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COVID-19 in Meatpacking Counties and the Rural Health System Fallout

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NCRCRD Webinar Series

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Why Meatpacking? Why Rural?

- Meatpacking is rural, consolidated, and labor-dense
- Plants became the first major rural epicenters (Spring 2020)
- Early narrative: “outbreaks caused massive COVID mortality”
- What our research shows:
  - Outbreaks were severe
  - Worker death totals were lower than expected
  - Rural community excess mortality was far worse than recorded COVID deaths

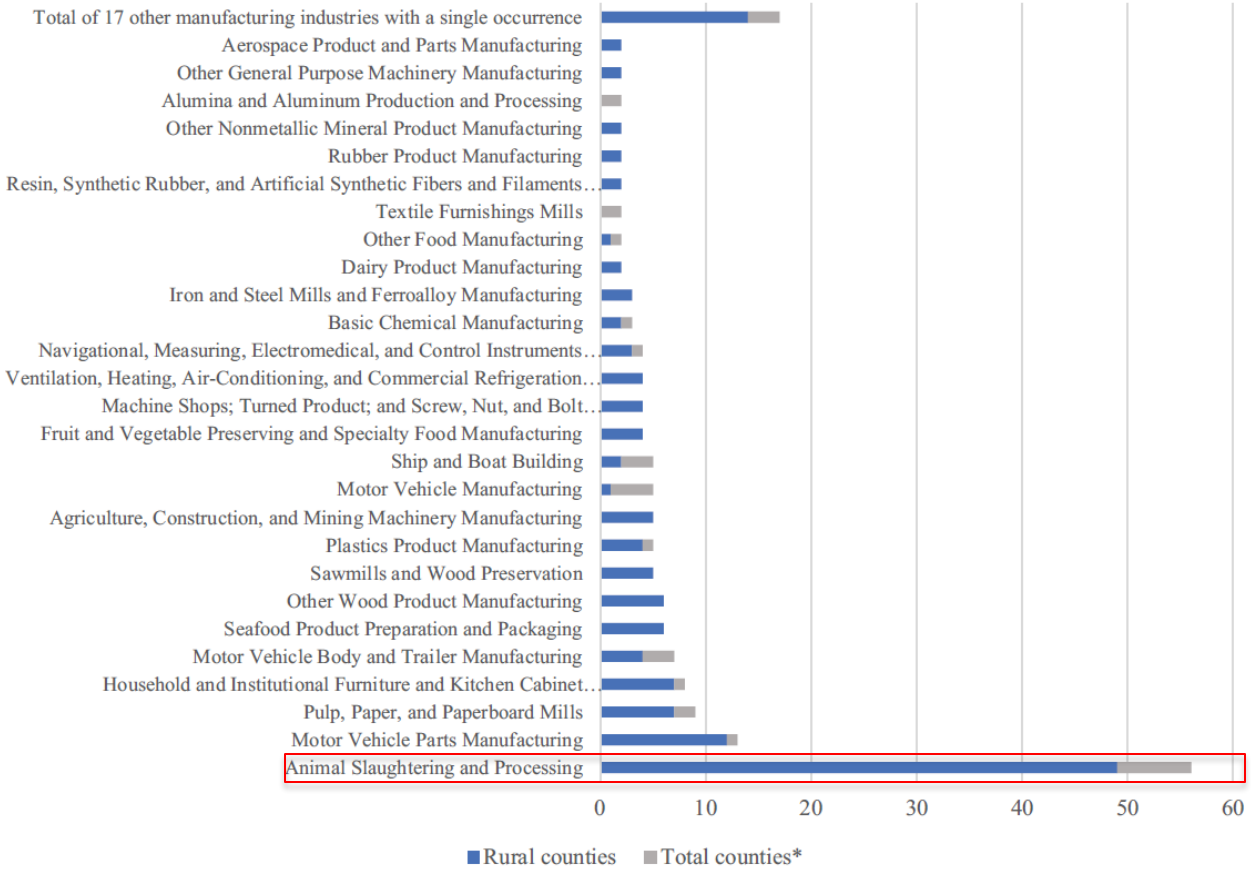

Figure 1. Number of counties with more than 20% of employment in a single 4-digit North American industry classification system, manufacturing category.

