



ZENTRALINSTITUT FÜR DIE
KASSENÄRZTLICHE VERSORGUNG
IN DEUTSCHLAND

Tracking Regional Variation in Health Care
Wennberg International Collaborative (WIC) Policy Conference,
Berlin, 4 June 2015

Virtual Network Analysis – What's the Value for the Individual Physician?

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Assumptions (1)

1. Health care is a **local phenomenon**, and it depends on **individuals**. Therefore, **variation is intrinsic to health systems** even when a homogenous legal framework and consistent economic incentives apply.
2. The degree of variation indicates the extent to which the outcome might be **improved** within the boundaries of the present system.
3. The analysis of **regional variation** of health care shows what level of care (outcome) can be expected for a given **resident population**.
4. Regional variation, however, is expressed by an aggregated value which may not reflect the **individual experience** very well.
5. If that is the case, health atlases won't change behavior. This can only be expected if a measure can be found which reflects **accountability for care**.

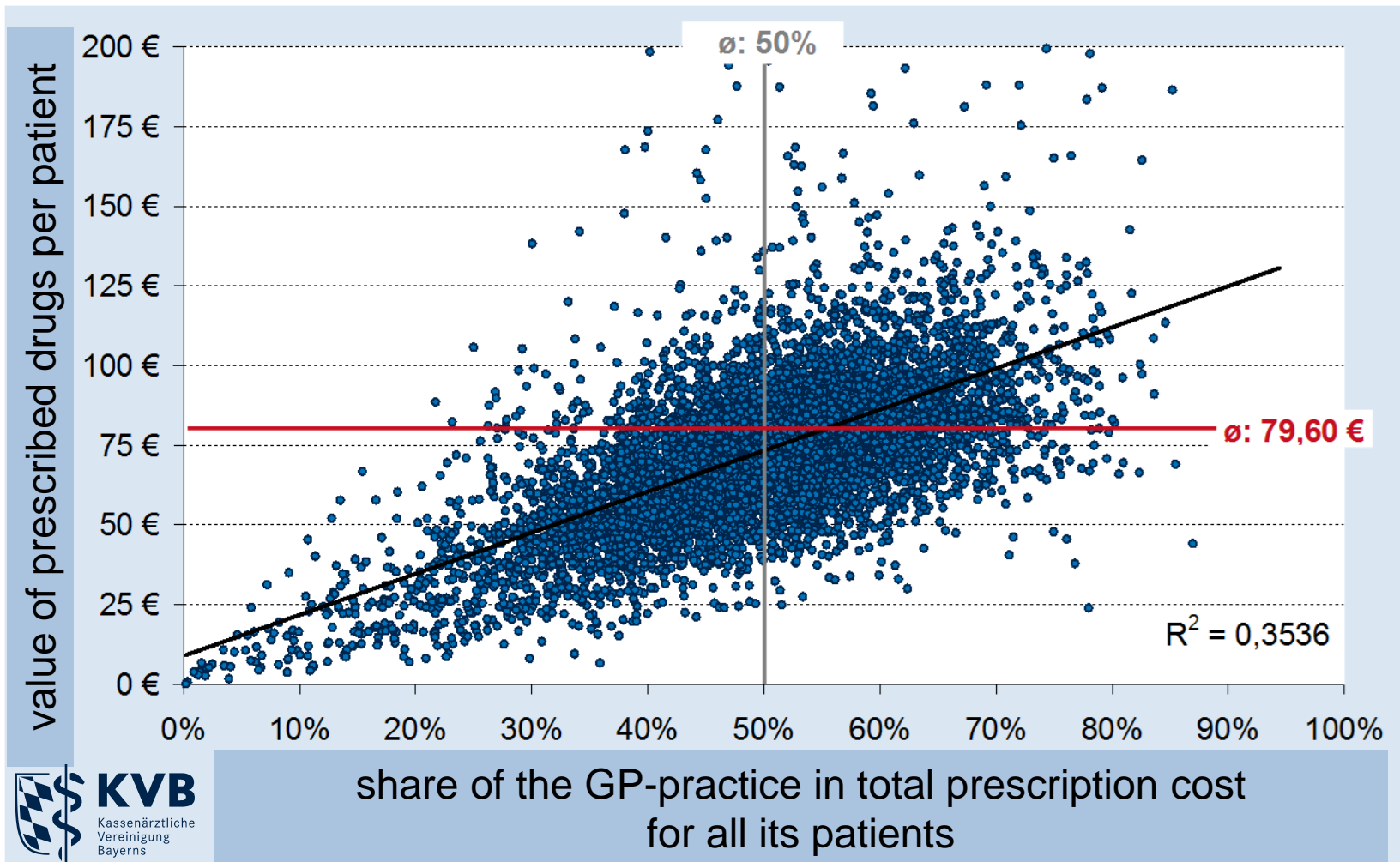
Assumptions (2)

1. **Health care is teamwork.** In a health system with completely **free choice of providers** it may not be meaningful to compare quality of care at the level of the individual provider.
2. Instead, we need to build **smaller patient populations** who's total care (outcome), provided by a virtual network of institutions, can be compared to identify the degree of potential improvement.
3. Virtual network analysis can be seen as an attempt to **increase accountability** and to **make the study of variation more relevant** to the recipient.
4. The **core questions** of this process could be:
 - a. **Are my patients treated differently from others?**
 - b. **If so, why? What can be changed to improve from here?**
 - c. **What would be the effect on the region, if care of my patient population were improved?**

Example: Comparing GP-practices in Bavaria:

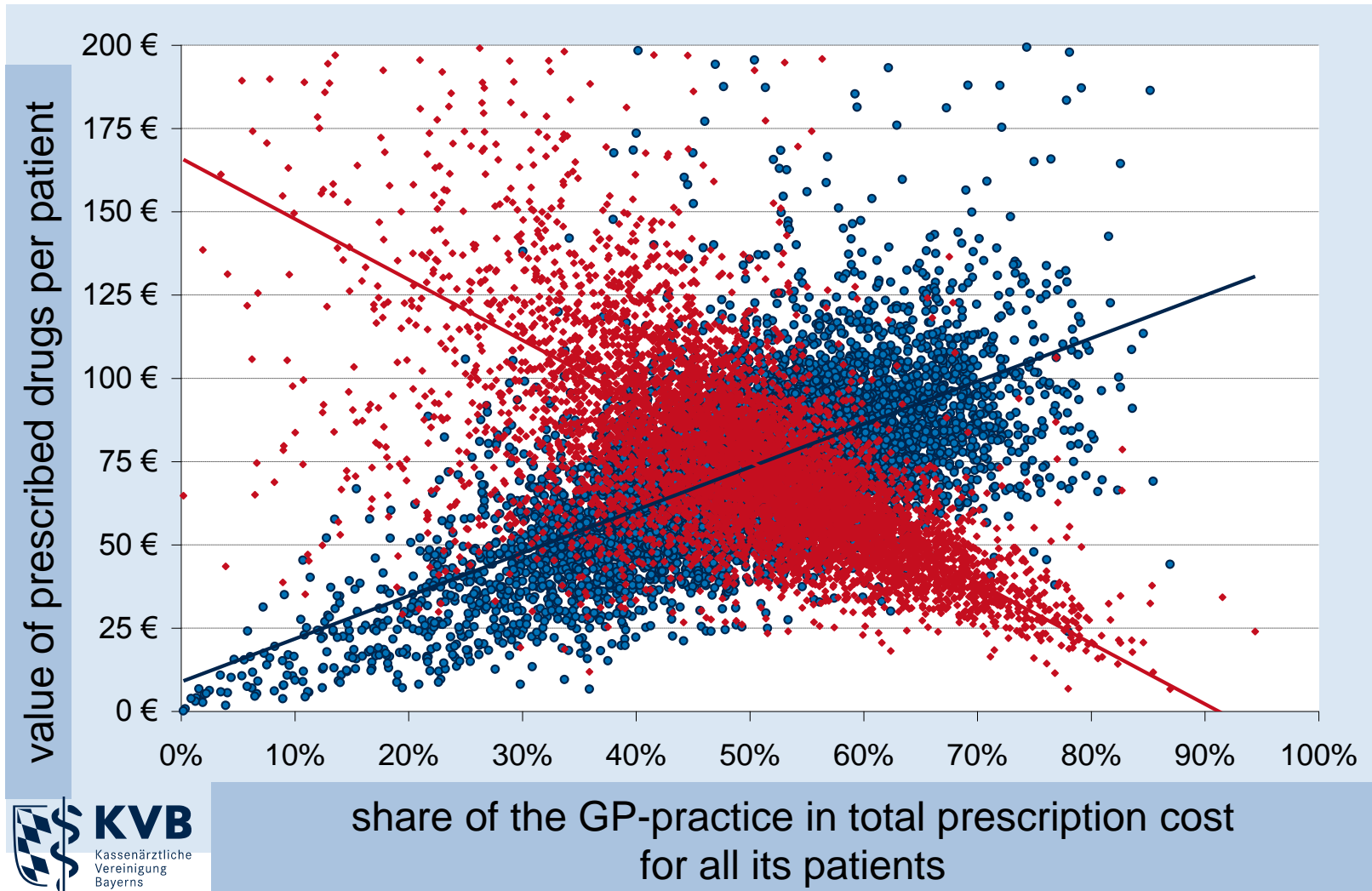
(1) prescription cost per patient and

(2) share of total prescription cost for all patients



Source: Dr. Martin Tauscher, Kassenärztliche Vereinigung Bayerns, 2014

Example: What you miss when focusing on GPs only: Prescriptions of all other physicians (the red dots, inversely related)



share of the GP-practice in total prescription cost
for all its patients



Source: Dr. Martin Tauscher, Kassenärztliche Vereinigung Bayerns, 2014

Objective

1. To establish a method of **measuring variation among (patient) populations**
 - a. according to **accountability** for the process of care
 - b. which can be linked to area indicators for the quality of care of **geographically defined populations**.
2. This method should be suitable for application as **part of a feedback system** which allows physicians to compare their patient populations to other patient populations (and other virtual provider networks) in the geographic area.
3. To provide an answer to a physician's question: “

What is my (potential) contribution to improving health of the population in this area?”

