



Universität St.Gallen



PCSI
Patient Classification
Systems International



ADMISSION AND DISCHARGE MANAGEMENT OF DEMENTIA PATIENTS IN SWISS PSYCHIATRIC HOSPITALS AND RELATED TREATMENT COSTS

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*“From insight
to impact”* 

Background

- Rising life expectancy of the Swiss population
- Dementia is a mental disorder for which age is the main risk factor
 - The prevalence of dementia in the population rises sharply after the age of 65
- Dementia is a source of relevant health and economic burden on the Swiss economy and society
- The National Platform Dementia and the National Dementia Strategy in Switzerland indicate that dementia is getting increasing policy attention in Switzerland

I. Introduction and motivation

Aims

- Provision of insights into the care situation of dementia patients before and after their stays in psychiatric hospitals in Switzerland
- Investigation whether admission and discharge variables can explain differences in treatment costs
- Contribution to the health policy discussion on the management of dementia patients and facilitation the further development of the TARPSY tariff structure



II. Research questions

1. Are there differences in the care situation of dementia patients before and after their stays at psychiatric hospitals at the regional level in Switzerland?
2. Are there differences in the care situation of dementia patients before and after their stays at psychiatric hospitals at the hospital typology level in Switzerland (i.e., are there differences for patients treated at general hospitals of different levels and hospitals specialized on psychiatry)?
3. Are the circumstances of a patient's admittance to and discharged from a psychiatric hospital in Switzerland associated with the respective hospital treatment costs?



III. Patient group definition and dataset

F00	Dementia in Alzheimer disease	F00.0	Dementia in Alzheimer disease with early onset
		F00.1	Dementia in Alzheimer disease with late onset
		F00.2	Dementia in Alzheimer disease, atypical or mixed type
		F00.9	Dementia in Alzheimer disease, unspecified
F01	Vascular dementia	F01.0	Vascular dementia of acute onset
		F01.1	Multi-infarct dementia
		F01.2	Subcortical vascular dementia
		F01.3	Mixed cortical and subcortical vascular dementia
		F01.8	Other vascular dementia
		F01.9	Vascular dementia, unspecified
F02	Dementia in other diseases classified elsewhere	F02.0	Dementia in Pick disease
		F02.1	Dementia in Creutzfeldt-Jakob disease
		F02.2	Dementia in Huntington disease
		F02.3	Dementia in Parkinson disease
		F02.4	Dementia in human immunodeficiency virus [HIV] disease
		F02.8	Dementia in other specified diseases classified elsewhere
F03		Unspecified dementia	
G30	Alzheimer disease	G30.0	Alzheimer disease with early onset
		G30.1	Alzheimer disease with late onset
		G30.8	Other Alzheimer disease
		G30.9	Alzheimer disease, unspecified
G31	Other degenerative diseases of nervous system, not elsewhere	G31.0	Circumscribed brain atrophy
		G31.1	Senile degeneration of brain, not elsewhere classified
		G31.2	Degeneration of nervous system due to alcohol
		G31.8	Other specified degenerative diseases of nervous system
		G31.9	Degenerative disease of nervous system, unspecified

Item	HoNOS item	HoNOS subscales
1	Overactive, aggressive, disruptive behaviour	A: Behaviour (items 1-3)
2	Non-accidental self-injury	
3	Problem-drinking or drug-taking	
4	Cognitive problems	B: Impairment (items 4-5)
5	Physical illness or disability problems	
6	Problems associated with hallucinations and delusions	C: Symptoms (items 6-8)
7	Problems with depressed mood	
8	Other mental and behavioral problems	
9	Problems with relationships	D: Social (items 9-12)
10	Problems with activities of daily living	
11	Problems with living conditions	
12	Problems with occupation and activities	

Admission	1.2.V02	Patient stay before admission
	1.2.V03	Admission type
	1.2.V04	Referring institution
Discharge	1.5.V02	Decision for discharge
	1.5.V03	Patient stay after discharge
	1.5.V04	Treatment after discharge

