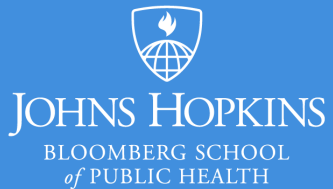


The Effect of Rural Hospital Closures on Emergency Medical Service Times



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Background



Rural hospitals provide critical services to local communities.

- (Kaufman et al., 2016; McDermott, Cornia, & Parsons, 1991; Mick & Morlock, 1990; Ricketts & Heaphy, 2000)

Rates of rural hospital closures are unprecedented.

- (Kaufman et al., 2016; Office USGA, 2018; Mullens, 2023)

Rural hospital closures increase distance to next nearest hospital.

- (Carson, 2011; Fleming, 1995; Reif, 1999; Rosenbach, 1995; Planey, 2023)

Background



- ▶ Pathway #1: Hospital provided emergency medical services (EMS).
 - ▶ Direct impact on access to services
 - ▶ Longer times driving to/from patients and destinations → patient outcomes (Wilde, 2013; Carroll, 2019)
- ▶ Pathway #2: Hospitals → Access to Care
 - ▶ EMS as potential substitute for non-emergent care (Goldstein, 2017 “In the Tennessee Delta, a poor community loses its hospital – and sense of security)
- ▶ Pathway #3: Hospitals → Access to Care → Healthy population
 - ▶ Lack of access results in worse population health (Bindman, Keane, & Lurie, 1990; Fihn & Wicher, 1988; Lurie, Ward, Shapiro, & Brook, 1984; Meuleman & Mounts, 1985), resulting in higher demand for EMS

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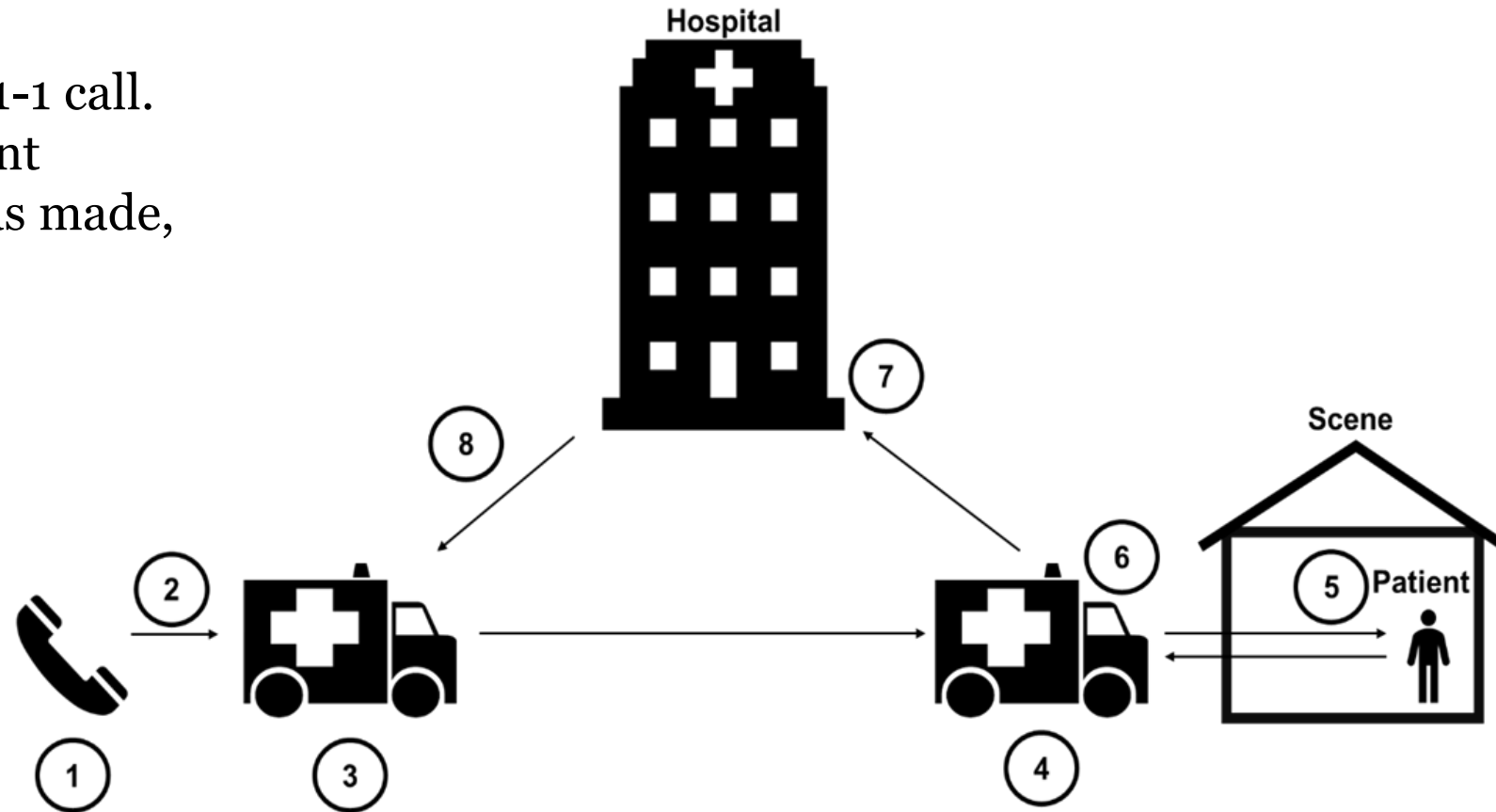