Inspirations

Bynum J et al (2007) Assigning Patients and Their Physicians to Hospitals: A Method for Obtaining Populations-Based Provider Performance Measurements Health Services Research 42(1): 45-62

Bynum J et al (2010) Measuring Racial Disparities in the Quality of Ambulatory Diabetes Care Medical Care 48(12): 1057-1063

Landon B et al (2013) Using Administrative Data to Identify Naturally Occurring Networks of Physicians. Medical Care 51 (8) 715-721

Data

- claims data: patient ID, age/gender, physician ID, specialty group, per patient/physician ID: diagnoses, fee schedule items, value according to RBRVS
- prescription data: patient ID, age/gender, physician ID, specialty group, per patient/physician ID: diagnoses, drug ID (active agent, DDD, cost)
- data base: total claims data or drug prescription data of office-based physicians for statutorily insured patients in Germany for calendar year
claims data: 2010; prescription data: 2009
 - patients and physicians can be identified by pseudonyms
 - patients $N \approx 70$ million, practices ≈ 100.000 , physicians ≈ 140.000 , practices ≈ 100.000
 - inpatient data not available at individual level

Method

Creating functionally defined populations and virtual provider networks:

- for each patient we identify the practice from the primary care sector which provided most care for this patient (defined by value according to fee schedule), we call this the primary practice
- every patient is assigned to exactly one primary practice (*), all other physician contacts of each patient are grouped to the primary practice
- **functional population:** all patients assigned to a given primary practice
- **virtual provider network:** all practices which have been contacted by the functional population

(*) approximately 15% of all patients did not ever see a GP but contacted directly one or more specialists. These are mostly relatively healthy patients, who e.g. contacted only a gynaecologist). These patients were excluded from the first exploratory analysis.

Why put a primary care practice at the center?

Total number of patients 2011

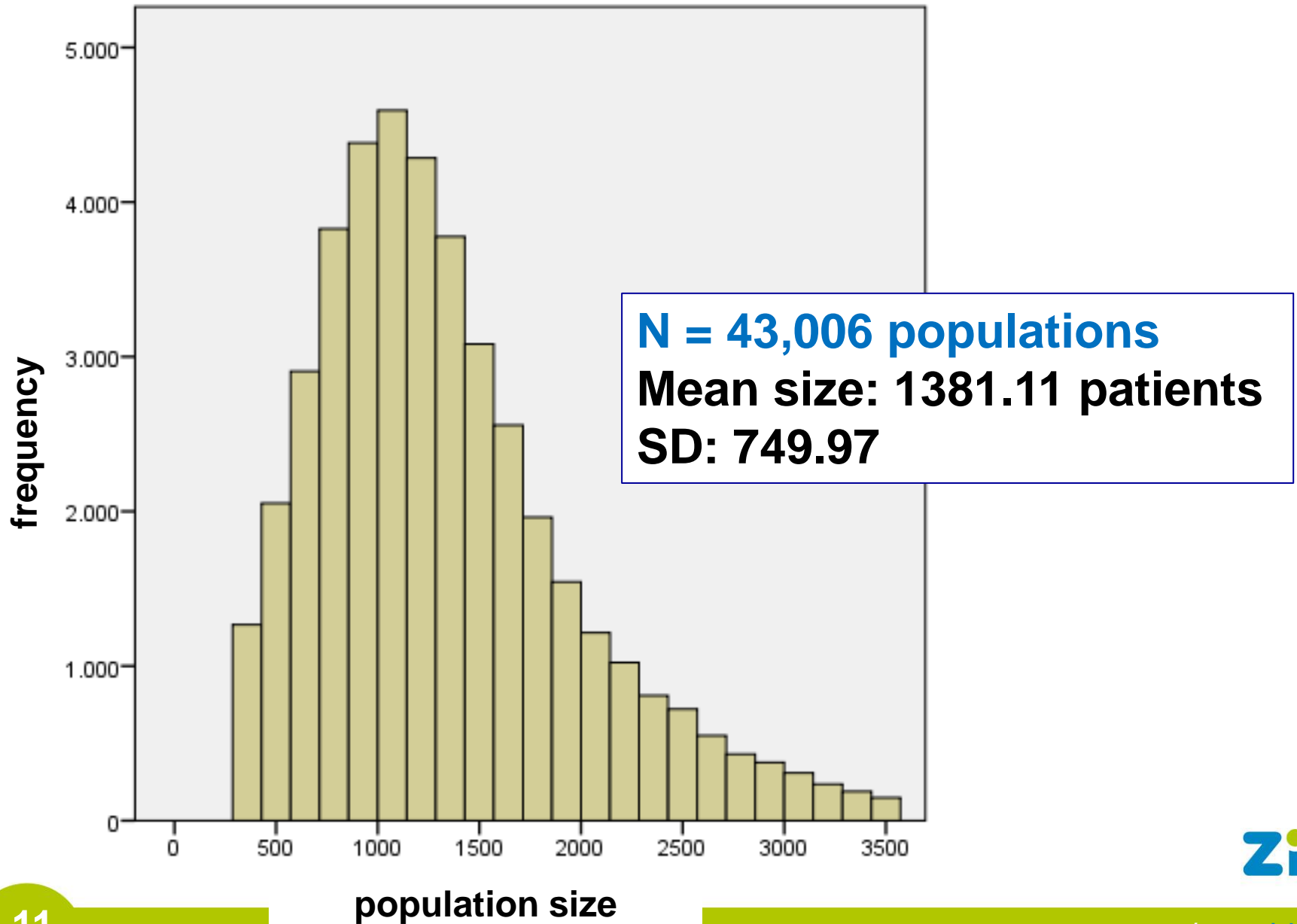
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No of patients with contacts in specialty group	patients	percent
Family Practitioners (GPs/General Internists)	53.473.089	77%
Gynaecologists	18.082.076	26%
Ophthalmologists	16.628.721	24%
Orthopaedics	11.924.508	17%
Dermatologists	11.812.001	17%
ENT	10.913.256	16%
Specialized Internists	10.648.097	15%
Pathologists	8.435.041	12%
Paediatricans	7.787.133	11%
Surgeons	7.510.329	11%
Radiologists	6.411.218	9%
Urologists	5.560.389	8%
Neurologists	3.651.148	5%
Anaesthesiologists	2.066.560	3%
Psychological Psychtherapists	1.251.634	2%
Psychiatry	968.104	1%
Nuclear Medicine	942.458	1%
Physician Psychotherapists	404.240	1%
Rehabilitative Medicine	394.011	1%
Paediatric Psychotherapists	342.048	0%

(85% including GPs in multispecialist practices)

