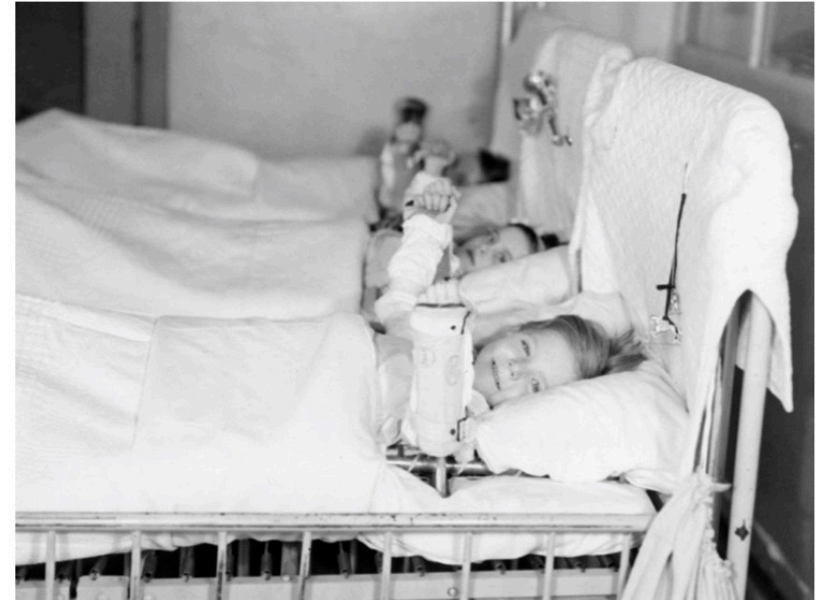


Paralytic Perspectives: Canada, The Polio Years & COVID-19 Connections

By Christopher J. Ruty, Ph.D.
Professional Medical/Public Health Historian
Health Heritage Research Services
<http://healthheritageresearch.com>
& Adjunct Professor,
Dalla Lana School of Public Health,
University of Toronto
CHS Bold Ideas Colloquium Series,
University of Manitoba
Via ZOOM, February 24, 2021

Survivors who missed out on polio vaccine hope for breakthrough against COVID-19



Young girls are shown in the Polio girls' ward at Sick Kids Hospital in a 1937 handout photo in Toronto. The mystery illness that paralyzed and killed mostly children across Canada came in waves that built for nearly four decades before a vaccine introduced in 1955 put an end to the suffering. That was too late for 14-year-old Miki Boleen who contracted polio for a second time in 1953, perplexing doctors who believed "the crippler" could not strike the same patient twice. Boleen, now 80, is hoping for a vaccine for COVID-19 as she reflects on the fear that spread with outbreaks of polio. *HO / THE CANADIAN PRESS*



Linking the Polio Years to COVID-19 Pandemic & Beyond

- As the COVID-19 pandemic has grown and evolved over the past year, I've been asked by various media organizations to provide some historical perspectives
- Initial interest in comparing the great 1918 "Spanish" influenza pandemic with COVID-19
- But the closer comparison is with the polio epidemic years of the 1910s through 1950s, particularly in Canada

- There are also close echoes between the polio vaccine development story and the urgent efforts to develop, produce and distribute COVID-19 vaccines

CORONAVIRUS | News

Looking back at Canada's polio epidemic through a COVID-19 lens

Alexandra Mae Jones CTVNews.ca writer
@AlexandraMaeJ | Contact

Published Friday, April 17, 2020 10:12PM EDT



Preparing poliovirus fluids in "Medium 199," Connaught Laboratories, 1953-54. (Sanofi Pasteur Canada / Museum of Healthcare)

SHARE  2K |  |  |  | 

TORONTO -- As COVID-19 spreads across the world, causing shutdowns, economic strife and widespread fear, many are looking back at how Canada handled a similar crisis: waves of polio outbreaks that peaked in the mid-20th century.

Although polio is significantly different from the novel coronavirus, some of the similarities between the two outbreaks, especially when looking at the height of the polio issue in Canada, are striking.

Polio was thought to only affect a specific age group at first, but then spread to infect patients of all ages.

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LIVE COVERAGE



WATCH LIVE UPDATES

COMING UP on July 22

11:30 a.m. ET: Ont. NDP Leader Horwath speaks

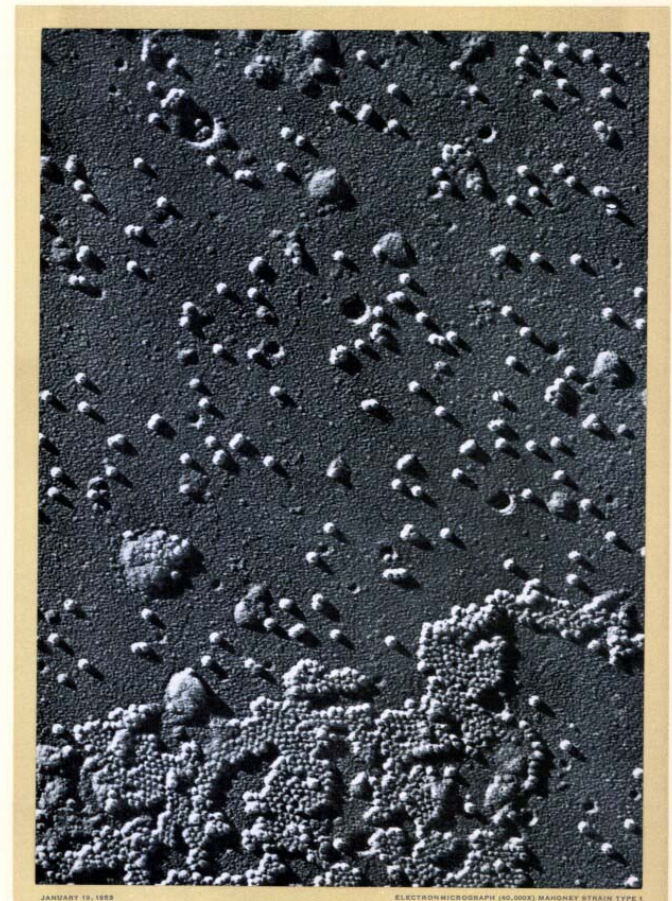
2:00 p.m. ET: Toronto health officials give COVID-19 update

3:30 p.m. ET: B.C. announces new child care spaces

CTV News' 24-hour news channels, CTV News Channel and CP24, are now available for a limited time through participating TV service providers. CTV News is also making our live local newscasts widely available online for a limited time.

Polio: “The Middle-Class Plague”

- Polio caused by one of the smallest known viruses that can damage the motor-neurons in the spinal cord, leading to muscle weakness or paralysis
- No two cases of paralytic polio alike; virus could cause weakness/ paralysis of a finger, to a leg, arms, or chest muscles (requiring an “iron lung”)
- **Polio’s clinical variability a common feature with COVID-19**
- Prior to late 19th century the poliovirus was endemic, primarily spreading orally and infecting almost all very young children with a harmless & immunizing gastrointestinal ‘flu-like illness



JANUARY 19, 1955
PARKE-DAVIS VIRUS LABORATORIES
The First Visualization of Polio Virus

Sanofi Pasteur Canada Archives

Polio: “The Middle-Class Plague”

- As public health/ hygiene standards improved, exposure to the poliovirus became increasingly delayed and less universal, or endemic
- Over time, more children, and increasingly older age groups, thus grew vulnerable to paralytic infection if the virus was able to invade the nervous system; “infantile paralysis” common name of disease
- Polio outbreaks and epidemics increased until polio vaccines were available; the middle class was particularly vulnerable



Fig. 4. Spinal Curvature, due to Paralysis of Trunk Muscles.

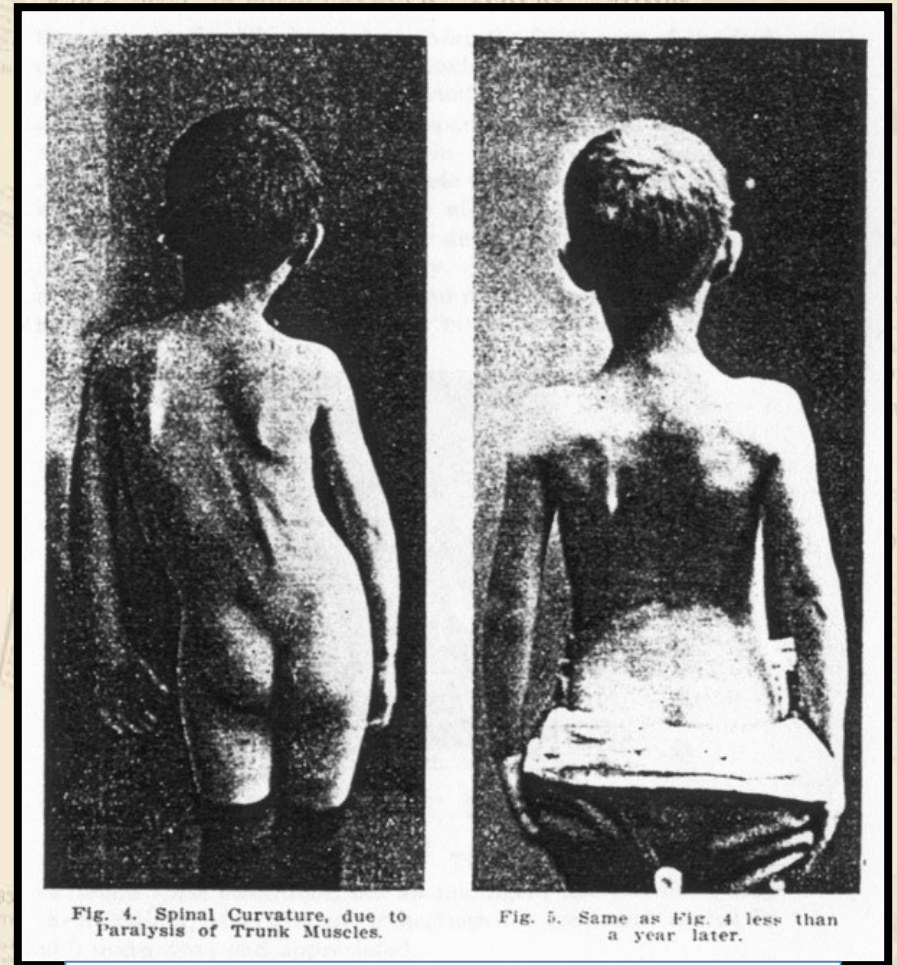


Fig. 5. Same as Fig. 4 less than a year later.

Canadian Journal of Medicine & Surgery, Jan 1911, p. 9

Polio: “The Middle-Class Plague”

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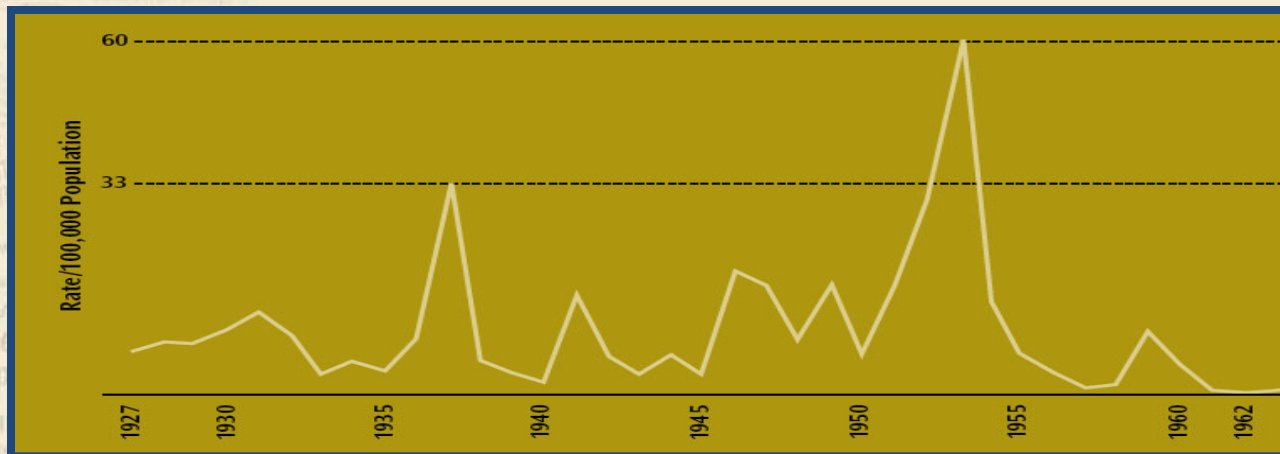


Canadian Journal of Medicine & Surgery, Jan 1911, p. 9

- The global experience with the COVID-19 pandemic over the past year echoes a variety of the public health and clinical challenges of polio that unfolded, particularly in Canada, over some 50 years of worsening epidemics

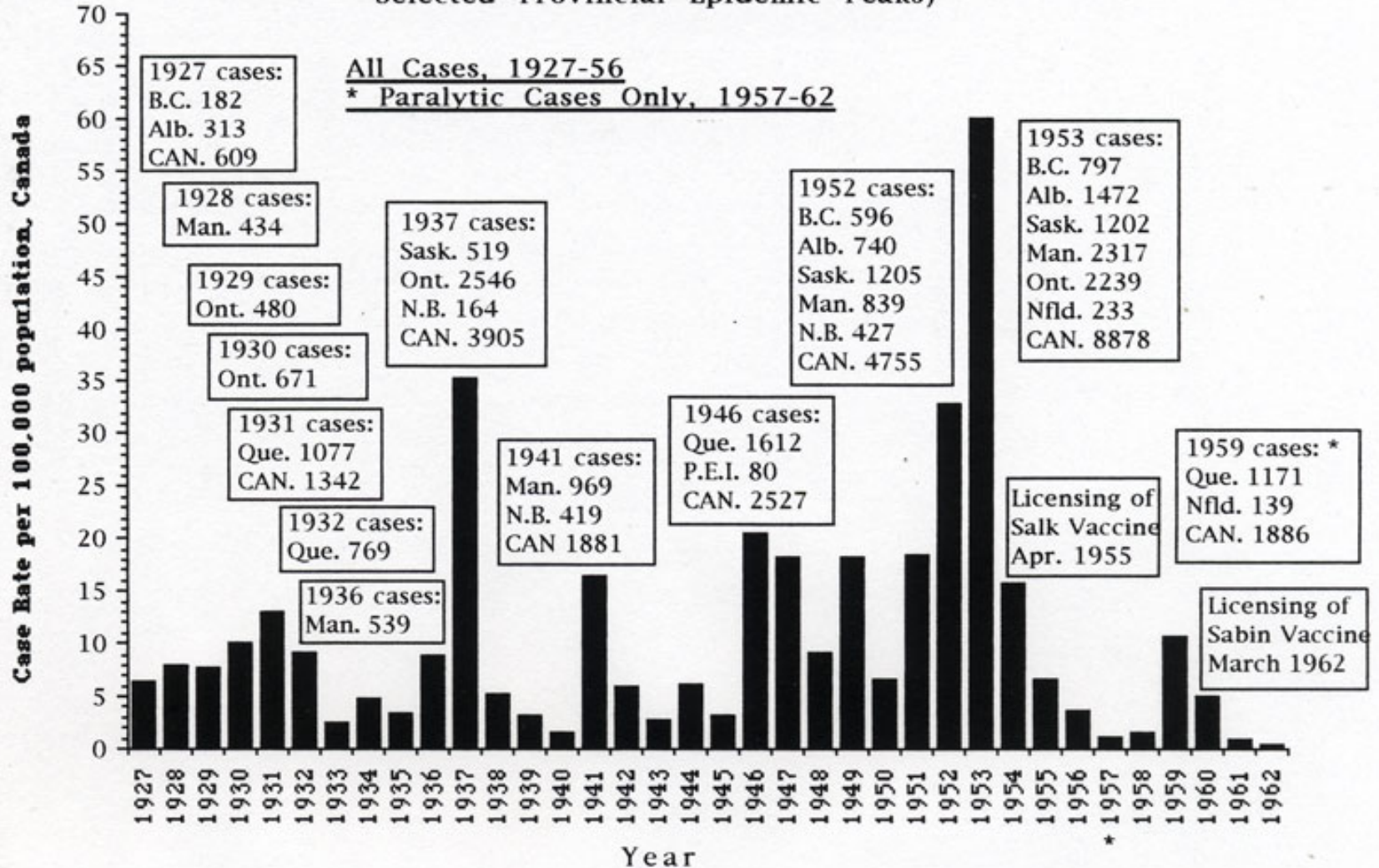
Polio: “The Middle-Class Plague”

- Canada was among the nations hardest hit by major polio epidemics
- Some 50,000 Canadians, mostly children, were affected by paralytic polio between 1927 and 1962
- Canada suffered through 4 major epidemic waves which resulted in 4,000 deaths



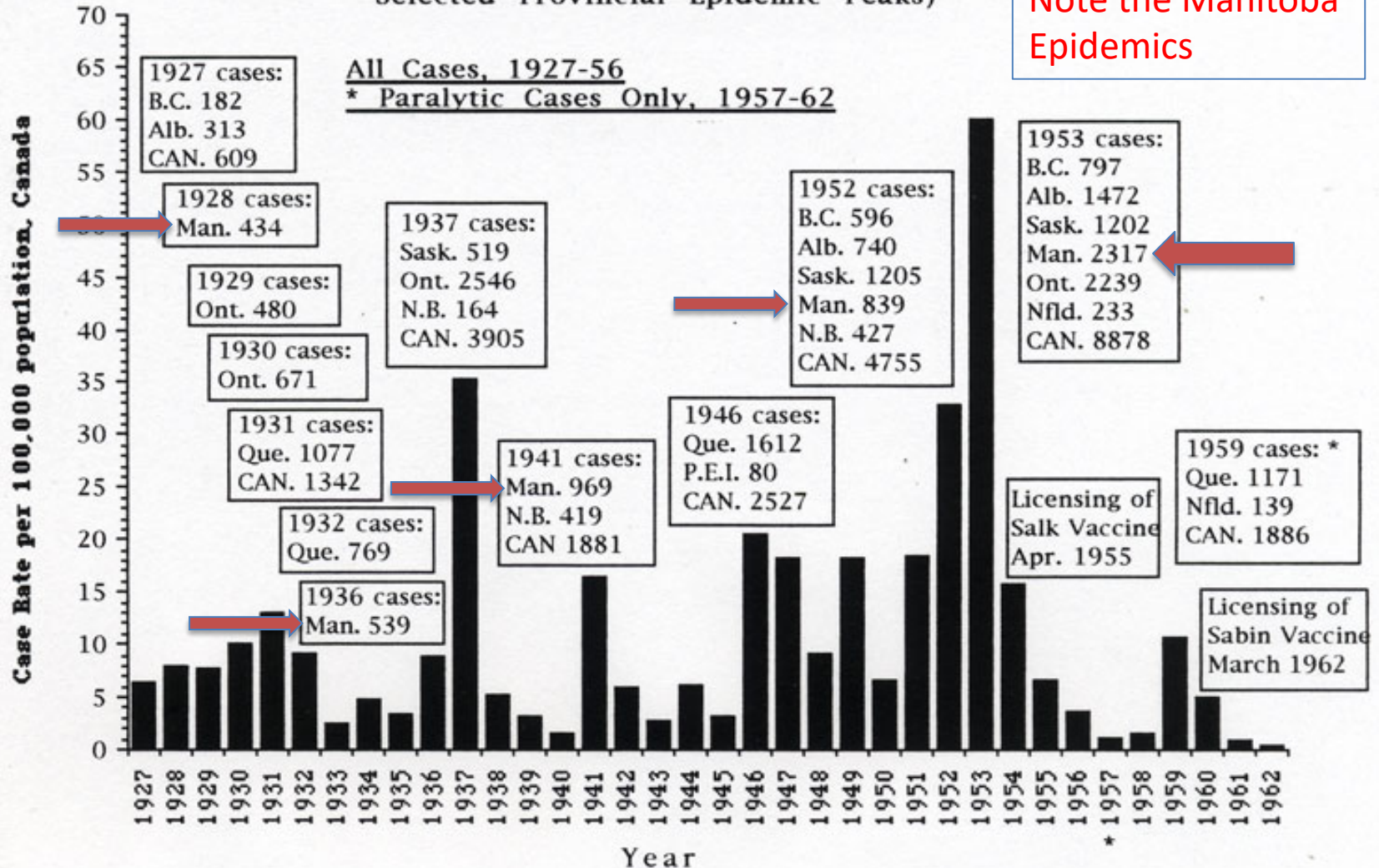
Poliomyelitis Incidence in Canada, 1927-1962

(Case Rates per 100,000 Population & Selected Provincial Epidemic Peaks)



Poliomyelitis Incidence in Canada, 1927-1962

(Case Rates per 100,000 Population & Selected Provincial Epidemic Peaks)



Polio: The New Epidemic

- **1860s-80s** – First reports of “infantile paralysis” outbreaks in Europe; not clear if disease contagious
- **1874** – “Poliomyelitis” scientific name given (inflammation of grey matter in spinal cord)
- **1880s-90s** – First polio outbreaks in North America
- **1908** – Isolation of poliovirus in laboratory monkeys

EXPERIMENTAL EPIDEMIC POLIOMYELITIS IN MONKEYS.¹

BY SIMON FLEXNER AND PAUL A. LEWIS.

(From the Laboratories of the Rockefeller Institute for Medical Research,
New York.)

PLATES XVIII AND XIX.

INTRODUCTION.

Epidemic poliomyelitis has become, in the past decade, a world-wide disease. The present state of our knowledge of the epidemic spread of poliomyelitis, up to the outbreaks in Europe and America since 1907, is well given in Wickman's² monograph. That epidemic poliomyelitis is an infectious disease is clearly pointed out by Medin,³ although, at an earlier date, Cordier⁴ gave it as his belief that it is a contagious disease. The most convincing evidence of the contagiousness of epidemic poliomyelitis is supplied by Wickman's⁵ studies of several Swedish epidemics.

Up to the present time there has existed no convincing knowledge of the nature of the agent causing epidemic poliomyelitis. Various bacteria and especially certain cocci⁶ have from time to time been isolated in cultures from fluids obtained by lumbar puncture from patients suffering from epidemic poliomyelitis, or from specimens of the central nervous system removed at autopsy. These bacteria did not conform to one species or group of microorganisms and did not suffice to set up poliomyelitis in animals. They can be accounted for more satisfactorily as contaminations or secondarily invading bacteria than as the cause of the disease.

¹ Received for publication January 3, 1910.

² Wickman, Beiträge zur Kenntniss der Heine-Medinschen Krankheit, Berlin, 1907.

³ Medin, Verhand. des x Internat. Med. Congresses, Berlin, 1890, ii, 37.

⁴ Cordier, cited by Medin, *Lyon médical*, 1888, lvii, 5, 48.

⁵ Wickman, *op. cit.*

⁶ Geirsvold, *Norsk Magazin f. Laegevid*, 1905, iii, 1280 (cited by Harbitz and Scheel).

Polio: The New Epidemic

- **Aug 1910** –the first widespread appearance in Canada of the “strange” and often deadly “new disease” of “infantile paralysis” sparked a wave of public and medical concern
- While most cases were children under 4, there were several adult victims, and it was not a “new disease” at all

Toronto Star, Aug 17, 1910, p.

CHILDREN ARE ATTACKED BY STRANGE EPIDEMIC

Twenty Cases of Fever and Infantile Paralysis—Once Swept Over the States.

Special to The Star.

Hamilton, Ont., Aug. 17.—An epidemic of poliomyelitis, or infantile paralysis, a comparatively new disease, which is attracting much interest among medical men the world over, has broken out here.

A score of cases have been reported to the Health Department, and the disease seems to be spreading. It was first noticed three or four weeks ago when a little girl, supposed to be suffering from hydrophobia, was taken to the hospital, where she died. It was later discovered she was a victim of infantile paralysis.

The disease generally begins with a high fever and then the patient is suddenly stricken with paralysis.

While most of the cases here are children under four years of age, two or three adults are victims.

Some years ago the disease swept over a portion of the States, claiming victims by the hundreds.

ANTERIOR POLIOMYELITIS! INFANTILE PARALYSIS

“Act of Assembly approved May 14, 1909, provides that anyone violating the provisions of this Act, upon conviction thereof may be sentenced to pay a fine of not less than \$10.00 or more than \$100.00, to be paid to the use of said county, or to be imprisoned in the county jail for a period of not less than ten days or more than thirty days, or both, at the discretion of the court.”

BY ORDER OF THE BOARD OF HEALTH.

Health Officer.

Address.

Polio: The New Epidemic

- “1910 was in a terrible sense a ‘wonder year’ for epidemic poliomyelitis. In that year it appeared all over the world...” as was stressed in a 1912 *Maclean’s* article
- It was also clear that most polio victims were “not among the poor, or delicate,” and yet its cause was very much unclear

Maclean's, Nov 1912

Paralysis: The New Epidemic

By Helen MacMurchy, M.D.

Infantile Paralysis is epidemic in some parts of Canada. The germ attacks rich as well as poor, adults as well as children. In Ontario last month half the cases were fatal. Dr. MacMurchy is able to give our readers the latest developments concerning this dread disease direct from the great specialists, having recently attended a medical congress where the question was discussed. It is now thought that the germ is carried mainly by the stable fly. Dr. MacMurchy says, Never let a fly rest on an infant.

Polio: The New Epidemic

- **Summer – Fall 1916** – The fearsome power of polio reached a level rarely surpassed, hitting the Northeastern US with a devastating fury; some 27,000 cases and 6,000 deaths were reported, with New York City seeing 9,000 cases
- Protecting borders became a critical issue, starting with New York City imposing strict travel restrictions on all children under 16; they couldn't leave the city without official certification that they were "polio free"
- In Canada, the US polio epidemic crisis raised concerns that something similar could develop north of the border, prompting border restrictions at several crossings

INFANTILE PARALYSIS ROUSES PROVINCE

Dr. McCullough Advises Prompt
Precautionary Measures

WARNING BULLETIN ISSUED

Several Cases Reported From One
Town in Ontario, While Others
Are Suspected—Methods Suggested
to Avoid an Epidemic.

INFANTILE PARALYSIS SPREADS IN STATES

Deaths and New Cases De-
crease in New York, but
Develop Elsewhere

(Special Despatch to The Globe.)
New York, July 7.—A decrease of deaths and new cases in this city, but a large increase in other cities and States, was reported to-day in the epidemic of infantile paralysis.
In the five boroughs twenty-two deaths and eighty-seven new verified cases were reported by the Health Department. Simultaneously, however, the State authorities reported forty-five cases in the State of New York. Similarly, the United States Government received reports of the spreading of the plague over eight States. The "plague" belt now extends as far east as Boston, as far west as Chicago, and as far south as Baltimore.
"The apparent decrease in this city as shown by to-day's figures means practically nothing," asserted Health Commissioner Haven Emerson to-night. "You must remember that there has been a great exodus of parents and children from the city. This is going to be a long hard fight."

