

A Composite Diagnostic Signature for Accurate Identification of Refractory Chronic Cough (RCC) Patients from Electronic Health Records (EHR)

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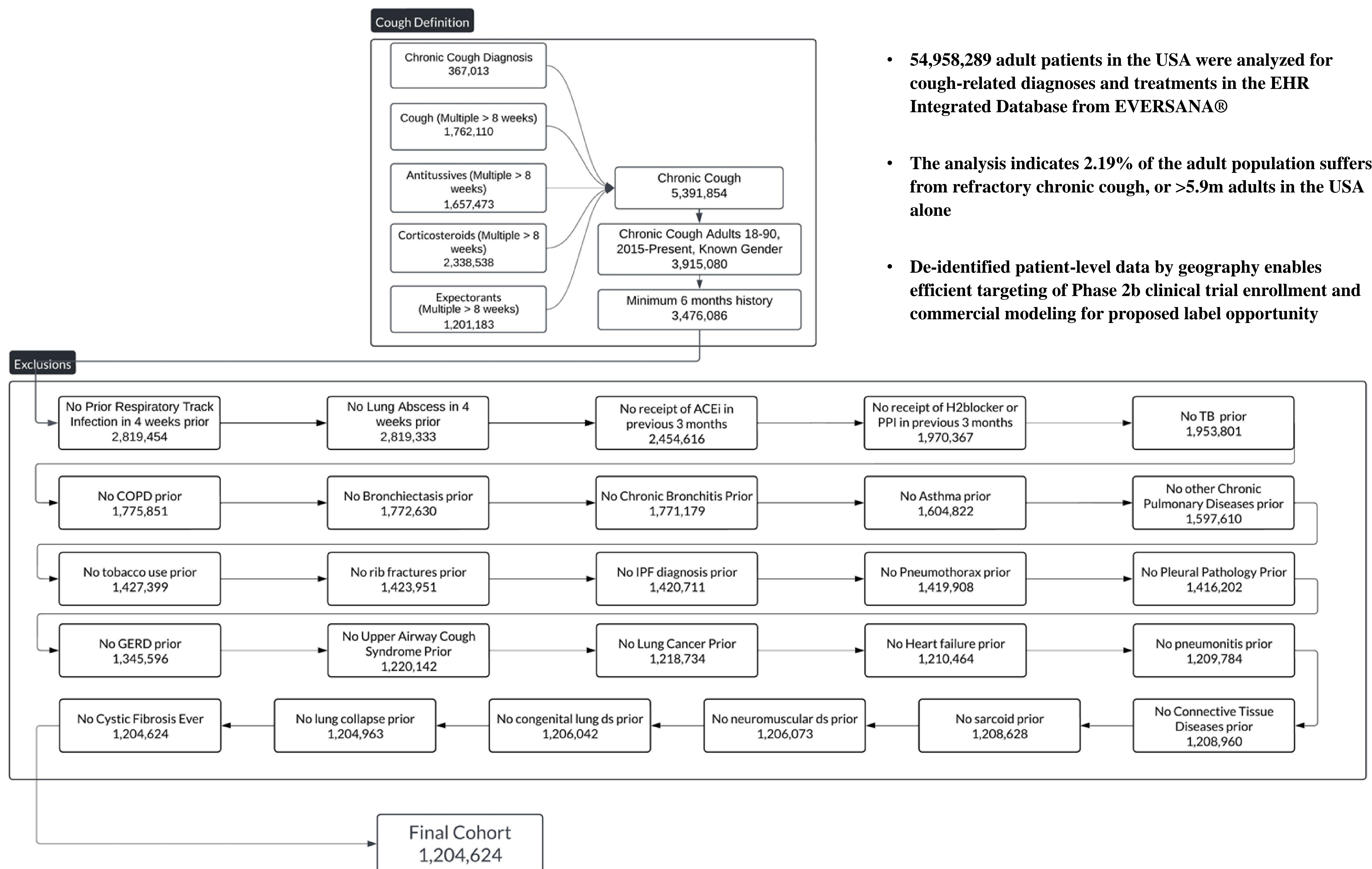
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Introduction

