



The 1917 Polio Outbreak in Montpelier, Vermont

An examination of the history of the Montpelier polio outbreak in 1917 illustrates how interpretations of the epidemic and subsequent actions reflected prevailing cultural as well as medical beliefs about this disease and how to prevent it.

By ELISHA P. RENNE

There are now 19 cases of infantile paralysis in Montpelier and it is cropping up in other towns of Washington County. All public meetings are forbidden and tomorrow for the first time in 120 years or more no religious services will be held in Montpelier.

—Dorman Kent diary, Saturday, June 30, 1917
Montpelier, Vermont

The 1917 outbreak of poliomyelitis (or infantile paralysis as it was then known) that occurred primarily in Montpelier, Vermont, led to 171 cases that year.¹ It exemplifies the beginning impact of the tremendous increase in paralytic polio cases among both children and adults in the United States in the early twentieth century. While not of the magnitude of the 1916 polio epidemic in New York City, when 8,900 cases of children and young adults with some form of paralysis were documented,² the responses in Montpelier to this mysterious

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illness—the cause and means of transmission were then unknown—provide a particularly well-documented historical example of the early use of epidemiological methods to address a public health problem. A report of the 1916–1917 polio outbreaks in Vermont was published in 1918 by Dr. Charles Caverly, the Vermont physician who served as president of the Vermont State Board of Health from 1891–1924.³ His meticulous epidemiological work provided the basis for subsequent documentation of poliomyelitis.⁴ Indeed, Vermont and Dr. Caverly have a distinctive place in the history of poliomyelitis in the United States, as the first substantial epidemic occurred in Rutland County in 1894.⁵ In the period between 1894 and 1917, Caverly continued to follow polio cases in the state, including outbreaks in 1916 in the western parts of the state bordering New York and in Montpelier in 1917.

As a result of this work, Caverly became convinced that the contagion of polio could best be contained through quarantine. On June 24, 1917, Dr. Caverly and the Vermont State Board of Health made the decision to recommend a quarantine restricting the movements of children in Montpelier, Barre, and Waitsfield in order to prevent the spread of the disease within the state.⁶ As the number of polio cases continued to increase, the board decided to take further steps to limit public gatherings, including street fairs and the popular Chautauqua meetings that took place during the summer in many Vermont communities. One response to these measures may be seen in the resulting civil suit filed by Community Chautauquas.⁷ In Montpelier, the trajectory of the outbreak was documented in quarantine notices and reports of specific polio cases that were regularly published in the *Montpelier Evening Argus*. However, it is the diary of the Montpelier insurance executive and historian, Dorman B. E. Kent (1875–1951),⁸ that provides a unique local perspective on the 1917 outbreak in the city and its environs. In his entries Kent provided descriptions of new cases and of the progression of the disease, interwoven with comments about quotidian affairs, relaying a sense of the terrifying nature of this disease, which appeared to affect children randomly, as well as its consequences for everyday activities in the city.

Kent's diary also provides another perspective on the Montpelier outbreak and the subsequent quarantine. In the United States in the late nineteenth century, public health and medical practitioners generally subscribed to the filth (or miasma) theory of disease, which stressed the importance of controlling sources of filth or pollution in the environment. According to this way of thinking, particular diseases were attributed “to one or more causal influences, of which contagion might be



Dorman B. E. Kent. Courtesy of Vermont Historical Society, Barre, Vermont.

one” among many,⁹ such as lack of proper sewage disposal and cleanliness in personal habits.¹⁰ However, this conception began to be replaced by the germ theory of disease, as postulated by Robert Koch in the late 1880s, which supported the idea that infectious diseases were caused by specific entities, germs, which, once identified, could be contained without regard to environmental, social, cultural, or political concerns. The early-twentieth-century polio outbreaks thus came at a time of a shift in scientific thinking about diseases and the appropriate means for controlling them. Yet despite the changing theoretical understanding of disease, older ideas persisted, including an association of disease with the dirt of congested cities and the living conditions of impoverished immigrants and an association of health with nature and the sparsely populated countryside. The coexistence of these seemingly contradictory ways of thinking may be seen in the epidemiological work of Charles Caverly and in the actions of Dorman Kent. For Caverly, assumptions

about immigrants and poor hygiene are evident in his research and reports. For Kent, his thinking about contagion and about the healthful effects of the open air and less-populated countryside led him to move his two sons out of Montpelier shortly before a full quarantine was implemented. The reactions of both men suggest the ways that previous ideas about dirt and disease intersected with the newer germ theory. At the time of the 1917 polio outbreak in Montpelier, these earlier ideas persisted, in part, because the basis for polio infection was only partially understood by medical researchers. Thus, an examination of the history of the Montpelier polio outbreak illustrates how interpretations of the epidemic and subsequent actions reflected prevailing cultural, as well as medical, beliefs about this disease and how to prevent it.