The Globe, July 8, 1916, p. 24

Polio: The New Epidemic

- **Late-Oct. 1916** – As the US polio epidemic seemed to be easing, an alarming polio outbreak began in Montreal, preventing the relaxing Canadian border restrictions
- Of further concern was the imposition by the Ontario government of a requirement of medical certificates for anyone under 16-years-of-age travelling from Quebec into Ontario
- **Nov. 30, 1916** – All Canadian border restrictions were lifted

GUARDING ONTARIO AGAINST PARALYSIS

Children Cannot Leave Quebec
Without Permit

NOTICE TO RAILWAYS

Department of Health Takes Precautionary Measures to Avoid the Spreading of Disease — Death in Toronto.

To counteract the spread of infantile paralysis, more particularly in consequence of the outbreaks in Westmount and Montreal, the Ontario Board of Health has taken steps to prevent persons under sixteen years of age entering the Province from Quebec unless possessed of a medical certificate, dated within twenty-four hours of departure, that they are in good health and have not been exposed to the disease.

Dr. J. W. S. McCullough, Chief Officer of Health, yesterday sent the following telegram to all general transportation agents of the Canadian Pacific, Grand Trunk, Grand Trunk Pacific and Canadian Northern Railways, advising them of the new regulations being put in force against Quebec Province:

The Globe, Oct. 28, 1916, p. 5

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- Border restrictions/closures have very much defined the COVID-19 pandemic, but other than in 1916, polio epidemics have not affected the US-Canada border

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The Globe, Oct. 28, 1916, p. 5

Polio Rising, 1927-1932

- **1927-32** - A new wave of polio outbreaks became more provincial in scale and grew in severity over the next decade as each province, almost in turn from west to east, was struck
- **1927** – British Columbia (182 cases and 37 deaths)
- **1927** - Alberta (313 cases and 65 deaths)

CANADIAN PUBLIC HEALTH JOURNAL

Vol. XX

May, 1929

No. 5

Some Findings in the Epidemic of Poliomyelitis in Alberta, 1927

R. B. JENKINS, M.D.

Provincial Inspector of Health, Alberta

DURING the year 1927 an epidemic of poliomyelitis occurred in Alberta. Considerable information was gathered which it is believed will be of interest to the profession. For some years prior to 1927 there had been sporadic cases in one part of the Edmonton district. In order to get fairly complete information of the situation a questionnaire was prepared, asking, among other things, for the following data concerning the patient: name, age, sex, date and nature of first symptoms, date of onset of paralysis, source of water supply, source of milk supply, presence of other illness in the family, nature of such illness, the number of cases of poliomyelitis in the family, whether there were cases amongst school-mates or friends, whether or not the patient had been away from home during the previous month, names and addresses of recent visitors at patient's home, names of employees in household. This questionnaire was used in collecting data when, in the 1927 epidemic, some two hundred copies were returned.

In all there were 354 cases reported during the year, 101 of these occurring in Edmonton and the greater part of the remainder in the district surrounding Edmonton, a district with a radius of about 100 miles, which is, in most part, tributary to that city. Fifty-three deaths occurred.

Polio Rising, 1927-1932

- While managing the acute crisis of a polio epidemic echoed that of the great influenza pandemic of 1918, with similar public health helplessness, the unique personal, economic and political challenges of paralytic polio continued long after the epidemic emergency passed

ALBERTA PUBLIC HEALTH BULLETIN



Issued By The
PROVINCIAL DEPARTMENT OF PUBLIC HEALTH
Malcolm R. Bow, B.A., M.D., C.M., D.P.H., Deputy Minister

By Direction of
HON. GEORGE HOADLEY, MINISTER OF HEALTH

EDMONTON, ALBERTA, OCTOBER, 1927

AFTER TREATMENT OF POLIOMYELITIS

The problem of the treatment of cases of infantile paralysis, after the acute symptoms have subsided, presents two or three important points. These, if kept in mind, will have a great effect on the final outcome of the case. The problem is essentially one of salvage and reconstruction to restore the greatest amount of function and so diminish the ultimate disability of the patient. Wrong methods of treatment have been shown, by the experiences of epidemics elsewhere, to increase rather than diminish the disability of the patient.

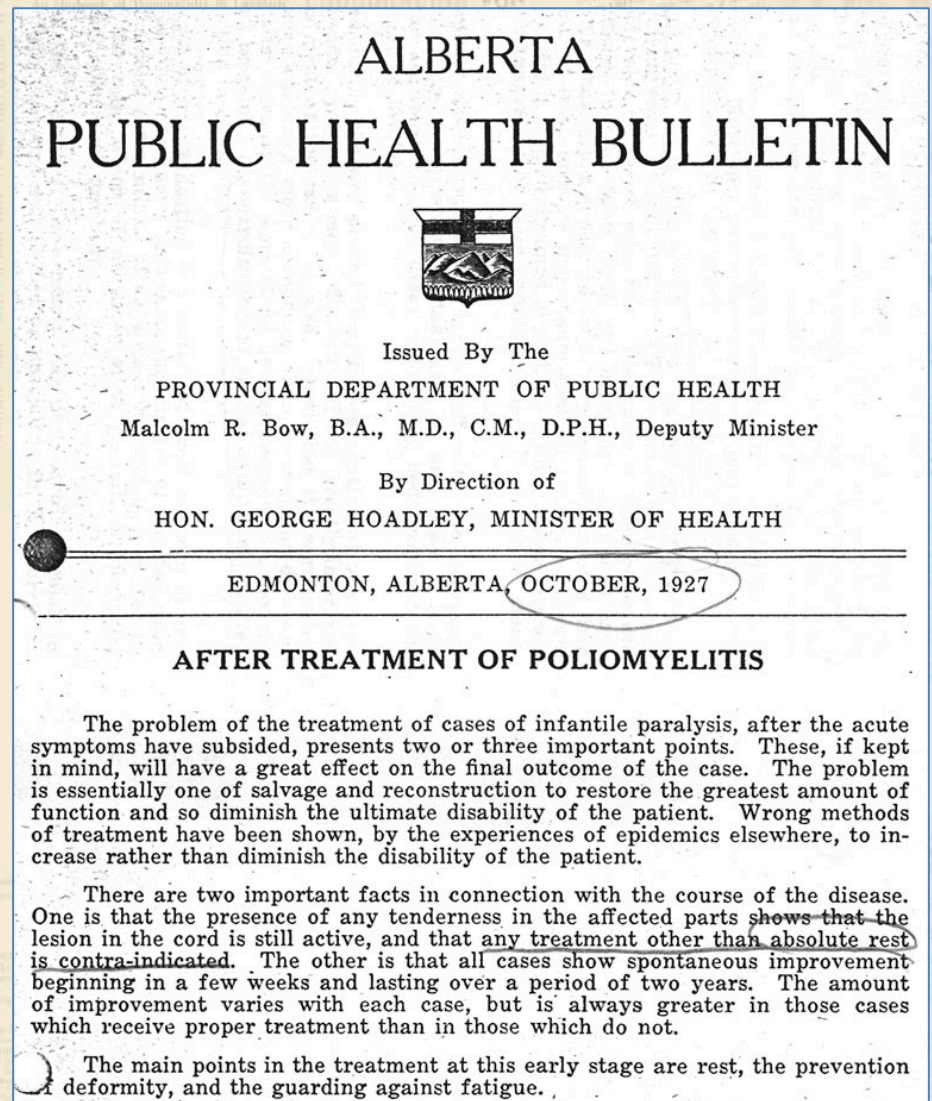
There are two important facts in connection with the course of the disease. One is that the presence of any tenderness in the affected parts ~~shows that the lesion in the cord is still active, and that any treatment other than absolute rest is contra-indicated.~~ The other is that all cases show spontaneous improvement beginning in a few weeks and lasting over a period of two years. The amount of improvement varies with each case, but is always greater in those cases which receive proper treatment than in those which do not.

The main points in the treatment at this early stage are rest, the prevention of deformity, and the guarding against fatigue.

Polio Rising, 1927-1932

- While managing the acute crisis of a polio epidemic echoed that of the great influenza pandemic of 1918, with similar public health helplessness, the unique personal, economic and political challenges of paralytic polio continued long after the epidemic emergency passed

- As the COVID-19 pandemic has spread globally, the varied and likely long-term clinical effects have become more apparent



Polio Rising, 1927-1932

- **1928** – Marching eastward, polio next struck Manitoba, leaving 434 cases and 37 deaths
- The primary focus of public health attention was on studying the early use of “convalescent serum” to hopefully minimize, or perhaps prevent, the onset and severity of muscle weakness or paralysis
- The serum prepared from blood donated from people who had “convalesced” from polio and were thought to have immunity to the poliovirus

Résumé of the Report on the Poliomyelitis Epidemic in Manitoba, 1928

THIS report was prepared by the Medical Research Committee of the University of Manitoba, with appendices on the Method of Control Employed by Dr. A. J. Douglas, Medical Officer of Health of Winnipeg, and Dr. T. A. Pincock, Deputy Minister, Department of Health and Public Welfare of the Province. It has been published for the Department of Health and Public Welfare by the Great-West Life Assurance Company.

Full of information obtained directly from the experience of this epidemic, the report is of probably the greatest significance in that section dealing with the use of convalescent serum, which is reproduced in full on pages 235 to 240. The other sections,—on organization; on the preparation of convalescent serum; on the epidemiology of the disease as shown in Manitoba, the extent in time and place, the age groups involved, the multiple of cases in families, the apparent incubation period; the symptoms and physical signs as found on careful examination; and the control methods employed—all these add much to our knowledge. The main features are shown in the extracts which comprise this review, chosen freely from the various sections.

The Chairman of the Committee was C. R. Gilmour, M. D., and the Secretary, A. T. Cameron, D.Sc.

Canadian Public Health Journal, May 1929, p. 225

- However, the lack of a clear polio diagnostic test prior to the onset of muscle weakness or paralysis, and patients often recovering with no treatment, made scientifically assessing the serum difficult

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- The serum prepared from blood donated from people who had “convalesced” from polio and were thought to have immunity to the poliovirus
- A similar type of convalescent serum was also a hopeful COVID-19 treatment

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Polio Rising, 1927-1932

- **1929-30** – Epidemic polio next struck in Ontario, with 558 cases and 26 deaths in 1929, and then in 1930, with 671 cases and 71 deaths
- Ontario Department of Health followed the prevailing public health approach during polio outbreaks, with a reliance on providing convalescent serum for free to all reported cases
- **1931-32** – Major polio epidemics next struck in Quebec

CANADIAN PUBLIC HEALTH JOURNAL

Vol. XXI

February 1930

No. 2

Report of an Epidemic of Poliomyelitis in Ottawa, 1929

DR. T. A. LOMER,
Medical Officer of Health, Ottawa

AND

DR. W. T. SHIRREFF,
Superintendent of Strathcona Hospital

ON account of the prevalence of poliomyelitis in Manitoba in 1928, it was considered probable by the Ontario Department of Health that the Province of Ontario might be visited by the disease in 1929, and local health authorities were warned to be on the lookout for cases and to prepare lists of possible donors of convalescent serum.

Incidence

The first case of poliomyelitis reported in Ottawa was on July 28th,

TABLE I
POLIOMYELITIS—OTTAWA, 1929
CASES BY WEEKS

Week Ending	Number	Per cent
August 3	4	2.3
August 10	7	4.0
17	1	.6
24	16	9.1
31	14	7.9
September 7	25	14.2
14	24	13.6
21	23	13.1
28	23	13.1
October 5	18	10.2
12	11	6.2
19	7	4.0
26	2	1.1
	1	.6
Total	176	100.0


although subsequent investigation showed that there had been at least two cases in the vicinity during the previous week.

53

Polio Rising, 1927-1932

- Alarming were tragic stories of deaths due to polio, such as a 3-year-old Toronto girl dying of polio 10 minutes after arriving at the Hospital for Sick Children, most likely of paralysis of the chest muscles, fatally impairing breathing
- The hospital would get an iron lung in 1930 (the first in the country), but there was no time for this young girl to get to it

PARALYSIS VICTIM



GRACE HANCOCK,
Aged 3½ years, of 53 Broadview Avenue, who died ten minutes after she was admitted to the Hospital for Sick Children yesterday afternoon from infantile paralysis.

**ACUTE PARALYSIS
TAKES BABY'S LIFE
WITHIN FEW HOURS**

**Little Grace Hancock Dies 10
Minutes After Entering
Hospital**

NO INQUEST TO BE HELD


Ten minutes from the time she was taken into the Hospital for Sick Children at 4.40 yesterday afternoon, Grace Hancock, aged 3 1-2 years, of 53 Broadview Avenue, died, a victim of infantile paralysis.

The Globe, Oct 11, 1930, p. 13

Polio Rising, 1927-1932

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 - The hospital would get an iron lung in 1930 (the first in the country), but there was no time for this young girl to get to it
- Impairment of breathing causing death is a common feature between polio and COVID-19, although the age of the principal victim of each disease was at opposite ends of the age spectrum; over time polio victims shifted to older ages, while COVID-19 victims have shifted to younger ages

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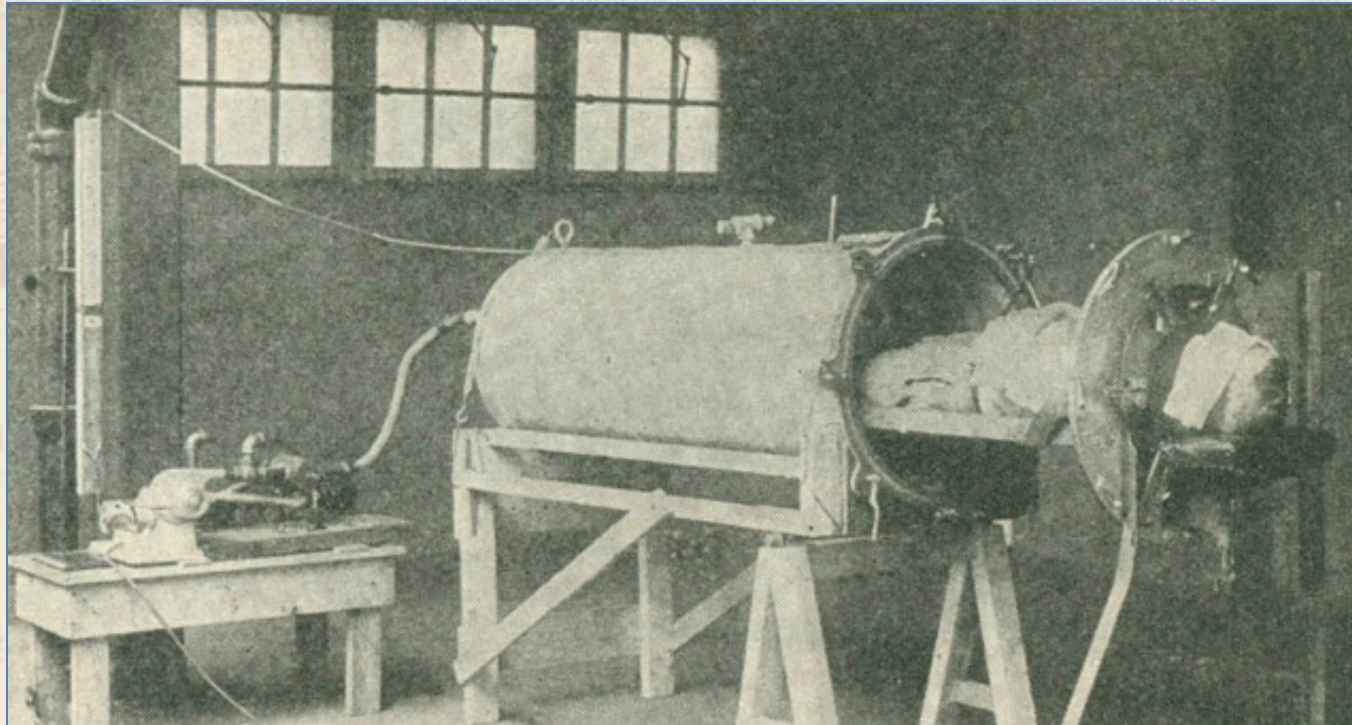
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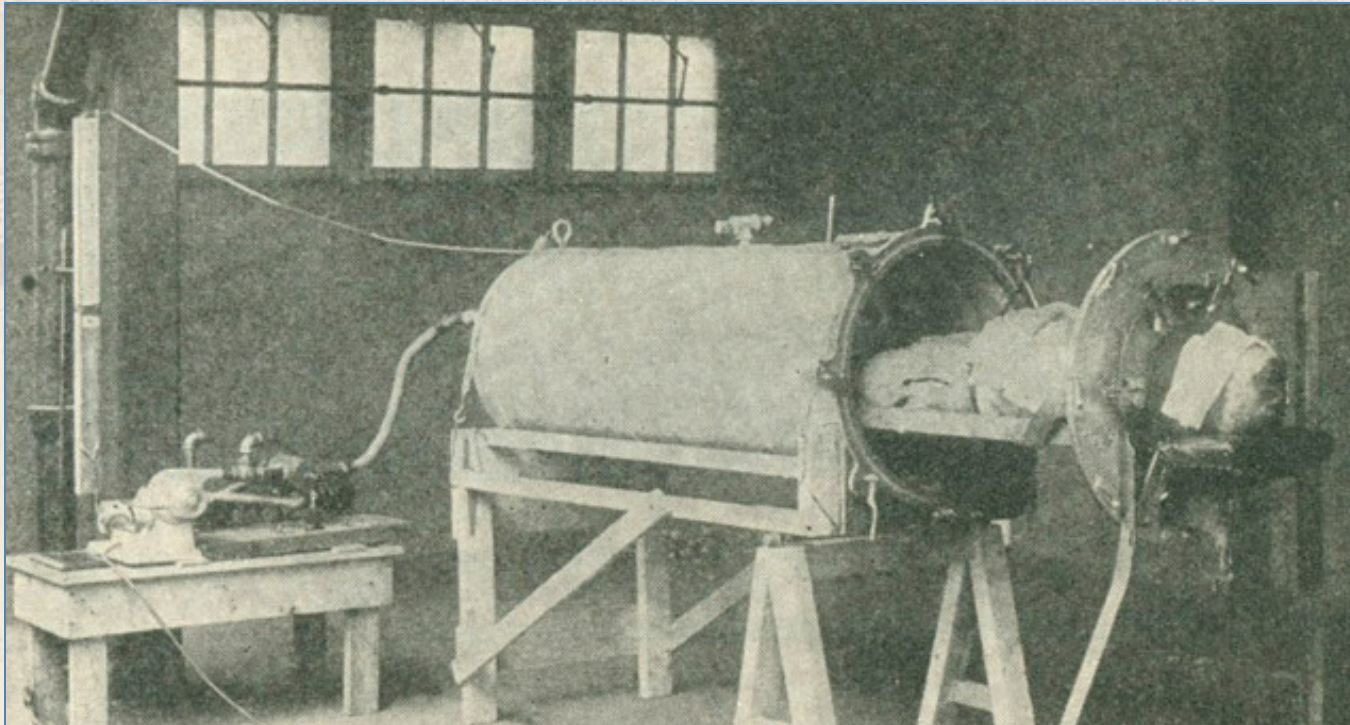
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Polio Rising, 1927-1932



- **1928** - The first “iron lung” for polio treatment developed at Harvard University
- Essentially a metal tank into which all but the head of the patient was sealed. A motor, or hand crank, operated a set of bellows and the negative and positive pressure inside the iron lung forced the patient’s lungs to expand and contract to enable breathing

Polio Rising, 1927-1932

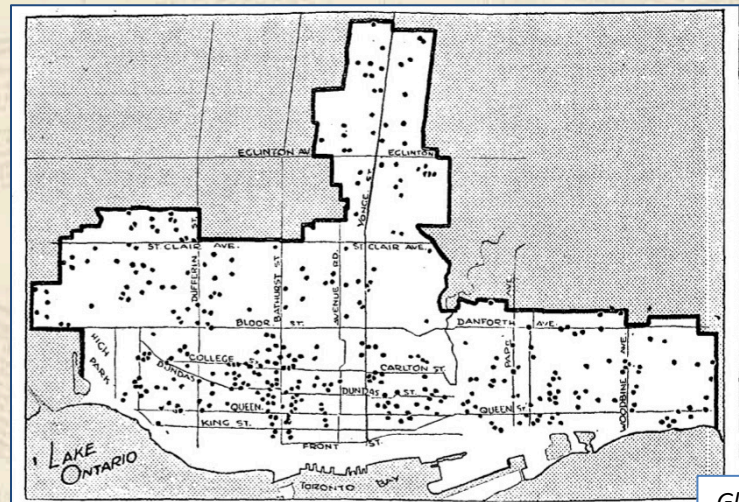


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- Essentially a metal tank into which all but the head of the patient was sealed. A motor, or hand crank, operated a set of bellows and the negative and positive pressure inside the iron lung forced the patient’s lungs to expand and contract to enable breathing
- In contrast, in severe COVID-19 cases in which the virus attacks the lungs to impair breathing, the ventilator provides oxygen directly into the lungs

Polio Rising, Dramatically, 1937

Globe & Mail, Aug 25, 1937, p. 13

- **1937** – Polio incidence reached an alarming new peak in Canada with 4,000 cases; more than half in Ontario:
- 2,546 cases (750 in Toronto)
- 119 deaths (31 in Toronto)



SOUTHWESTERN PART OF CITY SHOWS MOST "POLIO" CASES
 Every time a case of infantile paralysis is reported in Toronto a pin is pushed into a city map in the health department office, enabling officials to trace the course of the epidemic day by day. On June 10 there were only three or four pins. To-day, with nearly 300 cases, it is hard to see the map. The map indicates that the disease is pretty general south of Bloor St. from Sunnyside to the eastern limits, with the most heavily stricken area the section bounded by Wellington St., Ossington Ave., Harbord St. and Spadina. Only three cases are indicated on the island. The epidemic started in the Earls Court area, and officials said to-day that as it declines it has been working north and east. The map shows the section north of Bloor St. and east to the city limits only lightly affected.

Globe & Mail, Sept. 15, 1937, p. 22

DEATH TOLL OF PARALYSIS NOT BOOSTED

But Twenty New Cases in Toronto and London

300 IN ONTARIO

Small Centres Also Plan to Postpone School Reopening

Ontario's infantile paralysis death toll remained at sixteen last night, no additional deaths being reported from the widespread areas affected by the disease, which, in some sections, has reached epidemic proportions.




Hospital for Sick Children Archives

Polio Rising, Dramatically, 1937

- Ontario Department of Health in crisis mode
- Convalescent serum & standardized splints provided at no cost to all cases



Hospital for Sick Children Archives



ONTARIO

Department of Health of Ontario

“INFANTILE PARALYSIS” (POLIOMYELITIS)

The Department of Health has a sufficient supply of Convalescent Serum for present demands. This serum is obtained from persons who have previously suffered from an attack of “infantile paralysis”.

In anticipation of further requirements the Department now requests that persons who are willing to provide blood for this purpose (donors) register with the medical officer of health in their district.

The Department remunerates donors on the basis of Ten Dollars for 100 cubic centimeters; the usual amount withdrawn from one donor is 200 cubic centimeters. This can be readily obtained without discomfort or ill effects to the donor.

Children under fourteen years of age are not eligible. Persons who have suffered an attack of the disease during the present year are also not eligible. Those persons fourteen years of age and over who have suffered an attack within the past twenty-five years and who show some definite evidence of resulting paralysis, are requested to provide the medical officer of health with their name and address.

Those who have already acted as donors need not register again.

When a clinic is to be held, donors will be notified through their medical officer of health.

Hubert L. ...
MINISTER OF HEALTH

(Ontario Newspapers), Sept. 3, 1937

Polio Rising, Dramatically, 1937

- Based on the olfactory nerve as a possible poliovirus portal to nervous system, a careful study of a hopeful preventive zinc-sulphate nasal spray undertaken in Toronto proved definitive
- Clear results of the trial showed that spray had no effect on preventing polio, it damaged the sense of smell, and undercut the validity of prevailing neurotropic view of polio etiology



Paralysis Nose Spray Just Squirt And Smile

Sit, squirt, and a smile—sometimes a squirm. That's just about all there is to spraying a child's nose to protect it against infantile paralysis.

Once in a while a scared youngster howls and struggles. But the doctors who are spraying 5,000 young Toronto noses don't argue.

The little howler is just asked to stand aside. "Next" gets into the chair, the "squirt" is over. The howler gets the idea nothing serious is happening after a few more patients have been treated.

Two long halls and a large waiting room were filled with parents and children when The Star visited a spraying clinic at the Hospital for Sick Children.

"Scared, sonny?" the reporter asked several young patients. There was always a "no," but it wasn't always convincing.

"I know it won't hurt. My mother used to be a nurse and she told me it wouldn't hurt," volunteered one eight-year-old miss.

She wriggled in her chair a bit when the doctor's pincer spread her nostril and the long, silver-pointed syringe went high up her nose.

Her hands convulsed upward as a sudden "pffft" came from the sprayer; but it was all over before she knew it. She grinned, scrambled off the hard little chair and ran out laughing.

"Most children are really a lot better if their parents stay outside," said one of the four nurses helping one doctor explained. "At first we let the mothers come in, but that nearly always makes more fuss.

A few fathers had brought their children. One explained his wife was at work. He didn't have a job. One father, who said he came from Italy, had brought his wife and three children.

Brave Young Indians

Bravery prize for the session at this clinic went to John and Stanley Canoe. Eight and 10 years of age, they stalked in with a grin on their faces, held back their heads without a touch from the nurse, let the long slim tube go up in their nose opposite their eyes, didn't shiver when the thing "pffft-ed," and were still smiling going out.

"They're good youngsters," said Mrs. Canoe, small and very dark. "They should be brave. They're Indians."

Dr. Basil Bradley, who was doing treatments at the rate of about 30 an hour, admitted there were a few "tricks to the trade."

"The syringe looks pretty sharp," he said, showing a six-inch long silver tube attached to the end of a little bottle with a bluish fluid inside.

"I let the child have a good look at it, tell him it isn't sharp, run a point along his arm to let him feel the feel of it."

Every patient gets a definite disappointment, but "most of them come a long time ahead," a nurse said.

"We try to prevent crowding, keep the children from getting in bunches, but when they come long ahead of time there's the great deal you can do about it."

For very small children who are scared, doctors sometimes use an entirely different method. Instead of the long silver tube up the nose, the child is put lying on his back on a table, its head held over the end. Then the fine nozzle is poured in the nostril, the head is held down for a few seconds and it's all over.

Several mothers were asked they brought their children. "Do you think your child was scared by the disease? Did you think you were going to get it?"

"No. I thought they were all right, but an ounce of prevention is, I figured, worth a couple pounds of cure," said one woman speaking for all.

Every Care Taken

The procession came into a little room, with hardly a dozen doctors, wearing little more than a big white "kimono" and a mask, dripped with perspiration. "The mask is to protect the children from us, not us from the children," one explained. The mirror flashed a beam of light up the child's nostril, the "gun" squirted, the nozzle was screwed and tossed into a bin, the next child was waiting.

Watching every more the made were several other children. Just watching — learning — done, they explained. One little practitioner from another city. So many of his patients came to him to spray their noses that he "grabbed a holiday" and came to Toronto.

"Sure, I'd far sooner see children than on adults," one doctor declared. "Working on a child is like being a garage man; never works on anything but cars. Children usually have one thing wrong with them; they can usually fix them up. A kick out of doing that. They are like old cars. You put in a generator or a spark-plug, and they still rattles and knocks. You see you find you need a new one. You're never done."

