Ensure access to water and sanitation for all

6 CLEAN WATER AND SANITATION

THE GLOBAL GOALS
For Sustainable Development

Target

By 2030, achieve universal and equitable access to safe and affordable drinking water.
By 2030, achieve access to adequate and equitable sanitation and hygiene for all.

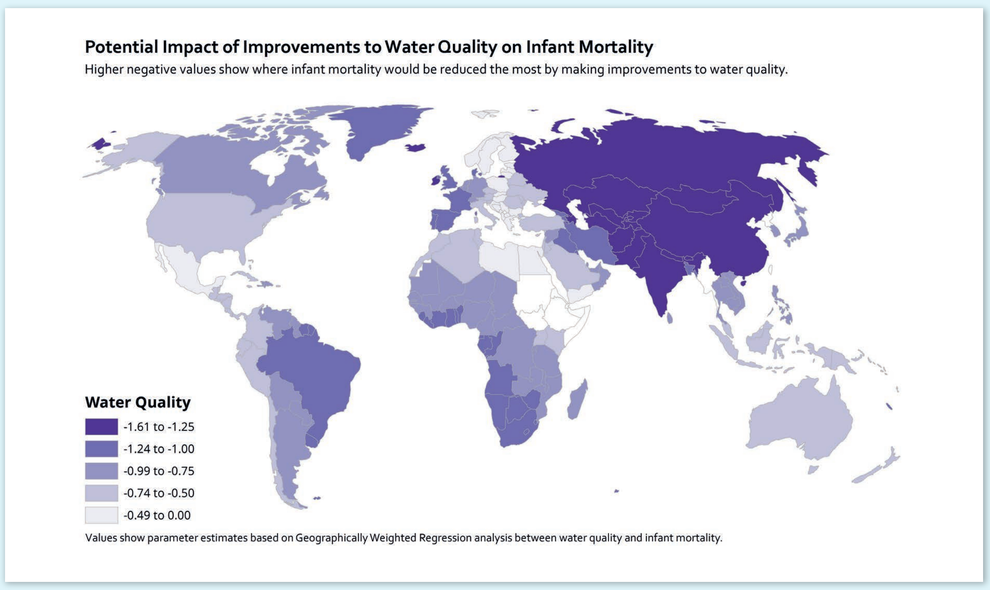
Indicator

Percentage of population using safely managed drinking water services.
Population with a hand washing facility with soap and water in the household.
We describe geographic relationships of these two indicators to rates of maternal and infant mortality.

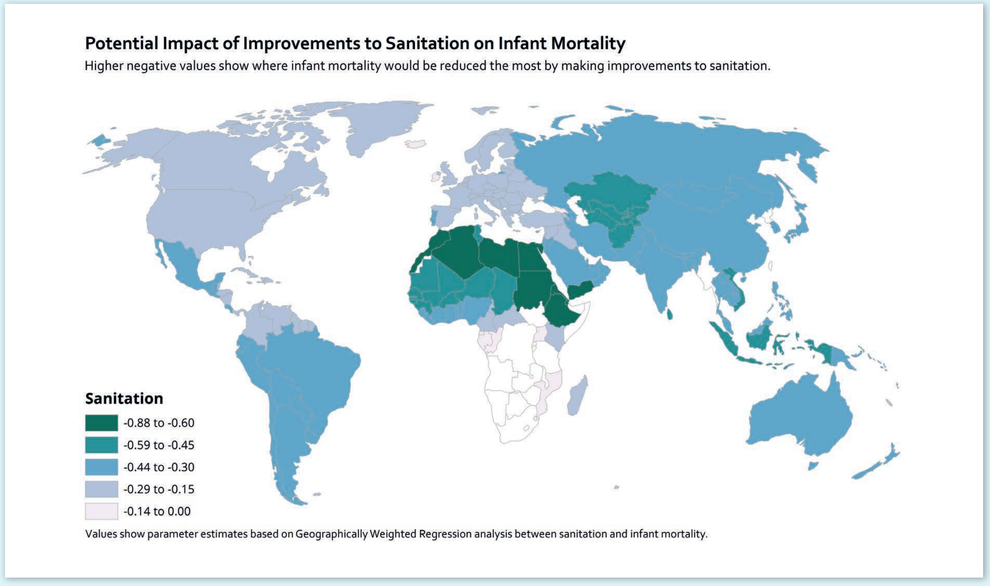
Combining spatial analysis with mapping reveals geographic patterns that statistics alone cannot identify

This example highlights the utility of exploring the geographic perspective in global problems to reveal patterns and suggest new locations for intervention – something that a purely statistical study (such as [1]) cannot do. The combined approach of geographic analysis and visualisation using methods from [2,3] helps us understand **where in the world the improvements to water and sanitation could have the most impact**, as well as in where we would not expect it to make a larger difference.

