

Original Article

Multicenter Evaluation of 434 Hospital Deaths From COVID-19: How Can We Improve End-of-Life Care During a Pandemic?



Felicity Dewhurst MBBS, MRCP, MD, Hannah Billett MBChB MRCP BSc, Lauri Simkiss MBBS MRCP, Charlotte Bryan MBChB MRCP, Julie Barnsley MBBS MRCP, Max Charles MRCP MBBS PGCE, Elizabeth Fleming MBBS Dip Pal Med, Jennifer Grieve Nurse Specialist BSc (Hons), Sade Hacking MBBS, Kate Howorth MRCP MBBS BSc DTM&H Diploma in Medical Education, Amy Huggin MBBS MRCP, Emily Kavanagh MBBS, MRCP, Cert Pall Care, Cert Med Ed, Rachel Kiltie MBChB MRCP, Lucy Lowery MBBS MRCP, Dene Miller Nurse Specialist BSc (Hons), Alex Nicholson MBBS, FRCP, Lucy Nicholson BSc, MBBS, MRCP, Ann Paxton B. Med.Sci, MBBS, MRCP, Anna Porteous MBBS MRCP, Grace Rowley MBChB MRCP, Kaly Snell MBBS, FRCP, Leena Srivastava MBBS, FRCP, Elizabeth Woods MBChB, MRCP, Elizabeth Zabrocki Nurse Specialist BSc (Hons), and Katherine Frew MBChB, FRCP, PHD

Population Health Sciences Institute, Newcastle University (F.D.), Centre for Ageing and Vitality, St Oswald's Hospice, Newcastle, Tyne and Wear, United Kingdom; Northumbria Healthcare NHS Foundation Trust (H.B., C.B., E.F., J.G., S.H., D.M.); Health Education England North East (L.S., M.C., K.H., A.H., E.K., R.K., G.R.); North Tees and Hartlepool NHS Foundation Trust (J.B., L.L.); County Durham and Darlington NHS Foundation Trust (A.N., L.N.); South Tyneside and Sunderland NHS Foundation Trust (A.P., A.P.); Newcastle upon Tyne Hospitals NHS Foundation Trust (K.S., E.W., E.Z.); Gateshead Health NHS Foundation Trust (L.S.); Population Health Sciences Institute, Newcastle University (K.F.), Northumbria Healthcare NHS Foundation Trust

Abstract

Context. The pandemic has substantially increased the workload of hospital palliative care providers, requiring them to be responsive and innovative despite limited information on the specific end of life care needs of patients with COVID-19. Multi-site data detailing clinical characteristics of patient deaths from large populations, managed by specialist and generalist palliative care providers are lacking.

Objectives. To conduct a large multicenter study examining characteristics of COVID-19 hospital deaths and implications for care.

Methods. A multi-center retrospective evaluation examined 434 COVID-19 deaths in 5 hospital trusts over the period March 23, 2020 to May 10, 2020.

Results. Eighty three percent of patients were over 70.32% were admitted from care homes. Diagnostic timing indicated over 90% of those who died contracted the virus in the community. Dying was recognized in over 90% of patients, with the possibility of dying being identified less than 48 hours from admission for a third. In over a quarter, death occurred less than 24 hours later. Patients who were recognized to be dying more than 72 hours prior to death were most likely to have access to medication for symptom control.

Conclusion. This large multicenter study comprehensively describes COVID-19 deaths throughout the hospital setting. Clinicians are alert to and diagnose dying appropriately in most patients. Outcomes could be improved by advance care planning to establish preferences, including whether hospital admission is desirable, and alongside this, support the prompt use of anticipatory subcutaneous medications and syringe drivers if needed. Finally, rapid discharges and direct hospice admissions could better utilize hospice beds and improve care. *J Pain Symptom Manage* 2021;61:e7–e12. © 2021 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Address correspondence to: Felicity Dewhurst, MBBS, MRCP, MD, Diploma Health Professions Education, Population Health Sciences Institute, Newcastle University, Centre for Ageing and

Vitality, St Oswald's Hospice, Newcastle, Tyne and Wear, United Kingdom. E-mail: drfelicitywerrett@doctors.org.uk

Accepted for publication: 5 February 2021.

