



SNOMED CT Case Studies



SNOMED CT
The global language of healthcare

Case Studies

SNOMED CT Order Sets

Clinical Benefits

Economic Benefits

North York General
HospitalSNOMED
International

North York General Hospital (NYGH) is a community academic hospital affiliated with the University of Toronto in Canada. NYGH deployed their *eCare* project in 2007, using the SNOMED CT-embedded Cerner clinical information system, and in 2010 deployed CPOE, clinical decision support, and electronic medication management. The introduction of CPOE and over 850 SNOMED CT evidence-based order sets at NYGH shifted the organization to evidence-based practice.

Using SNOMED CT evidence-based order sets NYGH achieved the following clinical benefits.

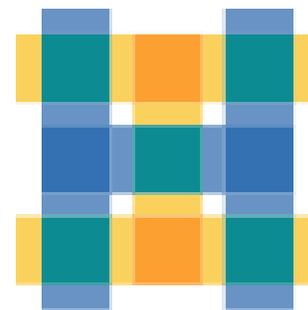
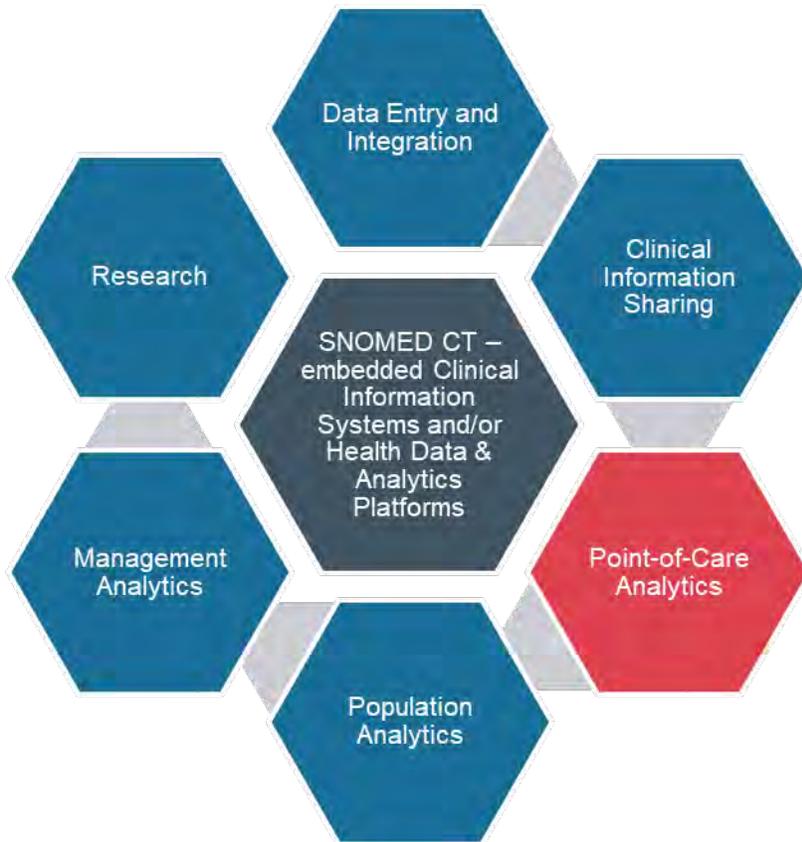
- 100% user adoption of the CPOE system; 92% of physician orders and 86% of medication orders entered by MDs.
- Approximately 50% of physician order volume was generated from evidence-based order sets.
- Increased use of evidence-based admission order sets from 36.5% pre-CPOE to 97.4% post-CPOE.
- Medication turnaround time for STAT antibiotics improved by 83% which leads to improved patient health outcomes.
- Inpatient preventable mortality from pneumonia and COPD exacerbation was reduced by 56% using CPOE with a correctly matched evidence based order set. Over 5 years this amounted to over 120 lives saved, a positive patient health outcome.
- Appropriate prophylaxis against venous thromboembolism (VTE) – a blood clot in a deep vein - increased from 50% of inpatients to >97% of inpatients, with a corresponding 39% reduction in VTE, a positive patient health outcome.

The total cost avoidance from improvements in the occurrence of four adverse events was determined to be CAD\$38.1M over 5 years, or CAD\$7.6M per year. When the total cost of acquiring and implementing the SNOMED CT-embedded *eCare* clinical information system was taken into account a net savings over the 5-year period of CAD\$1.2 million was achieved.

For the detailed NYGH Case Study see Appendix 5 [here](#).

