Ensure healthy lives and promote well-being for all at all ages

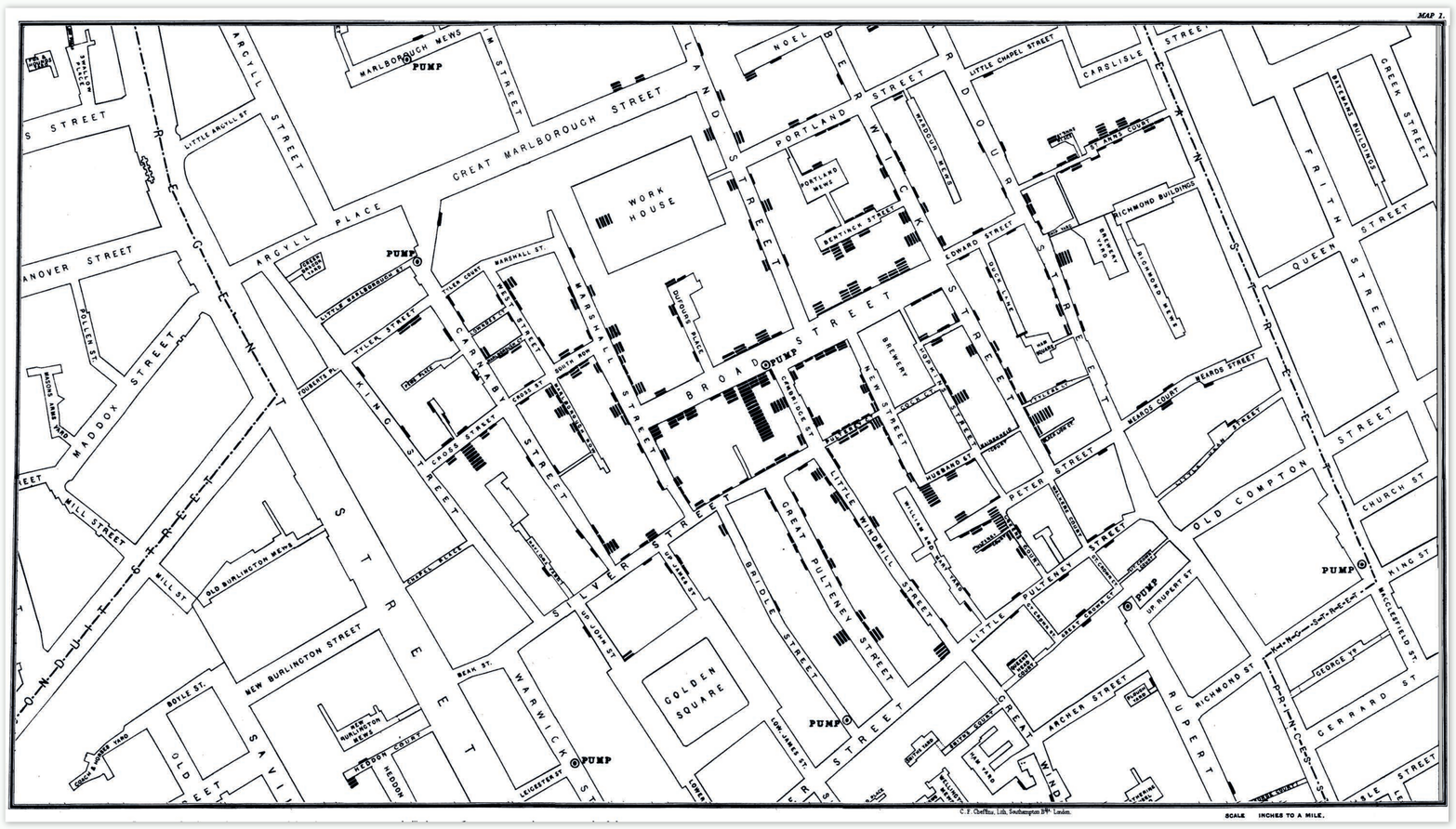
3 GOOD HEALTH AND WELL-BEING

THE GLOBAL GOALS
For Sustainable Development

Targets
By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

Indicators
Malaria incident cases per 1,000 person years.
Malaria deaths per 100,000 population could be presented with the methods shown below. The bottom map show additionally an estimation of exposure risk to malaria.