Toronto Star, Sept 2, 1937

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- Similarly hopeful trials of novel treatments echoed in COVID-19 pandemic



Polio Rising, Dramatically, 1937

- As the polio epidemic worsened in Ontario during July and August, there were concerns and controversy surrounding the issue of whether or not to delay the fall opening of schools
- It would be an issue that was debated and decided by local governments and school boards; some delayed, while others didn't based on local incidence
- However, if school opening was delayed, the concern was would kids be safer unsupervised in the streets and playgrounds?

DELAY REOPENING OF ALL SCHOOLS TO FIGHT DISEASE

Health Board Studies Wisdom of Closing Theatres, Swimming Pools

17 NEW CASES CITED

Won't Close Park, Pools, etc., Unless Health Board Makes Request

Toronto public, high and separate schools will remain closed until at least Sept. 7, members of the board of education and separate school board agreed to-day accepting the recommendation of the board of

MIMICO PARALYSIS REPORT IS NOT ALARMING

Schools Not To Be Closed Under Present Conditions

Mimico, Aug. 26.—The present epidemic of infantile paralysis in Mimico is not of serious proportions, concluded members of the local board of health last night following the hearing of a report submitted by the medical officer of health, Dr. Warren Snyder.

"At present there are two active cases of infantile paralysis ill at home in the town and three are in hospital," read Dr. Snyder's report. "There have been six cases all told, and at present five homes are under strict quarantine. Quarantine has been lifted on the sixth case because of no active development."

Members of the board were of the opinion that it was not advisable to close the schools under present conditions.

The meeting was held behind closed doors. The public and the

YORK TOWNSHIP KEEP YORK SCHOOLS CLOSED AS ADDED PARALYSIS CHECK

Board Sets September 7 as Delayed Opening Date

41 CASES REPORTED

Because of the infantile paralysis outbreak, York township board of education last night decided to keep its schools closed until Sept. 7, as trustee Dr. Luke Teskey warned parents to keep children away from theatres and swimming tanks and named "Young Canada's Day" at the Canadian National Exhibition, as a possible danger period.

Forty-one cases of the disease have been found in the township since June, reported Dr. W. E. Pearson, board of education M.O.H. No new cases have been reported since before last week-end, he said.

"Parents should not become unnecessarily alarmed at the situation," asserted Dr. Teskey, "but they should not subject their children to congregations, particularly with the exhibition opening in the near future. I might point out that Young Canada's Day is a place where the disease may be spread."

He told of four children in his district who had been thoroughly informed of the disease and its after-effects and said that since then their parents had received no further requests from the children to attend theatres or mingle with crowds.

Answering a query concerning possible contagion through swimming tanks, trustee Dr. C. W. Dales said: "The season has more to do with the spread than water."

Frank Oke, chairman of the board, was instructed to keep in touch with the M.O.H. to ascertain if the opening date should be further deferred.

TORONTO DISTRICT ALL YORK SCHOOL OPENINGS DEFERRED UNTIL SEPT. 13

Total of Infantile Paralysis Cases Mounts in Suburban Toronto HALTED IN PLACES

Although no new cases of infantile paralysis were reported in some centres, the total to-day mounted in others as school boards closed schools in an effort to check spread of the disease in Toronto's suburban area.

High number of cases was reported from York township, where three new cases reported since yesterday brought the total to 50 since June. There have been two deaths in that municipality. At a meeting last night, the school board deferred opening of all schools until Sept. 13.

A halt to the increasing number of cases was called in East York township, where the total remained 23, as yesterday. Scarborough township remained among the least affected municipalities, with only two cases of the disease, neither of these involving school children. Schools in Scarborough will open on schedule, it was announced.

SUBURBAN SCHOOLS' OPENINGS DELAYED

Because of the prevalence of infantile paralysis many schools have postponed the opening of classes. A few will open on schedule, to-morrow, but the majority will not begin until Sept. 7. Some will not open until Sept. 13. A few have deferred openings indefinitely until the epidemic subsides. Openings as announced to-day are as follows:

Sept. 1.—Burlington, Oakville, Schomberg, Scarboro (except two sections), Port Credit, Clarkson, Lorne Park, Erindale.

Sept. 7.—Forest Hill, Weston, Erindale, Elmbank, Cooksville, Mimico, Etobicoke Twp., Long Branch, Bolton, Dixie, Lakeview, Woodbridge, Milton.

New Toronto will open on the 8th. Sept. 13.—Leaside, Orangeville, Markham township, York township.

Postponed indefinitely — East York, North York, Scarboro, S.S. 6 and S.S. 12, Brampton.

Postponed from Markham township, where schools will remain closed

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- It would be an issue that was debated and decided by local governments and school boards; some delayed, while others didn't based on local incidence
- However, if school opening was delayed, the concern was would kids be safer unsupervised in the streets and playgrounds?
- The question of whether, or not, to delay school opening has become especially complex during the COVID-19 pandemic

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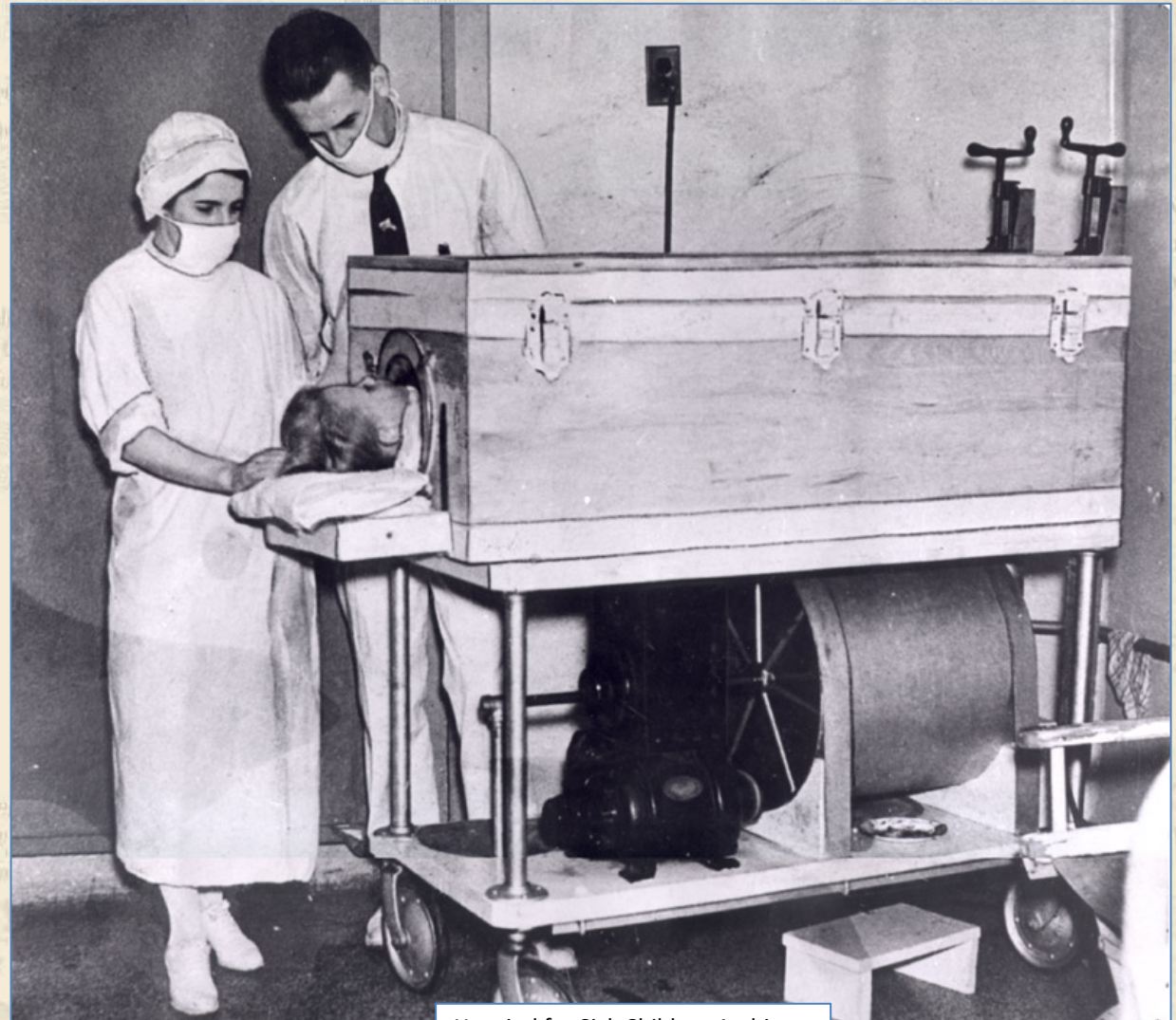
Polio Rising, Dramatically, 1937



- Most alarming was the sharply higher numbers of severe and life-threatening cases with weakness or paralysis of muscles that control breathing and swallowing
- When the epidemic started, the Hospital for Sick Children had the only iron lung in the country, which was soon in use when an 11-year-old girl needed it

Polio Rising, Dramatically, 1937

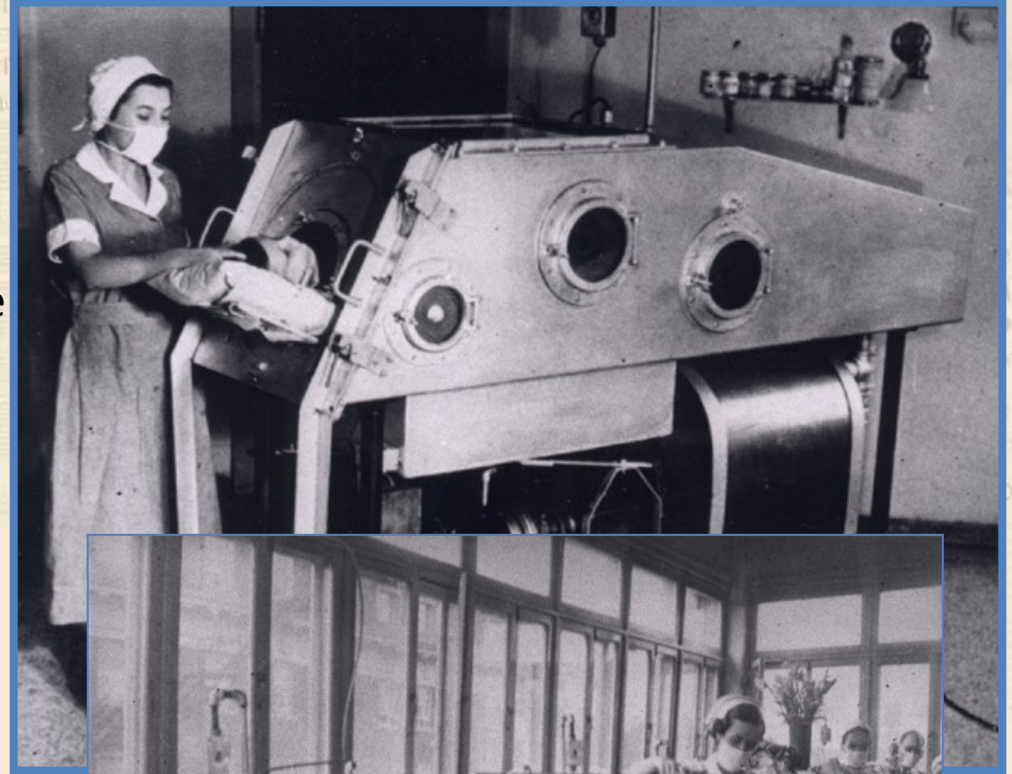
- When a young boy arrived at HSC with respiratory weakness and the iron lung was still occupied, hospital staff scrambled and were able to assemble a “wooden lung” that saved his life



Hospital for Sick Children Archives

Polio Rising, Dramatically, 1937

- Fearful of many more such cases, this effort was followed by the construction of 27 iron lungs in the basement of HSC, paid for by the Ontario Department of Health; some iron lungs distributed elsewhere in the province, and beyond.



Hospital for Sick Children Archives

Polio Rising, Dramatically, 1937

One such iron lung is the centerpiece of an exhibit I curated on the history of vaccines at the Museum of Health Care in Kingston,

<http://www.museumofhealthcare.ca/explore/exhibits/vaccinations/polio.html>

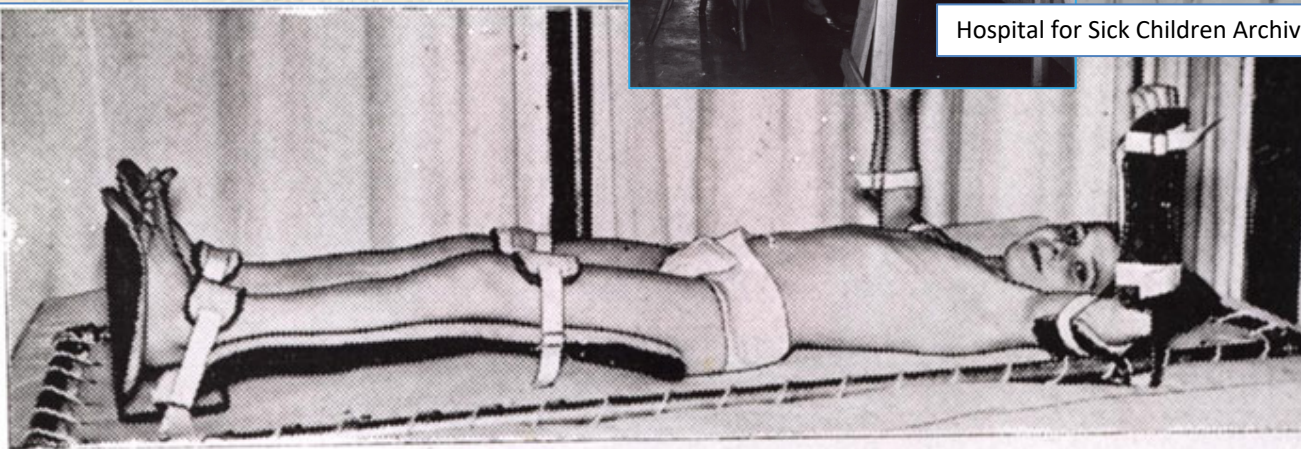


Polio Rising, Dramatically, 1937

- Managing the crippling effects of polio was a major challenge
- Strict immobility was the standard of medicine for polio after-care until the early 1940s



Hospital for Sick Children Archives



The Provincial Department of Health supplied all Poliomyelitis patients suffering from paralysis with splints and frames designed and built in our workshop.

Polio Rising, Dramatically, 1937

- The severity of the 1937 polio epidemic prompted the Ontario government to establish a distinctive program to cover the costs of specialized polio treatment and hospitalization
- Similar polio treatment policies began in other provinces in the late 1930s, particularly in Alberta and Saskatchewan

PAY PARALYSIS CASE EXPENSES

Government To Aid Where Families Unable To Pay


HEALTH BOARD ADVISED

M.O.H. Reports 50 Positive Cases Treated Here

In cases where families are unable to meet the costs, the Ontario Government will assume all obligations for hospitalization, transportation and medical attention in connection with the infantile paralysis epidemic which has been sweeping the province for nearly two months.

London Free Press, Sept 22, 1937

THE HORIZON



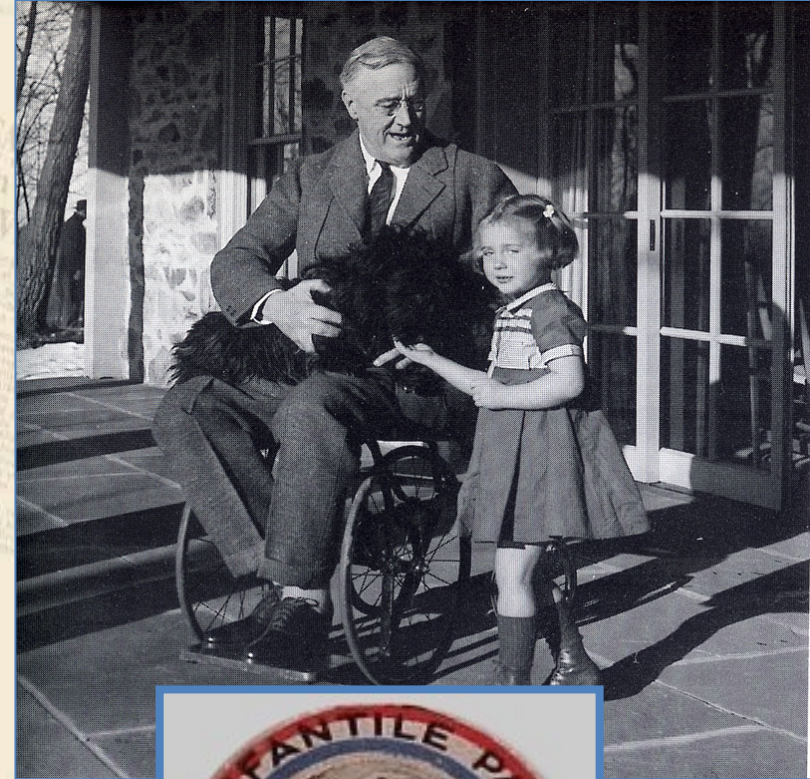
VOL. 2
NO. 7

CHRISTMAS, 1937

PRICE
10 CENTS

Polio Paralysis, 1940s

- During the war years, however, there seemed little hope of a polio vaccine being available anytime soon, despite considerable research funding provided by the National Foundation for Infantile Paralysis through its annual “March of Dimes” campaigns
- **1938** – As U.S. President, Franklin D. Roosevelt founded the National Foundation for Infantile Paralysis, which was galvanized by his personal experience with polio
- **1921** – Franklin D. Roosevelt stricken with polio when he was a Senator
- NFIP also provided direct support to polio victims for their treatment



Polio Paralysis, 1940s

- **1941** - In the meantime, polio epidemics continued and worsened, most notably in Manitoba, at the same time as an outbreak of “sleeping sickness” also struck parts of the province
- Severity of situation prompted medical and scientific aid from Ottawa and the U.S.

TABLE I
POLIOMYELITIS, MANITOBA, 1928-1941

Year	Cases	Deaths	Year	Cases	Deaths
1928	434	43	1935	23	10
1929	57	13	1936	539	37
1930	45	6	1937	261	12
1931	15	2	1938	159	11
1932	7	2	1939	25	5
1933	8	5	1940	19	5
1934	10	3	1941	966	18

Canadian Public Health Journal, June 1942, p. 246

Symposium

Poliomyelitis and Encephalitis, Manitoba 1941

INTRODUCTION

F. W. JACKSON, M.D., D.P.H.
Deputy Minister of Health and Public Welfare for the Province of Manitoba

THE combined epidemics of the two virus diseases, poliomyelitis and encephalitis, about which so comparatively little is known—certainly from the standpoint of epidemiology, which occurred in Manitoba during the summer and fall of 1941 was an unique experience for a Provincial Health Department. During the early part of July it became apparent to the personnel of the Department of Health and Public Welfare, particularly those in the epidemiological field, that probably we were in for an epidemic of poliomyelitis. In view of this it was thought desirable to do some planning before we be

Canadian Public Health Journal, June 1942, p. 242

Globe & Mail, Aug 22, 1941, p. 9

Polio Epidemic Much Worse; Ottawa Speeds Aid for West

Winnipeg, Aug. 21 (CP). — The number of infantile paralysis and sleeping sickness cases in Western Canada steadily mounted tonight as leading medical authorities from both Eastern Canada and the United States searched for a cure and studied conditions in the affected areas.

Infantile paralysis, which has been reported in all four Western Provinces, had 668 cases and 10 deaths since the outbreak early in July, and there were 209 cases and 17 deaths in the sleeping sickness epidemics of Manitoba and Saskatchewan.

The epidemics centred in Manitoba. Yesterday thirty new cases of sleeping sickness (encephalitis) were reported in the Province and

earlier in the week the poliomyelitis cases passed the previous record of 536 established five years ago. Eleven persons died from sleeping sickness and nine from infantile paralysis.

Dr. John R. Paul, Professor of Preventive Medicine at Yale University, came here by plane for conferences with Provincial and Winnipeg health authorities. Earlier Dr. Donald W. Gudakunst, medical director of the United States National Foundation for Infantile Paralysis, studied the current infantile paralysis epidemic.

Dr. J. M. Uhrich, Saskatchewan Minister of Health, said he has invited Dr. Donald Cameron, Dr. G. Watson and Dr. H. Gibbons of the Dominion Government's Health Department at Ottawa to come to Regina and study the epidemics in the Province.

Encephalitis fatalities in Regina increased to six and there are nearly sixty cases in city hospitals, he said. The Province also has twenty-two infantile paralysis cases in southern districts but none in Regina.

In Alberta there are forty-five poliomyelitis cases and no deaths, while British Columbia has four cases and one death. No persons have been stricken by sleeping sickness in Alberta and British Columbia.

Meanwhile the sleeping sickness epidemic in the Northwestern States showed some signs of abatement. Minnesota reported there have been 392 cases, with forty-five deaths since the outbreak there.

The United States Senate has approved a resolution authorizing \$3,000,000 for investigations into the causes of sleeping sickness in Northwest Plains States and Western Canada.

Dr. Gudakunst recently told Dr. F. W. Jackson, Manitoba Deputy Minister of Health, that the present epidemic of infantile paralysis is a mild type and urged complete rest under constant medical supervision for persons afflicted.

Dr. Paul is making a study of both infantile paralysis and sleeping sickness here in an attempt to discover if there is any relationship between them and how they are communicated.

140 Polio Cases in New Brunswick.

Fredericton, Aug. 21 (CP). — New Brunswick's total of reported infantile paralysis cases stood at 140 tonight. Five new cases were reported during the day, two of the victims being adults. Efforts were being made by the Provincial Department of Health to increase the supply of blood for serum by appeals to donors who have previously suffered from the disease.

Post-War Public Health Progress: *Federal Health Grants*

Paul Martin, *A Very Public Life*, Vol. 1 (1985)

- **1946-48** – The end of World War II began a period of accelerating change in public health and biotechnology in Canada, fuelled by peacetime prosperity and a progressive federal government ready to take a leadership role in upgrading Canada’s health care infrastructure held back by almost two decades of economic depression and war
- **1946** - A key leader in this effort was Paul Martin, who became Minister of National Health and Welfare just after his 8-year-old son, Paul Jr., was stricken with polio.



With Louis St Laurent, Canada's minister of external affairs at Hyde Park, the hostess Mrs Eleanor Roosevelt, 3 November 1946.

- **1907** - Paul Martin Sr. had his own experience with polio as a child

Post-War Public Health Progress: *Federal Health Grants*

- **1946-48** – Worsening polio epidemics, among other health challenges, put a major strain on the Canadian public health and hospital infrastructure
- The ability of provincial governments to pay for specialized polio care services became acute
- **1948** – With the growing polio problem an important factor, Martin introduced annual Federal Health Grants to boost provincial health services on a shared cost basis, designed to support hospital construction, mental health, cancer and tuberculosis control, crippled children, and public health research

\$150 Million in Grants Health Services Plan

By WARREN BALDWIN

OTTAWA, May 14 (Staff) — Prime Minister King today revealed to the Commons the government's plans to spend \$300 million a year for five years in grants to the nine Canadian provinces for assistance in setting up health services. Money this year will be included in supplementary estimates to be voted by parliament before the session prorogues. The grants follow the pattern laid down in the Dominion Government proposals to the provinces in August, 1945, and the amounts in many cases are identical. The program represents the maximum length to which it is believed the Dominion will go in providing health services.

Martin Says Grants War on Disease

Vancouver, May 18 (CP). — Health Minister Paul Martin today said the new federal \$30,000,000 health program marks the start of a frontal attack on disease.

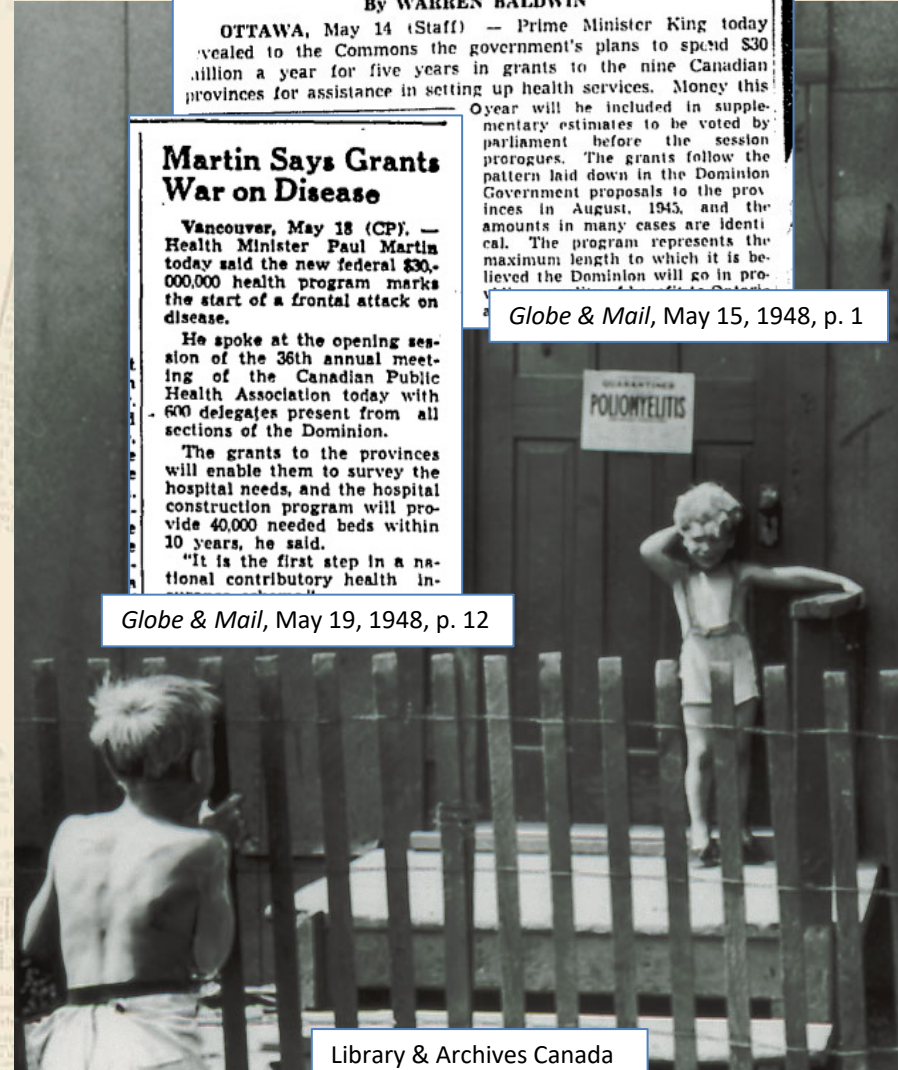
He spoke at the opening session of the 36th annual meeting of the Canadian Public Health Association today with 600 delegates present from all sections of the Dominion.

The grants to the provinces will enable them to survey the hospital needs, and the hospital construction program will provide 40,000 needed beds within 10 years, he said.

