



Institute of medical sociology  
and rehabilitation science

# What factors influence the length of stay (LOS) in women experiencing homelessness?

Using data of the study: The health and social situation of homeless people in Berlin  
Mitte (GIG1)

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# 1

## Background & Research Question

# 1 Background

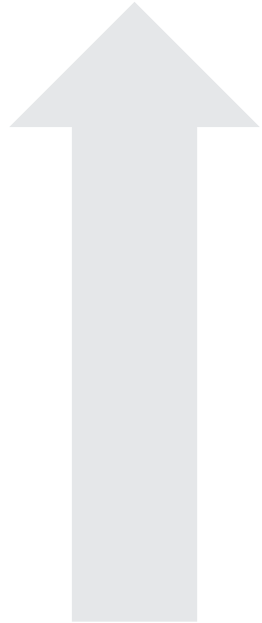
What do we know so far?

Social determinants of health are well known:

„Other research has established the effects of patient-level social determinants of health [...] with factors such as **race/ethnicity, health literacy, marital status, education, income, and social support** [...]“ *Navathe et al. (2018)*

# 1 Background

What do we know so far?



Factors associated with LOS in non-homeless individuals:

“Notable factors associated with longer hospitalization included: [...] **diagnosis of schizophrenia or schizoaffective>affective disorders**, [...], **unemployment**, being **unmarried**, as well as **public vs. private insurance**.” *Masters et al. (2013)*

“[...] longer length of stay for inpatients with **social deprivation** (+16%), [...] **social isolation** (+17%) and for patients with **inadequate housing** (+17%).” *Yilmaz & Raynaud (2013)*

“Other factors associated with increased bed use include advanced **old age**, [...], multiple **co-morbidities**, **depression**, [...] **low socio-economic status**, **lack of family support**, [...].” *Philp et al. (2013)*

“**Race and ethnicity** are other important demographic parameters which effect LOS.” *Buttigieg et al. (2018)*

# 1 Background

What do we know so far?



Factors associated with LOS in people experiencing homelessness (PEH):

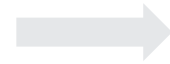
“In comparison with housed individuals[...] homeless individuals had **higher rates of [...] inpatient bed days** (0.3 vs 4.4 bed days/person/annum).” *Ní Cheallaigh et al. (2017)*

“Significant ( $p < 0.001$ ) independent predictors of [...] LOS included a **diagnosis of schizophrenia or bipolar disorder**, as well as **high** ( $\geq 32$  service contacts) non-psychiatric **medical service use** in the community.” *Russolillo et al. (2016)*

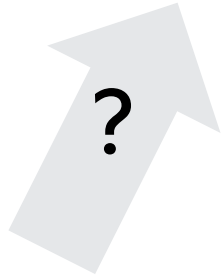
“[...] sex emerged as the only predictor of overnight treatment in a hospital (OR = 2.68, 95% CI = 1.61-4.47), [...], such that **women were more likely** than men **to be treated overnight** [...].” *Iwundu et al. (2020)*

# 1 Background

What do we know so far?



Little literature is focused on PEH and LOS



Although data shows:

- 1.) Social and medical factors influence health outcomes
- 2.) PEH have a longer length of stay in hospital than housed people
- 3.) Women experiencing homelessness have a longer stay in hospital than men experiencing homelessness

What sociodemographic and medical factors influence the length of stay in women experiencing homelessness?

# 2

## Methodology

## 2 Methodology

### Overview

- **Secondary data analysis** of hospital discharge letters of the **Health Center for the Homeless (GZO)** of the Jenny De la Torre Foundation in **Berlin Mitte**
- Inclusion criteria:
  1. At least **one consultation** at the Health Center for the Homeless (GZO) between 2006 and 2020
  2. At least **one hospital discharge** letter
  3. **Female** gender
- Analysis of hospital discharge letters and social anamnesis
- Data analysis via SPSS 29.0.



