was seven years old and had to be placed in an iron lung after a relapse when he was in his twenties, found that even the most basic of activities – eating – required thought. ‘You can eat in the iron lung because your head is outside’, he recalled, ‘but the rest of your body is inside’. However,

since you are flat on your back you really need to be careful when you swallow; you have to swallow in rhythm with the machine because it’s pulling your diaphragm in and then pushing it out again. You just wait until it’s breathing out and then you swallow.

Although Barr was remarkably stoical about his life in the ‘iron lung’, others lamented their loss of autonomy and privacy, with its accompanying infantilization. Their only access to the wider world was provided by a mirror suspended above their faces. The death of a fellow-patient was signaled by the sinister silence that fell on the ward when one of the noisy breathing-machine was switched off: nurses would rush to turn everybody’s mirrors to face the rear of the machine so that survivors would not see the corpse being wheeled away.

From the early 1940s, polio patients who did not need the assistance of the ‘iron lung’ but had been left with twisted limbs were presented with an alternative to the standard treatment involving immobilization. Until this time, the medical establishment had concluded that polio was a neurological affliction. When connections between muscles and nerves were severed, the weakened muscles atrophied, distorting limbs or paralyzed patients. This was their rationale for forcibly straightening limbs and immobilizing them.

Sister (her title was medical, not religious) Elizabeth Kenny, a snowy-haired Australian bush-nurse who immigrated to Britain, had different ideas. She argued that immobilization was *exacerbating* the problems faced by polio sufferers. Believing polio to be a systemic disease, she focused on muscles, especially muscular spasms. Rather than immobilization, patients needed intense physical therapy carried out by nurses or the patients themselves, using hot compresses to reduce spasms. This was extremely innovative. Kenny promoted a shift away from viewing polio as *deformity*, which required the straightening of limbs, to polio as creating *disability*. The emphasis on deformity had encouraged an emphasis on ‘normality’, while Kenny’s focus on disability stressed functionality and living a fuller life. Her therapeutics also presented a different way to think about the role of pain in treating polio patients. For many orthodox practitioners, pain was regarded as necessary for any return to ‘normality’, while for Kenny it was a symptom of an underlying pathology that needed to be eradicated.

The male medical elite were appalled. They held Kenny in contempt, claiming that she was an ignorant fraudster – or even mentally unhinged. They were not impressed by her trust in ‘hands-on’ experience with patients as opposed to laboratory experiments and clinical trials. They were riled by her brash, opinionated mannerisms. Polio patients and their families as well as friends disagreed. Such was her celebrity status

that, in 1946, Kenny was immortalized in film. The glamorous star Rosalind Russell, who played 'Sister Kenny' in the film of that name, won a Golden Globe Award for Best Actress in a Leading Role and was nominated for an Academy Award for Best Actress. Five years later, a Gallup poll ranked Kenny in first place as America's most admired women – even beating the celebrated Eleanor Roosevelt. Not surprisingly, this only further irked orthodox practitioners. Their clashes with Kenny were legendary, exposing the gendered tensions between a largely male establishment and a woman without scientific credentials who challenged their authority.

Kenny's popularity with patients and their families was part of a wider move towards understanding the harms carelessly and thoughtlessly inflicted on people who were viewed as 'abnormal' due to physical difference. The stigma associated with being 'disabled' meant that families sometimes sought to keep them hidden away. Employers preferred to give jobs to the "able-bodied". In the street, strangers gaped, voyeuristically. A large proportion of polio sufferers ended up confined to institutions for 'cripples', where visiting hours were restricted, facilities were bare, and there was little investment in up-to-date technologies. Isolation and loneliness were endemic. In his memoir *Bottom High to the Crowd* (1973), polio sufferer Don Kirkendall described visiting the Crippled Children's Home in Fargo, North Dakota in the 1930s. He was 'shocked' to see the 'unkempt children in drab hospital garb, children with listless limbs and vacant stares'. He observed that the children in wheelchairs all had 'sad, unsmiling eyes'. For such patients, a range of anxieties could be overwhelming. Would they ever become 'normal'? Would they always have to endure the shame and humiliation of dependency. Had they been abandoned by their families and friends? Would they be able to 'catch up' with their peers in terms of education and careers? Were they to be forever condemned to 'fall short', letting everyone down? Physical rehabilitation, firmly founded on Protestant self-help doctrine and the need to pursue 'normalization', dominated their waking lives. This helps explain why many polio survivors, especially in the U.S., turned for inspiration to Franklin D. Roosevelt (FDR) who had contracted polio in 1921 and went on to become a U.S. Senator, Governor of New York, and then President of the United States. Of course, RDF was able to mask the full extent of his disability through the resources made available to him as President and through the tacit agreement by journalists not to photograph him in his wheelchair or wearing braces. However, the thousands of letters written to him by polio survivors testify to the strength of their identification with him.

