Paper ref:	TB (06/20) 019

Sandwell and West Birmingham Hospitals NHS
NHS Trust

Report Title	COVID-19: Mortality - March and April review		
Sponsoring Executive	Dr David Carruthers, Medical Director		
Report Author	Dr Chizo Agwu, Trust Mortality lead/Deputy Medical Director Khalida Begum, Learning from Deaths Facilitator		
Meeting	Trust Board	**Date**	4th June 2020

1. Suggested discussion points *[two or three issues you consider the Committee should focus on]*

COVID-19 pandemic required a rapid change in pathways for hospital care of admitted patients. Our approach to providing best practice and reviewing mortality of cases is reviewed here.
The main questions addressed are:

- How our care pathways have compared to best practice?
- How our outcomes compare to neighbouring providers and why?
- How well all populations served by the Trust have been treated with Covid-19 to date, and anything we need to change in June and July?

The main focus of the paper is on deaths from COVID-19, but also care of patients with non-COVID related illness was also reviewed. This is in line with role of Medical examiners and Learning from Deaths committee. Case note review was undertaken for tier 1 review in 98% of COVID related deaths and 64% of non- COVID deaths. Analysis of data to look at different populations and comparison with National position was undertaken and is presented here.

2. Alignment to 2020 Vision *[indicate with an 'X' which Plan this paper supports]*

Safety Plan	x	Public Health Plan		People Plan & Education Plan	
Quality Plan	x	Research and Development		Estates Plan	
Financial Plan		Digital Plan		Other *[specify in the paper]*	

3. Previous consideration *[where has this paper been previously discussed?]*

Q+S Committee May 2020

4. Recommendation(s)

The Quality and Safety Committee is asked to:

a.	**Note** the approach taken to providing best care to patients with COVID at SWBHT
b.	**Discuss** the mortality data from the analysis of our deaths
c.	**Comment** on the plans for developing improvement work from this analysis

5. Impact *[indicate with an 'X' which governance initiatives this matter relates to and where shown elaborate]*

Trust Risk Register	x	COVID-19 risk register						
Board Assurance Framework	x	SBAF 14						
Equality Impact Assessment	Is this required?	Y		N	x	If 'Y' date completed		
Quality Impact Assessment	Is this required?	Y		N	x	If 'Y' date completed		

SANDWELL AND WEST BIRMINGHAM HOSPITALS NHS TRUST

Report to the Public Trust Board: 4th June 2020

COVID-19: Mortality - March and April review

1. Introduction or background

1.1 The national Pandemic due to COVID 19 infection which has led to an increase in the crude mortality rate of patients admitted to hospital. This report has analysed the mortality data and mortality reviews of clinical care of patients who died at SWBH in the months of March and April. In this paper we examine the following 3 questions:

- How our care pathways have compared to best practice?
- How our outcomes compare to neighbouring providers and why?
- How well all populations served by the Trust have been treated with Covid-19 to date, and anything we need to change in June and July?

2. How our care pathways have compared to best practice?

2.1 At the onset of the pandemic the following processes were undertaken to realign the normal pathways of care to accommodate patients with COVID-19 infection

2.1.1 Creation of **treatment pathways** for specialties for COVID-19 patients. These were reviewed by relevant Group and checked by one of 2 deputy medical directors as part of the Clinical Advisory Group (CAG), created to provide clinical advice related to the COVID pandemic.

2.1.2 Review of Nationally published **guidance from NHSe/I** or from **NICE (Rapid clinical reviews).** On receipt of the guidance, it was sent to the relevant specialty lead with the request to address 3 points:

- Summarise the key points
- Relevance to SWBH
- Actions needed from guidance

Responses were reviewed by representatives of the CAG, any questions presented back to the reviewer and then logged on our tracker document.

In total 55 guidance documents and 28 pathways were reviewed in the first month through the CAG. In April there were 78 and May 32 clinical and operational guides received, now managed through tactical command.

2.1.3 A third arm of CAG under took rapid review of any published research literature for any learning and to help influence treatment choices. This fed into the R+D department which has been highly effective in opening and recruiting to COVID-19 related studies, with 3rd highest recruitment in Midlands and supporting our approach to best practice for our patients.

2.1.4 Where multiple clinical guidance was produced for some areas, the CAG would discuss and bring together clinical pathways into one combined document to help with best practice. This was especially relevant for O_2 therapy and thrombosis prophylaxis and awareness. Early pathway generation also allowed, for example, improved process for care of the deceased.

Compliance with Best Practice is reviewed indirectly through mortality reviews and should now be possible to monitor through Unity (O_2 prescription, proning and VTE prescriptions)

3. How our outcomes compare to neighbouring providers and why?

3.1 Comparative data was sourced for the National position and also for regional comparators. Published data is available for the National position but less so for regional Trusts. From what data is available it appears that SWBH is not a significant outlier. Where published comparators are available they are shown below, comparisons inferred from unpublished data will be provided.

3.2 SWBH mortality data:

3.2.1 A comprehensive retrospective review utilizing existing mortality reviews, electronic records and patient systems was undertaken.

- 289/293 (98.6%) of case notes of patients who were swab positive for COVID-19 had 1st tier mortality review.
- 32 were escalated to structured judgement review (SJR)and a further 10 were scrutinised by Palliative Care team
- Analysis of Mortality data for March and April was undertaken
- Analysis of outcome of patients managed in all inpatient setting, ED, critical care services and respiratory hub
- Review of Complaints relating to mortality received in the 2 months
- Review of Feedback received from Next of Kin by Medical Examiners

3.2.2 Key Findings

33% of all March deaths and 67.7% of all deaths in April were in patients whose swabs were positive for COVID 19.

	March	April	Combined March/April
Total Deaths	**n=206**	**n=332**	**n=538**
Number of elective and non-elective inpatient spells	**7050**	**4503**	
Crude Mortality Rate – Total inpatient deaths	**2.93**	**7.37**	**-**
12 month Cumulative Crude Mortality Rate – Total inpatient deaths	**1.47**	**1.74**	**-**
Inpatient COVID-19 Positive Deaths	**n=64**	**n=221**	**n=285**
ED COVID-19 Positive Deaths	**n=4**	**n=4**	**n=8**

Total COVID-19 Positive Deaths	**n=68**	**n=225**	**n=293**
Crude Mortality for COVID-19 Positive Deaths	**18.63**	**47.47**	**-**
Total deaths not due to being COVID positive	**n=138**	**n=107**	**n=245**
Crude Mortality for deaths due to other causes (NOT COVID)	**2.12**	**2.72**	**-**

3.3 Over the 2 months, crude mortality rate for COVID positive patients at SWBH was 32.5% compared to 33% from National data. Further analysis by NHSE shows that SWBH mortality falls within control limits.

4. How well all populations served by the Trust have been treated with Covid-19 to date, and anything we need to change in June and July?

4.1 Here we consider the demographics of the population studied and the subgroups of patients managed within ICU and with NIV/CPAP on the respiratory Hub

4.1.1 Patient demographics

- Median age of those that died of COVID 19 illness was 80 years (22-103yrs).
- 282/293 (96.2%) of patients had complex past medical histories.
- 67% had hypertension whilst 44% had Diabetes Mellitus
- 61.8% of those that died were male.
- Overall in SWBH over the 2 months, White Caucasians accounted for 52.2% of all deaths, Asian patients 22% and Black African/Caribbean population accounted for 17.7% of all deaths. Our data reflects the move of the pandemic from West Birmingham in march (where Black African Caribbean/African patients made up 38% of all deaths in march) towards Sandwell in April (where Black African Caribbean/African patients made up 19% of deaths in April)
- 70% of those that died in the 2 months were placed on supportive care pathway (SCP/DNACPR) during admission.

4.1.2 Outcome within ICU and on NIV (non-invasive ventilation)

- Overall survival if admitted to ICU at SWBH was 46.6% compared to 34.6% from National data (ICNARC).
- Of the 36 patients managed with NIV in Respiratory Hub in April at SWBH, 28% survived. These patients had ceiling of care as NIV and were not for ICU escalation.

4.2 Medical Examiners obtained feedback from 96 Next of Kin

- 49/96 (51%) - Happy with care
- 44/96 (45.8%) - No issues with care
- 3/96 (3.1%) - Satisfied with care
- Dissatisfied (10.4%)
  - 3/96 (3.1%) expressed dissatisfaction with communications
  - 7/161 (4.3%) expressed issues with care.

- 3 were concerns that NOK may have hospital acquired COVID infection.

4.2.1 Following 1st Tier Mortality review,

- 1/68 (1.5%) were classified as potentially avoidable in March. Following structured judgement review and panel discussion, the death was concluded NOT to have been avoidable. Key lesson was about acknowledgement of results. The details of this case were described in the march report
- No case was classified as potentially avoidable on 1st tier review in April (however following 2nd tier structured judgement review, 2 cases were judged as potentially avoidable). The 2 cases have had additional panel review at the Learning from Deaths Clinical and Professionals mortality review meeting (CAPROM) where it was concluded that they were not avoidable but key lessons and action plans identified.
- Of the 32 cases subjected to Structured Judgement Case note Review, the overall care was judged as adequate, good or excellent in 26 cases while in 6 cases , the reviewers identified many issues in the care they received. These have been highlighted to teams involved so action plans can be developed and monitored.

