HSD51

Differences in Disease Burden and Treatment Utilization By Socioeconomic Status Among a Large Cohort of Patients with COVID-19 Diagnosis in the United States

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Background

- Healthy People 2030 describes social determinants of health as the conditions in the environment where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.[1] These measures consist of 5 domains
  - Economic stability
  - Education access and quality
  - Health care access and quality
  - Neighborhood built and environment
  - Social and community context
- It is reported that the United States has over 100 million cases and over 1 million deaths from COVID-19[2]
- Social determinants of health are known to affect health outcomes, while use in real world HEOR studies are limited

Methods: Study Design

- This retrospective observational study utilized linked data from IQVIA's Professional fee claims (Dx) and Longitudinal prescription claims (LRx) to describe patient characteristics and utilization of COVID-19 specific medications stratified by neighborhood socioeconomic disadvantage among patients with a COVID-19 diagnosis between April 1, 2020 and April 30, 2022 (index period)
- Patient demographic characteristics were assessed on the date of the first COVID-19 diagnosis (index date)
- Baseline healthcare resource utilization including the number of distinct days with at least one medical claim and the total number of unique prescriptions during in the 12 months pre-index period were assessed

Methods: Population Selection

- Patients were selected having a COVID-19 diagnosis during the index period in the IQVIA medical and longitudinal pharmacy claims databases of >277 million patients. (Figure 1)

Figure 1: Population Selection

Patient with at least 1 medical claim in Dx during the index period: 4/1/2020-4/30/2022 (estimate of whole population)
N= 277,286,899

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Patients with >=1 medical claim with a COVID-19 diagnosis in Dx during the index period, date of 1st COVID-19 Dx claim is the index date
N= 22,862,723

↓

Patients with at least 1 medical claim in Dx >180 days prior to the index date (final study population)
N= 17,682,111

Objective

- This study assessed socioeconomic differences in the burden of disease and utilization of COVID-19 specific medications among patients in the US with medical claims containing a diagnosis of COVID-19 using a large U.S. open-source claims database

Data Description

Medical Claims Data (Dx)

- Approximately 1.2M health care practitioners represented (76% of the AMA coverage), 1.5B professional fee claims, 5.6B diagnostic claims services per year submitted, and over 150 million active patients. Records are available from September 1999, with approximately 95% of claims available for analyses within 3 weeks of the service date. Over time, there is representation from approximately 236 physician specialties (e.g., American Medical Association (AMA) classifications such as Family Medicine, Pediatrician, Radiologist, Urologist, etc.) as well as representation of non-physician practitioners (e.g., Nurse Practitioners and Physicians Assistants). The data includes patient demographics, physician demographics, diagnoses, procedures, and in-office administered drugs

Longitudinal Prescription Data (LRx)

- IQVIA receives nearly 4 billion prescription claims per year with history from January 2004 with coverage up to 92% for the retail channel, 62% for traditional and specialty mail order, and 76% for long-term care. The longitudinal prescription data (LRx) is derived from electronic information received from pharmacies, payers, software providers and transactional clearinghouses. This information represents activities that take place during the prescription transaction and contains information regarding the product, provider, payer and geography. LRx data is longitudinally linked back to an anonymous patient token and can be linked to events within the dataset itself and across other patient data assets. Common attributes and metrics within the LRx data include payer, payer types, product information, age, gender, 3-digit zip as well as the scripts relevant information including prescriber, date of service, refill number, quantity dispensed and day supply

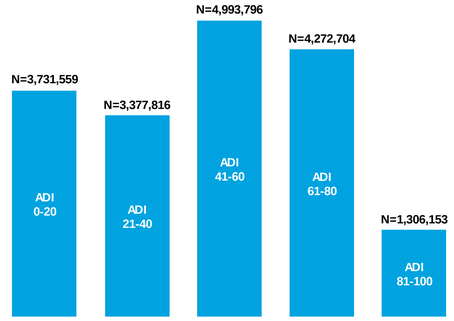
Area Deprivation Index

- The Area Deprivation Index (ADI) created by the Health Resources & Services Administration (HRSA) and modified to Kind et al allows for rankings of neighborhoods by socioeconomic disadvantage using factors related to income, education, employment, and housing quality from the American Community Survey (ACS) Five Year Estimates.[3] The original ADI measure is applied at the 9-digit zip code (ZIP9) level
- The modified ADI score developed for this study was computed as the median of the ADI scores for all the ZIP9 codes within each 3-digit zip code (ZIP3) area. The individual ZIP3 scores were classified into pentiles based on the distribution of the median scores. Sensitivity analysis was performed to ensure the validity of this method
- Patients with ADI score of 0-20 is the least disadvantaged (highest socioeconomic group) and 80-100 represents the most disadvantaged (lowest socioeconomic group)

Results

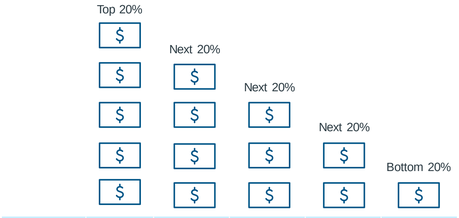
- A total of 17,682,111 patients having a COVID-19 diagnosis during the index period were identified in the IQVIA longitudinal medical and pharmacy claims databases of >277 million patients. (Figure 2)