What This Talk Covers

- Working conditions
- Case and mortality dynamics
- Spatial excess mortality using MN address-level geolocation
- Event study: when the system broke
- Policy lessons for rural resilience

Key Background Facts

- Plants were national spread accelerators
- Early death estimates differed because of:
  - CFR-scaling vs. death certificate attribution
  - Incomplete and inconsistent reporting
- Broader issue: rural health systems lacked surge capacity
- Central question: Did the system fail, not just the plant?

SECTION 1

WORKING CONDITIONS & SPREAD

Physical Proximity as Mechanism

- O*NET working-conditions profile: extreme outlier value
- Physical proximity > 3 SD above sample mean
- “Typical worker is an arm’s length apart; cutters and trimmers are even closer.”

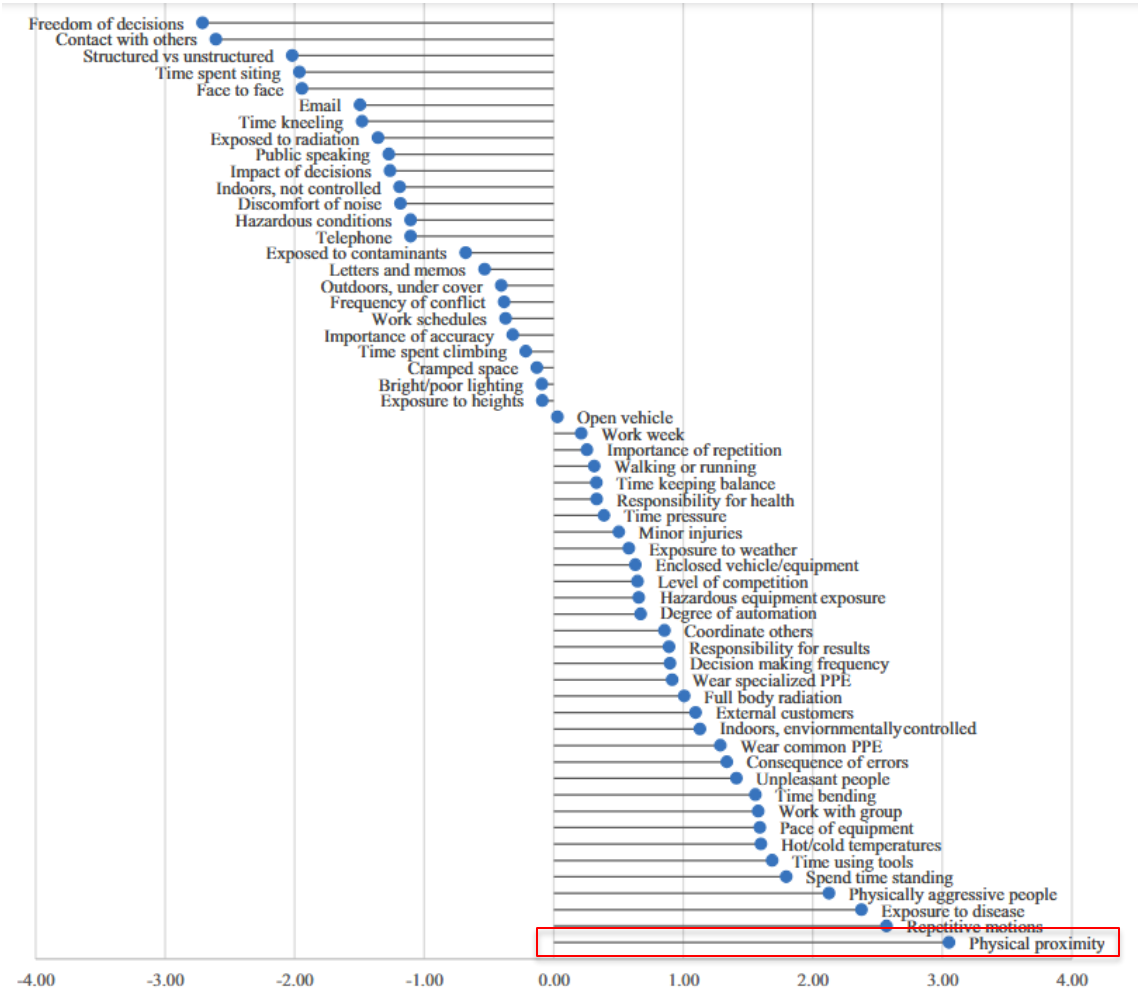

Figure 2. Meatpacking working condition scores and number of standard deviations from the comparison sample's mean.

