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The impact of voluntary certification of cancer centers in surgical oncology on the quality of medical care and hospital services planning: a national population-based study

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From insight to impact.

Background and objectives



- In 2003, the German Cancer Society launched a certification program to improve cancer care quality in Germany.
- Hospitals need to meet evidence-based, multidisciplinary, medical, technical, and quality standards that are monitored through annual reporting and regular audits. [1]
- Certifications may serve as an accessible quality signal for patients and referring physicians to make an informed hospital choice [2,3]; necessary condition is a positive association of certification with medical quality and patients being influenced in their hospital choice by cancer certifications.

Our research aims at answering the following question:

➤ “Is treatment in German Cancer Society–certified hospitals associated with lower in-hospital mortality, altered patient travel behavior, and changes in hospital surgical case volume for major oncologic surgeries?”

Data & methods | Several methods used for analysing certification association with mortality, travel time and hospitals' case volumes



Data

Panel data set on patient level – enriched with certification and travel time data

- Retrospective cohort study using German DRG data for adult inpatients undergoing elective cancer surgery from 2011 to 2020. [4]
- Surgeries were grouped as esophageal, lung, gastric, pancreatic, or colorectal resections based on German procedure codes.
- Certification status was obtained from OnkoZert. [5]
- Travel time estimated by fastest car route; patients were classified as “core users” and “bypassers”.



Methods

- Comparative analyses using logistic regression, Student's t-tests, or quantile regression
- **Multivariable logistic regression** for independent association of baseline covariates, including patient profile and hospital certification, with in-hospital mortality and bypassing.
- The effect of cancer certification on case volume was estimated using a **within-hospital fixed-effects model**, controlling for year-fixed-effects and spatial competition index.

Results – in-hospital mortality | Certified hospitals with lower odds for in-hospital mortality – equally true for bypassers

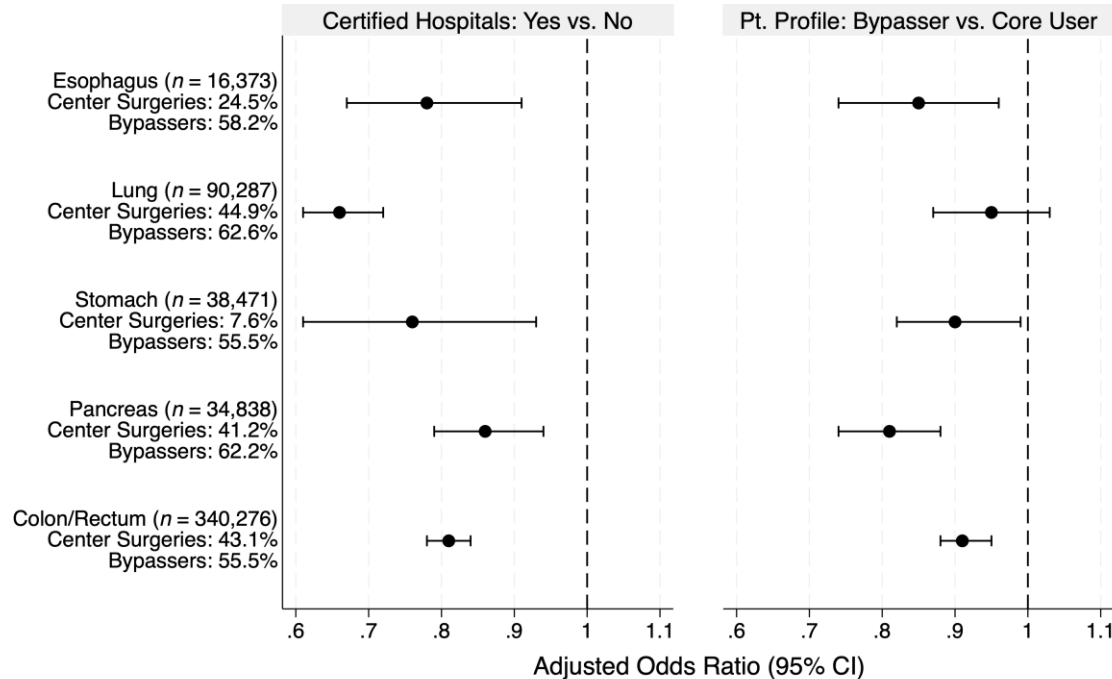


Figure 1. Adjusted Odds Ratios of In-Hospital Mortality Associated with Certification Status and Patient Profile, by Type of Complex Cancer Surgery (Germany, 2011–2020).

Notes: Odds ratios are adjusted for baseline characteristics included as covariates in multivariable logistic regression analysis, including gender, age group, length of stay, Charlson Index, Social Deprivation Index, hospital type, county's median salary, and year of surgery.

