

## Rod Little Prize Papers

### 1658 IMPROVEMENT IN THE QUALITY OF CARE DELIVERED TO HEAD INJURY (HI) PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT OF A DISTRICT GENERAL HOSPITAL

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10.1136/emered-2022-RCEM2.1

**Aims, Objectives and Background** A significant mortality and morbidity rate has been observed in patients presenting with head injuries. Delays in assessment, imaging, time critical diagnosis and management has compromised patient safety and quality of care at Walsall Manor Hospital.

To roll out an effective HI pathway with the aim to ensure:-

- > 90% of high risk HI patients are assessed within 15 minutes
- Greater efficiency within the process of obtaining CT (computed tomography) imaging
- Final decision making < 4 hours.

**Method and Design** Quality improvement methodology was employed in the form of process mapping to understand the current patient journey. SWOT (Strengths, weaknesses, opportunities and threats) analysis and driver diagrams were used to analyse the problem. Gantt chart was used to plan proposed timelines and PDSA (Plan-Do-Study-Act) cycles used to implement small changes with continued analysis. A new HI pathway was introduced which involved; a succinct thorough assessment, earlier identification of need for CT head, modifications to the requesting and transfer processes to imaging and review of the decision making processes.

**Results and Conclusion** Data retrieval and analysis post interventions showed a reduction in time to initial ED clinician assessment from 63 minutes to 29 minutes. Percentage of CT scans performed within the hour increased from 67% to 89%. Time to CT scans being performed improved from 82 minutes to 55 minutes. These changes in turn had a significant impact on the decision to admit/discharge time which reduced from an average of 9 hours and 5 minutes to 3 hours and 40 minutes.

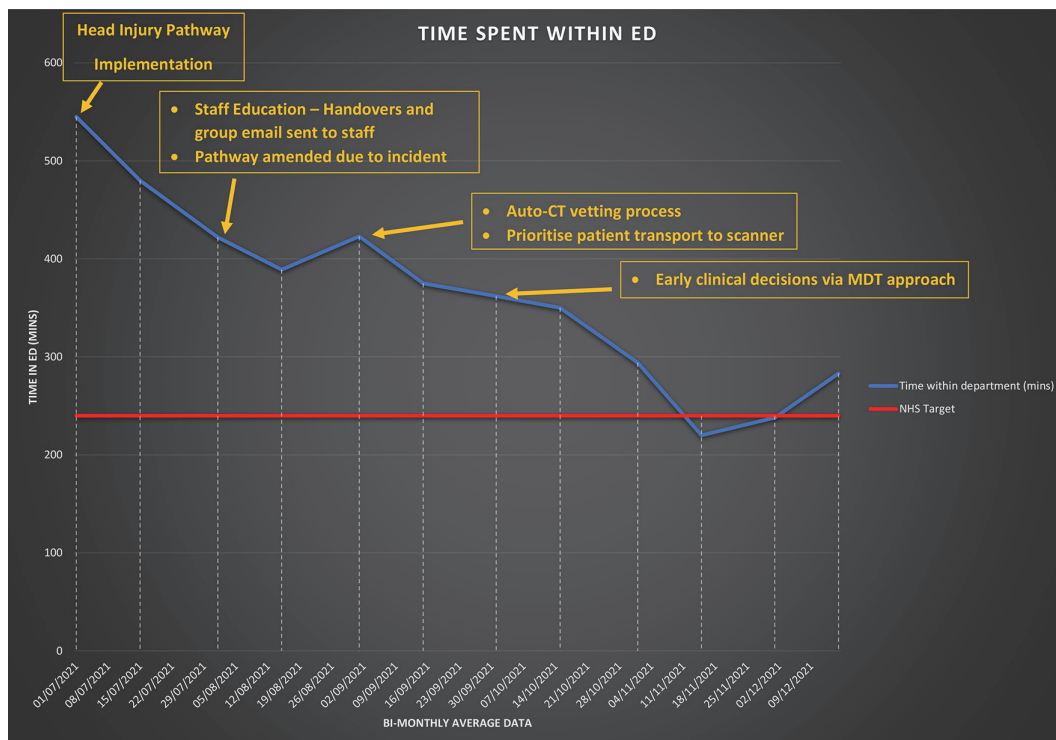
The introduction of a HI pathway alongside other adjuvant interventions had a marked impact on the safety and quality of care, provided to head injury patients at Walsall Manor Hospital. These measures will be re-evaluated at 6–12 monthly intervals to ensure continued enhanced performance.

