Cheshire & Mersey Operational Delivery Networks:
Adult Critical Care & Major Trauma

C&M JOINT ODNs NEWSLETTER

SPRING 2021: COVID-19 Spotlight

Welcome to the Spring 2021 Joint Newsletter of the Cheshire and Mersey Major Trauma (CMMTN) and Adult Critical Care (CMCCN) Networks

This issue focuses on the network's responses to the **Covid-19 pandemic**, predominantly **Wave 1**, which has dominated much of the past year and represents the majority of work undertaken by both networks, with much of our regular activity being deferred.

The main theme of this newsletter and the response to the Covid-19 crisis from both Critical Care and Major Trauma, can be summed up by a single word: Collaboration.

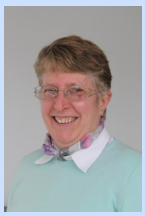
It highlights work undertaken by both networks and associated organisations locally , regionally and nationally, as well as those previously unknown to the networks with whom new and lasting relationships have been formed.

As always we aim to represent the entire patient pathway from point of injury or illness, through definitive care, critical care and onwards to rehabilitation.

We would like to thank all the contributors to the newsletter; we hope you enjoy this issue and welcome any contributions and suggestions for future editions.

If you would like to feed back any comments about this newsletter or have suggestions for future issues please contact : nicola.ludlam@thewaltoncentre.nhs.uk

Foreword by Sarah Clarke MBE, C&M ODN's Director and Lead Nurse, and Dr Jonny Walker, Consultant Intensivist and CMCCN Medical Lead



First and foremost, we must **thank all of you** for the tremendous work, collaboration and dedication you have shown over the last year. The teamwork and mutual support within units, between specialities and between units and hospitals has been truly inspiring. The Network team considers it a privilege to work with and support you.

It has been a difficult, tiring, strange and often distressing experience. We have all learnt a lot. This is clearly reflected in the debrief feedback you have sent us, which has informed the strong recommendations we made to the Cheshire & Mersey in-Hospital Clinical Cell & NHSE NW, as we prepared for what was a challenging winter and look forward to what critical care may look like in future.

CMCCN has been fortunate in achieving investment in equipment and infrastructure through nationally allocated capital for critical care and this has facilitated expanded capacity, including additional respiratory beds for CPAP and NIV. Central to the recommendations made and future capacity planning is the fact that the most important component is you, the professionals. We are consistently advocating that investment in training and support for staff, as well as staff numbers, is essential to make any extra space and equipment useful.

Collaboration between critical care units across the network and with the various components of the major trauma pathway, have enabled both CMCCN and CMMTN to manage demand for these specialist services through this time of unprecedented demand on adult critical care. We are very grateful for all the help provided to achieve this.

The following comments were made by a neutral observer to the Networks debriefing sessions held following the initial response to the pandemic.

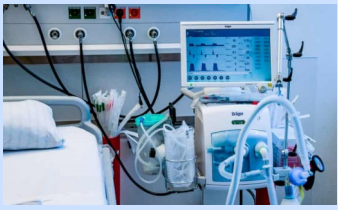
- *'It is clear that the Network worked collaboratively very well.*
- *The support received by the Network from the specialist trusts, organisations and individuals during the crisis is a direct result of the relationships we have built over the years.*
- *It is clear that during these times of pressure we need to reflect on what the network role is; to guide clinically or strategically, or a bit of both*
- *It is obvious that you are a team that knows each other well and work well together.*
- *NHSE and other organisations have come to us for help and advice because of our clinical knowledge and the leadership we have displayed.'*

CRITICAL CARE

The Role of the CMCCN network team during the COVID-19 response

The Cheshire and Mersey Critical Care Network (CMCCN) saw a major change in its roles and functions to support the COVID-19 pandemic. We had to postpone much of our network day to day activities and step into roles supporting national, regional and local command and control structures to support our units during the pandemic.
Sarah Clarke Network Director and Dr Jon Walker Network Medical Lead were seconded to the C&M STP in-Hospital Cell as Medical Lead & Critical Care Leads in addition to their existing roles.

