

Healthcare Resource Utilization and Costs Associated with Acute COVID-19 in Adult Patients Managed in the Primary Care or Hospital Setting in England: A Population-Based Cohort Study

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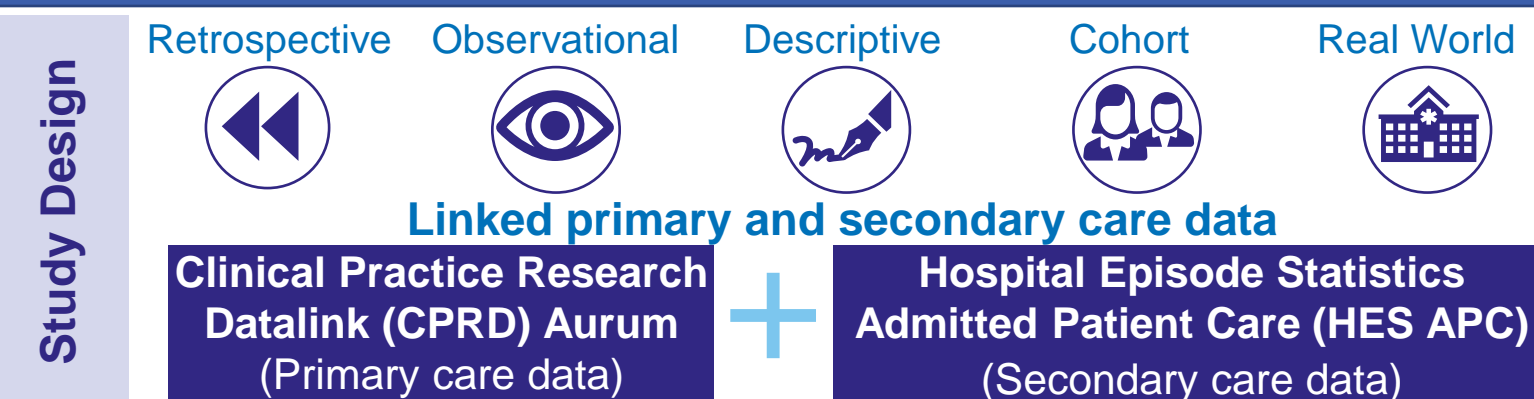
INTRODUCTION

- COVID-19 has caused an estimated ~982,000 s and ~186,000 deaths in England as of March 2023¹ hospitalization
- COVID-19 vaccination has significantly reduced COVID-19-related morbidity and mortality in the UK. However, COVID-19-related hospitalizations remain high², with COVID-19 estimated to cost the UK economy £40 billion in 2020 alone³
- Evidence is needed to describe patient-level costs to the National Health Service (NHS) for the management and treatment of patients with COVID-19

OBJECTIVE

This study aimed to quantify health care resource utilization (HCRU) and costs associated with acute COVID-19 in adult patients managed in the community care or hospital setting in England.

METHODS



Study Cohorts

This study identified patients in **two distinct cohorts**:

Primary Care Cohort:
Patients diagnosed with COVID-19 between 1st August 2020 and 31st March 2021 were included if they did not have a record of a COVID-19-related hospitalization within 84 days of diagnosis. All patients diagnosed on or after 1st April 2021 to January 2022 were included in this cohort, due to end of secondary care data coverage at March 2021.

Secondary Care Cohort:
Patients who had a COVID-19-related hospitalization in the 84 days after testing positive for COVID-19 between 1st August 2020 and 31st March 2021

- Eligibility Criteria**
- Aged ≥18 years
 - Confirmed COVID-19 diagnosis within the specified index period
 - ≥12 months of pre-index continuous registration with a general practitioner (GP)
 - Electronic health record data considered of acceptable research quality
 - Data eligible for linkage to HES

HCRU and associated costs during acute phase COVID-19 (≤4 weeks following positive test):

Primary Care Consultations with GP or Nurse

Hospitalizations

Mechanical Ventilation (MV)

Critical Care (HDU/ICU)
HDU: High Dependency Unit
ICU: Intensive Care Unit

Total Direct Healthcare Costs

All outcomes were stratified by age
(18-49, 50-64, 65-74, 75-84, ≥ 85 years)

RESULTS

Of 1,706,368 COVID-19 cases identified, 1,693,263 were included in the PCC and 13,105 in the SCC cohorts (Table 1)

Table 1. Baseline sociodemographic and clinical characteristics for the Primary Care and Secondary Care Cohorts