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Timeline of 9-1-1 Call



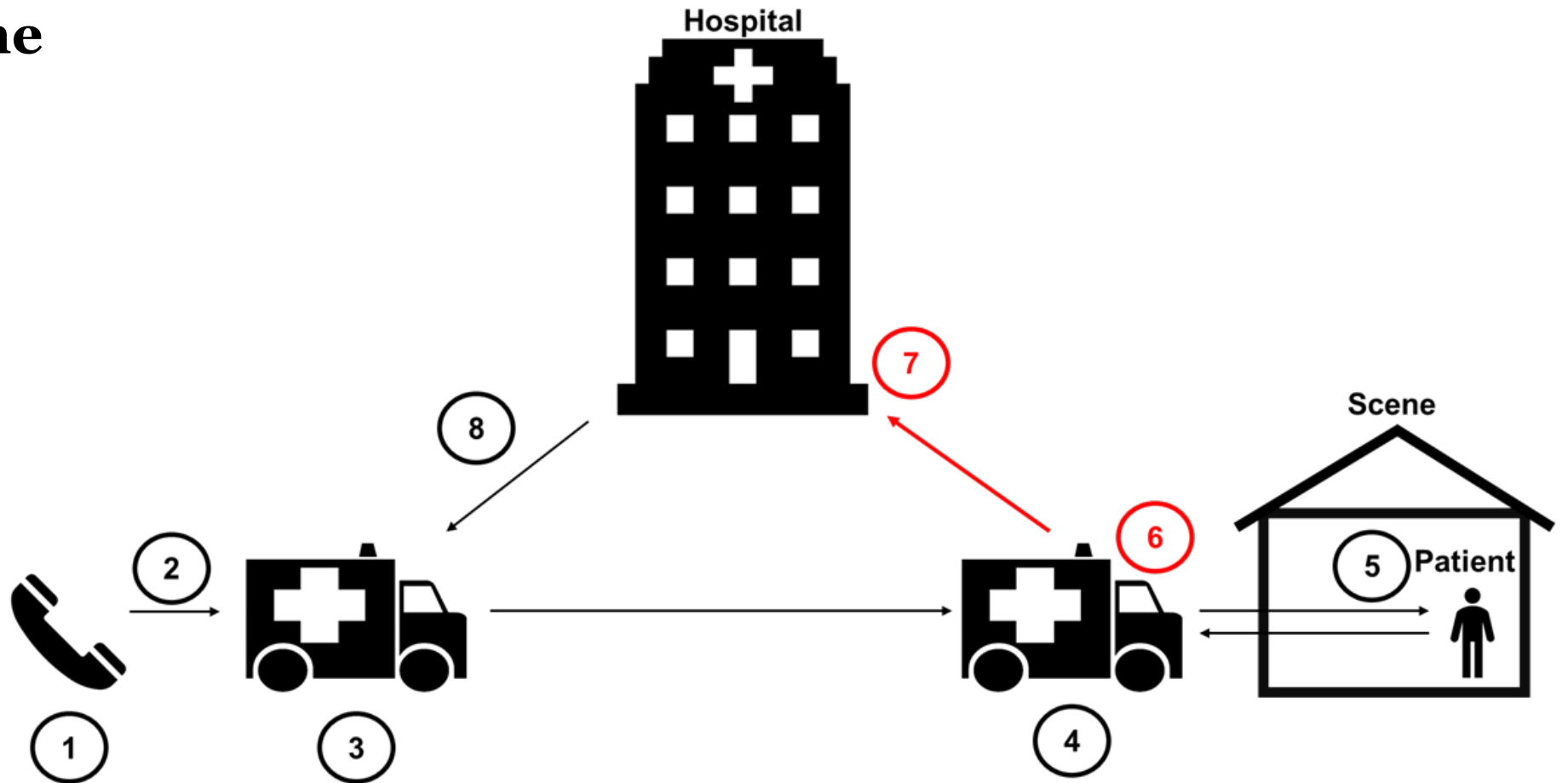
- (1) Time 9-1-1 call is made.
- (2) Dispatch notifies EMS unit of 9-1-1 call.
- (3) EMS unit is en route to the patient incidence where the 9-1-1 call was made, the scene.
- (4) EMS unit arrives at the scene.
- (5) EMS unit arrives at patient side.
- (6) EMS unit departs scene.
- (7) EMS unit arrives at destination.
- (8) EMS unit returns to service, i.e., ready to accept next call.



