Antibiotics for acute cough in general practice.
Differences between high and low prescribers

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Background: High vs. low prescribers

Individual behaviour

„Whether or not a patient [...] will be handed an **antibiotic prescription seems to depend more on the attending doctor's behaviour** than on the clinical picture"
(Sutter et al., 2001)

Differences in diagnostic labelling

Figure 2. Diagnoses of patients with respiratory tract infections by high prescribers (171 patients) and low prescribers (181 patients): P <.001.
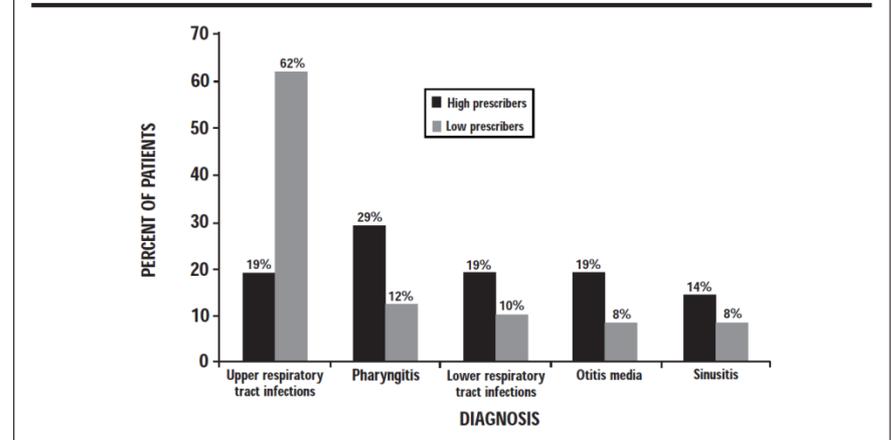
Hutchinson et al., 2001

Describing differences between

high and low prescribers in German primary care

1. antibiotic prescribing rate

2. diagnostic labelling
   (presumed bacterial infections, e.g. acute bronchitis)

3. doctors' and patients' characteristics

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Data provider:

Association of Statutory Health Insurance Physicians in Bavaria (Kassenärztliche Vereinigung Bayerns, KVB).

physician

KVB

Send reimbursement claims quarterly

Physician's fee
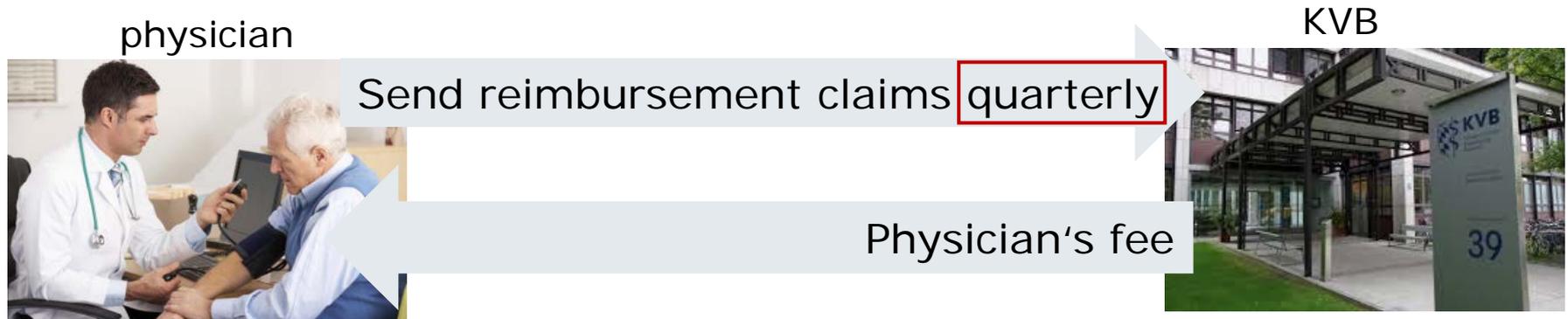
Methods:
Data set

- **Patient information**
  - age, sex,
  - diagnoses
- **Practice information**
  - location: rural vs. urban
  - single or group practice
  - prescribing dominance = prescriptions issued by a specific surgery divided by all prescriptions of its patient population
  - practice volume
  - deprivation (Bavarian Index of Multiple Deprivation, Maier et al., 2012)
- **Linked to prescription data** (ATC code)

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Data set:
Claims data, 2011 - 2012