## 2 Methodology

### Analyzed patient characteristics

#### Sociodemographic factors:

Age (in years, 3 Categories), citizenship (German, EU, Non-EU), health insurance status (no/yes), sleeping rough (no/yes), education ( $\geq 10$  years no/yes), school drop out (no/yes), professional education (no/yes), current employment (no/yes), receiving entitlements (no/yes), duration of homelessness (in years), duration of current unemployment (in years), single (no/yes), children (no/yes), contact with family or friends (no/yes)

#### Medical factors:

Period of care at GZO (in months), number of consultations at GZO, number of medical consultations at GZO, length of stay in hospital (in days), number of discharge diagnosis (3 digit ICD-10-Code), absolute and relative frequency of women having at least one diagnosis of the following categories:

*Mental and behavioural disorders, diseases of the circulatory system, diseases of the digestive system, endocrine, nutritional and metabolic diseases, diseases of the skin and subcutaneous tissue, diseases of the respiratory system, Injury, poisoning and certain other consequences of external causes, Certain infectious and parasitic diseases*

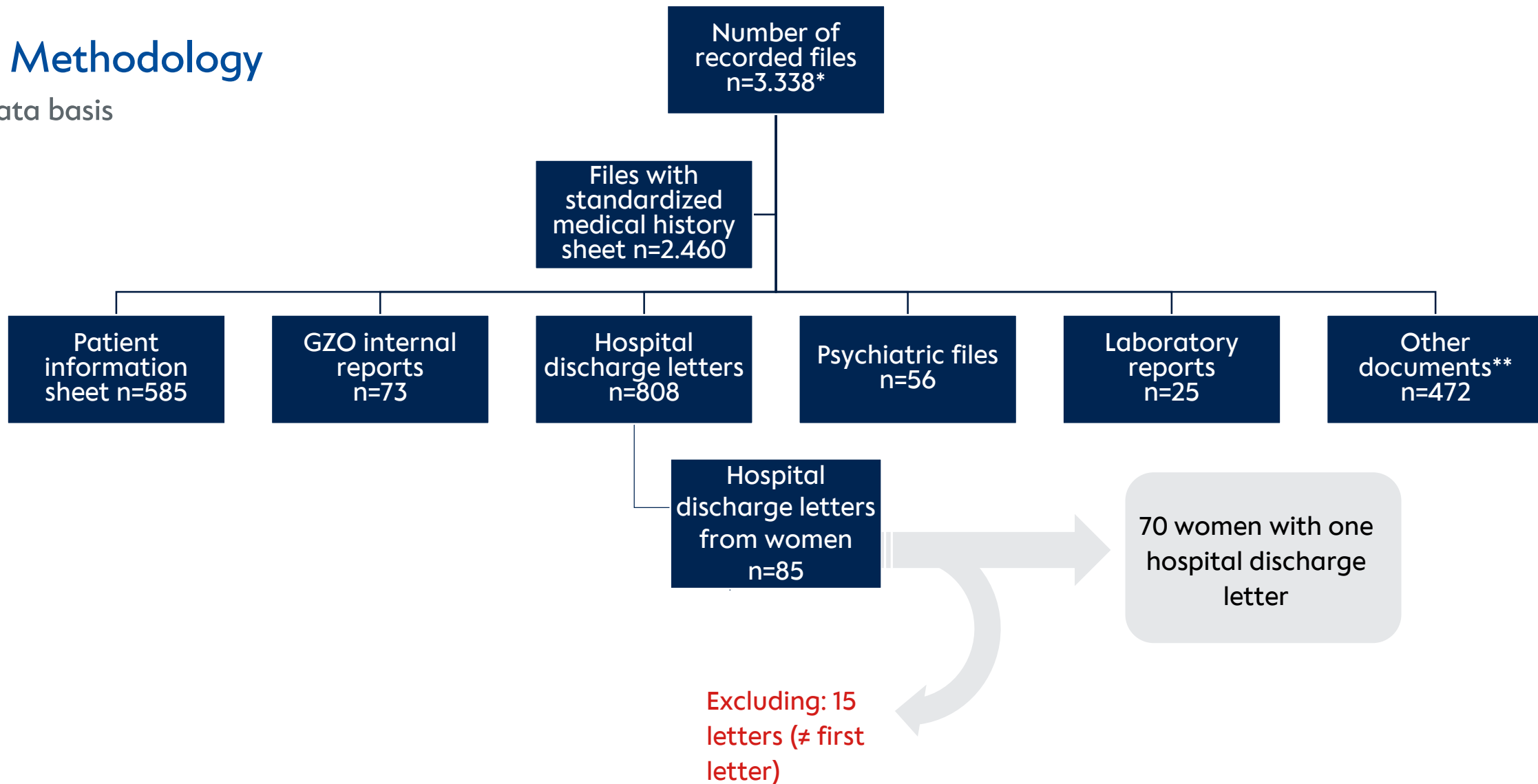
## 2 Methodology

### Data analysis

- **Description** of the two subgroups (LOS <24h; LOS > 24h)
- **Cross-sectional, comparative analyses** (LOS <24h; LOS >24h):
  - Absolute and relative frequencies (categorical variables)
  - Median and interquartile ranges (metric variables)
  - Chi-square test, Mann-Whitney U test
- **Binominal logistic regression**
- Significance level:  $\alpha = 0.05$ .

## 2 Methodology

Data basis



\* Corresponds to a 91.5% share of the total archive.