### 1427 THE EFFECT OF THE COVID-19 PANDEMIC ON MAJOR TRAUMA PRESENTATIONS AND PATIENT OUTCOMES IN ENGLISH HOSPITALS

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10.1136/emered-2022-RCEM2.2

**Aims, Objectives and Background** There is evidence that COVID-19 ‘lockdowns’ may have contributed to increased non-accidental injury, domestic violence and self-harm related to deteriorating mental health. Internationally, there is also evidence that the diversion of health care resources may led



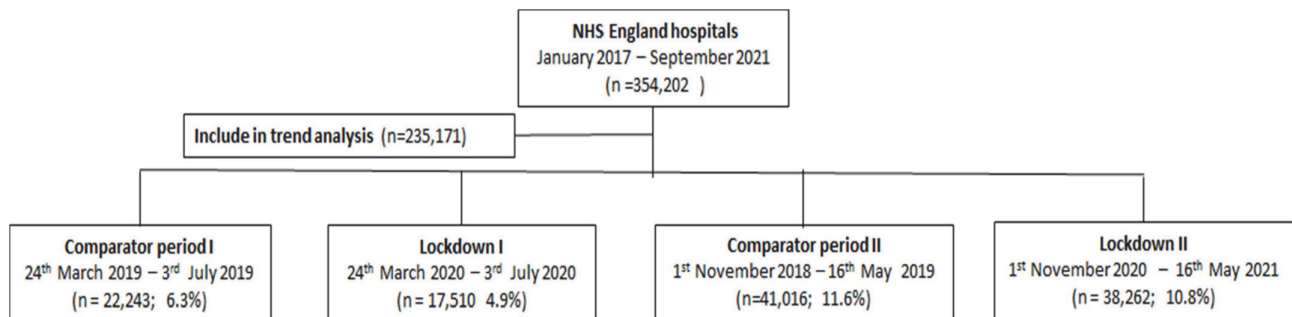
Abstract 1658 Figure 1

Abstract 1427 Table 1 Comparison of demographics 'lockdown' and pre-COVID periods

