

APPENDIX

Influence of hospitalisation on the prescription of drugs in the primary care sector

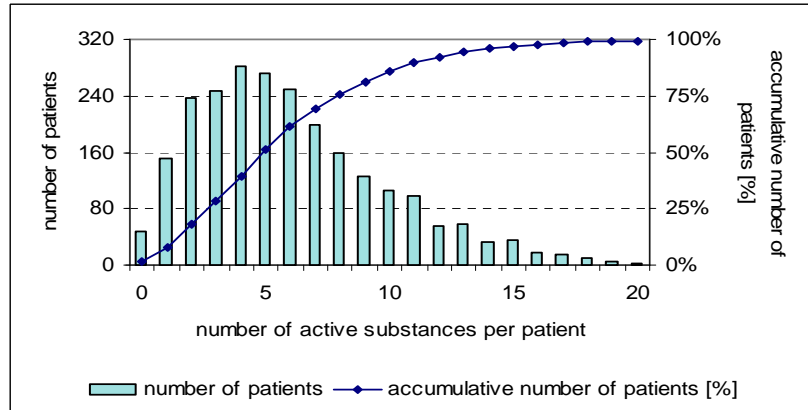
Thomas Grimmsmann

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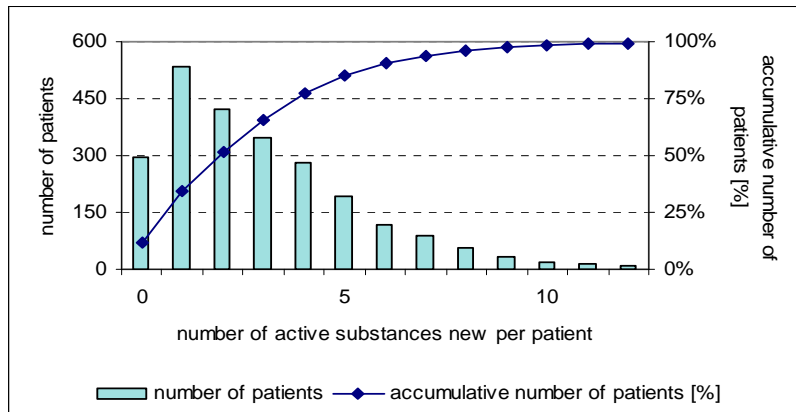
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Figure A - 1: Number of substances changed per patient

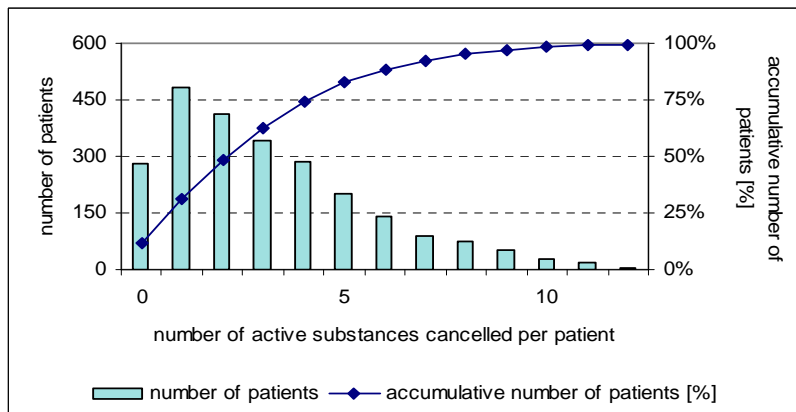
a)



b)



c)



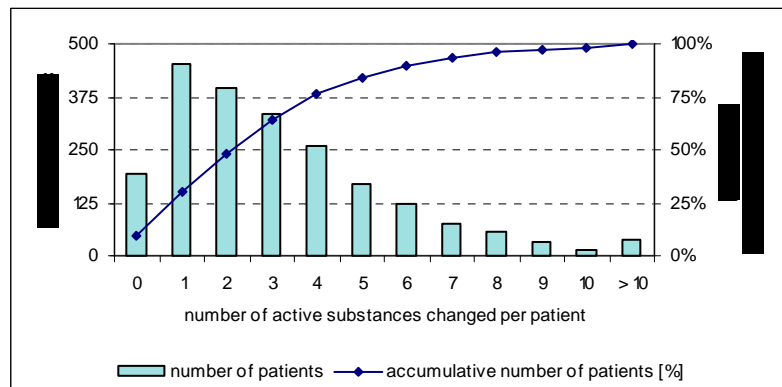
Absolute number (boxes) and accumulative proportion (line) of patients in dependence of the number of active substances changed (a), newly started (b) and cancelled (c) per patients after discharge.