Key Words

COVID-19, Deaths, Hospital, End of life care, Palliative, Characteristics

Key Message

This article describes a large multicenter retrospective evaluation of COVID-19 deaths and the care provided. Clinicians are alert to and diagnose dying appropriately in most patients. Care could be improved by advance care planning and the prompt use of anticipatory subcutaneous medications and syringe drivers.

Introduction

Palliative care has improved patient and family experience during the pandemic despite multiple challenges.^{1–3} Recent studies, in the hospital setting, focus on patients referred to specialist palliative care (SPC),⁴ observing patients have a shorter prognosis and higher in-hospital mortality and symptom burden than ‘typical’ SPC caseloads.⁵ Most symptoms are controlled with modest doses of opioids and benzodiazepines⁶ and early syringe driver use is important.⁴ Different phenotypes have been observed including; fulminant COVID-19, atypical presenters and those that stabilize then rapidly deteriorate.^{6,7}

This study responds to the need for data on hospital deaths from large multi-site studies.^{2,8,9} Patients referred to SPC are likely unrepresentative of all COVID-19 hospital deaths, which were analyzed in this study to get a true picture of care and to ascertain if dying is being identified appropriately. The COVPALL study¹⁰ has demonstrated a significant increase in the workload of hospital palliative care providers whilst hospices remain less affected. Improved understanding of the trajectory of a death from COVID-19 will help plan better utilization of resources across sites.

Methods

This multicenter retrospective audit included 5 NHS Foundation Trusts: County Durham and Darlington, Gateshead, Newcastle, Northumbria, South Tyneside and Sunderland. These hospitals serve populations who had among the highest COVID-19 prevalence during the first wave. The work was registered with service evaluation teams.

Patients who died in hospital in alternate weeks between March 23, 2020 and May 10, 2020 were included if they had a positive nasopharyngeal swab for COVID-19 just prior to or during their in-patient stay. Data collection proformas were produced independently in two NHS Foundation Trusts (South Tees and Northumbria) by SPC physicians who were

experienced in providing care to hospital patients with COVID-19 at the start of the pandemic (HB, CB, KF). The data collected was (in the opinion of local SPC multidisciplinary teams) information required to understand how COVID-19 patients were dying and how care could be improved. These proformas were amalgamated and repeated review with all authors made the proforma fit for purpose across all sites. A data collection guide provided detailed instructions. For example: Symptoms were defined as COVID-19 related symptoms, if they included shortness of breath, cough, sore throat, anosmia/dysgeusia, gastrointestinal upset OR general malaise AND the clinical impression was COVID-19. The symptoms were recorded as Non-COVID-19 related if no clinical concern of COVID-19 was highlighted e.g. symptoms clearly indicating acute cerebrovascular/cardiovascular disease or trauma. Guidance also advised if and when to record that the possibility of dying was recognized by the clinical team. This included first documentation that the person was “at risk of further deterioration,” “sick/ill enough to die,” “approaching end of life,” or “dying.” This included (but was not exclusive to) care of the dying patient documentation completion.

Data were extracted from medical and nursing notes by clinicians with knowledge of local note keeping systems AND palliative care experience. Data that were unavailable from electronic/paper medical/nursing notes and medicine charts were left blank. However, if no reference was made to specific symptoms or administration of medication these were recorded as not present or not given. Given the size of the study statistical adjustment was not made for missing data. Simple descriptive statistics were used to describe the audit data, the Chi Square statistic was used to test the relationship between categorical variables, Kaplan-Meier plots and log rank tests were used to investigate differences in the survival distribution on the basis of age and number of comorbidities.