\*\* Letters from health insurance companies, certificates from the GZO, medication schedules.

# 3

## Results: Sociodemographic factors of women experiencing homelessness in hospital care

# 3 Results

## Sociodemographics

	LOS < 24 h		LOS ≥ 24 h		p value
	n	%	n	%	
<b>Total sample</b>	39	100	31	100	
<b>Age</b>					0.84
≤ 29 years	12	31.6	8	25.8	
30-44 years	10	26.3	8	25.8	
≥ 45 years	16	42.1	15	48.4	
(missing)	1	-	0	-	
<b>Citizenship</b>					0.427
German	22	66.7	17	65.4	
EU	7	21.2	8	30.8	
Non-EU	4	12.1	1	3.8	
(missing)	6	-	5	-	
<b>Health insurance</b>					0.964
yes	15	40.5	12	40	
no	22	59.5	18	60	
(missing)	2	-	1	-	
<b>Rough sleeping</b>					0.470
yes	3	7.7	4	12.9	
no	36	92.3	27	87.1	
(missing)	0	-	0	-	

# 3 Results

## Sociodemographics

	LOS < 24 h				LOS ≥ 24 h				p value
	n	%	n	%	n	%	n	%	
<b>Education</b>									0.328
< 10 years	10	52.6	7	36.8					
≥ 10 years	9	47.4	12	63.2					
(missing)	20	-	12	-					
<b>School drop out</b>									0.206
yes	1	5.6	3	20					
no	17	94.4	12	80					
(missing)	21	-	16	-					
<b>Professional education</b>									0.726
yes	11	52.4	11	57.9					
no	10	47.6	8	42.1					
(missing)	18	-	12	-					
<b>Current employment</b>									0.682
yes	3	18.8	2	13.3					
no	13	81.3	13	86.7					
(missing)	15	-	16	-					
<b>Receiving entitlement</b>									0.832
yes	12	54.5	7	58.3					
no	10	45.5	5	41.7					
(missing)	17	-	19	-					
	<b>n</b>	<b>M</b>	<b>IQR 25</b>	<b>IQR 75</b>	<b>n</b>	<b>M</b>	<b>IQR 25</b>	<b>IQR 75</b>	
<b>Duration of current homelessness</b>									0.828
Years	13	1	0.06	3	18	1	0.17	2	
(missing)	26	-	-	-	13	-	-	-	
<b>Duration of current unemployment</b>									0.243
Years	13	10	3.5	14	13	5	0.5	13.5	
(missing)	26	-	-	-	18	-	-	-	