III. Patient group definition and dataset

Dataset

Dataset at the case level provided by the Swiss Federal Statistical Office (“Bundesamt für Statistik, Fallkostenstatistik 2010 – 2025”)

Data cleansing I (admission and discharge management, treatment paths; sequential)

- 7,090 cases main diagnosis of dementia
- 145 cases missing admission or discharge variables
- 2447 cases do not have values for the HoNOS items 4,5,7, and 8
- 39 cases missing information on the canton
- 28 cases missing information on the respective hospital typology
- = **4,447 cases**

Data cleansing II (cost analyses, sequential)

4,447 cases

- 1562 cases cases from 2016, 2017

- 159 cases missing values of total costs at the patient level

= 2,726 cases

IV. Research design

Descriptive statistics

- Potential differences at the regional level and at the hospital typology level

Regression analyses

- Treatment costs

Regression equation

$$\begin{aligned} \textit{Case Costs} = & \alpha + \beta_1 \textit{AcuteHospAdm} + \beta_2 \textit{PsychAdm} + \beta_3 \textit{EmergAdm} \\ & + \beta_4 \textit{AcuteHospDis} + \beta_5 \textit{InpTreatDis} \\ & + \gamma' [\textit{Controls}] + \varepsilon \end{aligned}$$

IV. Research design

The dependent variable Case Costs is defined as follows:

Case Costs: Total Case Costs: Total case costs in CHF or
Day Costs: Daily case costs in CHF

The variables of interest (the admission and discharge variables):

AcuteHospAdm: Indicator variable equal to 1 if the patient was transferred from another acute care hospital and 0 otherwise

PsychAdm: Indicator variable equal to 1 if the patient was transferred from a psychiatrist and 0 otherwise

EmergAdm: Indicator variable equal to 1 in case of an emergency hospitalization and 0 otherwise

IV. Research design

The variables of interest (the admission and discharge variables):

- AcuteHospDis:* Indicator variable equal to 1 if the patient was discharged to another acute care hospital and 0 otherwise
- InpTreatDis:* Indicator variable equal to 1 if the patient was cared for in an inpatient setting after hospitalization and 0 otherwise

IV. Research design

Control variables:

<i>HospType</i>	Indicator variable equal to 1 if the patient is treated at a university hospital and 0 otherwise
<i>Age</i>	Age of the patient
<i>Sex</i>	Indicator variable equal to 1 if the patient is female and 0 otherwise
<i>LoS</i>	Length of Stay, duration of the patient's hospitalization
<i>HoNOS</i>	4 (cognitive problems), 5 (physical illness or disability problems), 7 (problems with depressed mood), 8 (other mental and behavioral problems)

IV. Research design

Variables/Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>AcuteHospAdm</i>	x					x		x
<i>PsychAdm</i>		x				x		x
<i>EmergAdm</i>			x			x		x
<i>AcuteHospDis</i>				x			x	x
<i>InpTreatDis</i>					x		x	x

V. Results

Descriptive statistics

	Mean	Median	Min	Max	Percentile	
					0.25	0.75
<i>Total Case</i>	33,996	27,431	581	551,257	16,214	41,973
<i>Day Costs</i>	903.51	843.39	51	7,138.00	715	1,006.96
<i>AcuteHospAdm</i>	0.25	0	0	1	0	0
<i>PsychAdm</i>	0.23	0	0	1	0	0
<i>EmergAdm</i>	0.45	0	0	1	0	1
<i>AcuteHospDis</i>	0.1	0	0	1	0	0
<i>InpTretDis</i>	0.14	0	0	1	0	0
<i>HospType</i>	0.19	0	0	1	0	0
<i>Age</i>	82.08	85	50	105	75	90
<i>Sex</i>	0.54	1	0	1	0	1
<i>LoS</i>	40.72	34	0	333	20	52
<i>HoNOS_4</i>	3.32	4	0	4	3	4
<i>HoNOS_5</i>	2.09	2	0	4	1	3
<i>HoNOS_7</i>	1.54	2	0	4	0	3
<i>HoNOS_8</i>	2.11	2	0	4	0	3