Results

434 deaths from COVID-19 occurred over the study period. Most deaths occurred in the elderly population with progressively fewer people in the younger age groups: 235 (54.1%) were aged 80 or over, 124 (28.6%) were aged 70–79, 46 (10.6%) were aged 60–69, 21 (4.8%) were aged 50–59 and 8 (1.9%) were aged less than 50. 54.6% were male, 45.4% were female. A total of 138 (31.8%) of all patients were

admitted from a care home, 258 (59.4%) from home and the remainder were admitted from another community location e.g. sheltered accommodation or supported living. Around 95.5% were white British (representative of the background population).

Most patients who died from COVID-19 were admitted for COVID-related symptoms ($n = 345$, 79.5%). This, together with the fact that 82.7% of positive tests occurred within seven days of admission (36 [8.3%] were positive before admission, 174 [40.1%] on the day of admission, 80 [18.4%] day 1 post admission, 26 [6.0%] day 2 post admission, 43 [9.9%] day 3–7 post admission), indicates that most infection occurred in the community. 17.3% of patients had a late positive swab (>seven days post admission); 33.8% of these patients were admitted with COVID related symptoms indicating the possibility of false negative tests.

Time frame analysis was available on 364 patients (Table 1). The possibility of dying was recognized in over 90% of patients. The possibility of dying was less likely to be identified in patients receiving ward-based care (92.1%) compared to those receiving higher level care (98.0%) ($P = .039$). The possibility of dying was recognized in a third of all patients less than 48 hours from admission. A higher proportion of those dying in higher level care were recognized to be dying within the last 24 hours of life compared with those in ward level care, although this difference was not statistically significant ($P = .158$). Survival distributions were similar for all age categories, and number of comorbidities (all log rank tests $P > .05$), meaning no firm conclusions could be drawn to guide prognostication (Fig. 1).

Prescribing at the end of life was evaluated in 297 patients (patients receiving care in HDU/ITU [$n = 38$], those in whom dying was not identified [$n = 23$] and those with data omissions [$n = 6$] were excluded). Anticipatory medication to treat common symptoms in the last days of life was prescribed for all 5 indications¹¹ in 90.2%. The proportion of those prescribed all anticipatory medicines was lower in those where dying was recognized less than 24 hours before death (86.7%) than in those where it was recognized more than 24 hours before death (92.5%) however this difference was not statistically significant ($P = .207$). This was equally true of syringe driver use. In those where dying was recognized less than 24 hours prior to death, syringe drivers were prescribed in 27.7%. If dying was recognized more than 24 hours prior to death, syringe drivers were prescribed in 51.4% ($P = .003$). Patients were more likely to require breakthrough medication in the last 24 hours of life if the possibility of dying was identified in the last 72 hours of life. This was more pronounced and statistically significant for benzodiazepines (60.4% vs. 46.0% [$P = .0182$]) than for opioids, which was not statistically significant (57.4% vs. 49.0% [$P = .171$]). This data **indicates** that there was an

increased likelihood of a patient being asymptomatic (not requiring breakthrough medication) and being on a syringe driver if the possibility of dying was recognized earlier. The doses of opioids and benzodiazepines received were relatively modest (Table 1).

Discussion

This large dataset detailing COVID-19 hospital deaths demonstrates that the possibility of dying was recognized in more than 90% of patients. The phrase “possibility of dying” was explicitly decided upon by the multi-site steering group to reflect that a person was “sick enough to die”¹² despite clinicians dealing with a novel disease with an uncertain trajectory and different treatments being regularly introduced. While acknowledging this important distinction in the phrase used, these results are similar to a national audit of patients who died in hospitals before the COVID-19 pandemic, where dying was recognized in 88% of patients.¹¹ In this (pre-COVID-19) audit, more patients were identified as dying in the last 24 hours of life than in our COVID-19 data (36% and 26.4% respectively). This may be due to health-care professionals being alert to the grave consequences of the virus or the use of the terminology “possibility” of dying.

This study demonstrates that the possibility of dying was identified in most, however this was often shortly before death. This may present challenges to facilitating individualized care plans and supporting wishes and preferences. Patients may be too unstable for transfers to alternative settings for end of life care; proactive palliative care in hospital is essential to ensure optimal end of life care in the last days of life. For those who are more stable, and for whom the possibility of dying was identified more than 48 hours prior to death, the use of a hospice may be possible, beneficial and appropriate given the relatively low hospice bed occupancy in the first wave and the likely exponential increase in hospital bed pressures over winter.¹⁰ This data did not determine how such patients would be identified and more research is needed on this.