Outcomes



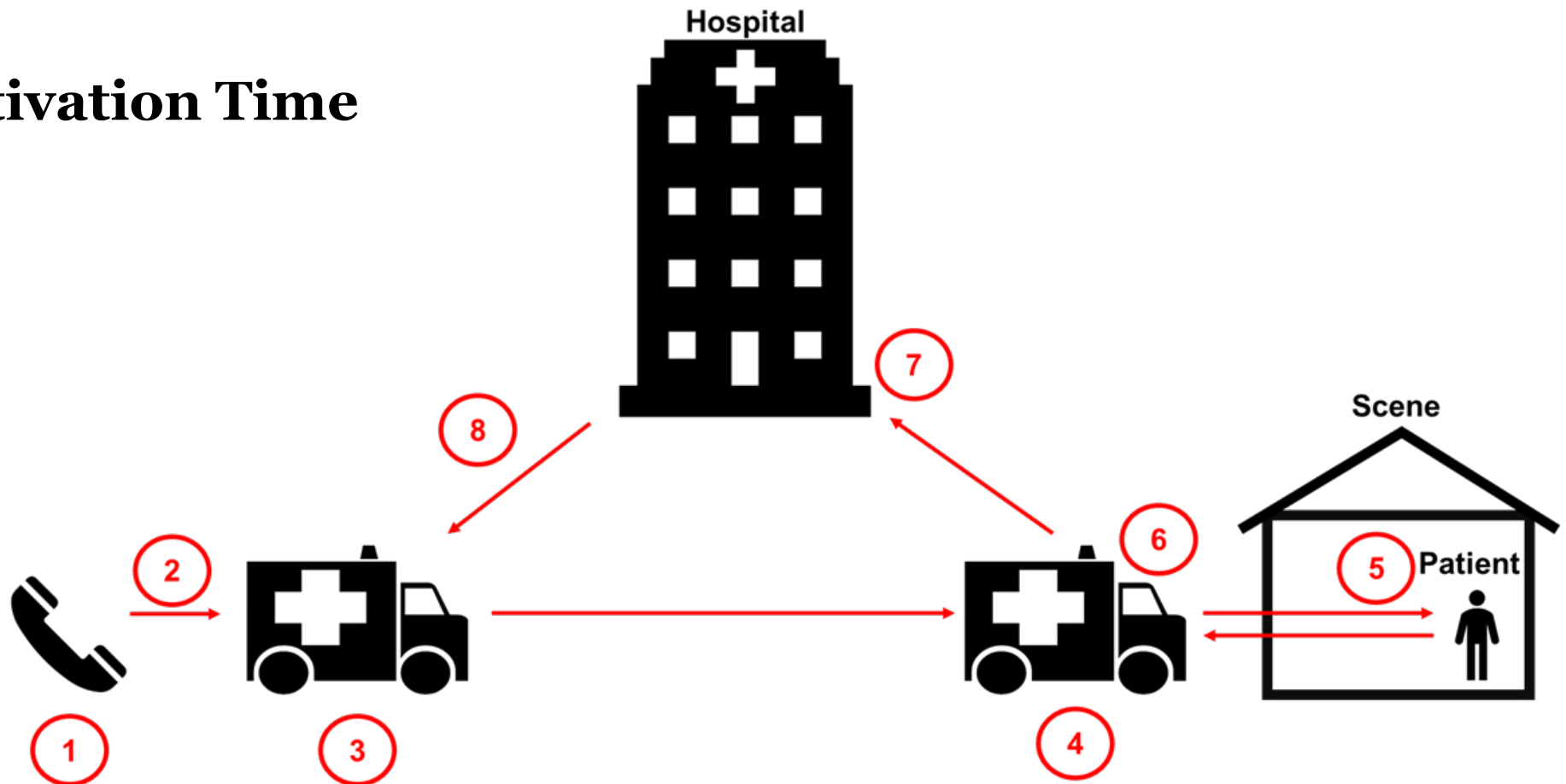
1. Transport Time



Outcomes



