Three innovations offer hope for enhanced drug safety in the future

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Adverse drug reactions are harmful to patients and a major burden for healthcare providers, governments and the pharmaceutical industry. But promising new breakthroughs in drug development and health monitoring may enhance drug safety in the future, according to an editorial to be published in the next edition of the *British Journal of Clinical Pharmacology*.

Adverse drug reactions have been around for as long as mankind has been taking medicines, but there is concern they are now presenting an increasing risk to patients and a growing burden on healthcare systems. Two major reasons for this are drugs becoming more complex in their mode of action and an ageing population taking a greater variety of medicines.

It has been estimated that one-in-seven patients may suffer an adverse drug reaction from their medications. In addition, a recent report from the British Pharmacological Society drew attention to the many hospital admissions associated with adverse drug reactions, which are conservatively estimated to cost in excess of £637 million ($999 million; €877 million) each year in England alone.

Adverse drug reactions are seen in patients of all ages, although the youngest and eldest are at greatest risk. They are a problem in both the developed world and the developing world, and they are not confined to conventional medicine, as they can occur with complementary and alternative therapies.

Scientists involved in the discovery and development of new medicines are increasingly good at identifying common adverse drug reactions. However, identifying the full range of rarer reactions that might occur, for example, as a result of a drug interacting with other drugs in a specific person obviously presents a much greater challenge.

Fortunately, three new innovations in drug development and health monitoring could help to meet this challenge. These innovations are:

- Electronic medical records, which are increasingly being used to store patient data and are a valuable resource for scientists;
- Informatics: computer-based statistical tools that can analyse data from medical records and other sources, such as academic studies and even social media, to pick out hidden trends in adverse drug reactions;
- Personalised medicine, in which genetic information is used to target drugs at very specific patient populations.

"Informatics and large administrative databases offer unique forms of signal detection to find new patterns of adverse events, while there are new insights both in vitro and from epidemiological studies which suggest how to better identify patients and populations at increased risk," explains Michael Rieder, professor of clinical pharmacology at the University of Western Ontario, Canada, and one of the authors of the editorial. "These innovations offer great potential in identifying, treating and hopefully preventing adverse drug reactions in the common pursuit of better drug therapy for all."

"Given the importance of drugs in modern medicine, the increasing awareness of the impact of adverse drug reactions and the potential for innovation in clinical pharmacology to reduce this risk, a themed issue of the *British Journal of Clinical Pharmacology* was in my view important, not only to address the burden but also to point to directions to enhance

drug safety," he adds.

More information: "Adverse drug reactions." *Brit J Clin Pharm*. DOI: 10.1111/bcp.1269

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