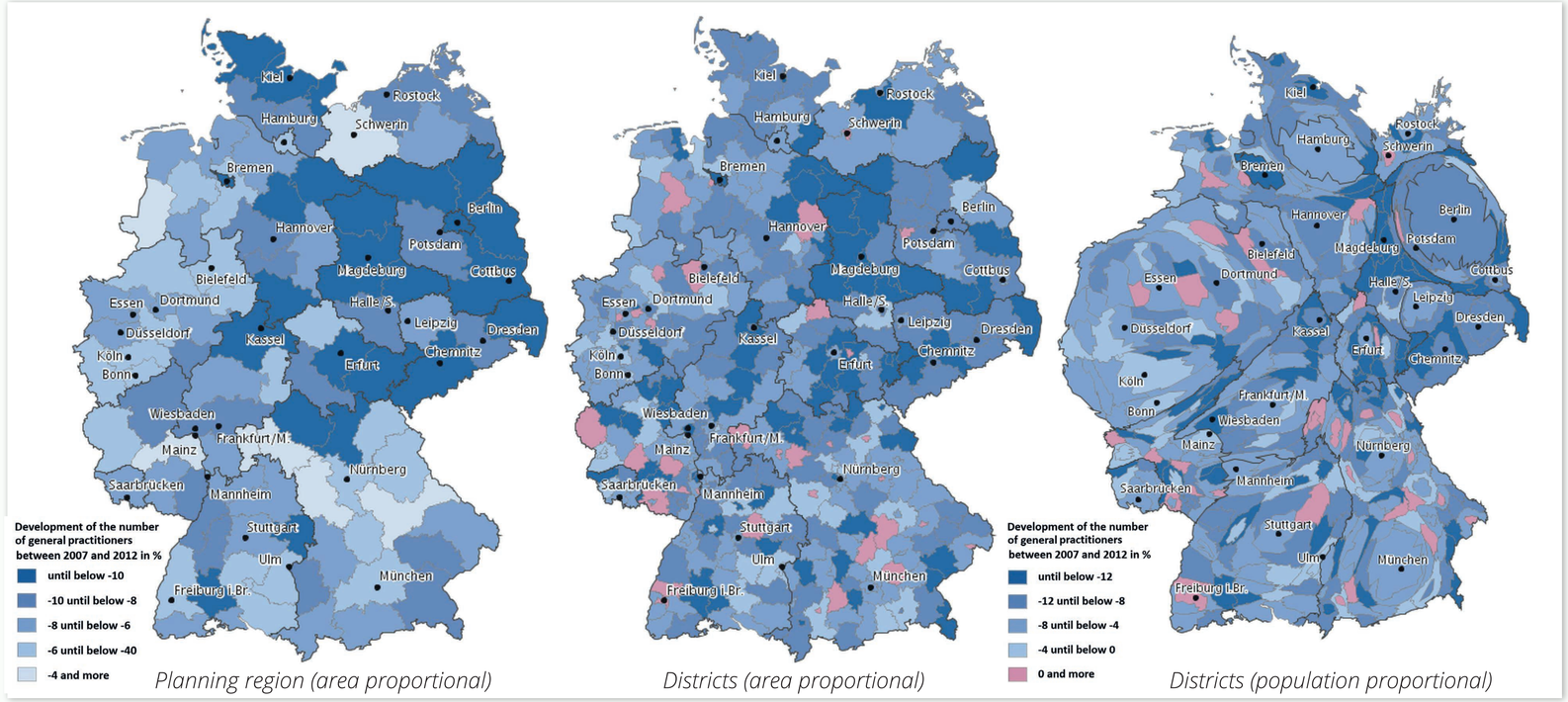
The choice of the administrative unit will influence the patterns visible in the map