"It is the first step in a national contributory health in-

Globe & Mail, May 15, 1948, p. 1

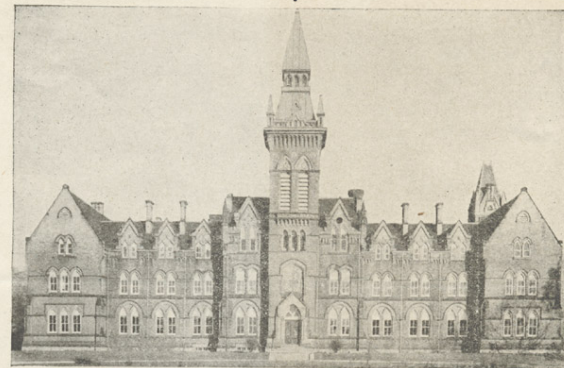
Globe & Mail, May 19, 1948, p. 12



Library & Archives Canada

Connaught Medical Research Laboratories: University of Toronto

- **1914** – Established as a self-supporting part of the University of Toronto to develop, produce, distribute and improve essential public health products
- **1920s** – Played a key role in the development and production of insulin
- **1920s-40s** – Played a major role in the development and production of diphtheria toxoid, pertussis vaccine, heparin, and penicillin
- **1972** – Ultimately, Connaught sold by UofT and today its legacy continues as Sanofi Pasteur Canada



Spadina Crescent Building, providing administration, research laboratories and the production of Penicillin.



School of Hygiene Building, a portion of which accommodates additional research laboratories and the preparation of insulin and other glandular products.



Virus Research Laboratory, one of the research laboratories in the Dufferin Division, a 145-acre farm property 12 miles north of Toronto.

CONNAUGHT MEDICAL RESEARCH LABORATORIES

In 1914 the preparation and distribution of essential public health biological and related products were undertaken in the University of Toronto in the Antitoxin Laboratory. In 1923 the greatly expanded undertakings were named Connaught Laboratories.

The work of the Laboratories is well known because of the widespread distribution of products. Throughout the years, however, research in preventive medicine has been a primary function. The number of research undertakings has kept pace with the growth of the Laboratories and to-day more than fifty studies are in progress.

To express the fundamental interest of the Connaught Laboratories in research, the Board of Governors of the University of Toronto has approved of the inclusion of the words "Medical Research" in the name of the Laboratories, which will now be known as "Connaught Medical Research Laboratories."

The preparation and distribution of biological and related products will be continued.

CONNAUGHT MEDICAL RESEARCH LABORATORIES
University of Toronto - Toronto 4, Canada


THIS ADVERTISEMENT WILL APPEAR IN
THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Issue of MAY, 1946

Connaught Medical Research Laboratories: University of Toronto



- **1972** – Ultimately, Connaught sold by UofT and today its legacy continues as Sanofi Pasteur Canada



Virus Research Laboratory, one of the research laboratories in the Dufferin Division, a 145-acre farm property 12 miles north of Toronto.

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Post War Polio Progress

- **1947-48** - Dr. Andrew J Rhodes, a leading virologist specializing in polio, was recruited from the UK to lead a comprehensive research program at Connaught to investigate the virology, epidemiology and diagnosis of polio
- Rhodes' research funded by NFIP, Canadian Life Insurance Companies, and the new Federal Public Health Research Grants

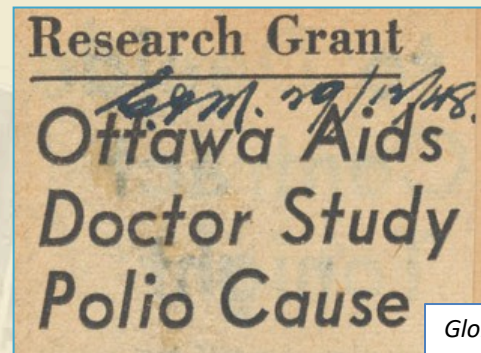


Sanofi Pasteur Canada Archives

Globe & Mail, Sept 11, 1948



Sanitary inspector of Dufferin County health unit, Harry Williams, is seen (left) taking sewage water samples from an open drain during study of poliomyelitis in the Dufferin County area. Check-back can be made to sewage sources for possible points of contamination. At right, Mr. Williams prepares check samples to be sent to Connaught Laboratories for analysis.



Globe & Mail, Dec 29, 1948

Key Poliovirus Studies, 1949: Arctic Polio

- **Winter 1948-49** – One of Rhodes' most significant projects involved investigating a highly unusual polio epidemic that struck Chesterfield Inlet on the western shore of Hudson Bay, with the Inuit community severely affected; 60 cases and 13 deaths among a population of 275, with many adults stricken
- Very little about this outbreak fit what was known about polio at the time, especially it striking so far north in the middle of an Arctic winter

The Canadian Medical Association Journal

Vol. 61

OCTOBER, 1949

No. 4

POLIOMYELITIS IN THE ARCTIC*

J. D. Adamson

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Assistant Pathologist, Winnipeg General Hospital

and

W. J. Wood

Regional Superintendent, Indian Health Services

DURING the autumn of 1948 and the winter of 1949 a widespread epidemic of acute anterior poliomyelitis occurred in the Eastern Arctic of Canada. This epidemic has attracted much attention since it was at its height during the winter in an isolated district, sparsely settled by Eskimos who had previously had no poliomyelitis. Thorough investigation was undertaken by Indian Health Services in the Federal Department of Health and Welfare, to whom this report is accordingly submitted.

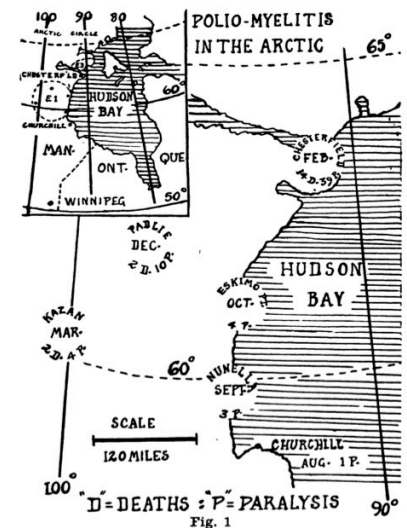
Two trips in ski-equipped aircraft were arranged by the Royal Canadian Air Force, the first in the first week of March and the second in the first week of May. The party received most valuable assistance from members of the white settlement at Chesterfield. Without

* This study was conducted under the direction of the Department of National Health and Welfare.

their general knowledge of the Eskimo and familiarity with local conditions the important features of the epidemic could not have been discovered.

THE LOCALE

Reference to the map will show the area affected to be between 60 and 65° N. and between 90 and 100° W. Chesterfield Inlet is a thousand air miles north of Winnipeg. This is one of the most northerly epidemics of polio-



myelitis on record and among the very few known to have occurred in Eskimos. Arne Hoygaard¹ refers to an epidemic in August-November, 1925, at Angmagssalik, East Greenland (65° N.) which caused 27 deaths among 800 Eskimos. He also refers to a report of an epidemic in West Greenland by A. Bertelson² in 1935.

It will be seen that the epidemic occurred during the coldest part of an unusually cold

Key Poliovirus Studies, 1949: Arctic Polio

- You can read more about the Arctic Polio story in my article, “Mercy Mission,” which was published in *Canada’s History Magazine* (Feb-March 2018).
- The article is available at,
- <http://healthheritageresearch.com/clients/docs/Arctic-Polio/>

MERCY MISSION

WHEN POLIO STRUCK THE INUIT COMMUNITY AT CHESTERFIELD INLET IN THE LATE 1940S, IT LED TO A TRAGEDY THAT SHOCKED THE COUNTRY.

BY CHRISTOPHER J. RUTTY

CONSTANCE BEATTIE WAS THE ONLY real choice to answer a distress call issued by the Department of Indian Affairs in late March 1949. A physiotherapist was urgently needed to help treat Inuit polio victims in the Arctic settlement of Chesterfield Inlet on the west coast of Hudson Bay. It would be an unprecedented mission in response to an unprecedented and especially tragic polio epidemic that struck during the winter of 1948–49, seemingly seeking out a large proportion of the immunologically vulnerable Inuit population. There were about 275 Inuit, along with 25 non-Inuit, living in and around the outpost.

Connie was twenty-four years old. She grew up in Brockville, Ontario, and graduated from the University of Toronto’s physiotherapy program in 1945 before serving in the Royal Canadian Army Medical Corps. In 1948 she joined Toronto East General Hospital’s physiotherapy department and very quickly became its head. She was also president of the Toronto branch of the Canadian Physiotherapy Association, which was where officials from the Department of Indian Affairs started their search.

Connie wasted little time in volunteering her services. “It will be a thrilling adventure and a chance to help those un-



Susie, an Inuk girl with polio, en route from Chesterfield Inlet (Igluligaarjuk), Keewatin District, to Winnipeg, circa 1949.



Post War Polio Progress: Vaccine Door Opening

- **1949** – Rhodes' Arctic polio investigations ultimately brought questions not of climate or Inuit food habits, but of human immunity, to the fore, underscoring how the poliovirus was widely distributed globally, even into the Arctic
- Yet this distribution had significant demographic and geographic gaps in countries with the most advanced public health infrastructures, and it was in such gaps that polio epidemics could be generated in any community
- This advance in understanding the disease was a critical step towards the development of polio vaccines

Canadian Journal of Public Health, Oct. 1949, p. 418

An Outbreak of Poliomyelitis in Canadian Eskimos in Wintertime

LABORATORY INVESTIGATIONS*

A. J. RHODES, M.D., F.R.C.P., Ed.¹
EINA M. CLARK, B.Sc., M.A.¹
ALICE GOODFELLOW, B.A., M.D.²
AND
W. L. DONOHUE, M.A., M.D.²

TECHNICAL METHODS

SEVERAL pathological specimens were obtained from Eskimos involved in an epidemic of poliomyelitis at Chesterfield Inlet which has been described elsewhere. The specimens were shipped by aeroplane in the frozen state, and were received in good condition; they were stored in the carbon dioxide ice chest until the time of examination. Some nervous tissue was also received in glycerol, and this was stored in the cold room.

It was decided to examine sufficient specimens by monkey inoculation to confirm the clinical diagnosis of poliomyelitis beyond reasonable doubt. Accordingly, the following 7 samples were selected as most suitable: preparations of brain and cord from 2 cases; stools from 3 cases; and throat washings from 2 cases.

Nervous tissue was prepared for inoculation by grinding in a mortar to constitute a 20 per cent suspension in broth. Penicillin (1,000 units per ml) and streptomycin (5 mg. per ml) were added, and the inoculations performed in rhesus monkeys by the cerebral route; the suspension was allowed to stand at room temperature for about 30 minutes before inoculation, to allow the antibiotics to act.

Bacteria-free extracts of 2 of the stool samples were prepared by shaking repeatedly with ether, without concentration of the contained virus. In the third case, virus in an aqueous suspension of stool was concentrated in the ultracentrifuge at approximately 39,000 r.p.m. Inoculations were made cerebrally and peritoneally in rhesus monkeys.

The throat washings were treated with penicillin and streptomycin without concentration of the virus, and inoculated cerebrally and peritoneally.

Monkeys were examined daily, and were killed when paralysis developed. Monkeys that did not develop paralysis were killed 4 weeks after inoculation. All animals were examined histologically.

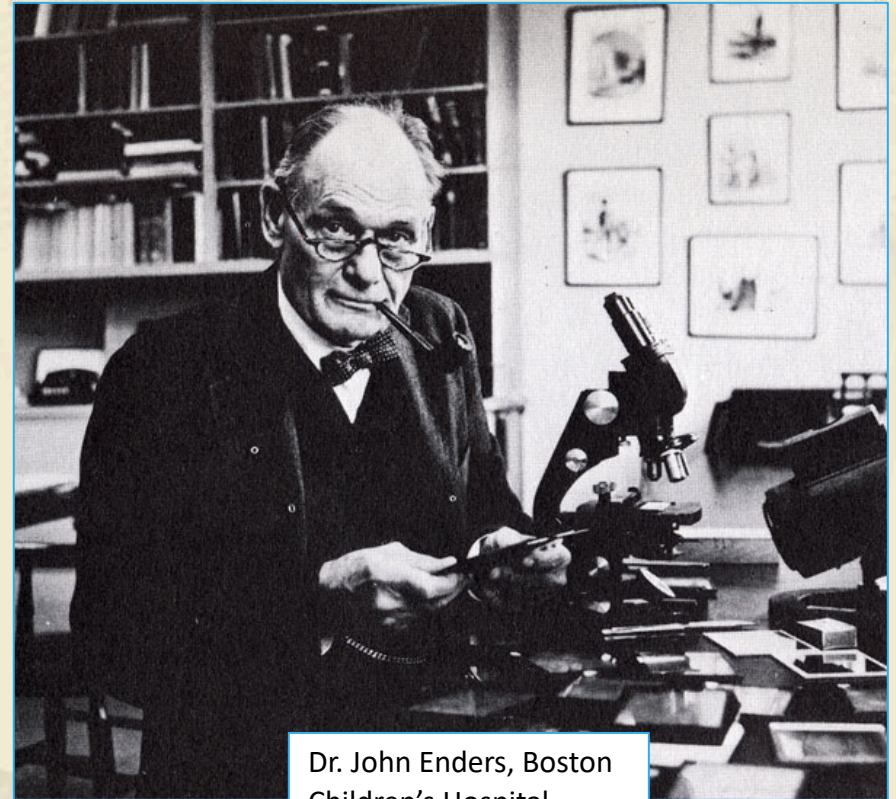
*Aided by a grant from the Department of National Health and Welfare, Ottawa.

¹Connaught Medical Research Laboratories, University of Toronto.

²Department of Pathology, Hospital for Sick Children, Toronto.

Post War Polio Progress: *Vaccine Door Opening*

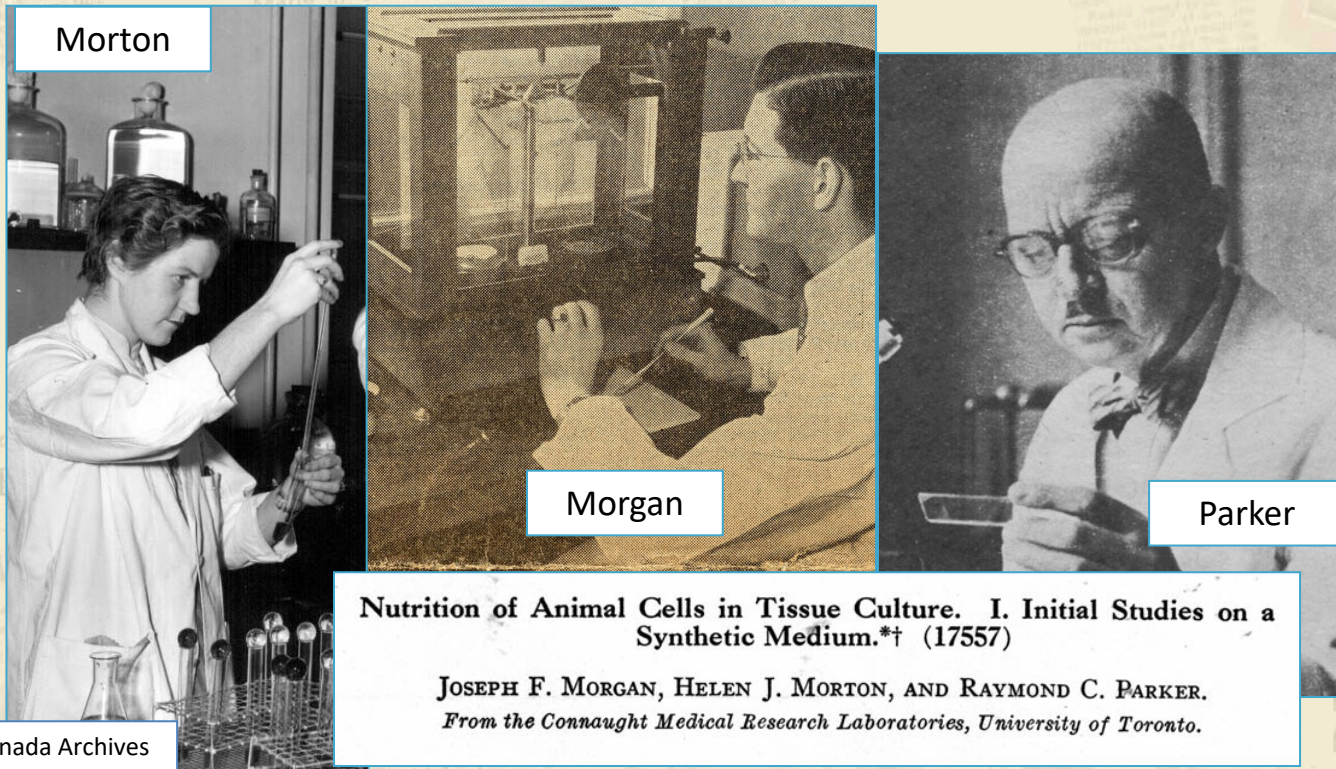
- **1949** - Hopes for a polio vaccine were also raised significantly when a research team in Boston, led by Dr. John Enders discovered a way to grow poliovirus in test tubes using non-nervous tissues
- This discovery earned the Nobel Prize
- A further advance was discovering the poliovirus in the bloodstream, in addition to the gastrointestinal track, pointing to two systems where a vaccine could be targeted



Dr. John Enders, Boston
Children's Hospital

Post War Polio Progress: Vaccine Door Opening

- **1949-50** – Although not linked to Rhodes’ poliovirus investigations until later, another Connaught research team developed the first chemically defined synthetic tissue culture medium known as “Medium 199”
- “Medium 199”, a precise mixture of 60+ ingredients, was originally developed for nutritional studies of cancer cells



Sanofi Pasteur Canada Archives

Nutrition of Animal Cells in Tissue Culture. I. Initial Studies on a Synthetic Medium.*† (17557)

JOSEPH F. MORGAN, HELEN J. MORTON, AND RAYMOND C. PARKER.
From the Connaught Medical Research Laboratories, University of Toronto.

Polio: Ontario, 1951

- **July 1951** – “Polio season” began with some 227 cases reported across Canada, with 161 in Ontario
- **Aug 1951** – Another 761 cases reported nationally; 561 in Ontario
- **Sept 1951** – 973 more cases nationally, 659 in Ontario
- **Polio Totals for 1951:**
 - 2,568 in Canada, 162 deaths
 - 1,701 in Ontario; 101 deaths

- Worst polio year in Ontario since 1937

Exhaust Oxygen Supply; Firemen Lose Race To Save Polio Victim

Peterborough, Aug. 6. — Two Peterborough firemen fought hard against insurmountable odds Sunday night in an effort to save the life of a young poliomyelitis victim.

In a rush trip to Riverdale Isolation Hospital in Toronto they used two ambulances, two inhalators and artificial respiration, but 25-year-old Alvin Snowden, Peterborough optical firm employee, was dead on arrival. During the trip one ambulance broke down, and at Oshawa they had to pick up a second inhalator. Before they reached Toronto it too, ran out of oxygen.

Capt. Garnet Brown and Fireman Bill Bloom left Peterborough at 11:05 and, in spite of their difficulties, arrived at the hospital at 12:50.

“We started out in Nesbitt’s ambulance from Peterborough,” said Bloom, “but about three miles east of Bowmanville a rod went through the motor. I hitchhiked into Bowmanville and got an ambulance from J. J. Morris and Sons and we went back and transferred Snowden.

“Then as we got near Oshawa Capt. Brown noticed we were run-

ning low on oxygen, so we stopped at the Oshawa Fire Department for their inhalator. Both of us were working on the man while Mr. Morris’ son drove so I don’t know just where it was, but about the time Scarborough police gave us an escort we ran out of oxygen. Capt. Brown started giving Snowden artificial respiration and I helped him.

“When we got to the city, the Toronto accident squad gave us an escort, and at 12:50 we were at the hospital, but it was all in vain.”

The death was Peterborough’s first from polio this year. Snowden had worked on Friday, but complained of feeling ill on Saturday. A doctor was called and on Sunday night he was ordered to the Toronto hospital for polio treatment.

14 Polio Cases During Weekend

The three-day holiday weekend turned up 14 new cases of poliomyelitis in Toronto, Health Department officials reported last night. The new cases, all but one being children, were reported between Friday night and Tuesday morning.

So far this year, 47 Torontonians have been stricken with the disease, as compared to only 30 for the whole of 1950 and 62 for the same period in 1949. The sole death this summer, that of a 22-year-old woman, occurred on July 19.

Of the weekend cases, one was a man of 26, the remainder youngsters between the ages of 2 and 14. Eight had no paralysis, the other four were slightly paralyzed either in legs or face.

At present, 17 of the 1951 cases are hospitalized, with nine still in the active stage.

Globe & Mail, Aug 7, 1951, p. 1

Globe & Mail, Aug 8, 1951, p. 5

Polio: Ontario, 1951

- The Toronto and surrounding area was hardest hit, with cases in Hamilton and Halton to the west, and the Peterborough area to the east
- Of particular note were the cases of respiratory paralysis, including many adults, some not making it in time to an iron lung
- Most dramatic was the case of a baby born to 25-year-old Peterborough woman in an iron lung at Riverdale Isolation Hospital; the first such case in Canada
- The news, however, soon turned tragic, first for the baby and then the mother

Mother Stricken by Polio, Baby Born in Iron Lung; Report Condition Good

A six-pound baby girl was born last night while her mother fought for her life in an iron lung at Riverdale Isolation Hospital.

According to Dr. Frank O'Leary, head of the obstetrical department at St. Michael's Hospital, the birth is the first, to his knowledge, of its type in Canada. There have been two or three cases in the United States of a polio victim giving birth in an iron lung.

Late last night both Mrs. William Miller, 25, and her new daughter were in good condition.

Earlier Dr. O'Leary and Dr. W. H. Jacques, assistant superintendent at the hospital, had followed the course of labor through portholes in the lung which completely covered the mother from the neck down.

Both doctors were contemplating the possibility of a Caesarian operation or even a post-mortem Caesarian when Mrs. Miller was brought in from Peterborough early in the evening.

In what hospital authorities described as "very critical" condition when she was admitted, she was kept alive during the last 17 miles of the ambulance trip with oxygen administered by a registered nurse.

While the two doctors were discussing the case, Mrs. Miller showed signs of regaining her strength and complained of a backache and other first signs of labor.

Through an anxious hour and a half they made complete preparations. When it was obvious that the moment of birth was near, the woman was slid out of the lung for less than a minute and Dr. O'Leary guided the birth with forceps.

The woman was immediately placed back in the lung and delivery of the placenta was made through the portholes. Following the delivery, Mrs. Miller showed good respiration and a marked improvement over her condition when she was admitted.

Her legs and chest muscles are paralyzed and her arms are partially paralyzed, Dr. O'Leary explained, "Mother Nature just overcame the obstacles."

The doctor said Mrs. Miller was given a few whiffs of anaesthetic just before she was taken out of the lung. "For the 30 seconds or so she was out of the lung," he said, "she was not breathing because of the paralysis in her chest muscles."

The baby, the doctor said, appears to be perfectly normal. She was due within the next week.

Mrs. Miller was stricken with polio Tuesday and the decision to move her to Toronto made yesterday after her respiration became serious.

Mr. Miller is a technician at Lumina Process Co. The couple has one other child, Michael, 2 years old.

Iron Lung Mother Dies of Polio

Mrs. William Miller, 25, of Peterborough, who gave birth to a six-pound girl while in an iron lung Thursday night, died Saturday of poliomyelitis, at Riverdale Isolation Hospital.

The child, born as Mrs. Miller was removed from the lung for less than a minute, died shortly after birth. Mr. Miller was on his way to Toronto when his wife died.

Globe & Mail, Aug 10, 1951, p. 1

Globe & Mail, Aug 13, 1951, p. 5

Polio: Ontario, 1951

- As the 1951 “polio season” continued in Ontario, there were other cases that seemed unusual, but which reflected polio’s broadening and highly variable threat during the early 1950s
- There were multiple cases in families, affecting children and parents, often with relatively mild effects
- Others, were deadly and heart-breaking

Polio Hits Scarborough Family of Seven

Three children are still in bed, while two adults, one older child and a baby have recovered from a mild form of polio which infected a Scarborough Township family one by one, over the past three weeks.

Only the mother, Margaret Woolhead, 33, was admitted to the hospital. She entered Riverdale Isolation Hospital on July 30 and was released on Aug. 4. Dr. C. D. Farquharson, medical officer of health for Scarborough, said the family has been released from quarantine.

Polio first struck the eldest daughter of Mr. and Mrs. Edward Woolhead, 13-year-old Myrna, a third form student at Markham High School. Then the parents contacted

polio and then the baby, 2-months-old Randy.

Still confined to bed are the Woolhead's three other children. Raymond, 11, a second form student at Markham High School; Barrie, 8, and Linda, 4.

Dr. O. E. A. Stephens, who, with Dr. R. E. Robinson of Agincourt, attended the family, said the illness was caused by a type of polio which does not paralyze.

Dr. K. R. Borland of Agincourt doubted that the entire family contracted polio. He denied a previous report that he had attended the family.

Mrs. Woolhead said Dr. Stephens believed the entire family had it.

“I was the only one in hospital, but tests showed the rest of the family had polio, even my 2-months-old baby,” declared Mrs. Woolhead.

Only one member of the family, the mother, was reported to health authorities as having polio, Dr. Farquharson said.

“Cells in fluid removed from the

Two cousins of the Woolhead's also were reported affected by the mild polio. They recovered. Mr. Woolhead's side, nor

Three

A 9-year-old woman and the three children were admitted to the hospital yesterday only to be discharged because of weakness.

The total number of cases in the family was any number.

Globe & Mail, Aug 17, 1951, p. 5

'A Perfect Pair,' 2 Young Sisters Killed by Polio

Two young sisters have died of polio in Toronto within two weeks. Frances Howell, 10, died at her Havelock St. home on Aug. 9. Her elder sister, Shirley, 15, was fatally stricken by the disease at Riverdale Isolation Hospital Monday.

She was one of three children to die of polio within 24 hours here. The other victims were Gordon Smith, 12, of Bellair St. and Garry Young, 14, of Malton.

“Shirley and Dolly were a perfect pair of happy sisters,” mourned their bereaved father. “Now we have nothing to live for any more.”

The father, Frank Howell, said the family had cancelled vacation plans because of the death of Frances, affectionately called Dolly, but had decided because of the city heat to spend a few days at their cottage near Eight Mile Point on Lake Simcoe.

“I wonder if we would have been better off to stay at home,” he said. “Perhaps Shirley would be still with us.”

Shirley became ill Saturday morning and was taken to Memorial Hospital at Orillia. When her condition was diagnosed, she was rushed to Isolation Hospital here Saturday evening in a police-escorted ambulance.

“I watched Dolly die,” her father said. “I saw the same look in Shirley's eyes.” Shirley was a star swimmer and basketball player at Central High School of Commerce, and was popular with all her classmates, who always regarded her as the life of the party.

Gordon Smith died Monday night, less than 48 hours after he had been taken to the Isolation Hospital. He became ill Friday, just after the family had returned from a month at Wasaga Beach.

Garry Young also died in the hospital Monday night, and was buried yesterday in Sanctuary Park Cemetery. His father, Harry Young, died

Globe & Mail, Aug 22, 1951, p. 5



Polio Hits Family—Ernest Ward of Toronto, his wife and 5-year-old son Tommy, were all reported improving last night after being stricken with poliomyelitis while visiting in Peterborough. The Wards' youngest child, Susan, 1½, has escaped the disease and is being cared for by grandparents. Mrs. Ward became ill last Tuesday, and on Wednesday her husband and son were stricken. Medical authorities said multiple cases in families were not common, but not unusual. Mr. Ward is a draftsman with the Ontario Hydro and lives at 20 Arden Cres., Scarborough.