Equipment – CMCCN had the responsibility for collating equipment orders for the 12 critical care units. This involved producing daily requests to the NHSE national equipment team, collating responses to unit equipment requests, feeding back outcomes of those requests to units and executive teams, recording equipment allocations, arranging storage and distribution, responding to queries from units, dealing with frequent changes to the ordering system, and communicating with external procurement departments. CMCCN coordinated a huge allocation of equipment (over 1000 individual items) for critical care from the NHSE national equipment team to all our critical care units this equipment supported the response to the pandemic and will help our units prepare for a further surges in future.



Renal Replacement Therapy – CMCCN worked closely with the C&M and NW Renal Networks to create a C&M renal replacement therapy escalation plan and collaboratively coordinate a NW response to the shortage in Renal Replacement therapy equipment and consumables which came at the peak of the pandemic. Work is still continuing around renal replacement therapy in preparation for further surges and increase resilience. CMCCN are extremely grateful to the renal network for all their help and assistance during the pandemic and continue to work closely with them.

Critical Care SitRep - CMCCN were and continue to be the host network for the North West Intensive Care Bed Information Service. This was set up in the absence of an essential Critical Care Bed Monitoring system that would provide regular 'sit-reps' for C&M and the wider North West region. This was set up with help from the Cheshire and Mersey Imaging Network who worked with CMCCN and the other 2 NW Critical Care ODN's to produce a SITREP of key data, completed 7/7 by NW Trusts to enable us to have an accurate view of critical care activity within the region . We wish to thank all the Cheshire and Mersey Imaging Network staff involved for their hard work and commitment to this during the pandemic.
This work has now been transferred to the NHS Arden & Gem team as the Imaging network team returned to their substantive posts. This service will be in place until a National data service able to provide the same benefits is in place, currently in development by NHSE.
Network wide Debrief post Pandemic wave 1– CMCCN network team conducted a network wide debrief of all our units, Clinical Leads, Senior Nurses, Service Improvement Leads and Clinical Educators using 3 key questions:

- What worked well during the pandemic?
- What didn't work well?
- What they would do differently in future?

A network wide debrief report and action plan was produced and circulated following this work.
A survey of staff redeployed during the first wave was created and 188 Responses have been received – a report and action plan will be produced from this data to ensure our redeployed staff are supported and skills they have acquired whilst being redeployed into critical care are maintained and built upon. National work is also underway to support this.

National Covid policy/guideline contributions

CMCCN was actively involved in the production of National Guidelines and Policies during COVID -19 particularly via roles within CC3N and UKCCNA. This work was produced and distributed nationally via the network lead nurses to assist and inform units of current best practice.

The guidelines included:

Emergency Induction for Non Critical Care Staff working in Critical Care to support the escalation process in times of surge

NICE Covid 19 Rapid Guideline Critical Care

Quick Look Resource guides for non-critical care staff

NHSE Specialty guides for management during the coronavirus pandemic

Coronavirus: principles for increasing the nursing workforce in response to exceptional increased demand in adult critical care

Joint statement on developing immediate critical care nursing capacity

UKCCNA - Accountability, delegation and indemnity for Covid 19 Adult Critical Care Surge

CMCCN gold calls with Medical Directors

On the 7th April 2020 the Cheshire & Mersey Critical Care Network (CMCCN) instigated a daily command and control call with Medical Directors (or designated deputy) . This was 7/7 during the Covid peak under the formal auspices of C & M STP gold command. These enabled the CMCCN team to communicate rapidly and directly with Trusts' executive teams to facilitate an informed, coordinated response to escalating critical care demand.