- Outcome from the SJRs and 1st tier mortality reviews by the medical examiners were discussed at the May 'Learning From Deaths Committee' and the actions from that discussion will be put in place.

4.3 **Nosocomial COVID infection**

4.3.1 Further work is underway to understand hospital acquired (nosocomial) COVID-19 infection and this is an active undertaking at the current time (preliminary data available in appendix, section 16). Whilst the work is underway, key actions have been undertaken to reduce Nosocomial infections in the Trust.

4.3.2 We have defined nosocomial transmission based on time after admission to becoming swab positive. Clinical opinion is also important here as there is a high false negative rate for swabs and some patients with negative swabs originally were managed as COVID based on clinical judgement, with repeat swabbing confirming the diagnosis at a later time point in some cases.

- *Definite Hospital acquired COVID 19:* No clinical suspicion of COVID on admission and develop new onset of respiratory symptoms suggestive of COVID > 14 Days post admission with positive COVID result

- *Probable Hospital acquired COVID 19:* No clinical suspicion of COVID on admission but development of new onset of respiratory symptoms suggestive of COVID > 7 Days post admission and positive COVID result.

- A total of 999 COVID-19 positive patients' data was analysed;

  - We identified 97 patients who became swab positive after 7 days of admission
  - 42/97 died. Further scrutiny of the 42 notes suggest that:

- 30/42 patients in this group most likely acquired COVID-19 in hospital.
- Of these 26 died with COVID related illness, while 4 died of other causes.
- A further 12/42 had symptoms suggestive of COVID-19 illness at presentation though their swabs were negative so are unlikely to have contracted COVID-19 in hospital.

4.4 Case notes of patients who died in SWBH but were either swab negative for COVID-19 or not swabbed as did not have suggestive symptoms were also reviewed as part of the ME process and data from the reviews are summarised here:

- In March, deaths in patients who were swab negative for COVID -19 or deaths were thought not to be due to COVID-19 illness accounted for 77% of all deaths whereas in April, they made up 32.3% of all deaths (March n = 138, April n = 107 deaths)

- 162/245 (64.0%) had a Tier 1 Mortality review

- Details of Tier 1 reviews are shown in appendix 10

- 4 SJR done have been completed to date. 1 case has been identified as receiving overall poor care on SJR and is now subject to further review
- Good practise points identified in both Tier 1 and SJR of Non COVID related deaths include
  - Excellent example of End of life care
  - Prompt nursing triage and recording of observation on arrival to ED.
  - Bladder scan done and documented within 10 minutes of triage to confirm urinary retention.

- Learning points identified include
  - Communication issues
  - Accuracy of Medical Certificate of Cause of Death (MCCD)
  -
  - lack of recognition of the dying patient, Resulting in lack of proactive co-ordinated palliative care
  - Lack of daily Medical Review (1 patient not seen for 3 days)
  - Lack of Senior review in a post op patient
  - Continued vigilance to reduce falls in hospital
  - Multiple Ward Transfers
  - Poor Documentation of procedures e.g. catheterisation

- Feedback from Next of Kin to Medical Examiners

  - Medical Examiners obtained feedback from 46 Next of Kin of deceased patients who were either swab negative for COVID-19 or who were swab negative for Non COVID -19 related or deaths were thought not to be due to COVID-19 illness 24/46 (53%) gave positive comments about the care their relative received

- 22/46 (47%) had issues about the care their relative received. Majority related to communication issues

5. Summary

5.1 Learning from Deaths team has undertaken, with MEs and clinical colleagues, review of higher number of deaths than normal due to COVID-19 deaths. The crude mortality rate is high for both covid and non-covid related deaths and is a reflection of both the high mortality of the infection within hospitalised patients but also the low number of elective and non-elective in patient spells (down by 50%) over this time period.

5.2 Mortality rates are equivalent to national data and also with inferences made about data from local hospitals. Outcome from ICU care was also the same as or better national comparators and there is no data to compare outcome for NIV/CPAP as a ceiling of care.

5.3 Analysis of both covid and non-covid related deaths will continue with review of data through the Learning from Deaths committee.

5.4 As the ward base consolidates to requiring a smaller number of wards for COVID +ve patients, our understanding and examination of nosocomial infection will become all the more important to reduce risk to non-COVID patients.

5.5 67% of our patients who died of COVID-19 had hypertension whilst 44% had Diabetes Mellitus. This is in line with National data which confirmed that patients with both Type 1 and Type 2 diabetes had significantly more risk of mortality compared to general population. Other contributory factors include poor diabetes control and obesity. Patients with hypertension and diabetes and their General Practitioners need to be aware of the increased risk so every effort is made to optimise their clinical management as well as heightened infection control processes to reduce risk of contracting COVID-19.

6. Recommendations

6.1 The Trust Board is asked to:

a. Note the approach taken to providing best care to patients with COVID at SWBHT
b. Discuss the mortality data from the analysis of our deaths
c. Comment on the plans for developing improvement work from this analysis

D Chizo Agwu
Mortality Lead/ Deputy Medical Director
20/05/2020

David Carruthers
Medical Director

Annex 1

CONFIDENTIAL

Sandwell and West Birmingham NHS Trust

Mortality Report: COVID-19 Positive Deaths and Non COVID -19 deaths March/April 2020

Response to NHS England

Report Authors:
Dr Chizo Agwu, Deputy Medical Director/Trust Mortality Lead
Khalida Begum, Learning from Deaths Facilitator

Content

1. Report Outline

The Learning From Deaths Committee analysed the Mortality Review of deaths that occurred in the Trust in the months of April and May 2020(during the pandemic) . The first part of the report focused on deceased patients who were found to be swab positive for SARS COV2 virus.

This report aims to provide an analysis of the mortality statistics aligned to this cohort of patients.
We will discuss the

1. Mortality data /Statistics
2. Comparative data
3. Review of outcome of mortality reviews with a view to answer the following questions
    a. How our care pathways have compared to best practice and what next?
    b. How our outcomes compare to neighbouring providers and why?
    c. How well all populations served by the Trust have been treated with Covid-19 to date, and anything we need to change in June and July?

2. Review Methodology

1. A comprehensive retrospective review utilizing existing mortality reviews, electronic records and patient systems was undertaken.
2. Analysis of Mortality data for March and April
3. Analysis of outcome of patients managed in all inpatient setting , critical care services, respiratory hub and where possible comparison with National data
4. Review of Complaints relating to mortality received in the 2 months
5. Review of Feedback received from Next of Kin by Medical Examiners

3. Case Identification

All cases were identified via the Trusts clinical and information management systems.

4. Report Methodology

In reviewing the identified cases, a number of sources were utilised in order to inform the report. These sources were as follows:

- Healthcare Records
- Medical Certificates of Cause of Death (MCCD)
- Mortality Review Proforma
- Trust Informatics and information systems

The SWBH Mortality Review pathway is a multi-step process, The Medical Examiners conduct Tier 1 mortality review on the SWBH Trust Mortality Review online platform (MRS) which is based on PRISM methodology), identifying any deficiencies or errors in care or cases of good or excellent practice, They identify cases which require more detailed scrutiny .These are escalated to a trained reviewer who utilises the Structured Judgement Review (SJR) tool. Cases where the death are suspected to be avoidable are referred to a multi-disciplinary,

multi-professional panel; Clinical and Professional Review of Mortality (CAPROM) for further review. Due to the increased mortality rate in the months of March and April, many SWBH consultants, senior nurses and senior Trainees were enlisted to contribute to the Tier 1 and Tier 2 Reviews discussed in this report. See appendix 9 for names of Reviewers

5. Details of Mortality Review

Tier 1 Mortality Review:

Of the 293 confirmed COVID-19 positive deaths identified; in march and April, 289/293 (98.6%) received a tier 1 review by either the Medical Examiners or independent clinicians. 245/293 (83.6%) of these were completed on the online Mortality Review Proforma, details are seen in Appendix 1. Whilst a further 44/293 (15.0%) received a review by the Medical Examiners which is documented in the Medical Examiner's log on the Trust shared drive

Note: 74% of all deaths (COVID and Non COVID related deaths) had a first tier mortality Review

Tier 2 Mortality Review (Structured Judgement Review):

Of the 289 cases reviewed, 32 were escalated for further scrutiny in the form of an SJR (7 in March and 25 in April). Ten of which were a random selection to review the quality of care provided, 3 were escalated due to a learning disability flag and 19 were escalated due to potential issues with care for further review. These are highlighted in green in appendix 1

A further 10 randomly selected notes were reviewed by Palliative Care team in order to help assess the quality of End of Life our patients received. See appendix 3

6. Findings

March 2020:

- Total of 206 deaths reported by the Trust. Of those, a total of 68 were in patients confirmed to have positive swabs for COVID-19, (4 died in ED and 64 in patients). An additional 5 cases of COVID-19 was listed on either 1a or 1b of the death certificate, but without a positive swab.

