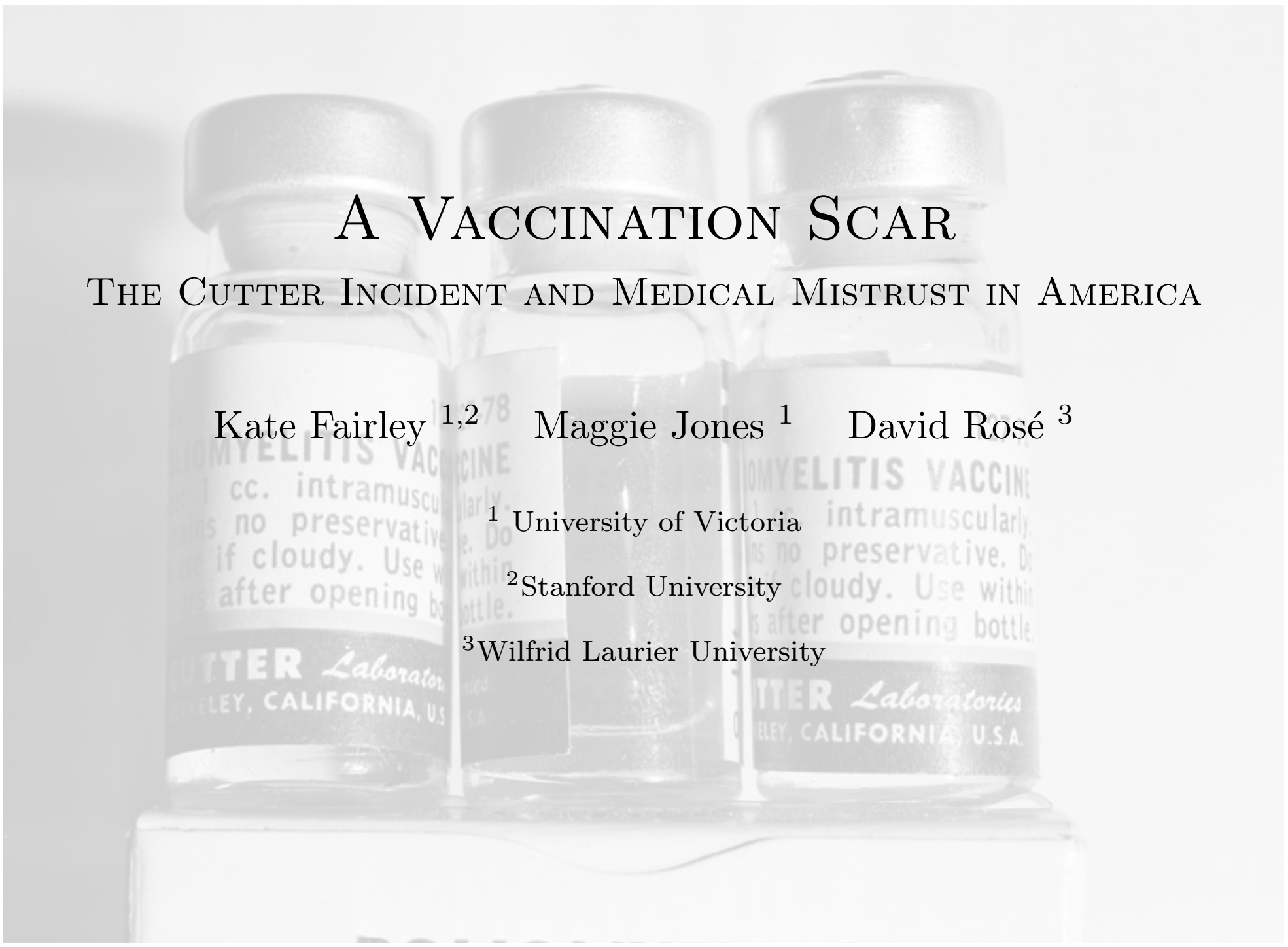


A Vaccination Scar

The Cutter Incident and Medical Mistrust in America

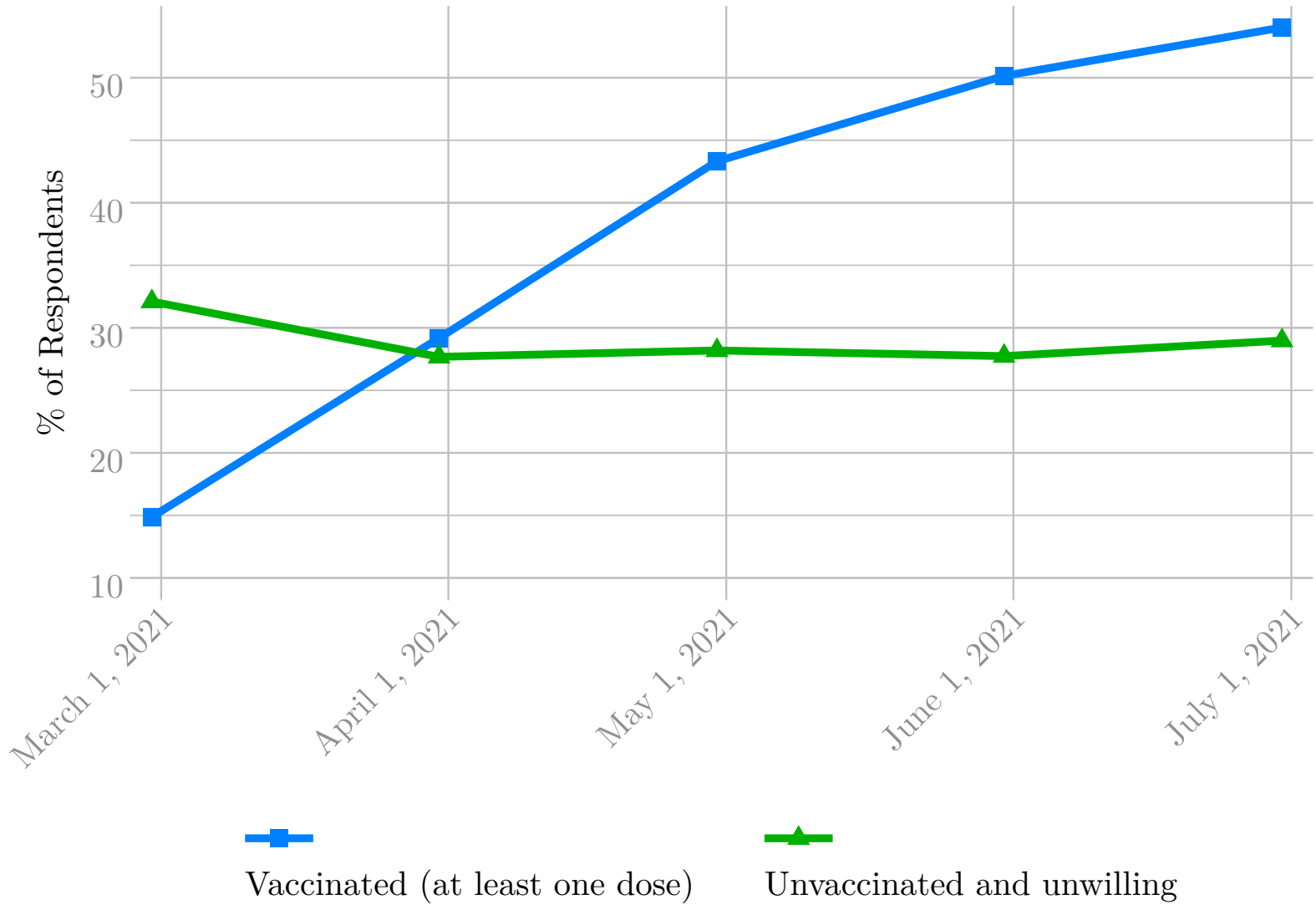
Kate Fairley [1,2] Maggie Jones [1] David Rosé [3]

[1] University of Victoria

[2]Stanford University

[3]Wilfrid Laurier University

Vaccine Hesitancy & Covid-19



Source: Our World in Data (July 10th, 2021)