A third of patients were admitted from nursing homes and hospital admission may not have enhanced their care. Improved communication between hospices, care homes and GP services could increase the number of patients able stay at home or be directly admitted to hospices for the dying phase if symptoms are problematic.

Overall, syringe drivers and anticipatory medication were prescribed in a similar percentage in COVID-19 deaths compared with non COVID-19 deaths (where they were prescribed in 37% and 89% respectively).¹¹ Where the possibility of dying was identified closer to death, patients required more reactive medication

Table 1
Key Time Points During Admission in Relation to Level of Care and Medication Administration

Places of Care During Admission (n = 364)	Overall Length of Stay	Admission to Recognition of Dying	Recognition of Dying to Death	Recognition of Dying to Death ~ HDU/ITU	Recognition of Dying to Death – Level 2 Care	Recognition of Dying to Death – Basic Ward
0–24 hours	17 (4.7%)	84 (23.0%)	96 (26.4%)	12 (31.6%)	20 (32.8%)	62 (23.4%)
1–3 days	61 (16.8%)	65 (17.9%)	126 (34.6%)	10 (26.3%)	24 (39.3%)	93 (35.2%)
3–7 days	108 (29.7%)	80 (21.9%)	86 (23.6%)	7 (18.4%)	13 (21.3%)	67 (25.4%)
7–14 days	99 (27.2%)	60 (16.5%)	26 (7.1%)	9 (23.7%)	2 (3.3%)	16 (6.1%)
14–21 days	34 (9.3%)	24 (6.6%)	4 (1.1%)	0 (0.0%)	0 (0.0%)	4 (1.5%)
21–28 days	25 (6.9%)	11 (2.6%)	2 (0.5%)	0 (0.0%)	0 (0.0%)	2 (0.8%)
28 days +	20 (5.5%)	17 (3.0%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
		Dying not identified	identified	0 (0.0%)	2 (3.3%)	21 (8.0%)
			identified	38 (100%)	59 (96.7%)	244 (92.1%)

Medications prescribed in the last 24 hours of Life (n = 297)						
Timing prior to death dying identified	Anticipatory Medications for all 5 symptoms	Anticipatory medication prescribed but incomplete	No Anticipatory medication prescribed	Syringe Driver Prescribed	PRN opioid Received	PRN Benzodiazepine Received
< 24 hours (n = 83)	72	3	8	23 (27.7%)	43 (51.8%)	44 (53.0%)
24–72 hours (n = 114)	104	3	7	59 (51.8%)	70 (61.4%)	75 (65.7%)
3 to 7 days (n = 77)	71	4	2	40 (51.9%)	39 (50.6%)	36 (46.8%)
More than 7 days (n = 23)	21	0	2	11 (47.8%)	10 (43.4%)	10 (43.5%)

Timing of recognition of possibility dying	PRN Opioid Received in final 24 hours					
	Yes - N/162	Number doses		Total OME 24h dose (mg)		No - N/135
		Median	Range	Median	Range	
< 24 hours	43	2	1–5 (IQR 1–2.5)	10	2–30 (IQR 5–15)	40
24–72 hours	70	2	1–9 (IQR 1–2)	7.5	2–120 (IQR 5–15)	44
3–7 days	39	1	1–5 (IQR 1–2)	5	3–50 (IQR 5–10)	38
> 7 days	10	1	1–2	5	3–5	13

Timing of recognition of possibility dying	PRN Benzodiazepine Received in final 24 hours					
	Yes - N/165	Number doses		Total 24h dose (mg)		No - N/132
		Median	Range	Median	Range	
< 24 hours	44	1.5	1–6 (IQR 1–3)	2.5	2.5–25 (IQR 2.5–7.5)	39
24–72 hours	75	2	1–8 (IQR 1–3)	5	2.5–20 (IQR 2.5–7.5)	39
3–7 days	36	2	1–4 (IQR 1–2)	5	2.5–20 (IQR 2.5–5)	41
> 7 days	10	1.5	1–5 (IQR 1–2.75)	3.8	2.5–12.5 (IQR 2.5–6.875)	13