April 2020

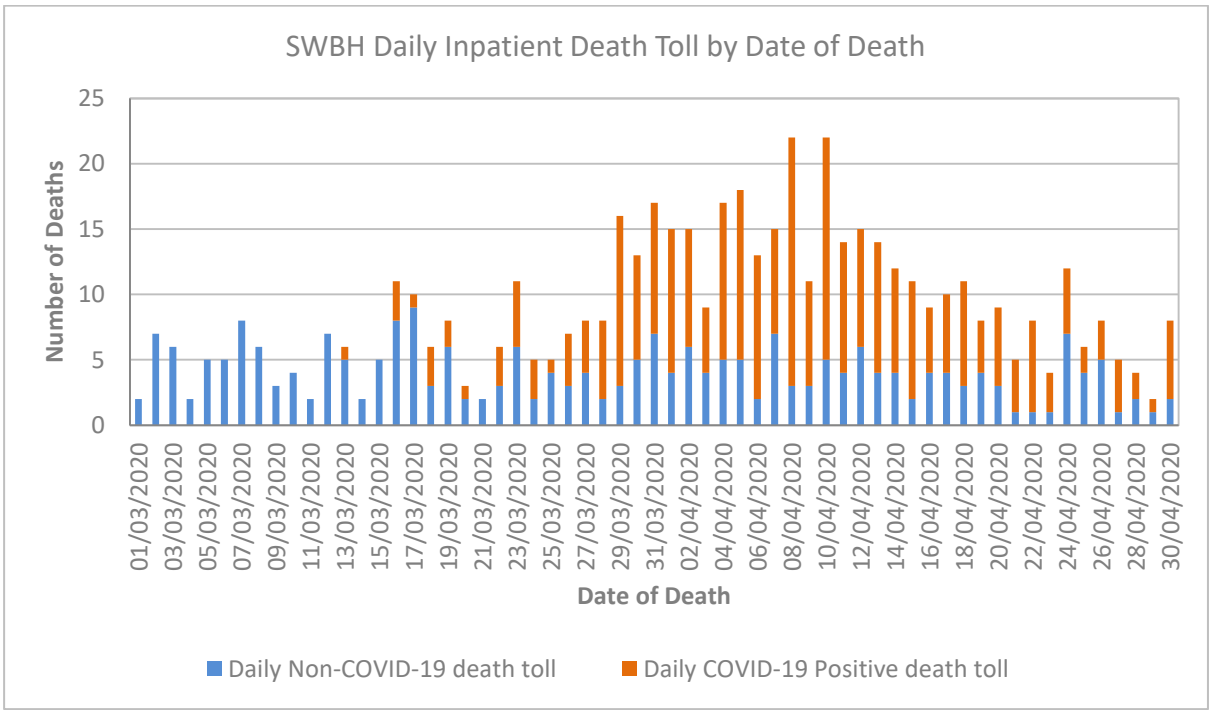
- A total of 332 deaths reported by the Trust. Of those, a total of 225 were confirmed COVID-19 positive deaths (4 died in ED and 221 as in patients). A further 24 cases have been identified where COVID-19 was listed on either 1a or 1b of the death certificate, but without a positive swab.

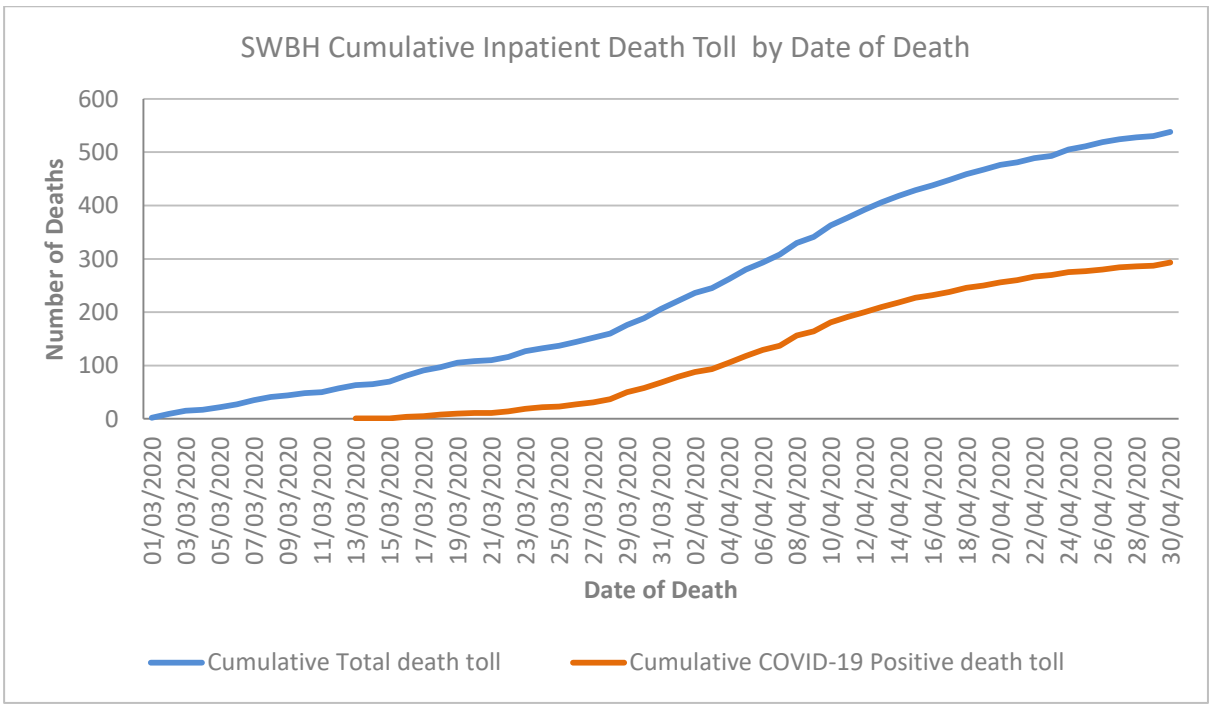
For the purpose of this analysis, we have concentrated on swab positive COVID 19 deceased patients in section 7-22 and on swab negative COVID related or Non COVID related deaths in section 23

7. Mortality Data/Statistics

The months of March and April saw an increase in the daily death toll with the excess mortality accounted for by the COVID pandemic with highest number of death between 8th and 10th April.

- 33% of all March deaths and 67.7% of all deaths in April were In patients with positive swabs for COVID-19





8. Mortality Rate

Total Number of COVID positive patients admitted in SWBH in March and April 2020=899
Total number of Deaths =293
Therefore 32.5% of patients who tested COVID positive and were admitted to SWBH died

9. Comparison with National and Regional data (ISARIC PUBLICATION (NATIONAL DATA)

Review of the first 16,749 people with COVID-19 nationally showed median age was 72 years [IQR 57, 82; range 0, 104], median duration of symptoms before admission was 4 days [IQR 1,8] , median duration of hospital stay was 7 days [IQR 4,12].

Overall, 49% of patients were discharged alive, 33% have died and 17% continued to receive care at date of reporting[1].

Further analysis by NHSE shows that SWBH mortality falls within control limits. See figure below. SWBH is shown as the red dot (arrowed) in the figure below

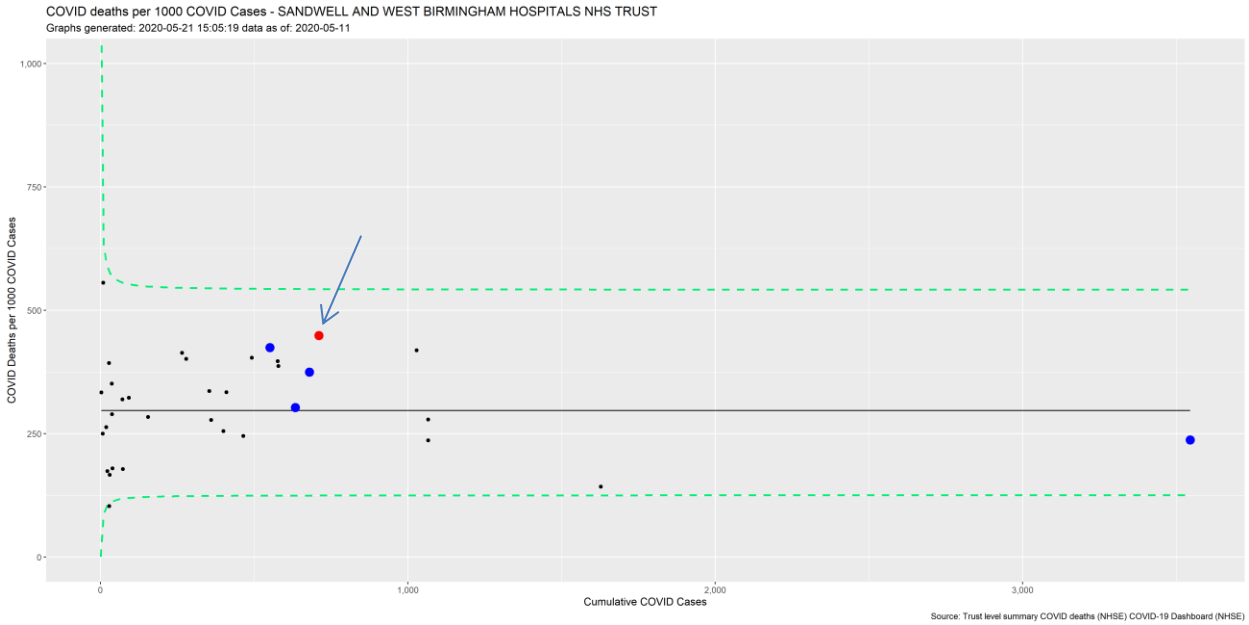
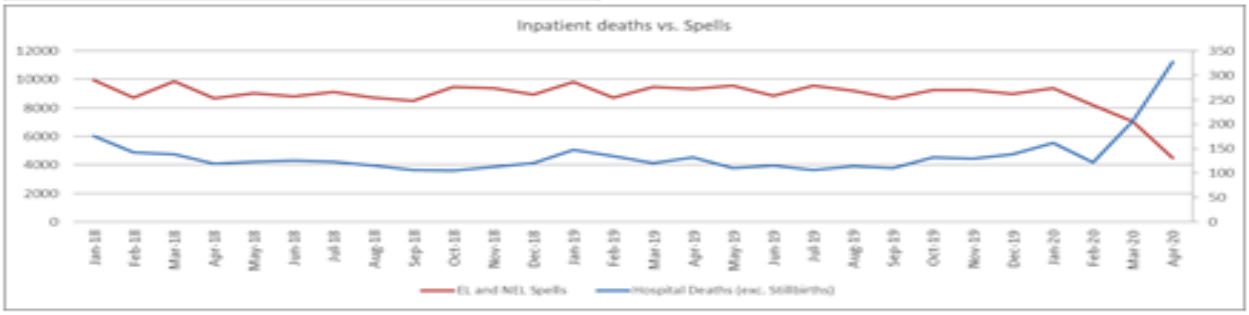


