**Electronic Supplementary Material (ESM)**

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

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:

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