Globe & Mail, Aug 14, 1951, p. 5

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Globe & Mail, Aug 17, 1951, p. 5



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Globe & Mail, Aug 14, 1951, p. 5

- During the COVID-19 pandemic there have been many similarly tragic stories of families hit especially hard by the disease

Globe & Mail, Aug 22, 1951, p. 5

Polio: Ontario, 1951

- **End of August 1951** – As the Labour Day weekend began, Toronto had reported 197 polio cases and 8 deaths so far, and once again there was debate over whether the start of school should be postponed
- In the county of Peterborough, to the north-east of Toronto, there would be a total of 7 deaths due to polio
- **Aug 31** – Within Peterborough county, the small village of Omemee would report its first case of polio, the youngest son of Scott Young, a noted writer, 5-year-old Neil; the town's 2nd case would prove fatal

THE GLOBE AND MAIL, FRIDAY, AUGUST 31, 1951. 5

Postpone School Start Due to Polio: Lamport

With summer vacation due to end next Tuesday, the possibility of postponing the reopening of the schools, in view of the polio situation, was raised last night by ex-Con. Allan Lamport.

Mr. Lamport said that he had wired Harold Males, chairman of the board of education, suggesting consideration of such a step as a means of protecting the children.

With four new cases and one death among Toronto residents in the last 24 hours, total for the year now stands at 197 cases and eight deaths. For the corresponding date in 1949, there were 127 cases and three deaths and in 1937, the year of the last epidemic, there were 263 cases and 11 deaths.

The board of education would have to have the permission of the Education Department at Queen's Park to prolong the vacation period. The board of health, however, has authority to keep schools closed. It would be guided by the advice of Dr. L. A. Pequegnat.

Mr. Lamport said the incidence of polio appears to be approaching a peak and for that reason he felt that postponement warranted some consideration.

There were three polio deaths in the last week at Riverdale Isolation Hospital, all adults. The Toronto victim was Thomas Edward Little, 25, a member of the Royal Canadian Regiment, who became ill while at home Saturday.

Paul Eric Schweltzer, 23, Old Mill Dr., York Township, and William Reginald Barrett, 35, Scarboro Township, were the other two fatal cases.

Toronto Suffers 12th Polio Death

The 12th polio death of the year among Toronto residents was reported yesterday by the Department of Public Health. The victim was Fred Schaeff of Silverthorn Ave., 26-year-old father of two children, who died in hospital Sunday night.

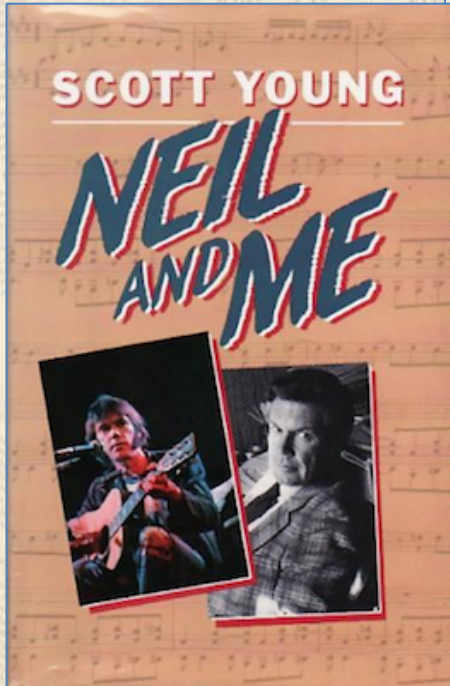
Thirteen new cases developed over the weekend, making the total for the year 292. For the corresponding date in 1937, the year of the polio epidemic, there were 562 cases and 24 deaths. Eleven of the cases were children under the age of 14. The other two were a man and woman in the 20-24 age group.

Globe & Mail, Sept 18, 1951, p. 5

Polio: Ontario, 1951: Neil Young Case

“Polio is the worst cold there is.”

*Neil Young, 1951, age 5
Omeme, ON*



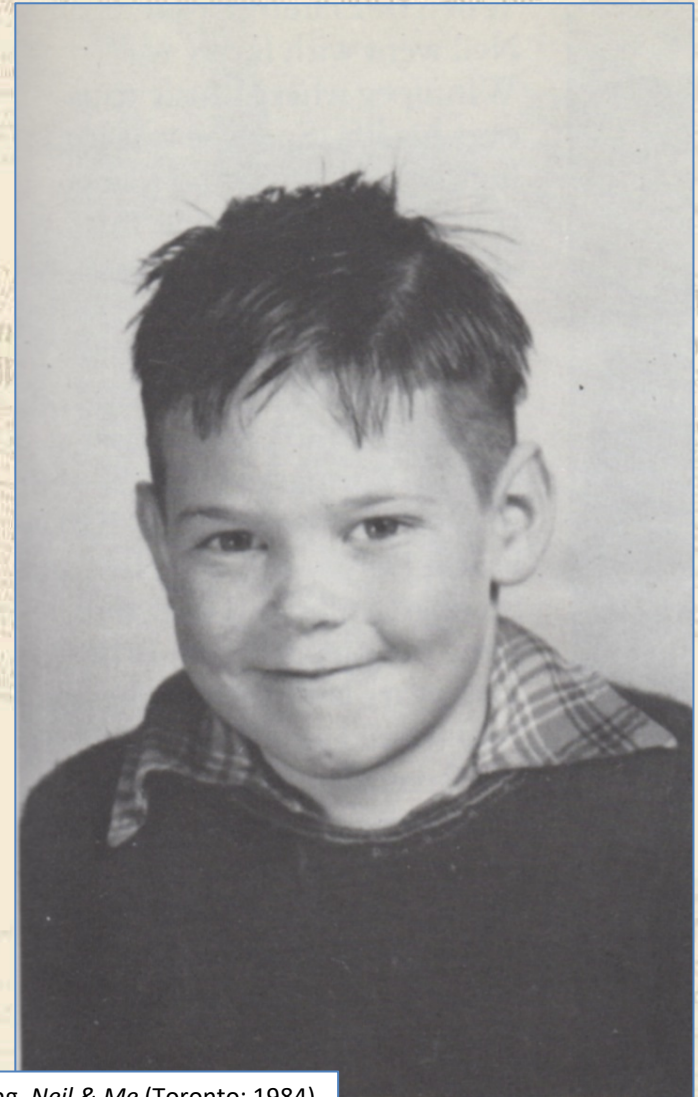
CHAPTER THREE

Polio Was a Killer – and Neil Had It

You have to be a certain age to remember the polio epidemic in the late summer of 1951, before there was Salk vaccine to control the disease. In Omeme, as elsewhere in Canada, the headlines every day gave the statistics, usually using the phrase “infantile paralysis” because the killer disease most often struck the young. News reports explained the different types. One form could kill a person in a few hours. Another could result in paralysis and leave a person crippled for life. People that August stayed away from fairs and exhibitions and were urged to avoid mingling in crowds anywhere. In cities the ultra-cautious walked instead of taking streetcars, and kept their distance from everyone else. City or country, the fearful woke in the night wondering if that back pain was the polio back pain, or that sore throat was the polio sore throat. There was, however, no polio in Omeme as the summer wore on into early September and the ducks began to flock up on the lake and partridges in farm wood lots began to feed in late afternoons under the apple and hawthorn trees.

Then Omeme did have its first case, and ten days later in September I went up to my third-floor study and wrote something, not for sale, but just so I would remember. It sat in my files for nearly thirty years, unpublished. Here it is, exactly as written in 1951:

The night that polio first made my younger son groan sleepily in his bed, I was reading. It was past one o'clock and I was the only one awake in the house. I waited for a minute or two after the first sound I heard from Neil's room. He seemed to be mumbling to himself. I got out of bed, trying not to disturb my wife, and opened his door. In the dim light that shone across the hall from



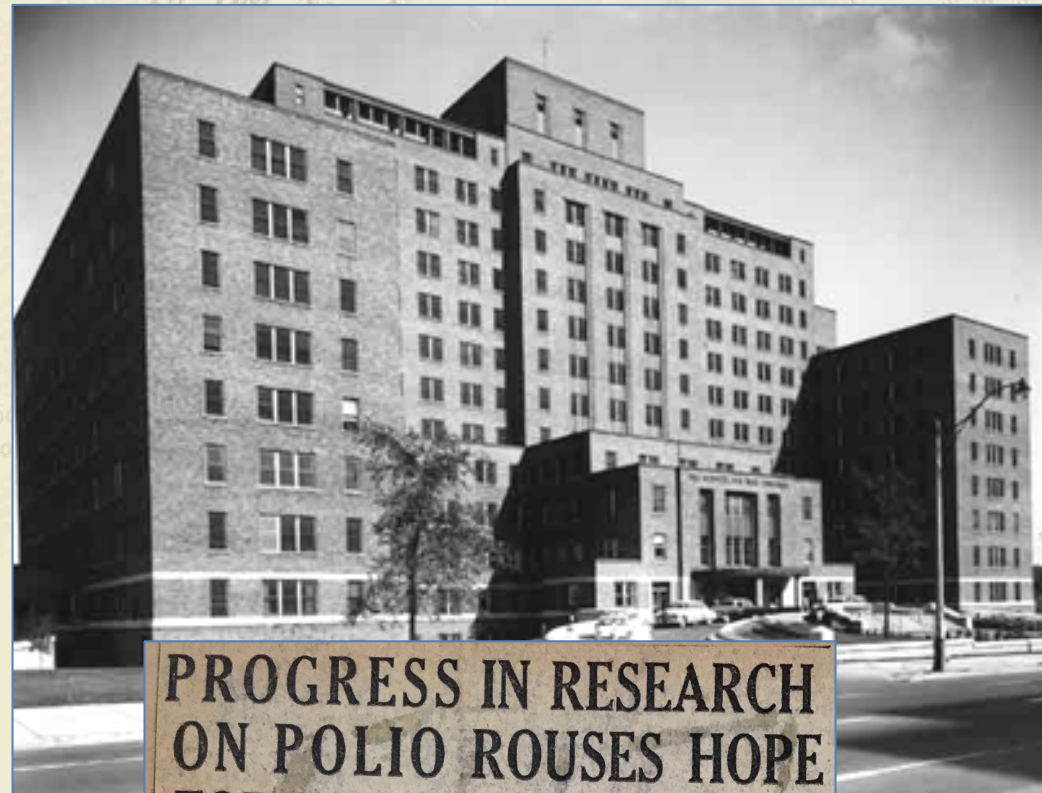
Scott Young, *Neil & Me* (Toronto: 1984)

Key Poliovirus Studies, 1951

- **Fall 1951** – While young Neil Young stabilized in the Hospital for Sick Children's isolation ward, little did he know that elsewhere in the hospital some very significant polio research was taking place in a state-of-the-art Virus Laboratory designed by Dr. Andrew J. Rhodes



Toronto Telegram, Dec. 1953



PROGRESS IN RESEARCH ON POLIO ROUSES HOPE FOR PREVENTIVE TOXOID

By ROY GREENAWAY

An important step in polio research, which may eventually lead to production of a prevention vaccine or toxoid similar in effect to diphtheria toxoid, is credited to Dr. Andrew Rhodes, a young Toronto research worker at the Connaught Laboratories. The research, originated in the Hospital for Sick Children, is being continued by the Connaught Laboratories under the direction of Dr. Rhodes, who for years has been concentrating on polio.

The fundamental idea behind the research is to obtain an attenuated or weak strain of the polio virus which the body can easily destroy, and in the process build up effective antibodies. These antibodies, remaining in the body, would give immunity against any future serious attacks of the disease.

Toronto Star?, Fall 1951

Key Poliovirus Studies, 1951



Sanofi Pasteur Canada Archives

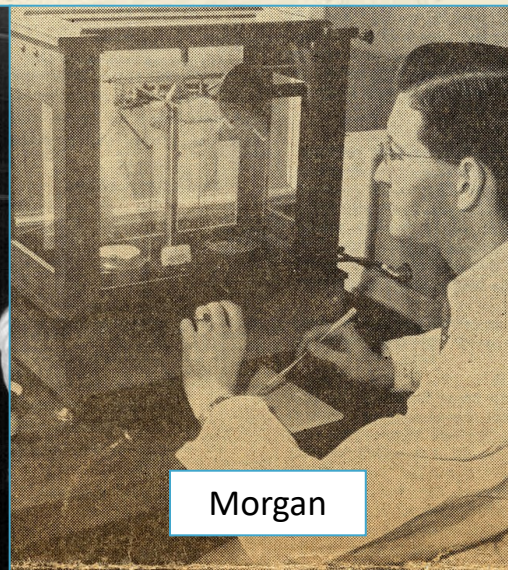
- **June 1951** – Dr. Arthur E. Franklin (left), who had recently earned his Ph.D. in Biochemistry, joined Rhodes’ polio research group, focusing his skills on cultivating the poliovirus in various tissues using a traditional animal serum-based nutrient media solution, but with limited success
- **Nov 1951** – After trying to modify the existing medium, Franklin happened to meet at a Connaught Labs seminar, Dr. Joseph Morgan, the biochemist behind Connaught’s recently developed “Medium 199,” the world’s first purely synthetic tissue culture nutrient medium

Key Poliovirus Studies, 1951

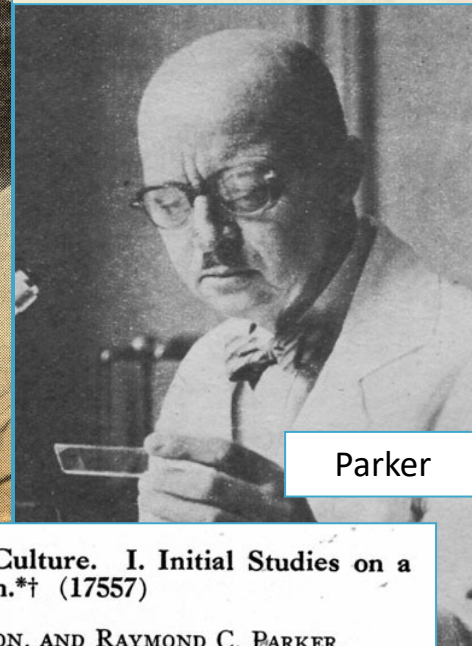
- **1949-50** – As noted earlier, “Medium 199”, a precise mixture of 60+ ingredients, was originally developed at Connaught for nutritional studies of cancer cells
- A lot could be learned about cancer cells when scientists were able to precisely measure what elements they require nutritionally, or do not require



Morton



Morgan



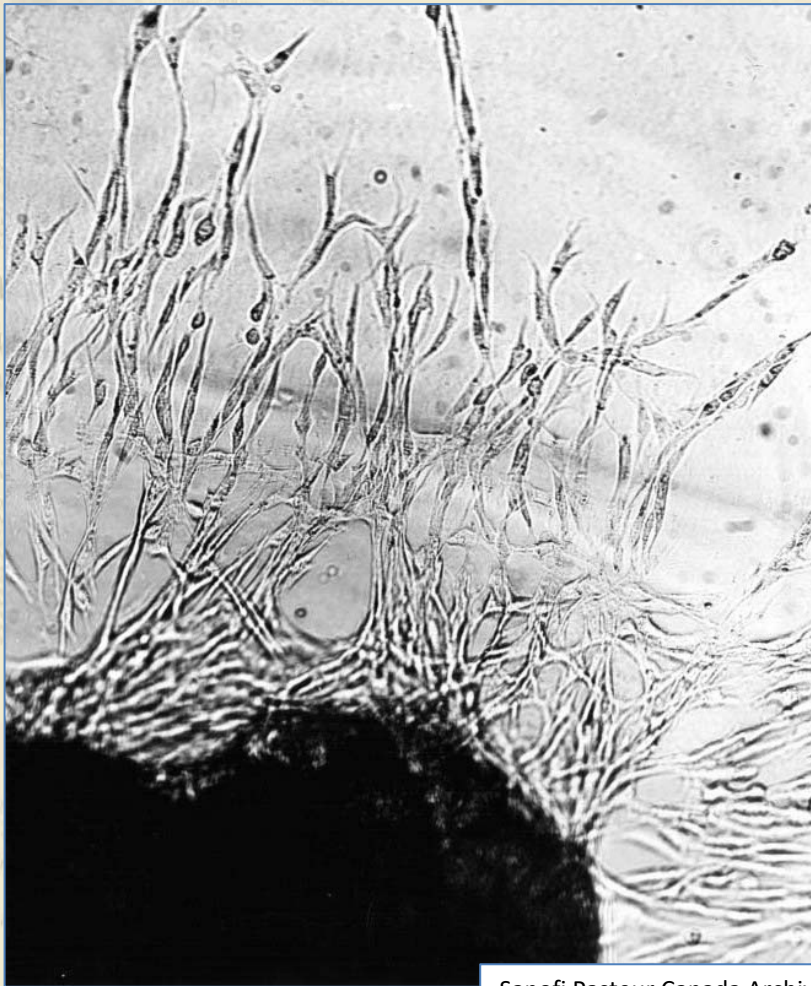
Parker

Nutrition of Animal Cells in Tissue Culture. I. Initial Studies on a Synthetic Medium.*† (17557)

JOSEPH F. MORGAN, HELEN J. MORTON, AND RAYMOND C. PARKER.
From the Connaught Medical Research Laboratories, University of Toronto.

Sanofi Pasteur Canada Archives

Key Poliovirus Studies, 1951

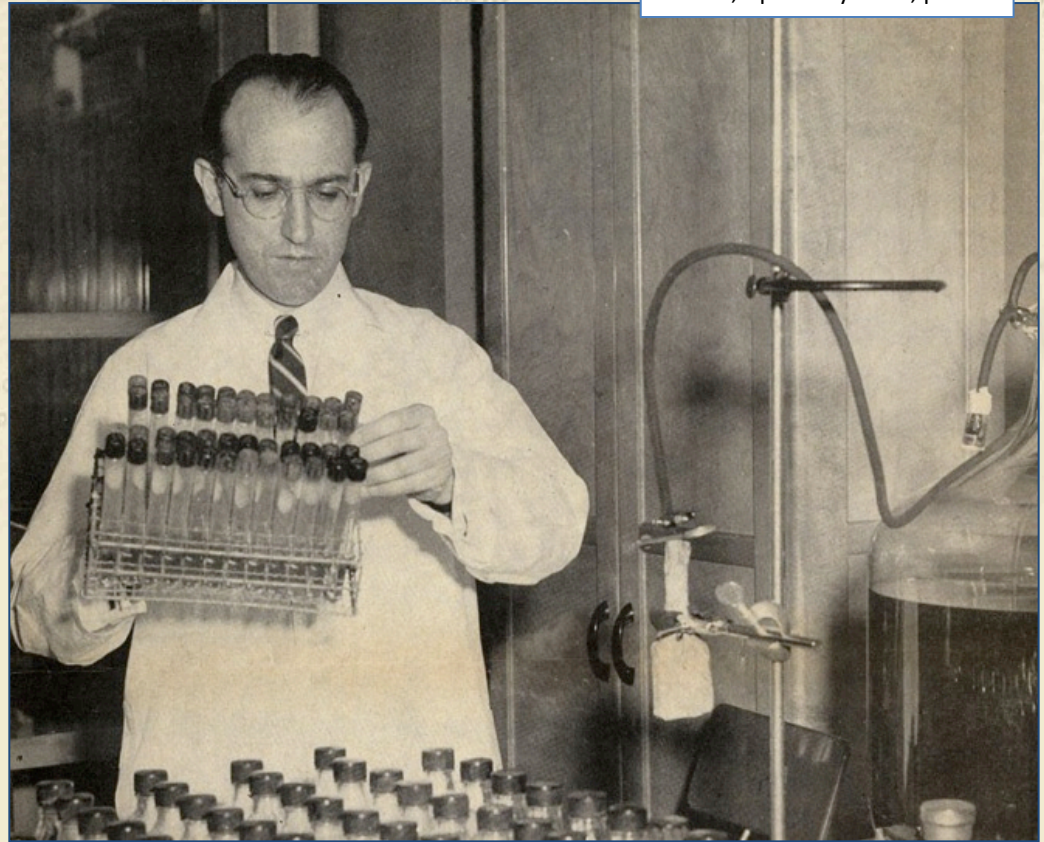


Sanofi Pasteur Canada Archives

- Morgan supplied Franklin with some Medium 199, and it was quickly apparent that it solved, quite spectacularly, most of the problems Franklin was having with cultivating the poliovirus, vastly improving the yields and purity of poliovirus cultures
- When Rhodes' initially found out about Franklin's remarkable results with 199, in an uncharacteristic display of excitement, he jumped up on a chair and cheered

Dr. Jonas E. Salk: Polio Vaccine Pioneer

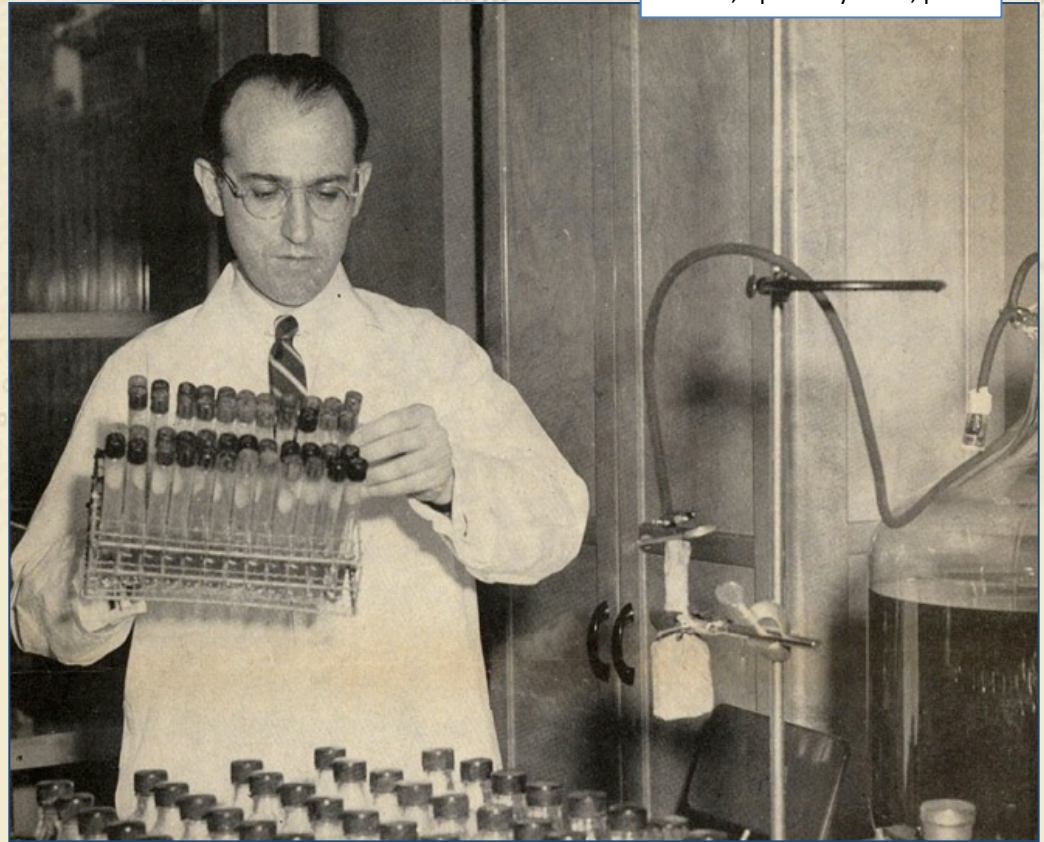
- **1951** - In the meantime, Dr. Jonas Salk, at the University of Pittsburgh, had shown that an inactivated poliovirus vaccine could prevent polio in monkeys
- **1952** - News of Connaught's "Medium 199" and its successful use for poliovirus cultivation, opened the door for Salk to plan for a first human trial of his polio vaccine
- **Late 1952** – The first trial took place at a residence for disabled children, most with polio, to test for antibody response and general side effects



- The first vaccine trial, and then a second, proved successful, but the major problem remained of how to make the vaccine on a large enough scale for a definitive field trial

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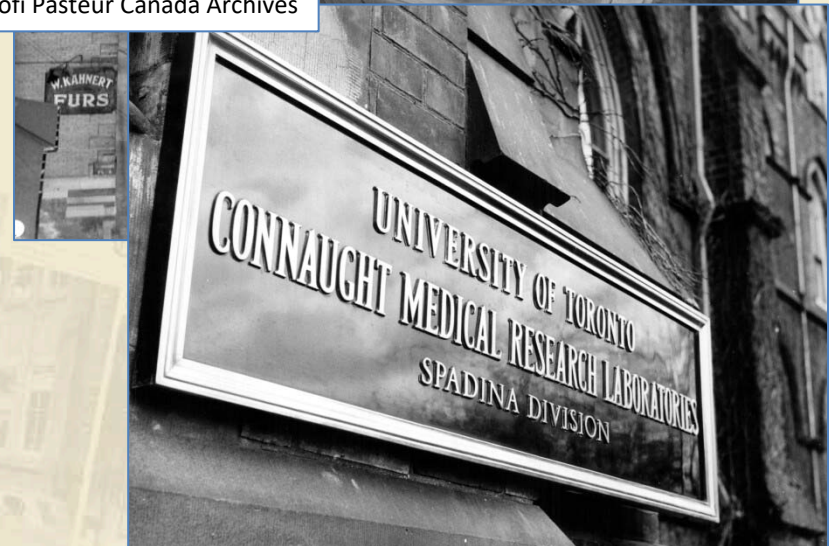
- Salk's first polio vaccine trials were the equivalent of a Phase 1 vaccine trial

Key Poliovirus Studies, 1952-53

- Connaught Lab's Spadina Building, acquired by the Labs a decade earlier to prepare penicillin, became the focus of solving the problem of how to produce Salk's inactivated polio vaccine on a larger scale
- **1952** - Recognizing Connaught's experience in developing large scale vaccine and biologicals production technologies, the NFIP financed a major pilot project to cultivate poliovirus in large quantities



Sanofi Pasteur Canada Archives



Key Poliovirus Studies, 1952-53: *The Toronto Method*

- Key to efforts to grow the poliovirus in larger containers was Dr. Leone N. Farrell, who had considerable experience with the large-scale production of vaccines