# 3 Results

## Sociodemographics

	LOS < 24 h		LOS ≥ 24 h		p value
	n	%	n	%	
<b>Marital status: single</b>					0.647
yes	9	42.9	10	50	
no	12	57.1	10	50	
(missing)	18	-	11	-	
<b>Children (at least one)</b>					0.252
yes	15	71.4	12	54.5	
no	6	28.6	10	45.5	
(missing)	18	-	9	-	
<b>Contact with friends or family</b>					0.815
yes	6	42.9	8	47.1	
no	8	57.1	9	52.9	
(missing)	25	-	14	-	

The groups (LOS<24h vs. LOS >24h) did not differ statistically significantly with respect to sociodemographic factors.

# 3

## Results: Medical factors of women experiencing homelessness in hospital care



# 3 Results

## Medical factors

		LOS < 24 h				LOS ≥ 24 h				P Value
		n	M	IQR 25	IQR 75	n	M	IQR 25	IQR 75	
<b>Period of care at GZO</b>										0.736
	<b>Months</b>	37	9	0,5	32	31	7	0	39	
<b>Total number of consultations</b>										0.390
	<b>Number</b>	39	6	3	12	31	4	1	15	
<b>Total number of medical consultations</b>										0.480
	<b>Number</b>	39	4	2	9	31	3	1	9	
<b>Total length of stay</b>										<0.001
	<b>Days</b>	39	0	0	0	31	8	4	17	
<b>Total number of diagnosis</b>										< 0.001
	<b>Number</b>	39	1	1	2	31	3	1	4	

### 3 Results

#### Medical factors

ICD Code	LOS < 24 h		LOS ≥ 24 h		p value
	n	%	n	%	
<b>F00-F99</b> Mental and behavioural disorders (yes)	6	15,4	18	58,1	< 0.001
<b>I00-I99</b> Diseases of the circulatory system (yes)	4	10,3	11	35,5	0.011
<b>K00-K93</b> Diseases of the digestive system (yes)	3	7,7	3	9,7	0.768
<b>E00-E90</b> Endocrine, nutritional and metabolic diseases (yes)	5	12,8	10	32,3	0.049
<b>L00-L99</b> Diseases of the skin and subcutaneous tissue (yes)	2	5,1	3	9,7	0.463
<b>J00-J99</b> Diseases of the respiratory system (yes)	1	2,6	5	16,1	0.044
<b>S00-T98</b> Injury, poisoning and certain other consequences of external causes (yes)	18	46,2	6	19,4	0.019
<b>A00-B99</b> Certain infectious and parasitic diseases (yes)	4	10,3	4	12,9	0.730