Figure 1

10. Crude Mortality Rate

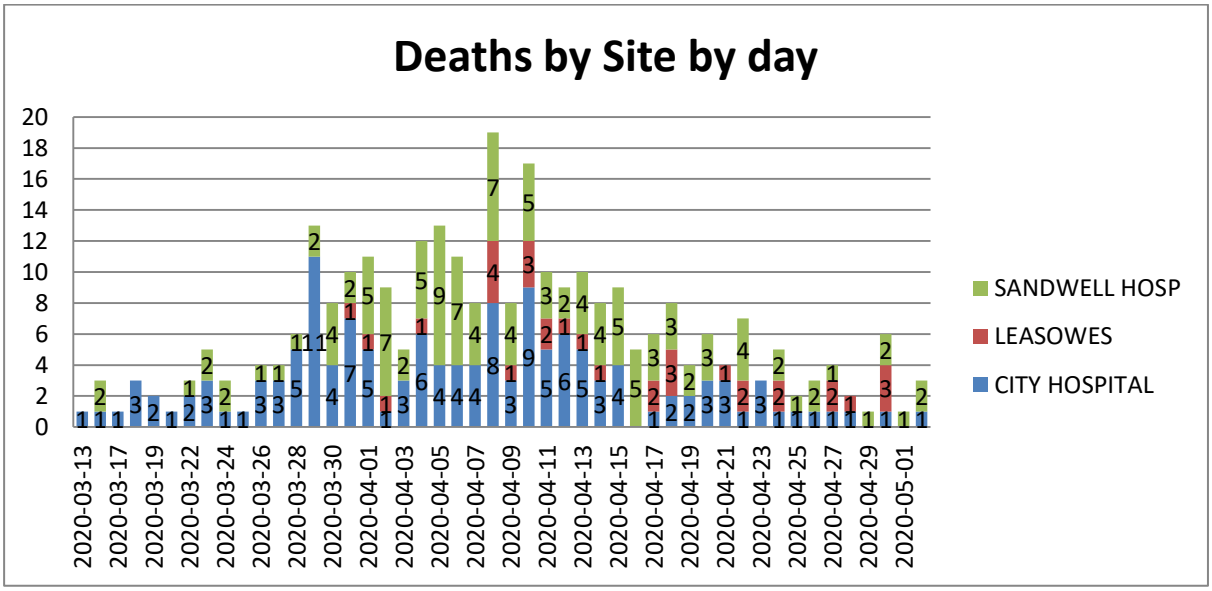
	March	April	Combined March/April
Total Deaths	**n=206**	**n=332**	**n=538**
Number of elective and non-elective inpatient spells	**7050**	**4503**	
Crude Mortality Rate – Total inpatient deaths	**2.93**	**7.37**	**-**
12 month Cumulative Crude Mortality Rate – Total inpatient deaths	**1.47**	**1.74**	**-**
Inpatient COVID-19 Positive Deaths	**n=64**	**n=221**	**n=285**
ED COVID-19 Positive Deaths	**n=4**	**n=4**	**n=8**
Total COVID-19 Positive Deaths	**n=68**	**n=225**	**n=293**
Crude Mortality for COVID-19 Positive Deaths	**18.63**	**47.47**	**-**
Total deaths not due to being COVID positive	**n=138**	**n=107**	**n=245**
Crude Mortality for deaths due to other causes (NOT COVID)	**2.12**	**2.72**	**-**

Crude Mortality



11. Mortality by Site

- The pandemic appeared to start at City Hospital. 72% of all deaths in the Trust in March occurred at City Hospital. Majority died in AMU whilst only 19% died in Intensive Care unit.
- In April however, this changed such that 45% of all deaths occurred in Sandwell site., 40% at City hospital and 14.2% at Leasowes Hospital
- 8 COVID positive patients died in the Emergency department in the 2 months. 4 of these were out of hospital cardiac arrest including one patient who was previously self-isolating at home.



12. Patient Characteristics

- Median age of those that died of COVID 19 illness was 80years (22- 103yrs). 54.6% of those that died were aged between 64-85years of age.
- 282/293 (96.2%) of patients had complex past medical histories. 67% had hypertension whilst 44% had Diabetes Mellitus Appendix2 details the commonest comorbidities found.
- 61.8% of those that died were male.
- 70% of those that died in the 2 months were placed on supportive care pathway (SCP/DNACPR) during admission

13. Ethnicity data

The impact on various ethnicities was dynamic and changed as the weeks went by for City hospital perhaps due to initial community clustering of cases in March

City Hospital: Whilst in March, patients from Black African/Caribbean population accounted for majority of deaths (38%) at City hospital, this high rate did not continue and in April, they accounted for 18.8% of deaths. Patients of Asian origin accounted for 28.6% of deaths in March and 34.2% of deaths in April. White Caucasian accounted for 22% of deaths in March and 32 % of deaths in April

Sandwell Hospital: Patients of white Caucasian origin accounted for 61% of all deaths in March and 74% of all deaths in April.

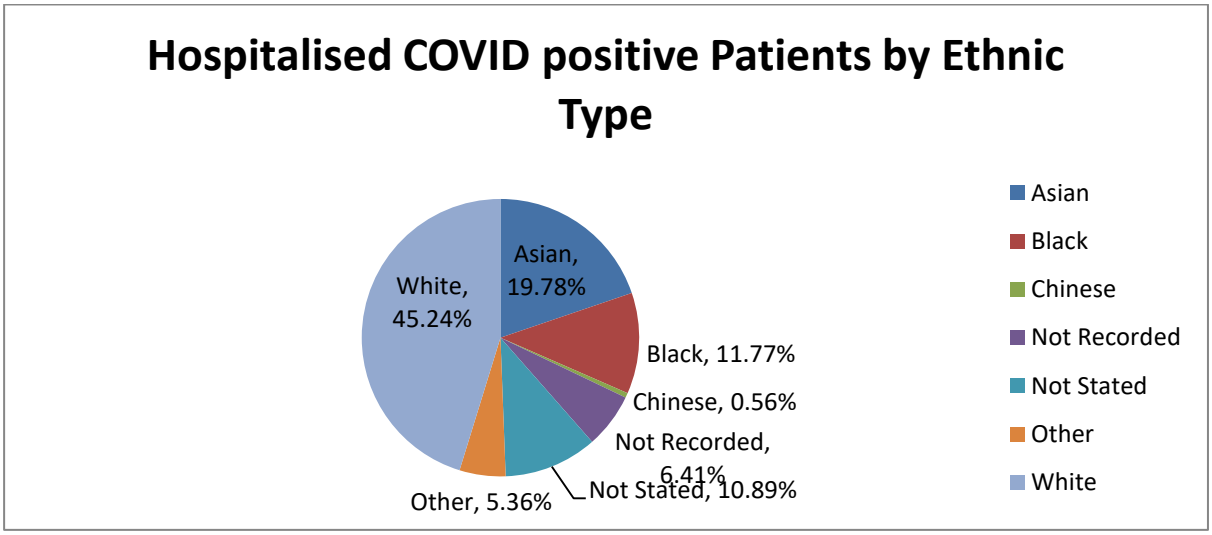
Overall in SWBH over the 2 months, White Caucasians accounted for 52.2% of all deaths, Asian patients 22% and Black African/Caribbean population accounted for 17.7% of all deaths.