RCC was defined as a clinical entity approximately a decade ago, and thus physician education on diagnostic criteria, standardized patient diagnosis, and subsequent coding in EHRs has not yet become robust. This has hampered our ability to obtain population-level data such as precise incidence and prevalence metrics, and to obtain patient-level data that has slowed our ability to deepen our understanding of this clinical condition. The latter, for example, related to epidemiology, natural history, co-morbidities, and social and economic impact. As a result, our ability to effectively allocate resources to better manage this condition and develop effective therapies has been hampered. In the absence of robust clinical diagnosis and EHR coding, we sought to identify a set of clinical features that, combined, would solve this issue and accurately allow us to query large health record data sets and extract patients who met the RCC definition to enable such future studies and move the field forward.

Results

Of the 54,958,289 patients who were aged 18-90, had associated gender data, and had greater than 6 months of follow-up data, 3,467,086 patients met our clinical criteria for diagnosis with chronic cough (6.31%). Of these patients, 1,204,624 patients, or 34.74% of chronic cough patients, met criteria that in our analysis defined them as RCC patients. For a different view of the data, we will also present metrics where we change the inclusion criteria for a chronic cough diagnosis to narrow the time span for having received a chronic cough diagnosis code, multiple cough diagnoses; multiple antitussive records; multiple inhaled corticosteroid records; or multiple expectorants to between 8 weeks and 3 months. In either analysis, the proportion of chronic cough patients who are defined as RCC is consistent with estimates that generally hover at ~40% from other studies. Data are reported in Figure 1 as the number of distinct patients at each step.



- 54,958,289 adult patients in the USA were analyzed for cough-related diagnoses and treatments in the EHR Integrated Database from EVERSANA®
- The analysis indicates 2.19% of the adult population suffers from refractory chronic cough, or >5.9m adults in the USA alone
- De-identified patient-level data by geography enables efficient targeting of Phase 2b clinical trial enrollment and commercial modeling for proposed label opportunity

Methods

Clinical findings commonly used by expert physicians to arrive at an RCC diagnosis from among a broader chronic cough population were identified. We analysed a total data set of 94,400,624 patients for these cough-related diagnoses and treatments in the EHR Integrated Database from EVERSANA®, a nationally representative electronic health record dataset. Records from January 1, 2015, to December 31, 2023, were used. To ensure that we had sufficient follow-up data to articulate >8 weeks of coughing, we restricted the data set to patients who had more than 6 months of total follow-up in the record. Finally, we restricted the initial data set to adult patients aged 18-90. This resulted in 54,958,289 patients forming the initial analysis group. Patients were considered to have chronic cough if they had a chronic cough diagnosis code, or if they had multiple cough diagnoses; multiple antitussive records; multiple inhaled corticosteroid records; or multiple expectorants over a span exceeding 8 weeks. Diagnoses were identified using ICD10 codes and medications identified by either RxNorm codes or ATC codes. Of this chronic cough population, we then excluded patients that had underlying pathologies that cause cough as described Figure 1 to arrive at patients with unexplained cough, or who we believe are RCC patients.

Conclusions

We have used real world evidence in this analysis to define the prevalence of chronic cough and RCC from among a large US-based EHR data set. The clinical criteria that have been applied to this data set have resulted in a prevalence of chronic cough in adults of 6.31%, with 34.74% of these patients being identified as having RCC. Now that we have identified a measurable set of clinical criteria that seems to identify RCC patients in the absence of a clear RCC diagnosis and/or EHR code, we can begin to perform detailed patient-level research studies to dissect pathogenic drivers, genetic predisposition, natural history, efficacy of combination therapies and other research that will be critical to deepen our understanding of this disorder. In addition, we can now identify RCC patients in EHRs for retrospective in silico studies and query data on therapies that have been administered for cough and other conditions to find potential efficacy signals. Finally, this resource allows us managing physician-level data so that we can identify high patient density clinical trial sites to increase the speed and efficiency of prospective therapeutic development activities.