EARLY KNOWLEDGE OF POLIOMYELITIS IN VERMONT

At the time of the Montpelier outbreak, little was known about poliomyelitis, including what would come to be understood as its source, an enterovirus, and its mode of infection through oral-fecal transmission. As was noted by Dr. Caverly in 1918, “While epidemics of poliomyelitis are not unknown or unrecorded, recent authorities speak only vaguely of their occurrence . . . The fact that poliomyelitis may occur epidemically, suggests, of course, an infectious origin, a view of the nature of the disease which has only been recently discussed.”¹¹

Caverly’s point about vague reports of earlier outbreaks of polio reflects the endemic aspect of this disease before the twentieth century in Vermont. The poliovirus was ubiquitous in the environment and most children were exposed to it as infants, when still under partial protection of their mothers’ antibodies. Thus many children acquired “natural immunity,” with only a small fraction—one in approximately two hundred cases—having symptoms of paralysis.¹² While unknown at this time, improved sanitation—indoor plumbing, pipeborne water, and attention to cleanliness more generally—which had been effective in reducing other early childhood diseases resulting in lower infant and child mortality, actually contributed to the massive polio epidemics during the 1930s, ’40s, and ’50s in the United States. This was because children raised under these sanitary circumstances were less likely to be exposed to the poliovirus as infants and hence had not acquired natural immunity through environmental exposure.¹³ This situation was complicated by the fact that poliovirus infections later in life also predisposed older children and adults to more serious cases of the disease—which could include severe, irreversible paralysis and at times, death.¹⁴ The pattern of more severe consequences of polio in relation to age was borne out in Caverly’s data showing percentages of death from the disease during the 1917

outbreak (Table 1).¹⁵ While only 3.19% of the 94 cases of children ages 0–4 years of age died, progressively larger percentages of those in older age groups contracted fatal cases of polio, even as the number of individuals affected diminished. The small number of cases in the 20–29 age range suggests that individuals born between 1888 and 1897 had acquired natural immunity through asymptomatic cases of polio as infants. Those who had not been exposed to the poliovirus as infants—either because they were living in households with improved indoor water and sewage systems or were living in remote rural communities without recent exposure to the poliovirus—had not acquired natural immunity. Not only were they susceptible when exposed to the virus, but they also experienced more severe cases of paralytic polio and sometimes death as they aged. Increased attention to household sanitary measures in subsequent years and reduced exposure to the poliovirus as infants led to the large epidemic outbreaks of paralytic polio and polio-related deaths in the twentieth century. Indeed, as Paul has noted, “The changing age incidence was a crucial event in the history of the disease, and the secret of the shift from *endemic* to periodic *epidemic* poliomyelitis was partially contained in it [*italics in original*].”¹⁶

Following the 1894 epidemic, outbreaks occurred in different parts of the state, which were meticulously documented by Caverly. There were smaller outbreaks during the period from 1910 to 1913, when 65 cases occurred in the Northeast Kingdom, centering in Hardwick (but also with cases in Barton, Glover, and Irasburg), and with 24 cases in Rutland. Caverly noted several characteristics of these areas that he believed explained outbreaks there: “These epidemic centers are all in larger river valleys with the exception of Barton; are all on main traffic lines except possibly Hardwick, located on a cross-state railroad.”¹⁷ In other words, the disease could be transmitted by a mobile population. Yet Caverly continued to believe that “while the disease is a communicable disease, it is one of low contagiousness”¹⁸ based on evidence from families with one paralytic polio child.

Thus while Caverly considered the possibility of “an infectious origin” of polio, he did not see it as a highly contagious disease because, unknown to him and others at the time of the 1894 epidemic, a large proportion of cases were asymptomatic, with cold- or flu-like symptoms but without any signs of paralysis. In 1886 he wrote, “The element of contagion does not enter into the etiology either. I find but a single instance in which more than one member of a family had the disease, and as it usually occurred in families of more than one child, and as no efforts were made at isolation, it is very certain that it was non-contagious.”¹⁹ However, his view began to change after 1909, when Karl Landsteiner and Erwin Popper isolated the poliovirus as the cause of paralysis,²⁰ and

after Ivar Wickman's research in Sweden became known, which showed that asymptomatic and "abortive" cases²¹ contributed to the spread of the disease.²² By 1914, Caverly began collecting data on family members who showed what he referred to as "abortive" symptoms,²³ suggesting that they could have been carriers of the disease as well:

A fact observed not infrequently, especially at Barton where such cases were of frequent occurrence in conjunction with paralyzed cases, was this—in visiting and examining a paralyzed case, one or more children in the family would be noted as not acting quite well. . . . That in all the communities where this disease appeared, there was a large number of such cases of varying degrees of severity, who recovered without any noticeable paralysis, there can be no doubt. These so-called abortive cases are surely important features of all outbreaks of infantile paralysis.²⁴

While Caverly made the important observation of "abortive cases," as in any good mystery, there were also clues that were overlooked in favor of prevailing hypotheses.²⁵ In 1914, the largest and most severe epidemic occurred in the northern half of the state, starting in Barton, "where the 1913 outbreak had ended,"²⁶ and followed by a large outbreak in Burlington. Caverly noted that "towns, which have had epidemics of infantile paralysis, are thereafter largely exempt from the disease for varying lengths of time" (see Table 2 for this pattern in Washington County).²⁷ In hindsight, this situation may be attributed to the large proportion of asymptomatic cases that conferred immunity to polio to a town's population; but in the early 1900s this dynamic was still unknown, leading Caverly to refer to them as "mysterious exemptions."