The purpose of the calls was for a network wide:

- Review of critical care capacity SitRep (primarily C&M and other variable sources)
- Review of CMCCN capacity pressure points & updates of units/network/NW/national position
- Receive indication from NWAS about critical care transfer capability for next 24 hours
- Collective understanding and agreement at executive level of the implications of managing demand if/when this exceeds our capacity to deliver within available resources
- Provide peer support and share learning

MDs were able to provide:

- Local pressure point details
- Equipment needs for the next phase of surge escalation using incremental measures (e.g. next 3 – 5 days or per surge area.
- Patients ready to transfer to other units to enable more effective use of available resources (e.g. into LHCH, Alder Hey, and from Aintree to Walton)
- Direct access to executive team pandemic management structures

There was an overwhelming sense of 'we are in this together 'in all our network units, proactive offers of support between units and often helping out other network units with equipment and consumables when supply chains were extremely limited, to assist with the continued safe care of critical care patients.

The calls continue but have now been reduced to weekly. Feedback from the CMCCN debrief report has been positive. This is some of the feedback we received.

- *CMCCN gold command calls. Participants found the briefing / call helpful to understand the larger picture across the CMCCN, particularly when busy and was extremely useful in smoothing and reviewing Capacity (re Alder Hey and transfers which MCHFT did utilise with positive outcomes).*
- *Allowed Benchmark with other organisations and confirmed up to date actions were appropriate within the Critical Care bed economy - operational to strategic.*
- *Medical Director level involvement ensured strategic involvement.*
- *Communications and situation really useful in informing key issues and linking in with Trust Gold and Silver command meetings.'*

One of the things that really stood out during the COVID 19 pandemic was 'Amazing *cross-network and cross-speciality mutual aid'*

A massive thank you to our amazing critical care units and all their staff at our Specialist Centres at Liverpool Heart and Chest, Walton Centre and Alder Hey During the pandemic, they were there to help when other CMCCN units really needed them to receive and care for patients from our units that were getting overwhelmed with critically ill Covid admissions.

A big "Thank You" to staff that were redeployed to Critical Care during Covid

We would like to say a huge "THANK YOU!" to the fantastic staff that were redeployed from their own areas to work in Critical Care at this time. Our units could not have managed without your help and you all did an amazing job.
The critical care units in CMCCN had staff deployed from Theatres and recovery units, specialist Nurses, outpatients, clinical education, therapies, community, research and corporate departments. In some of our units retired staff and staff that had previously worked in critical care also volunteered to work shifts to support their units too – the response to support our critical care units has been totally amazing.

CMCCN are currently doing further work to help support our redeployed staff and maintain the critical care skills they acquired during Covid.
We conducted a survey of redeployed staff about their experiences working in critical care during COVID which will form a bigger work stream around redeployed staff.

For further details on this please
contact Karen Wilson Quality Improvement lead Nurse CMCCN
karen.wilson@thewaltoncentre.nhs.uk

Spotlight Article

Caring for Adult patients in a Paediatric intensive care unit – More than large children by Emma Fadden and Anna McNamara ICM Trainees

By the end of the first week in April 2020, there were nearly 60,000 confirmed COVID-19 cases in England, 8812 of which were in the North West. Whilst adult hospitals in the region were inundated with admissions, and their respective critical care resources overwhelmed with patients requiring higher levels of care, the paediatric services were comparatively tranquil.

With non-emergency surgery curtailed, and only a limited effect of COVID-19 observed in children at the time, the logical conclusion was reached that a Paediatric Intensive Care Unit (PICU) with capacity to spare, even in a standalone paediatric centre, could accommodate adults.

Having anticipated an increased paediatric critical care (PICU and High Dependency Unit/HDU) workload, approximately 260 members of clinical staff from throughout the hospital rapidly received training in the basics of intensive care. Ward nurses, health care assistants and theatre staff underwent training from the critical care education team, and then observed nursing teams on PICU. An 'intensive care guide' for medical staff from a non-intensive care background was developed. Educational resources were rapidly collated and distributed electronically, using Microsoft Teams.