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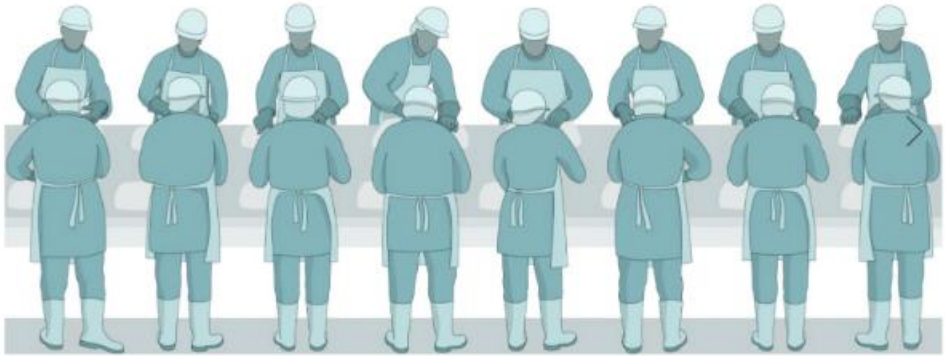
Why Proximity Matters

- Early plants had no barriers, no spacing, rapid line speeds
- Proximity created spatial infection clusters inside plants
- Matches documented internal transmission geometry
- Explains why county case spikes begin with the plant curve



"Before the pandemic, some workers had as little as 3 feet of space at the cutting table. Plants try to use every square inch of the fabrication floor to maximize the number of workers and increase production."

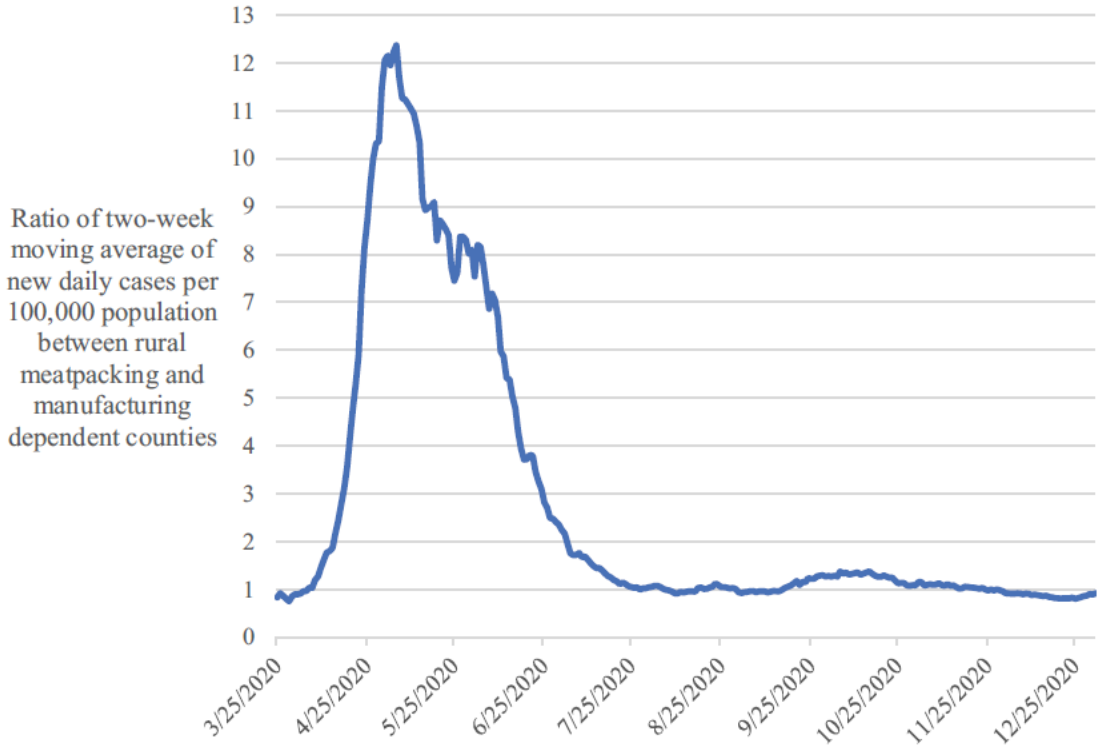
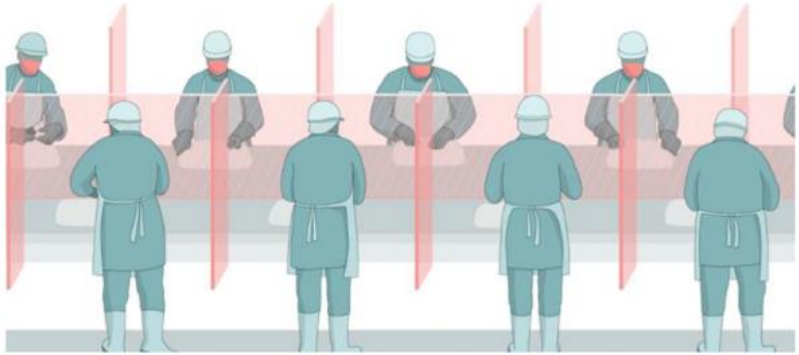