Thus, precisely how the poliovirus spread and immunity was acquired remained unclear until the late 1930s, when accumulating evidence supported an oral-alimentary pathway for polio infection, rather than a nasal-olfactory one supported by researchers such as Simon Flexner of the Rockefeller Institute during the time of the Montpelier outbreak.²⁸ That it was a *lack of exposure* as infants to the poliovirus (mainly through human contact with feces-contaminated water) that led to more severe cases of polio when individuals without "natural immunity" were exposed as children and adults, countered the conflation of better health with better hygiene. As Rogers has noted, "Researchers were, not surprisingly, unwilling to believe that cleanliness itself might explain polio's epidemiological picture."²⁹

The terror inspired by this puzzling disease, in which one member of a family might be severely paralyzed while other children had only a slight fever or appeared to be perfectly well, led to quarantines and other health measures (e.g., nasal swabs) in Vermont and in the United States more generally. Even after the source and transmission of this

highly contagious disease was known, widespread epidemic outbreaks occurred in the United States, including the 1944 and 1952 epidemics in which 19,000 and 57,000 cases occurred, respectively.³⁰ These experiences have profoundly shaped the ways that Americans view polio and reinforced their pride in having supported the successful development of the Salk and Sabin vaccines, making it difficult to imagine the uncertainty and fear surrounding infantile paralysis outbreaks in early-twentieth-century Vermont.

THE OUTBREAK OF POLIO AND QUARANTINE IN MONTPELIER

Beginning in June 1917, a large polio outbreak occurred mainly in Montpelier, and in the nearby town of Barre (see Tables 2 and 3), both of which had had relatively few cases before. As in earlier outbreaks in the state, public health officials kept records on all those who had distinct symptoms of paralysis, as well as those with “abortive” symptoms. Polio victims were sorted by age, sex, type of paralysis, outcome of illness, occupation of father, nationality of parents, and number of children in the family. Statewide, 171 individuals were affected—93 males and 78 females, ranging from under 4 years to over 40 years old—with 103 cases with residual paralysis, and an estimated overall death rate of 8.77 per cent.³¹

As the number of cases increased in Montpelier, the city council took measures to establish a quarantine that restricted the movements of children under sixteen years of age and prohibited them from attending all places of public gatherings such as theaters, schools, ball games, and churches.³² However, with more cases being identified daily, the local board of health and Montpelier City Council decided to extend the quarantine by restricting the movement of children beyond their homes (see Dorman Kent’s diary entry for June 28, 1917).³³ In addition to keeping their children at home, parents were advised to disinfect their children by washing their noses, throats, and mouths with a saline solution to prevent the spread of the disease.³⁴ This recommendation reflects the belief at the time that polio was spread through nasal mucous transmission rather than by oral-fecal routes, which were eventually shown to be the case.

The trajectory of the outbreak in Montpelier, beginning on June 20, 1917, and ending in late August, is dramatically documented in Dorman Kent’s matter-of-fact diary entries for the period,³⁵ as the following selection of entries suggest:

Wednesday, June 20, 1917: “Infantile paralysis broke out in town today. One case on Corse Hill, one on Elm St & a suspected case at Rob Blissess.”

Thursday, June 28, 1917

all day in the office on the policy holders
July service work. I don't believe I get is
much of a going to run such a job. I'm
rattle brained. Met Agnes at 4.30 & we
came home. After supper I went to the Elks
a few minutes & at 7.30 went to the City
meeting. Only about 60 present.

De Witt proposed an extra tax of 15 cts & of
course George Blanchard opposed as usual.
He wanted to rob the sinking fund & accused
the Council of foolishness & waste (indirectly).
I asked him why he wouldn't put his
shoulder to the wheel & take office.

The meeting adjourned at 8.30 & May & Mitchell
George Almon & I went to Base & back.
Gone but an hour.

Tomorrow the town goes on a strict
quarantine as far as public meetings of every
kind is concerned & no children will be
allowed in the streets.

Mr De Boer was married today in
Albany New York.

Saturday, June 23, 1917: "The McKee child on First Ave came down with infantile paralysis today making five cases in the town thus far. People are rightly alarmed."

Tuesday, June 26, 1917: "More new cases of infantile paralysis again today. Some are very very ill."

Thursday, June 28, 1917: "Tomorrow the town goes on a strict quarantine as far as public meetings of every sort is concerned & no children will be allowed in the streets."

Saturday, June 30, 1917: "There are now 19 cases of infantile paralysis in Montpelier and it is cropping out in the other towns of Washington County."

Monday, July 2, 1917: "Found this morning that seven new cases of infantile had appeared yesterday making a total now of twenty six."

Wednesday, July 4, 1917: "Two more cases in town today. The boy of Will Theriault & a daughter of Charlie Booth in the Meadows."

Friday, July 6, 1917: "Geo Hunts child came down with the disease today. Newsboys forbidden to deliver any more papers today so did not get our Argus tonight."

Saturday, July 7, 1917: "Will Theriault's boy died of infantile paralysis this morning making two deaths thus far. No child under 14 now can leave the town or even its door yard." [See Table 4.]

It was not until August 8th that children who had remained in the town were allowed to move about Montpelier freely, although they were not allowed to leave the town until the full quarantine was lifted in late September, as Kent noted, Saturday, September 22, 1917: "The quarantine of children was fully lifted tonight at 6:00 P.M. Been on since about June 30. No new cases of polio in town for over a month."