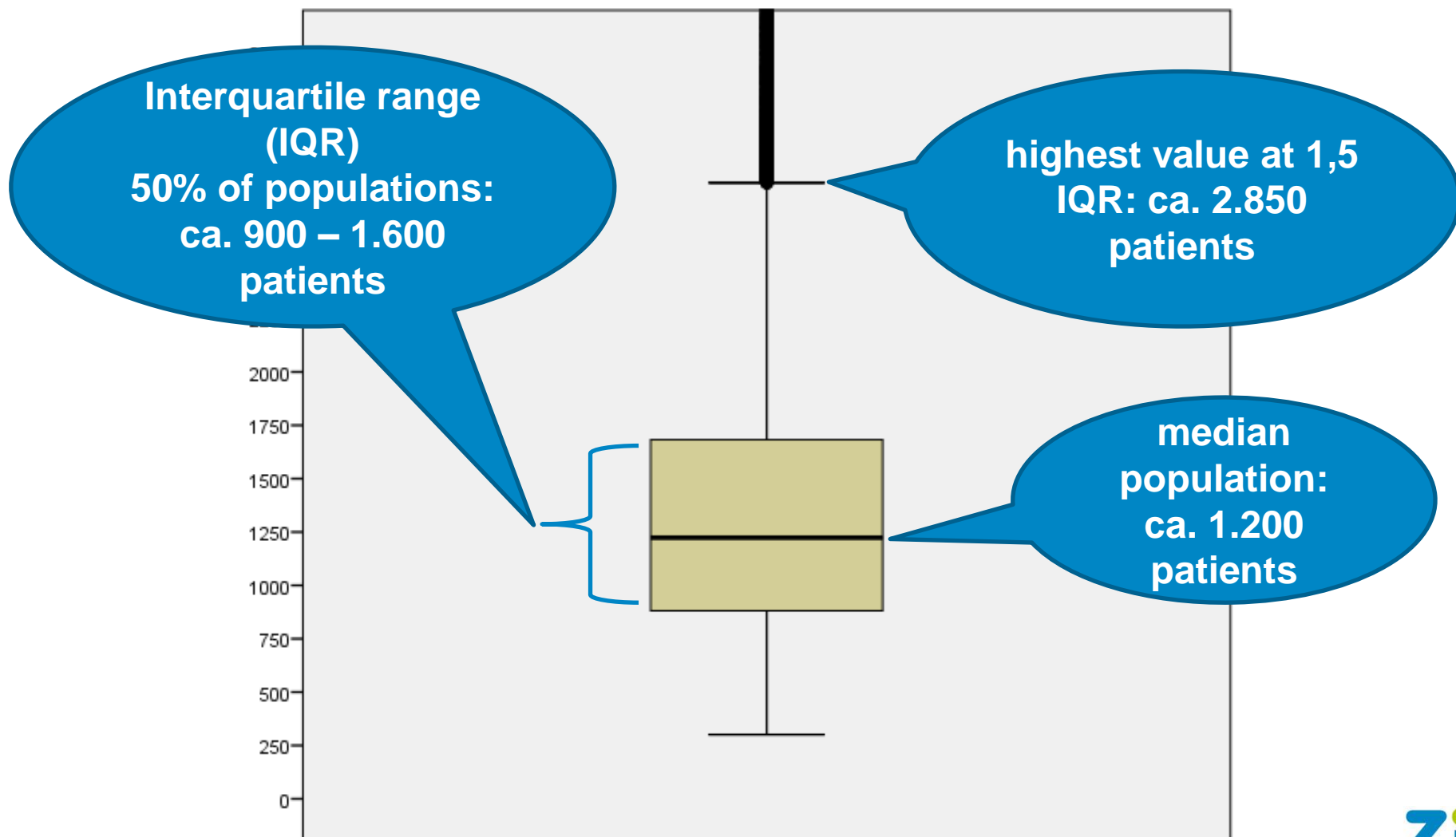
- by far biggest coverage in terms of patient contacts
- follows medical logic
- less than 20% of patients with specific diagnoses typically see specialists
- but 90-95% of patients with chronic diseases regularly see GPs

Results: N & Size of functional populations

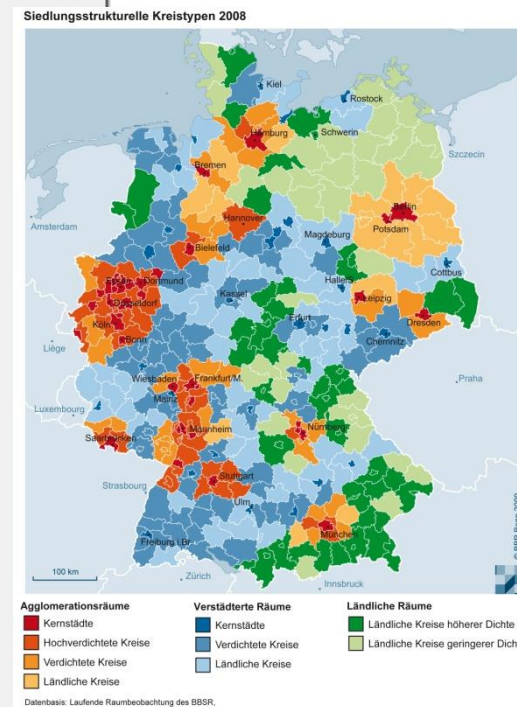
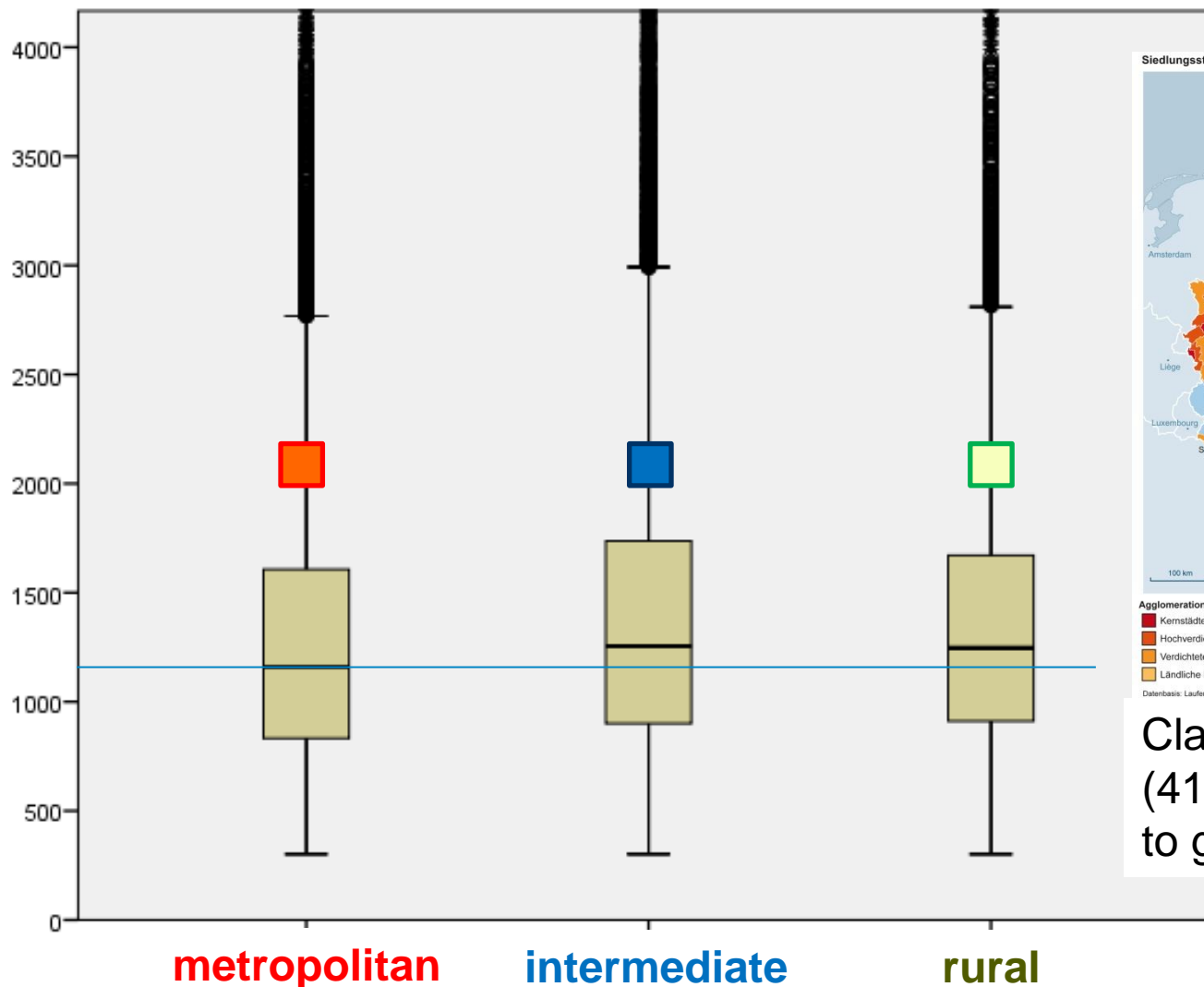