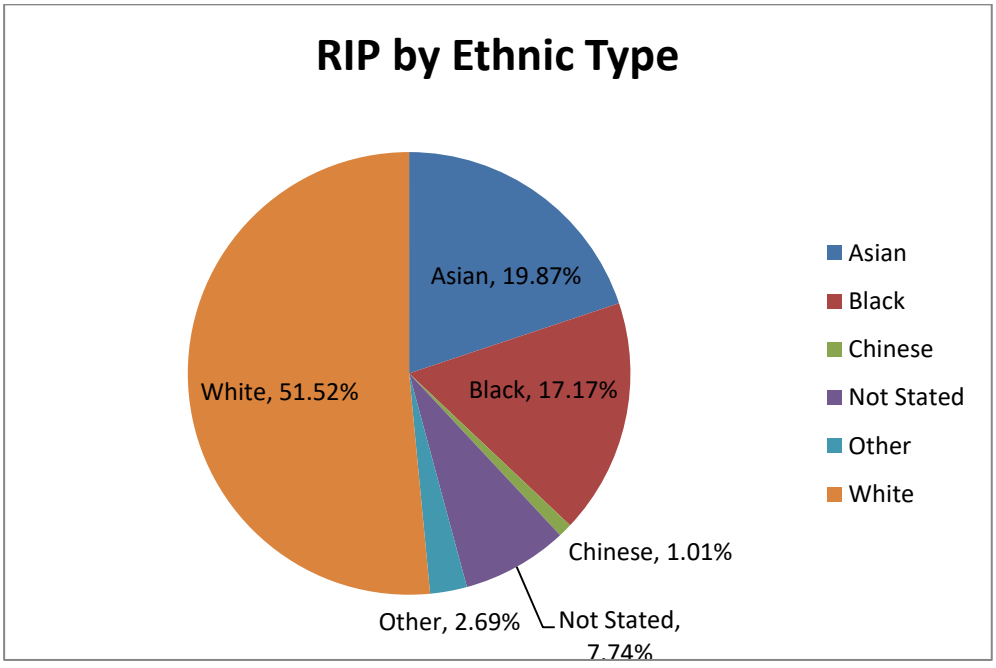
Breakdown by Ethnicity
Deaths by Ethnicity and Hospital Site:

March 2020	City (n=49)	Leasowes (n=1)	Sandwell (n=18)
Asian (Bangladeshi, Indian, Pakistani, Any other background)	14/49 (28.6%)		3/18 (16.7%)
Black (African, Caribbean, Any other Background)	19/49 (38.8%)		2/18 (11.1%)
Other	1/49 (2.0%)		1/18 (5.6%)
Not Known	4/49 (8.2%)		1/18 (5.6%)
White (British, Irish, Any other background)	11/49 (22.4%)	1/1 (100.0%)	11/18 (61.1%)

April 2020	City (n=91)	Leasowes (n=32)	Sandwell (n=102)
Asian (Bangladeshi, Indian, Pakistani)	32/91 (35.2%)	2/32 (6.3%)	10/102 (9.8%)

Black (African, Caribbean, Any other Background)	17/91 (18.7%)	5/32 (15.6%)	9/102 (8.8%)
Mixed ethnicity	2/91 (2.2%)	0/32 (0.0%)	0/102 (0.0%)
Other	0/91 (0.0%)	1/32 (3.1%)	2/102 (2.0%)
Not Known	10/91 (11.0%)	0/32 (0.0%)	5/102 (4.9%)
White (British, Irish, Any other background)	30/91 (33.0%)	24/32 (75.0%)	76/102 (74.5%)





14. Key outcomes for patients admitted SWBH Critical Care unit (CCU)

Over the 2 months, 15.7% (46/293) of patients in SWBH died in CCU

- Overall survival if admitted to ITU at SWBH was 46.6% compared 34.6% (ICNARC National data). There is no statistical difference in our mortality rate compared to National data in those admitted to CCU(55.3% Vs 52.7%) p=0.4
- SWBH data (small numbers) but even with fisher Exact test to account for small numbers, there is no statistical difference in mortality between the 3 ethnic groups, However review of National 1CNARCdata ,shows there is a statistical difference in mortality between white vs Asian vs Black with white patients more likely to survive (p=0.005)

Comparison between National Data (Intensive Care National Audit and Research Centre data ICNARC) and SWBH Intensive care data.

This brief analysis is based on the SWB CCS ICNARC Pandemic datasets for Sandwell and City CCUs. The data for City is for up to 17/04 and for Sandwell for up to 25/04. Both datasets were combined for this analysis.
The ICNARC figures for the last completed report (24/04/2020) are shown in orange (* indicates estimation from a graph within the report)

	National Total number admitted to ITU	National data on Total number deceased	SWBH data on total number admitted to ITU	SWBH data on Total number deceased
White	2553	1227	24	12
Mixed	53	28	2	1
Asian	517	299	21	14
Black	373	208	15	9
Other			10	2

			Complete data set available		
		Total SWB, ICNARC	Survived % SWB, ICNARC	Died % SWB, ICNARC	Incomplete outcome data
Overall		89 patients	46.6, 34.6	53.4, 65.4	16
Age					0
	Mean (IQR) 60 (52 - 71) 59.4 (52 – 68)				
	>70	23	46, 32.1	54, 67.9	2
	50-70	52	42, 48.7	58, 51.3	10
	<50	14	75, 75.2	25, 24.8	4
Sex					0
	M	62% , 71.8	43, 46.7	57, 53.3	
	F	38% , 28.2	54, 55.8	46, 44.2	
Ethnicity					12
	W	38% , 65.7	50, 51.6	50, 48.4	6
	M	3%, 1.6	50, 47.2	50, 52.8	0
	A	34%, 15.4	37, 42.2	63, 57.8	6
	B	21%, 10.7	31, 44.2	69, 55.8	2
	O	6%, 6.6	100, 51.2	0, 48.8	0
BMI					37
	Range	41.8 – 20.29			
	<18.5	0, 0.6			
	18.5 - <25	35%, 26.3	50, 52.0	50, 48.0	6
	25 - <30	23%, 34.6	50, 48.5	50, 51.5	2
	30 - <40	40%, 31.2	50, 50.2	50, 49.8	3
	>40	2%, 7.3	100, 47.4	0, 52.6	
APACHE II Mean	15.6 14.5	IQR 12 – 20 11 - 18	14.3	16.6	
Ventilated		69	37, 34.6	62, 65.4	10
Vent in 1st 24hrs	Yes	43 (53%, 67.2)	35, 40*	71, 60*	4
	No	38	64, 70*	35, 30*	10
Renal support		11	11, 22	88, 78	2

15. COVID positive patients managed with Non Invasive Ventilation in Respiratory Hub between 2/04/20 and 24/04/20 at SWBH

- 36 patients were managed in the Respiratory Hub (a 16-bed unit with a minimum of 4:1 nursing care.) during this time
- The mean clinical Frailty score was 4.5 (This describes a vulnerable cohort, with frailty progressively affecting walking outside alone, and needing help with high order activities of daily living (e.g. heavy housework)
- For many the ceiling of care was non-invasive ventilation (NIV)
- Patients have continuous monitoring and managed by NIV using non-ventilated masks were used to reduce the transmission of SARS-CoV-2 to healthcare workers

Of the 36 patients admitted, 28% survived.

		Total	Survivors	Non-survivors
Number		36	10 (28%)	26 (72%)
M		26	6	20
Ethnicity	Caucasian	15	5	10
	Asian	13	3	10
	Black	8	2	6
Mean BMI		27	26	28
Mean SpO_2 on admission to hospital		89.50%	90%	89%
Mean oxygen supplementation on admission to hospital		6.2L/min	8.8L/min	5.5L/min
Comorbidities	Cardiovascular	13	3 (8%)	10 (77%)
	Diabetes	15	3 (20%)	12 (80%)
	Respiratory	6	3	3
	Immunocompromised	2	1	1
	Malignancy	1	0	1
	Hepatic	1	0	1
Mean Clinical Frailty Score		4.5	5	4

16. Hospital Acquired COVID-19 Deaths (Nosocomial Infections)

Definitions:

Definite Hospital acquired COVID 19: No clinical suspicion of COVID on Admission And Develop new onset of respiratory symptoms suggestive of COVID > 14 Days post admission with positive COVID result

Probable Hospital acquired COVID 19: Clinical suspicion of COVID on admission with initial Negative result followed by worsening of respiratory symptoms > 14 Days post admission and positive COVID result and • No clinical suspicion of COVID on admission but development of

new onset of respiratory symptoms suggestive of COVID > 7 Days post admission and positive COVID result.

A total of 999 COVID-19 positive patients' data was analysed;

9.7% (97/999) patients were positive after day 7 of admission, (4.5% (45/999) patients were positive after 7 to 14 days of admission while 5.2% (52/999) patients were positive after 14 days.)

Demographics:

- 42 female, 52 male
  - Median age female 79, male 74
  - Ethnicity Asian 13 (13.4%) , African Caribbean /African 11 (11.3%) , White Caucasian 54 (55.6%), Others 14 (`14.4%)

42/97 died. Further scrutiny of the 42 notes suggest that:

- 30/42 patients in this group most likely acquired COVID 19 in hospital.
  - Of these 26 died with COVID related illness, while 4 died of other causes.
- A further 12/42 had symptoms suggestive of COVID-19 illness at presentation though their swabs were negative so are unlikely to have contracted COVID-19 in hospital.

Altogether 26/97 (26.8%) patients died with hospital acquired COVID 19 illness

Conclusion: This review suggests that further work is needed to understand the likelihood of developing hospital acquired Covid-19 infection in both blue and red wards .