Sanofi Pasteur Canada Archives

Key Poliovirus Studies, 1952-53: *The Toronto Method*

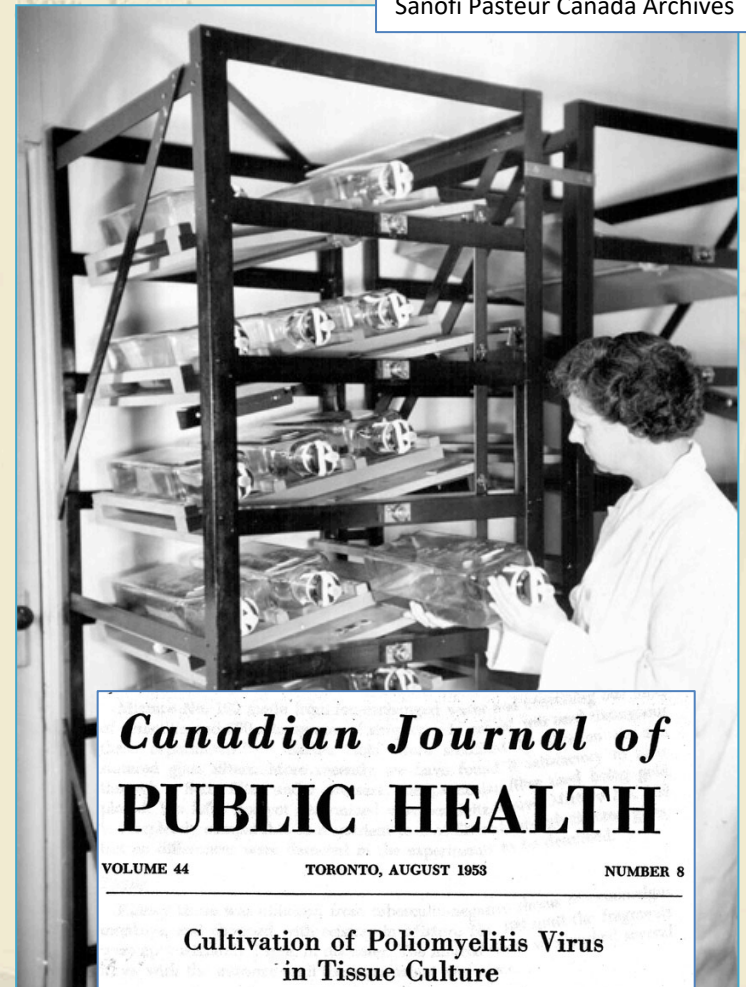


Sanofi Pasteur Canada Archives

- Dr. Leone Farrell was among a small group of women of her generation to earn a Ph.D. in the sciences
- She was a true pioneer in the laboratory, innovative in her work and inspirational in her dedication to it
- **1939-40** – She developed a new deep culture method of “rocking” cell cultivation (“Toronto Method”) for the bulk production of toxin in a liquid semi-synthetic cell nutrient mixture
- **Early 1940s** – She adapted this deep culture “rocking” method for the production of pertussis vaccine

Key Poliovirus Studies, 1952-53: *The Toronto Method*

- **1953** - Farrell adapted the “Toronto Method” to the production of poliovirus fluids using Medium 199 to cultivate the virus in monkey kidney cells in large Povitsky bottles that were incubated on custom built rocking machines
- **July 1953** - In the wake of the worst polio epidemic year in U.S. history, and encouraged by Salk’s and Connaught’s progress, the NFIP asked the Labs to provide all of the poliovirus fluids required for an unprecedented controlled field trial of Salk’s inactivated polio vaccine



Canadian Journal of **PUBLIC HEALTH**

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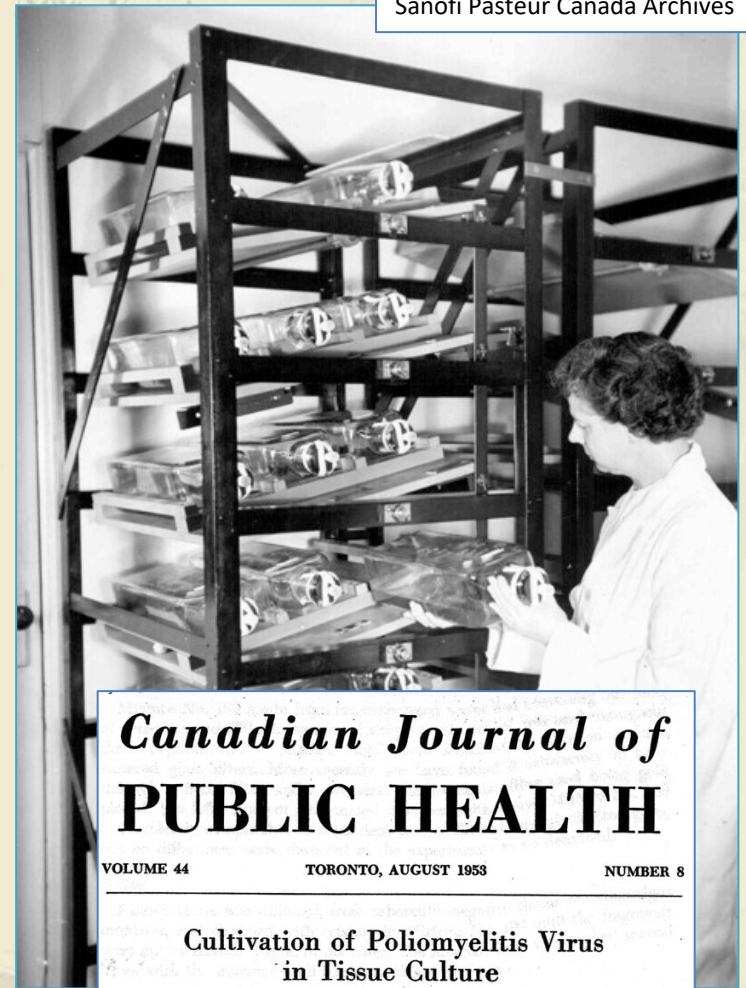
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- Canada’s worst polio epidemic year was just starting...



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Summer of Fear, 1953

- **1953** – Canada's worst polio year began in the Yukon in May; it eventually affected most provinces and continued through the winter into 1954

Yukon Polio Total 130 Cases, 5 Fatal

Edmonton, June 23 (CP).— An outbreak of polio in the Yukon has taken at least five lives, striking 59 civilians and 71 military men and their dependents. Three of the deaths were civilian cases. Canadian servicemen and their dependents are being attended in the 75-bed Whitehorse military Hospital. Civilians are being treated in hospitals at Dawson City, Mayo and Whitehorse.

Three iron lungs have been flown into the Yukon by the RCAF.

Globe & Mail, June 24, 1953, p. 32

Poliomyelitis in the Yukon

J. D. ADAMSON, M.D.,¹ MALCOLM R. BOW, M.D.²
AND E. H. LOSSING, M.D.³

THE YUKON is a sparsely settled Territory in the north-west extremity of Canada. It extends into the Arctic, lying between 60° and 40°N. longitude and between 130 and 140°W. latitude (see map). To the north is the Arctic Ocean, to the west, Alaska, to the south, British Columbia, and to the east, the Northwest Territories. The capital city, Whitehorse, lies 1,369 miles by the Alaska Highway north-west of Edmonton. The most northerly settlement, Dawson City, lies 250 air miles farther north. The country is mountainous, with very little arable land, and is richly grown with poplar, spruce and jack pine of small size. It is drained to the north-west by many magnificent, rapidly flowing, navigable rivers, all of which ultimately join the Yukon, which empties into the Behring Sea. The climate is moderate in comparison to the Eastern Arctic and other parts of the earth of equal longitude. The annual mean temperatures for the past eleven years are as follows: 1942, 32.4; 1943, 33.2; 1944, 34.7; 1945, 31.0; 1946, 31.2; 1947, 32.7; 1948, 28.6; 1949, 30.8; 1950, 27.6; 1951, 28.3; and 1952, 31.4. The average monthly temperatures during the first five months of 1953 were: January, 13.9; February, 19.1; March, 16.5; April, 35.8; and May, 48.9. The monthly mean for the 10-year period was as follows: January, 1.5; February, 7.5; March, 19.1; April, 31.4; May, 45.9; June, 54.7; July, 57.3; August, 53.7; September, 46.4; October, 34.1; November, 16.3; and December, 4.8.

THE PEOPLE

Before 1898 the country contained only a few bands of Indians and Metis, who lived by fishing and trapping, and some widely spaced trading posts. Then came the gold strike on the Klondike River, which joins the Yukon at Dawson City. This was followed by the most noteworthy gold rush in Canadian history, which brought all conditions of men and women swarming down the waterways and overland. It is said that the population of Dawson City reached 25,000. Fabulous wealth was temporarily attained by a few; abject failure was the fate of most. The Klondike days have become a legend and a pensive memory to the oldtimers. Since then the Yukon history has been punctuated by strikes of gold, silver, lead, zinc and uranium, and prospectors are always on the prowl. The only large operation at present is at Keno, 35 miles north-east of Mayo, where there is a settlement of 500 people, including miners and dependents.

¹Former Professor of Medicine, University of Manitoba.

²Chief Medical Health Officer, Yukon Territory.

³Epidemiology Division, Department of National Health and Welfare, Ottawa.

Summer of Fear, 1953

- From Manitoba west, especially, every province felt the full effects of epidemic polio at record or near record levels
- While the experience of each of the western provinces was dramatic and devastating, it was Manitoba that faced the worst crisis in the country, if not in the history of this disease

National numbers:

- 9,000 cases (59.9 per 100,000)
- 500 deaths

Manitoba:

- 2,317 cases (286.4/100,000)
- 91 deaths

Winnipeg:

- 763 cases (318/100,000)

Canadian Journal of **PUBLIC HEALTH**

VOLUME 45

TORONTO, MAY 1954

NUMBER 5

The Poliomyelitis Epidemic in Winnipeg, 1953

EPIDEMIOLOGICAL STUDY, INCLUDING THE USE
OF GAMMA GLOBULIN

R. G. CADHAM, M.D., D.P.H.
*Deputy Medical Health Officer
Winnipeg, Manitoba*

DURING the summer months of 1953 the City of Winnipeg (population 243,000) experienced the second largest case rate of poliomyelitis ever to occur in North America in an urban population of over 200,000. A total of 763 cases was reported. The case rate was 318 per 100,000 population. Type I virus was identified in stool specimens from hospital patients. The only previous epidemic in a large urban centre in which this case rate was exceeded was in Newark, New Jersey, in 1916, with a case rate of 340 per 100,000 population. Other severe poliomyelitis epidemics with a high incidence of reported cases in American cities with populations in excess of 200,000 are as follows (1): Los Angeles (1934), 95; Providence (1935), 100; Buffalo (1944), 110; and Minneapolis (1946), 150.

In Table I are shown the number of reported cases and the case rate for

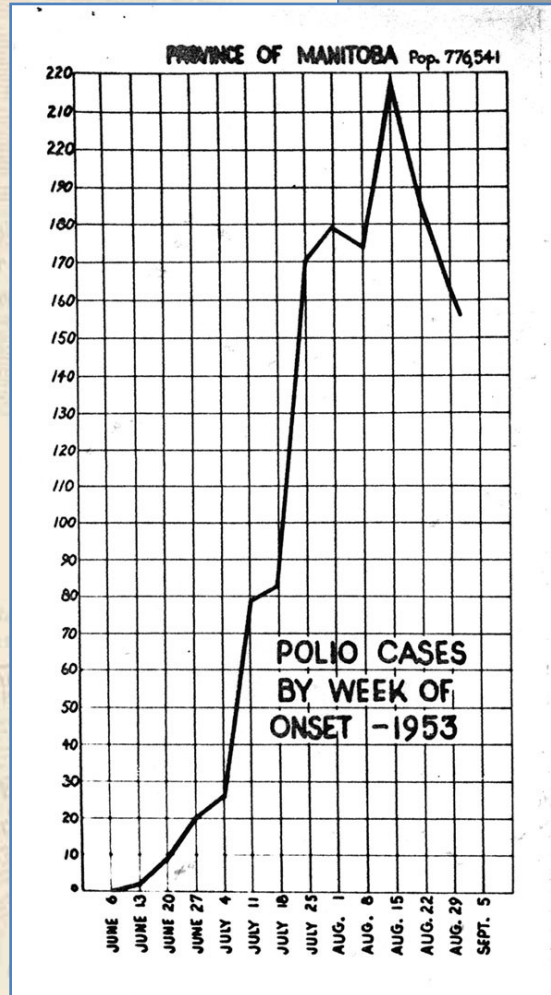
THE B. SUN. 28.11.53 Manitoba Had Heaviest Polio Epidemic In World History

WINNIPEG (CP) — This year's technical advisory committee said polio epidemic in Manitoba which "we know of no polio epidemic in struck nearly 2,300 persons and the world of similar magnitude." caused 82 deaths is believed to The 2,300 cases were 120 per cent more than in Manitoba's lar-

Brandon Sun, Dec 28, 1953

Summer of Fear, 1953

- **May 1953** - The first cases of the epidemic were reported, the numbers growing steadily until late June
- Incidence then escalated alarmingly, reaching a peak of 244 cases per week by mid-August, staying above 160 cases per week for the next three weeks, and then slowly declining
- Cases were reported through December and to the end of February 1954



Summer of Fear, 1953

- During the 1953 epidemic, many iron lungs were needed all over the country, although the greatest need was in Winnipeg
- The Canadian Air Force was called on to transport iron lungs, from elsewhere in Canada and from the U.S., in a desperate attempt to meet the crisis



Riverview Health Centre Archive, Winnipeg

RCAF Flies F.P. 27 8 53 p. 1 Iron Lungs To Winnipeg

Ten iron lungs for treatment of polio victims at King George hospital arrived in Winnipeg from Boston Wednesday night aboard an RCAF C-119 "Flying Boxcar."

The 10 respirators bring to 14 the number flown here by the RCAF in answer to a request by provincial health authorities.

Difficulties in transporting iron lungs from Boston factories to Winnipeg originally prompted the request for air force assistance.

There is no immediate need for the respirators, but health authorities feel they will provide a safeguard against any future development in the Manitoba polio epidemic.

The aircraft, one of four of its kind in Canada, left its home base at Montreal Monday afternoon. It will leave Winnipeg today to return to Montreal.

Summer of Fear, 1953

- As the 1953 epidemic began there were 21 adult-size iron lungs and one child-size respirators in Manitoba, but of these, 13 were occupied by cases from 1952.
- Initial confidence that the supply of iron lungs would meet any need was soon shattered and by August there was a desperate scramble to get iron lungs to Winnipeg's King George Hospital

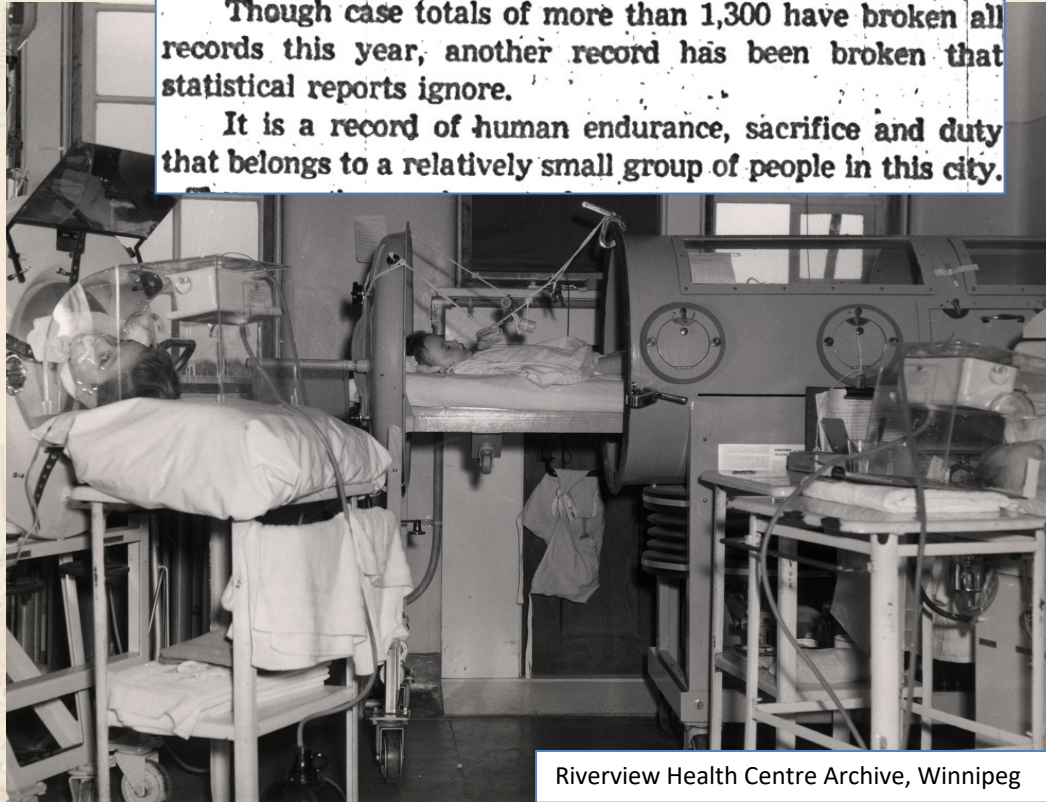
Small In Number, A 'Fighting' Few, Stand Polio Siege

FP 5.9.53 p.1
BY LYN CHANDLER

Statistics never tell the whole story of the Manitoba polio epidemic.

Though case totals of more than 1,300 have broken all records this year, another record has been broken that statistical reports ignore.

It is a record of human endurance, sacrifice and duty that belongs to a relatively small group of people in this city.



Riverview Health Centre Archive, Winnipeg

Summer of Fear, 1953

- The crisis grew sharply worse...
 - A total of 64 patients needed iron lungs by the end of August, 72 a week later, 82 by September 21st, and an overwhelming 92 cases were dependent on respirators at once at KGH at the beginning of October.
- In total, 165 cases were treated in iron lungs in Winnipeg's King George Hospital; 62 died during the epidemic



Riverview Health Centre Archive, Winnipeg



Summer of Fear, 1953

- This dramatic and desperate search for and transport of iron lungs, and of patients in need of them, by the Air Force, or any other means, was repeated, though on somewhat lesser scale, across Canada in 1953



Riverview Health Centre Archive, Winnipeg

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Riverview Health Centre Archive, Winnipeg

- In many ways the challenges associated with securing sufficient supplies of ventilators to manage COVID-19 patients during the pandemic very closely echoes the 1953 polio epidemic crisis

Summer of Fear, 1953

- The financial costs of the 1953 polio epidemic in Manitoba in particular, and in Canada generally, were extremely high, leaving many wondering who would pay the bills
- The epidemic occurred within a context of rising interest in public health insurance and a federal election in which it became an issue

WINNIPEG FREE PRESS, THURSDAY, DECEMBER 10, 1953 p. 10

Canada Hard Hit By Polio Epidemic

By THE CANADIAN PRESS

Canada is nursing the wounds of one of the worst outbreaks of polio in her history. The western flank of the 1953 epidemic outmanoeuvred medical defenders and short-lived theories, resulting in at least 269 deaths in the four western provinces and a high rate of paralysis among the 5,318 cases.

In eastern Canada, polio followed a generally orthodox route, creating a record incidence and death only in Newfoundland, which experienced a 1953 increase to 12 deaths and 224 cases from the five cases and no deaths reported last year.

When final figures are available, the number of polio cases across Canada this year is expected to double the 1952 total. The federal health department reported in the Commons Wednesday that to Nov. 28 there had been 8,298 cases compared with 4,755 last year.

Manitoba, Alberta and Ontario were the hardest hit by this season's outbreak.

In Manitoba there were 300 cases of polio for every 100,000 persons, a total of 2,318 cases, of which 85 persons died. Government officials say this incidence exceeded all known Canadian and world figures.

Alberta, plagued with an epidemic prolonged beyond the normal period, has suffered 98 deaths

persons over 20. In Alberta, too, polio no longer is considered a children's disease. Seventeen per cent of the 98 Alberta deaths occurred in children under 10, while 60 per cent were persons between 20 and 40.

In previous years, the oil province has seen epidemics hit their peak in August and end their normal decline in September. This year, 40 per cent of deaths occurred in the final quarter of the year.

"Cold weather" polio also continues in British Columbia, where, for bulbar and paralysis, 1953 has been the worst year in the province's history.

There have been 595 cases and 37 deaths in the B. C. this year, compared with 760 cases and 26 deaths last year. Medical authorities term the increased death rate "exceptionally low" compared to the Prairie figures but say Prairie provinces have had more bulbar.

Bulbar polio occurs when the polio virus attacks the "bulb," or spinal nervous system at the base of the neck, and affects respiratory muscles. Paralysis of other nature results from infections of other sections of the nervous system.

Alberta hospitals have crowded isolation wards with iron lungs, including 12 flown from Boston, to combat bulbar polio.

CAUSE UNKNOWN

Polio Now Major Issue Says Martin

FP. 3.12.53 P. 1.

OTTAWA (CP) — Poliomyelitis has assumed new prominence as a major public health problem in Canada, Hon. Paul Martin, health minister, said Wednesday in the Commons.

He said preliminary figures of 8,213 cases and 354 deaths "indicate that this year's outbreak will prove to be one of the most serious on record."

Replying to a question by E. G. McCullough (CCF—Moose Mountain) as to what federal assistance is being provided, Mr. Martin said the government has made more

Winnipeg Free Press, Dec 3, 1953, p. 1



Riverview Health Centre Archive, Winnipeg

Summer of Fear, 1953

- The financial costs of the 1953 polio epidemic in Manitoba in particular, and in Canada generally, were extremely high, leaving many wondering who would pay the bills
 - The epidemic occurred within a context of rising interest in public health insurance and a federal election in which it became an issue
- Canadian Medicare certainly removes the direct economic impact of COVID-19, but the broader economic impact of the pandemic has been much greater than polio's worst epidemic year

WINNIPEG FREE PRESS, THURSDAY, DECEMBER 10, 1953 p. 10

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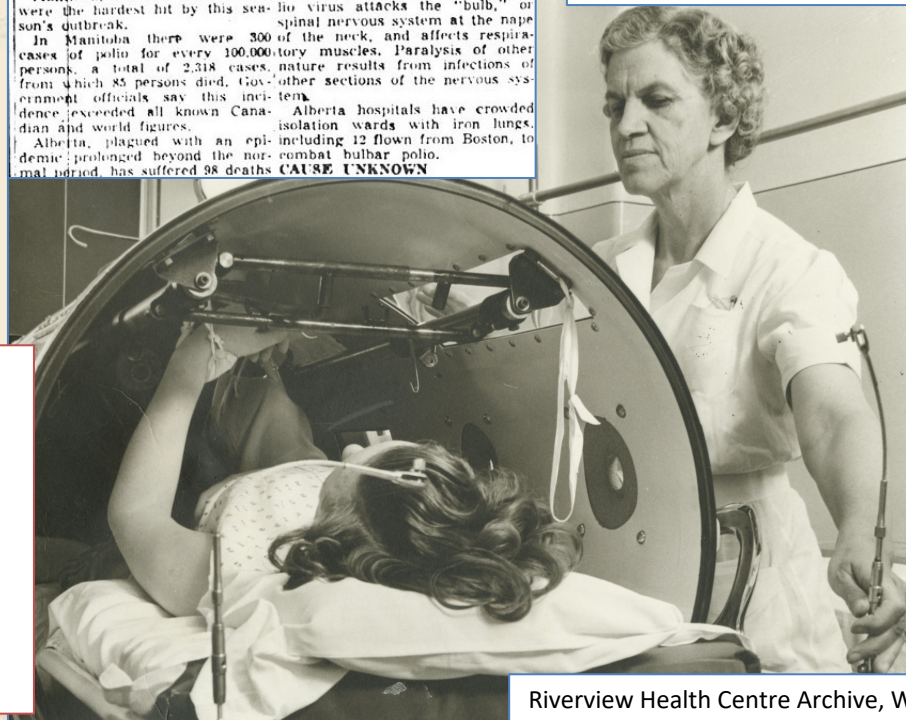
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Winnipeg Free Press, Dec 3, 1953, p. 1



Riverview Health Centre Archive, Winnipeg

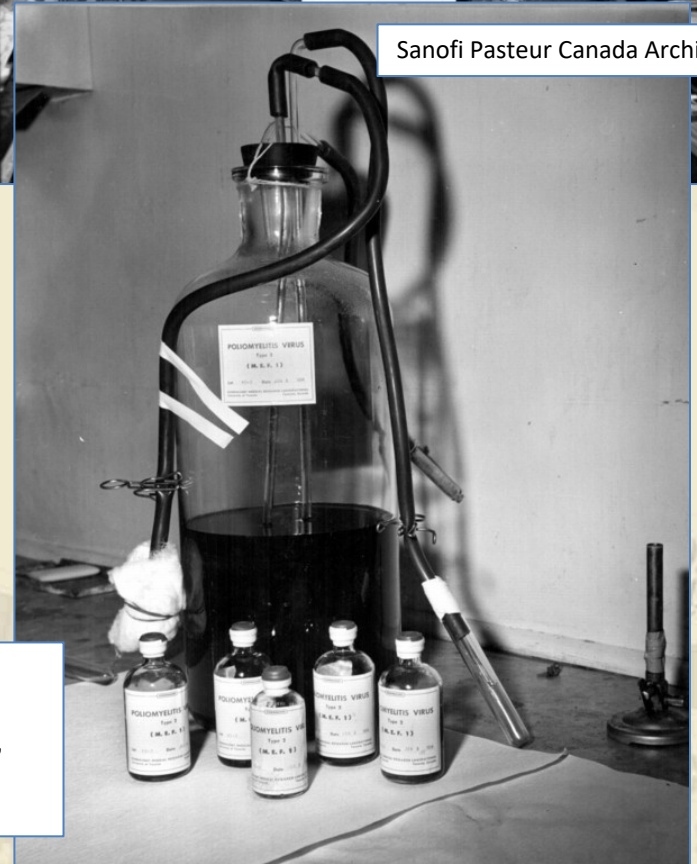
Polio Vaccine Trial, 1953-54: Connaught's "Herculean Task"

- **1953-54** – While the polio emergency worsened, Connaught undertook -- as Salk described it -- the "herculean task" of producing over 3,000 litres of poliovirus fluids for what would be the largest vaccine field trial ever attempted
- The poliovirus fluids were shipped to two U.S. pharmaceutical firms by station wagon for inactivation and processing into the finished vaccine in time for immunizations to start in April 1954

1954-55 - Connaught then focused its efforts on the full preparation of vaccine for eventual Canadian use, pending the results of the field trial



Sanofi Pasteur Canada Archives



April 24, 1954: *Launch of Salk Vaccine Field Trial*

- 1,800,000 “polio pioneer” children enrolled across U.S; in May, Alberta, Manitoba and Halifax joined trial, along with parts of Finland
- For this triple-blind field trial, children (grades 1-3) received either the vaccine, a placebo of Medium 199, or were observed

VOLUME 46

TORONTO, JULY 1955

NUMBER 7

Preparation of Poliomyelitis Virus for Production of Vaccine for the 1954 Field Trial†

L. N. FARRELL, W. WOOD, H. G. MACMORINE,
F. T. SHIMADA, AND D. G. GRAHAM
*Connaught Medical Research Laboratories
University of Toronto*

THE important demonstration of Enders, Weller and Robbins (3) that viruses of poliomyelitis proliferate in cultures of human embryonic tissue opened wide areas for study of the cause and prevention of this disease. When Rhodes and his associates showed (5) that the entirely synthetic nutrient Medium no. 199 devised by Morgan, Morton and Parker (6) can replace conventional tissue culture media containing antigenic material such as horse serum, a cell-free vaccine suitable for use in children became a possibility. Salk and his colleagues in fact used Medium no. 199 in tissue cultures to prepare their vaccine for use in children and adult human subjects

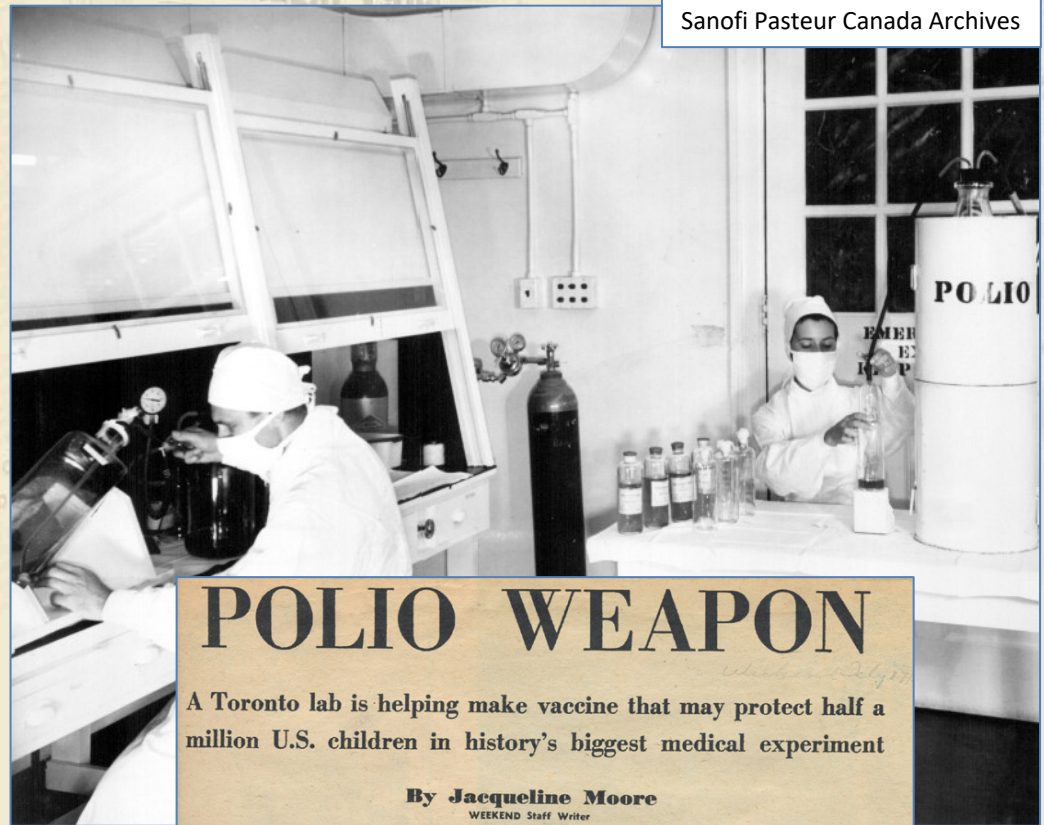
Canadian Journal of Public Health, July 1955, p. 265



Time (Canadian Edition), March 29, 1954

**April 24, 1954:
Launch of Salk Vaccine Field Trial**

- Meanwhile, Connaught proceeded to prepare the full vaccine while the federal and provincial governments planned an all-Canadian observed-controlled trial of it that would start in April 1955, regardless of U.S. results
- Each batch of vaccine was double-tested by Connaught and the Laboratory of Hygiene in Ottawa



Globe & Mail, April 5, 1954, p. 21

All Virus for U.S. Polio Inoculations Made in Connaught Laboratories

By KEN W. MacTAGGART
During the next eight weeks, one of the greatest projects in medical history will be launched. By June 1, between 500,000 and 1,000,000 children of Grade Two age in the United States will have been inoculated against poliomyelitis. In the weeks that follow, medical authorities the world round will be watching breathlessly.

of brews, tested various tissues. Boston had been able to keep the virus alive on rare, hard-to-obtain embryo tissues. Connaught tried others, suddenly came up with monkey kidney tissue, and delved back into years-old studies to re-discover that a fluid, labelled by its Connaught discoverers years ago as 199, met all the needs. It was costly; one of its 62 ingredients alone costs \$2,500 a bottle.

