



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

# Capacity planning for acute hospital inpatient care and adult critical care in England: a descriptive study using hospital administrative data

Violeta Balinskaite, Alex Bottle, Paul Aylin

## Abstract

**Background** At the beginning of the COVID-19 pandemic in March and April, 2020, there was a focus on accommodating an anticipated surge of patients with COVID-19 in acute hospitals. We aimed to estimate the potential for freeing up capacity in acute hospitals in England.

**Methods** In this descriptive study, we used admitted patient and adult critical care records from Hospital Episode Statistics (a database containing details of attendances at National Health Service acute hospitals in England) from 2018/19 to estimate historical numbers of inpatients. Each admission was grouped into emergency, maternity, and elective, with elective split by the presence or absence of cancer in the primary diagnosis. We further stratified the population by age and frailty, which we estimated with an index using International Statistical Classification of Diseases and Related Health Problems (tenth revision) codes in diagnosis fields. We used the (then current) National Institute for Health and Care Excellence (NICE) 2020 guidance on critical care pathways as a framework to examine four scenarios that limited access to beds for specific patient groups. This study was approved by the Secretary of State and the Health Research Authority under Regulation 5 of the Health Service (Control of Patient Information) Regulations 2002 to hold confidential data and analyse them for research purposes (CAG ref 15/CAG/0005). We have approval to use these data for research into the quality and safety of health care, from the London–South East Ethics Committee (REC ref 20/LO/0611).

**Findings** Between April 1, 2018, and March 31, 2019, 8957521 adults were admitted (7372040 [82.3%] emergency, 295598 [3.3%] elective with cancer, 850964 [9.5%] elective without cancer, and 438919 [4.9%] maternity admissions), and 974038 critical care episodes were recorded. Our analysis suggested that up to 70% of all acute inpatient beds could be released if only maternity, cancer, and emergency patients younger than 65 years were admitted; if non-frail patients aged 65 years and older were also admitted, 41% of beds could be freed up. Similarly, if only maternity, cancer, and emergency patients younger than 65 years were admitted to critical care beds, that might free up to 56% of adult critical care beds; if non-frail patients aged 65 years and older were also admitted, 30% of critical care beds could be freed up.

**Interpretation** Given a crisis in health-care capacity, it seemed appropriate to model some difficult options based on NICE guidelines. We identified scope for freeing up total acute and critical care beds by postponing elective non-cancer admissions as a short-term measure during the first wave of COVID-19 (March to June, 2020) in England. The NICE guidelines were criticised by patient groups and have since been updated (NG191). Administrative data can inform planning for future crises albeit with limitations on estimating individual patient need, and deep social and ethical considerations. Our estimates were incorporated into a modelling tool for hospital provision during the pandemic.

**Funding** Dr Foster Intelligence.

**Copyright** © 2021 Published by Elsevier Ltd. All rights reserved.

### Contributors

AB and PA conceived and designed this study. VB did the analysis. All authors have seen and approved the final version of the Abstract for publication.

### Declaration of interests

We declare no competing interests.

### Acknowledgments

This study was supported by Dr Foster Intelligence (a wholly owned subsidiary of Telstra Health). We are grateful for support from the UK National Institute for Health Research (NIHR) under the Applied Research Collaboration for NW London. The views expressed in this publication are those of the authors and not necessarily those of the UK National Health Service, the NIHR, or the UK Department of Health.

Published Online  
November 26, 2021

Dr Foster Unit, Primary Care  
and Public Health Department,  
Imperial College London,  
London, UK (V Balinskaite PhD,  
Prof A Bottle PhD,  
Prof P Aylin FRCPE)

Correspondence to:  
Dr Violeta Balinskaite,  
Dr Foster Unit, Imperial College  
London, London EC4Y 8EN, UK  
v.balinskaite@imperial.ac.uk