

Understanding multimorbidity in primary health care

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Quantitative and qualitative research has documented the burden of multimorbidity on patients, caregivers, providers, and broader health and social systems in developed countries.¹⁻³ While qualitative research can provide much-needed insight into individual patients, quantitative research allows us to examine multimorbidity in large groups. Electronic medical record (EMR) data are key to a population-level, yet clinical, understanding of these complex patients. Internationally, EMRs are increasingly forming databases of longitudinal, point-of-care information for thousands, even millions, of patients. The Canadian Primary Care Sentinel Surveillance Network (CPCSSN) is currently the only pan-Canadian EMR database. It collects de-identified health information on primary health care (PHC) patients with chronic diseases across the country; these data unite a public health and PHC perspective (point-of-care data combined into a population-level data set).⁴ CPCSSN EMR data, from more than 1 million patients, are extracted quarterly and provide real-time insight into PHC patients' ongoing health issues and health care use, holding information not available through population surveys or administrative databases. This uniqueness demands that researchers manage, analyze, and interpret the data appropriately.

There are specific challenges in multimorbidity research. First, there is no consensus on how to define *multimorbidity*; researchers must adopt a definition that can be populated by EMR data. They must also determine where the data is in the database: problem lists, billing codes, encounter diagnoses, or medications. Validated algorithms to identify true cases of individual chronic diseases within EMR data have been developed⁵; additional algorithms would provide a starting point for more valid and reliable case identification. As these data are recorded for clinical not research purposes, researchers must consider the effects of missing data on statistical analyses and eventual estimates (eg, diagnostic codes might not be recorded at all or might be recorded in non-extracted areas of the EMR). The longitudinal nature of EMR data requires researchers to define the *first occurrence* of the chronic diseases that form their multimorbidity definition. It takes time to explore the raw data, understand their quality and completeness, and consider which study designs are most appropriate. For example, multilevel clustering of the data (encounters clustered within patients; patients, within providers; providers, within practices; practices, within networks; and networks, within a province or territory) will require more advanced statistical techniques

or collaboration of clinicians, epidemiologists, biostatisticians, and computer scientists. Methodologic decisions during this process should be clearly articulated, and published in research protocols to enhance the reproducibility and transparency of multimorbidity research.⁶

Despite these challenges, the CPCSSN database represents a crucial resource for health researchers in Canada. As EMR functionality evolves, contextual information important for patient-centred care should be recorded and extracted more consistently (eg, employment status, education, and family structure, as well as patients' ideas, feelings, and expectations about health) to answer more patient-relevant questions.⁷ Further, these data can be used to examine effects of interventions and risk-prediction models. The CPCSSN database continues to be a one-of-a-kind avenue to understanding PHC patients living with multimorbidity. The CPCSSN database depends on participating practices, sentinels, and patients, and the data provided will allow us to make comparisons with international research exploring the burden of multimorbidity⁸⁻¹⁰ and contribute our perspective to the growing international knowledge base.

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Competing interests

None declared

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Sentinel Eye is coordinated by CPCSSN, in partnership with the CFPC, to highlight surveillance and research initiatives related to chronic illness prevalence and management in Canada. Please send questions or comments to Dr Richard Birtwhistle, Chair, CPCSSN, at richard.birtwhistle@dfm.queensu.ca.