Size of functionally defined populations

Boxplot

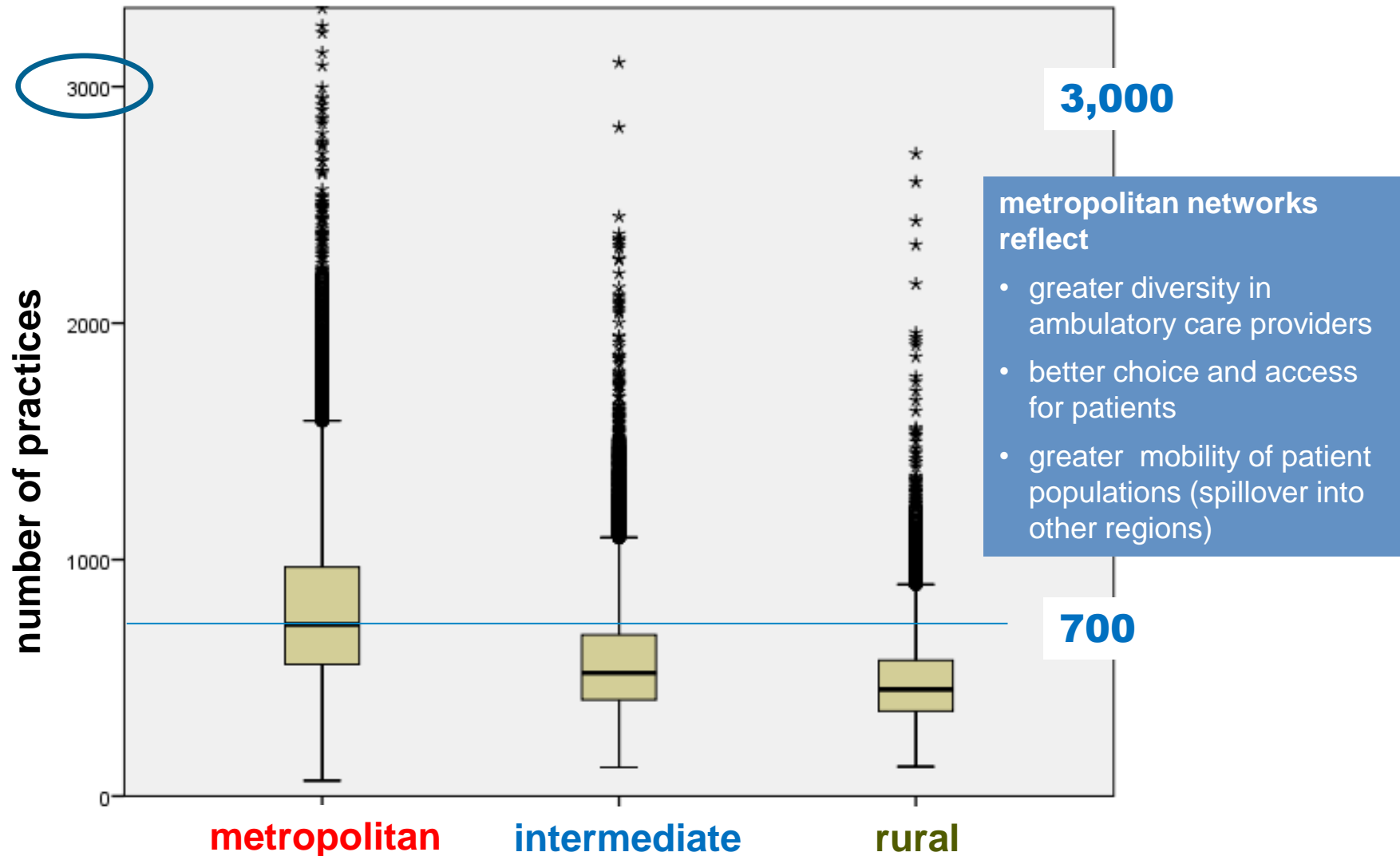


Size of populations according type of area



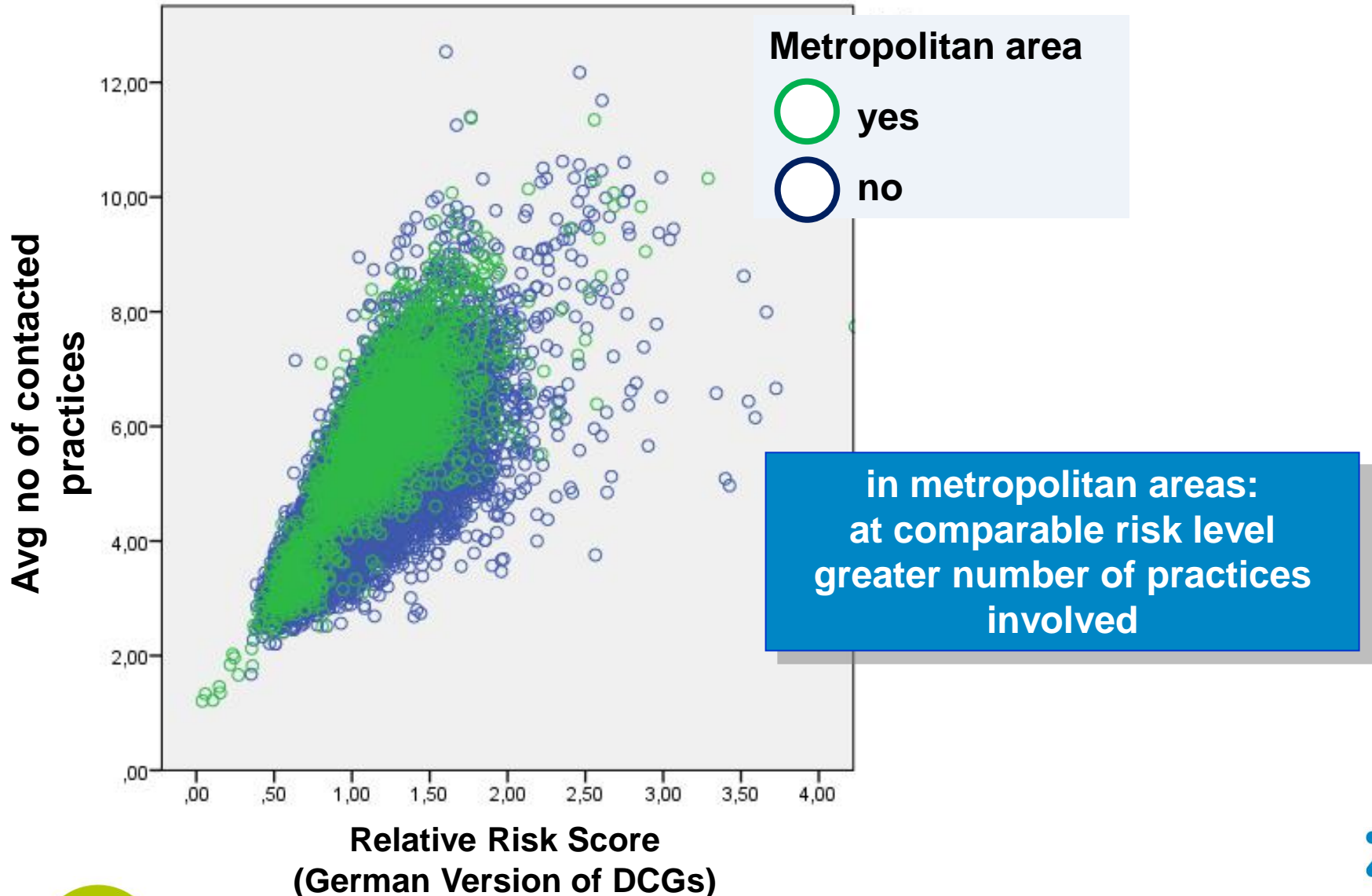
Classification of regions (413 counties) according to grade of urbanization

