

# Where does it hurt?

## Local general practitioner reductions and hospital utilization

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The Power of Where  
Spatial Insights from Survey Data

Cottbus

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# Background

## Reduction in General Practitioner Supply

- Supply of general practitioners (GPs) declining in many healthcare systems, including Germany (Bussche 2019)
  - Demographic change → retirement
  - Work preferences → fewer hours worked per GP
  - Maldistribution → GPs underproportional in countryside
  - Profession → specializations more attractive than general practice (KBV 2018; IGES 2021)
- 
- Increasingly difficult to recruit and retain GPs
  - GPs leave workforce & no re-staffing
  - Shortage of GPs looming
  - Primary care supply endangered

# Motivation

## Effects of Reductions in General Practitioner Supply

- Reduction in GPs means some people will lose their GP  
e.g., GP retires, no successor takes over practice
- Potential immediate effects when losing GP
  - Find new GP
  - Substitute for specialized care
  - Avoid / delay care

## Effects on Hospital Utilization

If GP supply ↓, hospital utilization ↑

- 1 Care substitution: Ambulatory hospital visits
- 2 Delayed care: Potentially avoidable hospitalizations

## Aim

Estimate effect of local GP reductions on hospital utilization

# Motivation

## Ambulatory hospital visits

(Lau et al. 2021; Pinchbeck 2019; Bischof and Kaiser 2021)

- Instead of seeing GP, substitute for more specialized care
  - Hospital ambulatory visits ↑
- More costly for healthcare system

## Potentially avoidable hospitalizations

(Purdy et al. 2009; Sundmacher et al. 2015; Renner 2019)

- Primary care avoided / delayed
  - More serious health conditions emerge as a result, requiring hospital care
  - Manageable illness ends up in hospital due to delayed / missed primary care
  - Hospitalizations that could potentially be avoided through timely primary care
  - E.g., Hospitalizations for asthma, diabetes, hypertension
- Worse patient health & more costly for healthcare system

# Literature

## Ambulatory Hospital Visits

- GP practice closures lead to substitution for specialist visits and ambulatory hospital visits in Switzerland. No effect on (overnight) hospitalizations. (Bischof and Kaiser 2021)
- Roll-out of convenient access to GP services reduced emergency department visits in England (Pinchbeck 2019)

## Potentially Avoidable Hospitalizations

- Policy to increase GP supply in deprived areas → hospitalizations ↓ in Brazil and Hungary (Fontes, Conceição, and Jacinto 2018; Elek, Molnár, and Váradi 2019)
- Lower primary care continuity (same GP) led to higher hospital admissions for ambulatory care sensitive condition in Canada (Godard-Sebillotte et al. 2021)
- Lower primary care spending → avoidable hospitalizations of diabetic patients ↑ in Germany (Schuettig and Sundmacher 2022)

# Setting

## Institutional Background

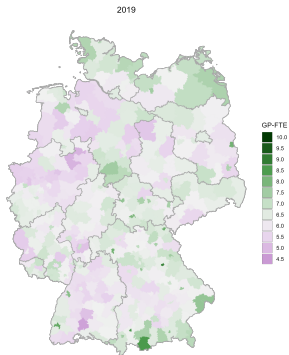
- Mandatory health insurance (near universal coverage)
- Patients can choose GP
- Primary care provided in solo/small GP practices
- GPs are mostly contracted physicians

## Healthcare Planning

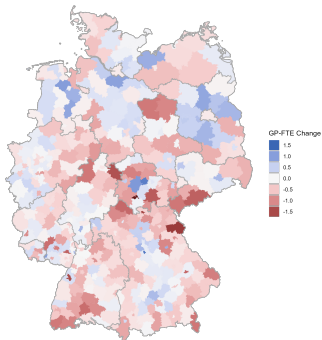
- Target ratio: 6.2 GPs per 10,000 inhabitants
- Entry restrictions / support measures

## Setting

GP full-time equivalents per 10,000 inhabitants; 2019



Change in GP full-time equivalents per 10,000 inhabitants from 2009 to 2019



# Aim

## Estimate effect of local reductions in GP supply on hospital utilization

- Hospital utilization
  - Ambulatory hospital visits
  - Potentially avoidable hospitalizations
- Local reduction in GP supply
  - Reduction in GP density in radius around individual / hospital
  - ✓ More fine-grained than area-level aggregate (individualized measure)
  - ✓ Capture relevant GP supply to approximate discontinuity of care
- Level of analysis
  - Individual level
  - Hospital level