This is not to deny that there was extreme bitterness and anger expressed by polio survivors about being constantly reduced to their disease: they were 'polios', as if their illness (or its effects) constituted their only identity. Being labelled 'cripples' similarly stamped them as 'deformed', hideous even. As Jim Marugg exclaimed, 'I am not polio! I am bigger than this thing that has happened to me!'

Polio survivors complained about the huge pressures placed upon them to behave in specific ways. Perhaps most galling was the mantra that cure, if not survival itself, depended on them 'fighting' the virus with every inch of strength they possessed. And they were expected to accept the 'tough love' of nurses and other caregivers with a smile. In the 1930s, J. Brooks Emory insisted that what was needed was 'proper medical treatment *and the right mental attitude*'. Exhortations to be cheerful, gutsy, and relentlessly positive were endorsed by the Association for the Aid of Crippled Children. They contended that the 'crippled child' had to

express his [sic] pain, his desires, his hopes, and his anguish only in the most superficial manner; if he expresses his bitterness deeply or with any sense of personal tragedy, he risks alienating the nonhandicapped.... As long as the handicapped individual is cheerful and lighthearted, he is, like the 'jolly fat boy', usually accepted by his peers.

Posters published by the National Foundation for Infantile Paralysis also sported cheery and 'brave' children who, through sheer willpower and passive submission to doctors and nurses, would eventually be able to walk across a fund-raising catwalk or sports field. Polio sufferers sought to live up to such demand, nervous about not seeming sufficiently 'grateful'. This was the point being made by Brenda Serotte in her 2006 memoir entitled *The Fortune Teller's Kiss* (2006). Serotte had been brought up in a Jewish household of Turkish descent living in the Bronx. In 1954, when she was eight years old, she contracted polio and was sent away to be cured. Like many young children, she believed that she was to blame for becoming paralyzed. In her words, 'I got the impression that I had done something really bad this time to warrant such punishment'. She later recalled that she heard the word 'guts.... so often that by the time I was ten it had become my mantra and middle name. All of us, every kid in all three hospitals, was brave. Courageous. Gutsy.' Serotte admitted that she was

indoctrinated with the idea that I could do *anything*, miraculous things, but that I'd never ever achieve the physical mobility I wanted unless I pushed harder than anyone else – in the *world*.

And if I did not reach my goal, it meant that I didn't work hard enough, try my best.

'Guts' were necessary not only for her own well-being but also in order not to 'let everyone down'. A puritan work ethic pervaded treatment, convincing polio patients to work hard and cheerfully if they were to reap the rewards of 'normality'.

Even in more recent years, this idea that suffering makes a person stronger and better can be seen time and again. As late as 1996, this was the view of George F. Will in an article about Roosevelt entitled 'Don't Hide His Source of Strength'. According to Will's *Washington Post* article, Roosevelt 'probably would not have become president, and certainly would not have become the... tough president he was, without passing through the furnace of polio'. He claimed that polio transformed the 'debonair young swell, skating along on charm and connections', into a 'brilliant and broadly empathetic politician'. Even disability rights activist Jim Dickson concurred, writing that 'FDR led the nation through the Great Depression, to victory in World War II and he did so from wheelchair. ... FDR developed his strength of character, determination and discipline most distinctly as a result of having polio'.

In the U.S., major campaigns were started to help alleviate the suffering of polio patients and promote research. The most prominent -- the National Foundation for Infantile Paralysis -- was instigated by Roosevelt, who handed it over to Basil O'Connor. They urged people to send in small donations -- dimes -- directly to President Roosevelt. This was the 'March of Dimes', a term coined by comedian Eddie Cantor. It was a witty play on 'The March of Time', a newsreel series shown in movie theatres from 1935 to 1951. In 1938 alone, the March of Dimes received \$1.8 million worth of donations; by 1945, annual contributions had reached \$19 million. As one White House employee complained, 'the Government of the United States darned near stopped functioning because we couldn't clear away enough dimes'.