Case Study #3

eCare: A Clinical Decision Support System



**NORTH
YORK
GENERAL**

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Case Study #3

eCare: A Clinical Decision Support System

Canada – North York General Hospital Clinical Decision Support System, Toronto, Ontario

- North York General Hospital (NYGH) is a community academic hospital affiliated with the University of Toronto providing inpatient, ambulatory and long term care services. It was a HIMSS Davies Award of Excellence winner in 2016.
- NYGH commenced the deployment of their *eCare* project in 2007, using the Cerner clinical information system^{1,2}. In 2010 Phase II of the project was initiated for Computerized Provider Order Entry (CPOE), clinical decision support, and electronic medication management (i.e. eMAR, bar coding, medication reconciliation and eRx on discharge).
- The introduction of CPOE and **SNOMED CT**- enabled evidence-based order sets at NYGH was an opportunity to shift the organization to evidence-based practice. However, similar to other CPOE and evidence-based order set implementations the *eCare* project met with significant resistance, particularly from physicians.
- NYGH initially tried to introduce **SNOMED CT**- encoded problem lists through drop-down lists, but achieved less than 1% physician adoption because there were too many terms and it took too long (i.e. ~12 seconds) per diagnosis to complete.
- NYGH then changed tack and introduced **SNOMED CT** using a “stealth approach” by building diagnoses and comorbidities into ordering workflow (increased to 15% adoption), adding diagnoses into documentation workflow for endoscopy, diabetes care, and urology (increased to 30% adoption), and finally into physician in-patient documentation when the vendor upgraded this functionality (100% adoption in the pilot group) which has been rolled out specialty-by-specialty.

1. Theal et al., “CPOE with Evidence-Based Clinical Decision Support Improves Patient Outcomes”, Healthcare Quarterly Vol 17 No 1, Longwoods, 2014

2. Theal et al., “CPOE with Evidence-Based Clinical Decision Support Improves Patient Outcomes – Part 2”, Healthcare Quarterly Vol 17 No 4, Longwoods, 2014

Case Study #3

eCare: A Clinical Decision Support System

Canada – North York General Hospital Clinical Decision Support System, Toronto, Ontario (continued)

- During this process the NYGH clinicians were invited to develop their own library of evidence-based order sets as a way to both standardize (i.e. use of evidence) and personalize (i.e. patient care plan) care. Once created, the 850 plus NYGH order sets were then made available to other health organizations across Canada.

Significant Patient Outcome Benefits Achieved³

- Achieved **100% user adoption** of the CPOE system; **92% of physician orders** and **86% of medication orders** entered by MDs.
- Approximately **50% of physician order volume** was generated from **evidence-based order sets**.
- Increased use of evidence-based admission order sets from **36.5% pre-CPOE** to **97.4% post-CPOE**.
- **Medication turnaround time for STAT antibiotics improved by 83%** (291 to 50 mins) which is important for diagnoses like pneumonia, where getting the antibiotic faster vastly improves patient health outcomes.
- In a review of CPOE and evidence-based order sets North York researchers found that **inpatient preventable mortality from pneumonia and COPD exacerbation was reduced** by 45% using CPOE vs paper orders, and **by 56%** using CPOE with a correctly matched evidence based order set (even after adjustment for comorbidities, age, sex, diagnosis, length of stay and critical care unit admission). Over 5 years this amounted to **over 120 lives saved**, a positive patient health outcome.

3. Theal J., "SNOMED CT – A Canadian Clinical Perspective", James Read Memorial Lecture, SNOMED International EXPO, Bratislava, 2017. See <https://confluence.ihtsdotools.org/display/FT/SNOMED+CT+Expo+2017#:~:text=Thursday%2C%2019th%20October%202017%20%20%20%20,Expo%202017%20Drinks%20Reception%20-%20%20...%20>

Case Study #3

eCare: A Clinical Decision Support System

Canada – North York General Hospital Clinical Decision Support System, Toronto, Ontario (continued)

Significant Patient Outcome Benefits Achieved con't

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Economic Benefits Achieved

- The eCare ROI was determined by applying the Economics of Patient Safety⁴ findings for 4 adverse events to the NYGH experience. The four adverse events included: reduction in medication errors, reduction in nosocomial adverse drug events, VTE prevention and prevented recurrences of *C. difficile*.
- The **total cost avoidance** from improvements in the occurrence of the **four adverse events** was determined to be **CAD\$38.1M over 5 years**, or CAD\$7.6M per year.
- When the total cost of acquiring and implementing the eCare clinical information system was also taken into account a **net savings over the 5-year period of CAD\$1.2 million** was achieved.

4. Etchells, Mittmann et al., “The Economics of Patient Safety in Acute Care – A Technical Report”, Canadian Patient Safety Institute, 2012. See <https://www.patientsafetyinstitute.ca/en/toolsResources/Research/commissionedResearch/EconomicsofPatientSafety/Documents/Economics%20of%20Patient%20Safety%20-%20Acute%20Care%20-%20Final%20Report.pdf>



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