RESPONSES TO THE QUARANTINE

The responses of parents to the Montpelier quarantine varied. Some parents and children remained and observed the quarantine. Others who could afford it left or sent their children to stay outside the city until the outbreak subsided, even though parents were discouraged from sending their children away from the city to avoid catching the disease. The local newspaper reported that:

All members of the [health] board were agreed in their severe criticism of families who are taking their children out of the city, some to places where the physician has had no experience with the disease . . . Dr. Lindsay said he expected some of the health officers will send some of the children back home.³⁶

Nonetheless, this criticism did not outweigh the fears of some Montpelier parents who proceeded to make arrangements for their children to stay outside the city for, as Dorman Kent noted on Wednesday, June 27, 1917, “Hundreds of children have left town & are leaving.”

This strategy to protect their children from disease reflected ideas about the wholesome, healthful qualities of nature, along with fear of contagion associated with the city.³⁷ Dorman Kent and his wife, Agnes, made arrangements for their two sons to stay with the Lyford family on the Middlesex Center Road (west of Montpelier) and moved them there on June 27, immediately before the full quarantine went into effect. Kent wrote in his diary:

Worked on policy holders campaign job. When I got home at noon, I called up Minnie Lyford and made arrangements to send the boys to their house for the summer. Went back to the office and at 3:30 got a team at Kent and Smiths stable. Agnes took the boys and carried them to Lyfords on the Middlesex Center road. . . .

I took the horses back to the stable, telephoned the boys from the Apollo Club & came home. Did not go out in evening.³⁸

The Kents regularly visited their sons on Sundays—although they kept their distance for fear of contagion—until they were forced to find another place for them in early July, this time near Calais, the Kent family’s home town:

Found the Lyfords could not keep them another night so I got a car . . . and went to Lyfords and got them. Took them through Putville [Putnamville] & Worcester to Wheelers. Found Julius at home & we waited for Mary to come home from Maple Corner. They said they would take them gladly. . . . The boys look fine & feel fine. Pray to God they’ll keep so.³⁹

It was almost another month, on August 7, 1917, before the local board of health in Montpelier recommended that the full quarantine be lifted the following day, allowing churches and movie houses to reopen.⁴⁰ While children were not allowed to attend, Kent noted that they “were however today released from their front lawns & great was the rejoicing,”⁴¹ which was reported in the *Montpelier Evening Argus*:

Yesterday was a great day for youths of 14 years and younger. They were out of quarantine, and they celebrated the event by coming down town in such numbers that it looked as if they all had come back from their vacation. At the same time it seemed like a reunion. There appeared to be a wireless telepathy that informed them that the quarantine was off. . . . It must be said of the parents of Montpelier children that they did splendidly. Only, occasionally, were there any complaints. Considering the fact there are a couple of thousand children in Montpelier the task of keeping them within ear shot of the kitchen door was by no means a small task.⁴²

While Dorman Kent may not have been opposed to quarantine measures in theory, in practice he and his wife decided to keep their sons outside of the city during the height of the epidemic, thus “voting with their feet” against the quarantine ruling that was about to be imposed.⁴³ In his diary entries for July 1917, Kent makes frequent references to his sons’ outdoor activities and good health, which seemed to reinforce the wisdom of his decision. However, in an entry dated August 12, he wrote that while he hoped to have his sons stay another week, he “learned. . . that they have infantile [paralysis] at Clyde Fitch’s [in Calais] so I don’t know what to do about the boys staying longer in Calais.”⁴⁴ That children residing in an idyllic countryside could contract polio there, along with the ending of the full quarantine and declining polio cases in Montpelier, convinced the Kents to bring their sons home. Agnes Kent brought their sons back to Montpelier on August 13, 1917, with Dorman Kent noting that, “The boys have been gone 7 weeks come Wednesday.”⁴⁵

A little over a month later, with, as Kent noted in his diary, “no new cases of polio in town for over a month,” a short notice appeared in the *Montpelier Evening Argus* announcing that, “Quarantine regulations, now in force, because of infantile paralysis are hereby declared released at 6 o’clock tonight, Saturday, September 22nd, 1917. W. LINDSAY, Health Officer.”⁴⁶ Thereafter children and their families could freely move within the town and out of it.

QUARANTINE CRITICS

In an article published on August 9, the *Montpelier Evening Argus* reporter mentioned that “Only, occasionally, were there any complaints” about the 1917 polio quarantine, although the content of these complaints is not specified. For parents with children who had no symptoms of the disease, quarantine measures restricting them to their homes during the entire month of July must have been difficult to maintain. Despite health officials’ praise for the many Montpelier parents who did cooperate with the quarantine, some people criticized this action. Some, particularly medical professionals, viewed quarantines such as those used by health departments in Montpelier and Barre—which did not focus on a specific germ and its transmission—as outdated practices, as Naomi Rogers notes in her study of polio in the early twentieth century:

The strict quarantine and sanitation measures extolled by health officials as part of their anti-polio campaigns were seen by some observers to cross the line from germ theory to the filth theory. . . . Similarly, a New Hampshire physician criticized “backward” city health

