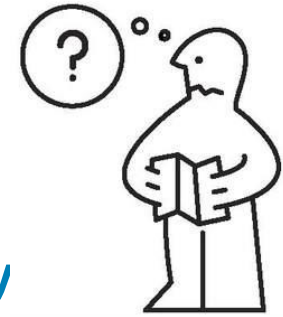


**Tracking Regional Variation in Healthcare, Villa Elisabeth, Berlin, June 4-5, 2015**

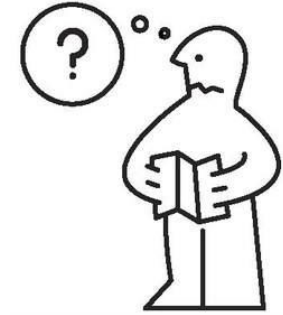
# **Treatment facilities for hemodialysis patients of working age in Germany: A GIS-supported analysis**

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### Some epidemiological data from Germany

- more than 67,000 end-stage renal disease (ESRD) patients are treated with hemodialysis
- Annual incidence of hemodialysis patients: more than 13,000.
- 45% (about 30,000) patients of working age
- 1,100 (24%) of patients newly requiring hemodialysis in 2013 were 20 - 64 years old,
- on average 5-6 years waiting time for transplantation (if striven).



## Employment in patients of hemodialysis

- After one year of hemodialysis, only 20% of the patients are full-time or part-time employed although
- on average 70-80% work performance of a healthy person could be rendered by these individuals - in absence of restricting comorbidities.

### Why is employment for patients of working age important?

- social participation,
- quality of life,
- reduced risk of poverty,
- increased functional health status,
- increased long-term survival.

# The literature on employment status

For example:  
main explanatory variables for employment

- **not** patient-level determinants
- but
- **appropriate dialysis facilities**

“Facility employment rate was positively associated independently with availability of a 5 p.m. or later dialysis shift ...”  
(Kutner et al. 2008)

## Dialysis Facility Characteristics and Variation in Employment Rates: A National Study

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**Background:** Investigation of factors associated with variation in dialysis patient employment has focused primarily on patient-level factors. Little is known about facility-level factors that may be associated with patient employment. Design, setting, participants, and measurements: The ESRD Facility Survey (CMS-2744A) began in 2004 to collect counts of employed patients aged 18 to 54, in addition to dialysis unit census, types and timing of treatments offered, and staffing. Using the 2004 ESRD Facility Survey File, we investigated hospital-based chronic renal care facilities, nonhospital renal disease treatment centers, independent special purpose renal dialysis facilities, and renal disease treatment centers. Results: Across all facilities, 18.5% of prevalent patients aged 18 to 54 were employed, but facility employment rates ranged from 0 to 100%. Facility employment rate was positively associated independently with availability of a 5 p.m. or later dialysis shift (odds ratio (OR) 1.54, 95% confidence interval (CI) 1.11 to 1.28), and provision of frequent HD (OR 1.25, 95% CI 1.07 to 1.49), after adjusting for (HR) training (OR 1.19, 95% confidence interval (CI) 1.11 to 1.28), and availability of peritoneal dialysis or home hemodialysis (VR) services was more often reported in facilities with higher employment rates. Conclusions: Promoting gainful employment among ESRD patients continues to be a quality improvement need. A dataset that allows adjustment for patient-level variables would facilitate increased understanding of the contribution of dialysis facility variables to patient employment.

**G**ainful employment among “the maximum practical number of patients” was specified as a goal in 1986 Congressional legislation governing responsibilities of End-Stage Renal Disease (ESRD) Networks (1). ESRD Networks, which function as liaisons between the federal government and providers of ESRD services (2), subsequently began to collect annual counts of employed patients in each dialysis facility within their respective Network geographic areas. Variation in facility employment rates and the association of these rates with facility characteristics and the association of these rates with facility characteristics has not been investigated, however. Studies of factors associated with variation in dialysis patient employment have focused primarily on patient-level factors, especially individuals’ educational background, occupational status before dialysis, treatment modality, and health status/comorbidity. Higher educational level and prior occupational status are the patient-level factors that have been most consistently identified as predictors of patient employment (3–8). A study by Reason *et al.* (9) showed, however, that facility-level variables may also influence patient employment status. The researchers found that blue-collar workers receiving dialysis in a facility that provided a multidisciplinary predialysis program designed to assist patients in maintaining employment were significantly more likely to continue employment than blue-collar workers who were treated at facilities that did not provide such a program. We undertook this study to examine the potential association of facility characteristics with variation in patient employment rates across dialysis facilities, using a national database. We investigated dialysis facility characteristics and aggregate employment within facilities of prevalent patients aged 18 to 54, as reported on the 2004 ESRD Facility Survey. The ESRD Facility Survey is completed annually for the Centers for Medicare and Medicaid Services (CMS) by all Medicare-approved facilities providing outpatient services to ESRD patients. In 2004, the survey began to collect aggregate information on the number of patients aged 18 to 54 who were employed at the end of the calendar year, in addition to counts of patients entering and leaving the facility and counts of patients in specific treatment modality categories at the end of the survey period. The survey also annually captures several facility characteristics that are recognized as potentially relevant for patient employment, *i.e.*, availability of a late dialysis shift (10), availability of home dialysis


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## Our objective

### Efficiency demand vs. existing treatment facilities

- high time expenditure for the therapy **AND** pursuing professional activities
-  Demand: high level of spatial and temporal efficiency.