Shares of HoNOS scores

	0	1	2	3	4
<i>HoNOS_4</i>	1	2.2	11.3	34.8	50.7
<i>HoNOS_5</i>	17.9	12.1	26.9	29.1	14
<i>HoNOS_7</i>	28.4	21.2	25.1	18.5	6.8
<i>HoNOS_8</i>	25.2	8.7	18.3	25.6	22.2

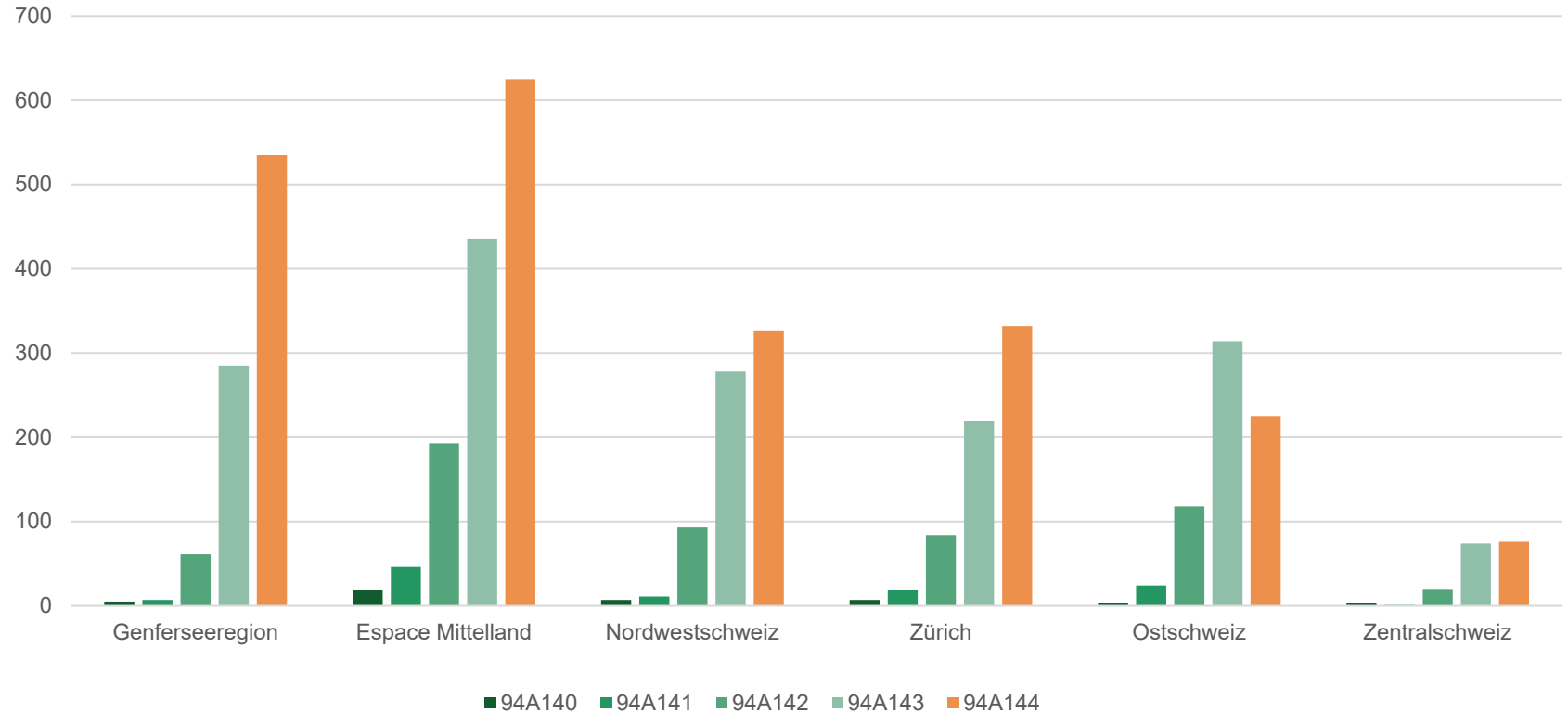
V. Results



- Espace Midland (29.7%)
- Lake Geneva (20.1%)
- Northwestern Switzerland (16.1%)
- Eastern Switzerland (15.4%)
- Zurich (14.9%)
- Central Switzerland (3.9%)

V. Results

Different severity levels of dementia coded in regions (HoNOS-values)