Figure 3. Ratio of new COVID-19 cases since 17 March 2020: Comparing rural counties with employment rates of 20% or more in meatpacking to rural counties with employment rates of 20% or more in other single manufacturing industries, two week moving average of new daily COVID-19 cases.



"Most plants are taking some steps, to varying degrees. Some are positioning workers so that they do not directly face one another and installing plexiglass dividers between them. They are also providing personal protective equipment like masks and making more sinks and hand sanitizer available. Other measures include staggering start times and adding shifts to minimize crowding at entrances, locker rooms and other shared spaces."

SECTION 2

WORKER DEATHS WERE NOT THE MAIN STORY

Observed Worker Deaths (MN + SD)

- March–July 2020
  - Meatpacking worker deaths: 8
  - Share of working-age COVID deaths: 10 percent
  - Out of 21,279 meatpacking workers estimated in our sample, only eight deaths were attributed to COVID-19 (0.04 percent).

Table 1. COVID-19 working-age deaths by month and meatpacking employment (March to July 2020).

	March	April	May	June	July	March-July
Meatpacking deaths	0	2	5	1	0	8
Working-age deaths	1	10	34	17	17	79
Share meatpacking deaths	0.0%	20.0%	14.7%	5.9%	0.0%	10.1%

Why So Few Worker Deaths?

- Workforce is relatively young → lower IFR
- Plants adopted mitigation measures rapidly (by May)
- Consistent with plant-level adaptation evidence
- Minnesota serology: high infection, low deaths among workers

SECTION 3

COMMUNITY EXCESS DEATHS: THE REAL CRISIS

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MN Geolocation Analysis

- Residential addresses of all decedents
- 15-mile buffer around large plants
- Compare COVID vs. non-COVID deaths
- Compare 2020 to 2019
- Threshold analysis follows Graddy et al.

Table 2. Geolocated deaths within the distance buffer of identified meatpacking plants with 250 or more employees (March to July).

		Placebo test	
	15 miles or less from large meatpacking plant (all deaths)	15 miles or less from large meatpacking plant (deaths in rural counties)	More than 15 miles from large meatpacking plant (deaths in rural counties)
Panel a: COVID-19 deaths			
Total number of COVID-19 deaths	49	25	94
Panel b: Estimates of excess mortality			
Total number of all cause deaths, 2020	1,855	1,231	3,996
Total number of all cause deaths, 2019	1,714	1,166	3,869
2020 excess deaths compared to 2019	141	65	127
2020 excess deaths compared to 2019, less total number of COVID-19 deaths	92	40	33
Percent of excess deaths not explained by COVID-19	65.2%	61.5%	26.0%

Excess Deaths Within 15 Miles (MN)

- Inside the 15-mile radius, nearly two-thirds of excess mortality was not recorded as COVID-19.
- This is the strongest evidence that the rural health system was overwhelmed.

Racial and Ethnic Inequality

- Minorities = 3.2% of deaths in 2019
- Minorities = 26.2% of excess deaths in 2020
- Minorities = 17.5% of non-COVID excess deaths
  - Minority communities near plants internalized the brunt of the system breakdown.