# Data Sources

## Bundesarztregister

- All contracted general practitioners (GPs) from 2010
  - Full-time equivalents, Practice address
- Treatment: Reduction in local GP density

## German Socio-Economic Panel (SOEP)

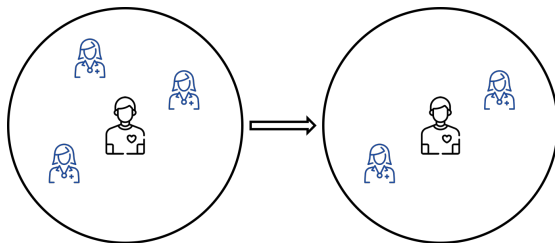
- Representative longitudinal household survey since 1984 (Goebel et al. 2018)
  - Income, education, living conditions, attitudes, health, household address
- Outcome: Number of nights spent in hospital last year

# Identification

## Treatment

→ Reduction in the local GP density from one year to the next

- Urban areas: within 3km radius around individual
- Non-urban areas: within 10km radius around individual



# Identification

## Outcome

- Number of nights spent in hospital

## Groups

- Treatment group: Individuals with reduction in local GP density
- Control group: Individuals without reduction in local GP density

## Restrictions

- Non-movers only (treatment external)
- Baseline GP density below target ratio (treatment salient)
- No switchers (treatment persistent)

## Identification Strategy

- Staggered Difference-in-Differences (Callaway and Sant'Anna 2021)

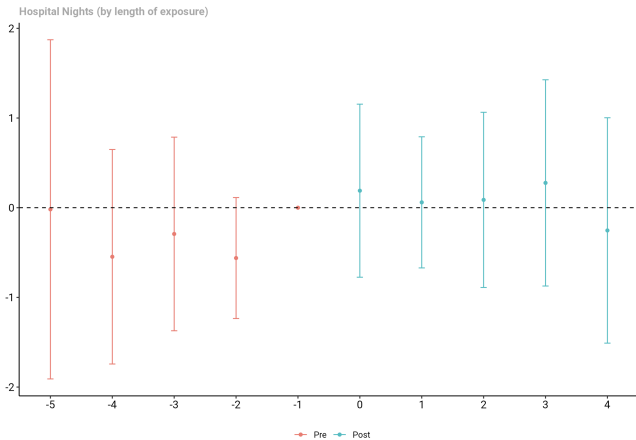
# Samples

## Sample Individuals

- Time-frame: 2014-2019
- Unbalanced panel
- Control group: 18,200 observations of 7,206 individuals
- Treatment group: 8,727 observations of 2,553 individuals

▶ Samples

# Hospital Nights



Outcome:  
Hospital nights

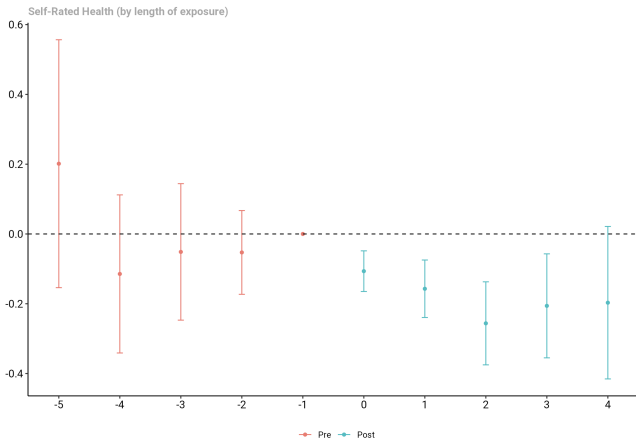
Treatment:  
Reduction in GP density

▶ Outcome Binary

▶ Treatment Intensity

▶ Treatment Definition

# Self-Rated Health



Outcome:  
Self-rated health

Treatment:  
Reduction in GP density

# Data Sources

## Bundesarztregister

- All contracted general practitioners (GPs) from 2010
  - Full-time equivalents, Practice address
- Treatment: Reduction in local GP density

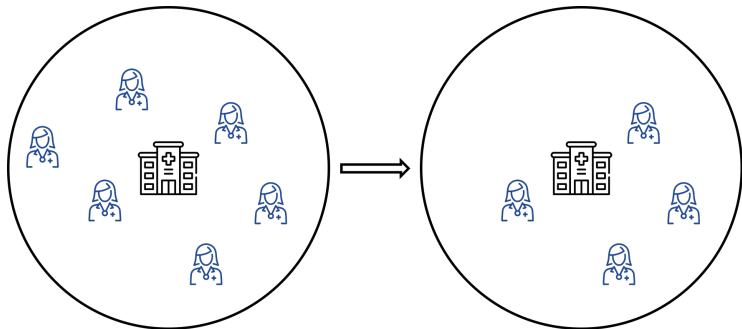
## Hospital Quality Reports

- All hospitals from 2014
  - Ambulatory cases, inpatient cases by diagnosis, hospital address
- Outcomes: Ambulatory hospital visits, total inpatient cases of avoidable hospitalizations (diagnoses: diabetes, bronchitis, hypertension, heart disease)