224
 Sunday, Aug. 12, 1917

Up at 6.00 Had breakfast & after doing morning chores, went to State house with mail. At 7.15 left alone for Colais. Went up North street. The first time I have been that way for years. Stopped at Simon Wheelers a minute & then drove on to Maple Corner. Left home with the intention of bringing the boys home but made arrangements at Will Foster's to keep them a week. Went on to Julius Wheelers. Fed team, took several pictures for the boys & had lunch. At 1.15 left there & took boys to Maple Corner. Then drove through Kent's Corner down the County road, over by the Arthur Bliss place out at about school house, then by Cecil Tucker & stopped at the place where Agnes & I found the raspberries so thick last summer. Hitched team in barn & was nearly an hour picking 1 quart. Left trees at 4.30 & drove home by Fairham place. Beautiful drive & perfect day. Had supper at 6.45. Paid Wheelers \$30.00 today it being the balance of the board owing them. They see of my camping this week but will take the boys again when they return. Learned this evening however from Bennett that they have infantile at Clyde Fitch's so I don't know what to do about the boys staying longer in Colais. Mrs Herbert & Chapman died today in Springfield Mass. They used to live on Liberty St.

Commenced raising mowing machine

Page from diary of Dorman Kent, dated August 12, 1917. Courtesy of Vermont Historical Society, Barre, Vermont.

departments, whose efforts, he believed, were guided not by calm scientific leadership but fearful physicians and members of the public in “bondage to the superstition and discarded theories of a prescientific age.”⁴⁷

While Charles Caverly in his position as president of the Vermont State Board of Health supported quarantine measures, some health officials in Vermont were opposed to the full quarantine eventually imposed; but they were overridden by city council members who in turn were under pressure from an anxious public to do something to control the spread of the disease, as was reported in the *Montpelier Evening Argus*:

The members of the city council expressed themselves freely in favor of general closing while Dr. William Lindsay took the position that the move was too drastic at this time and was backed up by the recommendation of Dr. Dalton that the matter is well enough in hand, and that it seemed unnecessary to take so drastic a step at this period. . . . The public was strongly in favor of the greatest possible precaution.⁴⁸

From Caverly’s perspective and based on epidemiological evidence, the “germ” or virus that caused polio paralysis was spread—somehow—from person to person. Thus the quarantine of those with paralysis as well as children living in the immediate vicinity made sense, and he commended the strictly worded measures implemented by the Barre City Department of Health as responsible for limiting the number of polio cases in the town, noting that “Barre City’s comparative exemption from the disease [prior to July 1917] is undoubtedly largely due to the stringent measures adopted by the local board.”⁴⁹

In addition to his support for quarantine measures meant to restrict contagion but without a clear sense of how the poliovirus was transmitted, two aspects of Caverly’s report on the Montpelier outbreak reflected contemporary thinking about “dirt and disease” in general and polio in particular. First, in noting that 38 out of the 171 cases of polio in 1917 occurred in stone-working families,⁵⁰ he made an indirect reference to the Hardwick outbreak of 1913 and an explicit connection between the sanitary habits of these families (many of whom were Italian immigrants⁵¹) and disease: “The Hardwick outbreak . . ., after the experiences of these other stone-working towns, is noteworthy. The connection, of course, may be sought in local sanitary defects, or habits of the men who are engaged in stone working, rather than in anything inherent to the work itself.”⁵² Second, during the 1914 polio outbreak in Burlington, while Caverly assumed that cases would be found in the more unsanitary areas of the city, he observed that while three-fourths of the cases occurred in one district, “most of the cases in this section *did not* occur in the worst portion of this section [italics in original].”⁵³ Thus,

while the evidence suggested that cases of infantile paralysis occurred in areas of the city with better sanitation, his views on the relationship of disease with crowding, filth, and slums made it difficult for him, as well as others, to conceive of a connection of cases of polio with cleanliness.

CONCLUSION

In 1917, uncertainty about how polio was transmitted led to various measures including quarantines of houses and communities, as well as treatments such as nasal and throat swabs with saline solution. Physicians such as Charles Caverly, who took up the new health paradigm represented by Koch's germ theory and the epidemiological tracking of individual cases of disease, nonetheless exemplified the transitional nature of this period, retaining to some extent earlier thinking about connections between dirt and disease. In a related way, the period of the Montpelier polio outbreak was also transitional in terms of the practice of public health in Vermont. With the shift toward a focus on specific agents for the spread of disease—germs—and the development of a methodology for tracking the spread of disease—epidemiology—Vermont State Department of Health officials who had initially served in an advisory role sought a more active, regulatory position for the department and for public health care in the state. Caverly's investigation of the first major polio outbreak in Vermont in the Rutland area in 1894 strengthened his claim that new and more rigorous public health measures needed to be instituted.⁵⁴ His subsequent leadership role in the Vermont State Department of Health, his epidemiological work on the continuing polio outbreaks in the state, and his support for the establishment of rehabilitation programs and clinics for those affected by polio, as well as isolation hospitals for the better treatment of those with infectious diseases,⁵⁵ reflected his role in promoting the "new public health" in Vermont.⁵⁶