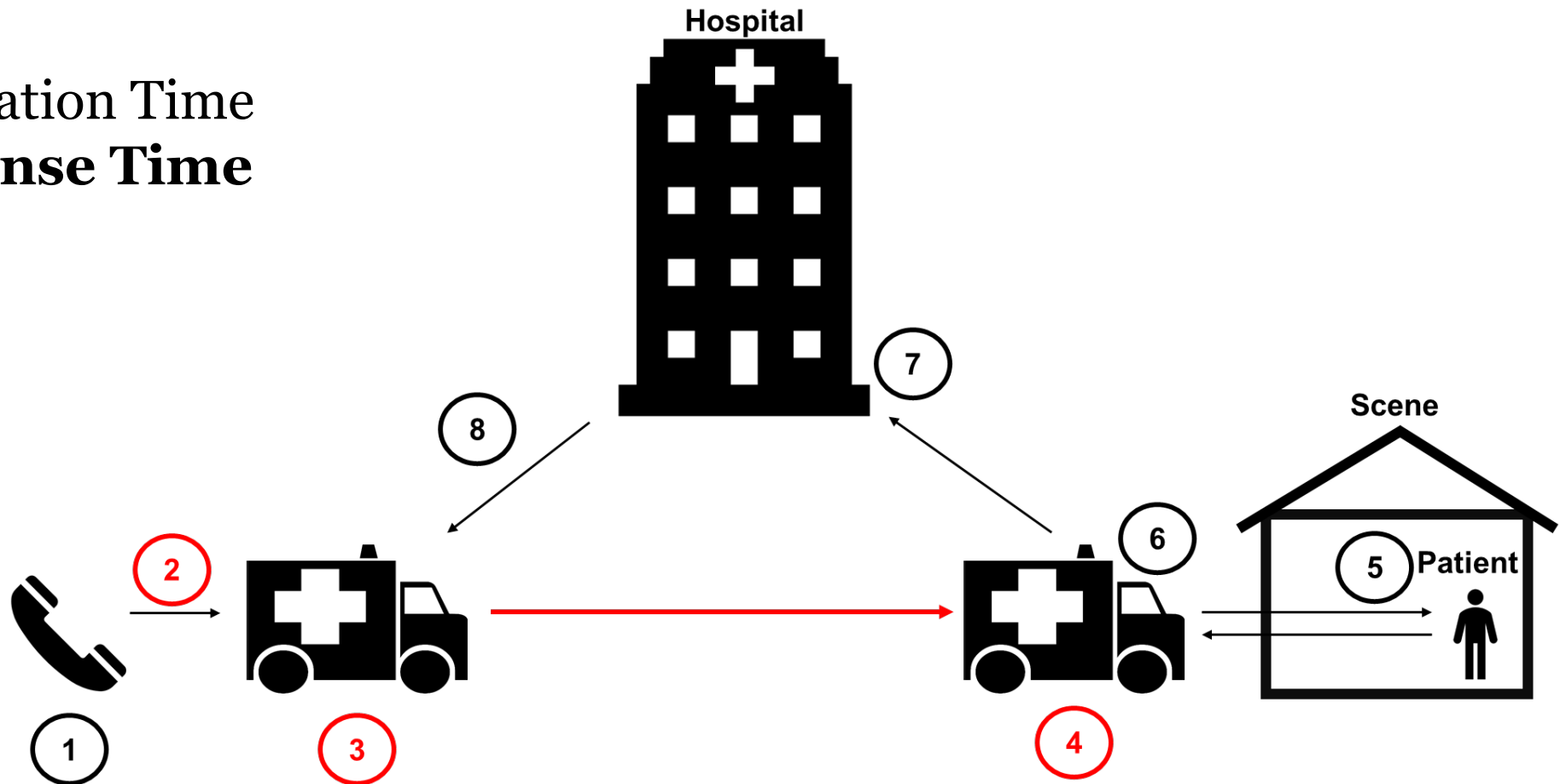
1. Transport Time
- 2. Total EMS Activation Time**



