

co-ordinated with the Director of the Institute / Research Unit

**Institute/ Research Unit / Clinical Co-operation Group / Junior Research Group:**  
**Institute of Health Economics and Health Care Management (IGM)**

**PSP-Element:**

S-700014-5053-001, G-505300-001

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**Title of the highlight:**

Regional deprivation in Bavaria: linking a new deprivation index to mortality and cancer incidence on municipality level.

**Keywords:**

Regional deprivation – Index of Multiple Deprivation – cancer – mortality - incidence

**Central statement of the highlight in one sentence:**

Using a newly developed deprivation index, analyses showed positive and significant associations between regional deprivation and general mortality as well as lung cancer and colorectal cancer risk in Bavarian municipalities.

**Text of the highlight:**

Analysis of regional differences in health has become increasingly popular in epidemiological and public health research. Deprivation indices are valuable instruments for the analysis of regional effects on health. The aim was to develop a small-area based, multidimensional Index of Multiple Deprivation for Germany, using Bavaria as a model region. This new Index (BIMD) is based on an established British method and comprises seven deprivation domains using socio-economic, socio-demographic and environmental official data.

The analyses revealed a positive and significant association between regional deprivation and mortality. Highly deprived municipalities showed a significantly higher general mortality risk, both for premature mortality (50% higher risk) and for total mortality (20%) compared to the least deprived municipalities.

Lung cancer and colon cancer are among the most common cancer types in both genders in Germany. Lung cancer is the leading cancer cause of death among men, colon cancer is the second most common cancer cause of death. A number

of studies have found an association between regional deprivation and cancer incidence as well as cancer mortality but this relationship has barely been studied for Germany yet. The analyses revealed that increased lung cancer risk in men and colorectal cancer risk in both genders were associated with increasing regional deprivation. Comparing the most deprived with the least deprived municipalities, the relative risk of men for lung cancer incidence was 40% higher, for colorectal cancer incidence 30% higher. Mortality risk for lung and colorectal cancer was even more than 50% higher for men. Area-based deprivation is significantly associated with cancer risk in Bavaria.

Using this new index, we could demonstrate that regional deprivation is significantly associated with mortality, in particular cancer mortality and with higher cancer incidence in Bavarian municipalities. This new deprivation index is therefore a potentially useful tool for epidemiological and public health related studies in Germany.

**Publication:**

Maier W, Fairburn J, Mielck A. [Regional Deprivation and Mortality in Bavaria. Development of a Community-Based Index of Multiple Deprivation.] Gesundheitswesen. 2011 [Epub ahead of print]

Kuznetsov L, Maier W, Hunger M, Meyer M, Mielck A. Regional deprivation in Bavaria, Germany: linking a new deprivation score with registry data for lung and colorectal cancer. Int J Public Health. 2012 [Epub ahead of print]