Yet the actions of parents suggest a certain lack of unanimity in this way of thinking, not only about disease transmission but also about the role of the state in matters of public health. While Caverly supported quarantine measures as the best way to stop the spread of polio in Vermont communities, parents' fears of contagion and uncertainty about the causes of infantile paralysis led some to counter public health directives. Thus, during the 1917 polio outbreak in Montpelier, some parents, such as the Kents, sent their children out of urban centers to areas where they believed their children would be safest from the disease. In this case, it was not an example of public health officials encountering resistance from working-class and/or immigrant parents.⁵⁷ Rather, it came from other educated professionals who believed that their own

judgment about the best means for protecting the health of their families was reinforced by public health physicians' inability to explain how polio was transmitted and how to prevent it. This dynamic may be seen in present-day anti-vaccination websites where parents discuss their fears of excessive vaccination undermining their children's immune systems and links of vaccines with autism,⁵⁸ leading some parents to refuse having their children vaccinated. The tension over whose judgment should prevail in matters of public and individual health with regard to vaccines and immunization continues to be a matter of public concern.⁵⁹

TABLE 1 Percentage of Deaths by Age Range, 1917 Polio Outbreak, Vermont¹

<i>Age Range</i>	<i>No. of Cases</i>	<i>No. of Deaths</i>	<i>% Cases Ending in Death</i>
0–4	94	3	3.19
5–9	47	7	14.9 ²
10–19	23	6	26.1 ²
20–29	5	2	40
Total	169 ²	18 ³	

¹Caverly, *Infantile Paralysis*, 165.

²Total cases for 1917 was 171; two cases not shown include one case aged 30–39 and one case aged 40+. For the age ranges 5–9 and 10–19 respectively, the percentages given for cases ending in death were 15.3% and 26.8% in the original table.

³Caverly noted that at least one and possibly two other deaths attributed to polio may have had other causes such as bronchial pneumonia (*Infantile Paralysis*, 165).

TABLE 2 1917 Polio Outbreak, Vermont: Cases by County and Month for the Eastern Side of the State¹

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sept</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Total</i>
Caledonia									1				1
Essex													0
Orange						1	1		2				4
Orleans									1	1			2
Washington			6 ²			44	32	35	15	5			137 ³
Windham								2					2
Windsor							2	3	8				13
Total	0	0	6	0	0	45	35	40	27	6	0	0	159

¹Caverly, *Infantile Paralysis*, 173. Only twelve cases were identified in the western side of the state in 1917.

²All six cases from Waterbury (Caverly, *Infantile Paralysis*, 170).

³Montpelier City ($n = 54$), Barre City ($n = 22$), and Barre Town ($n = 16$ cases) accounted for the majority ($n = 92$) of the 137 cases in Washington County.

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TABLE 3 Cases of Poliomyelitis, 1910–1917, in Washington County and the State of Vermont¹

<i>Year</i>	<i>Washington County</i>	<i>State of Vermont</i>
1910	12	69
1911	1	27
1912	1	12
1913	0	47
1914	25	304
1915	1	44
1916	1	64
1917	137	171

¹Caverly, *Infantile Paralysis*, 172.

TABLE 4 Deaths Attributed to Poliomyelitis, 1917, in Vermont by Town, County¹

<i>Town (County)</i>	<i>Population</i>	<i>No. of deaths</i>
Barre Town (Washington)	4,194	1
City of Barre (Washington)	10,734	8
Barton (Orleans)	3,346	1
Duxbury (Washington)	648	2
Enosburgh (Franklin)	2,212	1
Montpelier (Washington)	7,856	2
Moretown (Washington)	886	1
Stowe (Lamoille)	1,991	1
Waterbury (Washington)	3,273	3
Total	—	20 ²

¹State Board of Health, State of Vermont, *Twenty-First Report of the State Board of Health of the State of Vermont, from January 1, 1916, to December 31, 1917* (Rutland, Vt.: Tuttle Company, 1918).

²This discrepancy in total number of deaths (see Table 1) may be due to an error in the published table or to the ambiguity surrounding the cause of death associated with poliomyelitis.

NOTES

I would like to thank librarians of the Vermont Historical Society—Marjorie Strong, for her help with accessing the Dorman Kent diary, and Paul Carnahan, who kindly provided the photograph of Dorman Kent—and librarians at the University of Michigan for microfilm assistance. I am also grateful to the anonymous reviewers whose thoughtful comments greatly improved this work.

¹Charles S. Caverly, *Infantile Paralysis in Vermont, 1894–1922* (Burlington, Vt.: State Department of Public Health, 1924), 164.

²Naomi Rogers, *Dirt and Disease: Polio before FDR* (New Brunswick, N.J.: Rutgers University Press, 1992), 11.

³The report was first published in *Bulletin of the Vermont State Board of Health*, 19 (September 1918).

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⁴Rogers, *Dirt and Disease*, 141.

⁵Caverly, *Infantile Paralysis*, 15–20; John Paul, *History of Poliomyelitis* (New Haven, Ct.: Yale University Press, 1971), 79–87. According to Paul, “The Vermont epidemic turned out to be by far the largest one (132 cases on the final count) that had ever been reported in one year anywhere in the world. And, as far as can be ascertained, it was the first epidemic to be studied by a full-time local public health official,” 80.