Outcomes



1. Transport Time
2. Total EMS Activation Time
- 3. System Response Time**



Methods



Data Sources

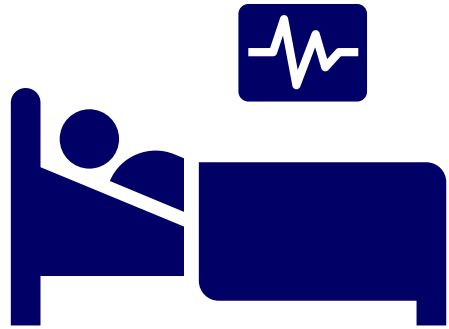
- ▶ Centers for Medicare & Medicaid Provider of Service Files, 2010-2016
- ▶ National EMS Information System (NEMSIS)
- ▶ Area Health Resource File, Health Resources & Services Administration

Sample

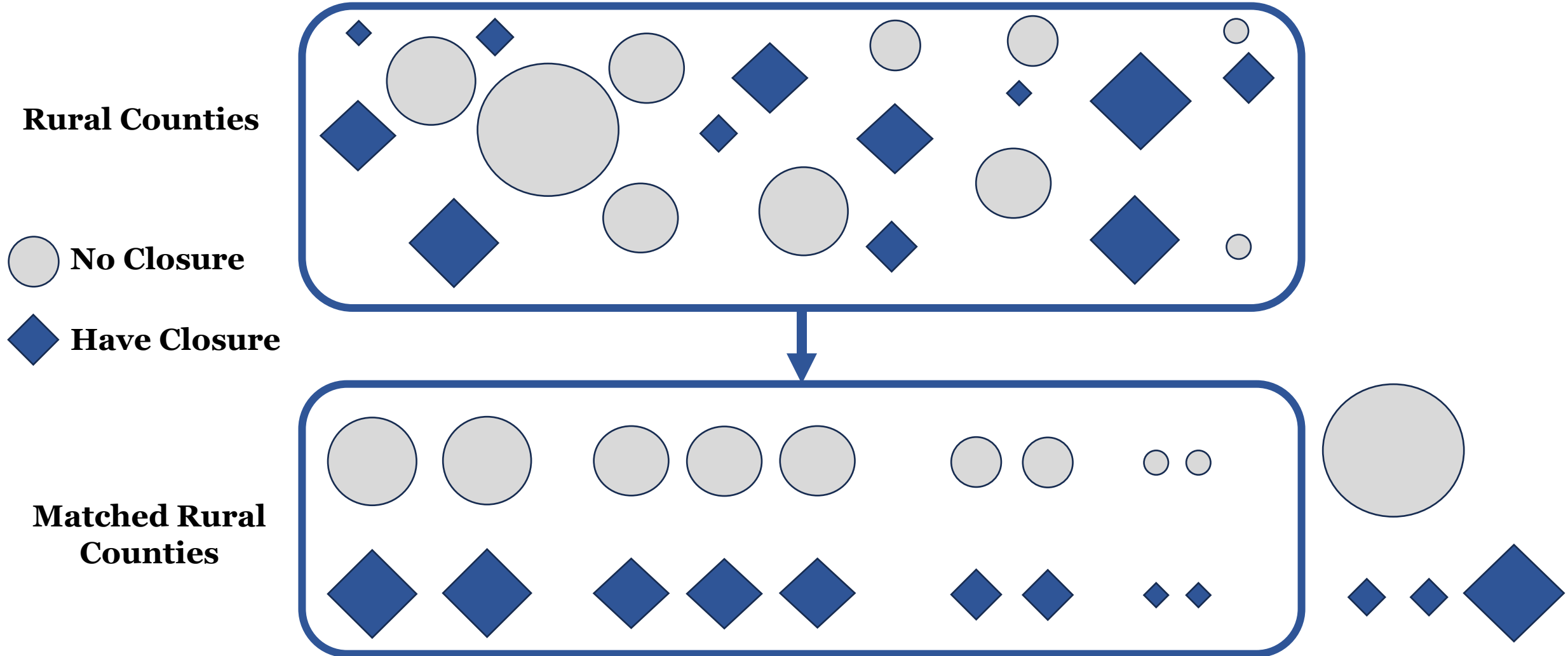
- ▶ Emergency patient encounters in NEMSIS occurring in rural counties

