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Title: Geographic clusters of high use of preoperative chest radiography in Switzerland
Presenting Author(s): Oliver Gruebner¹
Institutes: 1) University of Zürich, EBPI
2) Helsana Insurance Company
Authors (s): Oliver Gruebner¹, Wenjia Wei¹, Viktor von Wyl¹, Beat Brüngger², Holger Dresse¹, Agne Ulyte¹, Eva Blozik², Caroline Bähler², Matthias Schwenkglenks¹
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Abstract

Background: Preoperative chest radiography is discouraged by most clinical recommendations. We have previously shown that there is substantial variation in the implementation of these recommendations in Switzerland, but do not know much about the regions where overuse is most prevalent. Furthermore, knowledge about locational risk factors is lacking. We applied a spatial epidemiological approach and 1) investigated spatial clusters of risk of preoperative chest radiography, 2) assessed whether the clusters persisted after adjusting for known influences, and 3) explored the differential risk in the clusters.

Methods: Based on Swiss health insurance claims data, we selected persons who underwent surgery during 2013 to 2015 and identified those patients who received preoperative chest radiography (cases). We applied a well-established spatial scan statistic (Satscan) to find spatial clusters of cases at the Medstat level (N=705). We assumed a Poisson distribution and adjusted for previously identified socio-demographic, clinical, insurance-, and healthcare provider-related influences.

Results: We found two clusters with the most likely cluster exhibiting a radius of 46 km in the German speaking part of Switzerland and a relative risk of 1.36 inside the cluster versus outside. The second likely cluster had a radius of 24 km and was found in the French speaking area of the country, exhibiting a relative risk of 1.92 inside the cluster versus outside. These clusters persisted when we adjusted for the previously identified risk factors and 19 additional clusters emerged mainly in the same areas but with different sizes and risks.

Conclusion: High use of preoperative chest radiography is spatially concentrated in specific areas of Switzerland. This is not explained by previously identified influences. Our spatial epidemiological approach helps to identify potential overuse and to monitor the implementation of clinical recommendations in subnational regions.