

Data Impact Challenge

Challenge Question: ***Choosing Wisely Canada Question*** – How frequently do physicians order ANA as a screening test, and what level of variation exists across physicians?

Team: Ottawa Hospital Performance Measurement

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DATA

Data custodian: The Ottawa Hospital (TOH)

Data sources: The data were extracted from The Ottawa Hospital Data Warehouse (TOHDW). The Ottawa Hospital is a 1,117-bed tertiary-care teaching hospital in Ottawa, Ontario with five campuses. TOHDW pulls together information from many different operational databases into a single repository with a clearly defined structure.

List of Datasets:

- SMS – Patient registration system
- OACIS – Clinical Information System that captures all lab, pharmacy and diagnostic imaging orders and reports

Data Quality: The TOHDW contains high quality data. TOHDW incorporates administrative, clinical, and patient information from various source systems, thus capturing **complete** information for each hospital encounter. The diagnostic and procedural coding is **consistent** with international classifications. The datasets have a normalized data structure, with **standard** naming conventions and formats across systems. Each record is **time-stamped** and updated on a nightly basis. The data is highly **accurate** and has been used extensively to support decision-making, report to the Ministry of Health, and in several high-impact research publications.

Inclusions: All antinuclear antibody (ANA) tests ordered between April 1, 2005 to April 31, 2015 at The Ottawa Hospital in an inpatient setting.

Exclusions: Duplicate tests (i.e., multiple tests associated with an order on the same date) were excluded. All cancelled and deleted tests were also removed.

Nature of cohort: Any ANA tests ordered for inpatients of TOH (Civic, General, University of Ottawa Heart Institute and The Rehabilitation Centre campuses).

Size of cohort:

- Number of inpatient encounters with an MRP: 1,126,975
- Number of inpatient encounters where ANA test was ordered: 9,484
- Number of ANA tests: 10,565

Data timeframe:

- Date ANA test ordered between April 1, 2005 and April 30, 2015.

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Representativeness: TOH is one of the largest academic health sciences centres in Canada and serves a population of 1.2 million residents. The hospital and its associated institutes provide a number of acute care services, including cardiovascular, surgical and trauma programs. The hospital is the main referral centre for those requiring complex care in the region, and therefore the patient population is representative of other tertiary care centres.

In an inpatient setting, patients can only get their ANA tests ordered and completed within the hospital, so we are confident that we are capturing the vast majority of the ANA tests ordered within the inpatient setting in the Ottawa region.

ANALYSIS

Screening Rate:

$$\text{Screening rate} = \frac{\text{Number of inpatient encounters where ANA test was ordered}}{\text{Number of inpatient encounters, by MRP}}$$

MRP: Most responsible physician, i.e., physician responsible for the greatest portion of the total acute length of stay

ANA Test: Codes for ANA testing were classified by keyword search on “ANA” and “anti nuclear” within the list of lab test descriptions. The list of codes was verified by a biochemist staffed at the hospital lab department.

Numerator: Number of encounters with at least one ANA test ordered.

Denominator: Number of inpatient encounters during time period. Encounters were grouped by the most responsible physician for the inpatient encounter.

Positive Autoimmune Disease Diagnosis Rate:

$$\text{Positive diagnosis rate} = \frac{\text{Number of inpatient encounters with a positive diagnosis}}{\text{Number of inpatient encounters where ANA was ordered}}$$

Positive Diagnosis: Discharge diagnosis with at least one ICD-10 code for autoimmune disease, as defined by: Liu, et al (manuscript in progress)¹ in consultation with an immunologist at Kingston General Hospital.

Numerator: The number of encounters that had a positive diagnosis of an autoimmune disease, where an ANA test was ordered.

Denominator: Number of encounters with at least one ANA test ordered.

Innovation: This submission is innovative because not only did we provide estimates of ANA testing rate by physician, but also insight into the potential low positive predictive value of the ANA test to diagnose an autoimmune disorder.

FINDINGS

In Figure 1, we see that the majority of MRPs have a screening rate of 10% or less, although there is significant variation in testing across physicians. Also, MRPs with more encounters tend to have lower screening rates.