Results – hospital case volume | Certification resulted in significant case volume growth for pancreatic & colorectal surgery (2011-2020)

Dependent variable: ln (case volume)					
	Pancreas	Stomach	Esophagus	Colon/Rectum	Lung
Certification	0.119***	0.018	0.049	0.134***	0.094
(SE ¹)	(0.034)	(0.049)	(0.088)	(0.04)	(0.061)
Effect					
in % of avg. case volume	+12.69%	+1.77%	+5.01%	+14.35%	+9.86%
cases	1.23	0.09	0.46	4.81	3.50
<i>Observations</i>	3,193	4,689	1,575	9,205	2,365
<i>Hospitals</i>	462	729	238	1,045	298
<i>R² (within)</i>	0.035	0.034	0.024	0.033	0.023

Table 1. Fixed-effects models - Impact of Certification on Case Volume Growth for Five Cancer Surgeries.

Notes: Results are controlled for spatial competition index and year fixed effects. Statistical significance: *** P-value ≤ 0.01 ; ** P-value ≤ 0.05 ; * P-value ≤ 0.1



Results – hospital case volume | Certification-related case volume growth varied with changes in provider numbers

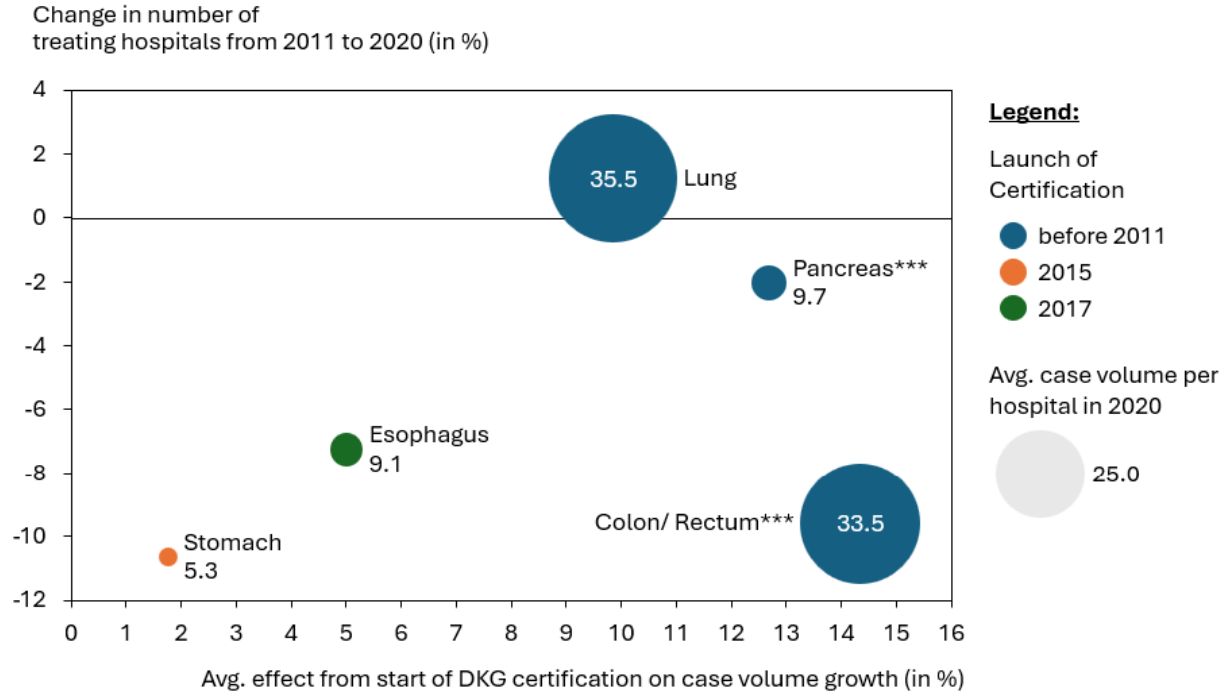


Figure 2. Case Volume Changes (2011-2020) after Certification

Notes: The Y-axis shows the percentage change in treating hospitals; the X-axis shows the estimated certification effect on case volume growth. Bubble size reflects average hospital case volume in 2020, and colors indicate the year each DKG certification program was launched.





Take aways



“Is treatment in German Cancer Society–certified hospitals associated with lower in-hospital mortality, altered patient travel behavior, and changes in hospital surgical case volume for major oncologic surgeries?”

- **Better outcomes:** Certified hospitals showed lower in-hospital mortality across 520,245 complex cancer surgery cases.
- **Patient choice & centralization:** Patients often bypassed local hospitals for certified centers; certification was linked to volume growth for pancreatic and colorectal surgery.
- **Certification is not sufficient:** Lower access among rural and deprived patients highlights the need for complementary policies on volume, reporting, capacity, and access.



However, the German voluntary certification program showed beneficial results – and might be a viable option for other countries

Sources

- [1] Gesundheit Bf. Nationaler Krebsplan. Handlungsfelder, Ziele und Umsetzungsempfehlungen. Bundesministerium für Gesundheit Berlin; 2012.
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