Geographic analysis of infant mortality rates

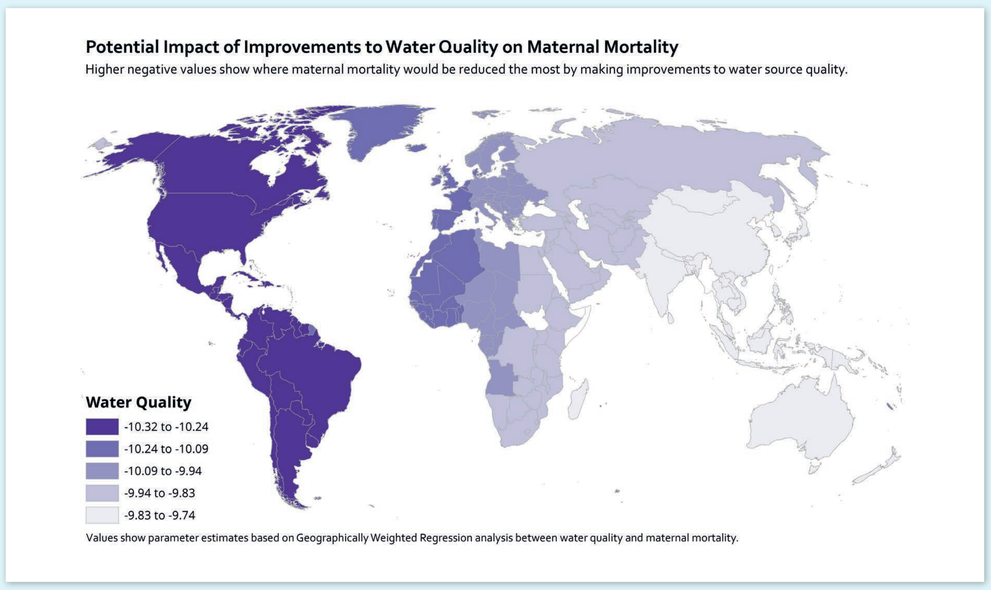


Asia and parts of South America and Sub-Saharan Africa are potential targets where better access to water would lower infant mortality.

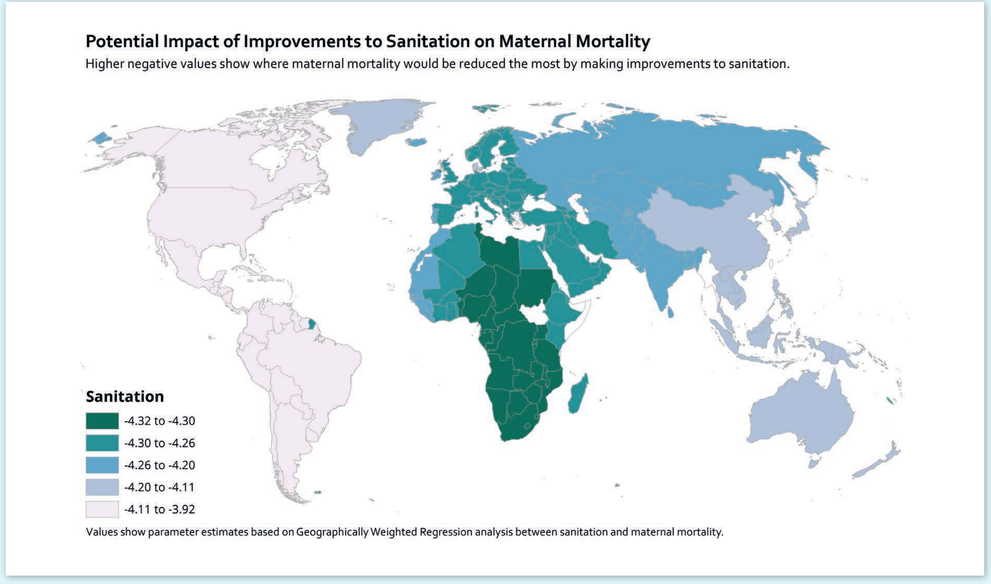


Better access to sanitation would lower infant mortality rates in Northern Africa and parts of Southeast Asia.