Table A - 1: Overall proportion of substances changed (only N3)

Number of active substances prescribed before and after hospitalisation and overall proportion of substances cancelled, continued or newly started after discharge per patient under consideration only of largest package sizes (N3)

all main group	number of active substances			cancelled (before=100%)	continued (after=100%)	new (after=100%)
	before admission	after discharge	changes			
only largest package sizes	6639	6759	2%	50.2%	48.9%	51.1%

Figure A - 2: Number of substances changed after hospitalisation (only N3)



Absolute number (boxes) and accumulative proportion (line) of patients in dependence of the number of active substances changed per patients after discharge under consideration of only largest package sizes (N3).

Table A - 2: Overall changes within selected drug groups

Number of prescription and costs of active substances before admission and after discharge from selected groups or active substances according to the ATC-Code

a) Main group B (ATC-Code): Blood and blood forming organs

ATC-Code	ATC-Group or active substance	prescriptions before	prescriptions after	changes	changes [%]	costs before [€]	costs after [€]	changes [€]	changes [%]
B05BA10	Combinations; Solutions for parenteral nutrition	-	43	43	-	-	26.625	26.625	-
	Other antianemic preparations								
B03XA01	Erythropoietin	41	55	14	34%	23.285	37.110	13.825	59%
B03XA02	Darbepoetin alfa	19	23	4	21%	11.375	15.442	4.067	36%
	sum	60	78	18	30%	34.660	52.551	17.892	52%
B01AB	Heparin group	307	410	103	34%	35.386	45.417	10.031	28%
B01AC04	Clopidogrel	159	201	42	26%	33.839	42.266	8.427	25%

b) Main group M (ATC-Code): Musculo-skeletal system

ATC-Code	ATC-Group or active substance	prescriptions before	prescriptions after	changes	changes [%]	costs before [€]	costs after [€]	changes [€]	changes [%]
	Anti-inflammatory and antirheumatic products, non-steroids								
M01AH02	Rofecoxib	228	309	81	36%	18.008	20.945	2.938	16%
M01AE01	Ibuprofen	259	259	0	0%	3.026	4.172	1.146	38%
M01AB05	Diclofenac	275	157	-118	-43%	2.617	2.181	-436	-17%
M01AB01	Indometacin	78	62	-16	-21%	1.100	1.005	-95	-9%
M01AH01	Celecoxib	76	49	-27	-36%	6.659	4.122	-2.537	-38%
M01AH03	Valdecoxib	21	33	12	57%	1.430	1.892	462	32%
M01AE17	Dexketoprofen	27	14	-13	-48%	383	238	-145	-38%
	other	89	50	-39	-44%	2.893	1.755	-1.137	-39%
	sum	1053	933	-120	-11%	36.115	36.310	195	1%

Table A - 3: Overall proportion of substances changed

Number of active substances prescribed before and after hospitalisation and overall proportion of substances cancelled, continued or newly started after discharge per patient under consideration of main groups according to the ATC-Code

main group (anatomical group)	number of active substances			cancelled (before=100%)	continued (after=100%)	new (after=100%)
	before admission	after discharge	changes			
Cardiovascular system	3880	3848	-1%	43.5%	57.0%	43.0%
Alimentary tract and metabolism	2237	1997	-11%	53.9%	51.6%	48.4%
Nervous system	1562	1665	7%	56.0%	41.3%	58.7%
Blood and blood forming organs	955	926	-3%	70.6%	30.3%	69.7%
Musculo-skeletal system	1046	945	-10%	62.6%	41.4%	58.6%
Respiratory system	1052	891	-15%	62.3%	44.6%	55.4%
Anti-infectives for systemic use	592	565	-5%	91.0%	9.4%	90.6%
Sensory organs	557	561	1%	71.5%	28.3%	71.7%
Antineoplastic and immunomodulating agents	99	137	38%	40.4%	43.1%	56.9%
other	1651	1518	-8%	65.5%	37.5%	62.5%
sum of all	13,631	13,053	-4%	57.3%	44.6%	55.4%