V. Results

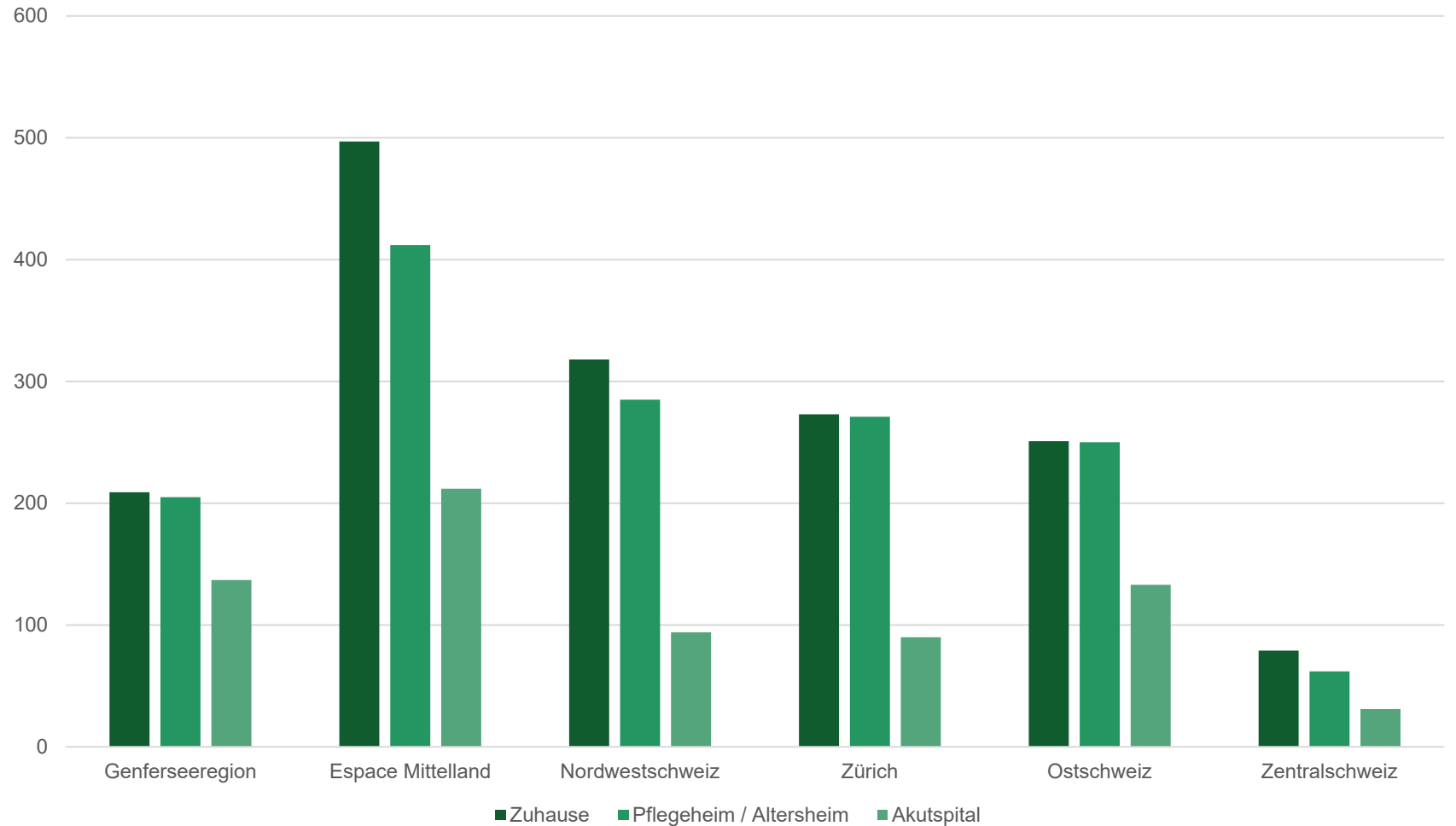
1.2.V02

Patient stay before admission

36.6% living at home

33.4% living in nursing homes

21.4% acute care hospitals



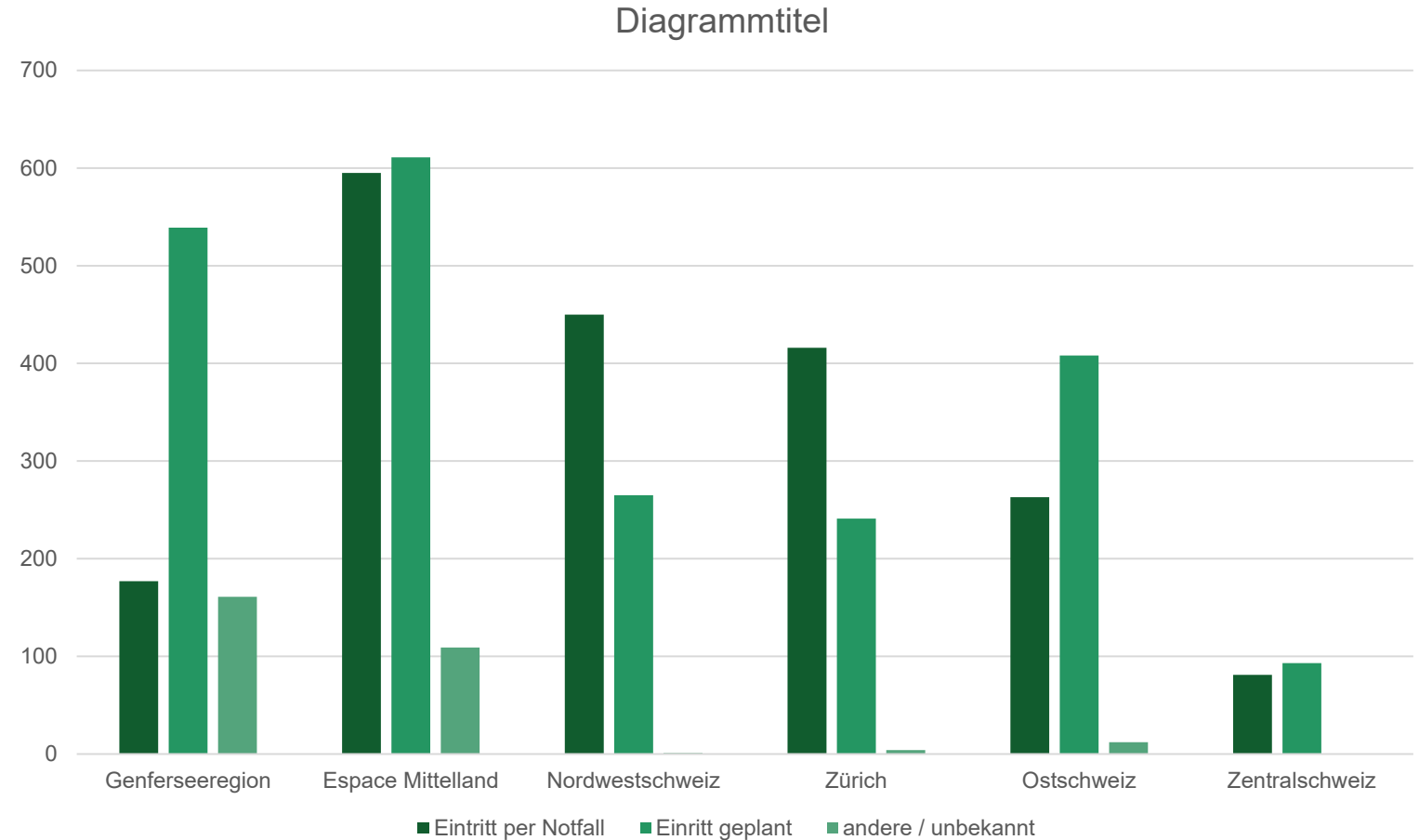
V. Results

1.2.V03

Admission type

44.6% of all admissions were emergency admissions

48.5% of all patients were admitted as planned cases



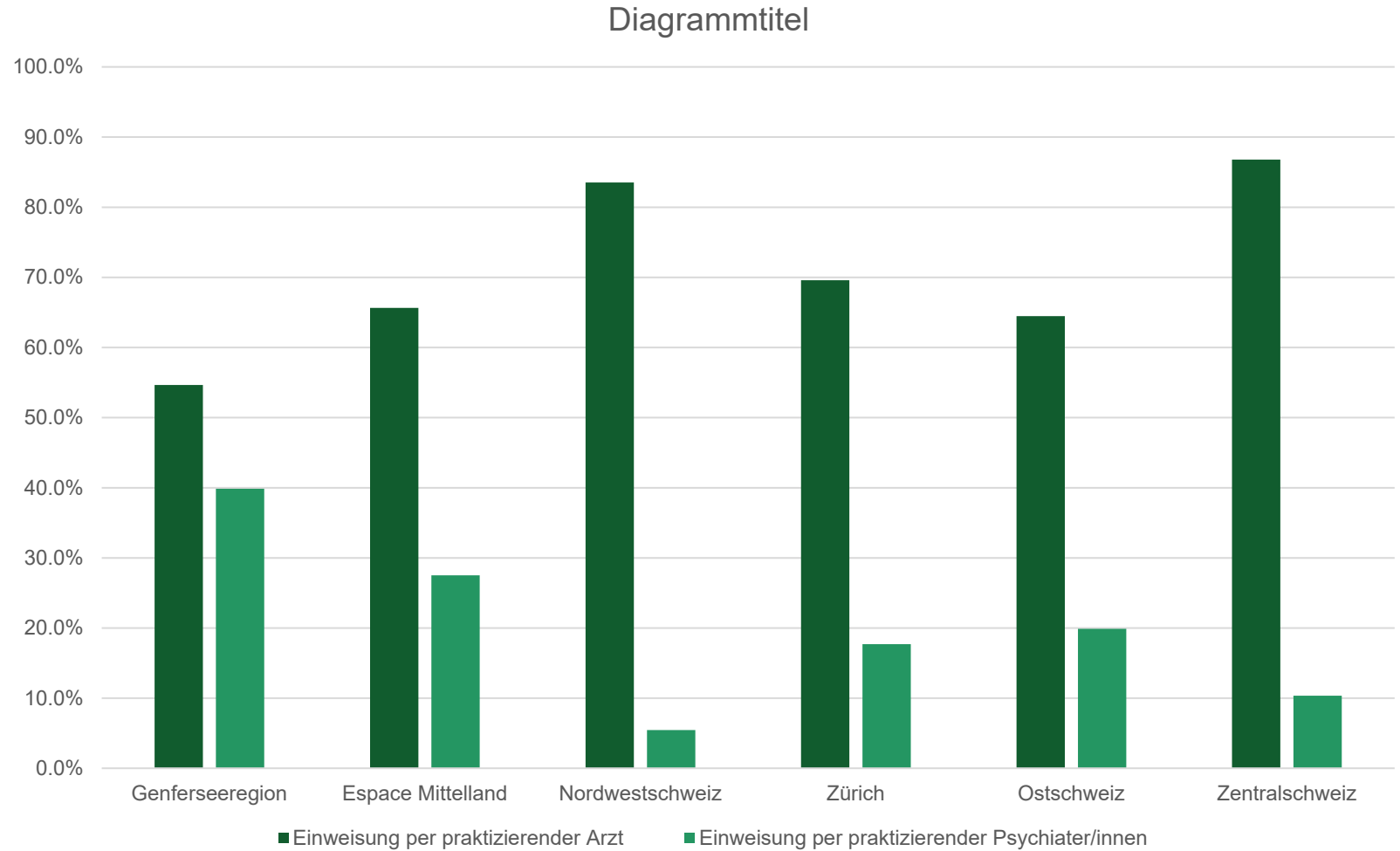
V. Results

1.2.V04

Referring institution

67.6% by acute care physicians

23.1% by psychiatric physicians



Hospital typology level

- 69.2% level 1 psychiatric hospitals
- 17,6% university hospitals