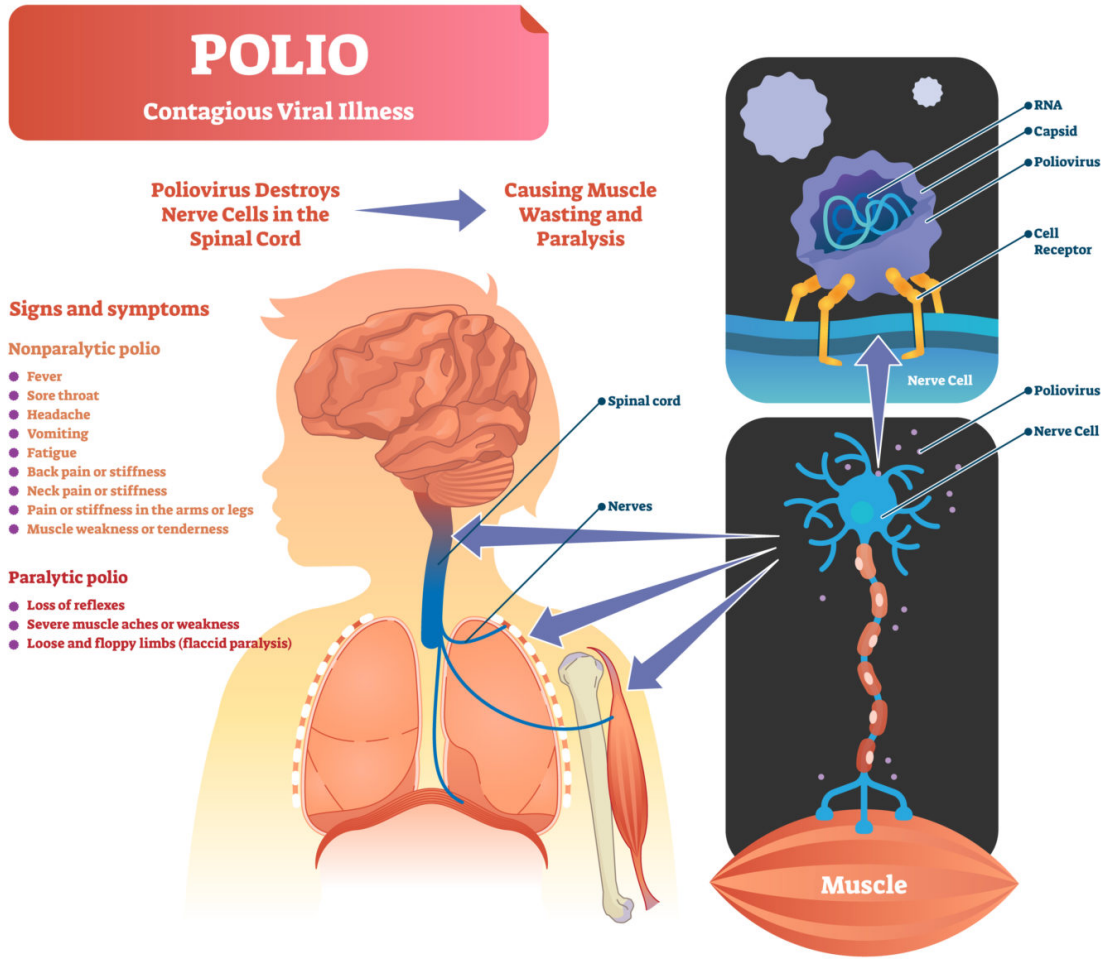
The Cutter Incident

In 1955, Cutter Laboratories failed to inactivate the poliovirus in some lots of vaccine, inadvertently injecting thousands of children live poliovirus

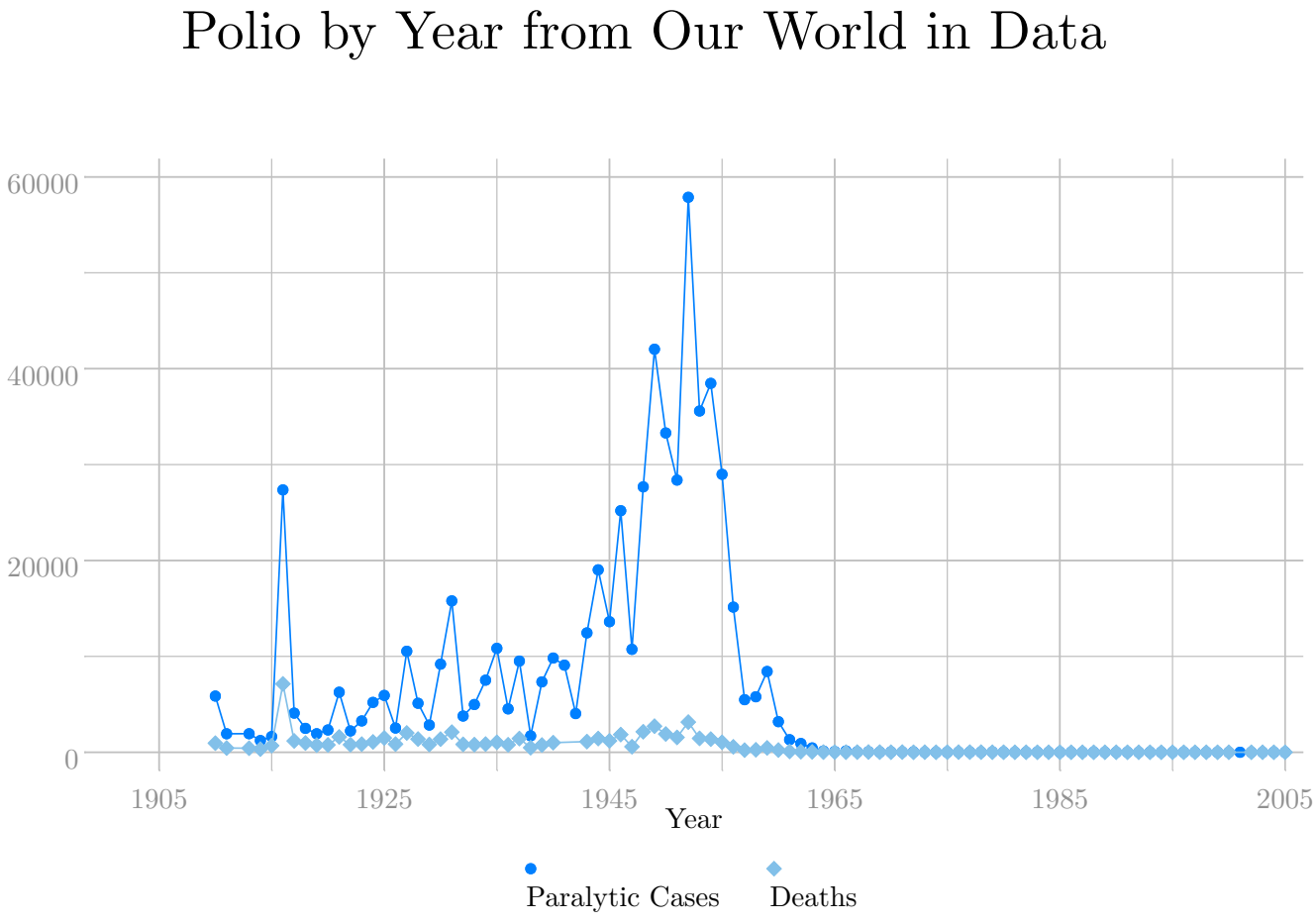
"[The Cutter Incident] was one of the worst biological disasters in American history, exploded the myth of the invulnerability of science and destroyed faith in the vaccine enterprise." - Offit (2005)

