RWD70

Development of ICD-10 CM Codes for the CDC-defined Underlying High-Risk COVID-19 Conditions and Frequency in Medical and Administrative Claims Data

A Scott,[1] F Draica,[2] J Atkinson,[3] R Chambers,[4] M Reimbaeva,[5] RH Stanford,[6] A Guisinger,[6] F Manuel[6]

[1]Pfizer Inc, Evidence Generation Platform, Medical Affairs, New York, NY, USA; [2]Pfizer Inc, US Medical Affairs, New York, NY, USA; [3]Pfizer Ltd, Global Medical Affairs, Tadworth, UK; [4]Pfizer Inc, Global Product Development Statistics, Collegeville, PA, USA; [5]Pfizer Inc, Global Biometrics and Data Management, Groton, CT, USA; [6]AESARA Inc., Chapel Hill, NC, USA

For more information please contact:
Amie Scott
Evidence Generation Platform, Medical Affairs
Pfizer Inc
New York, NY, USA
Amie.Scott@pfizer.com

BACKGROUND

- As the coronavirus disease 2019 (COVID-19) pandemic continues to evolve, identifying individuals who are at increased risk of progression to severe disease is essential.
- Older individuals and people with certain comorbid conditions are at a greater risk of developing severe COVID-19, which can lead to poor health outcomes and death. Existing literature has identified preexisting conditions that may lead to poor severe outcomes, such as chronic lung disease, smoking, cardiovascular diseases, chronic kidney and liver diseases, cancer, overweight and obesity, and immunosuppressed states.[1,2]
- The Centers for Disease Control and Prevention (CDC) has developed a list of underlying conditions that are associated with higher risk of developing severe COVID-19 and has ranked the conditions based on the strength of evidence available.[3]

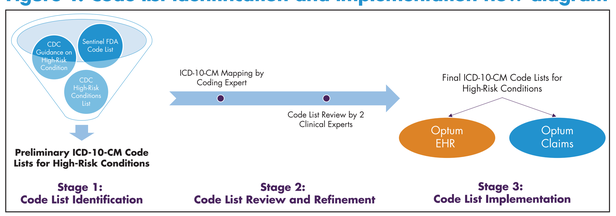
OBJECTIVES

- To develop a comprehensive list of International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes for underlying conditions identified by the CDC as being associated with high risk of developing severe COVID-19.
- To assess the frequency and consistency of these codes when applied to large US-based electronic medical records (EHRs) and administrative claims datasets.

METHODS

- A coding expert and 2 independent clinicians developed a list of ICD-10-CM codes mapped to the CDC-defined high-risk underlying conditions (**Figure 1**).[3]

Figure 1. Code list identification and implementation flow diagram



- These codes were subsequently applied to Optum's de-identified Clinformatics® Data Mart Database (claims) and the Optum® de-identified Electronic Health Record databases across 3 years (2018, 2019, and 2020) in subjects ≥12 years of age with frequency of each condition assessed.

RESULTS

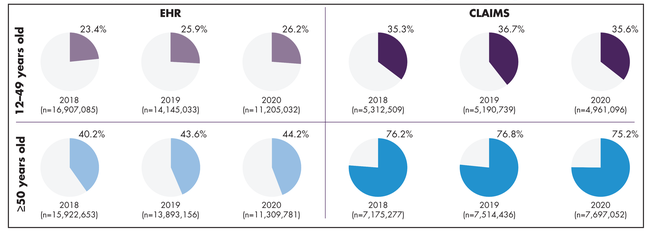
- A total of 8211 ICD-10 codes were mapped to 20 underlying conditions (**Table 1**).