Size of virtual provider networks - no. of all contacted practices

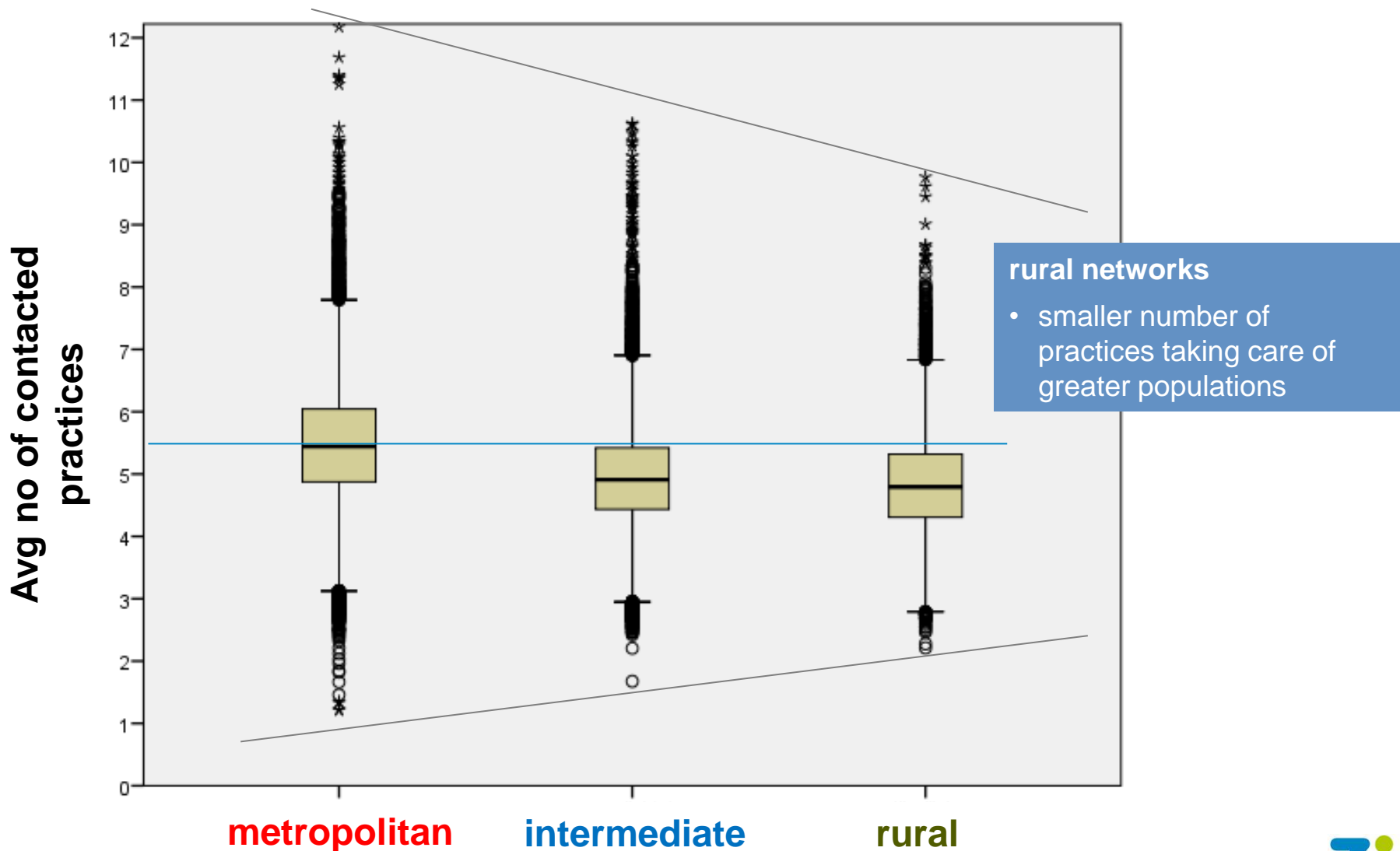


What explains network size?

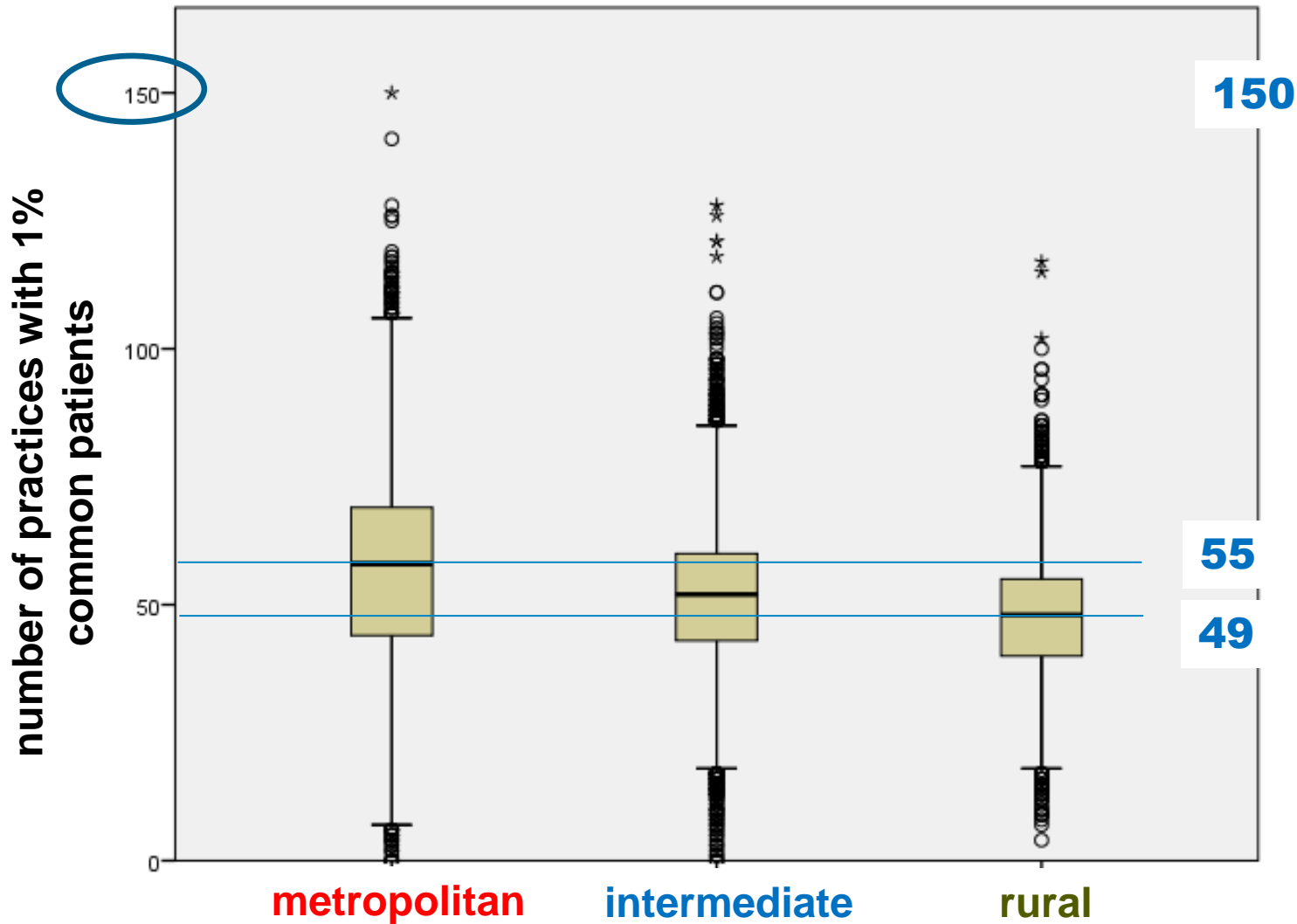
Average number of contacted practices per individual in each patient population related to risk-structure (age, gender, morbidity)



Average number of contacted practices per individual in each population

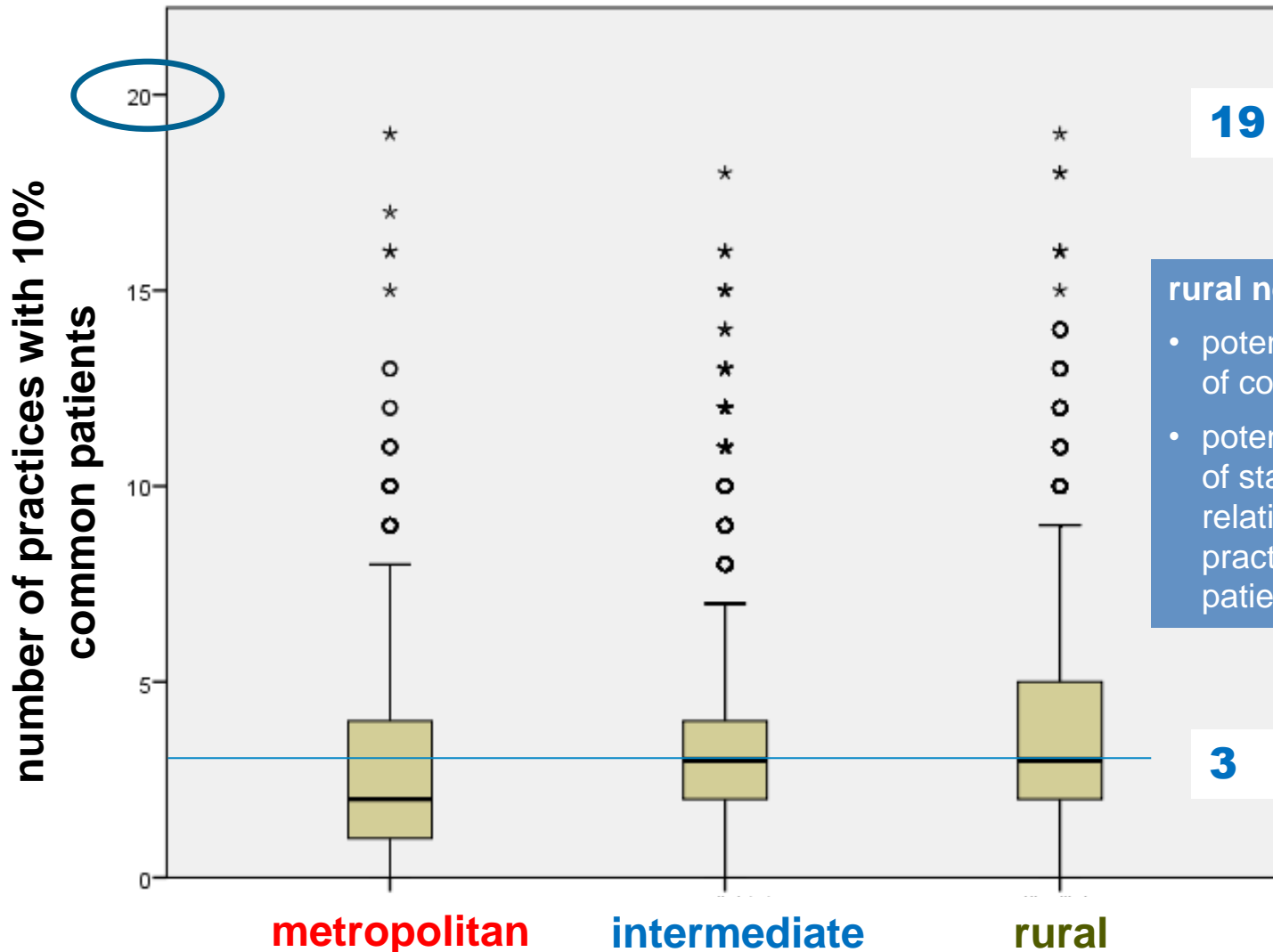


Cooperation? Size of virtual provider networks - no. of practices with 1% common patients