SECTION 4

WORKFORCE SHORTAGES & ELASTICITY

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Healthcare Capacity Constraints

- Per-capita staffing similar in rural vs. metro
- Absolute staffing is drastically lower in rural counties
- A rural hospital with 40 employees cannot respond like a metro hospital with 1,000.
- Elasticity of substitution in health production was effectively near zero.

Why Elasticity Matters

- Hospitals produce health with labor and equipment
- Substitution elasticity = ability to reassign/reallocate inputs
- Rural hospitals:
  - Fewer workers
  - Fewer specialists
  - Fixed-cost constraints
  - Heavy triage burdens
- When cases surged, rural hospitals could not substitute inputs—non-COVID care was delayed or rationed.

SECTION 5

EVENT STUDY: WHEN THE SYSTEM BROKE

Event Definition

- Event = first date a county reaches double-digit COVID cases
- Compare excess deaths before and after the event
- Findings:
  - No pre-trends
  - Excess deaths spike exactly during peak cases
  - Effects dissipate as cases decline

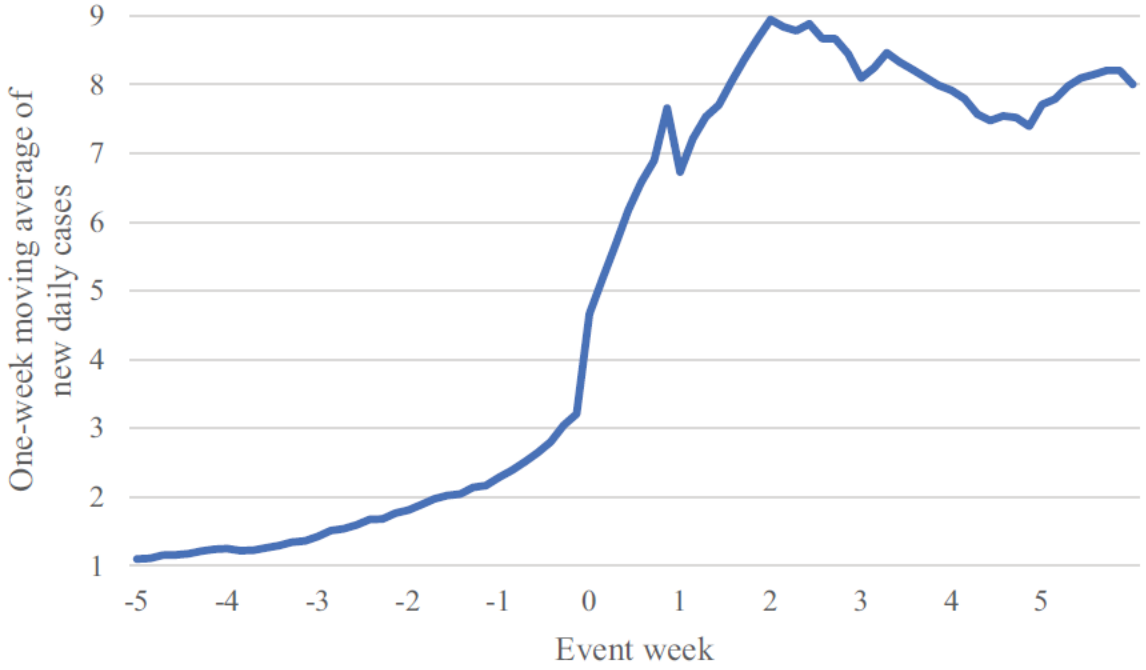

Figure 1. New COVID-19 cases for rural counties centred on the first observance of double-digit daily new cases, one week moving average of new daily COVID-19 cases.

Event Study Pattern

- X-axis: days relative to event
- Y-axis: excess non-COVID mortality
- Pattern:
  - Flat before the event
  - Sharp increase after the event
- The rural health system failed precisely when COVID cases surged