# Identification

## Treatment

- Reduction in the local GP density from one year to the next
  - Within 30km radius around hospital



# Identification

## Outcomes

- Ambulatory hospital visits
- Total potentially avoidable hospitalizations (Sundmacher et al. 2015)

## Groups

- Treatment group: Hospitals with reduction in local GP density
- Control group: Hospitals without reduction in local GP density

## Restrictions

- Baseline GP density below target ratio (treatment salient)

## Identification Strategy

- Staggered Difference-in-Differences (Callaway and Sant'Anna 2021)

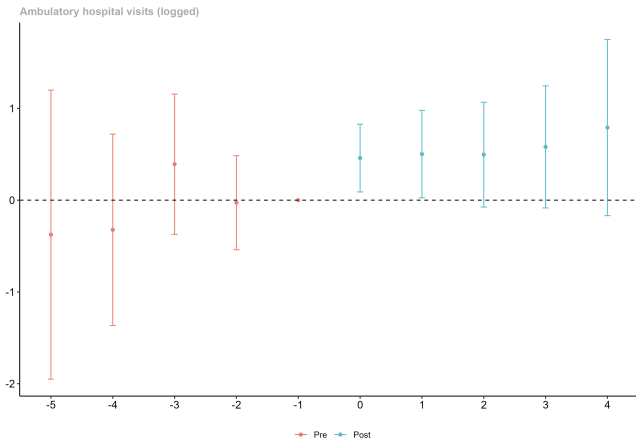
# Samples

## Sample Hospitals

- Time-frame: 2014-2019
- Unbalanced panel
- Control group: 1,943 observations of 474 hospitals
- Treatment group: 4,184 observations of 749 hospitals

▶ Samples

# Ambulatory Hospital Visits



Outcome:  
Ambulatory hospital visits

Treatment:  
Reduction in GP density

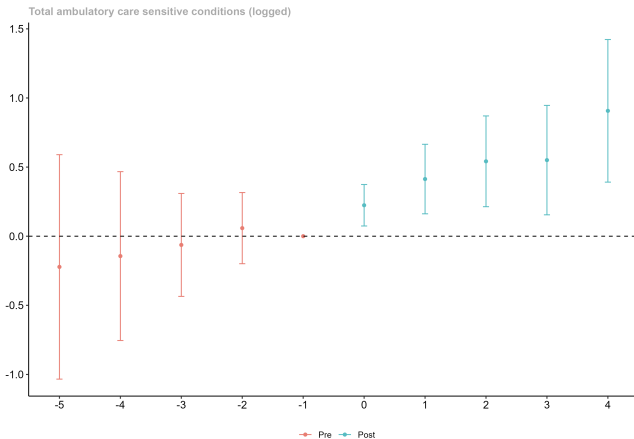
▸ Diabetes

▸ Bronchitis & COPD

▸ Hypertension

▸ Heart Disease

# Potentially Avoidable Hospitalizations - Total



Outcome:  
Total potentially avoidable hospitalizations

Treatment:  
Reduction in GP density

# Summary

## Findings

Effect of local reductions in GP supply on ...

- Ambulatory hospital visits: Some
  - Small care substitution in first period observed
- Potentially avoidable hospitalizations: Increase
  - Individual level: Hospitalization risk does not seem to be affected, but self-rated health does get worse.
  - Hospital level: potentially avoidable hospitalizations are affected
    - Increase of total ambulatory care sensitive conditions
    - Increase of inpatient cases for diabetes, bronchitis & COPD, hypertension

# Conclusion

## Policy Implications

- Ambulatory hospital visits  
(currently) limited substitution for hospital care  
Potentially (unobserved) care substitution with visits to specialist doctor  
→ Efficiency implications: more costly care; congestion
- Potentially avoidable hospitalizations  
Increase in ambulatory care sensitive conditions  
As a result of reductions in GP supply, manageable illnesses end up in hospital  
→ Patient health & efficiency implications: worse patient health, more costly care

# Thank You!

Thank You!

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