## Our objective

Examining selected regional examples

- Question 1:** Do the recent dialysis facilities allow a full- or part-time employment of hemodialysis patients? To which extent?
- Question 2:** Are there regional disparities in this specific health care facility characteristics resp. can patients continue to work if they want to do this?

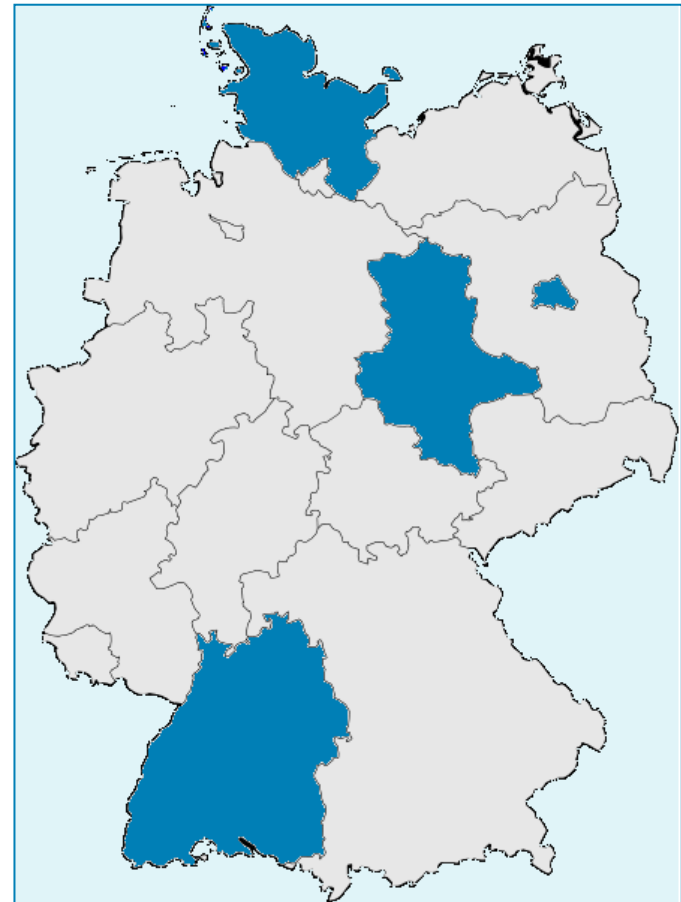


## Our primary research: Methods

### Selection of regional examples

#### Selection criteria

- Treatment facilities per million inhabitants
- hemodialysis units (beds) per million inhabitants
- Outpatient hemodialysis units per million inhabitants
- Prevalence hemodialysis patients per million inhabitants
- Share of people under the age of 65 in the total population



## Methods

### The survey



**Primary survey** (web pages, e-mailing, phone)

### Survey variables

- Location(s),
- Administrative status (dialysis company (PHV, KfH), hospital company, outpatient practice),
- Availability of late shift times (days, starting time, closing time, evening shifts, over night treatment etc.)
- Distance to the railway station or public transport and to the city center,
- Relative location (city center, periphery, residential area, hospital area, industrial area etc.)

### Descriptive analysis

**Application of a geographical information system** (QuantumGIS)

## Results

### Administration (all facilities = 193)

Province	companies (KfH, PHV)	Hospitals / hospital companies	outpatient practices
Baden-Württemberg	12 (13 %)	4 (4 %)	75 (83 %) +
Berlin	8 (30 %) +	1 (4 %)	18 (66 %)
Sachsen-Anhalt	8 (20 %) +	4 (10 %) +	29 (70 %)
Schleswig-Holstein	2 (6 %)	4 (12 %) +	28 (82 %) +
Mean	30 (16 %)	13 (7%)	150 (77 %)