	Period			Period		
	24Mar19 – 03Jul19 (comparator)	24Mar20 – 03Jul20 (lockdown 1)	Absolute change [percentage point change (95%CI)] p-value	01Nov18 – 16May19 (comparator)	01Nov20 – 16May21 (lockdown 1)	Absolute change [percentage point change (95%CI)] p-value
<b>Total</b>	<b>22243</b>	<b>17510</b>	<b>-4733 (-21%) p&lt;0.0001‡</b>	<b>41016</b>	<b>38262</b>	<b>2754 (-6.7%) p&lt;0.0001‡</b>
Age (years), Median (IQR)	67.6 (46.5–83.1)	70.9 (50.3–84.2)	3.3 (2.4 to 4.2) p<0.0001	69.1 (48.7–83.6)	73.1 (53.3–85.1)	4 (3.5 to 4.2) p<0.0001
<b>Age bands, n(%)</b>						
Age< 1	138 (0.6%)	130 (0.7%)	-8 [0.1(-0.04 to 0.030)] p=0.14	281 (0.7%)	234 (0.6%)	-47 [0.1 (-0.2 to 0.04)] p=0.1979
Age <16	942 (4.2%)	674 (3.8%)	-268 [-0.4 (-0.8 to 0)] p=0.0531	1444 (3.5%)	1218 (3.2%)	-226 [-0.3(-0.6 to -0.1)] p=0.0084
Age 16 – 64	9561 (43%)	6974 (39.8%)	-2587 [-3.2(-4.1 to -2.2)] P<0.0001	17173 (41.9%)	13980 (36.5%)	-3193 [-5.3(-6 to -5)] p<0.0001
Age 65 and over	11740 (52.8%)	9862 (56.3%)	-1878 [3.5 (2.5 to 4.5)] p<0.0001	22399 (54.6%)	23064 (60.3%)	665 [5.7(5 to 6.3)] P<0.0001
Age 85 and over	4610 (20.7%)	4047 (23.1%)	-563 [2.4(1.6 to 3.2)] p<0.0001	8903 (21.7%)	9731 (25.4%)	828 [3.7 (3.1 to 4.3)] p<0.0001
Male, n(%)	12316 (55.4%)	9512 (54.3%)	-2804 [-1 (-2 to -0.6)] p=0.0373	22146 (54%)	19769 (51.7%)	-2377 [-2.3 (-3 to -1.6)] p<0.0001
<b>CCI*, n(%)</b>						
CCI 0	9359 (42.1%)	6220 (35.5%)	-3139 [-6.5 (-7.5 to -5.6)] p<0.0001	16665 (40.6%)	12806 (33.5%)	-3859 [-7.1(-7.8 to -6.5)] p<0.0001
CCI 1 – 5	8538 (38.4%)	6896 (39.4%)	-1642 [1 (0.3 to 2)] p=0.0426	15899 (38.8%)	15667 (40.9%)	-232 [2.2 (1.5 to 2.9)] p<0.0001
CCI 6 – 10	3032 (13.6%)	3061 (17.5%)	29 [3.8 (3.2 to 4.6)] p<0.0001	5987 (14.6%)	6863 (17.9%)	876 [3.3(2.8 to 3.8)] p<0.0001
CCI > 10	927 (4.2%)	1024 (5.8%)	97 [1.7(1.2 to 2.1)] p<0.0001	1648 (4%)	2410 (6.3%)	762 [2.3(2 to 2.6)] p<0.0001
Not recorded	387 (1.7%)	309 (1.8%)	-88 [0.2 (-0.2 to 0.3)] p=0.8513	817 (2%)	516 (1.3%)	-301 [-0.6(-0.8 to -0.5)] p<0.0001
<b>MOI**: RTC, n(%)</b>						
Car occupant	1247 (30.7%)	551 (20.4%)	-696 [-10.4(-12.4 to -8.2)] p<0.0001	2485 (35.2%)	1551 (31.3%)	-934 [-3.9(-5.6 to -2.2)] p<0.0001
Pedestrian	661 (16.3%)	288 (10.6%)	-373 [-5.6 (-7.2 to -4)] p<0.0001	1629 (23.1%)	962 (19.4%)	-667 [-3.7(-5.1 to -2.2)] p<0.0001
Motorcycles	1196 (29.4%)	711 (26.3%)	-485 [-3.2(-5.3 to -1)] p<0.0001	1524 (21.6%)	976 (19.7%)	-548[-1.9(-3.3 to -0.4)] p<0.0001
Cyclist	912 (22.4%)	1139 (42.1%)	227 [19.6(17.4 to 21.9)] p<0.0001	1315 (18.6%)	1396 (28.2%)	81 [9.5(8 to 11.1)] p<0.0001
Other	11 (0.3%)	<9 ()	-10 [-0.2(-0.4 to -0.06)] p=0.0251	31 (0.4%)	10 (0.2%)	-21 [-0.23(-0.4 to -0.04)] p=0.0281
<b>MOI: Intentional, n(%)</b>						
Intentional assault	130 (0.6%)	88 (0.5%)	-42 [-0.08 (-0.2 to 0.06)] p=0.2724	227 (0.6%)	175 (0.5%)	-52 [-0.1(-0.2 to 0.002)] P=0.0570
Self harm	276 (1.2%)	284 (1.6%)	8 [0.4 (0.1 to 0.6)] p=0.0014	525 (1.3%)	562 (1.5%)	37 [0.2 (0.02 to 0.3)] p=0.0223
NAI	63 (0.3%)	27 (0.2%)	-36 [-0.1(-0.2 to -0.03)] p=0.0072	97 (0.2%)	90 (0.2%)	-7 [-0.001(-0.07 to 0.07)] p=0.9701
Shooting	34 (0.2%)	40 (0.2%)	6 [0.08(-0.01 to 0.2)] p=0.0826	80 (0.2%)	56 (0.1%)	-24 [-0.05(-0.1 to 0.001)] p=0.0979
Stabbing	450 (2%)	312 (1.8%)	-138 [-0.2(-0.5 to 0.03)] p=0.0816	791 (1.9%)	589 (1.5%)	-202 [-0.4 (-0.6 to -0.2)] p<0.0001
Blows	1174 (5.3%)	647 (3.7%)	-527 [-1.6(-1.9 to -1.2)] p<0.0001	2059 (5%)	1299 (3.4%)	-760 [-1.6(-1.9 to -1.3)] p<0.0001
<b>Unintentional, n(%)</b>						
Falls>2m	2055 (9.2%)	1757 (10%)	-298 [0.8(0.2 to 1.4)] P=0.0075	3740 (9.1%)	3528 (9.2%)	-212 [0.1(-0.3 to 0.5)] p=0.6181