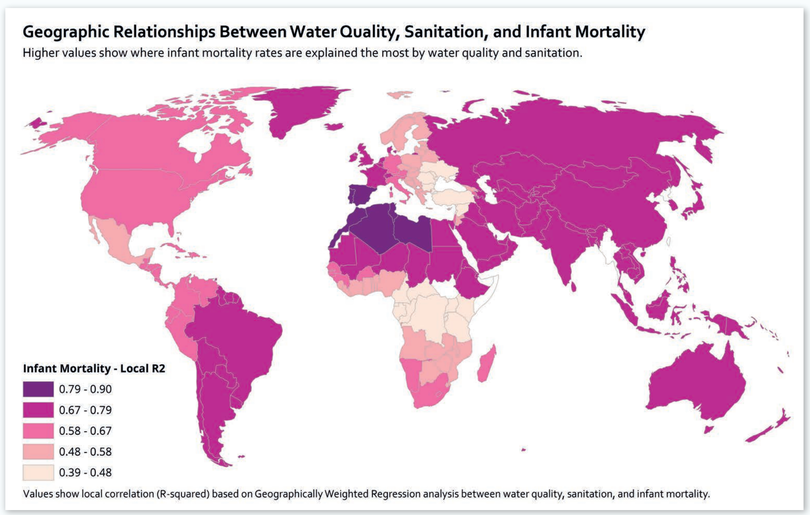
Geographic analysis of maternal mortality rates



Better access to water would lower maternal mortality rates across both Northern and Southern America, western and central Africa and in Europe.

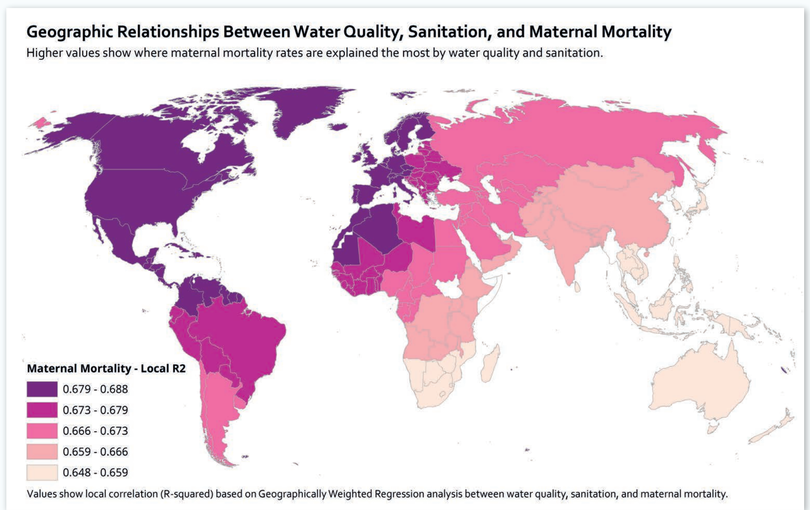


In Africa, Middle East and Eurasia the maternal mortality would decrease the most with **improved access to sanitation.**



Reliability of geographic analysis:

These two maps help us understand how well our spatial statistical models represent the relationships between infant and maternal mortality and rates of access to water and sanitation. The darker the purple, the more representative our models are. The lighter the colour, the less we managed to explain – in these areas, there may be other factors beyond access to sanitation and clean water that can better explain the rates of infant and maternal mortality.



The ICA **Commission on Visual Analytics** seeks to advance the state of the art in analytical reasoning supported by visual interfaces to geographic information. Through the coupling of computational analysis and interactive visualizations of geospatial data, the Commission encourages new research to solve major human and environmental problems.

Data and information sources:

We used data from 2010 [1], sourced from WHO (http://www.who.int), World Bank (http://data.worldbank.org/) and Natural Earth (http://www.naturalearthdata.com). The data were analysed and visualised using Geographically Weighted Regression [2, 3].

1. Cheng JJ & al. 2012, An ecological quantification of the relationships between water, sanitation and infant, child and maternal mortality. Environmental Health, 2012, 11:4.
2. Fotheringham AS et al., 2002, Geographically Weighted Regression. Chichester, England ; Hoboken, NJ, USA: Wiley.
3. Demšar U & al., 2008, Combining Geovisual Analytics with Spatial Statistics: the example of GWR. The Cartographic Journal, 45(3):182–192.

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WE MAPS
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