⁶Caverly, *Infantile Paralysis*, 175. Quarantine restrictions were put in place in these three places as by late June 1917, the majority of the 50 cases of paralytic polio in Washington County occurred in Montpelier, Barre Town, and Waitsfield. While there had been six cases of paralysis in early March in Waterbury, a main transportation node in the area, and while Caverly suspected that there had been “some connection between the March cases in the town of Waterbury and the later severe outbreak in Barre Town, Waitsfield, and Montpelier” (Caverly, *Infantile Paralysis*, 169), at the time these quarantine orders were put in place there had been no further cases in Waterbury. An additional 87 cases occurred in Washington County in July through October 1917 (see Table 2).

Waitsfield, unlike Montpelier and Barre Town, was a small rural community and was not a large transportation node, although it was connected by road to Waterbury (by present-day Highway 100) and to Montpelier (via Moretown and Berlin by present-day Moretown Mountain Road and Highway 12). In 1917, Caverly noted a large number of cases relative to population in Waitsfield, which “had the most cases per capita of population of any other town” (*Infantile Paralysis*, 171), although he was unable to offer an explanation of why towns between Waitsfield and Montpelier (i.e., Berlin, Northfield, and Moretown) had relatively few cases. In hindsight, it is likely that Waitsfield’s relative isolation had resulted in many individuals—infants, children, and adults—without antibodies acquired from asymptomatic cases of polio. An asymptomatic child visiting the Waitsfield area or a Waitsfield farmer visiting the capital and who was exposed to the poliovirus could thus have spread the disease to this susceptible community.

⁷Caverly, *Infantile Paralysis*, 176–182; Montpelier *Evening Argus*, 24 July 1917; *Community Chautauquas, Inc. v. Caverly et al.*, District Court D, Vermont, 244 F. 893; 1917 U.S. District, LEXIS 1099. The quarantine was opposed by Community Chautauquas, Inc., groups that organized fairs, plays, and other educational public events in Vermont communities in the early twentieth century. Chautauqua representatives took Dr. Caverly, as president of the Vermont State Board of Health, to district court, asking that a restraining order against the quarantine be upheld. The court ruled against them.

⁸W. R. Cutter, ed., *New England Families*, vol. 4 (New York: Lewis Historical Publishing Co., 1950): 1950.

⁹Stephen Kunitz, “Explanations and Ideologies of Mortality Patterns,” *Population and Development Review* 13 (September 1987): 380.

¹⁰Thus, disease outbreaks among immigrant ethnic groups were often attributed to unclean, foreign habits. See Rogers, *Dirt and Disease*, 148; Alan M. Kraut, *Silent Travelers: Germs, Genes, and the “Immigrant Menace”* (New York: Basic Books, 1994), 108–111. For a more recent example of this type of thinking, see Charles Briggs and Clara Mantini-Briggs, *Stories in the Time of Cholera* (Berkeley: University of California Press, 2003).

¹¹Caverly, *Infantile Paralysis*, 28.

¹²Centers for Disease Control, “What is Polio?” Global Polio Eradication Initiative. <http://www.polioeradication.org/disease.asp> (accessed 25 August 2009).

¹³Paul, *History of Poliomyelitis*, 358. In the 1930s, a test was developed that showed immunity to poliomyelitis according to age by measuring antibodies in blood serum. In a study conducted in Baltimore in 1941, Thomas Turner and colleagues found that in the Eastern Health District, a poorer section of the city, polio antibody levels in blood serum increased with age after the initial protection from maternal antibodies wore off. See T. Turner, L. Young, and E. Maxwell, “Mouse-adapted Lansing Strain of Poliomyelitis Virus: Neutralizing Antibodies in Serum of Healthy Children,” *American Journal of Hygiene* 42 (September 1945): 121. This pattern was repeated in studies carried out in other parts of the world with inadequate environmental hygiene, such as Cairo, Egypt, which resulted in widespread “natural immunity.” See J. Paul, J. Melnick, V. Barnett, and N. Goldblum, “A Survey of Neutralizing Anti-bodies to Poliomyelitis Virus in Cairo, Egypt,” *American Journal of Hygiene* 55 (1952): 402–413. With improved public environmental and personal hygiene by 1900 in the United States, exposure to the poliovirus and the subsequent development of antibodies came at a later age. In the pre-polio vaccination era (before 1955), older children without antibodies were more likely to experience paralytic rather than asymptomatic cases of polio, as the severity of symptoms increased with age.

¹⁴Paul, *History of Poliomyelitis*, 365.

¹⁵Caverly, *Infantile Paralysis*, 165.

¹⁶Paul, *History of Poliomyelitis*, 84.

¹⁷Caverly, *Infantile Paralysis*, 91.

¹⁸ Ibid., 166.

¹⁹ Ibid., 28.

²⁰ Paul, *History of Poliomyelitis*, 98.

²¹ Abortive cases have been described as ranging from “illness in which a stiff neck and pain and stiffness in the back were evident to one[s] in which the only manifestation was fever lasting from one to five days”; Paul, *History of Poliomyelitis*, 91.

²² Ibid., 91. Paul provides an excellent, detailed discussion of the early research on poliomyelitis which sometimes reads like a mystery thriller. It also provides several cautionary tales about medical research.

²³ Caverly, *Infantile Paralysis*, 99–100.