### Type of settlement (all facilities = 193)

Province	major cities (> 100,000 inh.)	medium-sized (20,000-100,000 inh.)	small towns (5,000-20,000 inh.)	village (< 5,000 inh.)
Baden-Württemberg	19 (21 %)	58 (64 %)	14 (15 %)	-
Berlin (Bezug Stadtteile)	7 (26 %) +	18 (67 %) +	2 (7 %)	-
Sachsen-Anhalt	8 (20 %)	26 (63 %)	7 (17 %)	-
Schleswig-Holstein	6 (18 %)	14 (41 %)	12 (35 %) +	2 (6 %) +
Mean	40 (21 %)	118 (61 %)	35 (18 %)	2 (1 %)






## Results

### Timing (all facilities = 193)

Province	Over night treatment
Baden-Württemberg	11 (12 %)
Berlin	6 (22 %) 
Sachsen-Anhalt	6 (15 %)
Schleswig-Holstein	4 (12 %)
Mean	27 (14 %)

### Compatibility with employment (all facilities = 193)

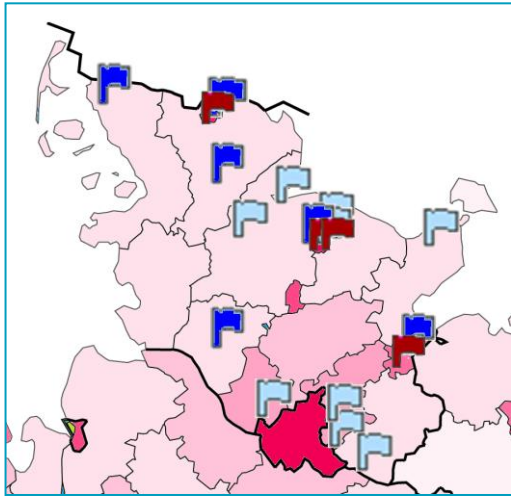
Province	Fulltime employment (end of treatment 10:30 PM or later)	Part-time employment (end of treatment 7:00 PM or later or Tues/Thu/Sat afternoon)
Baden-Württemberg	35 (38 %) 	46 (51 %)
Berlin	11 (41 %) 	20 (74 %) 
Sachsen-Anhalt	9 (22 %)	15 (37 %)
Schleswig-Holstein	5 (15 %)	15 (44 %)
Mean	60 (31 %)	96 (50 %)

## Relative facility location: the example of Baden-Württemberg

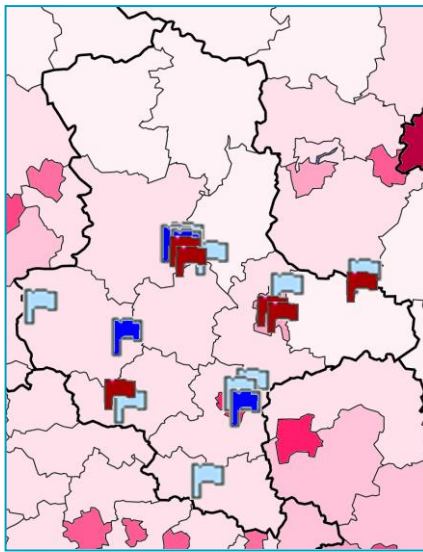
Province	
Industrial area	25 %
In / nearby hospital	25 %
residency area	18 %
mixed area (living, business, shopping)	22 %
central	13 %
periphery	4 %