Treatment: county with a rural hospital closure

Key Points about Methods



Key Points about Methods



Key Results



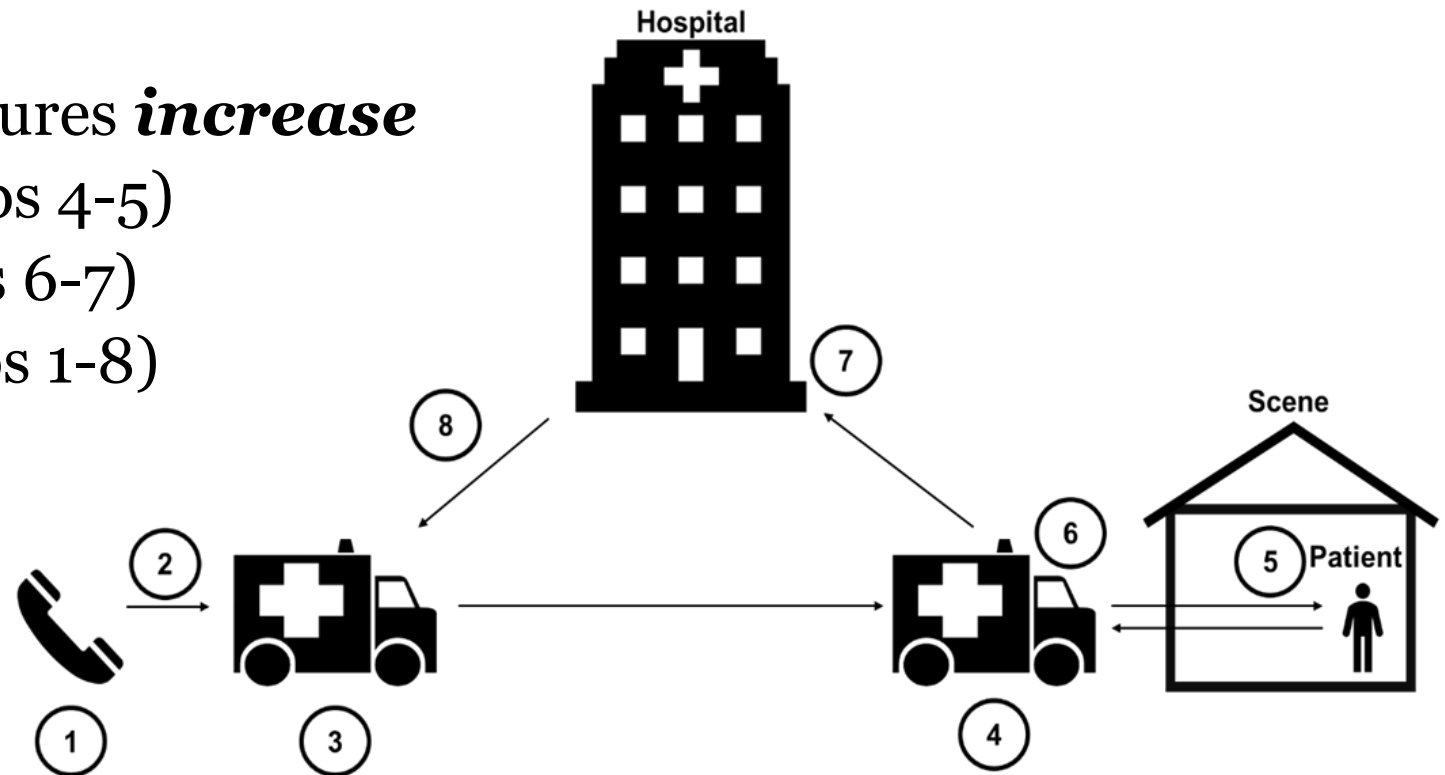
- ▶ Baseline average response time in rural areas was **11 minutes**.

Key Results



- ▶ Baseline average response time in rural areas was **11 minutes**.