Key action:

- All in patients are swabbed on admission with quicker test results turnover
- Reiterate need for stringent infection control measures in all areas including red and blue wards

17. Findings from data analysed from the Mortality Review System (MRS)

Analysis of the Cases reviewed in the MRS:

- 1/68 (1.5%) were classified as potentially avoidable in March. Following structured judgement review and panel discussion, the death was concluded NOT to have been avoidable. Key lesson was about acknowledgement of results. The details of this case were described in the march report

- 0/185 (0.0%) were classified as potentially avoidable on 1st tier review in April (however following 2nd tier structured judgement review, 2 cases were judged as potentially avoidable.) These 2 cases have now been discussed at the multi-professional Clinical and Professional Review of Mortality Panel (CAPROM).. They were judged not to be avoidable though there were some lessons to learn. Key action plans have been developed and will be monitored in the Learning from Deaths committee

  The categorization of the deaths reviewed is identified in **Table 1** below.

245 deaths have a completed mortality proforma

Classification	Count	Percentage of Total
Delayed diagnosis (delay in making the correct diagnosis and providing timely medical care with potential contribution to early mortality) (ED CASE)	1	0.4%
Due to terminal illness	2	0.8%
Due to terminal illness diagnosed post admission	55	22.4%
Expected death which occurred despite the health service taking preventative measures	121	49.4%
Following cardiac or respiratory arrest before arriving at the hospital (ED CASE)	2	0.8%
Unexpected death which was not reasonably preventable with medical intervention	60	24.5%
Inappropriate medical management	2	0.8%
Cases not categorised	2	0.8%

Clinical assessment; data derived from the mortality proforma

	Clinical Assessment	Yes	No	Not Stated	% deemed to have received appropriate care
Q1	Appropriate initial history and clinical examination in a timely manner	244	**1**	0	99.6%
Q2	Appropriate diagnostic tests ordered and completed in a timely manner	244	**1**	0	99.6%
Q3	Results of tests obtained and	239	**6**	0	97.6%

	acted upon in a timely manner				
Q4	Reasonable evidence that diagnosis identified supports treatment given	243	**2**	0	99.2%
Q5	Treatment administered in an adequate and timely manner	237	**4**	4	96.7%
Q6	Appropriate senior review occurred in an adequate and timely manner	239	**4**	2	97.6%
Q7	Appropriate consultant obtained and completed in a timely manner	245	0	0	100.0%

Ongoing management; data derived from the mortality proforma

	Ongoing Management	**Yes**	**No**	**Not Stated**	**% deemed to have received appropriate care**
Q1	Was ongoing management adequate?	235	6	4	95.9%
Q2	Were appropriate investigations ordered and actions in a timely manner?	235	6	4	95.9%
Q3	Was the patient reviewed by their parent team on a regular basis	231	9	5	94.3%

18. Key Themes and Learning points from 1st Tier Mortality Reviews (See appendix for full details)

- -Positive Themes
    - Initial assessment on admission of a patient to A&E is usually good. Between admission and transfer to a definitive ward, care can be variable. Once on a designated ward for example the respiratory hub, care is good
    - ICU management is based on protocols and regularly updated guidance as our learning of the disease progresses. This is managed very well. For example, respiratory support is now on V6. They send out short, regular and easy to read updates on therapies such as antibiotics, anticoagulation, renal support etc (1xA5 sheet with a few highlighted points). Evidence in reviews that all clinicans largely all adopt the same approach
    - Very good use of Treatment Escalation Plans/DNACPR
    - More MCCD's being discussed than previously.

Learning Points

- Much less use of the formal SCP pathway

- Lack of daily medical review in 1-2 patients.
- Still a few VTEs being done incorrectly i.e. stating a low risk of VTE in an obviously high-risk patient
- Whilst there were many examples of excellent communication with next of Kin, there were also some cases where communication could be improved. Comments from reviewers include:
  - A more structured communication approach with families unable to visit.
  - Sensitivity around informing NOK of positive COVID results,
  - Ensuring staff have appropriate Telephone number to contact NOK ……instances where staff phoned patient's mobile or their home landline (no one there as patient lives alone).

19. Outcome from Tier 2 Mortality Review (Structured Judgement Review):

- Of the 289 cases reviewed, 32 were escalated for further scrutiny in the form of an SJR (7 in March and 25 in April). Ten of which were a random selection to review the quality of care provided, 3 were escalated due to a learning disability flag and 19 were escalated due to potential issues with care for further review

Of the 32 subjected to SJR

The overall care was judged as adequate, good or excellent in 26 cases while in 6 cases the overall care provided was judged as poor.. The findings of all the SJR including key learning points are shared with the Mortality Leads/teams of appropriate department to ensure that learning is widely disseminated. Key Action plans developed following the reviews are shown in section 24.

20. Palliative Care during the pandemic

Very early in the pandemic Leasowes community hospital was turned into a dedicated End Of Life facility (as opposed to the 2 ring fenced beds pre COVID directly commissioned for EOL). See appendix for characteristics patients that died in Leasowes.

Key to this was :

- developing the pull model, so every patient was identified and case managed into Leasowes by the specialist palliative care team to ensure relatives aware/appropriate anticipatory prescribing and appropriate oxygen delivery (as no piped oxygen so all oxygen on home delivery service)
- Specialist palliative care nurse based at leasowes in hours, and out of hours the urgent response palliative care team had a roving presence and there were we had some additional verification of death training and briefing sessions with staff
- Enhanced the core team, with nurses from district nursing and wider community nursing and enhanced the leadership team
- the palliative care team set up some support systems for staff who on a bad day were getting 4 deaths a day.

- the palliative care team they were there 7 days a week supporting the medical teams and advising on pathways, resulting in smooth managed transfers of care
- The palliative care team would liaise with the ward teams to arrange transport and equipment so that the patients had a comfortable transfer.
- The Macmillan Occupational Therapists offered complementary therapies for patients, phone contact with relatives to enable a project called "meet my loved one" and sending Hearts after the death.
- Our Drs have supported with complex patients and reflection meetings with the workforce.
- The CNS has offered Training to all staff and support as well as symptom control (Prescribing support).

Care of patients admitted to Leasowes were subjected to 1st Tier Mortality Review and the Reviewers also spoke to next of kin

Examples of Good Practise

- 2 FYIs mentioned numerous times by relatives from the acute part of the pathway words such as " wonderful/10/10 /never forget him/kind/ etc. Both identified as going the extra mile in communicating with these families who were unable to visit.
- Quality of their recorded conversations with family detailed and informative as well as well received by families
- On the whole recording was informative, and care responsive with senior review and clear plans recognition of the dying patients was very much supported by palliative care services who were proactive in terms of engagement with acute teams and families for a proactive pull into Leasowes (which we had converted to an end of life facility)
- palliative care consultants engaged and operational from front door through to death advising on management and 24/7 support to Leasowes evident

Feedback from Next of Kin

- The efforts to get to know the patients in short time was widely appreciated, by families ie ringing family to ask for family member names, what patient liked to be called etc
- Whatsapp videos of the facility so family members could be reassured a non clinical environment
- Sensitive use of face time
- Going out to pick up family photos for one lady whose husband had died at leasowes - then wife admitted and wanted to see his face
- conversation after conversation of the kindness shown and the comfort relatives said they had taken from re watching videos etc after death

Learning point
Initial concern about rapid release at weekends which was resolved in real time)

Review of Palliative Care received on acute wards
10 sets of notes were subjected to detailed review. Results are shown in Appendix 6.

Of the 10,

- 4/10 cases where good end of life care was identified
- 4/10 where death was rapid
- 1 case where patient was not recognised to be dying. No EOL care plan. Very little evidence of communication with family

Key Learnings identified
Documentation of decisions and communication could be improved. From admission it appeared likely he would die, so there were missed opportunity to support family and communication between patient and family

21. Feedback from Next of Kin to Medical Examiners

Medical Examiners obtained feedback from 96 Next of Kin

a. Happy with care 49/96 (51%)
b. No issues with care 44/96 (45.8%)
c. Satisfied with care 3/96(3.1%)
d. Dissatisfied (10.4%)
    i. 3/96 (3.1%) expressed dissatisfaction with communications
    ii. 7/161 (4.3%) expressed issues with care. These have been passed on to the PALS office to investigate.

Appendix 9 shows details of Feedback from Next of Kin to Medical Examiners

22. Complaints Report: March 16th -6th May 2020

During the period 15 March 2020 – 6 May 2020 the Trust received 88 formal complaints. When compared to the same period for 2019, the Trust received 135 formal complaints. This reveals a reduction of incoming complaints of -34%. During this same period the Trust has received only 2 complaints specifically (and solely) relating to COVID 19 concerns. Of those complaints, 1 has since closed with an outcome of Not Upheld and the second case is in Executive sign off, following investigation.

Specific COVID complaints raised to date have related to concerns regarding the management of Covid, or suspected COVID patients. Case 1 related to the transfer of a relative to a hot ward and the perceived risks associated. This patient was discharged by the family against advice and taken to another hospital Trust. The second concern related to the streaming of the patient to the hot area in ED, this caused the patient to leave but re-attend later that day for the events to be repeated. The patient left as they felt they should be provided with PPE and felt they were at risk by being streamed to the hot area.

It is expected that once the number of incoming complaints reverts to normal, pre Covid, levels the number of COVID related complaints will also naturally increase.