# 3

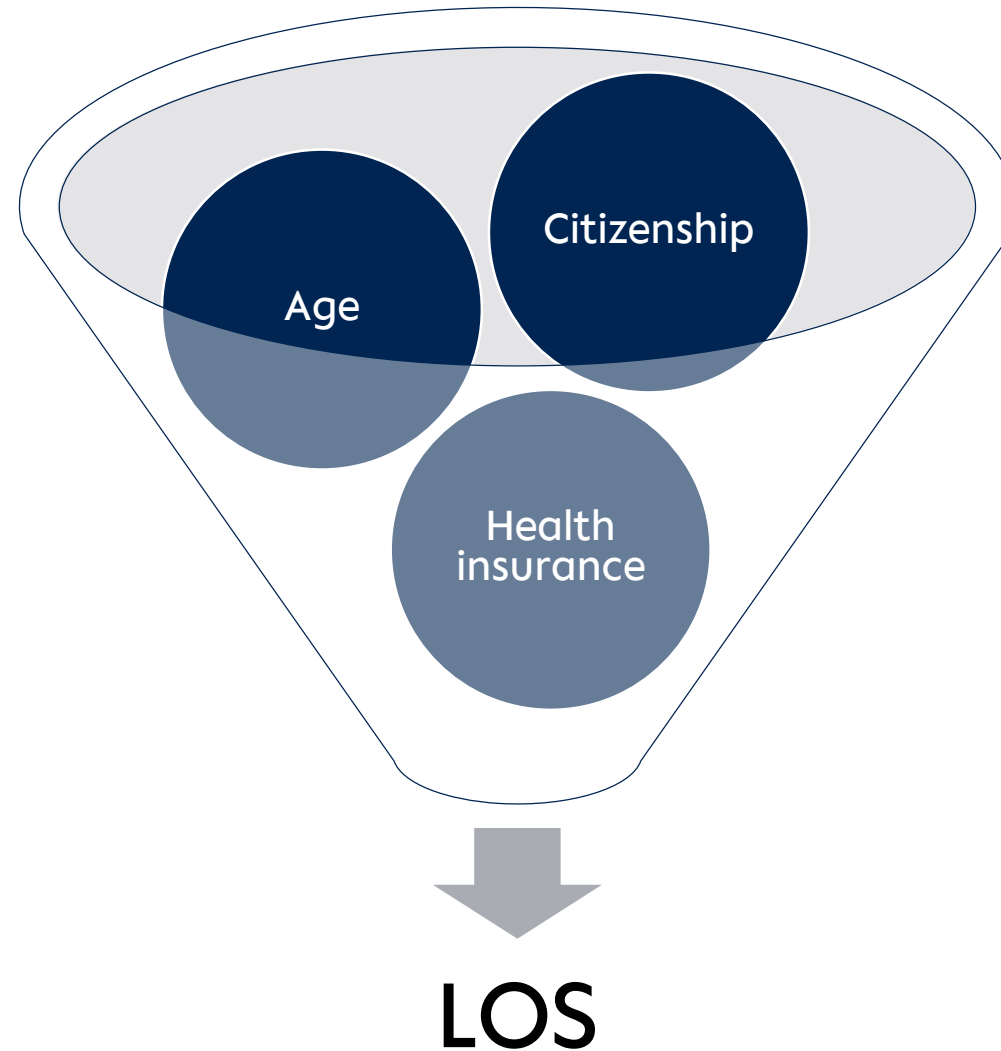
## Results: Regression models

# 3 Results

Regression models

## 1. Binominal logistic regression

Entered factors: age, citizenship, health insurance



# 3 Results

Regression models

First model (n=57)

	B	SE	Wald	df	p	Odds Ratio	95% CI for Odds Ratio	
							Lower bound	Upper bound
<b>Age at admission</b>								
≤ 29 years (Reference)			,271	2	,873			
30-44 years	-,140	,790	,031	1	,859	,869	,185	4,089
≥ 45 years	,210	,634	,109	1	,741	1,233	,356	4,277
<b>Citizenship</b>								
German (Reference)			1,095	2	,579			
EU	,408	,672	,369	1	,543	1,504	,403	5,613
Non EU	-,861	1,244	,479	1	,489	,423	,037	4,845
<b>Health insurance</b>								
Yes	,013	,604	,000	1	,983	1,013	,310	3,309
<b>Constant</b>	-,313	,640	,239	1	,625	,731		

## 3 Results

Regression models

First model:

3 factors (**age, citizenship, health insurance**), binomial regression (outcome: LOS >24h)

Overall percentage of accuracy in classification: 57.9%

Sensitivity: 23.1% Specificity of 87.1%

The binomial logistic regression model was **not statistically significant**,  $\chi^2(5) = 1.369$ ,  $p = .928$ , not explaining the variance (Backhaus et al., 2006), as shown by Nagelkerke's  $R^2 = .032$ .