A Brief History of Poliomyelitis

Disease caused by the poliovirus, which spreads from person to person and can infect a person's spinal cord



A Brief History of Poliomyelitis



"There were three little hearses before the door; all her children had been swept away."

- New York City social worker, July 27, 1916, quoted in Offit (2005)

SALK POLIO VACCINE PROVES SUCCESS; MILLIONS WILL BE IMMUNIZED SOON; CITY SCHOOLS BEGIN SHOTS APRIL 25

TRIAL DATA GIVEN

Efficacy of 80 to 90% Shown—Salk Sees Further Advance

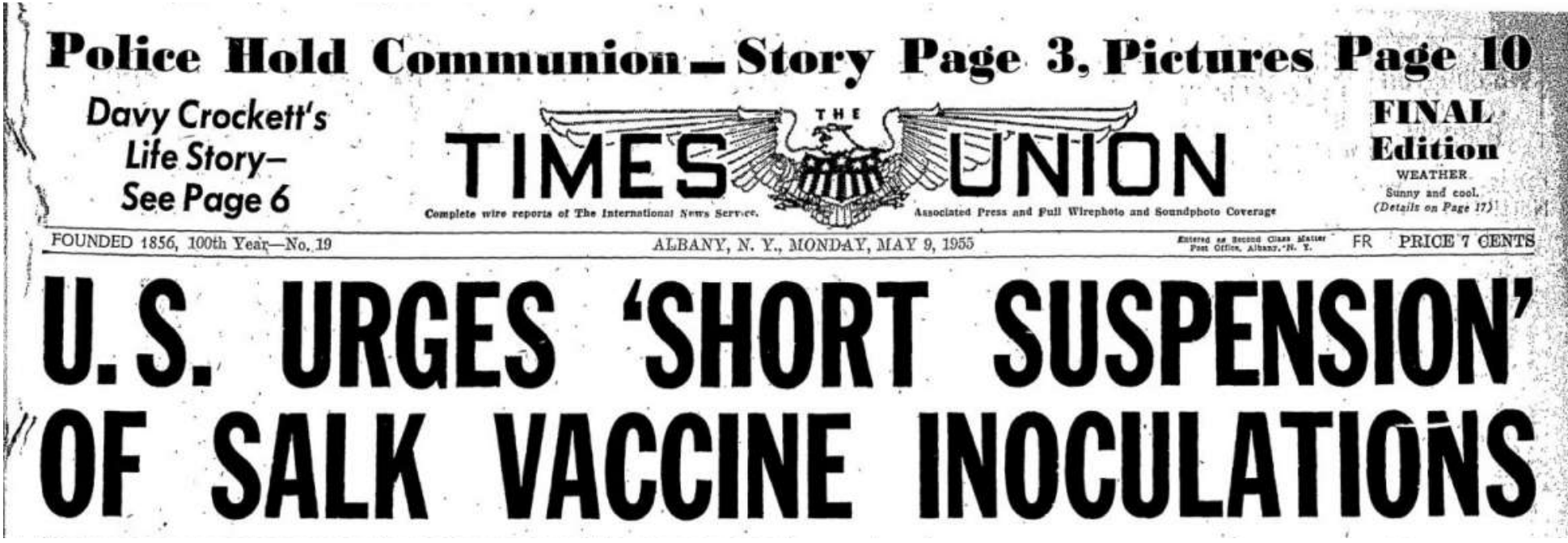
Abstract of report, summary of data on tests, Page 22.