These campaigns were based on a new model of 'bottom-up' philanthropic fundraising. They saw mothers knocking on their neighbor's doors, collecting money for polio research. Indeed, the National Foundation for Infantile Paralysis had actively argued *against* federal funding for research, saying that it was 'Communistic' and 'un-American'.

Of course, polio survivors fought back. Some survivors even claimed that polio enhanced their talents. The list of artists and musicians who survived polio includes artist Frida Kahlo (1913), actress Connie Boswell (1910s), actress Dinah Shore (1918), blues singer Brownie McGee (1919), folk singer Judy Collins (1950), rock singer Ian Dury (1949), folk singer Donovan (1949), rock guitarist Neil Young (1951), singer-songwriter Joni Mitchell (1951), and the reggae group Israel Vibration (1950s). Joni Mitchell claimed that she started singing as a way of protesting against being forcibly isolated in hospital. She recalled that

I really started singing when I had polio.... They said I might not walk again and that I would not be able to go home for Christmas. I wouldn't go for it. So, I started to sing Christmas carols, and I used to sing them real loud. When the nurse came into the room I would sing louder.

Mitchell also credited her unique guitar chord technique to her polio. She explained that 'My left hand is somewhat clumsy because of polio. I had to simplify the shapes of the left hand, but I craved chordal movement that I couldn't get out of standard tuning without an extremely articulate left hand'. For Mitchell, polio fostered an 'artisticness'. In her words, 'the creative process was an urgency then... it was a survival instinct'.

Ian Dury's musical response to polio was at the opposite extreme to Mitchell's. Dury had contracted polio in 1949, aged seven years, in a municipal swimming pool in Southend. He spent five years in Black Notley Hospital in Essex and the Chailey Heritage Craft School and Hospital in Sussex, known as the land of 'crippledom', in the words of its founder Grace Kimmins. Much of Dury's angry punk aesthetics reflected on his experience in these grim institutions. In the 'Dance of the Screamers', for example, he screams out the words, 'Some of us are stupid sister, some of us are very shy/.... We're ever so pathetic, chickie, we know quite well that we try too hard/ Some of us were born like this while others got it by the yard/ So I'm screaming this to you -waaaaaaagh-/ Coz I haven't got a clue -wuuaarrh-/ I really think I'd like you given half the chance/ As we ain't got that I'll do the screamers dance/-Waaaaaaagh'. He told interviewers that the lyrics reflected on how 'you could hear people screaming on the way there, and it was you when you were there'. His 1980 song 'Hey, Hey, Take Me Away', about Chailey, with its graphic descriptions of sexual abuse and casual violence. The lyrics include 'Hey, Hey, Take Me Away/ I hate waking up in this place/ There's nutters in here who whistle and cheer/ When they're watching a one-legged race'.

The campaign to reduce and eventually eradicate polio was led by scientists searching for an effective

vaccine for polio. The 1930s saw some failed experiments: most tragically, the vaccines created (independently) by John Kolmer and Maurice Brodie infected some recipients and killed others. For example, Kolmer had tried to weaken the polio virus so that, when it was injected into people, they would develop protective immunity. But when he tested his vaccine on 10,000 American and Canadian children, ten became paralyzed and five died. He was branded a 'murderer' by colleagues.

Jonas Salk and Albert Sabin were more fortunate. Salk created a 'killed' vaccine while Sabin experimented with a 'live but weakened' one. The advantages of Sabin's vaccine included the fact that it could be administered orally via a sugar cube, and it stimulated the immune system rapidly. While Salk's vaccine required three injections in addition to a 'booster', Sabin's vaccine needed only a single dose.

The story of the bitter rivalry between Salk and Sabin – both extremely combatant and disagreeable men – has been told innumerable times – and I will not be retelling this familiar story here. The tensions were a matter of style as much as scientific content. It was a medical drama that drew its oxygen from the structure of U.S. health care system, the early growth of virology as a discipline, the politics of the Depression, and the Cold War. Unfortunately, their legendary rivalry has led historians of science to overlook the scientific genius of a Johns Hopkins University virologist called Isabel Morgan. She was the first scientist to identify the three serotypes of poliovirus, all of which need to be taken account of for a successful vaccine. Her 'killed virus' vaccine culminated in the approval of Salk's vaccine in 1955. Morgan did not reap the benefits of her research because, in 1949, when she was at the height of her career, she married, leaving her laboratory behind.