- 8,1% general hospital central care (level 2)
- 3.4% general hospital, primary care (level 3)
- 1.6% psychiatric hospital (level 2)

V. Results

	Total Case Costs				
	(1)	(2)	(3)	(4)	(5)
Constante	-4997.78 (2920.25; 0.087)	-5272.57 (2924.402;0.072)	-5121.62 (2921.766; 0.080)	-5244.61 (2916.267;0.072)	-5146.2 (2917.213; 0.078)
AcuteHospAdm	-310.75 (628.97; 0.621)				
PsychAdm		778.82 (627.431; 0.215)			
EmergAdm			352.11 (547.312; 0.520)		
AcuteHospDis				2413.89 (894.311; 0.007)	
InpTretDis					1623.85** (766.956; 0.034)
HospType	11236.60*** (11236.60; 0.000)	11025.28*** (712.377; 0.000)	11267.29*** (725.165; 0.000)	11102.90*** (703.978; 0.000)	11086.14*** (704.85; 0.000)
Age	2.44 (33.02; 0.941)	2.92 (33.010; 0.929)	1.36 (33.027; 0.967)	2.9 (32.969; 0.930)	1.25 (32.987; 0.970)
Sex	-567.14 (535.61; 0.290)	-580.89 (535.615; 0.278)	-551.79 (535.917; 0.303)	-507.03 (535.306; 0.344)	-526.19 (535.464; 0.326)
LoS	789.65*** (8.25; 0.000)	789.13*** (8.235; 0.000)	789.07*** (8.25; 0.000)	790.33*** (8.230; 0.000)	789.93*** (8.231; 0.000)
HoNOS_4	972.27** (326.92; 0.003)	981.97** (326.461; 0.003)	965.41** (327.326; 0.003)	972.51** (326.126; 0.003)	954.95** (326.498; 0.003)
HoNOS_5	1098.16*** (214.22; 0.000)	1097.67*** (213.850; 0.000)	1095.34*** (213.911; 0.000)	1042.29*** (214.365; 0.000)	1102.11*** (213.739; 0.000)
HoNOS_7	-201.38 (223.45; 0.368)	-200.24 (223.256; 0.370)	-206.02 (223.701; 0.357)	-191.63 (223.017; 0.390)	-187.78 (223.167; 0.400)
HoNOS_8	-157.51 (190.24; 0.408)	-151.89 (190.229; 0.425)	-146.34 (190.929; 0.443)	-173.19 (190.082; 0.362)	-170.82 (190.198; 0.369)
N	2726	2726	2726	2726	2726
R	0.893	0.893	0.893	0.893	0.893
R ²	0.797	0.798	0.797	0.798	0.798
Adjusted R ²	0.797	0.797	0.797	0.797	0.797
SSE	13681.140	13677.875	13680.712	13663.441	13670.477
F Statistic	1188.119***	1188.830***	1188.212***	1191.981***	1190.444***