	Primary Care Cohort (N=1,693,263)	Secondary Care Cohort (N=13,105)
Age (in years) at indexing		
Mean (SD)	42.3 (15.8)	60.7 (16.0)
≥65, n (%)	151,892 (9.0)	5,134 (39.2)
Sex (female), n (%)	928,546 (54.8)	5,601 (42.7)
Ethnicity (white), n (%)	1,106,974 (65.4)	8,769 (66.9)
2019 Index of Multiple Deprivation		
Quintile 1 – least deprived, n (%)	335,374 (19.8)	2,166 (16.5)
Quintile 5 – most deprived, n (%)	340,894 (20.1)	3,221 (24.6)
Smoking Status (current or ex smoker), n (%)	576,709 (34.1)	5,500 (42.0)
Quan-Charlson Comorbidity Index (score ≥1), n (%)	230,472 (13.6)	6,027 (46.0)
Immunocompromised status		
Immunocompetent, n (%)	1,629,716 (96.2%)	12,924 (98.6%)
Immunocompromised, n (%)	63,547 (3.8%)	181 (1.4%)
Vaccination status at index (immunocompromised)		
Unvaccinated, n (%)	1,154 (1.8)	102 (56.4)
≥1 dose, n (%)	62,393 (98.2)	79 (43.6)
Vaccination status at index (immunocompetent)		
Unvaccinated, n (%)	660,610 (40.5)	12,684 (98.1)
≥1 dose, n (%)	969,106 (59.5)	240 (1.9)

HCRU in the Primary Care Cohort

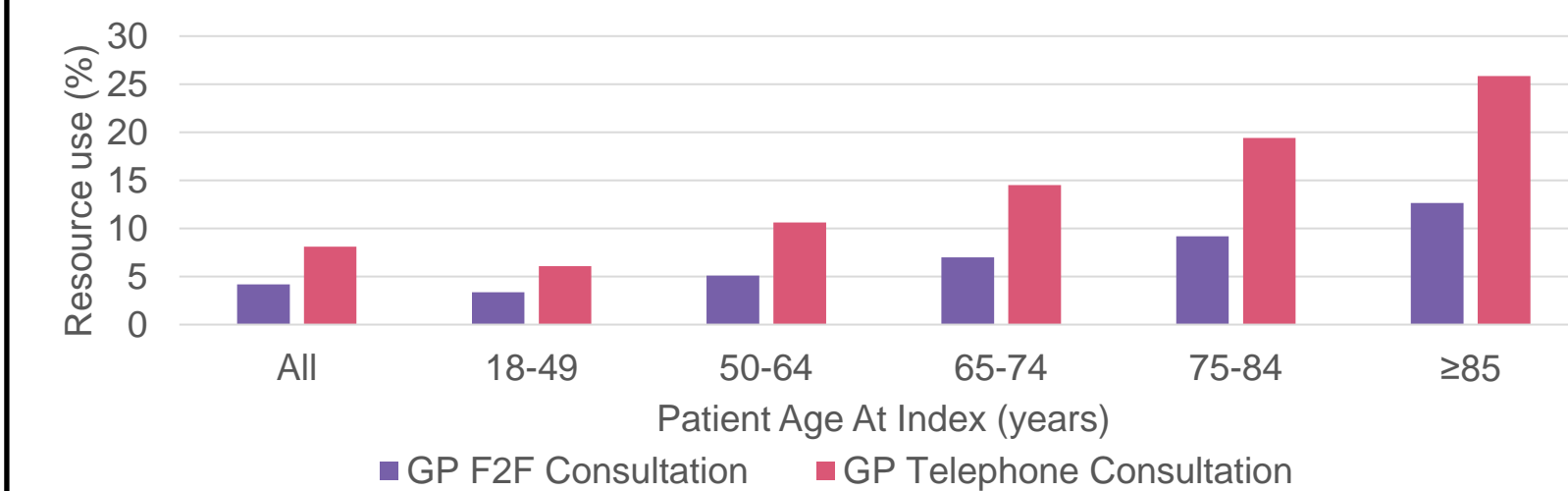
- Primary care (GP or nurse) telephone consultations were more frequent than face-to-face (F2F) consultations across all age groups (Figure 1)
- The proportion of primary care consultations was greater with increasing age, and highest use in the older age group (≥ 85 years), irrespective of consultation method.

Costs in the Primary Care Cohort

- In those with ≥ 1 primary care consultation, mean primary care consultation costs were broadly similar across the age groups, irrespective of consultation type; slightly lower in the youngest age group (18-49 years: F2F, £26; telephone, £17) and higher in the oldest age group (≥85 years: F2F, £27; telephone, £20).

