



#### 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

Sigrid Droste, Charalabos-Markos Dintsios Public Health Unit University of Düsseldorf



# Background



# 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).



# Background



# **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 Nancy Kutner, Tess Bowles, Rebecca Zhang, Yijian Huang, and Stephen Pastan Behadalastine Disality of 1 Ste Converse Constant Constant Constant Constant Constant Constant Constant University Nancy Kutner, Tess Bowtes, Rebecca Zhang, Yijian Huang, and Stephen Pastan Rehabilitation/Quality of Life Special Studies Center, United States Renal Data System, Emory University, Atlanta, Georgia 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. Background: Investigation of factors associated with variation in dialysis patient employment has focused pri-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 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-274AA) began in 2004 to collect counts of emoloved patients aced 18 to 54. In addition to dialysis unit census, types and timing of treatments offered, and staffing. 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Renalis: Across all facilities, 18,9% of prevalent patients aged 18 to 54 were employed, but facility employment rate was positively associated independently with availability of a 5 p.m. or jar Results: Across all facilities, 15.9% of prevalent patients aged 15 to 54 were employed, but facility employment rates was positively associated independently with availability of a 5 pm. or lates datased ability (odds ratio (OR) 1.54, 95% confidence interval (C) 1.42 to 1.68, availability of pertoneal dialysis or home homedulysis from 0 to 100%, Facility employment rate was positively associated independently with availability of a 5 pm. or later datavas hits (adds rate OR) 154, 95%, confidence interval (C) 142 to 158), availability of perioneal datavas (HD) training (OR 1.19, 95%, CI 1.11 to 1.28), and erovision of frequent HD (OR 1.26, 85%, CI 1.07 to 1.49), after adjustite for shift (odds ratio (OR) 1.54, 95% confidence interval (C) 1.42 to 1.68, availability of peritoneal dialysis or home hemodulary (iID) training (OR 1.19, 95% CI 1.11 to 1.28), and provision of frequent IID (OR 1.26, 95% CI 1.07 to 1.40), after adjustice for a duits size. 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Conclusions: Promoting galarial 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 dialyste facility variables to ratient employment. attiful employment among "the maximum practical tently identified as predictors of patient employment (3-8). A number of patients" was specified as a easi in 1086 study by Baseon et al. (9) showed. however, that facility-level Clin J Am Soc Nephrol 3: 111-116, 2008. doi: 10.2215/CJN.02990707 Congressional legislation governing responsibilities of End-Stage Renal Disease (ESR) Networks (1), ESR) Net-Interview of personal legislation precision as a break of a transformed personal legislation governing responsibilities of the transformed strength Alexandread of the transformed strength and transformed strength or range-age nerve tables (taket) veryons (t. 1500) very one (taket) very work Organizations, which function as failsons between the federal government and providers of ESRD services (2) subset manufactures to active served source of manufactures (2) subset tentify identified as productors of patient employment (1-0). A study by Rasgon et al. 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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.



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?





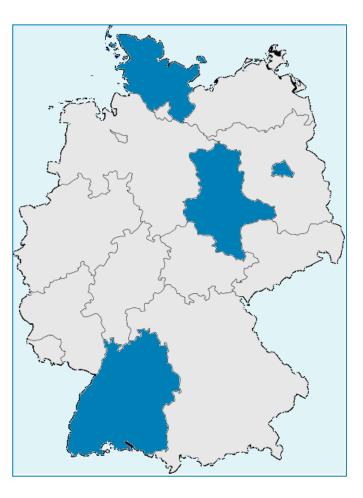


# **Our primary research: Methods**

# **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 %)	



## **Results**

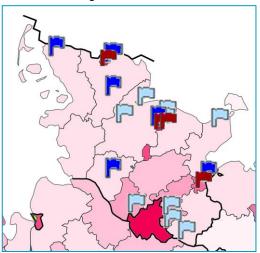
# Relative facility location: the example of Baden-Württemberg

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

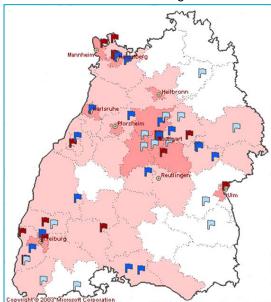


## The current status: evening and overnight shift times

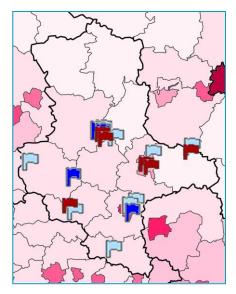
Schleswig-Holstein



Baden-Württemberg

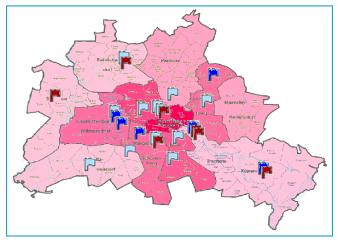


Sachsen-Anhalt



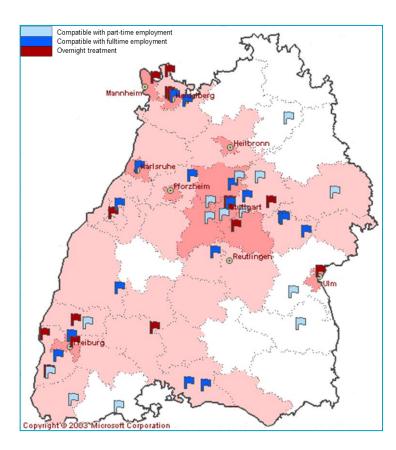


Compatible with part-time employment Compatible with fulltime employment Overnight treatment Berlin





# The example of Baden-Württemberg 2009 and 2015



#### Changes between 2009 and 2015:

City size	Closed centers	New centers
Major cities	7 (8 %)	9 (10 %)
Medium-sized	10 (11 %)	28 (31 %)
Small towns	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



# Conclusions

# **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!

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#### Contact

Sigrid Droste Public Health Unit University of Düsseldorf Moorenweg 5 40225 Düsseldorf Charalabos-Markos Dintsios Public Health Unit University of Düsseldorf Moorenweg 5 40225 Düsseldorf