Inclusion criteria

Patients
with respiratory tract infections diagnosed by a primary care physician in Bavaria

Exclusion criteria

Primary care surgeries
Less than 200 patients and less than 10 patients with respiratory tract infections per quarter

Patients
- Implausible diagnosis
- Younger than 15 years
- Other infectious diseases
- More than one respiratory tract infection and/or more than one antibiotic prescription
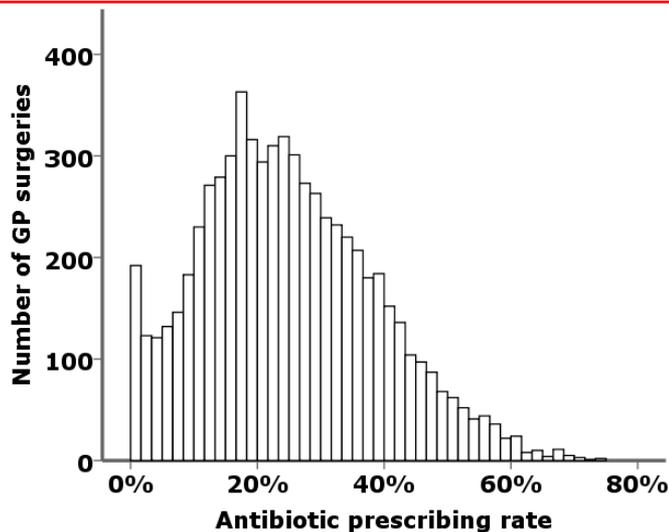
4.045.579 patient-physician-contacts in 6.647 GP surgeries

Results:
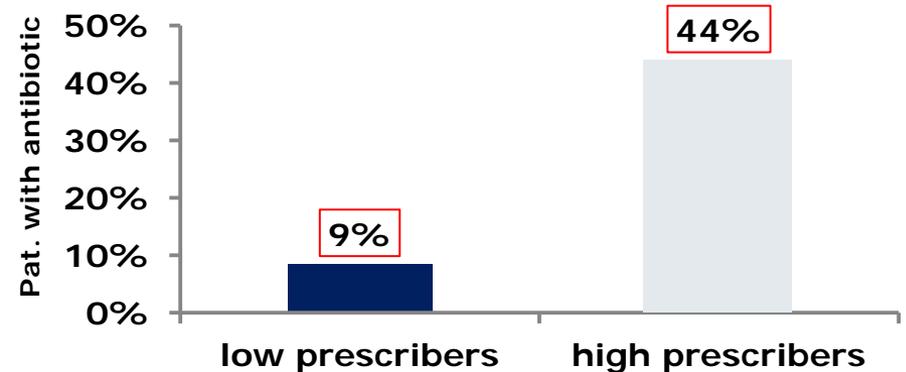# Antibiotic prescribing rate

Over all primary care surgeries
$M = 24.9\ \%$, $SD = 14\ \%$

Stratification
low prescribers   <25th %tile
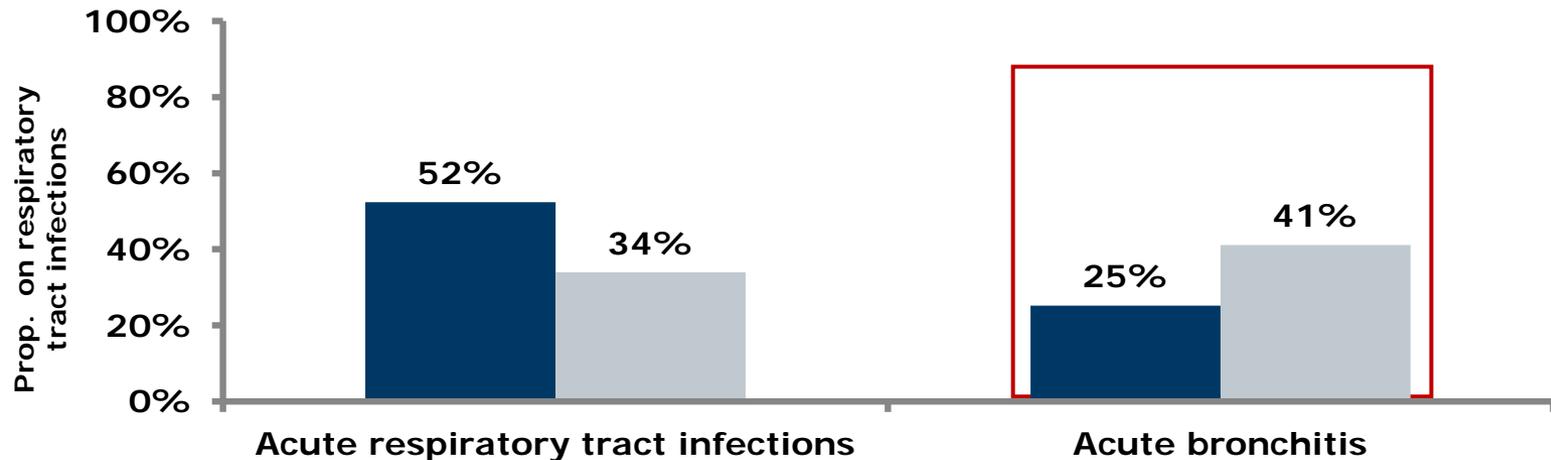high prescribers   >75th %tile