RESULTS (continued)

Figure 1. COVID-19-related GP consultations in resource-users within the Primary Care Cohort



HCRU in the Secondary Care Cohort

- Median overall hospitalization length of stay (LoS) was shorter in the youngest age groups (18-49 years: 5 days), and longer in the oldest age group (≥85 years: 8 days) (Figure 2).
- 14.8% (n=1,934) were admitted to critical care; among these patients, LoS was shortest in those aged ≥85 years (4 days).
- 6% (n=792) of patients within critical care received MV.

Costs in the Secondary Care Cohort

- Mean costs per overall hospitalization were lowest in the youngest and oldest age groups (18-49 years: £10,215; ≥85 years: £10,365), but highest in those aged 65-74 years (£15,655) (Figure 3).
- Mean costs for critical care per hospitalization were highest in the 50-64 and 65-74 age groups (£32,617 and £32,784) and lowest in the ≥85 age group (£8,501).
- Mean costs for non-critical patients per hospitalization were lowest in the youngest age group (18-49 years: £7,516) but highest in the oldest age groups (75-84 years: £10,898; ≥85 years: £10,876).

Figure 2. Median length of COVID-19-related stay in hospital for the Secondary Care Cohort

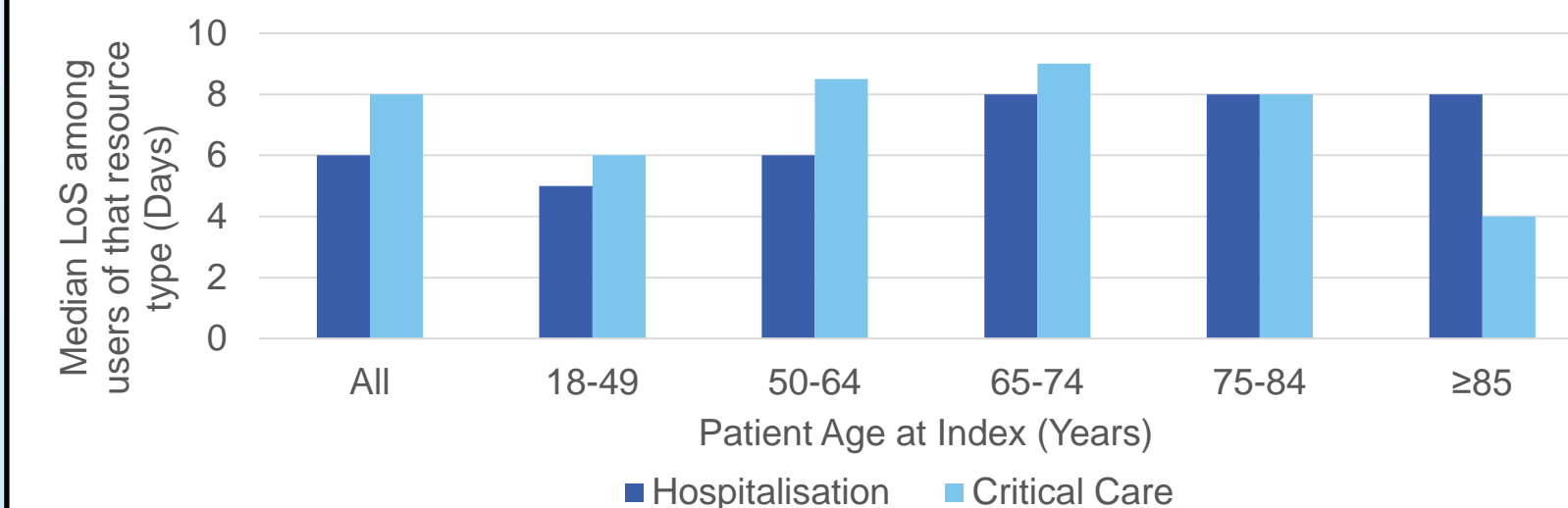
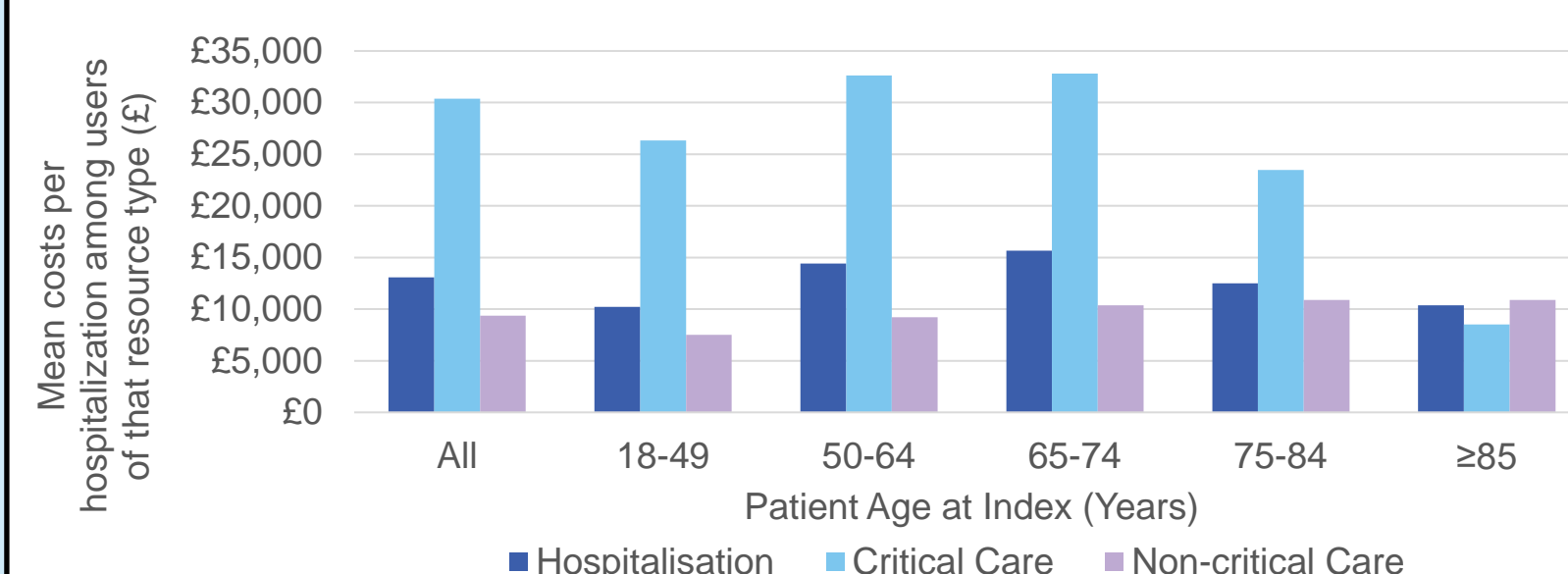