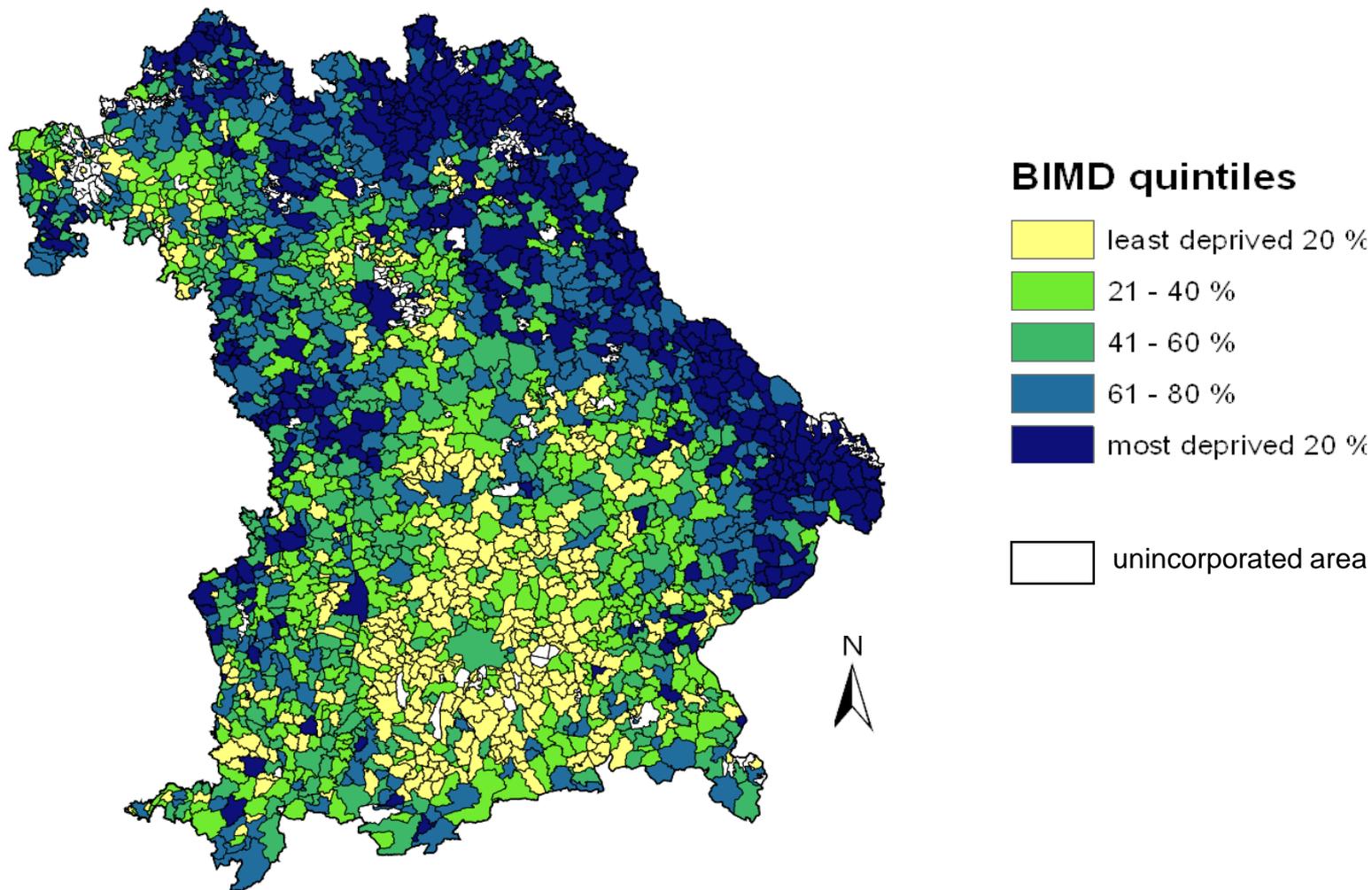
**Taking account of the HMGU mission:**

The study of social and regional disparities on health contributes to increase the understanding of causes of disease and disease mechanisms which affect humans. Developing new tools for the analysis of these inequalities is useful for epidemiological and public health related studies.

**The internal HMGU co-operation partners with whom the highlight was compiled, if appropriate:**

# Bavarian Index of Multiple Deprivation (BIMD) on municipality level

IGM Institut



## Relative risks (RR) for premature mortality and total mortality in Bavaria depending on the degree of deprivation (n=2,056 municipalities)

BIMD quintiles	Premature mortality (<65 yrs.)			Total mortality		
	RR	95% CI	p value	RR	95% CI	p value
1 Ref	1,00			1,00		
2	1,08	1,02-1,15	0,0128	1,02	0,99-1,05	0,2228
3	1,14	1,08-1,21	<0,0001	1,06	1,03-1,09	<0,0001
4	1,29	1,22-1,36	<0,0001	1,14	1,10-1,17	<0,0001
5	1,49	1,42-1,57	<0,0001	1,21	1,18-1,25	<0,0001

BIMD quintiles, Index of Multiple Deprivation for Bavaria (quintile 1= lowest degree of deprivation); Ref, reference group; RR, relative risk (Poisson regression); 95% CI, 95% confidence interval; (Scale parameter estimated).

# Relative risks for cancer incidence and mortality (lung and colorectal cancer) in Bavarian municipalities, 2003-2006

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Deprivation quintiles	Incidence		Mortality	
	Lung cancer	Colorectal cancer	Lung cancer	Colorectal cancer
	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<b>Men</b>	n = 10,973	n = 16,151	n = 7,487	n = 4,190
1 (least deprived) <sup>a</sup>	1	1	1	1
2	<b>1.1 (1.03–1.21)</b>	<b>1.1 (1.01–1.16)</b>	<b>1.1 (1.01–1.24)</b>	1.0 (0.90–1.18)
3	1.1 (0.98–1.15)	<b>1.1 (1.02–1.16)</b>	<b>1.1 (1.01–1.22)</b>	1.1 (1.00–1.30)
4	<b>1.3 (1.22–1.43)</b>	<b>1.3 (1.17–1.34)</b>	<b>1.4 (1.31–1.58)</b>	<b>1.5 (1.31–1.68)</b>
5 (most deprived)	<b>1.4 (1.29–1.49)</b>	<b>1.3 (1.22–1.38)</b>	<b>1.5 (1.41–1.68)</b>	<b>1.6 (1.40–1.76)</b>
<b>Women</b>	n = 4,632	n = 13,424	n = 2,963	n = 4,000
1 (least deprived) <sup>a</sup>	1	1	1	1
2	0.9 (0.80–1.02)	1.0 (0.95–1.11)	1.0 (0.77–1.05)	1.0 (0.89–1.18)
3	1.1 (0.97–1.20)	<b>1.1 (1.02–1.18)</b>	1.1 (0.95–1.24)	1.1 (1.00–1.30)
4	1.0 (0.87–1.09)	<b>1.2 (1.09–1.27)</b>	1.1 (0.91–1.21)	<b>1.4 (1.19–1.54)</b>
5 (most deprived)	1.0 (0.87–1.07)	<b>1.2 (1.11–1.27)</b>	1.1 (0.94–1.21)	<b>1.3 (1.19–1.51)</b>