Note: *p<0.1; **p<0.05; ***p<0.01

	Total Case Costs		
	(6)	(7)	(8)
Constante	-5302.14 (2929.221; 0.070)	-5243.04 (2916.798; 0.072)	-5512.19 (2927.19; 0.060)
AcuteHospAdm	-259.35 (630.438; 0.681)		-331.41 (631.719; 0.600)
PsychAdm	743.27 (629.808; 0.238)		797.37 (629.479; 0.205)
EmergAdm	319.70 (548.011; 0.560)		307.58 (551.566 ;0.577)
AcuteHospDis		2233.72 (1327.63; 0.093)	2146.14 (1335.563; 0.108)
InpTretDis		208.99 (1137.982; 0.854)	359.7 (1149.496; 0.754)
HospType	11197.99*** (753.421; 0.000)	11097.82*** (704.646; 0.000)	11139.80*** (752.958; 0.000)
Age	2.58 (33.046; 0.938)	2.74 (32.988; 0.934)	3.34 (33.029; 0.920)
Sex	-571.05 (536.164; 0.287)	-506.4 (535.412; 0.344)	-513.87 (536.019; 0.338)
LoS	789.04*** (8.269; 0.000)	790.33*** (8.232; 0.000)	790.03*** (8.268; 0.000)
HoNOS_4	961.97** (327.752; 0.003)	969.83** (326.508; 0.003)	948.43** (327.952; 0.004)
HoNOS_5	1105.72*** (214.326; 0.000)	1047.31*** (216.135; 0.000)	1065.58*** (216.828; 0.000)
HoNOS_7	-211.44 (223.871; 0.345)	-190.83 (223.1; 0.392)	-205.16 (223.66; 0.359)
HoNOS_8	-143.09 (190.975; 0.454)	-173.77 (190.142; 0.361)	-160.85 (190.887; 0.399)
N	2726	2726	2726
R	0.893	0.893	0.893
R ²	0.798	0.798	0.798
Adjusted R ²	0.797	0.797	0.797
SSE	13681.631	13665.872	13667.496
F Statistic	972.191***	1072.405***	824.912***

Note: *p<0.1; **p<0.05; ***p<0.01

V. Results

	Unstandardized Coefficient		Dev Costs	t	P-Value
	B	SE	Standardized Coefficient β		
Constant	903.447***	75.656		11.942	0.000***
AcuteHospAdm	4.107	16.303	0.005	0.252	0.801
PsychAdm	14.407	16.267	0.016	0.886	0.376
EmeraAdm	31.119**	14.253	0.040**	2.183	0.029**
AcuteHospDis	244.356***	34.562	0.186***	7.070	0.000***
InpTretDis	21.888	29.667	0.019	0.738	0.461
HospType	222.630***	19.428	0.229***	11.459	0.000***
Age	-0.553	0.854	-0.012	-0.647	0.517
Sex	-19.924	13.851	-0.026	-1.438	0.150
LoS	-3.002***	0.214	-0.258	-14.041	0.000***
HoNOS_4	16.732**	8.467	0.036	1.976	0.048**
HoNOS_5	29.003***	5.600	0.098	5.179	0.000***
HoNOS_7	-10.676	5.780	-0.035	-1.847	0.065
HoNOS_8	-3.696	4.931	-0.014	-0.749	0.454

Note: *p<0.1; **p<0.05; ***p<0.01

Thank you!



PCSI 2022



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