Falls<2m	13384 (60.2%)	11314 (64.6%)	-2070 [4.4 (3.5 to 5.4)] p<0.0001	25505 (62.2%)	26203 (65.8%)	698 [6.3 (5.6 to 6.9)] p<0.0001
Sport	449 (2%)	320 (1.8%)	-129 [-0.2 (-0.5 to 0.01)] p=0.1697	615 (1.5%)	489 (1.3%)	-126 [-0.2 (-0.4 to -0.006)] p=0.0079
<b>GCS bands , n(%)</b>						
Mild	19609 (88.2%)	15449 (88.2%)	4160 [0.1 (-0.6 to 0.7)] p=0.8264	35831 (87.4%)	34051 (89%)	-1780 [1.6 (1.2 to 2.1)] p<0.0001
Moderate	689 (3.1%)	625 (3.6%)	-64 [0.5(0.1 to 0.8)] p=0.0090	1333 (3.2%)	1127 (2.9%)	-206 [-0.3 (-0.5 to -0.06)] p=0.0135
Severe	955 (4.3%)	765 (4.4%)	-190 [0.1 (-0.3 to 0.5)] p=0.7136	1886 (4.6%)	1464 (3.8%)	-422 [-0.8(-1 to -0.5)] p<0.0001
Not recorded	990 (4.5%)	671 (3.8%)	-319 [-0.6(-1 to -0.2)] p=0.0022	1966 (4.8%)	1620 (4.2%)	-346 [-0.6(-0.8 to -0.3)] p=0.0002
ISS***, median (IQR)	9 (9–18)	9 (9–18)	0	9 (9–18)	9 (9–17)	0
<b>ISS bands, n(%)</b>						
ISS 1 – 8	4545 (20.4%)	3062 (17.5%)	-1483 [-3 (-4 to -2)] p<0.0001	8266 (20.2%)	7838 (20.5%)	-428 [0.3(-0.2 to 0.9)] p=0.2457
ISS 9 – 15	9290 (41.8%)	7728 (44.1%)	-1562 [2.4(1.4 to 3.3)] p<0.0001	17207 (42%)	16969 (44.3%)	-233 [2.4(1.7 to 3.1)] p<0.0001
ISS >15	8408 (37.8%)	6720 (38.4%)	-1688 [5.6(-0.4 to 1.5)] p=0.2391	15543 (37.9%)	13455 (35.2%)	-2088 [-2.7 (-3.4 to -2)] p<0.0001
ISS >25	3995 (18%)	3127 (17.9%)	-868 [-0.1(-0.9 to 0.7 )] p=0.7921	7521 (18.3%)	6201 (16.2%)	-1320 [-2.1(-2.6 to -1.6)] p<0.0001
<b>Body regions, n(%)</b>						
Head AIS 3+	5911 (26.6%)	4670 (26.7%)	-1241 [0.1 (-0.8 to 1)] p=0.8301	11128 (27.1%)	9629 (25.2%)	-1499 [-2(-2.6 to -1.3)] p<0.0001
Face AIS 3+	63 (0.3%)	41 (0.2%)	-22 [-0.05 (-0.1 to 0.05)] p=0.3416	99 (0.2%)	69 (0.2%)	-30 [-0.06 (-0.1 to 0)] p=0.0618
Chest AIS 3+	4787 (21.5%)	3915 (22.4%)	-872 [8.3 (0.2 to 1.6)] <0.0450	8515 (20.8%)	8075 (21.1%)	-440 [0.3 (-0.2 to 0.9)] p=0.2337
Abdomen AIS 3+	872 (3.9%)	690 (3.9%)	-182 [0.02 (-0.3 to 0.4)] p=0.9177	1465 (3.6%)	1179 (3.1%)	-286 [-0.5 (-0.7 to -0.2)] p=0.0001
Spine AIS 3+	1985 (8.9%)	1561 (8.9%)	-424 [-0.01(-0.6 to 0.5)] p=0.9744	3784 (9.2%)	3459 (9%)	-325 [-0.2(-0.6 to 0.2)] p=0.3654
Pelvis AIS 3+	758 (3.4%)	600 (3.4%)	-158 [0.02(-0.3 to 0.4)] p=0.9184	1501 (3.7%)	1386 (3.6%)	-115 [-0.04(-0.3 to 0.2)] p=0.7802
Limb AIS 3+	5707 (25.7%)	4892 (27.9%)	-815 [2.3 (1.4 to 3.2)] p<0.0001	10719 (26.1%)	10122 (26.5%)	-597 [0.3(-0.3 to 0.9)] p=0.3053
Other AIS 3+	217 (1%)	199 (1.1%)	-18 [0.2 (-0.04 to 0.3)] p=0.1176	375 (0.9%)	396 (1%)	21 [0.1 (-0.01 to 0.2)] p=0.0836
Polytrauma	1622 (7.3%)	1350 (7.7%)	-272 [0.4 (-0.1 to 0.9)] p=0.1160	2984 (7.3%)	2429 (6.3%)	-555 [-0.9(-1.2 to 0.6)] p<0.0001