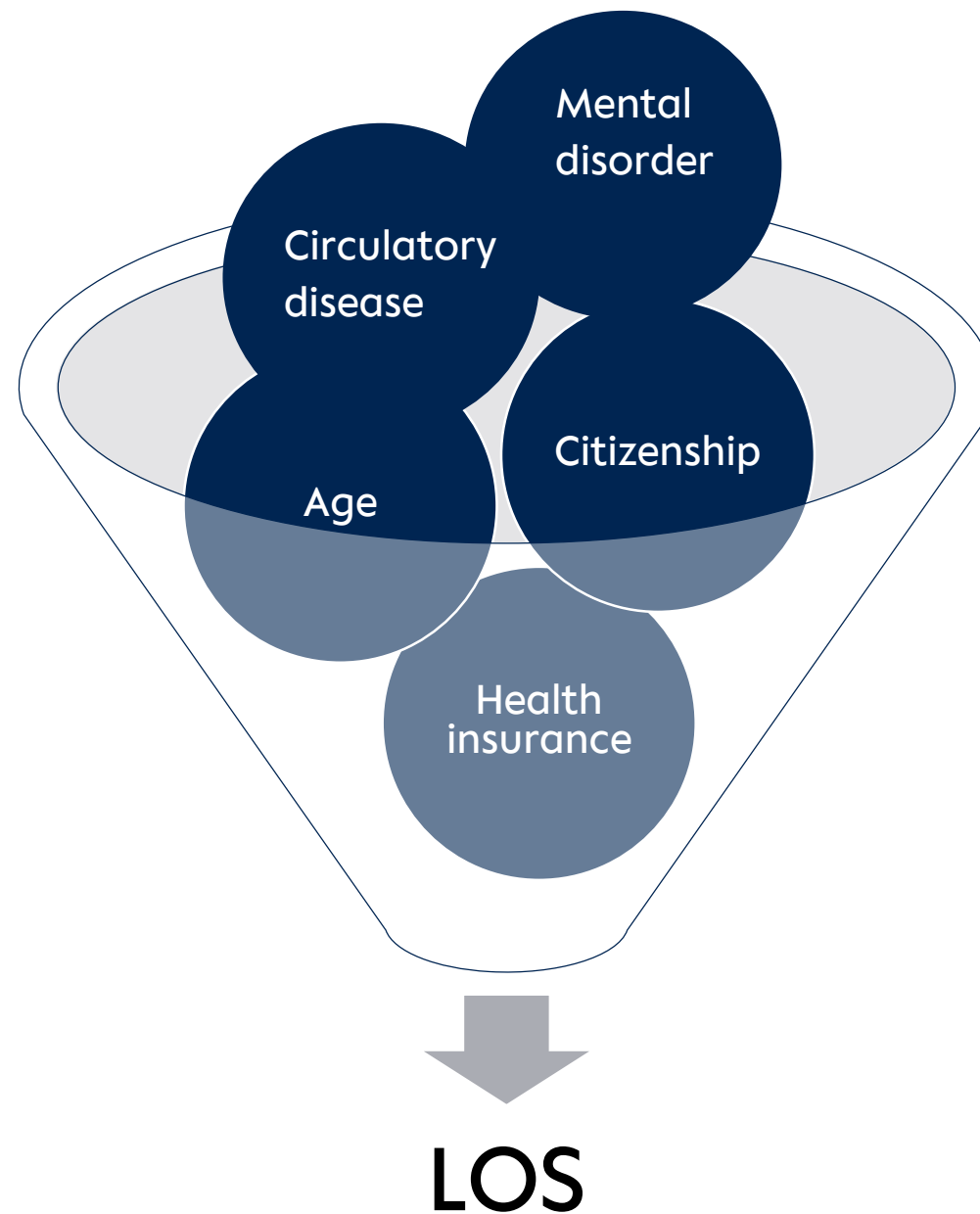
### 3 Results

Regression models

#### 2. Binomial logistic regression

Entered factors: age, citizenship, health insurance

Plus 2 medical factors (i.e. diagnosis of mental and behavioural disorder, diagnosis of disease of the circulatory system)