Cooperation? Size of virtual provider networks

- no. of practices with 10% common patients



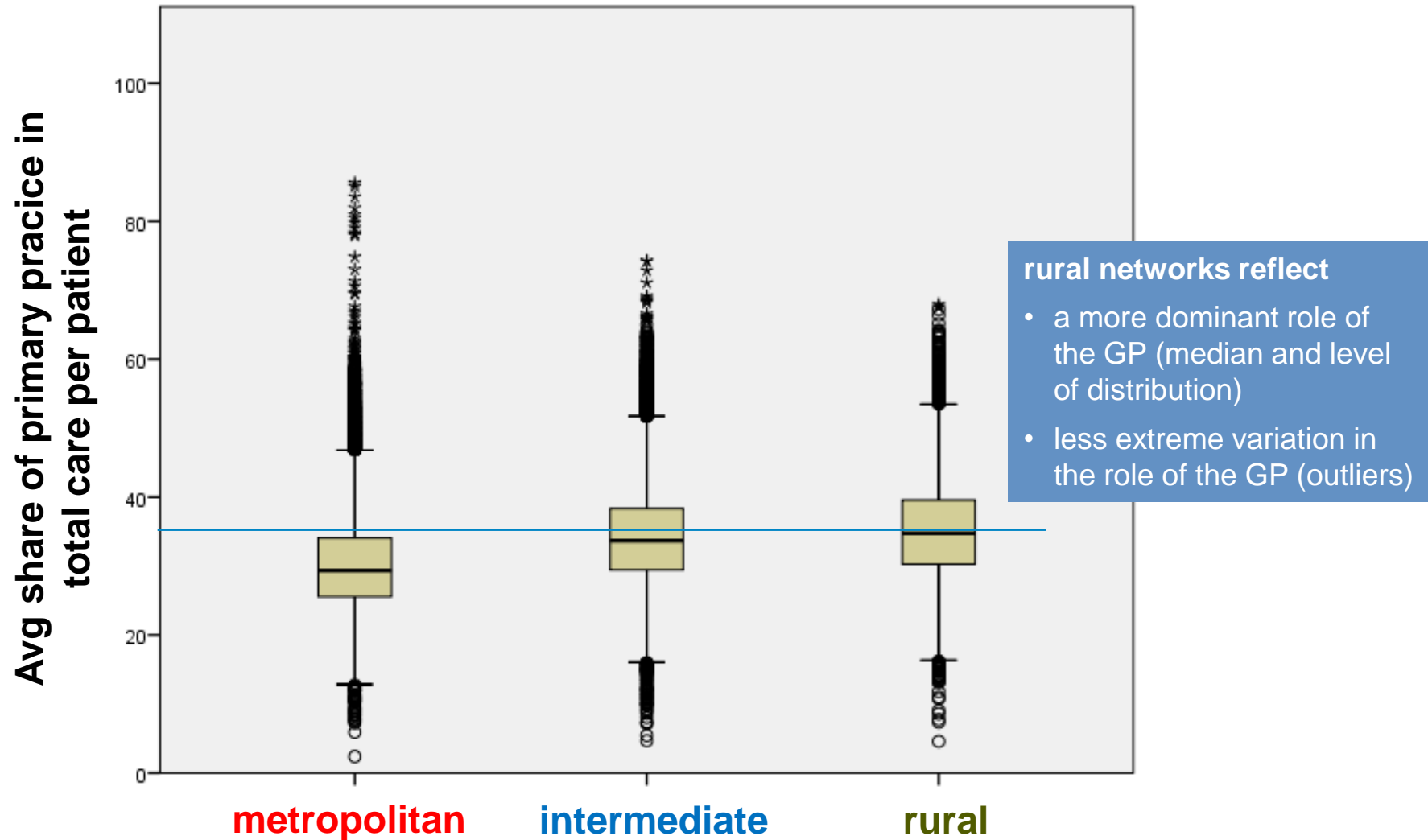
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rural networks reflect

- potentially greater degree of cooperation
- potentially greater degree of stability in networking relationships (more practices sharing common patients)

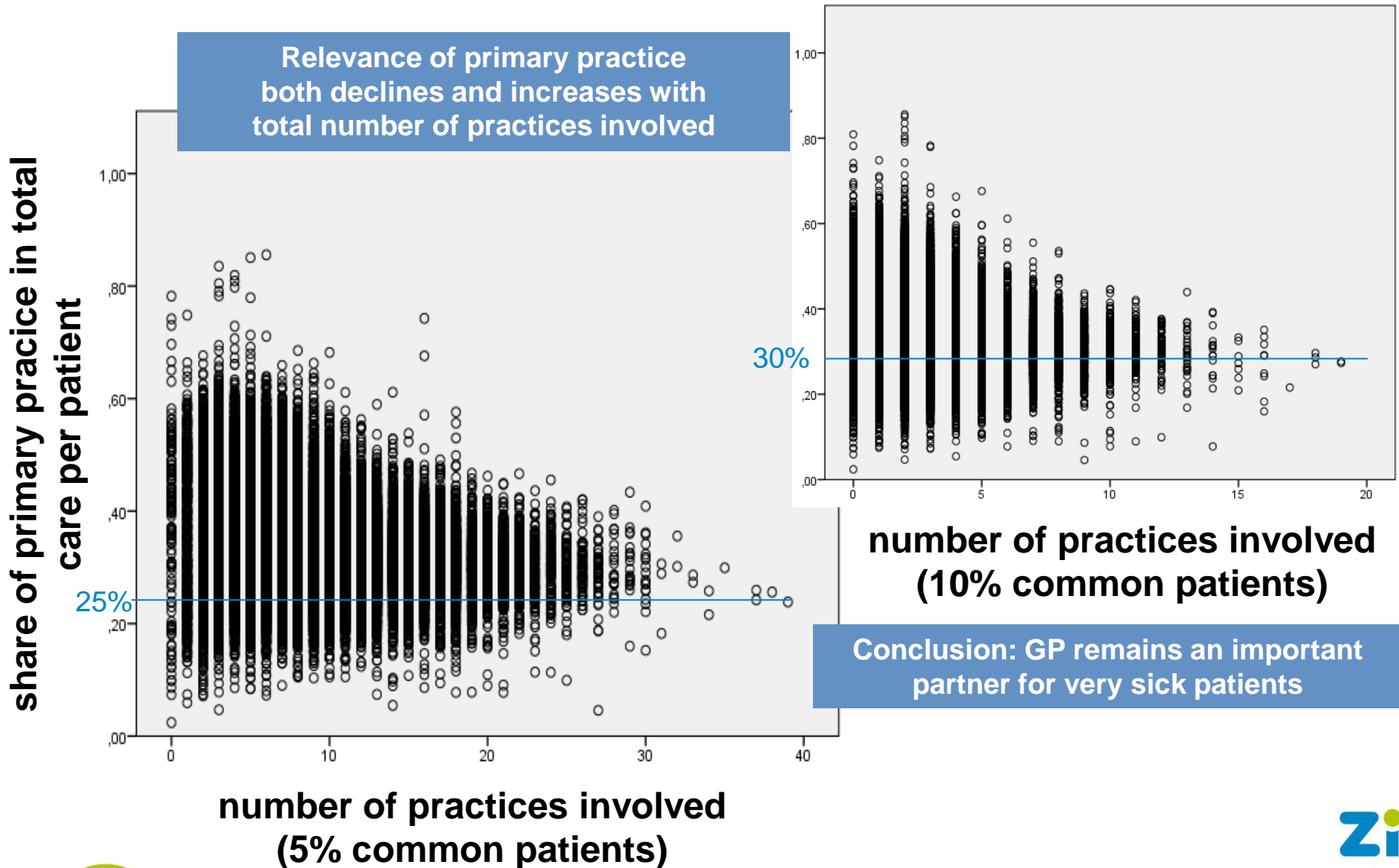
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Cooperation? Relevance of the primary practice (share of total care provided)



