Honing the three Vs of big data in medicine: Volume, variety and velocity

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In recent years, the use of big data in health care has become more prevalent, and one area where it is proving particularly useful is in precision medicine. Precision medicine aims to provide more personalized health care by using large amounts of data to gain a deeper understanding of diseases.

Research published in the *International Journal of Management Concepts and Philosophy* has focused on the potential limitations of precision medicine and explores how it might be better integrated with clinical data, biomarker information, and genetics to better understand and so treat disease. Simone Malekar of the Oxford Internet Institute at the University of Oxford, UK and Shamira Malekar and Hung Chu of the Borough of Manhattan Community College in New York, U.S., examine some of the problems seen when handling big data, including the issues of data ownership and potential bias.

The team also considers how to ensure that the information revealed by big data in the context of precision medicine using advanced computational techniques is as transparent as possible and explained to patients and health care providers.

Precision medicine treats each patient as an individual and uses the best available tools to help create a personalized medical treatment for that patient based on their individual characteristics, their genetics, environment, and lifestyle. It requires large amounts of data, big data, such as clinical information, biomarkers and test results, and genetic data , to provide a deeper understanding of the disease and to identify more targeted and effective therapies.

The potential of this new approach is not only to improve the patient's prognosis but also to accelerate medical research and perhaps even reduce the overall cost of health care. Commonly precision medicine driven by big data is proving highly effective in treating certain types of cancer, such as breast cancer and malignant melanoma.

To move forward with precision medicine more broadly, we need to be able to handle big data more effectively than ever before and to understand the implications of using it. Big data refers to large, complex, and diverse sets of information that too big to manage and process with

conventional data processing methods. Big data means volume, variety, and velocity—lots of different types of data generated rapidly, in other words.

More information: Hung Chu et al, The perils of big data: understanding the usage in precision medicine, *International Journal of Management Concepts and Philosophy* (2023). DOI: 10.1504/IJMCP.2023.10053877

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