\*CCI Charlson Comorbidity Index  
 \*\*MOI Mechanism of injury  
 \*\*\*ISS Injury Severity Score  
 ‡ chi square test for uniform distribution

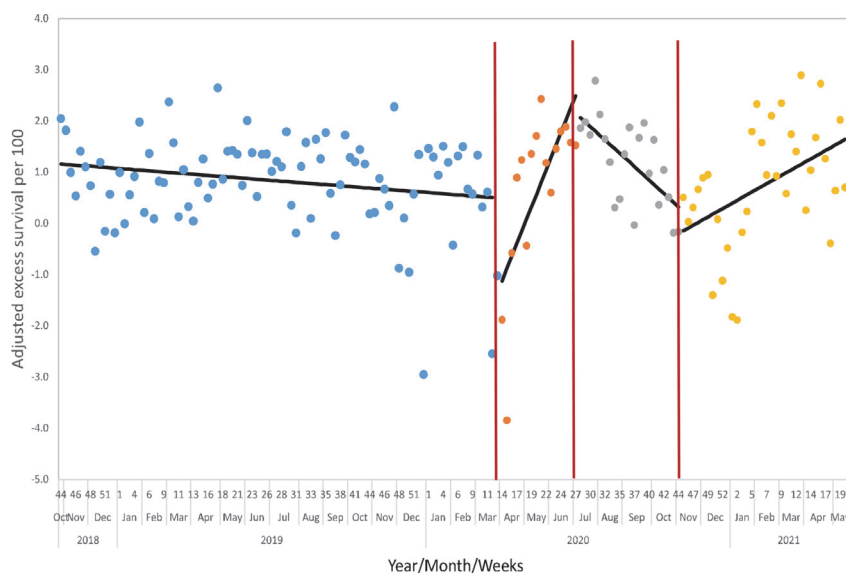


Abstract 1427 Figure 1 Strobe diagram for inclusion of study population

Abstract 1427 Table 2 Comparison care pathways 'lockdown' and pre-COVID periods

	Period			Period		
	24Mar19 – 03Jul19 (comparator)	24Mar20 – 03Jul20 (lockdown 1)	Absolute Change	01Nov18 – 16May19 (comparator)	01Nov20 – 16May21 (lockdown 2)	Absolute Change
1 <sup>st</sup> Hospital MTC	9908 (44.5%)	7376 (42.1%)	-2532 [-2.4 (-3.4 to -1.4)] p<0.0001	18099 (44.1%)	15928 (41.6%)	-2171 [-2.5 (-3.2 to -1.8)] p<0.0001
Treated at MTC	11176 (50.2%)	8256 (47.2%)	-2920 [-3 (-4 to -2)] p<0.0001	20395 (49.7%)	17852 (46.7%)	-2543[-3 (-4 to -2.4)] p<0.0001
Consultant ED	8140 (36.6%)	5562 (31.8%)	-2578 [-4.8(-5.8 to -3.9)] p<0.0001	14779 (36%)	12577 (32.9%)	-2202 [-3.2 (-3.8 to -2.5)] p<0.0001
CT within 1 hr	5062 (31.9%)	3992 (30.9%)	-1070 [-0.9(-2 to 0.1)] p=0.0944	9203 (31.6%)	7776 (27.1%)	-1427 [-4(-5 to -3.7)] p<0.0001
Whole body CT	3348 (15.1%)	3210 (18.3%)	-138 [3 (2 to 4)] p<0.0001	6040 (14.7%)	6417 (16.8%)	377 [2 (1.5 to 2.5)] p<0.0001
ICU stay	3092 (13.9%)	2208 (12.6%)	-884 [-1.3(-1.9 to -0.6) ] p=0.0002	5591 (13.6%)	3850 (10.1%)	-1741 [-3.6(-4 to -3)] p<0.0001
Mortality*	1417 (7.1%)	1316 (8.3%)	-101 [1.2 (0.6 to 1.7)] p<0.0001	2916 (7.9%)	2858 (8.1%)	-58 [0.2 (-0.1 to 0.6)] p=0.2040
<b>Discharge destination, n(%)</b>						
Home (own)	13800 (62%)	10484 (59.9%)	-3316 [-2(-3.1 to -1.2)] p<0.0001	24961 (60.9%)	23368 (61.1%)	-1593 [-0.7 (-1.4 to -0.05)] p=0.0340
Home (relative/carer)	473 (2.1%)	372 (2.1%)	-101 [0 (-0.3 to 0.3)] p=0.9890	974 (2.4%)	852 (2.2%)	-122 [-0.1(-0.4 to 0.06)] p=0.1653
Mortuary*	1501 (6.7%)	1323 (7.6%)	-178 [0.8(0.3 to 1.3)] p=0.0019	3086 (7.5%)	2977 (7.8%)	-109 [0.1 (-0.3 to 0.5)] p=0.5113
No fixed abode	75 (0.3%)	47 (0.3%)	-28 (-37.3%)	107 (0.3%)	87 (0.2%)	-20 (-18.7%)
Not Known	87 (0.4%)	39 (0.2%)	-48 (-55.2%)	101 (0.2%)	95 (0.2%)	-6 (-5.9%)
Nursing Home	1190 (5.3%)	1063 (6.1%)	-127 [0.7(0.3 to 1.2)] p=0.0020	2448 (6%)	2231 (5.8%)	-217 [-0.2(-0.6 to 0.1)] p=0.1620
Other Acute hospital	2425 (10.9%)	1736 (9.9%)	-689 [-0.1(-1.6 to -0.4)] p=0.0014	4346 (10.6%)	3313 (8.7%)	-1033 [-0.1(-0.5 to 0.2)] p=0.4115