The National Foundation had been watching Connaught. Swift-

team is spread through two of its divisions: College St., opposite police headquarters, and Spadina, the venerable building on the crescent which was salvaged by the scientists. Some idea of the work entailed, with thousands of flasks and tubes used daily, is given by the knowledge that 20 people work steadily at the single job of cleaning and sterilizing the glassware.

Three times a week, a station-wagon with the license-plates of a U.S. state arrives with a team

POLIO WEAPON

A Toronto lab is helping make vaccine that may protect half a million U.S. children in history's biggest medical experiment

By **Jacqueline Moore**
WEEKEND Staff Writer



Photos by Herb Nott
Cancer researcher Dr. Raymond Parker made the discovery being used in producing experimental polio vaccine.

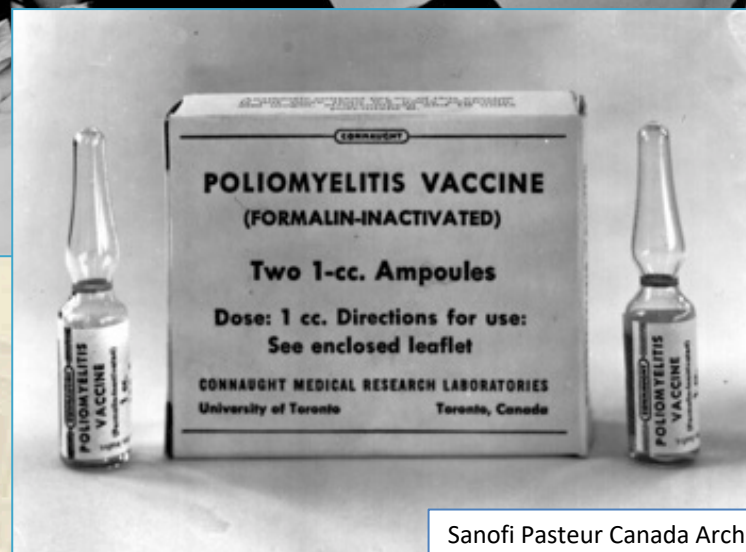
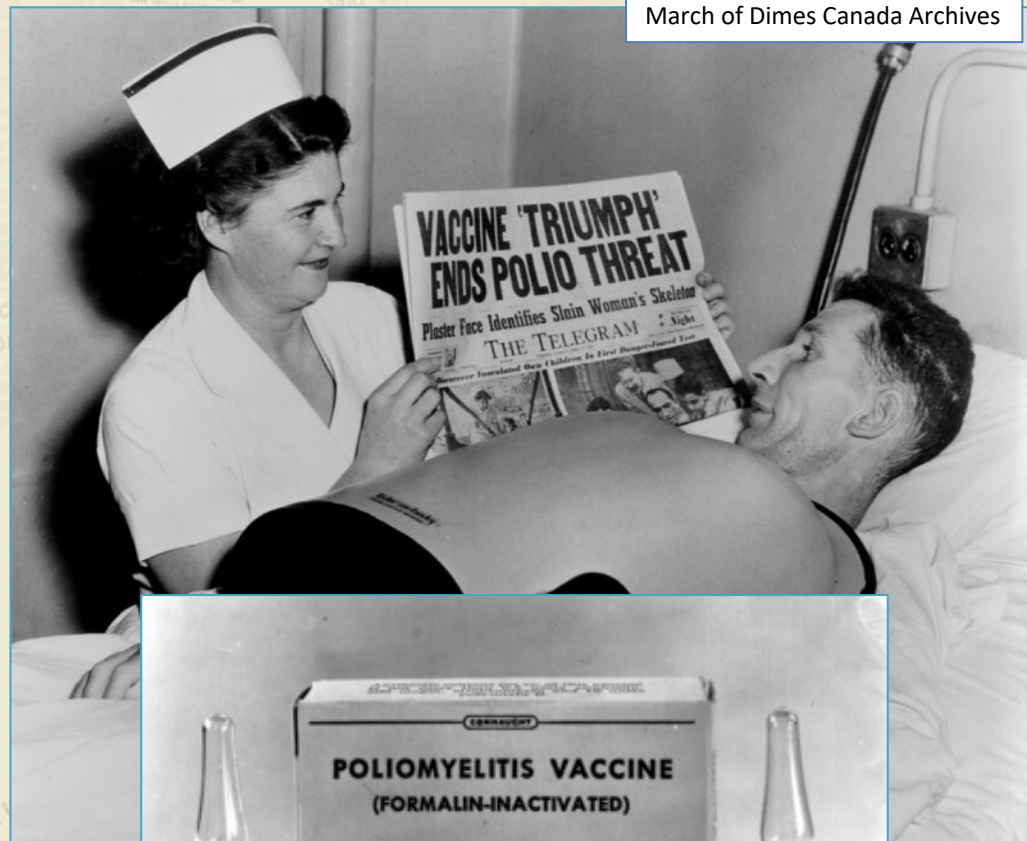
Weekend Magazine, April 1954

April 12, 1955:

“V-Day”: Salk Vaccine Trial Results Announced

- **April 12, 1955** – Unprecedented media attention to announcement of field trial results in Ann Arbor, Michigan
- Salk vaccine proves to be 60-90% effective against the three types of poliovirus
- Vaccine immediately licensed in U.S. and Canada
- In Canada, Salk vaccine distributed through a special federal-provincial free program for children and subjected to further study of its effectiveness

March of Dimes Canada Archives



Sanofi Pasteur Canada Archives

“Cutter Crisis” U.S. Vaccine Suspension; Canada’s Choice?

- **April 25, 1955** – However, there was a major setback when it was discovered that some batches of vaccine from one U.S. producer, Cutter Labs in California, were not fully inactivated, leading ultimately to 79 polio cases linked to the bad batches
 - **May 7** – After first recalling all of Cutter’s vaccine, and then setting up a national polio surveillance system, the U.S. Surgeon General suspended the entire vaccine program
- North of the border, the burning question was what should Canada do?

8 Get Polio, Serum Held Up; 'Can't Happen in Canada'

By WHITNEY SHOEMAKER
Washington, April 27 (AP).—The U.S. Government ordered one of the companies making Salk vaccine to pull back all its shipments today after eight children inoculated against polio were reported hit by the disease. One death was listed.

Health authorities cautioned against a scare, however. They said there was no indication that the vaccine caused the disease, and that there was evidence to the contrary in some cases, at least.

The vaccine in question was made by Cutter Laboratories in Berkeley, Calif., which said it had made shipments for mass inoculations of school children in parts of California, in Arizona, New Mexico, Idaho, Nevada and Hawaii.

The Cutter firm also reported it had shipped relatively small lots for commercial use to its

By KEN W. MacTAGGART
The chance of any child's getting polio after receiving Canadian-made Salk vaccine was doubted last night, and even termed by some medical authorities an impossibility.

In fact, local authorities' first reaction was to doubt that vaccination had anything to do with the cases reported in the U.S. On the basis of the known delay between infection and appearance of the disease—10 days—they suspected that coincidence was responsible for the U.S. outbreaks, and that children who

Recall Salk Vaccine Made by One Firm

Continued from Page 1.

Cutter personnel in investigating the vaccine.

Dr. Scheele gave his explanation of the Government's withdrawal order:

"We heard of some cases and we felt it was safest to study the problem. This is no indictment of Cutter vaccine at all. It was an action of safety to protect the children who may be getting shots today and tomorrow until we can make an investigation."

No parent should keep his child from being inoculated, he said. He added his own second-grade youngster is due for a shot.

The public health service reported polio cases among Cutter-inoculated

the gamma globulin as an antidote.

Cutter moved swiftly to recover its shipments. Six laboratories are producing the anti-polio vaccine, but Cutter is the only one in the West.

Dr. Scheele said studies indicate effective antibodies are not built up for more than a month after injections. In the six cases noted by the public health service, he said, even a wholly effective vaccine could not have been expected to create full immunity in the two weeks between inoculation and the flush of illness.

Inoculation in one case was given April 14, another April 15, the other four April 16. The incubation period in polio is from three to 30 days, with the average around 14.

plete faith in the vaccine evolved by Salk, he added: "The action in this one instance does not indicate even that the batches of vaccine which were used were in any way faulty."

The U.S. public health service sent Dr. John Tripp of the biologists control laboratory, and Dr. Karl Habel, polio expert, to Berkeley. They will work with

RECALL—Page 2

Couldn't Happen In Canada, View

Continued from Page 1.

vaccine to be faulty," said one official.

"After the tests have been made, and to give the vaccine every opportunity to reveal any improper test effects, it is then retained for two months. Not until it has been seen what results occur, even after a delay considerably beyond normal probability of infection, is any of the vaccine released for use."

Medical authorities noted that reports from the U.S. indicated that only vaccine produced by Cutter Laboratories of Berkeley, Calif., had been withdrawn from use. None of this firm's vaccine has been licensed for entry into Canada. Only two firms, Eli Lilly and Co. (Canada) Ltd. and Parke Davis and Co. Ltd., both of which were pioneers with Connaught, have licenses to import the vaccine.

Dr. Andrew J. Rhodes, virologist who headed the Connaught Laboratories group which made possible mass production of polio virus for the Salk program, last night urged parents not to become panicky because of the developments in the U.S.

The Canadians closest to the work, he said, were aware of the methods used at Connaught Laboratories and were convinced that faulty vaccine could not find its way into use from this source.

“Cutter Crisis” U.S. Vaccine Suspension; Canada’s Choice?



Sanofi Pasteur Canada Archives

- While the U.S. launch of the Salk vaccine was suspended, after careful consideration and advice, yet some resistance from the Prime Minister, federal health minister, Paul Martin (himself a victim of polio, as was his son) decided that the Canadian launch of the vaccine should continue uninterrupted

Canadian-made Salk Is Safe Ottawa, All Provinces Sure

“There is nothing wrong with the Salk vaccine made in Canada and we are continuing the mass inoculations according to program,” said Dr. T. J. Phair, deputy minister of health for Ontario, today.

“Some 256,000 children have had their first shots without any ill effects and this is most reassuring,” he said. “If there is anything wrong with any U.S.-manufactured vaccine, which is used only in that country, it might be from the manufacture. It also might be psychological in many cases.”

“We are confident there is nothing wrong with the Canadian Salk vaccine and are proceeding in all Toronto schools according to plan,” said Dr. L. A. Pequegnat, Toronto medical officer of health.

“We have already inoculated more than 20,000 Toronto children in the first and second grades and this week we will give shots to some 10,000 third-grade students for the first time and second shots to the lower grades.”

“It is ‘No Stop’ in the Toronto program — we have been convinced,” said Dr. Pequegnat.

Canada has barred the entry of U.S.-produced Salk vaccine until the U.S. government releases its

(Continued on Page 13, Col. 3)



Toronto Star, May 1955

“SEE? NOTHING TO IT,” PARK SCHOOL GIRL TELLS SCEPTICAL CHUM

“Cutter Crisis” U.S. Vaccine Suspension; Canada’s Choice?

- There had been no reports of cases linked to Connaught’s vaccine and immunization continued uninterrupted without incident
- Moreover, a detailed Canadian evaluation of the vaccine further demonstrated its safety and effectiveness

- Considerable debate ensued over the different approaches to the vaccine between the two countries
- The Canadian success meant a lot to Salk and led to full scale immunization programs in the U.S.



Dr. H.E. Van Riper – NFIP medical director:
“We in the United States have much to learn from you (in Canada)”

Canada Reports Shots Safe, 85% Effective

Massachusetts Gets Enough Vaccine To Complete Its NFIP School Program

Two or more shots of Salk vaccine proved completely safe and 85 per cent effective in preventing paralytic polio according to a national field study of some 1,500,000 Canadian children.

Canada’s Health Minister Paul Martin reported that only five of 589,716 children between the ages of five and ten years old who got two doses of the vaccine in 1955 were stricken with paralytic polio. The five cases in the vaccinated group compared with 51 cases among 885,000 children in the same age

Canadian Polio Work Said Second to None

Edmonton, Sept. 7 (CP).—Canada is second to no country in control of polio, Dr. H. E. Van Riper, medical director of the National Foundation for Infantile Paralysis, New York, said today.

“Nowhere in the world has greater progress toward control of paralytic poliomyelitis been made than in Canada,” he told the annual convention of the Canadian Public Health Association. “We in the United States have much to learn from you.”

in 1953 worked out methods for quantity production of polio viruses in the culture of monkey kidneys.

A second contribution, he said, was the discovery by J. F. Morgan, H. J. Morton and R. C. Parker of a satisfactory method for feeding animal cells and tissue culture and a synthetic medium used to grow virus in vaccine manufacture.

“I think it only fair to say that if this Connaught Laboratory group had not worked out this te

Globe & Mail, Sept 8, 1955

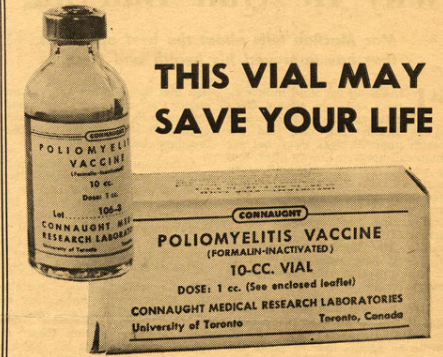
Preventing Persistent Polio

- Despite the successful introduction of the Salk polio vaccine in Canada, it took time for all age groups to be immunized and time for polio outbreaks to end
- **1958-59** - In particular, significant polio epidemics struck several parts of the country, primarily effecting un-immunized pre-school and older children, as well as adults

Financial Post, Jan 11, 1960

Polio Score

	Cases	Deaths
	—1959—	
Que.	1,131	101
Ont.	198	21
Nfld.	139	12
B.C.	132	12
Alta.	81	12
N.B.	62	6
Sask.	46	3
Man.	26	2
N.W.T.	10	4
N.S.	8	0
P.E.I.	7	1



POLIO CAN NOW BE PREVENTED

Polio can now be prevented and its effects limited. Don't take chances — you owe it to yourself and your family to obtain the protection offered by Salk Polio Vaccine.

Three properly spaced shots offer complete immunity to most people, and minimize the crippling effects for the balance. Since 1957, sufficient vaccine has been distributed to allow 2,296,359 people to receive three doses of Polio Vaccine. This has been supplied free to your Physician and Medical Officer of Health by the Ontario Department of Health. In the same period, the number of cases of Polio has shown a sharp decline attributed mainly to the intensive vaccination program.

Now is the time to act — summer and fall are the main polio seasons. Arrange your family's vaccination program today.

FROM INFANCY TO 40 YEARS

The most critical ages for Polio are from infancy to 40 years. It is most important for everyone in these age groups to receive three properly spaced Polio Vaccine shots. Consult your local physician or Medical Officer of Health.



ONTARIO DEPARTMENT OF HEALTH

HON. MATTHEW B. DYMOND, M.D.
Minister

99 New Cases, Polio Total Climbs to 969

Ottawa, Sept. 25 (CP)—There were 99 cases of paralytic poliomyelitis reported in Canada last week, more than half of them from Quebec, the Health Department said today.

They brought to 969 the number of 1959 cases up to Sept. 19, compared with 131 at the corresponding date last year. This year's total includes 73 polio deaths as against 14 at this time a year ago.

Only Manitoba, the Yukon and the Northwest Territories reported no polio cases last week. Nova Scotia had its first case of the year.

The Montreal outbreak and other Quebec cases have accounted for 656 in the national total of 969 cases. Only 35 were reported to this date last year.

Ontario reports 101 paralytic cases up to Sept. 19, compared with seven a year ago. Newfoundland had 95 cases, up from three at the same time last year.

Cases in other provinces, with comparable 1958 totals in brackets:

New Brunswick 28 (1); Prince Edward Island 2 (0); Manitoba 17 (60); Saskatchewan 16 (0); Alberta 22 (17); British Colum-

POLIOMYELITIS—A CONTINUING MENACE

CASES of paralytic poliomyelitis in Canada last year numbered 177, the lowest number since 1949. There were 26 deaths. To the end of September of this year 151 cases were reported in contrast with 134 at the same time last year. Almost all the cases and all the deaths occurred in persons who had not received three doses of Salk vaccine. Throughout Canada, widespread use of the vaccine has been made as a result of the combined efforts of the federal and provincial departments of health and the medical profession. The Department of National Health and Welfare has given outstanding leadership by assisting the provincial departments through the payment of half the cost of the vaccine. The vaccine, in turn, has been supplied without charge by provincial departments of health to local health departments and to physicians for use in the age group under 20 years.

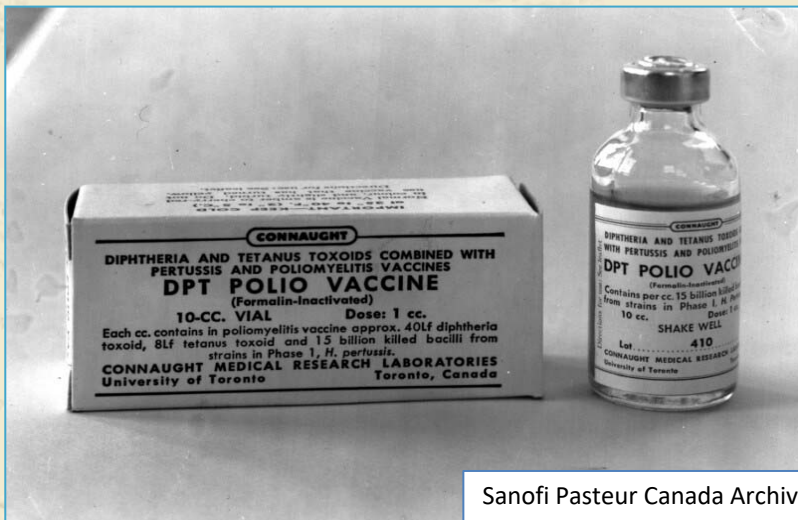
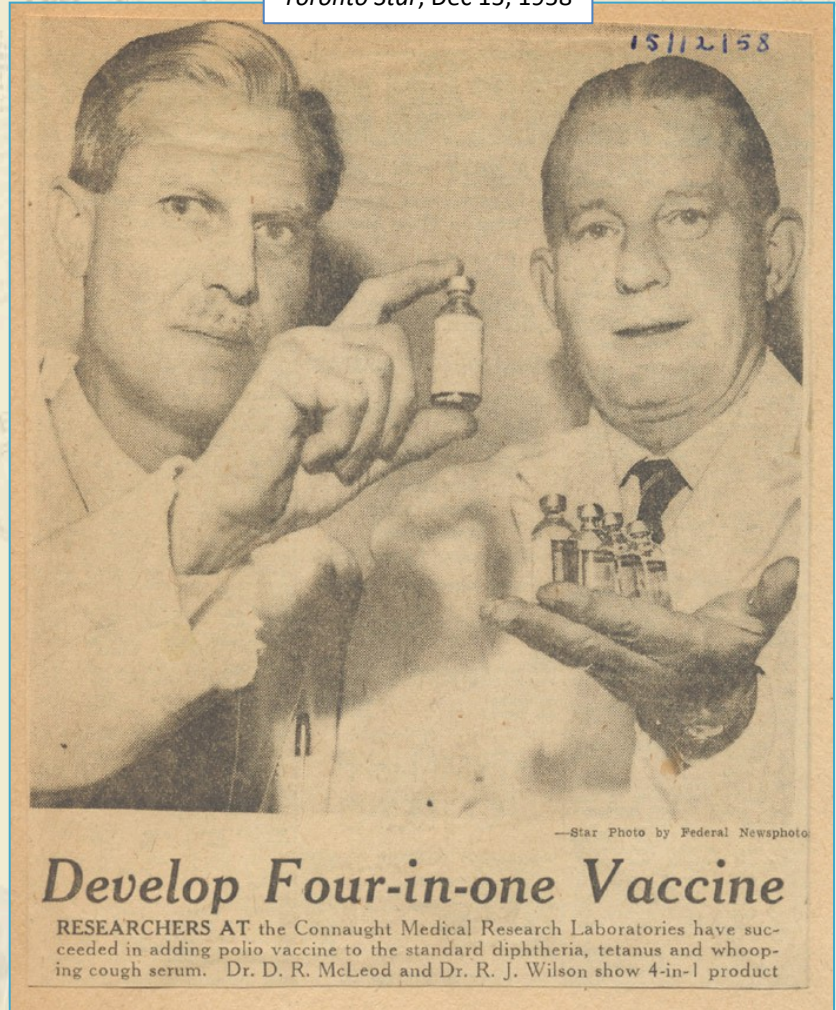
Canadian Journal of Public Health, Nov 1958, p. 489

Globe & Mail, Sept 26, 1959, p. 2

Preventing Persistent Polio: *The Right Combination*

- The best strategy to broaden and simplify polio immunization was to build on the DPT combination vaccine model and add in Salk polio vaccine
- **Jan 1959** - Connaught pioneered a new generation of combined vaccines:
- DPT-Polio for primary immunization, DT-Polio for booster shots, and T-Polio for adult boosters

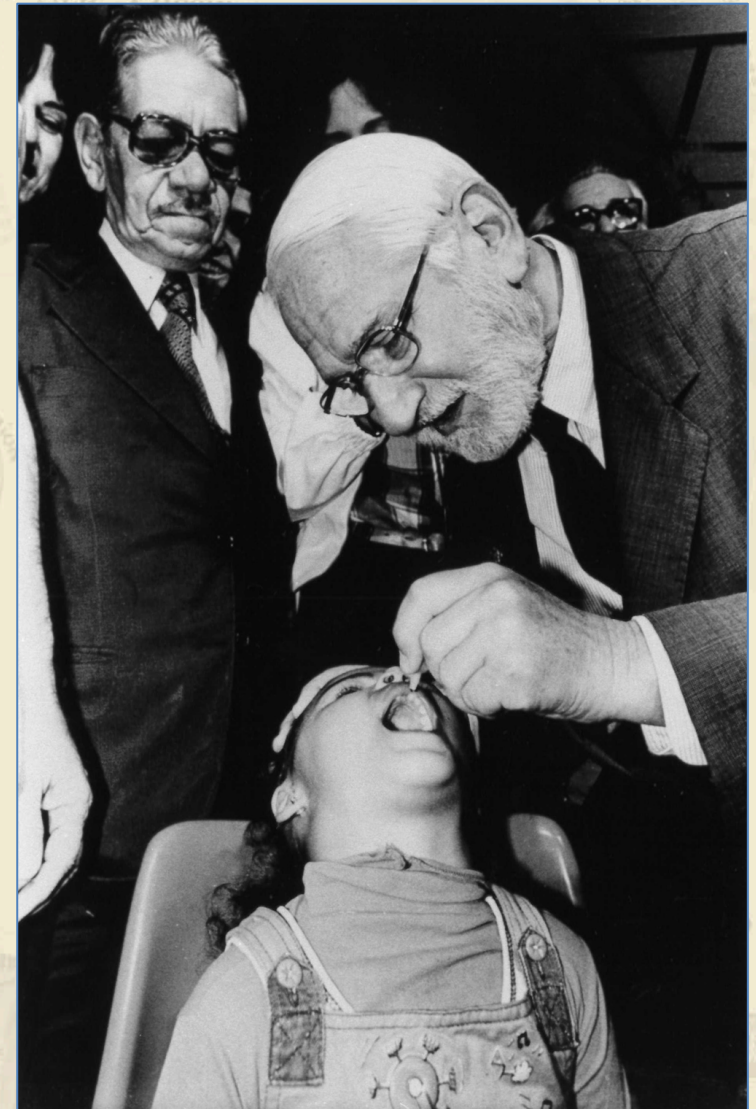
Toronto Star, Dec 15, 1958



Sanofi Pasteur Canada Archives

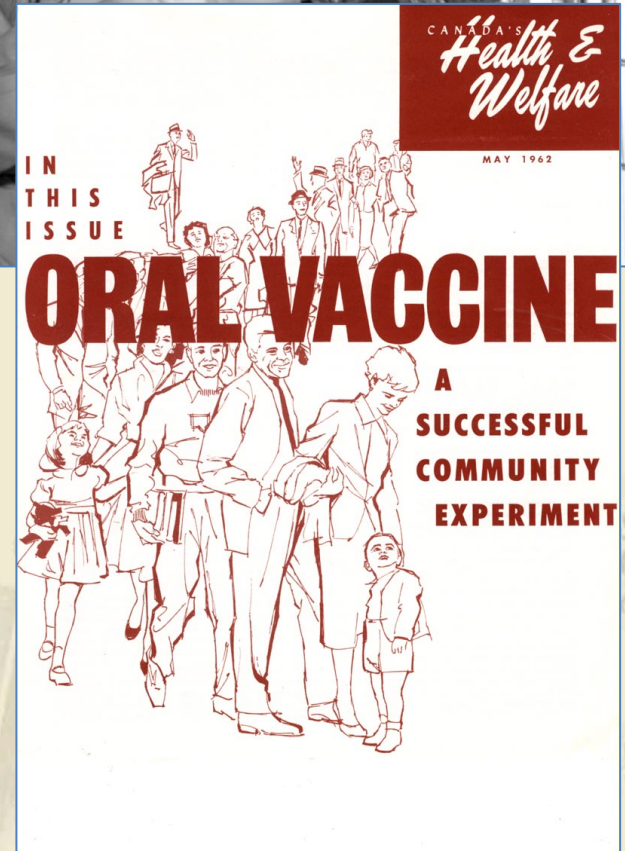
Preventing Persistent Polio: From Salk IPV to Sabin OPV

- Persistent polio incidence during the late 1950s also highlighted the limits of the Salk inactivated vaccine
- Growing polio incidence internationally pointed to the need for another type of polio vaccine that was cheaper to produce and could be more easily given
- Salk's vaccine built blood immunity, but Dr. Albert Sabin focused on preparing a vaccine that would build immunity in the digestive tract – where the poliovirus naturally replicates
- Sabin's goal was to carefully cultivate live attenuated or weakened poliovirus strains, which would be administered with a spoon



Preventing Persistent Polio: From Salk IPV to Sabin OPV

- **1959** - Connaught's OPV research intensified after Sabin provided attenuated strains from which vaccine could be produced
- The major challenge was maintaining the genetic stability of the vaccine strains
- Connaught's key contributions included facilitating OPV field testing through uniquely designed "demonstrations" in several parts of Canada



Preventing Persistent Polio: From Salk IPV to Sabin OPV

1961 – Connaught also provided OPV on an experimental basis to a several countries facing major polio epidemics, such as in New Zealand and Japan

March 1962 – Connaught’s trivalent Sabin Oral Polio Vaccine was licensed in Canada

Reveal Canadian Aid Halted Japanese Polio

Globe & Mail Feb 20, 1965

The story of how Canada helped to check a serious outbreak of polio in Japan during the late summer of 1961 was disclosed yesterday in the report of Dr. J. K. W. Ferguson, director of the Connaught Medical Research Laboratories.