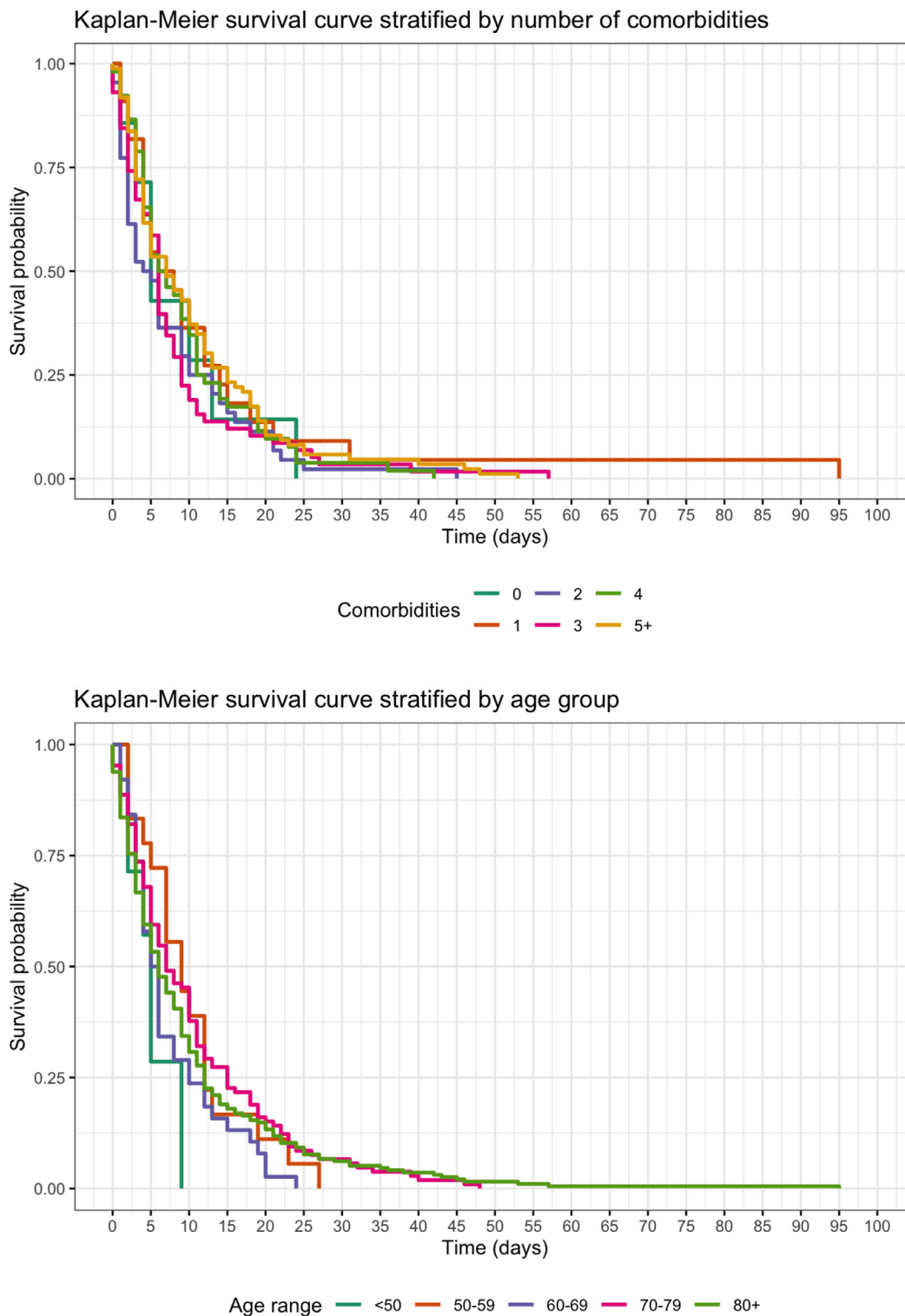


Fig. 1. Kaplan-Meier survival curve stratified by comorbidities and age group.

administrations and were less likely to be prescribed a syringe driver. It is our opinion that there should be a low threshold for prescribing symptom control medications for those with prognostic uncertainty.