Other institution	526 (2.4%)	516 (2.9%)	-10 [0.6 (0.3 to 0.9)] p=0.0003	980 (2.4%)	870 (2.3%)	-110 [-0.1 (-0.3 to 0.1)] p=0.2817
Rehabilitation	2077 (9.3%)	1871 (10.7%)	-206 [1.3(0.7 to 1.9)] p<0.0001	3851 (9.4%)	4274 (11.2%)	423 [ 1.7(1.3 to 2.2)] p<0.0001
Social care	63 (0.3%)	50 (0.3%)	-13 [0 (-0.1 to 0.1)] p=0.9657	121 (0.3%)	103 (0.3%)	-18 [-0.2(-0.1 to 0.5)] p=0.4939

\*These totals do not correspond as mortality includes deaths in the community and is censored at 30 days



Abstract 1427 Figure 2 Interrupted time series analysis assessing the impact of COVID restrictions on likelihood of survival (red horizontal lines indicate introduction and relaxation of 'lockdown' measures)

to worse outcomes for patients presenting with major trauma. There has been no previous national evaluation of 'lockdown' measures impact on the characteristics, treatment pathways and outcomes of trauma patients in England

We aimed to assess the impact of successive lockdowns on the volume, demographics, injury mechanism, severity, treatment and outcomes of major trauma in England.

**Method and Design** Demographic characteristics and clinical pathways of TARN eligible patients in the first lockdown (24th March to 3rd July 2020 inclusive) and second lockdown (1st November 2020 to 16th May 2021 inclusive) were compared to equivalent pre-COVID-19 periods in 2018–2019.

A segmented regression model predicting the weekly risk adjusted survival was estimated and a discontinuity in the gradient (trend) or intercept (level) of the fitted model was tested for at the weekly time point of implementation of each lockdown.

**Results and Conclusion** The first 'lockdown' had a larger associated reduction in total trauma volume (-21%) compared to the pre-COVID period than the second 'lockdown' (-6.7%). Trauma volume increased for those 65 and over (3%) and 85 and over (9.3%) during the second 'lockdown'.

There was a reduction in likelihood of survival (-1.71; 95% CI: -2.76 to -0.66) associated with the immediate introduction of the first 'lockdown'. However, this was followed by a trend of improving survival (0.25; 95% CI: 0.14 to 0.35) and likelihood of survival returned to pre-pandemic levels by the end of the first 'lockdown' period.