It was Salk's research that initially triumphed. He was ruthless. Keen for scientific breakthrough, he tested the virus on his wife and children (as had Kolmer two decades earlier) before setting out to persuade millions of parents and teachers to allow their children to become guinea pigs. His field trial was the largest test of a medical product in the U.S. It eventually involved 1.8 million people, some of whom were given the vaccine, others were given a placebo saline injection, and others were given nothing. It was a double-blind trial: neither the doctors giving the injections nor any of the participants knew whether or not they had actually been vaccinated. The trial was a sensation, with the first shot being given on the 26<sup>th</sup> of April 1954 to six-year-old Randy Kerr of Fairfax County, Virginia. The result concluded that the vaccine was between 60 and 80 per cent effective. Showing a cavalier attitude to accuracy, newspapers throughout the country declared 'Polio Is Conquered'. Salk became a celebrity scientist, much to the chagrin of the other members of his laboratory whom he failed to credit. Many scientists (including Morgan) contributed to the Salk's success, but their names were buried under a colossal, clinical ego.

The adulation came to an end. In the U.S. (unlike Canada), *private* drug companies manufactured and distributed the vaccine. In the spring of 1955, one of these companies – Cutter Laboratories in Berkeley, California – released six lots of the Salk anti-poliomyelitis vaccine that contained live polio virus. They had not tested their vaccine lots sufficiently: what used to take four weeks in 1954, was taking only one day in 1955. In other words, their manufacturing processes had not fully inactivated the virus. Salk had assumed that there was a linear relationship between the amount of virus that would be killed with formaldehyde and the length of time taken to treat the virus. This was mistaken. 200 people become ill with polio and eleven died. It was a disaster that is often compared with other tragedies associated with vaccines, such as the 1930 Lübeck tragedy (in which the BCG vaccine I discussed in my lecture on tuberculosis infected 173 neonates with TB and killed 72) and the vaccine against yellow fever that was administered to U.S. army troops in 1942, but which led them to contract Hepatitis B. In the case of polio, a subsequent lawsuit cleared Cutter Laboratories of negligence but made them liable for damages. This was an important legal ruling because it meant that even if a company was not 'at fault', they could still be forced to pay damages. Some commentators claim that this legal doctrine of liability without fault is at least partly responsible for the hesitancy of pharmaceutical companies to produce vaccines today.

The Cutter incident had major effects. The American Medical Association accused the National Foundation for Infantile Paralysis of chasing profits and acclaim at the expense of scientific precision. It was pointed out that too much pressure was being placed on manufacturers to distribute 'magic bullet' solutions to complex diseases. The furor also shifted attention to Sabin's research into the *live* virus vaccine. Due to the fact that tensions between the U.S. and Russia had improved with the death of Stalin in 1953, Sabin was able to collaborate with Russian scientists. Together, they vaccinated ten million Russian children, demonstrating that Sabin's vaccine was safe.

The introduction of vaccines, which was followed by a steep decline in polio infections (by 1964, the incidence of polio was below 0.1 cases per 100,000), did not benefit everyone. Polio survivors found themselves

sidelined: there were other, more exciting scientific challenges to conquer. The vaccine dramatically reduced the incidence of polio. However, they had a less positive effect for patients who had already been infected. These patients had been praised for their courage and resilience – after the successes of vaccination, they were cast aside and forgotten. As distinguished writer and polio survivor Tony Gould put it in *A Summer Plague: Polio and Its Survivors* (1995), he came from a generation of polio patients who had been ‘born too soon’. They were ‘suddenly ignored as embarrassing emblems of their own poor timing, clumsy enough to get polio before the vaccine that could have protected them was found’. Even worse, forty years after the acute poliomyelitis phase, polio sufferers who had thought that the worse effects of the virus were over, were dismayed to discover a revival of their symptoms, especially severe muscle fatigue, joint and muscle pain, cold intolerance, gastrointestinal upsets, and sleep difficulties.

So far, this talk has been a homogenizing one. But two things complicate this story. The first is the impact of racism; the second, able-ism. So many of the texts that historians use to analyze disease are raced white. Pathographies, or illness narratives that prioritize the voices of patients, are highly biased towards white, educated, and middle-class patients. Many authors were professional writers before becoming ill.