Alder Hey usually admits patients up to 16 years of age (with a few exceptions), with a critical care capacity of 21 PICU and 15 HDU beds. The paediatric HDU and burns unit were relocated to other wards to facilitate the creation of a 19-bed adult ICU area whilst also allowing for potential increased capacity for paediatric level 3 patients.

Following discussions with our regional adult critical care network (Cheshire and Merseyside, CMCCN), and in light of our stand-alone paediatric hospital status, chosen admission criteria included invasively-ventilated COVID adults aged 70 years or less, under 120kg and not anticipated to require input from multiple adult subspecialists. These constraints on patient size and complexity were selected to ensure that the anticipated demands placed on PICU would not exceed the equipment and expertise readily available. Potential admissions were selected by the regional CMCCN Gold Command and discussed with the designated on-call PICU consultant. In total, eleven adult patients were admitted from four different hospital trusts.

Adult and Paediatric trainee experience

From the perspective of an adult ICM trainee, there were elements that worked very well from the start and others that improved as time went on. In the initial stages, teething problems included ensuring the presence of equipment appropriate for adults and the removal of paediatric sizes (such as heat and moisture exchange filters), availability of certain drugs which are rarely or never used in paediatrics and accessibility to guidelines for problems commonly encountered in adult practice. Issues that we faced usually pertained to the, often quite simple, differences in routine practice for adults and children such as management of bowels or delirium. We were not, however, alone in our struggle to determine the optimal strategy for aspects of care such as anticoagulation or ventilation.

For doctors with a predominantly paediatric background, taking on the challenge of caring for a much larger patient with the complexities of chronic adult illness was daunting. Patients often had common issues, most of which are not encountered in paediatrics. Obtaining adult guidelines and establishing a point of contact with The Royal Liverpool helped to ease issues relating to prescribing and standardised our practice. Proning was a more complex task in adults than in children, particularly in PPE, and required a team of six to perform.

A proning team consisting of surgeons, anaesthetists, operating department practitioners and healthcare assistants, became experts at this and arrived at scheduled times twice daily. These eased the burden on clinicians working in the adult ICU and proved useful for performing routine cares, such as checking pressure areas and making sure endotracheal tapes were secure.

Several aspects of caring for adults in Alder Hey stood out as being particularly good. The paediatric staff worked extremely hard under exceptional circumstances, putting their apprehension aside, to care for these patients as if they were their own family. In Alder Hey, we were in a unique position of admitting only patients whom we had never met before they were sedated and ventilated and, contrary to the patients usually under our care, had decades of life experience behind them. Written accounts of their personalities, interests and family lives from long before COVID, provided by those who knew them best, had a significant impact on all of us and afforded us an insight into the people we were treating. When some of the patients unfortunately, yet inevitably, failed to recover or when others were successfully repatriated to their original hospital, either ventilated or extubated, we felt that we knew them, even if they didn't know us.

The first patient repatriation occurred on 20th April 2020. Gradually, the numbers dwindled as more were stable enough to be transferred to adult critical care units. This was unfortunately juxtaposed with a total of four deaths. The final patient to leave, also the last to arrive, was discharged on 30th April 2020 – just twenty-three days after the first adult was admitted.

Over the course of three weeks, we learned more than we could have anticipated under circumstances that, only a few months earlier, we could never have envisaged. Although our daily
work on PICU has returned to a new normal, and we hope that adult units will not be so overwhelmed that their patients are admitted here again, we still regard the patients that we cared for as 'ours' and know that, should we be called upon again, we will be better equipped, more experienced and ready.

Helping Families during COVID 19 – Southport Critical Care Unit

Families unable to visit loved-ones in intensive care in Southport can now access a video showing where their relatives are being treated. In a bid to help families better understand the treatment being given to isolated critical Covid-19 patients, Southport and Ormskirk Hospital NHS Trust has uploaded the video online
Angela Westwood, Matron for the Intensive Care Unit (ICU) at the Trust explains: "As we are unable to allow visitors at the moment, we are learning as we go -working to find new ways to help families and patients feel connected and less isolated. "We invite families to send in photos and put these on the walls to help create a more homely environment. Picture badges, which allow patients to see the face of those caring for them are helping to reduce some of the issues which come from nursing in face masks. "Families of less-poorly Covid-19 patients are able to carry out video and phone conversations with patients, and get regular phone updates from staff, while they are in hospital. However, this is not always impossible in ICU because of the condition of the patients.