- ▶ On average, rural hospital closures *increase*
 - ▶ Scene to patient times (steps 4-5)
 - ▶ EMS transport times (steps 6-7)
 - ▶ Total activation times (steps 1-8)



Key Results



- ▶ Baseline average response time in rural areas was **11 minutes**.
- ▶ On average, rural hospital closures ***increase***
 - ▶ Scene to patient times (steps 4-5)
 - ▶ EMS transport times (steps 6-7)
 - ▶ Total activation times (steps 1-8)
- ▶ Rural hospital closures also have ***heterogeneous effects*** across the distribution of EMS system response, transport and total activation times.

Conclusions



- ▶ This analysis has limitations, but also does not exist in a vacuum.
 - ▶ Wilde (2013)
 - ▶ Nikpay et al. (2021)
 - ▶ Smith et al. (2022)

Key Take Away from this growing body of evidence:

Rural hospital closures increase EMS times on average.

Additional Areas of Potential Interest



When Rural Hospitals Close

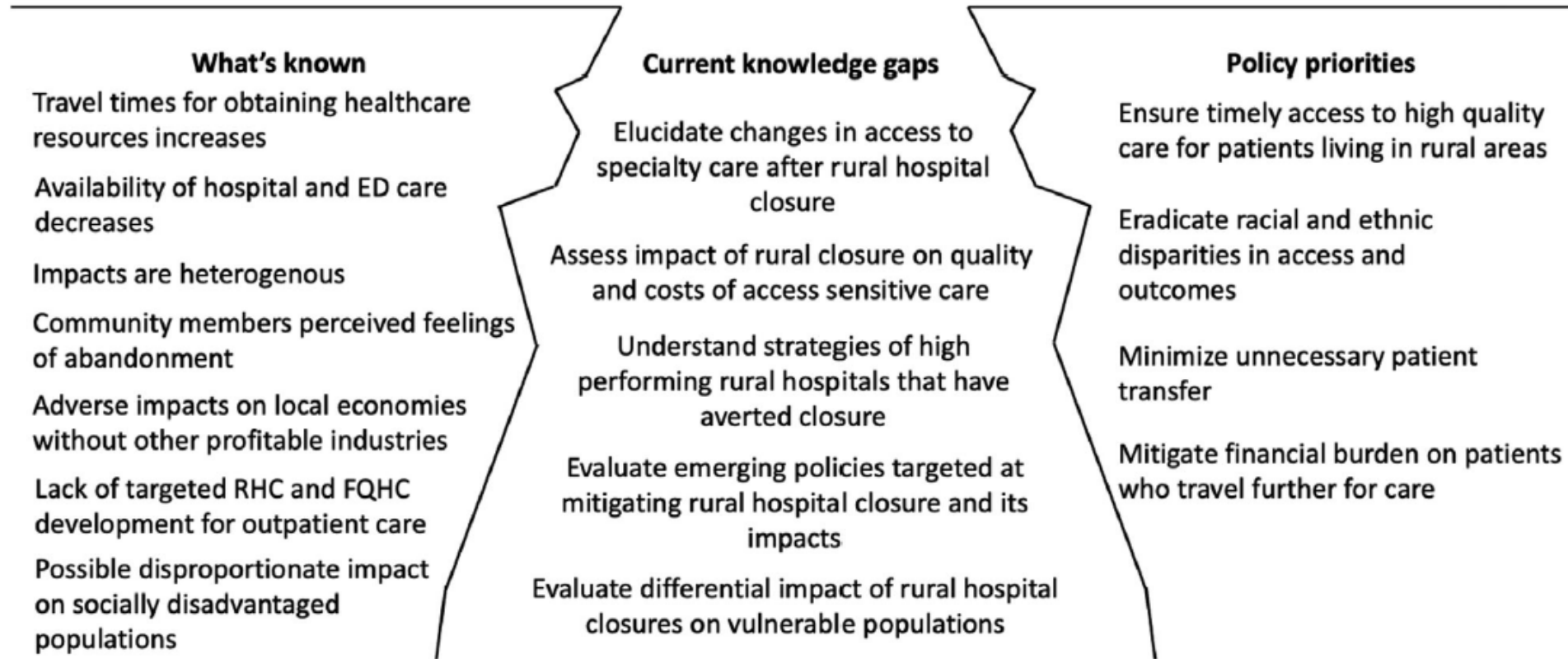


FIGURE 2 Summary of known impacts, current knowledge gaps, and policy priorities related to rural hospitals and rural hospital closures.



Thank you.

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