Table 1. CDC-Defined High-Risk Underlying Conditions[3]

Condition	Number of ICD-10 Codes
Cancer - Active and History	1464
Chronic Kidney Disease	129
Chronic Liver Disease	22
Dementia	82
Diabetes Mellitus	470
Disability	1234
Heart Conditions	417
HIV	8
Hypertension	66
Immunocompromised State	163
Lung Disease	313
Mood Disorders	132
Obesity and Overweight	34
Pregnancy	2520
Sickle Cell Disease and Thalassemia	45
Smoking	12
Solid Organ or Stem Cell Transplant	83
Stroke and Cerebrovascular Disease	686
Substance Use Disorder	265
Tuberculosis	66

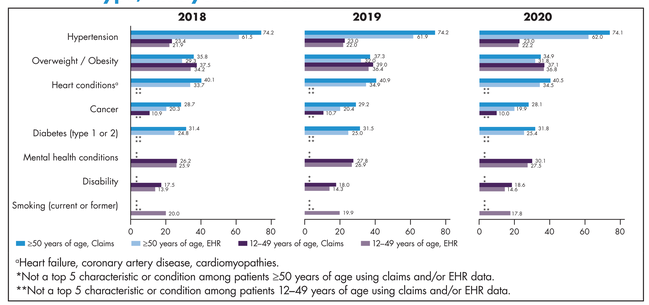
- Using Optum claims data, 59.7% of patients ≥12 years of age and 75.2% of patients ≥50 years of age had ≥1 CDC-defined high-risk condition (excluding age) in 2020.
- Using Optum EHR data, 35.2% of patients ≥12 years of age and 44.2% of patients ≥50 years of age had ≥1 CDC-defined high-risk condition (excluding age) in 2020.
- The distribution of patients with ≥1 high-risk characteristic or condition, excluding age, are shown in **Figure 2**.
  - A higher proportion of patients were identified with high-risk characteristics or conditions using the Optum claims data than the Optum EHR data, regardless of year of index or age.
  - A higher proportion of patients ≥50 years of age were observed to have ≥1 high-risk characteristic or comorbidity, regardless of data source or year.

Figure 2. Percentage of patients with ≥1 characteristic or condition associated with higher risk of severe COVID-19 (excluding age) among patients by age, data type, and year of index



- The top 5 conditions among patients with ≥1 high-risk characteristic or comorbidity are shown in **Figure 3**.
  - Among patients ≥50 years of age, the top 5 conditions were consistent across years of index and data sources, and included hypertension, overweight/obesity, heart conditions, cancer, and diabetes (type 1 or 2).
  - Among patients 12–49 years of age, the top 5 conditions were also mostly consistent across years of index and data sources, and included hypertension, overweight/obesity, mental health conditions, disability, cancer (claims data only), and smoking (EHR data only).
  - Generally speaking, a slightly higher proportion of these comorbidities were observed in patients using claims data compared with EHR data.

Figure 3. Percentage of top 5 conditions among patients with ≥1 characteristic or condition associated with higher risk of severe COVID-19 (excluding age) by age, data type, and year of index



[a]Heart failure, coronary artery disease, cardiomyopathies.
*Not a top 5 characteristic or condition among patients ≥50 years of age using claims and/or EHR data.
**Not a top 5 characteristic or condition among patients 12–49 years of age using claims and/or EHR data.

CONCLUSION

- **A comprehensive list of ICD-10 CM codes was compiled in a valid and standardized manner utilizing the CDC's comprehensive list literature describing underlying conditions with a greater risk of leading to severe COVID-19. These codes can be used by researchers, clinicians, and policy makers to identify and characterize patients that may be at high risk of progressing to severe COVID-19 outcomes. In addition, they consistently identify these conditions over several years in both electronic medical records and administrative claims data.**

REFERENCES

1. Treskova-Schwarzbach M, et al. *BMC Med.* 2021;19(1):212.
2. Zheng Z, et al. *J Infect.* Aug 2020;81(2):e16-e25.
3. Centers for Disease Control and Prevention. Science Brief: Evidence Use to Update the List of Underlying Medical Conditions Associated With Higher Risk for Severe COVID-19. 2022 [cited 2022 June 15]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/underlying-evidence-table.html. Accessed March 15, 2023.

DISCLOSURES

Funded by Pfizer Inc.