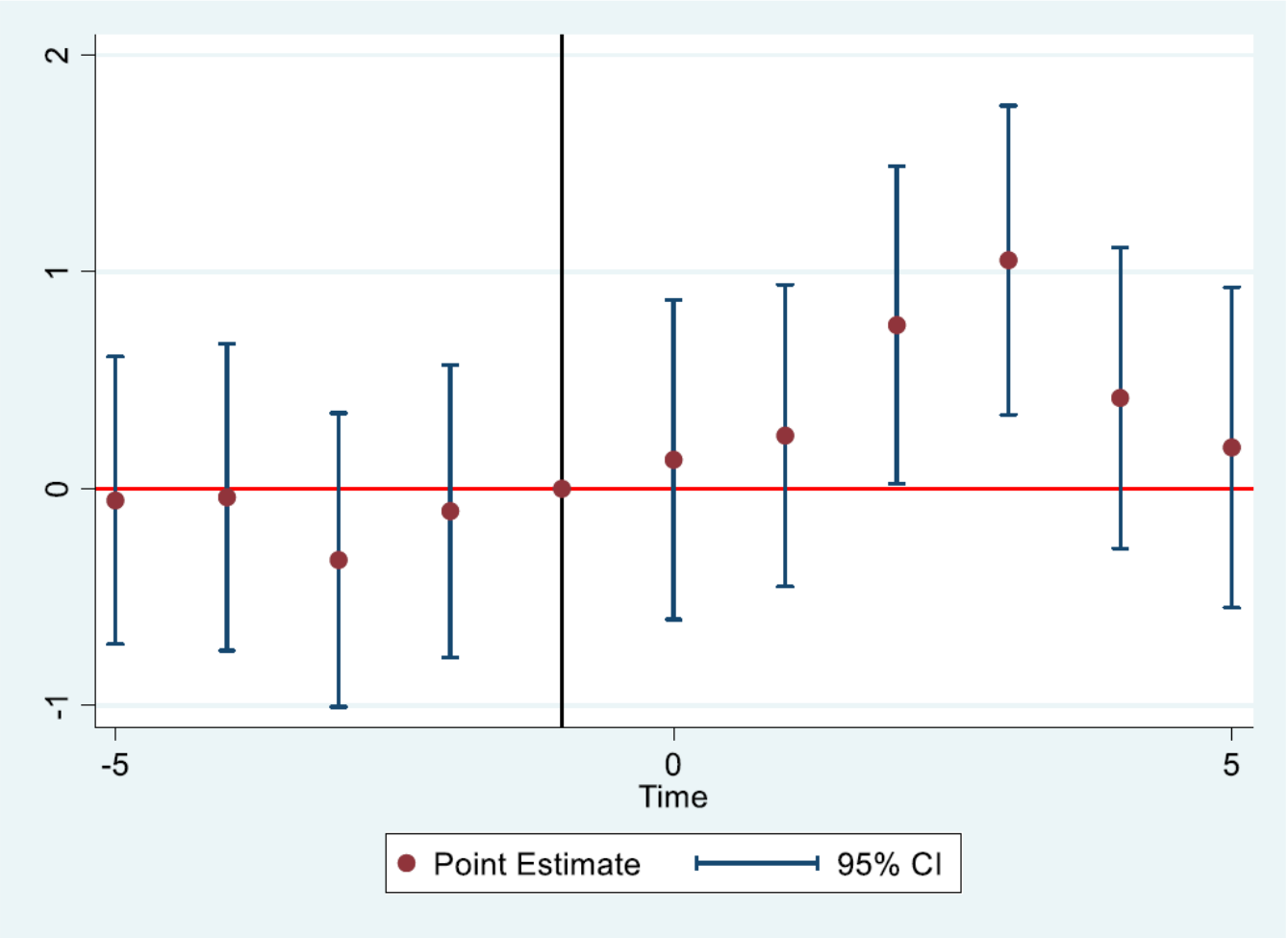

Figure 2. Quasi-event study of weekly excess mortality in rural Minnesota and South Dakota counties.

SECTION 6

IMPLICATIONS FOR RURAL DEVELOPMENT

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Main Findings

- Outbreaks originated in plants but overwhelmed rural hospitals
- Worker deaths were relatively low
- Community excess mortality was high and racialized
- Rural health systems lacked:
  - Surge capacity
  - Staffing flexibility
  - Equipment
  - Testing and tracing infrastructure

Policy Lessons

- Strengthen rural hospital surge capacity
- Invest in flexible labor: travel nurses, cross-training
- Build interoperable health-data systems
- Improve employer–public-health coordination
- Treat meatpacking counties as critical infrastructure regions

Closing

- The problem was never only the plant. The rural health system was already stretched thin, COVID-19 exposed the fault lines.

Thank you!

Questions welcome.