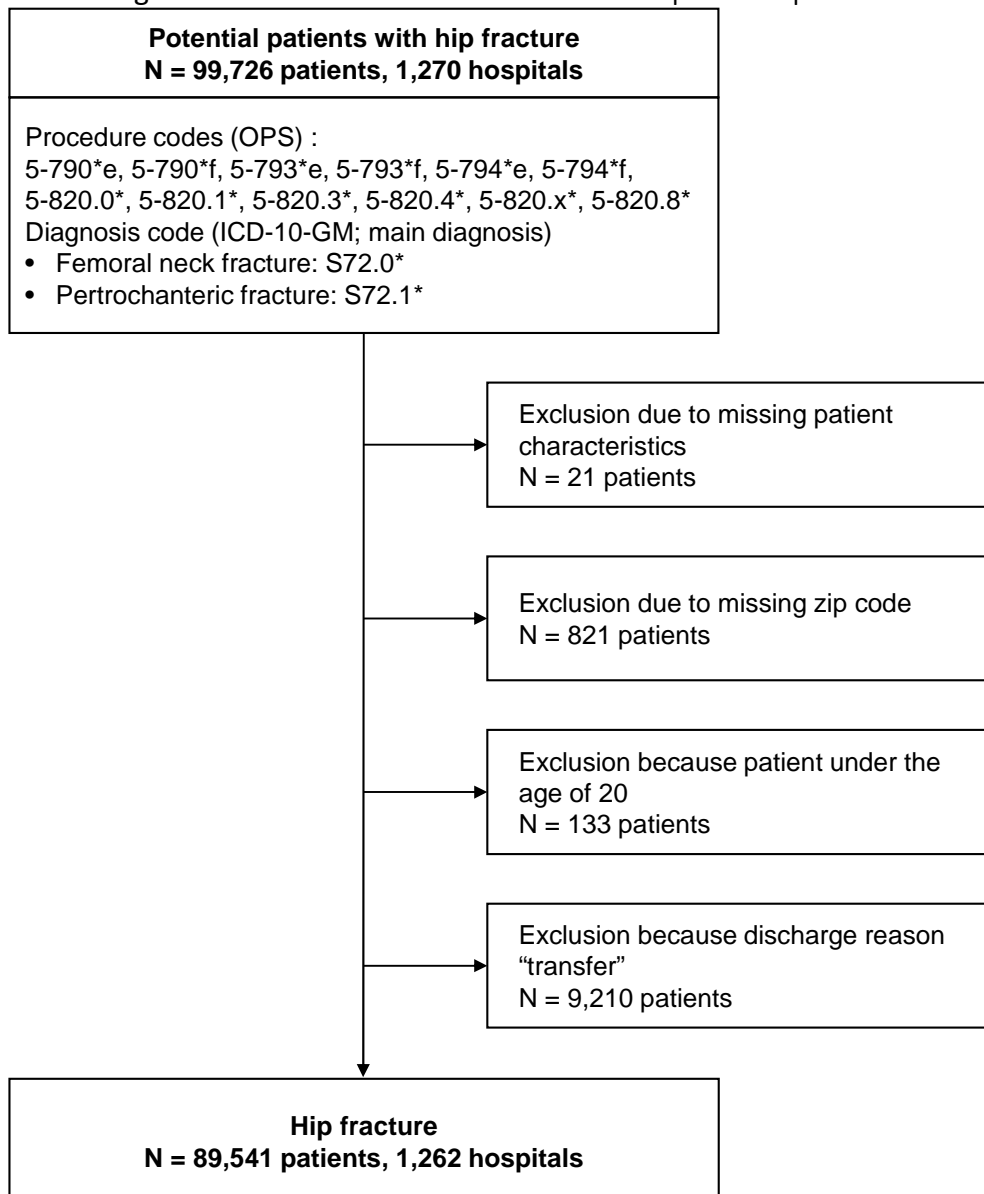


The volume-outcome relationship revisited: Practice indeed makes perfect

(Corinna Hentschker and Roman Mennicken)

Appendix

Figure A1: Inclusion and exclusion criteria for hip fracture patients



Note: * - stands for all possible subcategories

Table A1: Descriptive statistics for hip fracture patients – Elixhauser comorbidities

	Mean	S.D.	Min	Max
Congestive heart failure	0.216	0.411	0	1
Cardiac arrhythmias	0.186	0.389	0	1
Valvular disease	0.043	0.204	0	1
Pulmonary circulation disorders	0.018	0.132	0	1
Peripheral vascular disease	0.047	0.212	0	1
Hypertension, uncomplicated	0.451	0.498	0	1
Hypertension, complicated	0.071	0.256	0	1
Paralysis	0.043	0.203	0	1
Other neurological disorders	0.086	0.281	0	1
Chronic pulmonary disease	0.083	0.276	0	1
Diabetes, uncomplicated	0.152	0.359	0	1
Diabetes, complicated	0.049	0.215	0	1
Hypothyroidism	0.053	0.224	0	1
Renal failure	0.128	0.334	0	1
Liver disease	0.017	0.131	0	1
Peptic ulcer disease excluding bleeding	0.003	0.054	0	1
Lymphoma	0.003	0.055	0	1
Metastatic cancer	0.009	0.094	0	1
Solid tumor without metastasis	0.020	0.140	0	1
Rheumatoid arthritis/collagen vascular diseases	0.014	0.119	0	1
Coagulopathy	0.034	0.180	0	1
Obesity	0.054	0.225	0	1
Weight loss	0.025	0.158	0	1
Fluid and electrolyte disorder	0.225	0.418	0	1
Blood loss anemia	0.015	0.123	0	1
Deficiency anemia	0.016	0.127	0	1
Alcohol abuse	0.036	0.185	0	1
Drug abuse	0.015	0.122	0	1
Psychoses	0.010	0.097	0	1
Depression	0.055	0.227	0	1

