# Validation of an electronic algorithm for Hodgkin and non-Hodgkin Lymphoma in ICD-10-CM

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## OBJECTIVE

- Develop and validate an ICD-10-CM-based algorithm to identify lymphoma with a positive predictive value (PPV) of at least 80% (±10%) to support studies of drug safety

## BACKGROUND

- >77,000 new non-Hodgkin (NHL) and 8,400 Hodgkin lymphoma (HL) cases diagnosed in the US each year
- More than 60 histologic subtypes of lymphoma
- Lymphoma is generally diagnosed in the outpatient setting with enlarged lymph nodes as the most common symptom
- Most lymphoma cases definitively diagnosed through biopsy or flow cytometry
- Majority of cases will have imaging studies (e.g. CT, MRI, PET scans) to aid in diagnosis and determine extent of disease

## METHODS

### *Data Source and Study Population*

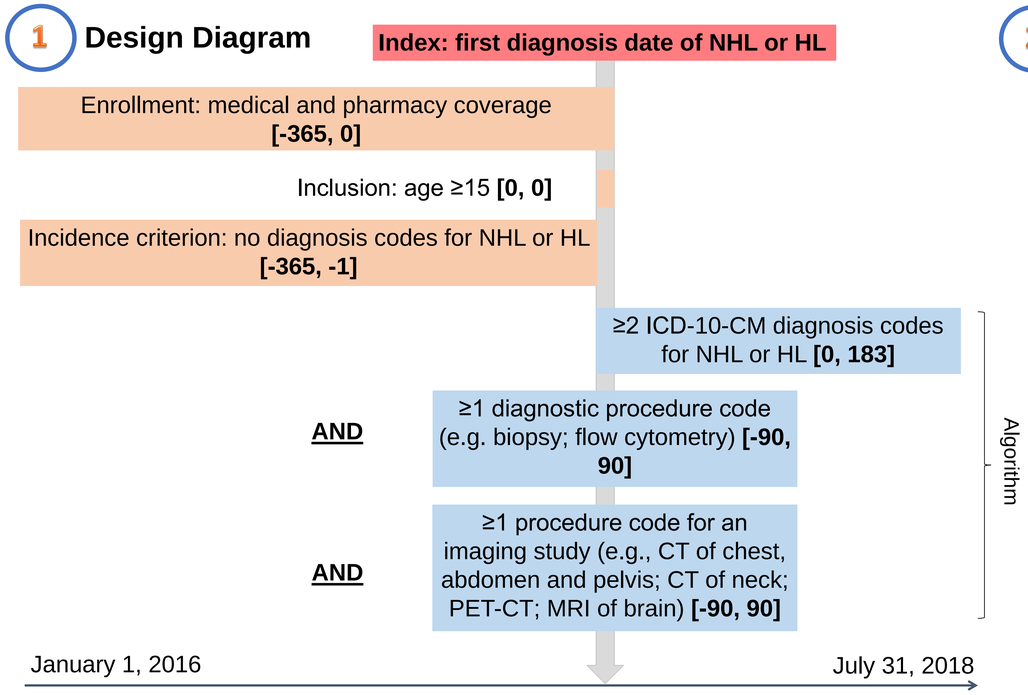
- Four Sentinel Data Partners (3 national insurers, 1 integrated healthcare system) contributed data
- Eligible participants were aged ≥15 years and enrolled for ≥12 months before diagnosis

### *Algorithm Development and Evaluation*

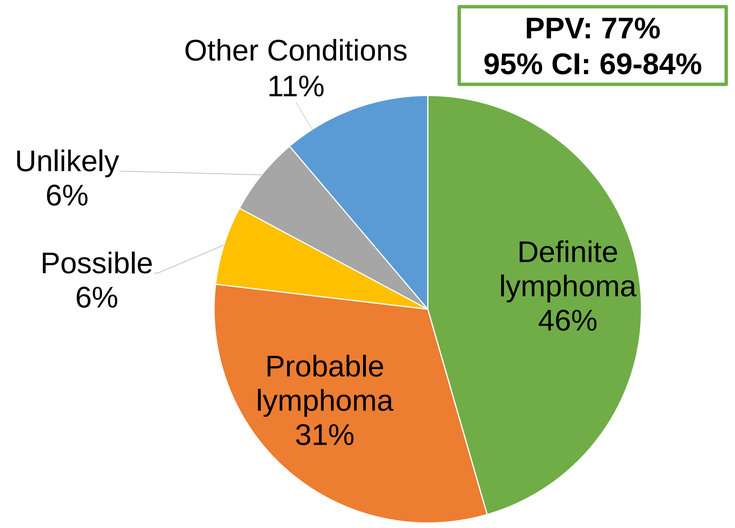
- Three component algorithm: 2 lymphoma-related diagnosis codes within 183 days, ≥1 diagnostic procedure and ≥1 relevant imaging code ± 90 days from first diagnosis (Figure 1)
- De-identified, patient-level claims data were extracted for 211 of the 8723 patients identified by the algorithm and reviewed by two oncologists to select encounters for chart retrieval
- 134 full charts from algorithm-positive cases were abstracted and adjudicated with data from -30 to +90 days from selected encounter date
- Subtype data (NHL vs HL) explored
- Definite and Probable cases considered true positives for calculation of the Positive Predictive Value (PPV)

## RESULTS

### 1 Design Diagram




### 2 Chart Adjudication Results (N = 134)




Cases judged as definite or probable lymphoma were considered true positives. Other conditions (N=15) included other cancers (80%) and non-malignant conditions (20%)

### 3 Demographic Characteristics by Chart Adjudication Status

| | | Final Adjudicated Case Status | | | | | Subtype | | |
|---|---|---|---|---|---|---|---|---|---|
| | Overall | Definite | Probable | Possible | No evidence | Other condition | NHL | HL | Non-case |
| **Total N (%)** | 134 | 61 (46%) | 42 (31%) | 8 (6%) | 8 (6%) | 15 (11%) | 92 (69%) | 11 (8%) | 31 (23%) |
| **Age, years** | | | | | | | | | |
| *Mean* | 62.2 | 62.4 | 63.7 | 70 | 52.6 | 58.1 | 65.7 | 39.7 | 59.8 |
| *Median* | 65.5 | 65 | 66.5 | 67.5 | 62 | 66 | 67 | 34 | 66 |
| *Range* | 17-94 | 21-85 | 17-83 | 49-94 | 18-79 | 18-90 | 17-85 | 17-72 | 18-94 |
| **Sex, N (%)** | | | | | | | | | |
| *Male* | 69 (52%) | 36 (59%) | 21 (50%) | 4 (50%) | 0 | 8 (53%) | 54 (59%) | 3 (27%) | 12 (39%) |
| *Female* | 64 (48%) | 25 (41%) | 20 (48%) | 4 (50%) | 8 (100%) | 7 (47%) | 37 (40%) | 8 (73%) | 19 (61%) |
| *Missing* | 1 (<1%) | 0 | 1 (2%) | 0 | 0 | 0 | 1 (1%) | 0 | 0 |

## DISCUSSION

### *Strengths*

- This project updates prior Sentinel work to develop an algorithm using ICD-10 codes
- Inclusion of data from both national insurers and an integrated delivery system enhanced generalizability of the results

### *Limitations*

- Chart reviews limited to one encounter
- Future iterations may add steps to further rule out non-lymphoma malignancies

### *Conclusions*

- An ICD-10-based algorithm including both diagnosis and procedure codes can identify lymphoma cases from health claims data with reasonable accuracy
- Subtype (NHL or HL) correctly determined for most cases

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