**Electronic Supplementary Material (ESM)**

The formula to calculate the accessibility index (AI) is as follows:

$$AI\_{x}=\sum\_{y\in (d\_{xy}\leq C) }^{}\frac{S\_{y}∙ f \left(d\_{xy}\right)}{\sum\_{x\in (d\_{xy}\leq C)}^{}P\_{x}∙ f \left(d\_{xy}\right)}$$

where *x* is the population location (centroid of a GPWv4 pixel) and *Px* is the population count at location *x*. The capacity *Sy* represents the number of intensive care beds at hospital location *y*. Hospital beds have been shown to be accurate surrogates of capacity and are commonly used in healthcare research and planning [1]. The maximum catchment size *C* is set to 120 minutes by car, which is in line with current literature regarding the inpatient sector [2]. The distance decay function *f (dxy)* represents the declining probability that patients will utilize hospitals with increasing travel time *d* (in minutes by car). We applied the Gaussian function with fast decay and four travel time zones (in minutes: <20, 20-39, 40-59, ≥60) [3].

In simplified terms, two steps are necessary to calculate the AI. First, all population pixels within each hospital catchment are summed (accounting for distance decay) and a ratio of hospital beds to population size is calculated for each hospital. Second, the ratio values from all of the overlapping hospital catchments are summed for each population pixel. For a more detailed description see the original publication of the E2SFCA method by Luo et Qi [4].

References:

1. Liu J, Bellamy GR, McCormick M (2007) Patient bypass behavior and critical access hospitals: Implications for patient retention. J Rural Health 23:17–24. doi: 10.1111/j.1748-0361.2006.00063.x

2. Bauer J, Groneberg DA, Maier W, et al (2017) Accessibility of general and specialized obstetric care providers in Germany and England: an analysis of location and neonatal outcome. Int J Health Geogr 16:44. doi: 10.1186/s12942-017-0116-6

3. Wang F (2012) Measurement, Optimization, and Impact of Health Care Accessibility: A Methodological Review. Ann Assoc Am Geogr 102:1104–1112. doi: 10.1080/00045608.2012.657146

4. Luo W, Qi Y (2009) An enhanced two-step floating catchment area (E2SFCA) method for measuring spatial accessibility to primary care physicians. Health Place 15:1100–1107. doi: 10.1016/j.healthplace.2009.06.002