Table A2: Marginal effects of Probit and IV-Probit estimates (full models)

	Probit (5)	IV-Probit (10)	IV-Probit (15)
Ln case volume	-0.0123*** (0.0022)	-0.0334*** (0.0061)	-0.0259*** (0.0071)
Age	0.0034*** (0.0001)	0.0035*** (0.0001)	0.0034*** (0.0001)
Male	0.0295*** (0.0019)	0.0300*** (0.0019)	0.0297*** (0.0019)
Admission reason: emergency	-0.0008 (0.0020)	-0.0003 (0.0020)	-0.0006 (0.0020)
transfer	0.0244*** (0.0075)	0.0218*** (0.0074)	0.0226*** (0.0074)
Femoral neck fracture	0.0009 (0.0015)	0.0001 (0.0015)	0.0004 (0.0015)
Winter	0.0043*** (0.0016)	0.0041*** (0.0016)	0.0042*** (0.0016)
Weekend	0.0013 (0.0017)	0.0015 (0.0017)	0.0015 (0.0017)
Ownership: private not-for-profit	0.0015 (0.0022)	-0.0017 (0.0024)	-0.0005 (0.0025)
private for-profit	0.0011 (0.0031)	-0.0014 (0.0035)	-0.0005 (0.0034)
University hospital	0.0031 (0.0070)	0.0000 (0.0069)	0.0012 (0.0069)
Teaching hospital	0.0029 (0.0025)	0.0077*** (0.0029)	0.0059** (0.0030)
Beds: 201-499	0.0084*** (0.0026)	0.0165*** (0.0033)	0.0136*** (0.0035)
≥ 500	0.0094** (0.0037)	0.0235*** (0.0052)	0.0186*** (0.0057)
ICU	-0.0053** (0.0021)	-0.0031 (0.0022)	-0.0039* (0.0022)
Purchasing power per inhabitant	-0.0004 (0.0003)	-0.0001 (0.0003)	-0.0002 (0.0003)
Unemployment rate	0.0010*** (0.0002)	0.0008*** (0.0003)	0.0009*** (0.0003)
Elixhauser comorbidities	Yes	Yes	Yes
Settlement structure indicators	Yes	Yes	Yes
First-stage F-statistic		42.3054	119.6255
Test for endogeneity (p-value)		0.0001	0.0299
Overidentification test (p-value)		0.0999	
Observations	89,541	89,541	89,541
Number of hospitals	1,262	1,262	1,262

Notes: Clustered standard errors (at the hospital level) in parentheses;

* p<0.10, ** p<0.05, *** p<0.01. IV-Probit (10) refers to the IV-probit regression with the instruments number of potential patients and further hospitals in the regional area. IV-Probit (15) refers to the IV-probit regression with the instrument number of potential patients per hospital in the regional area.

Table A3: First-stage regression explaining ln case volume

	IV-Probit (10)	IV-Probit (15)
Potential patients within 0–10 min	0.0025*** (0.0003)	
10–20 min	0.0007*** (0.0001)	
20–30 min	0.0003*** (0.0001)	
Further hospitals within 0–15 min	-0.1011*** (0.0080)	
15–30 min	-0.0226*** (0.0040)	
Pot. patients per hospital between 0 to 15 min		0.0052*** (0.0005)
Age	0.0008*** (0.0002)	0.0010*** (0.0002)
Male	0.0050 (0.0037)	0.0067* (0.0037)
Admission reason: emergency	0.0307** (0.0136)	0.0256* (0.0143)
transfer	-0.0839** (0.0376)	-0.0737** (0.0318)
Femoral neck fracture	-0.0296*** (0.0037)	-0.0335*** (0.0038)
Winter	-0.0081** (0.0034)	-0.0076** (0.0033)
Weekend	0.0059* (0.0032)	0.0070** (0.0033)
Ownership: private not-for-profit	-0.1078*** (0.0276)	-0.1237*** (0.0279)
private for-profit	-0.1342*** (0.0407)	-0.0977** (0.0422)
University hospital	-0.0909 (0.0855)	-0.1145 (0.0862)
Teaching hospital	0.1922*** (0.0301)	0.1831*** (0.0294)
Beds: 201-499	0.4098*** (0.0356)	0.3587*** (0.0350)
≥ 500	0.6331*** (0.0511)	0.5875*** (0.0532)
ICU	0.0301 (0.0296)	0.0633** (0.0302)
Purchasing power per inhabitant	0.0054** (0.0025)	0.0093*** (0.0030)
Unemployment rate	-0.0058** (0.0023)	-0.0056** (0.0023)
Constant	3.7252*** (0.0729)	3.4612*** (0.0779)
Elixhauser comorbidities	Yes	Yes
Settlement structure indicators	Yes	Yes
R ²	0.511	0.500
Observations	89,541	89,541
Number of hospitals	1,262	1,262

Notes: Clustered standard errors (at the hospital level) in parentheses; * p<0.10, ** p<0.05, *** p<0.01.