The collection of this large regional dataset required collaboration and utilized multiple

personnel. Individuals all had palliative care experience and variance in entry requirements was reduced by a data entry guide. Due to the novel nature of COVID-19, timeframes reported related to the possibility of dying rather than the diagnosis of dying.

Conclusions

This large multi-center study comprehensively describes COVID-19 deaths in hospitals. The possibility of dying was recognized in a vast majority, leading to anticipatory prescribing for commonly experienced symptoms in over 90%. A proportion of patients may be stable enough to consider alternative options for end of life care, potentially enhancing hospice utilization and optimizing acute hospital beds use. Community based advance care planning may be able to identify those who don't want and/or would not benefit from hospital admission.

Disclosures

The named authors have nothing to disclose.

Acknowledgments

The authors gratefully acknowledge Dr Daniel Stow PHD from Newcastle University who provided statistical consultation.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Wu Z, McGoogan J. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese center for disease control and prevention. *JAMA* 2020;323:1239–1242.
2. Etkind S, Bone A, Lovell N, et al. The role and response of palliative care and hospice services in epidemics and pandemics: a rapid review to inform practice during the COVID-19 pandemic/j.painsymman.2020.03.029. *J Pain Symptom Manage* 2020;60:e31–e40.
3. Selman LE, Chao D, Sowden R, Marshall S, Chamberlain C, Koffman J. Bereavement support on the frontline of COVID-19: recommendations for hospital clinicians. *J Pain Symptom Manage* 2020;60:e81–e86. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/32376262%0A>. <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC7196538>.
4. Lovell N, Maddocks M, Etkind SN, et al. Characteristics, symptom management and outcomes of 101 patients with COVID-19 referred for hospital palliative care. *J Pain Symptom Manage* 2020;60:e77–e81. <https://doi.org/10.1016/j.jpainsymman.2020.04.015>.
5. Hetherington L, Johnston B, Kotronoulas G, Finlay F, Keeley P, McKeown A. COVID-19 and hospital palliative care – a service evaluation exploring the symptoms and outcomes of 186 patients and the impact of the pandemic on specialist hospital palliative care. *Palliat Med* 2020;34:1256–1262.
6. Jackson T, Hobson K, Clare H, Weegmann D, Moloughney C, McManus S. End-of-life care in COVID-19: an audit of pharmacological management in hospital inpatients. *Palliat Med* 2020;34:1235–1240. 2020;34(9):1235–40.
7. Turner J, Eliot Hodgson L, Leckie T, Eade L, Ford-Dunn S. A dual-centre observational review of hospital based palliative care in patients dying with COVID-19. *J Pain Symptom Manage* 2020;60. e75–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/32387139>.
8. National Institute for Health and Care Excellence (NICE). COVID-19 rapid guideline: managing symptoms (including at the end of life) in the community. *Natl Inst Heal Care Excell* 2020. <https://doi.org/10.1136/bmj.m1461>.
9. NICE. COVID-19 rapid guideline: critical care in adults. *Natl Inst Heal Care Excell* 2020: 2020.
10. Bradshaw A, Dunleavy L, Walshe C, et al. Understanding and addressing challenges for advance care planning in the COVID-19 pandemic an analysis of the UK CovPall survey data from specialist palliative care services. *medRxiv* 2020: 1–30. Available from: <https://medrxiv.org/cgi/content/short/2020.10.28.20200725>.
11. Healthcare Quality Improvement Partnership. National Audit of Care at the End of Life. 2019.
12. Oliver D. What to say when patients are “sick enough to die”. *BMJ* 2019;367:6–7. <https://doi.org/10.1136/bmj.l5917>.