By WILLIAM L. LAURENCE
Special to The New York Times.

ANN ARBOR, Mich., April 12—The world learned today that its hopes for finding an effective weapon against paralytic polio had been realized.

New York Times, April 13th, 1955

Reports of Polio Appear in Vaccinated Individuals



Police Hold Communion — Story Page 3, Pictures Page 10

Davy Crockett's Life Story— See Page 6

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U.S. URGES 'SHORT SUSPENSION' OF SALK VACCINE INOCULATIONS

Times Union, May 9th, 1955

Data: Polio Surveillance Reports

FOR OFFICIAL USE ONLY
NOT FOR PUBLICATION

MAY 11, 1955
12:00 A.M.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE COMMUNICABLE DISEASE CENTER

POLIOMYELITIS SURVEILLANCE UNIT

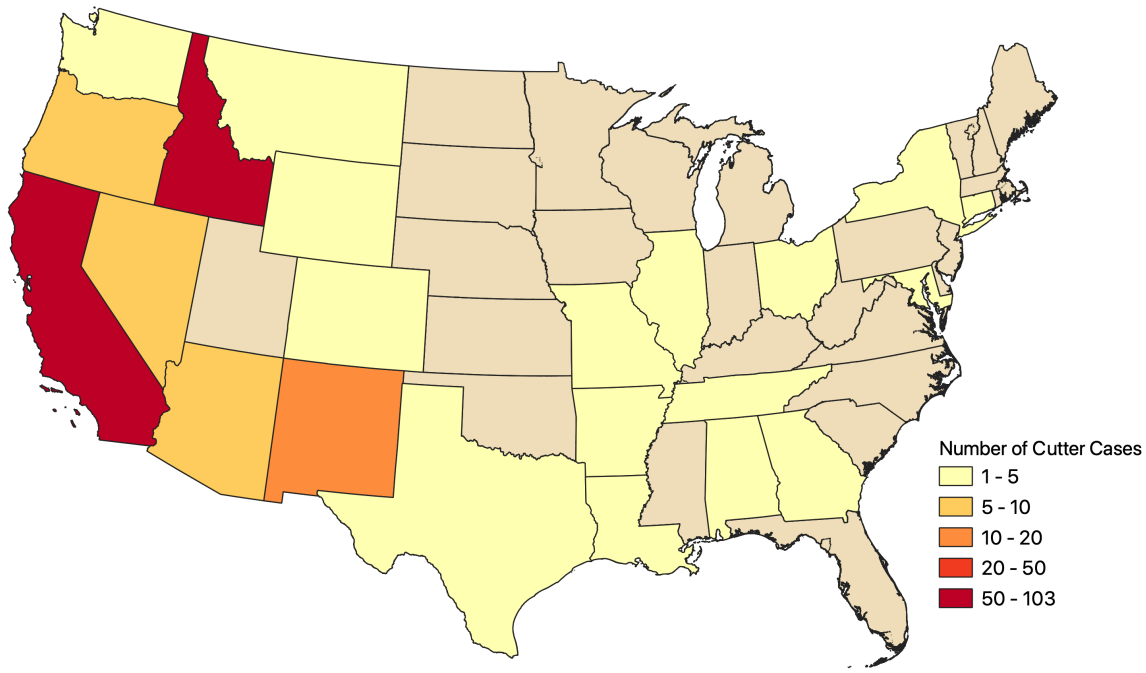
Accepted Cases Associated with Poliomyelitis Vaccine

Daily Cumulative Summary

PSU Case No	Residence	Initials	Age	Sex	Date Inoc.	Date 1st Symp	Date 1st Para	Site Inoc	Site 1st Para	Mfr	Lot No	Remarks
						NEW CASES						
Cal-25	Tulare Co.	JS	7	F	4/26	4/26	5/3	LA	LA	C	E5972	Ill at time of inoculation
Pa-2	Delaware Co.	CS	7	F	4/27	5/8	5/9	LA	?	W	?23505 ?23616	Quadriplegia

Note: Example from the May 11, 1955 Poliomyelitis Surveillance Report

Location of Cutter Cases



Note: Data collected from Poliomyelitis Surveillance Reports (1955)

Outcomes & Methods

Two geographic levels: $\rightarrow r$
county & state

Four frequencies: $\rightarrow t$
month, quarter, year, survey wave

Three sets of outcomes: $\rightarrow \text{outcome}_{rt}$
immediate impacts, medium-long-run impacts, response to other health shocks

One treatment: $\rightarrow \text{Cutter}_r$
indicator $= 1$ if the region had at least one case of polio among an individual vaccinated by vaccine manufactured by Cutter Laboratories