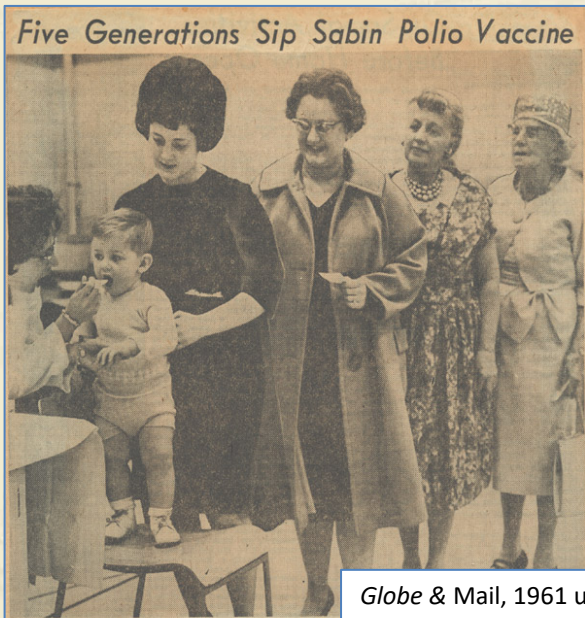
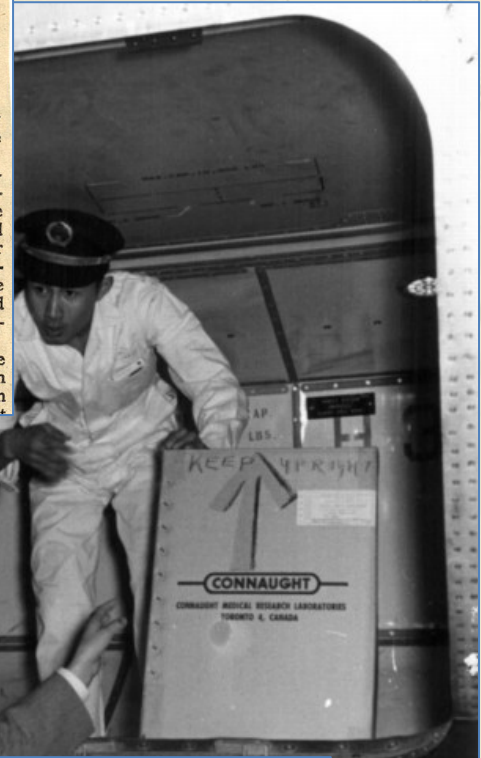
With supplies of anti-polio vaccine scarce, the Japanese Government bought 3,000,000 doses of Sabin vaccine from the Connaught Medical Research Laboratories.

Chief competitors for the Russian European

myelitis had occurred. A low incidence prevailed for the balance of the year.”

The results were so spectacular that the Japanese Government decided to extend the program to older children and continue it during the winter of 1962. Requiring some 17,000,000 additional doses, the Japanese Government issued invitations to tender competitively.

Globe & Mail, Feb 20, 1965



Globe & Mail, 1961 uncertain

Baby Is First in Line of Five-Generation Family at Cottingham School
From left: Mrs. Anne Cooper; Cory Richardson, 15 months; Mrs. Karen Richardson, mother; Mrs. Eleanor Birkenshaw, grandmother; Mrs. May Beal, great-grandmother; Mrs. Elizabeth Castigane, 89, great-great-grandmother.



Sanofi Pasteur Canada Archives

Preventing Persistent Polio: From Salk IPV to Sabin OPV

- Several provinces, and most of the United States, soon switched to OPV, although the Salk vaccine was preferred in Ontario and Nova Scotia



Sanofi Pasteur Canada Archives

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Live Poliovirus Vaccine for Oral Use

J. K. W. FERGUSON,¹ M.D.

SINCE 1958 poliomyelitis vaccines for oral administration have been used with satisfactory results in many countries. They are known as *attenuated live poliovirus vaccines*. Attenuated polioviruses are specially selected strains which have almost no capacity to cause paralytic disease even when injected directly into the brains of monkeys. They retain, however, the capacity to multiply in the human alimentary tract. Several different strains of attenuated poliovirus have been developed and tried extensively as vaccines. Only the strains introduced by Dr. Albert B. Sabin of Cincinnati, U.S.A., have been approved as yet for use in a large number of countries including Canada, Great Britain, and the United States of America (1, 2, 3, 4).

Mode of Action

Each dose of Sabin vaccine contains thousands of particles of living but harmless virus. When these are swallowed they multiply in the wall of the digestive tract where they cause an infection but no illness. In response to this infection, antibodies against poliovirus develop in the body and circulate in the blood stream. Circulating antibodies act as a barrier to prevent virulent poliovirus from passing from the digestive tract by way of the blood stream to the central nervous system. In this way circulating antibodies prevent paralytic poliomyelitis. It is thought that attenuated live poliovirus vaccine acts also by another mechanism. It seems probable that it induces local immunity in the digestive tract which prevents multiplication of poliovirus in the digestive tract. By this means it can reduce the number of carriers of poliovirus infection in the community.

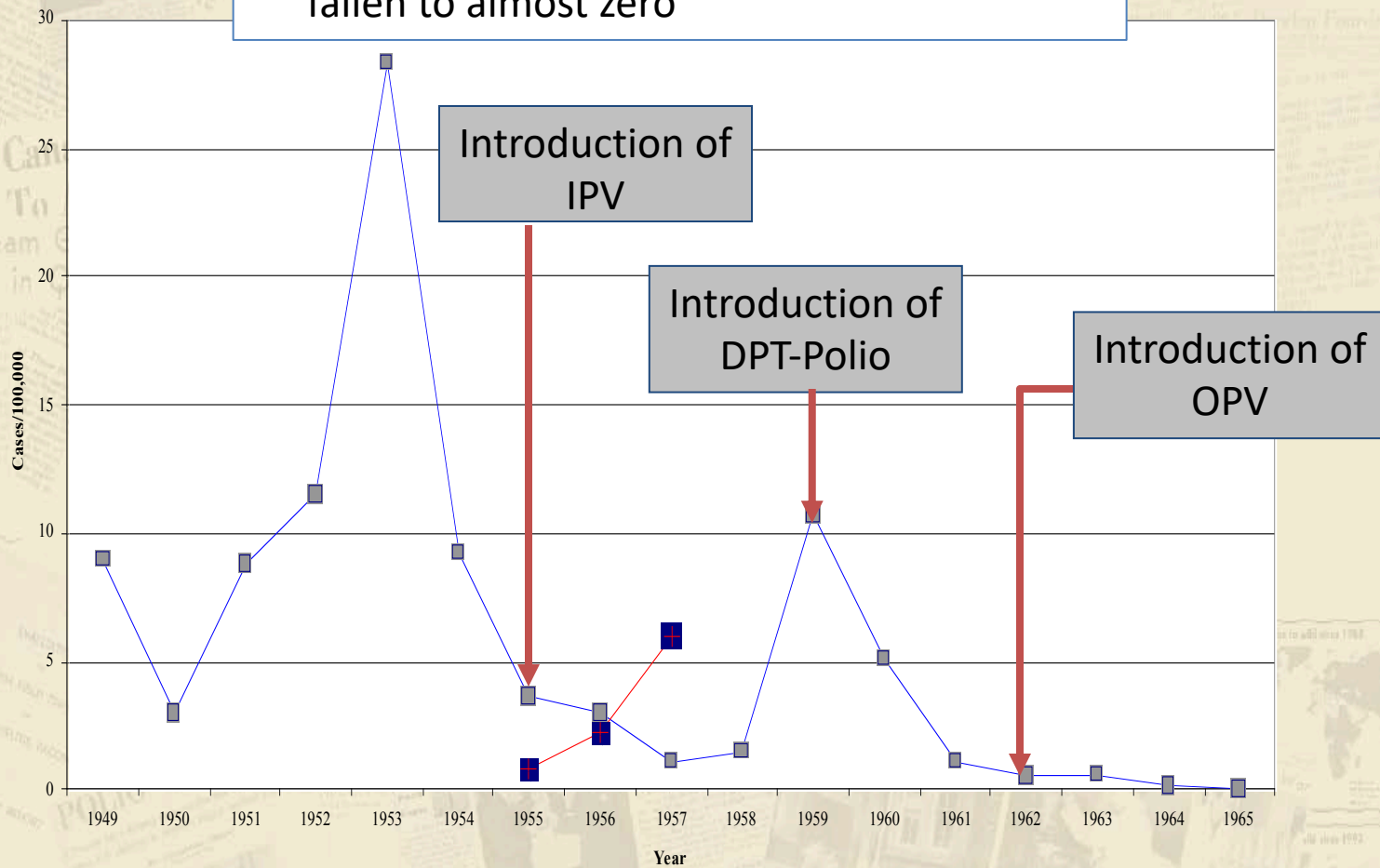
Advantages of Oral Poliovirus Vaccine

Oral vaccine can be given more easily to large numbers of persons because no needles or syringes are used. The cost of this equipment and of sterilizing it is eliminated.

¹Director, Connaught Medical Research Laboratories, University of Toronto, Toronto 4, Ontario.

Preventing Persistent Polio: From Salk IPV to Sabin OPV

- By 1965, polio incidence in Canada had fallen to almost zero

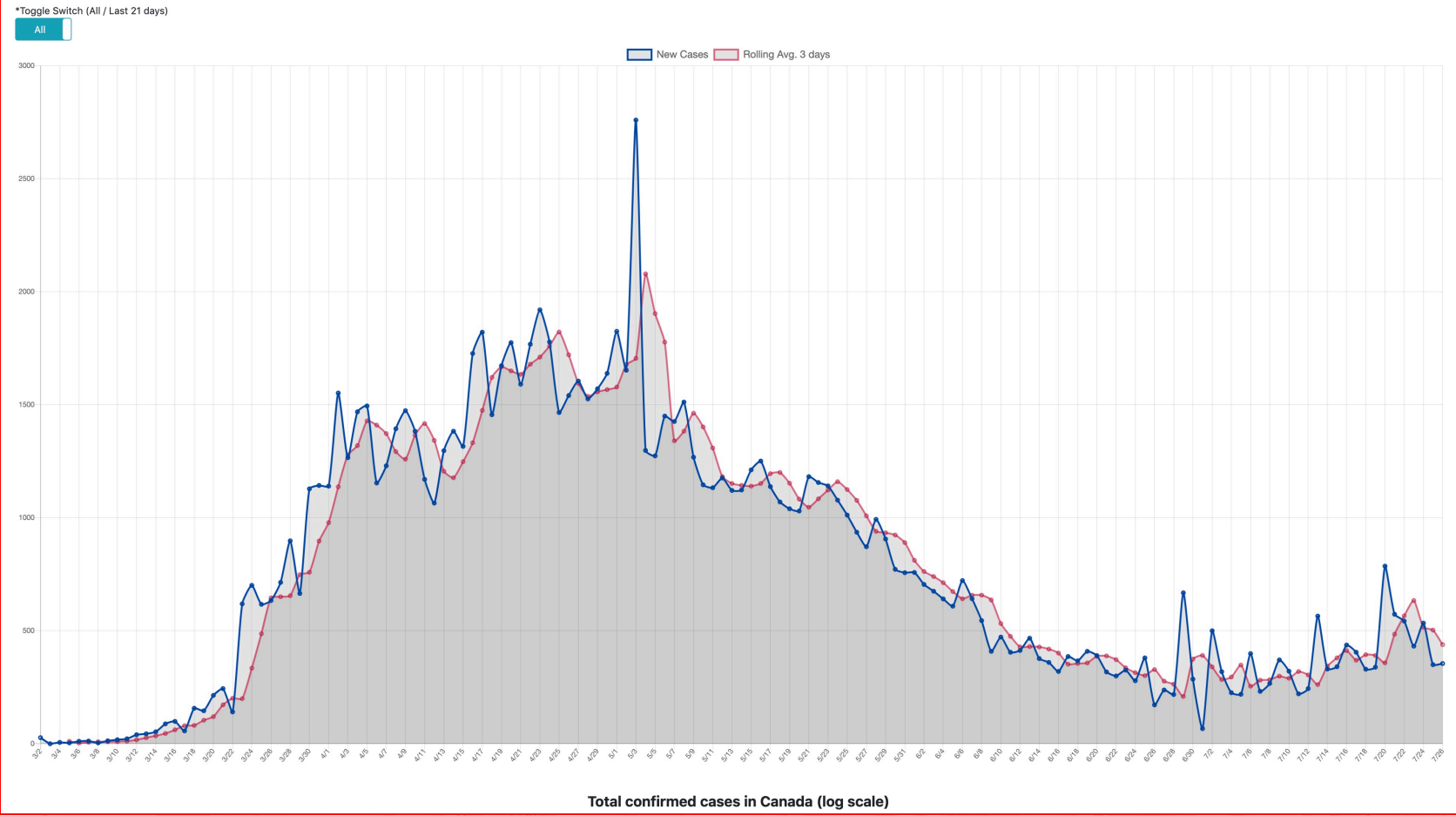


COVID-19 in Canada: Following the Polio Path?

- Hopefully Canada's COVID-19 incidence graph will soon follow a similar pattern...

COVID-19 Cases, March 2 to July 26, 2020

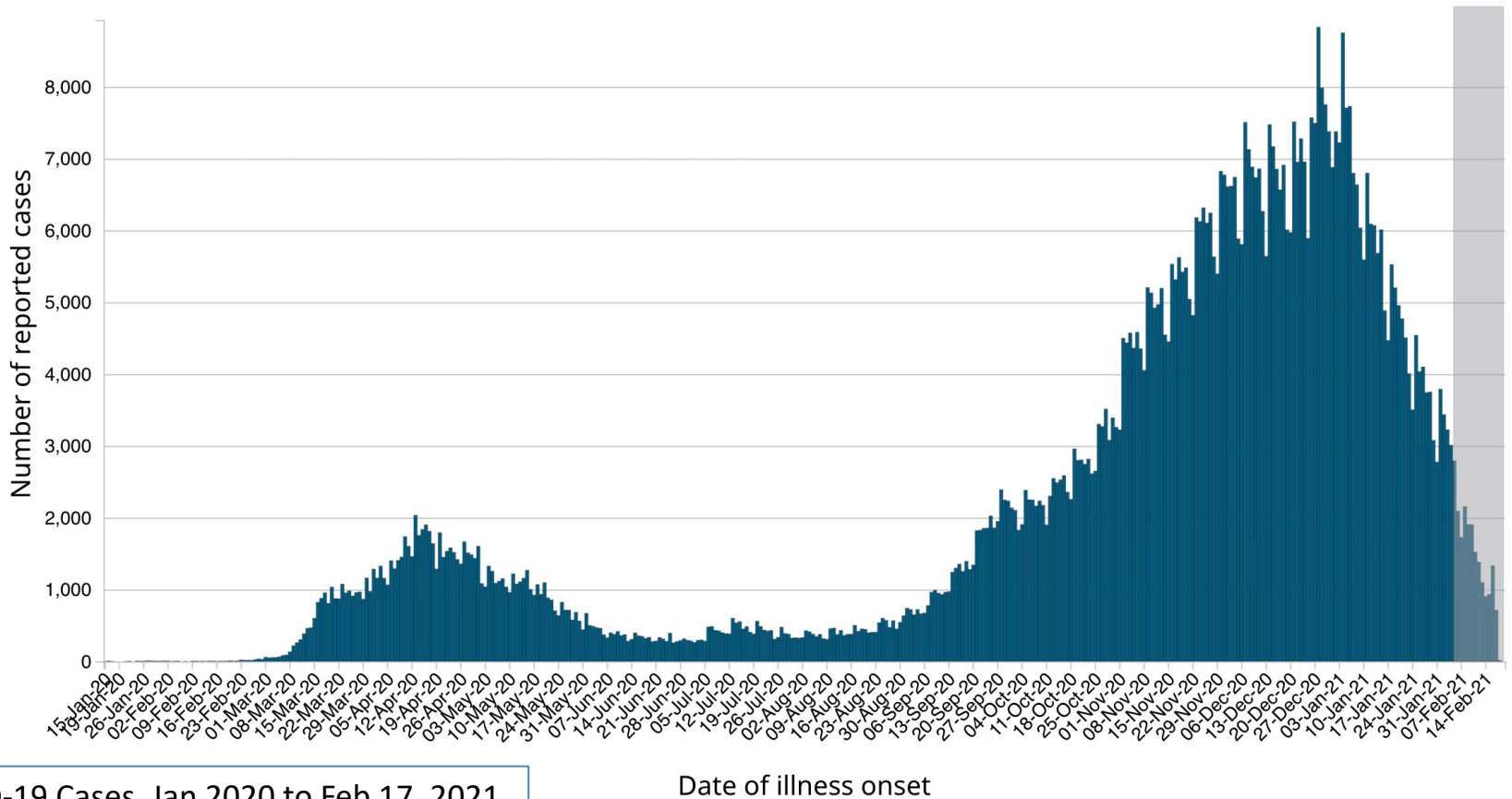
New Cases Analysis by Date
*Clickable & Scrollable Graph
As of 7/26/2020, 4:29 PM (PDT)
New Cases: 355



COVID-19 in Canada: Following the Polio Path?

- Unfortunately, it has not...

Figure 2. COVID-19 cases (n=822,369 ¹) in Canada by date of illness onset ² as of February 19, 2021, 7 pm EST (total cases



COVID-19 Cases, Jan 2020 to Feb 17, 2021

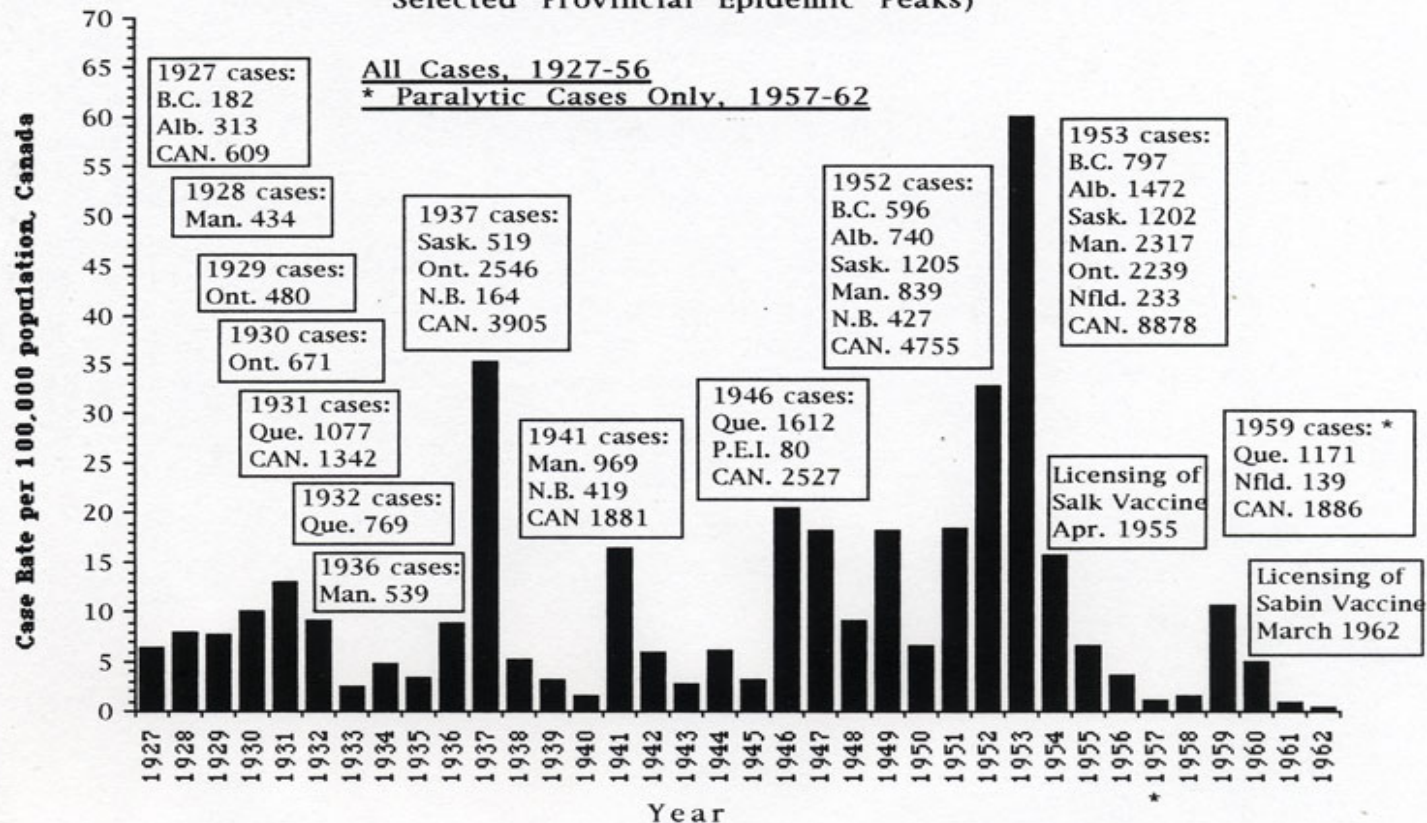
Date of illness onset

COVID-19 in Canada: Following the Polio Path?

- However, until COVID-19 vaccines are produced and broadly and evenly distributed nationally and globally, protect against new variants, and prevent virus spread, the Canadian COVID-19 incidence graph may well echo the pre-1955 polio incidence graph...

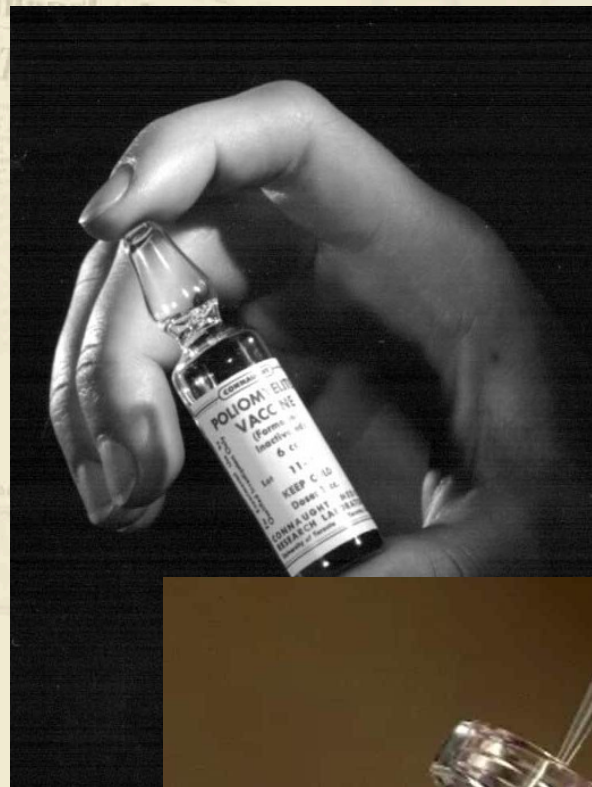
Poliomyelitis Incidence in Canada, 1927-1962

(Case Rates per 100,000 Population & Selected Provincial Epidemic Peaks)



COVID-19 in Canada: *Following the Polio Path?*

- The polio epidemic era and polio vaccines experience resonates with the COVID-19 pandemic experience more closely than other previous major infectious disease threats and can thus inform how the pandemic's aftermath will develop, particularly,
- Challenges of consistent COVID-19 vaccine(s) application and boosters, especially among adults and vulnerable populations, and maintaining sufficient uptake to prevent outbreaks
- Managing the long-term physical and psychological impact of COVID-19; “long-haulers” = “post-polios” ?



Thank You

Direct any questions and comments to
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Also active via: <http://twitter.com/cjruty>

Useful resources on the history of polio and polio vaccines in Canada:

- <http://www.museumofhealthcare.ca/explore/exhibits/vaccinations/polio.html>
- <http://connaught.research.utoronto.ca/history/> (Articles #7 & #8)