²⁴ Ibid., 104.

²⁵ Along with the distinctive age pattern in severity of polio symptoms, there were other early clues to explain the transmission of the poliovirus. In the 1911 outbreak, physicians’ comments indicated that “several of the cases, as is usual under these circumstances, had been accustomed ‘to go in swimming’ during the hot weather;” Caverly, *Infantile Paralysis*, 63.

²⁶ Ibid., 111.

²⁷ Ibid., 115.

²⁸ Paul, *History of Poliomyelitis*, 243, 250. Dr. Simon Flexner, the director of the Rockefeller Institute of Medical Research, believed that the route of polio transmission was through the nose. He consequently recommended the use of nasal swabs to disinfect the nasal passageways to prevent the spread of the disease.

²⁹ Rogers, *Dirt and Disease*, 161.

³⁰ David Oshinsky, *Polio: An American Story* (Oxford: Oxford University Press, 2005), 69, 161.

³¹ Caverly, *Infantile Paralysis*, 165.

³² *Montpelier Evening Argus*, 25 June 1917.

³³ Ibid., 28 June 1917.

³⁴ Ibid., 25 June 1917.

³⁵ Dorman B. E. Kent, *Diary*. Vermont Historical Society, Barre, Vermont.

³⁶ *Montpelier Evening Argus*, 28 June 1917.

³⁷ During the polio epidemic in New York City in the summer of 1916, more affluent families moved out of the city to rural areas to avoid the disease (Rogers, *Dirt and Disease*, 34). Consequently, in July 1916, the Vermont State Board of Health adopted a quarantine specific to children from New York City. The quarantine stated, among other requirements, that any child under 15 years of age residing within Vermont for more than 24 hours be reported to local health officers (Caverly, *Infantile Paralysis*, 157–159). Nonetheless, the movements of some individuals (probably those with asymptomatic cases) contributed to the spread of polio in parts of Vermont bordering New York State in 1916 (Caverly, *Infantile Paralysis*, 154).

³⁸ Kent, *Diary*, 27 June 1917.

³⁹ Ibid., 6 July 1917.

⁴⁰ *Montpelier Evening Argus*, 7 Aug 1917.

⁴¹ Kent, *Diary*, 8 August 1917.

⁴² *Montpelier Evening Argus*, 9 August 1917. In this news story and in the Kent diary entry of July 7, 1917, the writers note that the quarantine affected children who were fourteen years of age or younger, whereas the *Montpelier Evening Argus* story of June 25, 1917, reported that the Montpelier City Council voted to quarantine children under sixteen years of age. While the June 25, 1917, story appears to be correct, this discrepancy may have been the result of some people remembering the Vermont State Board of Health quarantine of New York City children under fifteen years of age, issued in July 1916 (see note 37).

⁴³ Marc Shell, *Polio and Its Aftermath* (Cambridge, Ma.: Harvard University Press, 2005), 39. Shell described a similar side-stepping of public health rules, as in Québec in 1953, when his parents were legally obligated to hospitalize their polio-afflicted son but did not, keeping him at home.

⁴⁴ Kent, *Diary*, 12 August 1917.

⁴⁵ Ibid., 13 August 1917.

⁴⁶ *Montpelier Evening Argus*, 22 September 1917.

⁴⁷ Rogers, *Dirt and Disease*, 157.

⁴⁸ *Montpelier Evening Argus*, 28 June 1917.

⁴⁹ Caverly, *Infantile Paralysis*, 185, 187.

⁵⁰ Ibid., 168.

⁵¹ Patrizia Audenino, “The Paths of the Trade: Stone Masons in the U.S.,” *International Migration Review* 20 (Winter 1986): 783. Italian stonecutters, such as those from Valle Cervo in the northern Italian Piedmont region, first moved to Vermont beginning around 1870. The “massive inflow of northern Italians” to quarry towns such as Barre occurred in the late 1890s, see Richard Hathaway, “The Granite Workers of Barre, 1880–1940,” in *We Vermonters: Perspectives on the Past*, eds.

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Michael Sherman and Jennie Versteeg (Barre: Vermont Historical Society, 1992), 229. This influx of northern Italian stonecutters coincided with growing numbers of outbreaks of poliomyelitis in Vermont.

⁵² Caverly, *Infantile Paralysis*, 87.

⁵³ *Ibid.*, 127.

⁵⁴ Marilyn S. Blackwell, "The Politics of Public Health: Medical Inspection and School Nursing in Vermont, 1910–1923," *Vermont History* 68 (Winter/Spring 2000): 61.

⁵⁵ Charles Caverly, "The Needy Child—From the Viewpoint of the State Board of Health," *Proceedings of the Second Annual Vermont Conference of Charities & Correction* (24 January 1917), 24.

⁵⁶ Blackwell, "Politics of Public Health," 60; Paul, *History of Poliomyelitis*, 87.

⁵⁷ Kraut, *Silent Travelers*, 112.

⁵⁸ Robert Wolfe, Lisa Sharp, and Martin Lipsky, "Content and Design Attributes of Antivaccination Web Sites," *Journal of the American Medical Association* (June 2002).

⁵⁹ Paul Offit, *Autism's False Prophets* (New York: Columbia University Press, 2010).