# The current status: evening and overnight shift times

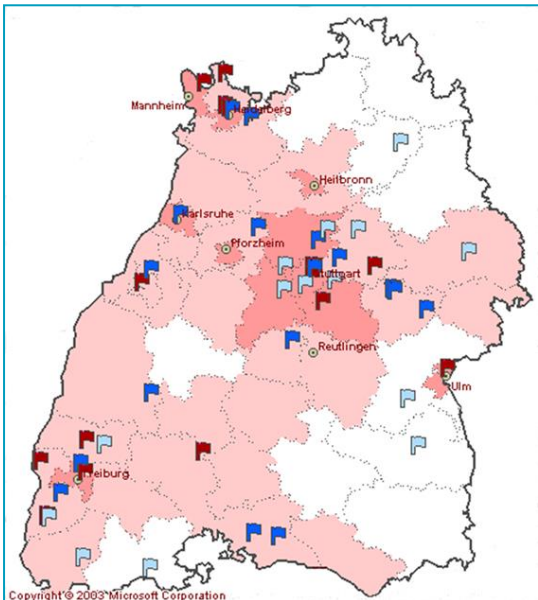
Schleswig-Holstein



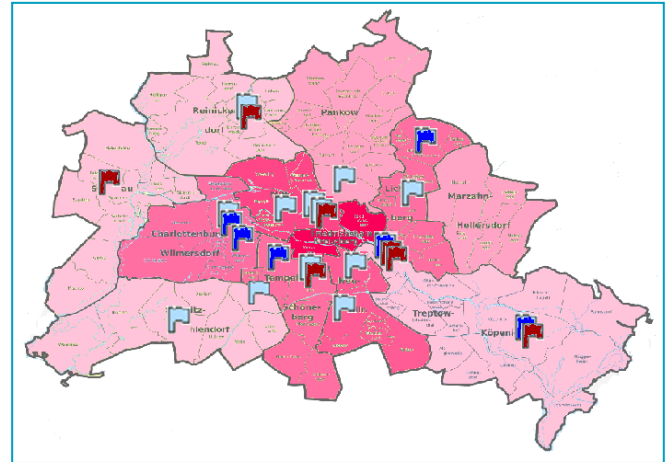
Sachsen-Anhalt



Baden-Württemberg

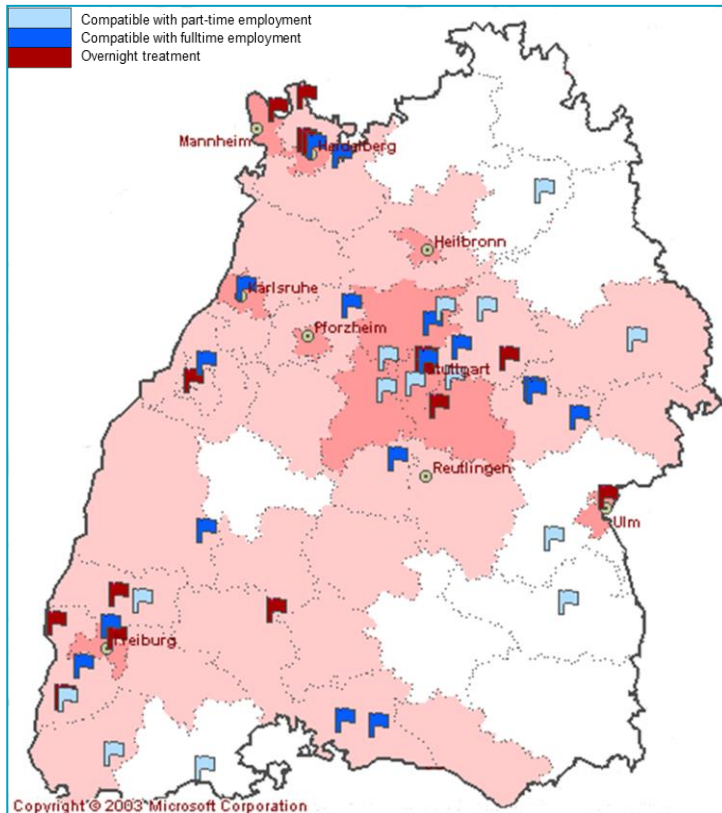


Berlin



Compatible with part-time employment  
 Compatible with fulltime employment  
 Overnight treatment

## The example of Baden-Württemberg 2009 and 2015



### Changes between 2009 and 2015:

City size	Closed centers	New centers
<b>Major cities</b>	7 (8 %)	9 (10 %)
<b>Medium-sized</b>	10 (11 %)	28 (31 %)
<b>Small towns</b>	6 (7 %)	7 (8 %)
	23 (25 %)	44 (48 %)

### New centers

Fulltime employment compatible: 9 facilities

Part-time employment compatible: 9 + 4 facilities

### Closed centers

Fulltime employment compatible: 12 facilities

Part-time employment compatible: 12 + 2 facilities

## Summary and Conclusions

- Significant **regional disparities** in treatment services
- **Better facility offers in major cities** or regional units with above-average rates of working aged people
- Many facilities are **located in the industrial areas / periphery** (more time, private transportation)
- **Conclusions** (literature and survey results):
  - **Attention should be paid on occupation and its preservation** (pre-dialysis / start of treatment). Employment possibilities are often restricted and patients are in need to move the place of residence or work.
  - **stronger focus on patient needs** (needs-based care)
  - **Improvements in center locations** (improved self-determined life)
  - Increased employment would **reduce the expenditure of social insurances**.
  - The improvement of facility offers can **not be regulated by supply and demand**. Thus, incentives and controlling measures are necessary.

**Many thanks for your attention!**

## References

- Frei U, Schober-Halstenberg HJ. Nierenersatztherapie in Deutschland: Bericht 2006 / 2007. Berlin: QuaSi-Niere; 2008.
- Jansen DJ, Heijmans MJWM, Boeschoten EW, Rijken PM. Bevordering van arbeidsparticipatie en autonomie van nierpatiënten. Utrecht: NIVEL; 2009.
- Kutner N, Bowles T, Zhang R, Huang Y, Pastan S. Dialysis facility characteristics and variation in employment rates: A national study. Clin J Am Soc Nephrol 2008; 3: 111-116.
- Medical Netcare. Jahresbericht Datenanalyse Dialyse für den Gemeinsamen Bundesausschuss: Berichtsjahr 2013. Münster: MNC; 2014.

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