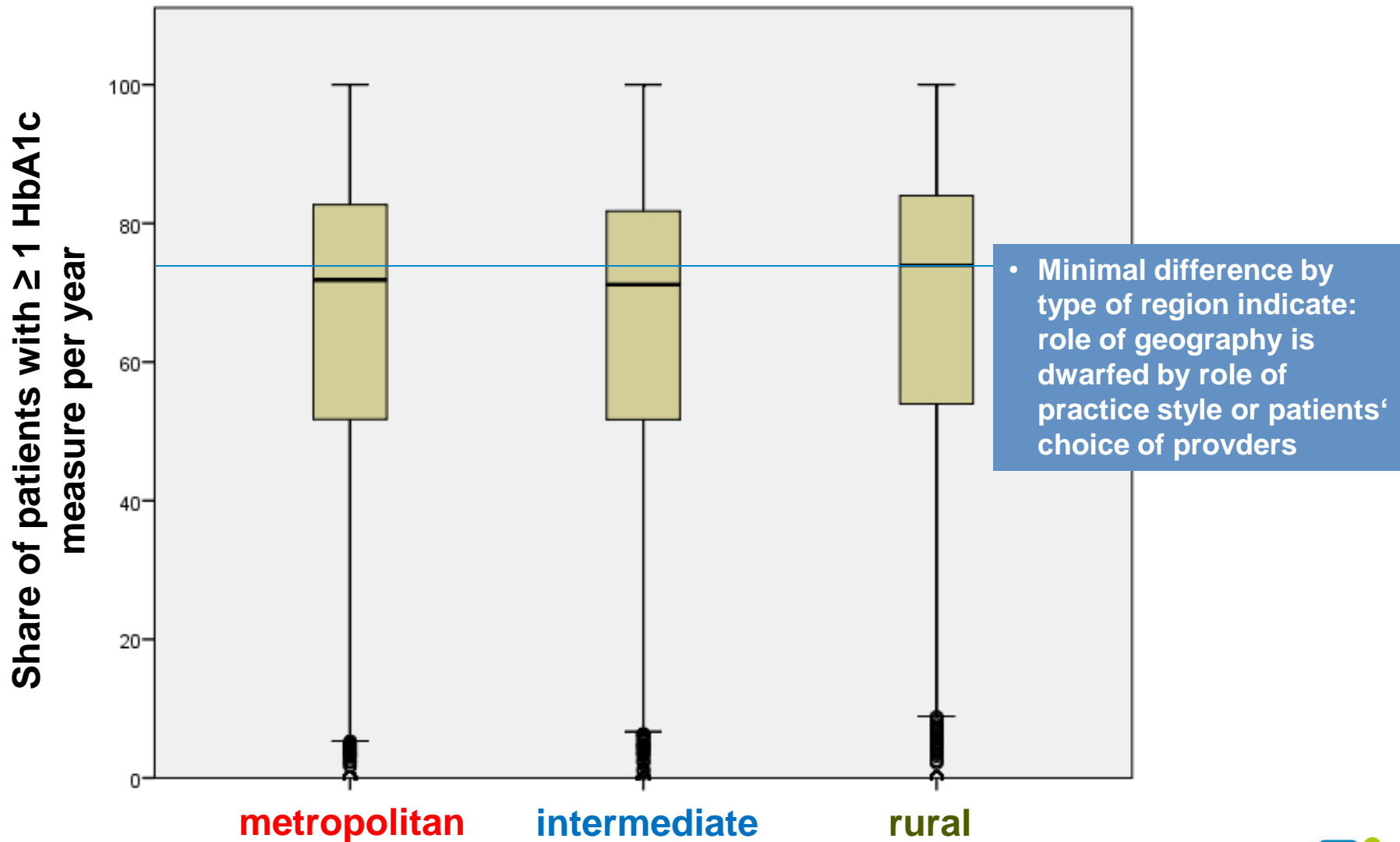
Diverse Patterns of Cooperation

Relevance of primary practice vs number of practices involved



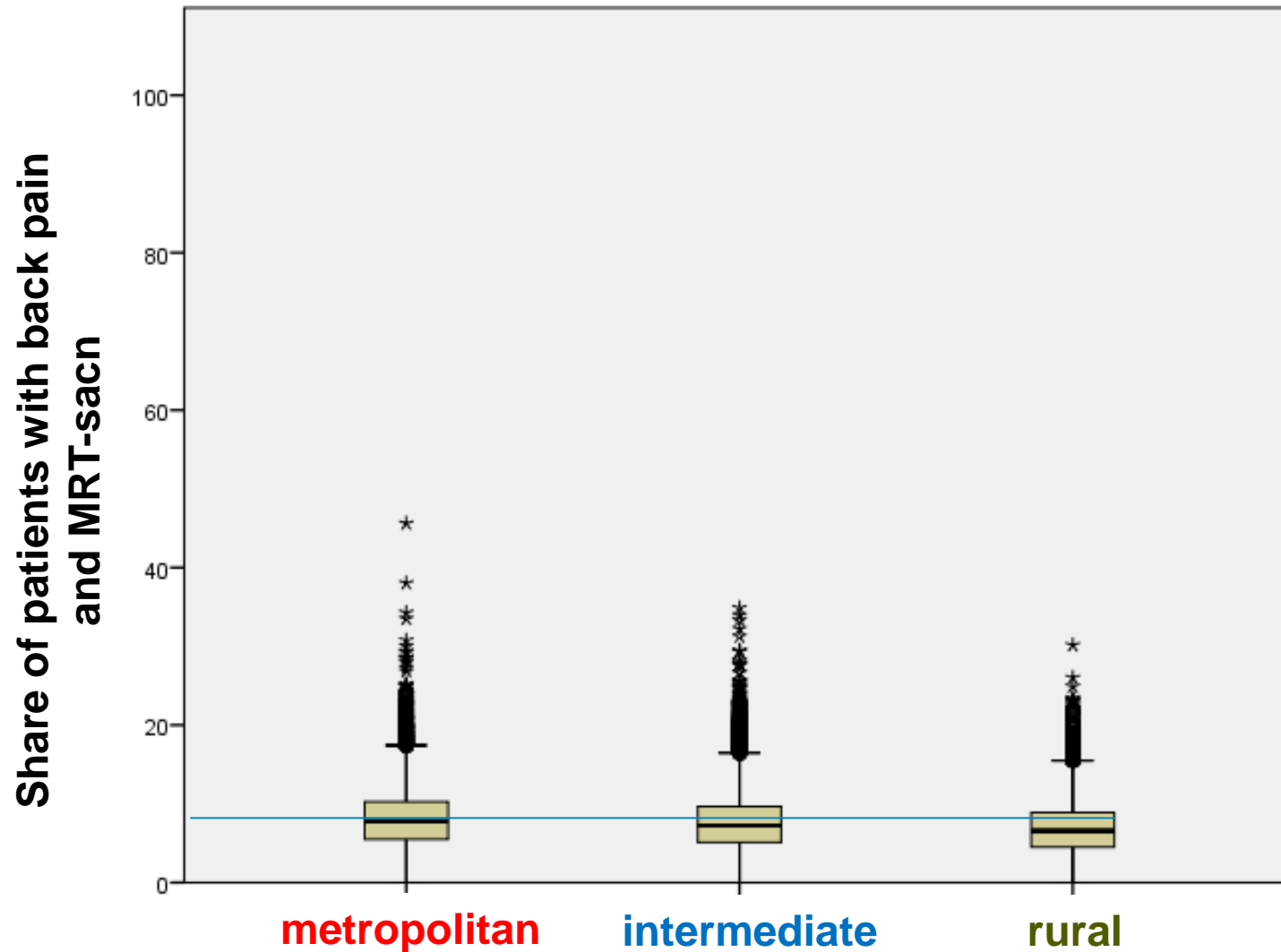
Indicators of process quality

- HbA1C measurement for diabetes patients



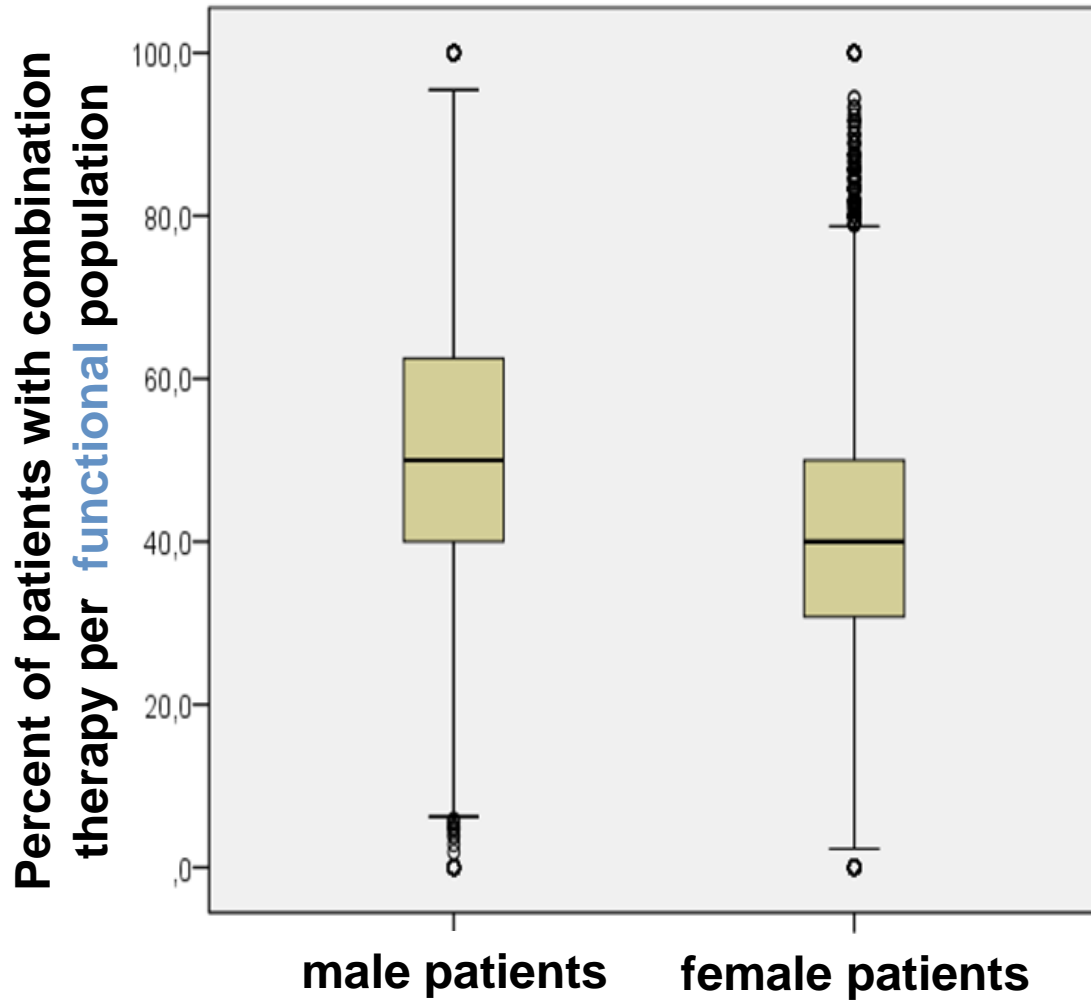
Indicators of process quality

- use of MRT for patients with lower back pain

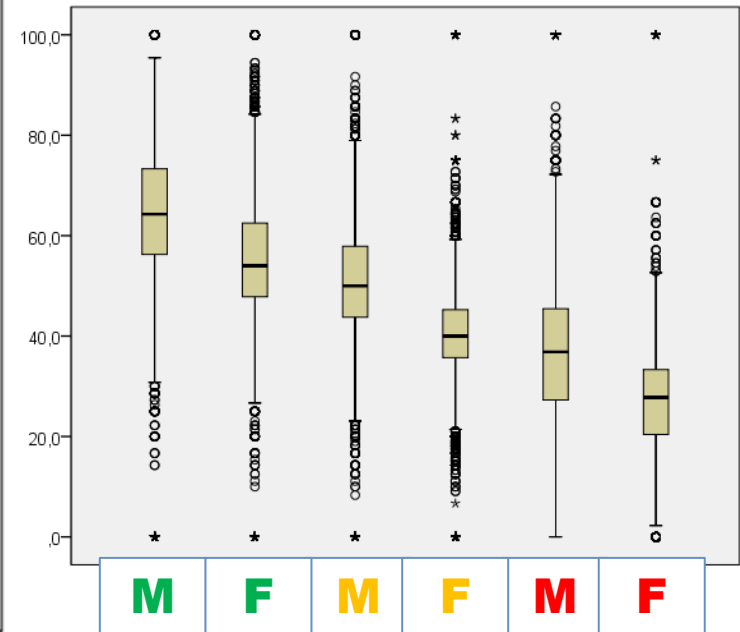


Indicators of process quality

- % of CHF-patients with combination therapy



Share of patients with ACE-inhibitors, AT1-antagonists and beta blockers in all patients with a relevant diagnosis (I50.1, I50.9 in ≥ 2 quarters of 2009)



N male = 714.656 patients
N female = 1.121163 patients

Cooperation or substitution?

Are indicators of process quality related to role of primary care practice?

Correlation (Pearson)	CHF-patients	diabetes patients		patients with low back pain		
	echocardiogram	retinal exam	HbA1c	MRI scan	radiology	CT scan
share of primary practice in total care	.119**	-.069**	.079**	-.080**	-,069**	.007**
significance	.000	.000	.000	.000	.164	.000

An inverse relationship with specialists' services might be expected (as increased participation of specialists increases in total care)

However, no decisive results for diagnostic exams for patients with diabetes and low back pain

Cooperation or substitution?

Are indicators of process quality related to role of primary care practice?

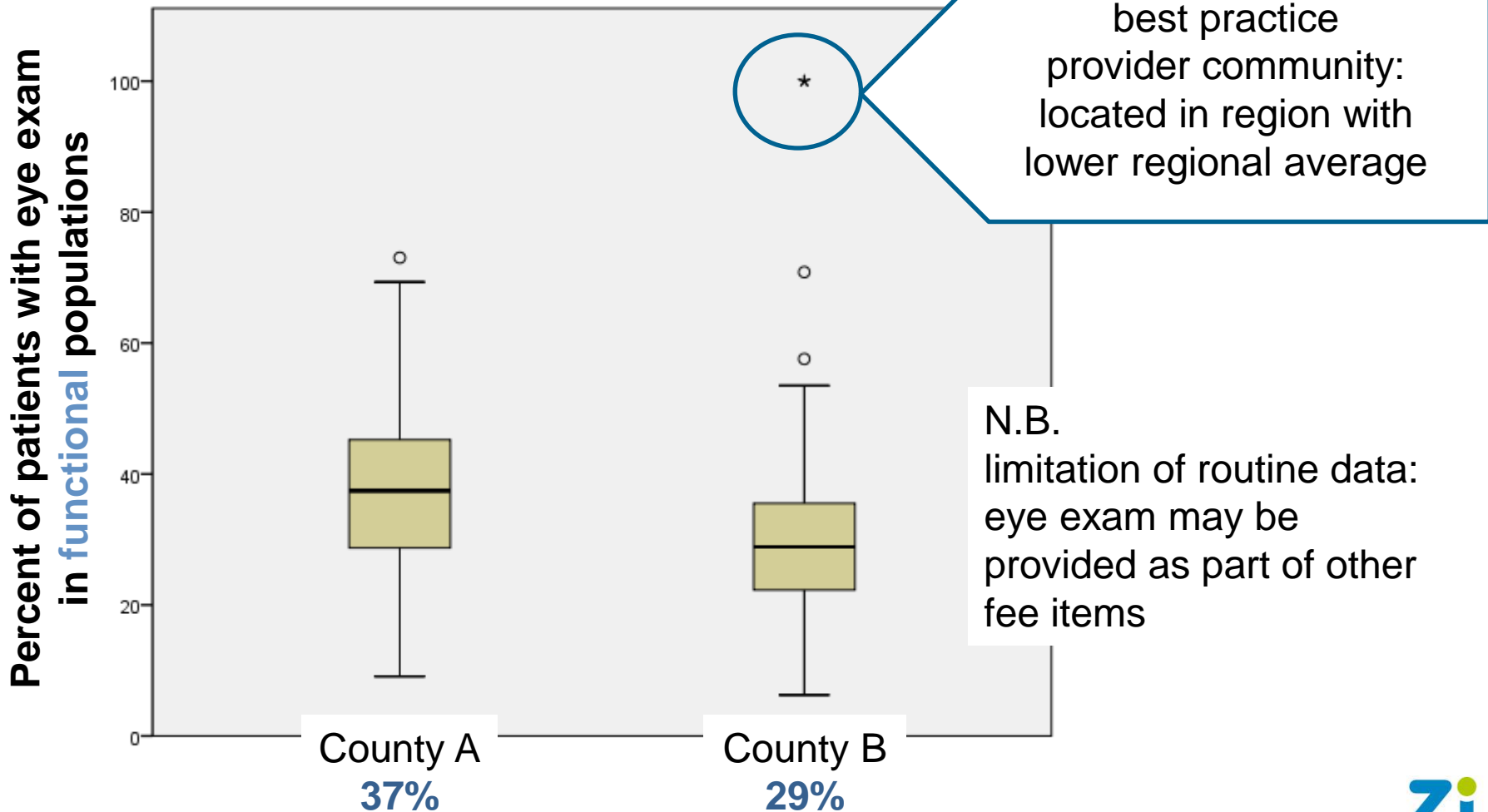
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significance	.000	.000	.000	.000	.164	.000

There is a marked difference for CHF-patients: **more intensely treated patients are more likely to receive an echocardiogram by a specialist**




Comparing regional & functional populations

- percent of diabetes patients with retinal exam

Percent of patients with eye exam
in regional populations



Can we begin answer our core questions?

1. **Are my patients treated differently from others?** 
2. **If so why? What can be changed to improve from here?** 
3. **What would be the effect on the region, if care of my patient population were improved?** 

Question 2:

some indicators may be provided – answers must be searched by members of the virtual networks locally

Discussion

- **Geography is much less destiny than we might think when looking at geographic variation**
- **Virtual network analysis could provide**
 - a tool to understand the relevance of regionally defined area indicators
 - to compare populations indicating degree of possible improvement
 - benchmarks for real networks to compare outcome indicators for their population to other functional populations in the area
- **Virtual network analysis needs to be further improved by**
 - including patients without a GP and/or by putting the specialist at the centre for rare conditions
 - developing measures of cooperation (e.g. percent of incident patients sent for diagnostic tests to specific specialist practices)
 - taking account of potential confounders (location of network; social structure of population)
 - including data on inpatient admissions and other utilized services
 - feeding the data back to virtual networks both at best-and worst-practice ends of indicators

next step: apply to feedback processes out in the field

**Thank you for your
attention**

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