23. Report on NON COVID 19 related deaths

In march, Non COVID -19 related deaths accounted for 77% of all deaths wheras in April, they made up 32.3% of all deaths

		March 2020	April 2020	March & April 2020
Total Non-COVID-19 Deaths		**n=142**	**n=111**	**n=253**
COVID-19 Negative Tier 1 review rates	**Reviewed**	**94/142 (66.3%)**	**68/111 (61.3%)**	**162/253 (64.0%)**
	Not Reviewed	**48/142 (33.8%)**	**43/111 (38.7%)**	**91/253 (36.0%)**
Number of SJRs Requested		**21**	**3**	**24**

Findings from data analysed from the Mortality Review System (MRS)

157 cases had Tier 1 Review

The categorisation of deaths is shown below

Classification	**Count N=157**	**Percentage of Total**
Due to terminal illness	20	12.7%
Due to terminal illness diagnosed post admission	44	28.0%
Expected death which occurred despite the health service taking preventative measures	66	42.0%
Following cardiac or respiratory arrest before arriving at the hospital	2	1.3%
Unexpected death which was not reasonably preventable with medical intervention	23	14.6%
Inappropriate medical management	1	0.6%

Cases not categorised	1	0.6%

Outcome of Clinical assessment

	Clinical Assessment	Yes	No	Not Stated	% deemed to have received appropriate care
Q1	Appropriate initial history and clinical examination in a timely manner	155	**2**	0	98.7%
Q2	Appropriate diagnostic tests ordered and completed in a timely manner	154	**3**	0	98.1%
Q3	Results of tests obtained and acted upon in a timely manner	157	**0**	0	100.0%
Q4	Reasonable evidence that diagnosis identified supports treatment given	154	**3**	0	98.1%
Q5	Treatment administered in an adequate and timely manner	155	**2**	0	98.7%
Q6	Appropriate senior review occurred in an adequate and timely manner	155	**2**	0	98.7%
Q7	Appropriate consultant obtained and completed in a timely manner	156	**1**	0	99.4%

	Ongoing Management	Yes	No	Not Stated	% deemed to have received appropriate care
Q1	Was ongoing management adequate?	156	**1**	0	99.4%

Q2	Were appropriate investigations ordered and actions in a timely manner?	155	**2**	0	98.7%
Q3	Was the patient reviewed by their parent team on a regular basis	154	**3**	0	98.1%

Details of Tier 1 reviews are shown in appendix 10,

- 4 SJR done have been completed to date. I case has been identified as receiving overall poor care on SJR and is now subject to further review

Good practise points identified in both Tier 1 and SJR of Non COVID related deaths include

- Excellent example of End of life care
- Prompt nursing triage and recording of observation on arrival to ED.
- Bladder scan done and documented within 10 minutes of triage to confirm urinary retention.

Learning points identified include

- Communication issues
- Accuracy of Medical Certificate of Cause of Death (MCCD)
- Continued strategy to reduce falls in hospital
- lack of recognition of the dying patient, Resulting in lack of proactive co-ordinated palliative care
- Lack of daily Medical Review (1 patient not seen for 3 days)
- Lack of Senior review in a post op patient
- Multiple Ward Transfers
- Poor Documentation of procedures e.g catheterisation

Feedback from Next of Kin to Medical Examiners see appendix 11

Medical Examiners obtained feedback from 46 Next of Kin of deceased patients who were either swab negative for COVID-19 or died of Non COVID-19 related deaths

- 24/46 (52.1%) gave positive comments about the care their relative received
- (22/46) 47% had negative comments

24. Action Plan

Key Actions Taken during the Pandemic

1. Management of COVID-19 evolved and was regularly updated in line with New Evidence
2. Standardised approach to management in ITU
3. Expansion of use Non-Invasive ventilation
4. Expansion of Leasowes as a dedicated End Of Life facility (as opposed to the 2 ring fenced beds pre COVID directly commissioned for EOL).
5. Participation in Recovery Trial
6. Change in Rapid Release, Death Certification, Death Registration pathways
7. Creation of an Intermediate ward (Lilac wards)

8. Infection control measures reiterated

NEW ACTIONS Plans

No	Issue identified	QI Outcome	Action	Lead	Completion
1.	Evidence of Hospital Acquired (Nosocomial) COVID 19 infection	50% Reduction in Hospital Acquired COVID -19 infection	All in patients to be swabbed on admission •Reiterate need for stringent infection control measures in all areas including red and blue wards Creation of Lilac wards Regular swabbing of staff	Medical Director/ Lead infection control Nurse	
2.	Oxygen Prescription and documentation poor in some cases	100% of patients will have Oxygen prescribed and documented			
3.	Inaccurate VTE assessment. Documented as low risk when indeed high risk	100% to have correct VTE assessment	1. Unity VTE assessment reminders intervals to be assessed 2. Review assessment tool 3. Nursing staff to identify those patients who are not on	Medical Director/Unity team /Lead for VTE	

4.	Medication management:	0% of patients to miss an essential medication 50% improvement in timeliness of antibiotic administration	Ward managers to ensure processes in place for robust medication reconciliation: generic steps for completion of this process: 1) verification, where the medication history or list is collected; 2) clarification, where medications and dosages are checked for appropriateness; and 3) reconciliation, where any changes are documented. It is good	Group Director of Nursing for Medicine	
5.	Active Case management of community cases of COVID-19	Reduce the likelihood of patients self isolating at home presenting in Cardiac Arrest.	Explore with the CCG strategies and pathways for active case monitoring in the community to include Public health campaign to encourage patients to report a range of symptoms Home Saturation monitoring based on risk assessment coupled with telephone consult for both symptom and vital sign monitoring End points will be 1. decision to stand down monitoring 2. Enrolment in community-	CCG lead / Respiratory lead	
6.	Delayed assessment by medical staff		Nursing staff to flag to doctors if their patient has not been 'clerked' within 2 hours of arrival to AMU	ED Lead/ ITU lead AMU lead	
7.	Poor Nutrition assessment and practise	Increase % of MUST assessment completed Timely involvement of SALT and dietitians	Set up a nutritional steering committee to facilitate improvement	Group Director of Nursing for Medicine	

8.	Patients not seen on Post Take Ward round		AMU to review process of ensuring all patients seen on ward round Nursing staff to flag to doctors if their patient if not seen by a consultant with 8 hours of arrival	AMU LEAD /AMU LEAD Nurse	
9.	Failure to identify Hyperglycaemia on ward round		Consultants must ensure that they review all of the clinical record, especially when seeing patients without the clerking doctor, to ensure important results are not missed .Blood glucose to 'be added to the auto populated text for		
10.	Communication . A more structured communication approach with families unable to visit . Sensitivity around informing NOK of positive COVID results, ensuring staff have appropriate Telephone number to contact NOK				

Appendix 1

25. Analysis of patient Characteristics of those that died between March and April 2020 of COVID-19in SWBH

		March 2020	April 2020	March & April 2020
Total Deaths		**n=206**	**n=332**	**n=538**
Total inpatients admitted				
Crude Mortality Rate – Total inpatient deaths		**2.93**	**7.37**	**-**
	Median	**79**	**81**	**80**
	Range	45-93	22-103	22-103
Age Banding	**0-17**	0/68 (0%)	0/225 (0%)	0/293 (0%)
	18-64	9/68 (13.2%)	34/225 (15.1%)	43/293 (14.7%)
	65-84	**41/68 (60.3%)**	**119/225 (52.9%)**	**160/293 (54.6%)**
	85+	18/68 (26.5%)	72/225 (32.0%)	90/293 (30.7%)
Gender	**Male**	**46/68 (67.6%)**	**135/225 (60.0%)**	**181/293 (61.8%)**
	Female	22/68 (32.4%)	90/225 (40.0%)	112/293 (38.2%)
Ethnic Group	**Asian (Bangladeshi, Indian, Pakistani, Any other background)**	17/68 (25.0%)	44/225 (19.6%)	61/293 (**20.8%)**
	Black (African, Caribbean, Any other Background)	21/68 (30.9%)	31/225 (13.8%)	52/293 **(17.7%)**
	Mixed ethnicity	0/68 (0.0%)	2/225 (0.9%)	2/293 (0.7%)
	Other	2/68 (2.9%)	3/225 (1.3%)	5/293 (1.7%)
	Not Known	5/68 (7.4%)	15/225 (6.7%)	20/293 (6.8%)
	White (British, Irish, Any other background)	23/68 (33.8%)	130/225 (57.8%)	153/293 **(52.2%)**
Admission Day	**Weekday**	44/68 (64.7%)	170/225 (75.6%)	214/293 (73.0%)
	Weekend	24/68 (35.3%)	55/225 (24.4%)	79/293 (27.0%)
Site	**City**	49/68 (72.1%)	91/225 (40.4%)	140/293 (47.8%)
	Leasowes	1/68 (1.5%)	32/225 (14.2%)	33/293 (11.3%)
	Sandwell	18/68 (26.5%)	102/225 (45.3%)	120/293 (41.0%)
Length of stay	**Average**	6.5	10.4	9.5

	Median	3	7	6
	Mode	3	3	3
	Range	0-39	0-162	0-162
% of patients receiving ICU care		**13/68 (19.1%)**	**33/225 (14.7%)**	**46/293 (15.7%)**
% of patients on SCP	**Placed on SCP/DNACPR during admission**	43/68 (63.2%)	162/225 (72.0%)	205/293 (70.0%)
	Community SCP/DNACPR in place	7/68 (10.3%)	18/225 (8.0%)	25/293 (8.5%)
Comorbidity		See below		