Outcomes & Methods

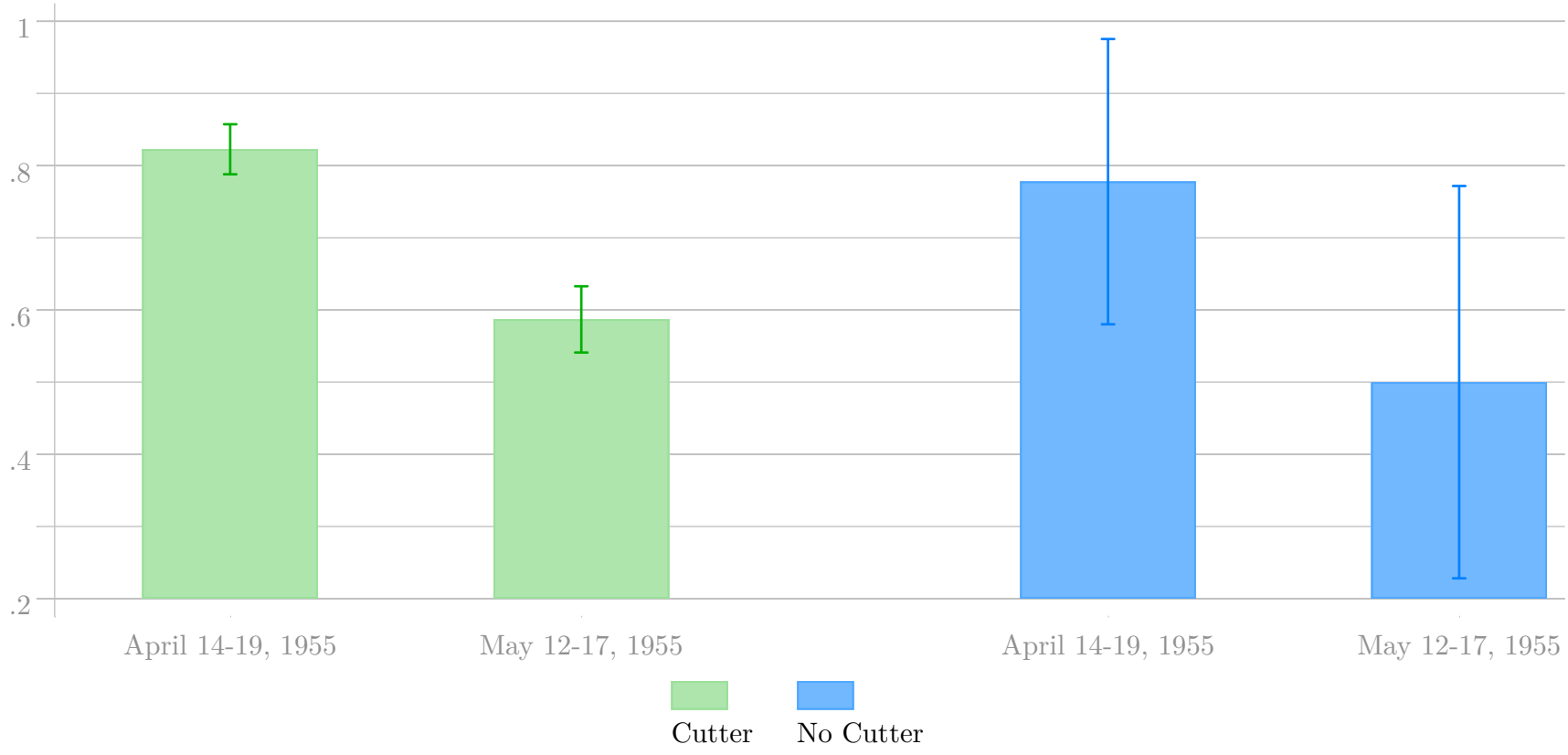
Event Study:

$$\text{outcome}_{rt} = \alpha + \sum_{t=-T, t\neq=-1}^{T} \phi_t \left[\text{Cutter}_r \times \text{Time}_t\right] + \gamma_r + \delta_t + \epsilon_{rt} \quad (1)$$

Random Assignment:

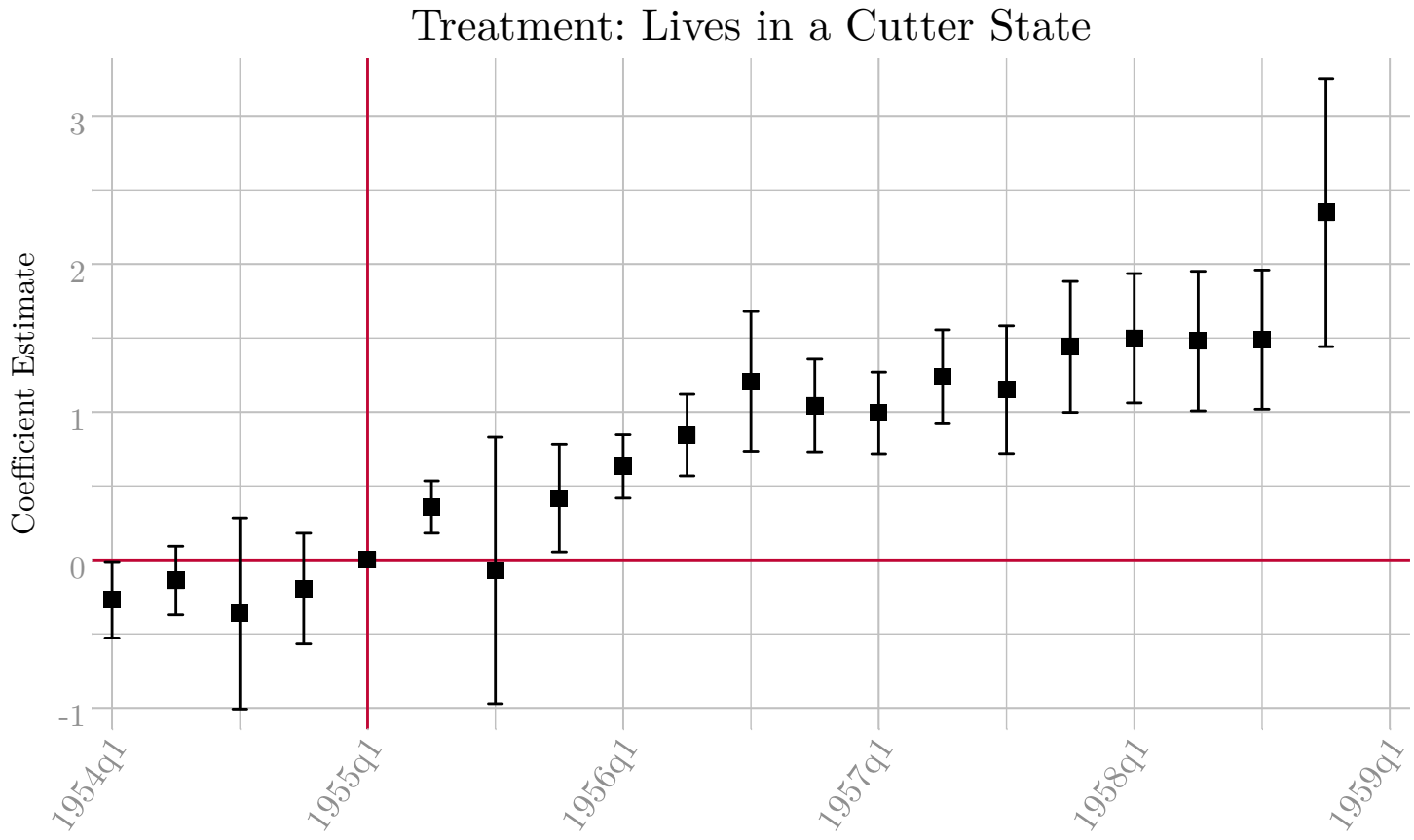
$$\text{outcome}_{rt} = \alpha + \beta \text{Cutter}_r + \gamma \text{population}_{rt} + \delta_t + \epsilon_{rt} \quad (2)$$

Gallup Polling



Fraction of people with children who say they have vaccinated or plan to vaccinate their children before and after vaccinations were suspended

Event Study Estimates of Polio Cases



Coefficient estimates and 95% confidence intervals from the event study. The dependent variable is the # of acute polio cases per 100,000 people. Controls: state fixed effects, state linear trends, quarter-year fixed effects. Standard errors clustered by state.

Mortality

Table: Vaccine-Preventable Mortality 1968-1978

	MMR <5	DPT <5	Flu <5	Flu >65
	(1)	(2)	(3)	(4)
Cutter Incident	0.0860	0.0209	0.189***	0.0626***
	(0.058)	(0.034)	(0.049)	(0.023)
Population	X	X	X	X
State F.E.	X	X	X	X
N. Obs	3067	3067	3067	3067
Clusters	48	48	48	48

Notes: The dependent variable in each specification is an indicator that equals 1 if the county reported at least one death from the specified disease over the 1968-1978 time period. Treatment varies by county in all specifications. Standard errors clustered by state in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Communicable Diseases

Table: Vaccine-Preventable Communicable Diseases 1996-1998

	MMRP	STIs	AIDS	Lyme
	(1)	(2)	(3)	(4)
Cutter Incident	0.181**	0.0495	0.0245	-0.0880
	(0.077)	(0.034)	(0.047)	(0.077)
Month F.E.	X	X	X	X
Year F.E.	X	X	X	X
Population	X	X	X	X
N. Obs	1764	1764	1764	1764
Clusters	42	42	42	42

Notes: The dependent variable in each specification is an indicator that equals 1 if the state reports at least one case of the specified disease in a given month. Treatment varies by state. Standard errors clustered by state in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Communicable Diseases

