

Limitations of ICD-9 coded billing data from primary care electronic medical records & solutions for the 21st century



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INTRODUCTION

- ICD-9 was adopted in Canada in **1979**.
- This is still used by Canadian physicians for submitting diagnosis codes as part of billing claims.
- ICD-9 coded billing data are used frequently for secondary uses (research, policy decisions, costing, disease surveillance).
- Do these codes really represent the diagnoses, activities and complexities of primary care practice?

Study Objective: To quantify information loss resulting from ICD-9 billing codes compared to primary care visit information and to explore newer alternatives that may be more suitable and accurate

METHODS

- Retrospective secondary analysis of primary care electronic medical record (EMR) data from the Canadian Primary Care Sentinel Surveillance Network.
- **Sample:** active patients with at least 1 visit to their primary care provider between 2017 and 2022
- Charts with both an ICD-9 billing code *and* information about the visit (text or coded) were included.
- Ranked lists of most frequent diagnoses were produced & compared for billing codes and for visits.
- A sub-analysis of generic "catch-all" ICD-9 codes (780) was conducted to explore how well different coding systems could capture this information.

CONCLUSIONS & NEXT STEPS

- Primary care billing data are quite general (often only three-digit ICD-9 codes)
- Accompanying text is often standardized, so is not much more informative
- Poor specificity for frailty, pain, cancer, etc. Not in sync with DSM-V
- Poor fit for detailed analysis, deciding resource allocation, and informing public health policy

NEXT STEPS:

- Analyze free-text for terms not covered by ICD-9
- Phase 2 will report on ICD-11 & ICPC-3 use as family physicians code patient vignettes.
- Phase 3 in progress: focus groups with physicians & interviews with policymakers to understand feasibility of replacing ICD-9

PRELIMINARY RESULTS

Patient demographics (N= 338,520)

Characteristics	
Female, n (%)	181,819 (53.7%)
Age, mean years (SD)	38.6 (24.1)
Urban residence, n (%)	279,682 (82.6%)
Median number of primary care encounters (IQR)	26 (39)
Assigned to female physician, n (%)	170,676 (50.4%)
Location (province), n (%)	
British Columbia	43,187 (12.8%)
Alberta	195,742 (57.8%)
Manitoba	55,347 (16.3%)
Nova Scotia	44,178 (13.1%)

Comparison of top 10 billing codes and diagnoses for same visit

Top 10 Conditions in Billing Ranked by Frequency	Top 10 Conditions in Visit Text Ranked by Frequency
1. Hypertension (401)	1. Hypertension (401)
2. Anxiety (300)	2. Anxiety (300)
3. General symptoms (780)	3. Diabetes Mellitus (250)
4. Medical Exam (780)	4. Medical Exam (780)
5. Diabetes Mellitus (250)	5. General symptoms (780)
6. Depression (311)	6. Depression (311)
7. Disorders of back (724)	7. Disorders of back (724)
8. Respiratory symptoms (786)	8. Respiratory symptoms (786)
9. Joint disorders (719)	9. Joint disorders (719)
10. Abdominal symptoms (789)	10. Osteoarthritis (715)

Top 10 text terms with ICD-9 780 (general symptoms)

Visit Information	Best ICD-9 Code	Best ICD-11 Code	Best ICPC-3 Code
General symptoms	780	MG4Y; MG9Y	AS99
Fatigue or malaise	780.7	MG22; MG25	27179500; 367391008
insomnia	780.52	7A0Z	193462001
Sleep disturbances	780.5	MG41	PS06
dizziness	780.4	MB48.Z	404640003
syncope	780.2	MG45.Z	271594007
phone call			
Sleep apnea	780.57	7A40.Z; 7A41	73430006
chronic pain	338.2	MG30.Z	LS18; 82423001; 373621006
fever	780.60	MG26	386661006

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