Appendix 2: Percentage of Deceased patients who were swab positive for COVID positive and in addition had co-morbidities

Past Medical History	March 2020	April 2020	March & April 2020
Asthma	9/68 (13.2%)	33/225 (14.7%)	42/293 (14.3%)
Aids/ HIV	2/68 (2.9%)	6/225 (2.7%)	8/293 (2.7%)
Anaemia	2/68 (2.9%)	2/225 (0.9%)	4/293 (1.4%)
Arthritis	**23/68 (33.8%)**	**91/225 (40.4%)**	**114/293 (38.9%)**
Atrial Fibrillation	**11/68 (16.2%)**	**35/225 (15.6%)**	**46/293 (15.7%)**
Cerebrovascular Disease	**14/68 (20.6%)**	**64/225 (28.4%)**	**78/293 (26.6%)**
Chronic Kidney Disease	**22/68 (32.4%)**	**43/225 (19.1%)**	**65/293 (22.2%)**
Chronic Pulmonary Disease	**15/68 (22.1%)**	**47/225 (20.9%)**	**62/293 (21.2%)**
Congestive Heart Failure	12/68 (17.6%)	47/225 (20.9%)	59/293 (20.1%)
Connective Tissue Disease	1/68 (1.5%)	7/225 (3.1%)	8/293 (2.7%)
Chronic Obstructive Pulmonary Disease	12/68 (17.6%)	26/225 (11.6%)	38/293 (13.0%)
Crohn's Disease	0/68 (0.0%)	1/225 (0.4%)	1/293 (0.3%)
Dementia	9/68 (13.2%)	41/225 (18.2%)	50/293 (17.1%)
Diabetes	**34/68 (50.0%)**	**95/225 (42.2%)**	**129/293 (44.0%)**
Diabetes Complications	**1/68 (1.5%)**	**4/225 (1.8%)**	**5/293 (1.7%)**
Epilepsy	4/68 (5.9%)	9/225 (4.0%)	13/293 (4.4%)
Hemiplegia	1/68 (1.5%)	6/225 (2.7%)	7/293 (2.4%)
Hypertension	**42/68 (61.8%)**	**156/225 (69.3%)**	**198/293 (67.6%)**
Iron Deficiency	7/68 (10.3%)	13/225 (5.8%)	20/293 (6.8%)
Ischaemic Heart Disease	18/68 (26.8%)	61/225 (27.1%)	79/293 (27.0%)
Learning Disability	1/68 (1.5%)	1/225 (0.4%)	2/293 (0.7%)
Leukaemia	1/68 (1.5%)	1/225 (0.4%)	2/293 (0.7%)
Liver Disease	3/68 (4.4%)	24/225 (10.7%)	27/293 (9.2%)
Local Tumour	5/68 (7.4%)	11/225 (4.9%)	16/293 (5.5%)
Lymphoma	2/68 (2.9%)	1/225 (0.4%)	3/293 (1.0%)
Myocardial Infarction	12/68 (17.6%)	29/225 (12.9%)	41/293 (14.0%)
Obesity	12/68 (17.6%)	36/225 (16.0%)	48/293 (16.4%)
Osteoporosis	7/68 (10.3%)	32/225 (14.2%)	39/293 (13.3%)
Peptic Ulcer Disease	5/68 (7.4%)	6/225 (2.7%)	11/293 (3.8%)
Peripheral Vascular Disease	2/68 (2.9%)	13/225 (5.8%)	15/293 (5.1%)
Respiratory System Disease	28/68 (41.2%)	95/225 (42.2%)	123/293 (42.0%)
Rheumatic Disease	3/68 (4.4%)	12/225 (5.3%)	15/293 (5.1%)
Sleep Disturbance	4/68 (5.9%)	6/225 (2.7%)	10/293 (3.4%)
Solid Tumour	2/68 (2.9%)	6/225 (2.7%)	8/293 (2.7%)
Stroke	7/68 (10.3%)	37/225 (16.4%)	44/293 (15.0%)
Thyroid Disease	9/68 (13.2%)	23/225 (10.2%)	32/293 (10.9%)
Transient Ischaemic Attack	2/68 (2.9%)	8/225 (3.6%)	10/293 (3.4%)

Urinary System Disease	30/68 (44.1%)	82/225 (36.4%)	112/293 (38.2%)

Characteristics of patients that died in CCU

(ITU) Appendix 3

		March 2020	April 2020	March & April 2020
Total COVID-19 Positive Deaths		**n=13**	**n=33**	**n=46**
	Median	62.0	63.0	62.5
	Range	45-84	35-81	35-84
Age Banding	**0-17**	0/13 (0.0%)	0/33 (0.0%)	0/46 (0.0%)
	18-64	**7/13 (53.8%)**	**17/33 (51.5%)**	**24/46 (52.2%)**
	65-84	6/13 (46.2%)	16/33 (48.5%)	22/46 (47.8%)
	85+	0/13 (0.0%)	0/33 (0.0%)	0/46 (0.0%)
Gender	**Male**	3/13 (23.1%)	10/33 (30.3%)	13/46 (28.3%)
	Female	10/13 (76.9%)	23/33 (69.7%)	33/46 (71.7%)
Ethnic Group	**Asian (Bangladeshi, Indian, Pakistani)**	3/13 (23.1%)	13/33 (39.4%)	16/46 (34.8%)
	Black (African, Caribbean, Any other Background)	5/13 (38.5%)	6/33 (18.2%)	11/46 (23.9%)
	Mixed ethnicity	0/13 (0.0%)	1/33 (3.0%)	1/46 (2.2%)
	Other ethnicity	1/13 (7.7%)	0/33 (0.0%)	1/46 (2.2%)
	Other - Not Known	0/13 (0.0%)	3/33 (9.1%)	3/46 (6.5%)
	White (British, Irish, Any other background)	4/13 (30.8%)	10/33 (30.3%)	14/46 (30.4%)
Admission Day	**Weekday**	10/13 (76.9%)	27/33 (81.8%)	37/46 (80.4%)
	Weekend	3/13 (23.1%)	6/33 (18.2%)	9/46 (19.6%)
Length of stay	**Average**	10.9	10.4	10.5
	Median	8.0	10.0	10.0
	Mode	1.0	10.0	10.0
	Range	1-39	2-30	1-39
Place of Death	**Critical Care Services - City**	8/13 (62.0%)	16/33 (48.0%)	24/46 (52.0%)
	ICU on D16	0/13 (0.0%)	3/33 (9.0%)	3/46 (7.0%)
	Critical Care - Sandwell	5/13 (38.0%)	12/33 (36.0%)	17/46 (37.0%)
	ICU on Newton 1	0/13 (0.0%)	2/33 (6.0%)	2/46 (4.0%)
% of patient on an SCP	**Placed on SCP/DNACPR during admission**	7/13 (54.0%)	17/33 (52.0%)	24/46 (52.0%)

	Community SCP/DNACPR in place	0/13 (0.0%)	0/33 (0.0%)	0/46 (0.0%)

Appendix 4. The Demographics of patients admitted to Leasowes hospital

		March 2020	**April 2020**	**March & April 2020**
Total COVID-19 Positive Deaths		**n=1**	**n=32**	**n=33**
	Median	-	87	87
	Range	-	68-98	68-98
Gender	**Male**	0/1 (0.0%)	15/32 (46.9%)	15/33 (45.5%)
	Female	1/1 (100.0%)	17/32 (53.1%)	18/33 (54.5%)
Ethnic Group	**Asian (Bangladeshi, Indian, Pakistani)**		2/32 (6.3%)	2/33 (6.1%)
	Black (African, Caribbean, Any other Background)		5/32 (15.6%)	5/33 (15.2%)
	Mixed ethnicity		0/32 (0.0%)	0/33 (0.0%)
	Other		1/32 (3.1%)	1/33 (3.0%)
	White (British, Irish, Any other background)	1/1 (100.0%)	24/32 (75.0%)	25/33 (75.8%)
Length of stay	**Average**	15	12.3	12.4
	Median		11.5	12
	Mode		6	6
	Range		1-35	1-35

Appendix 5 Demographic details of COVID positive deaths in Emergency Department

		March 2020	April 2020	March & April 2020
Total COVID-19 Positive Deaths		**n=4**	**n=4**	**n=8**
	Median	78.5	70.5	78.5
	Range	65-87	51-88	51-88
Gender	**Male**	3/4 (75.0%)	3/4 (75.0%)	6/8 (75.0%)
	Female	1/4 (25.0%)	1/4 (25.0%)	2/8 (25.0%)
Ethnicity	**Asian or Asian British - Indian**	1/4 (25.0%)		1/8 (12.5%)
	Black or Black British - Caribbean	1/4 (25.0%)		1/8 (12.5%)
	Other - Not Known		1/4 (25.0%)	1/8 (12.5%)
	White - British	2/4 (50.0%)	3/4 (75.0%)	5/8 (62.5%)
Admission Day	**Weekday**	3/4 (75.0%)	4/4 (100.0%)	7/8 (87.5%)
	Weekend	1/4 (25.0%)	0/4 (0.0%)	1/8 (12.5%)

Appendix 6 Summary of mortality reviews: (available on request)