Table A - 4: Number of patients, total prescriptions and total costs

Number of patients, total prescriptions and total costs of all patients, those with prescriptions before and after hospitalisation, only before admission or only after discharge, respectively.

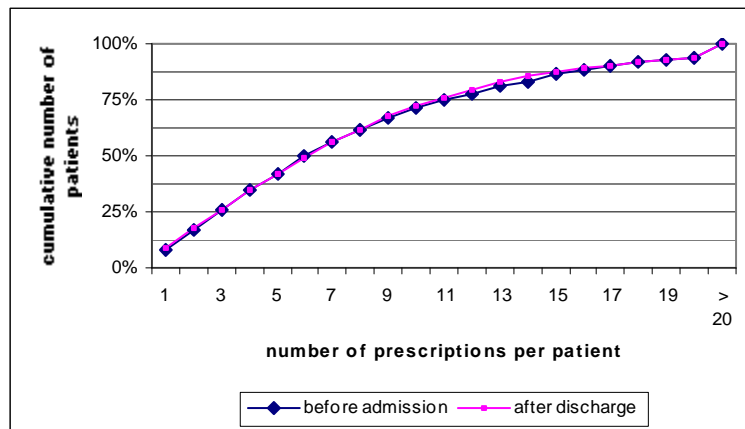
all patients:		
number of patients	2.848	100,0%
number of prescriptions	42.903	100,0%
costs [€]	2.124.312	100,0%
patients with prescriptions before admission and after discharge		
number of patients	2.426	85,2%
number of prescriptions	40.315	94,0%
costs [€]	2.000.997	94,2%
patients with prescriptions only before admission (excluded from further analysis)		
number of patients	254	8,9%
number of prescriptions	1.923	4,5%
costs [€]	95.919	4,5%
patients with prescriptions only after discharge (excluded from further analysis)		
number of patients	168	5,9%
number prescriptions	665	1,6%
costs [€]	27.396	1,3%

Table A - 5: Proportion of the number of prescriptions per patient

Proportion and cumulative proportion of the number of prescriptions per patient before admission and after discharge.

number of prescriptions per patient	number [%]		cumulative number [%]	
	before admission	after discharge	before admission	after discharge
1	7.6%	9.3%	7.6%	9.3%
2	9.2%	8.3%	16.8%	17.6%
3	8.8%	8.6%	25.6%	26.2%
4	9.2%	8.3%	34.8%	34.5%
5	7.2%	7.3%	42.0%	41.8%
6	7.6%	7.4%	49.6%	49.2%
7	6.7%	7.0%	56.3%	56.2%
8	5.3%	5.7%	61.6%	61.9%
9	5.2%	6.1%	66.8%	67.9%
10	4.5%	4.2%	71.2%	72.1%
11	3.5%	4.1%	74.8%	76.3%
12	2.8%	3.0%	77.6%	79.2%
13	3.3%	3.9%	80.9%	83.1%
14	2.3%	2.5%	83.1%	85.6%
15	3.0%	1.9%	86.2%	87.5%
16	1.9%	1.7%	88.1%	89.2%
17	2.3%	1.2%	90.4%	90.4%
18	1.4%	1.3%	91.8%	91.7%
19	0.9%	1.3%	92.7%	93.0%
20	0.8%	0.8%	93.5%	93.8%
> 20	6.5%	6.2%	100.0%	100.0%