➡ **High prescribers used antibiotics five times more often.**

Results:
Diagnostic labelling

High prescribers diagnosed more presumed bacterial infections.

Results: Doctors' and patients' characteristics
Stepwise logistic regression (adjusted model)

Predictors   **Outcome**

1. Prop. of pat. with presumed bacterial infections
2. Prop. of pat. older than 65 years
3. Prop. of pat. with comorbidities
4. Practice volume   **type of prescriber**
5. Degree of prescribing dominance   **(high vs. low)**
6. Deprivation
7. Rural Practice
8. Single-handed practice

- Continuous variables were transformed in quintiles

- Reference category: lowest quintile

- **OR = odds of high prescribers in the highest quintile as compared to the odds of high prescribers in the lowest quintile**

Adjusted model: stepwise logistic regression

	Adjusted OR Highest Quintile	95% CI	p
Pat. with presumed bacterial infections	**13.9**	[10.2, 18.8]	< .01
Pat. older than 65 yr.	**0.9**	[0.7, 1.2]	> .45
Pat. with comorbidities	**0.6**	[0.4, 0.8]	< .01
Practice volume	3.8	[2.9, 5.0]	< .01
Prescribing dominance	3.6	[2.6, 4.5]	< .01
Regional deprivation, BIMD	4.6	[3.3, 6.2]	< .01
Rural setting	2.0	[1.6, 2.5]	< .01
Single-handed practice	0.7	[0.6, 0.8]	< .01
constant	0.02		

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Adjusted model: stepwise logistic regression

	20. Perzentil (P_20)	80. Perzentil (P_80)	Adjusted OR P_80	95% CI	p
Pat. with presumed bacterial infections	< P_{20} = 32.3 %	> P_{80} = 75.4 %	**13.9**	[10.2, 18.8]	< .01
Pat. older than 65 yr.	< P_{20} = 12.7 %	> P_{80} = 27.5%	**0.9**	[0.7, 1.2]	> .45
Pat. with comorbidities	< P_{20} = 17.2 %	> P_{80} = 43.7 %	**0.6**	[0.4, 0.8]	< .01
Practice volume	< P_{20} = 544.7	> P_{80} = 1133.8	3.8	[2.9, 5.0]	< .01
Prescribing dominance	< P_{20} = 40.2 %	> P_{80} = 60.7%	3.6	[2.6, 4.5]	< .01
Regional deprivation, BIMD	< P_{20} = 11.36	> P_{80} = 31.58	4.6	[3.3, 6.2]	< .01
Rural setting			2.0	[1.6, 2.5]	< .01
Single-handed practice			0.7	[0.6, 0.8]	< .01
constant			0.02		

- In surgeries with the highest rate of **presumed bacterial infections**, the **odds of high prescribers was 14 times higher** as compared to surgeries with the lowest rate.

- In surgeries with the highest rate of **patients with comorbidities**, the **odds of high prescribers was 40% lower** as compared to surgeries with the lowest rate.

- No association with proportion of older patients.

- Strong association of high prescribers with **structural factors.**

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Conclusion

- Compared to international studies, **the overall prescribing rate in Germany was _relatively_ low**.

- **Diagnostic labelling** was the strongest predictor to **high perscribers.**

- In the adjusted model, a **high proportion of patients with comorbidities** was associated with **lower antibiotic prescribing**.

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