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Medical Geology and Geochemistry teaming up to achieve equity and social resilience in a post-COVID-19 world

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COVID-19 exposed and intensified long-standing social, economic, and environmental inequalities worldwide. While the first affected were higher-income populations, a rapid spread into low-income and disadvantaged communities later exposed profound inequities in access to health care, clean water, and safe environments. At the same time, immigration, driven by social conflicts in several countries, also contributed to creating pandemic-driven disruptions that altered traditional patterns of resource use, waste generation, land use, and environmental contamination, additionally creating a whole new and unevenly distributed set of geochemical risks. From a Medical Geology perspective, these dynamics highlighted the essential societal role that Geochemistry should play in understanding how geological materials, environmental processes, and social vulnerability interact to affect global public health. Microplastics and emerging contaminants, as well as medical and plastic waste, have soared in water resources, intensifying pressure on ecosystems during the post-COVID-19 economic recovery and creating complex exposure pathways affecting already impoverished populations. Geochemistry, along with Geographic Information Systems (GIS), Remote Sensing, and data-based tools such as Machine Learning and Deep Learning, collaborated to provide fair and accessible approaches to environmental problems. Thus, combining geochemical data (e.g., groundwater quality and toxic element distributions) with epidemiological and sociodemographic indicators (e.g., income and education) can help develop predictive tools to identify populations at increased risk of exposure to naturally occurring and anthropogenic contaminants, even in regions with fragmented or limited data. These approaches support evidence-based prioritization of interventions, improved risk communication, and more informed policy engagement, thereby helping decision-makers everywhere. Even more important is translating geochemical knowledge into clear narratives for education, outreach, social service, and civic engagement. This, since cause-and-effect frameworks linking geology, exposure, and health outcomes can strengthen science communication, empower local and Original/Indigenous communities, helping eliminate barriers to participation in scientific decision-making. Allowing and accepting the social dimensions of science is critical for confronting contemporary global challenges. Multidisciplinary research should help us address both new and old problems. Medical Geology provides a solid framework for connecting geochemical processes to societal resilience, advancing open, inclusive science, and ensuring geochemistry contributes to achieving health equity and sustainable development globally.