Figure A - 3: Proportion of the number of prescriptions per patient



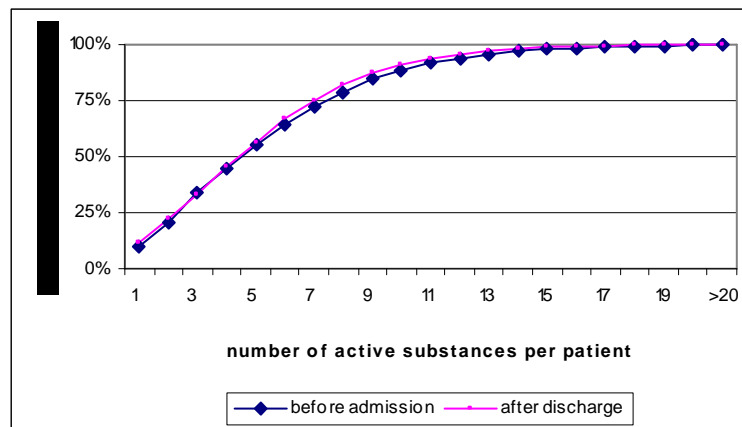
Cumulative proportion of the number of prescriptions per patient before admission and after discharge

Table A - 6: Proportion of the number of different substances per patient

Proportion and cumulative proportion of the number of different substances per patient before admission and after discharge.

number of substances per patient	number [%]		cumulative number [%]	
	before admission	after discharge	before admission	after discharge
1	9.5%	11.4%	9.5%	11.4%
2	11.4%	10.7%	20.9%	22.2%
3	12.6%	11.3%	33.5%	33.4%
4	11.3%	12.3%	44.8%	45.7%
5	10.6%	10.9%	55.4%	56.6%
6	9.1%	10.1%	64.5%	66.8%
7	8.1%	8.2%	72.6%	75.0%
8	6.1%	7.0%	78.7%	82.0%
9	5.7%	5.5%	84.4%	87.5%
10	3.6%	4.0%	88.1%	91.5%
11	3.5%	2.6%	91.5%	94.1%
12	2.5%	1.8%	94.1%	95.9%
13	1.4%	1.3%	95.5%	97.2%
14	1.4%	1.0%	96.9%	98.1%
15	1.0%	0.6%	97.9%	98.7%
16	0.6%	0.3%	98.6%	99.0%
17	0.3%	0.4%	98.8%	99.5%
18	0.3%	0.2%	99.1%	99.6%
19	0.3%	0.2%	99.4%	99.8%
20	0.2%	0.0%	99.6%	99.8%
>20	0.4%	0.2%	100.0%	100.0%

Figure A - 4: Proportion of the number of different substances per patient



Cumulative proportion of the number of different substances per patient before admission and after discharge.

Table A - 7: Costs per prescription

Total number and proportion of prescriptions and total costs in dependence on the costs per prescription.

cost per prescription [€]	number of prescriptions (%)		total costs [€] (%)	
	before admission	after discharge	before admission	after discharge
no price known*	363 (2%)	418 (2%)	-	-
> 0 – 10	4,544 (22%)	1,244 (6.2%)	25,020 (2.7%)	6,039 (0.6%)
> 10 – 30	7,306 (36%)	9,429 (47%)	133,217 (14%)	172,293 (16%)
> 30 - 100	5,848 (29%)	6,557 (33%)	321,787 (35%)	359,091 (34%)
> 100 - 300	2,015 (10%)	2,043 (10%)	299,219 (32%)	310,158 (29%)
> 300 - 1000	230 (1.1%)	263 (1.3%)	107,516 (12%)	135,828 (13%)
> 1000	14 (0.07%)	41 (0.21%)	44,670 (4.8%)	86,161 (8.1%)
sum	20,320 (100%)	19,995 (100%)	931,428 (100%)	1,069,569 (100%)

* For some drugs like receipts made within the pharmacy there are no prices listed in the pharmacy price schedule; therefore the costs per prescription is based on the 19,957 prescriptions before and 19,577 after the stay with prices available.

Table A - 8: Prescriptions of HMG CoA reductase inhibitors

Number of patients with prescriptions of HMG CoA reductase inhibitors (statins) before and after a hospital stay.