Figure 3. Mean COVID-19-related hospitalization costs for the Secondary Care Cohort



Study limitations

- Due to limited HES APC data availability, some patients included within the PCC (April 2021 onwards) may have been hospitalized
- The study period does not fully capture the impact of the entire pandemic (e.g. omicron), and ongoing impact of COVID-19

Conclusions

- COVID-19 has placed a substantial burden on the NHS in England**
- High HCRU and associated costs have been primarily driven by COVID-19-related hospitalizations and those who received critical care**
- Future research should explore the longer-term clinical and economic burden of COVID-19 and consequences of long COVID on NHS healthcare systems**

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Disclosures and Acknowledgements:

Jingyan Yang, Kathleen M. Andersen, Maya Reimbaeva, Leah McGrath, Carmen Tsang, Tendai Mugwagwa, Kevin Naicker, Diana Mendes, Mary Araghi and Jennifer L Nguyen are employees of Pfizer and may hold stock or stock options. Kiran K. Rai, Theo Tritton, Poppy Payne, Bethany Backhouse and Robert Wood are employees of Adelphi Real World, which received funds from Pfizer to conduct the study and develop the manuscript. **Funding:** Funding for this study was provided by Pfizer Inc. Pfizer Inc. commissioned Adelphi Real World to independently conduct the study.

This study is based in part on data from the Clinical Practice Research Datalink obtained under licence from the UK Medicines and Healthcare products Regulatory Agency. The data is provided by patients and collected by the NHS as part of their care and support. The interpretation and conclusions contained in this study are those of the author/s alone. Copyright © 2021, re-used with the permission of The Health & Social Care Information Centre. All rights reserved. The OPCS Classification of Interventions and Procedures, codes, terms and text is Crown copyright (2016) published by Health and Social Care Information Centre, also known as NHS Digital and licensed under the Open Government Licence available at [www.nationalarchives.gov.uk/doc/open-government-licence-open-government-licence.htm](http://www.nationalarchives.gov.uk/doc/open-government-licence/open-government-licence.htm).

CPRD's Research Data Governance (RDG) committee approved this study (CPRD study ID: 22_002062) in July 2022 prior to obtaining the data relevant to the project. This study complied with all applicable laws regarding subject privacy. As all patient-level data were fully anonymised, and no direct patient contact or primary collection of individual patient data occurred, patient consent was not required.

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