# 3 Results

Regression models

Second model (n=57)

	B	SE	Wald	df	p	Odds Ratio	95% CI for Odds Ratio	
							Lower bound	Upper bound
<b>Age at admission</b>								
≤ 29 years (Reference)			1,475	2	,478			
30-44 years	-,965	,917	1,108	1	,293	,381	,063	2,298
≥ 45 years	-,812	,785	1,070	1	,301	,444	,095	2,068
<b>Citizenship</b>								
German (Reference)			1,497	2	,473			
EU	,920	,821	1,256	1	,262	2,510	,502	12,553
Non EU	-,220	1,379	,025	1	,873	,803	,054	11,986
<b>Health insurance</b>								
Yes	,120	,741	,026	1	,871	1,127	,264	4,816
<b>At least one diagnosis of mental and behavioural disorder (yes)</b>								
	1,831	,725	6,376	1	,012	6,239	1,506	25,842
<b>At least one diagnosis of the circulatory system (yes)</b>								
	1,929	,949	4,134	1	,042	6,883	1,072	44,196
Constant	-,873	,747	1,367	1	,242	,418		



## 3 Results

Regression models

Second model: 5 factors, binomial regression (outcome: LOS >24h)

Overall percentage of accuracy in classification: 70.2%

Sensitivity of 73.1% Specificity of 67.7%

The binomial logistic regression model was **statistically significant**,  $\chi^2(7) = 14.671$ ,  $p = .040$ , resulting in a small amount of explained variance (Backhaus et al., 2006), as shown by Nagelkerke's  $R^2 = .303$ .

### 3 Results

#### Regression models

Second model: 5 factors, binomial regression (outcome: LOS >24h)

Of the 5 variables entered into the regression model, **2 contributed significantly** in predicting LOS >24h: having at least one **mental or behavioural disorder** ( $p = .012$ ) and having at least one **disease of the circulatory system** ( $p = .042$ ).

Having at least one mental or behavioural disorder increases the likelihood of staying longer than 24 hours in hospital for women experiencing homelessness: **OR = 6.239 (95%-CI[1.506, 25.842])**.

Having at least one disease of the circulatory system increases the likelihood of staying longer than 24 hours in hospital for women experiencing homelessness: **OR = 6.883 (95%-CI[1.072, 44.196])**.

# 4

## Discussion & Limitations

## 4 Discussion

1.) The **groups** (LOS<24h vs. LOS >24h) did **not differ** statistically significantly with respect to **sociodemographic factors**.

- Although already described for people not experiencing homelessness (*Masters et al. (2013) Yilmaz & Raynaud (2013), Philp et al. (2013) Buttigieg et al. (2018)*)

2.) The **groups** (LOS<24h vs. LOS >24h) did **differ** statistically significantly with respect to **medical factors** (i.e. in the disease categories: mental and behavioural, circulatory, endocrine/nutritional/metabolic, respiratory and injury, poisoning and certain other external causes of disease) (*Russolillo et al. (2016), Masters et al. (2013), Philp et al. (2013), Khatana (2020), Vohra (2022)*)

3.) **Mental and behavioural disorders** as well as **diseases of the circulatory system increase the length of stay** in women experiencing homelessness.

- Mental health problems effecting LOS is known (*Russolillo et al. (2016), Masters et al. (2013), Philp et al. (2013)*)
- Circulatory diseases effecting higher readmission rates in PEH is known (*Khatana (2020)*)

## 4 Limitations

### 1.) Sample size

- Some variables: high amount of **missings**

### 2.) Specific subgroup of PEH

- Urban women, rather German (66,1%),  $\geq$  45 years (44,1%)
- Ability to **manage documents**

### 3.) Data source

- Not every woman with hospital discharge letters, only 9,78%
- Different **time of hospitalization** (trends in health care, seasonal diseases etc.)

# Thank you for listening!

Contact

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Questions? Comments?