Active ingredient (ATC-Code)	before admission		after discharge		Risk Ratio Point estimate	95% Confidence Interval
	Patient with drug	Patient without drug	Patient with drug	Patient without drug		
Simvastatin (C10AA01)	176	2250	199	2227	1.131	0.931 - 1.374
Lovastatin (C10AA02)	8	2418	5	2421	0.625	0.205 - 1.908
Pravastatin (C10AA03)	42	2384	48	2378	1.143	0.758 - 1.723
Fluvastatin (C10AA04)	37	2389	42	2384	1.135	0.732 - 1.76
Atorvastatin (C10AA05)	104	2322	129	2297	1.24	0.964 - 1.596
HMG CoA reductase inhibitors	361	2065	419	2007	1.161	1.02 - 1.321

Some patients got more than one different HMG CoA reductase inhibitor, so the sum of the single active ingredients is greater than the number dedicated as HMG CoA reductase inhibitors.

Table A - 9: Prescriptions of HMG CoA reductase inhibitors: Cross table

Cross table of the number of prescriptions of HMG CoA reductase inhibitors (statins) before admission and after discharge. Note: For each patient only the last prescription of a statin before and the first after hospitalisation was counted.

		<u>after discharge</u>						sum
		Simvastatine	Lovastatine	Pravastatine	Fluvastatine	Atorvastatine	no statine after	
<u>before admission</u>	Simvastatine	89		1	1	3	81	175
	Lovastatine		2				6	8
	Pravastatine	1	1	23			16	41
	Fluvastatine	2			20		12	34
	Atorvastatine	9			1	54	39	103
	no statine before	96	2	24	20	70		212
sum		197	5	48	42	127	154	573

Table A - 10: Prescriptions of proton pump inhibitors

Number of patients with prescriptions of proton pump inhibitors before and after a hospital stay.

Active ingredient (ATC-Code)	before admission		after discharge		Risk Ratio Point estimate	95% Confidence Interval
	Patient with drug	Patient without drug	Patient with drug	Patient without drug		
Omeprazole (A02BC01)	118	2308	114	2312	0.966	0.752 - 1.242
Pantoprazole (A02BC02)	166	2260	261	2165	1.572	1.305 - 1.894
Lansoprazole (A02BC03)	15	2411	10	2416	0.667	0.3 - 1.481
Rabeprazole (A02BC04)	1	2425	3	2423	3	0.312 - 28.822
Esomeprazole (A02BC05)	62	2364	66	2360	1.065	0.756 - 1.499
Proton pump inhibitors	343	2083	436	1990	1.271	1.116 - 1.447

Some patients got more than one different proton pump inhibitor, so the sum of the single active ingredients is greater than the number dedicated as proton pump inhibitors.

Table A - 11: Prescriptions of proton pump inhibitors: Cross table

Cross table of the number of prescriptions of proton pump inhibitors (PPI) before admission and after discharge. Note: For each patient only the last prescription of a PPI before and the first after hospitalisation was counted.

-		<u>after hospital stay</u>						sum
		Omeprazole	Pantoprazole	Lansoprazole	Rabeprazole	Esomeprazole	no PPI after	
<u>before hospital stay</u>	Omeprazole	56	8			3	40	107
	Pantoprazole	3	108			4	46	161
	Lansoprazole	1	2	8			4	15
	Rabeprazole				1			1
	Esomeprazole	3	5			27	24	59
	no PPI before	48	132	1		26	-	207
sum		111	255	9	1	60	114	550

Table A - 12: Aut-idem savings

Absolute and relative (as proportion of total costs) aut-idem savings before admission and after discharge.

	before admission	after discharge	change	
number of patients	2,426	2,426		
total costs	931,428	1,069,569		
total aut-idem savings	46,816	49,586	5.9%	
mean aut-idem savings per patient [€]	19.30	20.44	5.9%	p = 0.022
mean aut-idem savings per patient [% of costs]	5.03%	4.64%	-7.8%	p < 0.017

P-value for Wilcoxon's signed rank test for two paired dependent samples.