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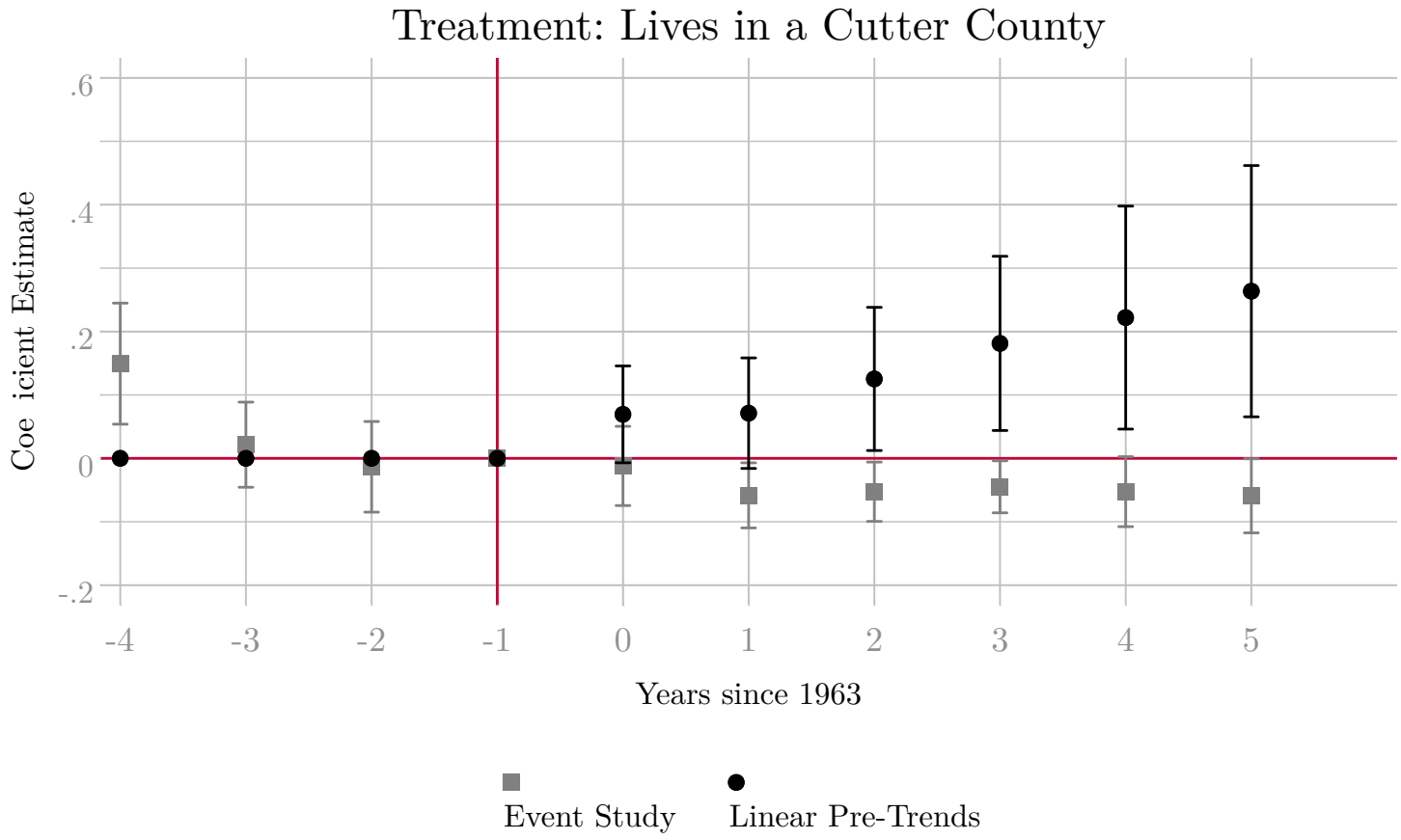
Year F.E.	X	X	X	X
Population	X	X	X	X
N. Obs	1764	1764	1764	1764
Clusters	42	42	42	42

Notes: The dependent variable in each specification is an indicator that equals 1 if the state reports at least one case of the specified disease in a given month. Treatment varies by state. Standard errors clustered by state in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Response to Measles Vaccine



Coefficient estimates and 95% confidence intervals from the event study. The dependent variable equals 1 if the county had a death from measles. Controls: county fixed effects, year fixed effects, population. Standard errors clustered by county.

Conclusion

Non-trivial change in health outcomes following the Cutter Incident

- The Cutter Incident may have some explanatory power for contemporary vaccine hesitancy
- Cautionary tale when compared to recent events, like the Johnson & Johnson and Astra Zeneca vaccine-pauses

Contribution to the persistence of health shocks and individual behavior

- Alsan and Wanamaker, 2018; Archibong and Annan, 2021; Lowes and Montero, 2020; Martinez-Bravo and Stegmann, 2021