Anxious families have been asking staff for more information, not only about how their relatives are, but also what their surroundings are and who is with them during their time in the unit.

Delivering high quality, compassionate care to you and our patients during difficult times.

NHS
Southport and Ormskirk Hospital
NHS Trust

To help us care for you and your loved one through this difficult time we will be calling you 3 times a day between; 9am-12pm, 3pm-6pm & 8pm-10pm to give you updates and allow you to ask questions. It may be helpful for you to write down questions. We would also like you to tell us more about your loved one as what is important to them is important to us.

We have lots of information about our Intensive Care Unit (ICU) on our website, simply search Google for ICU Knowledge Southport.

Our dedicated ICU phone number is 01704 704218

We use the zoom app to allow you to communicate with your relative when able.

- ☑ You can send letters into the trust via email so they can be printed and delivered to your relative. Simply send your email to: soh-tr.lettertolovedones@nhs.net
- ☑ You can also choose up to 5 pictures that can be emailed to Matron Angie Westwood, printed out and put at the bedside, please email: angelawestwood@nhs.net

Helping Bereaved Families during Covid 19 at Southport Critical Care Unit by Tanya Holden, CMCCN Local Service Improvement Lead

At Southport Critical Care Unit as part of our response to the Covid 19 pandemic, we introduced memory boxes for the relatives of patients that had died on the unit. The boxes contain an ECG strip of the patients heartbeat, hand prints, a lock of hair, a candle, seeds for the family/ loved ones to plant, a knitted heart, soft toy and a message from the critical care staff, if the family have sent pictures or cards in these will go in the box as well. The contents of the boxes are personalised to the families need, for example a gentleman died who had two young grandchildren so we place two soft toys in the box. A sympathy card is also sent to the family from all the staff. Although this was started as a response to the pandemic we will continue with the memory boxes for all patients that die on Critical Care.
Southport Critical Care unit were shortlisted and won a 2020 Nursing Times Award for their work in helping patients and relatives during restriction of visiting.
Congratulations to all the team.

Life Lines National Virtual Visiting Project

Life Lines: Keeping families connected

The online platform connecting families with their loved ones in hospital and the clinicians looking after them.

From left: Dr Joel Meyer and Professor Louise Rose holding Life Lines tablets at St Thomas' Hospital in London.

Families whose loved ones are being treated in intensive care units for coronavirus (COVID-19) can now be present virtually at their bedside.

The Life Lines project, which has been launched at Guy's and St Thomas' and King's College Hospital, supported by King's Health Partners Academic Health Sciences Centre and King's College London, allows relatives to see and speak to their loved ones via a tablet using the secure online platform, aTouchAway.

Another platform in which our critical care units were able to support patients and their loved ones was with virtual visiting.
CMCCN was fortunate to be part of the Life Lines Virtual visiting project which was created by Dr Joel Mayer and Prof Louise Rose. It was originally launched at Guys 'and St Thomas's and King's College Hospital and supported by Kings Health Partners Academic Health and Science centre and Kings College London.
It allows relatives to see and speak to their loved ones via a tablet device using a secure online platform called a Touch Away. Life Lines kindly donated several tablet devices to all of our critical care units within Cheshire and Mersey. would like to thank Joel, Louise and the Life Lines project team for their help and support – it really made a difference.