Polio survivors of colour are also less visible in the histories because they were typically cared for in general hospitals, which lacked specialist facilities and treatments – and lacked the detailed archival traces that specialist and private hospitals often possess. The much-lauded polio hospital at Warm Springs, Georgia, which was frequented by Roosevelt who invested his savings in it (famously ‘swimming his way to health’, as the *Atlanta Journal* put it in 1925), excluded African Americans from treatment. Segregation led to the establishment in 1941 of the Tuskegee Infantile Paralysis Center for African American sufferers, which also trained Black medical personnel for work in their communities. It was an outgrowth of Jim Crow, in other words. There was even the belief that Black people were immune to the disease – a useful justification for under-funding. The result was a higher mortality rate for Black sufferers of polio as John Chenault, the head of Orthopedic Surgery at Tuskegee University’s John A. Andrew Memorial Hospital and, later the Director of the hospital’s Infantile Paralysis Unit was able to demonstrate. The fact that Sabin tested his vaccines on incarcerated prisoners in Ohio also meant that he was disproportionately experimenting on people of colour.

Able-ism was also prominent. I mean this is two ways. First, humans at the bottom of the ‘ableist’ pecking order were fair game. The first person to test the live virus on humans was Hilary Koprowski at the privately funded Lederle Laboratories. His subjects were young ‘feeble-minded and epileptic’ ‘volunteers’ at Letchworth Village in New York. When Salk was given approval by the National Foundation for Infantile Paralysis in 1951 to test his vaccine on humans (up to this time, his experimental object of choice was monkeys) he turned to the residents of the D. T. Watson Home for Crippled Children and the Polk School for the Retarded and Feeble-Minded. He bypassed parental consent for the experiments (and most of the parents of the children at the Polk School had IQs under 50 anyway), by persuading the Pennsylvania state authorities that the experiments were a ‘humanitarian enterprise’.

Second, able-ism was contested by polio survivors. Speaking out against the unrealistic expectations and individualization of illness was not a new phenomenon. As we have seen, popular prejudices dictated that patients and their families had to adopt the ‘hard way’, making ‘true men’ (breadwinners) and ‘good women’ (wives and mothers) of sufferers. This was what sociologist Irving Kenneth Zola was fuming against when he noted that ‘if a Franklin Delano Roosevelt... could *overcome* handicaps so *could and should* all the disabled. And if we fail, it is our problem, our personality defect, our weakness’.

Let’s conclude: This talk started with the Great Cat Massacre of July 1916, during which 72,000 New York cats were killed as a result of a polio scare. The Great Cat Massacre fused fears of wild cats (including the leader of Cats, the ‘tailless mauve’ Wang from Formosa) with itinerants and morally suspect night-workers. The virus that caused polio devastated millions of lives, and we owe a huge debt to the scientists and other medical personnel who sought and eventually succeeded in creating a vaccine that would protect people in the future. They did so at a cost – through exploiting the vulnerabilities of children from poor homes, children and adults with learning difficulties, prisoners, and people of colour.

The fight back was slow coming, but determined, People who had been stigmatized as ‘cripples’ or ‘polios’ refused the label. Through consciousness raising and activism, they are insisting not only on their rights to accessible physical and social spaces but also on their complex humanity. In this way, polio survivors were important in the Disability and Patients’ Rights Movements, drawing inspiration *from*, and *inspiring*, LGBT activism, women’s liberation movements, student’s activism, and anti-nuclear campaigns. They started mobilizing against a world where their needs were willfully ignored or even denied: early targets were curbs, steps, and inaccessible bathrooms. Men like Ed Roberts, for example, was the first wheelchair user to attend

the University of California, Berkeley, where he lobbied for wheelchair access, counselling, and services that would enable disabled people to live in the community. He was a founder of the advocacy group, the Center for Independent Living. Disability activists resisted the assumption by people in 'normal-land' (otherwise known as TAB's or 'temporarily able bodied') for assuming that polio-survivors possessed an identity entirely fixed according to their 'impairment'. They were increasingly suspicious of the tyranny of the medical 'expert'. They contested the idea that a virus alone creates a 'disability'. Rather, scientific ideologies, public understandings, and social policy all interact with the virus to create a disease, a 'disability'.

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