

Identifying new referrals from FPs using EMRs

Heather Maddocks PhD Bridget L. Ryan MSc PhD Joshua Shadd MD CCFP MCISc Amanda Terry PhD Vijaya Chevendra MSc

Interest in health policy issues around physician referrals has been growing. Referral patterns reflect not only the clinical needs of patients but also issues of standards of care, scopes of practice, and physician human resources. Electronic medical records (EMRs) give researchers a new window into patterns of referrals from primary care physicians to other specialist physicians.¹ Although the process of cleaning and coding EMR data recorded for clinical rather than research purposes is complex, EMRs contain valuable patient-level information not available in health administrative data that could provide important insights into referral patterns. Accordingly, methods are being developed to enable this research using EMR databases.

Ryan and colleagues at Centre for Studies in Family Medicine (CSFM) at Western University, London, Ont, used the Canadian Primary Care Sentinel Surveillance Network (CPCSSN) database as the source for their study on patterns of referral. The CPCSSN 2012 data contained information from 64 practice sites across 9 networks, representing 353 660 patients and containing 612 190 referral records. Ascertaining the new referrals to specialist physicians among these 612 190 records presented 2 challenges: 1) distinguishing referrals to specialist physicians from those to allied health or other professionals; and 2) distinguishing new—ie, outgoing—referrals from incoming consultation reports.

To address the first challenge, the researchers decided to include only sites where 90% or more of referral records included information about the type of specialist: 28 practice sites across 6 networks.

Next, they selected a cohort of patients with complete age and sex information who were 18 years of age or older and who had had at least 2 appointments occurring 12 or more months apart during a 5-year period (July 1, 2007, to June 30, 2012). These patients' data included 107 112 referral records. Referrals to specialist physicians were then identified. Among these, referrals for nonmedical consultations or without a description of the type of specialist were removed.

Without careful inspection, the remaining referral records might be assumed to be new outgoing referrals from the FP to a medical specialist. However, in some practices, the referrals section of the EMR is used for both outgoing referrals and information on completed referrals with consultation feedback returned by the specialist. To be identified as new outgoing referrals, referral records had to be linked to an in-office patient visit and not have a specialist appointment date before the physician visit. Referral records were considered linked to an in-office visit if they had a linked encounter number or if

the record date created for the referral was the same date as an in-office visit in the FP's appointment schedule. For each patient, duplicate records to the same specialist type with the same date were removed, on the assumption that the FP made the decision to contact multiple medical specialists to find one accepting patients. Following these inspections, the number of referral records had been winnowed to 88 077.

The date of the appointment with the specialist was also used to identify new referrals. When this information is available, it additionally allows the calculation of wait times to see specialists.² In this study, this date was not essential to the research question and so any records without the date of appointment with the specialist were included. However, when the date of the specialist appointment was present, it had to be on (in rare occurrences) or after the date of the patient visit. If the medical specialist appointment was before the patient visit (n=9346), it was not considered a new referral, because it could represent a consult note returned by the specialist and stored in the EMR; this reduced the records to a final total of 78 731.

These steps illustrate the need to follow a careful process using all available information in the EMR to arrive at meaningful data. To improve the utility of patient-level primary care data for future studies, it is critical that methods to code and structure EMR data for use in research be developed. Understanding the complexity of EMR data, and its principal function for clinical practice rather than research, requires investigators to critically assess database contents before identifying patient cohorts and associated clinical information. The CPCSSN database is a valuable source of information on referral patterns from primary care to medical specialists. The work of Ryan and colleagues adds to the inventory of methods for examining data in CPCSSN and other EMR-derived databases by proposing a process for ascertaining new referrals.

Dr Maddocks is a research scientist at CSFM at Western. **Drs Ryan** and **Terry** are both Assistant Professors in the family medicine and the epidemiology and biostatistics departments at Western, and **Dr Terry** is Assistant Professor in the Schulich Interfaculty Program in Public Health at Western. **Dr Shadd** is Adjunct Professor in the Department of Family Medicine at Western. **Ms Chevendra** is a research IT consultant at CSFM at Western.

Competing interests
None declared

References

- Shadd J, Ryan BL, Maddocks H, Thind A. Patterns of referral in a Canadian primary care electronic medical record database: retrospective cross-sectional analysis. *Inform Prim Care* 2011;19:217-23.
- Thind A, Stewart M, Manuel D, Freeman T, Terry A, Chevendra V, et al. What are wait times to see a specialist? An analysis of 26,942 referrals in southwestern Ontario. *Health Policy* 2012;8(1):80-91.

La traduction en français de cet article se trouve à www.cfp.ca dans la table des matières du numéro d'octobre 2014 à la page e502.

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 Anita Lambert Lanning, CPCSSN Project Manager, at all@cfpc.ca.