LIFE LINES
Be with them when you can't be near them

Using the Life Lines Devices at Macclesfield District General Hospital by Anne Williams, CMCCN Service Improvement Lead at East Cheshire NHS Trust

Video calling during COVID 19

During the initial COVID 19 episode the Critical Care Unit at MDGH was loaned two tablets which were preloaded with "aTouchAway"
The staff in the Trust having used a different brand of tablet for observation recording for a number of years and were worried (for about 5 minutes) that they would not be able to use the new devices.
The instructions supplied with the devices made it very easy to set up and the day the devices arrived staff quickly engaged with the product, a patient was added and relatives invited to the scheme.
Below are 3 experiences of using the device:

- With one patient who was recovering from COVID 19 the tablet provided a fantastic link to allow them to see their pets (as well as their human family), their positive reaction to seeing the pets on the video link prompted a few days later a socially distanced car park viewing of the pets. This patient has now gone home. For a unit that has never managed to progress with pet therapy, (not for the want of trying) this gave an option for how to progress pet visiting in the future.
- On another occasion when the Chaplin was not able to attend the Critical Care Unit, using the video link (at the request of the family) one of our COVID 19 patients who sadly did not survive was able to receive prayers for the dying, providing some comfort to both patient and family.
- A third COVID 19 patient who benefited from the unit being able to use the video link was a person who was struggling during sedation holds. The unit staff made sure that when a sedation hold was planned the relative of the patient would be on the video call to provide reassurance and a familiar voice. This reassurance provided by the link allowed the patient care to be progressed. This patient has now gone home.

With the unit having been split over two sites one tablet was kept in the COVID 19 area and the second one was kept in the non-COVID 19 area. Though staff offered the opportunity of the video call to patients and relatives in the non-COVID 19 area there was a much lower uptake of the offer in this cohort, possibly because these patients have generally had much shorter stays in.
The biggest problem the unit staff had with the devices was remembering the swipe code!
The staffs are aware these devices are on loan, they will be missed when they have to be returned.
The unit is very grateful for this resource having been made available to them during the first COVID 19 episode.

Network Support from the Laura Hyde Foundation during Covid-19

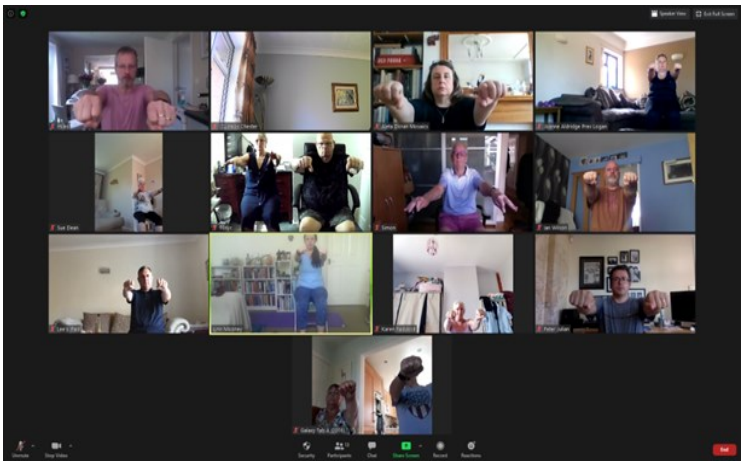
CMCCN also received support during COVID from the Laura Hyde Foundation (LHF). The LHF are a foundation that ' Cares for those who care for us ' and their main objective is to ensure that all medical and emergency services personnel have access to the best mental health support network available. During Covid the LHF kindly sent a care package to each of our critical care units, all of which were gratefully received by critical care staff in Cheshire and Mersey.
CMCCN would like to say a very big thank you to the LHF for everything they are doing to support staff in the NHS.

ICUsteps Chester

Covid 19 and being in lockdown certainly did not stop the amazing ICU STEP Chester patient support group. This unprecedented time, it has just made them go from strength to strength even when group members were shielding themselves – they have just wanted to help others that have been through what they have.
They have moved all their activities and meetings to a virtual platform. Post recovery support and rehabilitation is vital for all critical care patients' pre and post COVID.
This allowed them to hold weekly Drop-In meetings, Exercise sessions and Yoga where you can join in the meetings, watch and follow Wes and Lynn, the exercise and yoga instructors and talk with them and other group members.