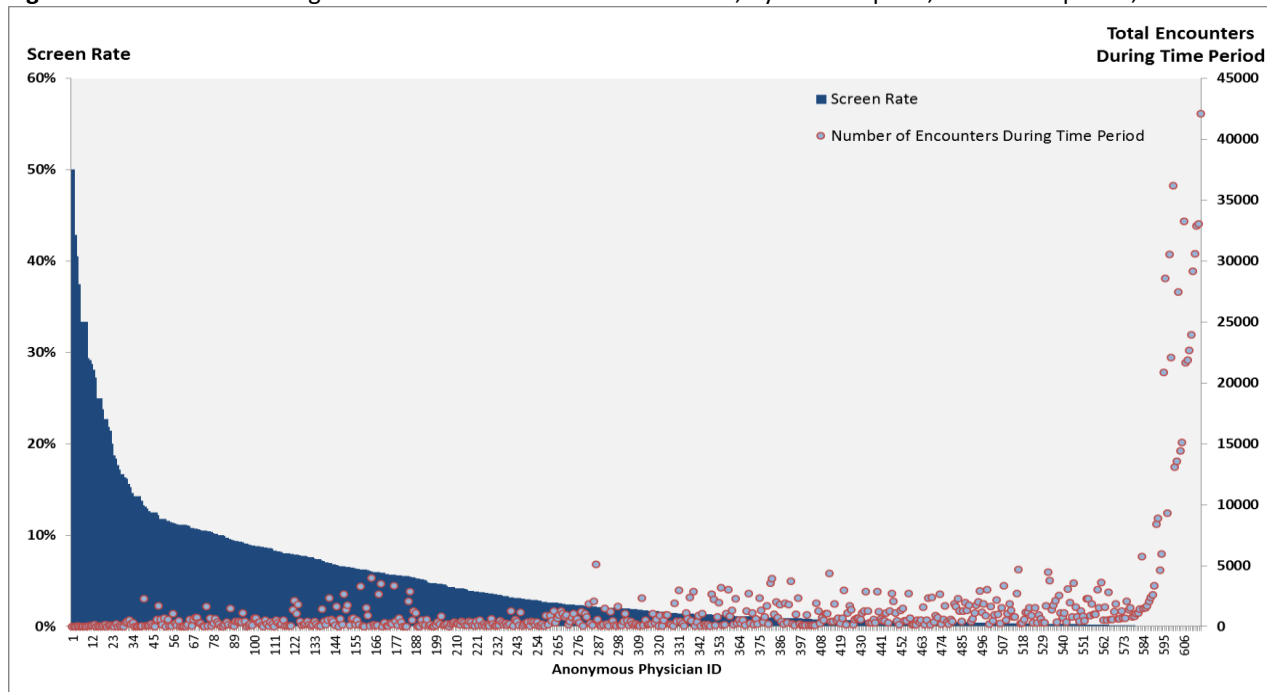
¹ Liu EY, Smith LM, Liu G, Levesque LE (2013). “Assessing the risk for autoimmune disorders following use of the quadrivalent human papillomavirus vaccine: the Ontario Grade 8 HPV Vaccine Cohort Study” (manuscript in progress)

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In Figure 2, we see that the majority of physicians who order ANA tests have lower than a 10% positive diagnosis rate for an autoimmune disease, which alludes to the potential overuse of ANA tests.

Limitations: Lab tests that do not distinguish what type of antibody test is being done were not included, based on our keyword search. These tests could potentially include ANA tests and would require individual chart reviews to verify. Also, our denominator definition for *Screening Rate* was broad. Ideally, we would want to limit the denominator to patients who could potentially have an autoimmune disease as opposed to all encounters during the timeframe, e.g., some physicians are more specialized in the autoimmune disease population, where there may be a higher screening rate.

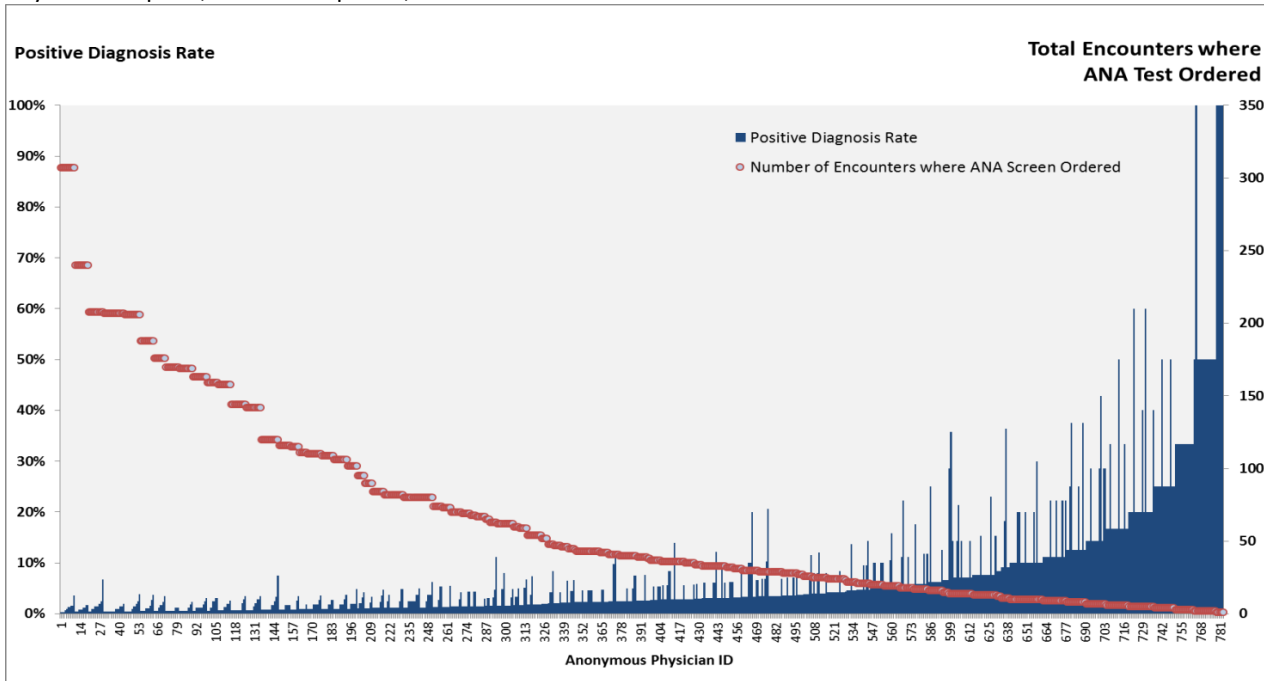
Figure 1: ANA Test Screening Rate and Total Number of Encounters, by MRP – April 1, 2005 and April 30, 2015



Note: Physician who requested test may not be MRP.

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Figure 2: Positive Diagnosis Rate and Total Number of Encounters Where at Least One ANA Test Was Ordered, by Ordering Physician – April 1, 2005 and April 30, 2015



Note: Anonymous Physician IDs in Figure 1 and 2 do not represent the same physicians.