Future research is needed understand the initial reduction in likelihood of survival after major trauma observed with the implementation of the first 'lockdown' to prevent this occurring if measures re-introduced.

1716

#### WHY DO EMERGENCY DEPARTMENT CLINICIANS MISS ACUTE AORTIC SYNDROME? A CASE SERIES AND DESCRIPTIVE ANALYSIS

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10.1136/emered-2022-RCEM2.3

**Aims, Objectives and Background** Acute aortic syndrome (AAS) is a rare, life-threatening emergency affecting approximately 4000 people per year in the UK, has an ED misdiagnosis rate as high as 38% and around one quarter of cases are not diagnosed until 24 hours after presenting to the ED.

It presents in many atypical ways, posing a significant diagnostic conundrum for the emergency department (ED) clinician and risk of litigation. We sought to understand the reasons why AAS was missed in ED by conducting a case series review of patients with misidentified AAS presenting to three UK EDs over a 10-year period.

**Method and Design** We identified missed diagnoses of AAS using searches of ED morbidity and mortality records, post-mortem reports, complaints, Electronic Patient Records (EPRs) and Radiology records from three UK EDs.

**Results and Conclusion** Between 1.1.2011–31.12.2020, 43 cases were identified across three EDs (1.4 cases/yr/dept).

The most common diagnosis was Type A aortic dissection (22; 51%).

The most common incorrect presumed diagnoses made were acute coronary syndrome (ACS, 12; 28%), pulmonary

embolism (PE, 5; 12%) and 'non-specific chest pain' (5; 12%).

In 31 of the 43 cases (72%) there was no evidence from the notes of consideration of AAS in the differential diagnosis. In 10 of the 43 cases (23%), AAS was clearly considered, but the clinician appears to have been falsely reassured by clinical findings, normal chest x-ray, or atypical or resolved symptoms.

Only 63% (27/43) presented with chest pain and 16% (7/43) had no pain. 65% (28/43) documented sudden onset of symptoms.

This case series reinforces the RCEM/RCR recommendation that 'All clinicians working in the emergency department should be made aware of the difficulties in excluding the diagnosis of thoracic aortic dissection.' Further research is required to improve ED diagnostic pathways for this group of patients.

1490

#### INTUBATION SUCCESS IN PREHOSPITAL EMERGENCY ANAESTHESIA: A RETROSPECTIVE OBSERVATIONAL ANALYSIS OF THE INTER-CHANGEABLE OPERATOR MODEL (ICOM)

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10.1136/emered-2022-RCEM2.4

**Aims, Objectives and Background** Pre-Hospital emergency anaesthesia (PHEA) is a complex procedure with significant risks. First-pass intubation success (FPS) is recommended as a quality indicator in pre-hospital advanced airway management. Previous data demonstrating significantly lower FPS by non-physicians does not distinguish between non-physicians operating in isolation or within physician teams. In several UK HEMS, the role of the intubating provider is interchangeable between the physician and critical care paramedic – termed the Inter-Changeable Operator Model (ICOM). The objectives of this study were to compare first-pass intubation success rate between physicians and critical care paramedics (CCP) in a large regional, multi-organisational dataset of trauma PHEA patients, and to report the application of the ICOM.

**Method and Design** A retrospective observational study of consecutive trauma patients  $\geq 16$  years old who underwent PHEA at two different ICOM Helicopter Emergency Medical Services in the East of England, 2015–2020. Data are presented as number (percentage) and median [inter-quartile range]. Fisher's exact test was used to compare proportions, reported as odds ratio (OR (95% confidence interval, 95% CI)), p-value.

**Results and Conclusion** In the study period, 13,654 patients were attended. 674 (4.9%) trauma patients  $\geq 16$  years old who underwent PHEA were included in the final analysis: the median age was 44 [28–63] years old, and 502 (74.5%) were male. There was no significant difference in the FPS rate between physicians and CCPs – 90.2% and 87.4% respectively, OR 1.3 (95%CI 0.7–2.5),  $p=0.38$ . The cumulative first, second, third, and fourth-pass intubation success rates were 89.6%, 98.7%, 99.7%, and 100%. Patients who had a physician-operated initial intubation attempt weighed more and had a higher heart rate, compared to those who had a CCP-operated initial attempt.