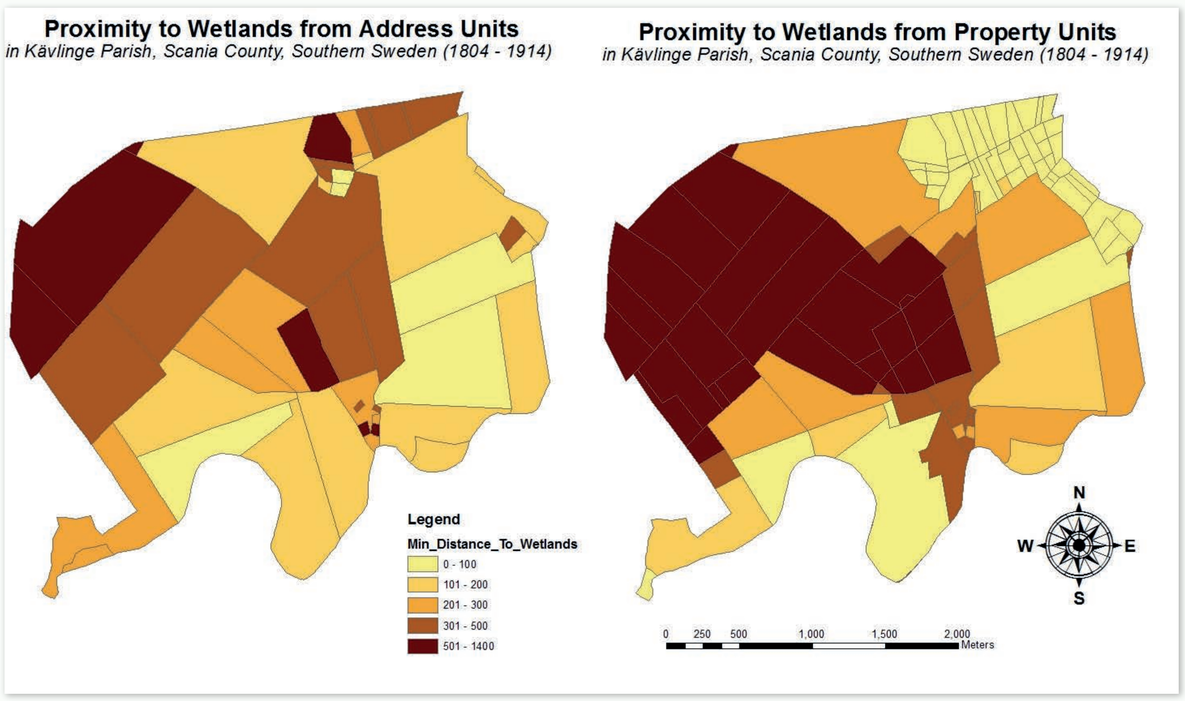
Health studies and cartography: an old story
The map shown on the left is famous for being one of the first epidemiology maps. It was published in 1855 by Dr John Snow, a medical doctor working on the mode of propagation of the cholera. The map shows occurrences of death by cholera in an area of London during the severe outbreak of 1854. Each death is displayed as a black bar, deaths in the same house being piled up perpendicularly to the street in which the house is situated. Water pumps are also shown.
The map shows that a big number of deaths occurred close to the Broad Street water pump. This is because cholera is indeed transmitted by drinking water (which was not acknowledged at this time), and because the water of this pump had been contaminated by cholera at the beginning of the outbreak. [1] [2]

Level of detail matters – Two illustrative case studies

Medical care in Germany - change in number of doctors between 2007 and 2012 in %
The three different maps show the development of the number of general practitioners between 2007 and 2012 in percent. All three maps are based on the same statistical data, but they look different since they are using different administrative units. The resulting patterns do not look the same, which might cause different interpretations and decisions. This effect is called the “modifiable areal unit problem” (MAUP). Only the map on he right uses areal units which are proportional to the number of population. [3]



Planning region (area proportional) *Districts (area proportional)* *Districts (population proportional)*



Historical demography – investigating correlation between proximity to wetlands and child mortality
Studies in historical demography aim at finding relationships between living conditions and demographic variables (fertility, mortality, etc.). To include the geographic conditions into these studies it is required to geocode the population and quantify the geographic context.
In an ongoing project at Lund University, Sweden 57,000 individuals from the Scanian Economic Demographic Database (SEDD) (during 1813-1914) have been geocoded. Studies using the geocoded SEDD database have revealed that the soil conditions (on micro-level) affected child mortality. Since malaria was a threat in Sweden during the 19th century it was investigated if closeness to wetlands affected child mortality. Such relationship was found when population is geocoded on property unit level, but not if it is geocoded on the coarser address level. The figure illustrates the variation of the geographic context variable on these two geographic levels. [4]

The ICA **Commission on Generalisation and Multiple Representation** works on the modelling and management of geographic information at different levels of details, and the automated transformation of the information from one level of details to coarser levels of details by means of simplification and caricature – an operation called generalisation.

[1] Brody H., Russell Rip M., Vinten-Johansen P., Paneth N., Rachman S. (2000). Map-making and myth-making in Broad Street: the London cholera epidemic, 1854. The Lancet, Vol. 356, July 1, 2000, p. 64-68.
McLeod K. (2000). Our sense of Snow: the myth of John Snow in medical geography. Social Science and Medicine, vol. 50, p. 923-935.

[2] Snow J. (1855). On the mode of communication of cholera. London: John Churchill, 1855 (2nd edn). Shiode N., Shiode S., Rod-Thatcher E., Rana S., Vinten-Johansen P. (2015). The mortality rates and the space-time patterns of John Snow’s cholera epidemic map. International Journal of Health Geographics, 2015, 14:21, DOI .1186/s12942-015-0011-y.

[3] Maps extracted from:
Federal Institute for Research on Building, Urban Affairs and Spatial Development
http://78.47.125.117/raumbeobachtung/

[4] Contributors of the study: Lund University, Department of Physical Geography and Ecosystem Science, (L.Harrie, F.Hedefalk, K.Pantazatou), Centre for Economic Demography and Department of Economic History (T.Bengtsson, L.Quaranta, P.Svensson)

ICACI
Commission on Generalisation and Multiple Representation
Chair: Dirk Burghardt *e-mail: firstname.lastname@tu-dresden.de*
Vice-chair: Cecile Duchene *e-mail: firstname.lastname@ign.fr*

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