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GeoMed 2017: deeper insight from big data and small areas

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This was the theme of the international congress held in Porto, Portugal, in September 2017, the 10th edition of GeoMed. In the 20 years since the first edition, the congress has become the leading forum for new methods and approaches to reveal the role of space, geography, place, and environment in public health issues. It was another excellent meeting this year. GeoMed 2017 convened not only statisticians, as in the earlier editions, but also geographers, computer scientists, and public health professionals interested in the discussion on new methodologies for the treatment and spatial analysis of complex data. The number of participants doubled this year in comparison to the last edition, attracting researchers from 28 countries and five continents, with an excellent balance between the fields: 37% from statistics, 27% from public health, 25% from geosciences, and 11% from computer sciences.

One highlight was the evolution of methods and databases. For example, one of the pre-congress mini-courses featured the new R library (The R Foundation for Statistical Computing, Vienna, Austria; http://www.r-project.org) for spatial data modeling. The other mini-course focused on Google Earth Engine, with free access, which allows tweaking and combining information obtained from remote sensing on a planetary scale, allowing studies that would be impossible in an isolated computer environment. Innovative approaches in the field of health surveillance provided the focus for thematic sessions and numerous posters. Statistical modeling, traditionally the strongest point of the congress, was also full of new approaches: spatially dependent survival analysis, spatial-temporal models capable of identifying trends and clusters, both in space and in time, e.g., epidemic outbreaks, as epidemiologists would say [1].

GeoMed also fostered reflection on general guidelines for articles focusing on the relationship between geographic space and health that are submitted to CSP. On the one hand, there is an evident need for posing clear questions: Why should we investigate spatial localization? What is the hypothesis? CSP often receives articles that are like academic exercises in which geographic information systems (GIS) and some spatial statistics are used inadequately, or in a way that is unclear to the reader. Meanwhile, the field's methods have progressed. If there was only one possible method for spatial analysis 15 or 20 years ago (for example, to detect the presence of spatial dependence with statistical tests), this does

not justify limiting current studies to the same methods today, since they fail to reflect the state of the art and are insufficient for answering today's research questions. It would be the equivalent of ignoring that one can use a multiple regression model to estimate the strength of association, while limiting the study to testing whether the mean values of two groups differ. Articles on modeling that consider spatial localization need to describe their questions and hypotheses clearly in the introduction. And the method should be adequate for the question. In fact, this recommendation merely expands the recommendations that are already explicit for epidemiological articles in general, summarized in the instructions to authors.

In the field of epidemiological surveillance, GeoMed 2017 also provided an opportunity to learn about fascinating experiences using innovative tools. CSP is interested in receiving articles along this line that can answer such questions as the following: Would there have been some way to detect the microcephaly epidemic earlier? [2]; How to deal with reporting delay?; Is it possible to use social networks to improve the prediction of outbreaks [3]?

Environmental epidemiology itself is a highly interesting area. But again, we need to go beyond simply identifying the association between exposure and outcome, for example pollution as a risk factor for hospitalizations from respiratory diseases. This has already been demonstrated. We need to discuss the integration of multiple data sources, from images obtained from sensors onboard satellites to data from local stations, in order to improve the accuracy, precision, and spatial resolution of estimates of pollutants. We need to advance the knowledge on other health problems caused by pollution [4].

The geography/health interface is old, and the cholera map in 19th-century London (U.K.) is familiar to all of us. We should also note that Brazil participated extensively in this interface from the late 1990s to the mid-2000s [5]. CSP is interested in attracting articles with questions on the environment's role in health, about how to improve our capacity for early detection of spatial-temporal clusters, about where to allocate health services, about patients' access and trajectory to services, among others. The field is vast, interesting, and relevant.

1. Pina MF, editor. GeoMed 2017. International conference on spatial statistics, spatial epidemiology and spatial aspects of public health. http://www.i3s.up.pt/geomed2017/.
2. Barcellos C, Xavier DR, Pavão A, Boccolini C, Pedroso FPM, Romero D, et al. Increased hospitalizations for neuropathies as indicators of zika virus infection, according to health information system data, Brazil. Emerg Infect Dis 2016; 22:1894-9.
3. Marques-Toledo CA, Degener CM, Vinhal L, Coelho G, Meira W, Codeço CT, et al. Dengue prediction by the web: tweets are a useful tool for estimating and forecasting dengue at country and city level. PLoS Negl Trop Dis 2017; 11:e0005729.
4. Beil L. The list of diseases linked to air pollution is growing. Science News 2017; 192(5). https://www.sciencenews.org/article/list-diseases-linked-air-pollution-growing.
5. Carvalho MS, Souza-Santos R. Análise de dados espaciais em saúde pública: métodos, problemas, perspectivas. Cad Saúde Pública 2005; 21:361-78.