Figure 2: COVID-19 Population Distribution Segmented by ADI Class



- The mean (SD) age of the COVID-19 population was 45.2 years (median 46 years). As the level of deprivation increased, the median age of the population and the proportion of female patients generally increased. (Figure 3)

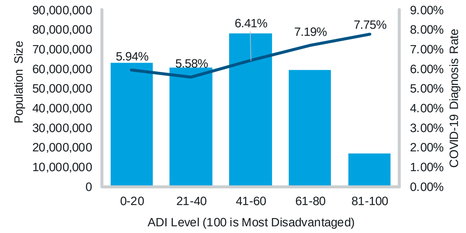
Figure 3: Age and Sex by Area Deprivation Index Group



	Top 20%	Next 20%	Next 20%	Next 20%	Bottom 20%
Median Age	**44**	**45**	**46**	**48**	**46**
Female %	56.7	57.1	57.6	57.6	58.2

- Patients living in neighborhoods with and ADI of 41-60 comprised the largest population while those in an ADI neighborhood of 81-100 comprised the smallest group. The rate of COVID-19 diagnosis was higher among patients with lower socioeconomic status. (Figure 4)

Figure 4: COVID-19 Diagnosis Rate by Socioeconomic Status



- Medical utilization in the 12 months pre COVID-19 diagnosis showed that the least disadvantaged group (ADI 0-20) had a mean of 15 claims, while the other groups had a mean of 14 medical claims pre-COVID-19 diagnosis. The median number of medical claims pre-index was 6 for all groups. (Figure 5)

Figure 5: Pre-index Medical Claims

14-15 — **Mean** number of medical claims in the 12 months pre-COVID-19 diagnosis

6 — **Median** number of medical claims in the 12 months pre-COVID-19 diagnosis

- For pharmacy claims, the most disadvantaged group had higher pharmacy claims in the 12 months pre-index (mean 28.4 claims) versus the least disadvantaged group (mean 23.6 claims) and the number of pre-index pharmacy claims generally rose with increasing socioeconomic disadvantage. (Table 1)

Table 1: Number of pharmacy claims 12 months pre-index

ADI Group	All	0-20	21-40	41-60	61-80	81-100
Mean	23.6	20.2	21.7	23.9	26.0	28.4
SD	31.6	29.4	29.2	31.1	33.1	36.9
Median	13	10	12	13	15	16

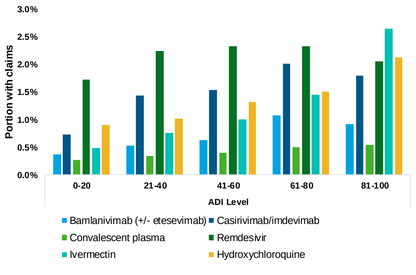
- The use of COVID-19 specific medications in the diagnosed population was less than 3% for any of the medications. Remdesivir had the highest utilization at 2.16% of the population, and convalescent plasma the lowest use at 0.4%. The two agents unapproved for COVID-19 use, ivermectin and hydroxychloroquine had utilization of 1.07% and 1.28% in the overall COVID-19 population. (Table 2)

Table 2: Use of COVID-19 specific drugs withing the entire COVID-19 population

Patients with >=1 claim for Therapy in study period	N	%
Bamlanivimab (+/- etesevimab)	121,230	0.69%
Casirivimab/imdevimab	261,886	1.48%
Convalescent plasma	70,216	0.40%
Remdesivir	382,672	2.16%
Ivermectin	189,583	1.07%
Hydroxychloroquine	225,991	1.28%

- When COVID-19 specific drug utilization was segmented by ADI level, the use of all the approved medications generally increased from the least disadvantaged groups to the most disadvantaged groups with the exception of the most disadvantaged group (ADI 81-100). This pattern repeated with the unapproved medications (ivermectin and hydroxychloroquine) except the utilization of these unapproved drugs was highest in the most disadvantaged group. (Figure 6)

Figure 6: Use of COVID-19 Medications by ADI Level



Conclusions

- This study observed a trend in the burden of COVID-19 diagnosis with the least disadvantaged population having a lower incidence of diagnosis and the most disadvantaged having the highest level of COVID-19 diagnosis
- COVID-19 patients in the lower socioeconomic classes were older and more female than in the higher socioeconomic classes
- Pre-index medical utilization was approximately equivalent among the ADI categories; however, pre-index prescription utilization was higher among the most disadvantaged populations
- The use of COVID-19 specific medications was very low across the COVID-19 diagnosed population; however, the use of the unapproved medications ivermectin and hydroxychloroquine was utilized almost half as frequently as any of the approved medications

Limitations

- Patients were assigned to a socioeconomic status based on living within a neighborhood where the median Area Deprivation Index for was calculated at the 3-digit zip code level, therefore, the socioeconomic status may be under or over-estimated for any given patient
- The open-source claims database is subject to missing data hypothetically greater than closed claims; therefore, some diagnoses and medication use may be under reported
- Claims data is subject to incomplete or inaccurate coding, missing data, and the lack of specific billing codes for some conditions
- The use of ivermectin and hydroxychloroquine for approved indications may have overestimated the presumed use for COVID-19

References

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4. Kind AJH, Buckingham W. Making Neighborhood Disadvantage Metrics Accessible: The Neighborhood Atlas. *New England Journal of Medicine*, 2018. 378: 2456-2458.

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