Online Support Group Meeting

Weekly Virtual Yoga Sessions



The aim of the group is to help patient's post critical care make the best possible recovery from their illness and improve the quality of life for patients post critical care.

The group have also just recently started a weekly virtual drop in session specifically for relatives and friends who are supporting critical care patients. It is facilitated by relatives just for relatives after the group were approached by a group of relatives to say they would like a group to have the freedom to discuss issues and worries they did not want to discuss in front of their loved ones.
The first session has been very successful and will become a permanent service the group will offer.
With permission from the Lifelines project they also offered virtual visiting to patients in the Critical Care unit at the Countess of Chester via the Life Devices – this was a service the group offered in person prior to Covid to allow patients and relatives the opportunity to speak to someone that been through the same experience as them.
They have also offered Critical Care Staff a warm invitation to attend their weekly meetings which has really helped support staff after Covid 19.
CMCCN wish to thank you for everything they are doing to support patient's post critical care and their families.
Within CMCCN we are very fortune to have 4 Critical Care Patient support groups within Cheshire and Mersey – these are Whiston, Chester, Warrington and the newest Support group based at Southport and Ormskirk.
For further information on ICU Steps Chester please visit their website
www.icustepschester.org

Rehabilitation Focus during Covid

Rehabilitation is vitally important for all every patient in critical care whether they have had COVID or not.
It should be multidisciplinary and start from the moment the patient is admitted into Critical Care. CMCCN will be doing an entire newsletter in the near future on all the amazing rehabilitation work that goes on daily within our units but for now here is a round up of some of the Covid 19 rehabilitation work that has been happening in within some of our units in CMCCN.

Critical Care Rehabilitation Service during Covid - Sophie Daley, Inpatient Therapy Team Leader, Countess of Chester Hospital

At the Countess of Chester Hospital we have continued to develop our Critical Care Rehabilitation Service, in particular support provided on discharge. Our normal practice was to contact patients on our pathway (those ventilated for more than 4 days or deemed to have significant Critical Illness associated issues) via phone within 7 days of discharge to ascertain how they are managing and provide advice and support as required. Patients would then be invited to our weekly Critical Care Rehabilitation Class 2-4 weeks post discharge.
Currently all patients admitted to Critical Care due to Covid are included in our pathway irrespective of their ventilator requirements.
Patients continue to be contacted via phone within 7 days and are signposted or referred to services as required, along with providing advice and further progression of their home exercise programme. Patients are now invited to attend our weekly remote Critical Care Rehabilitation Class 2-4 weeks post discharge.
We are running 1:1 video call consultations to complete an initial assessment and then patients are allocated to the appropriate exercise group. If a patient declines to attend then exercise progressions are sent to the patient along with a link to the exercise videos and presentations, as appropriate.
The remote Rehabilitation Class is an hour long session that runs weekly via an NHS approved platform. Patients watch a pre-recorded exercise session which includes an introduction and demonstration of each exercise with 3 levels of difficulty followed by a minute of the exercise. Patients are able to take part in time with the video whilst the Therapists are able to continually observe all the participants and, with consent, feedback can be given during the session.
Following the circuit there is a 5 minute presentation on topics to advise and support patient's recovery. These are topics often identified during the initial assessment or highlighted during the sessions.
Goals are set and outcome measures are completed during the initial 1:1 assessment and then re-measured 6 sessions later in a further 1:1 video call.
Patients and their families have found being able to remotely access our service extremely beneficial.

How the In Therapy Service at LHCH responded during the Covid pandemic by Hannah Rooney, In-hospital Therapy Lead at Liverpool Heart and Chest Hospital

- Pulmonary Rehab was suspended – Exercise physiologists and physios deployed to wards to boost numbers
- Cystic Fibrosis clinics were suspended – CF physios joined with surgical physios to create one big respiratory team
- Switched to a full 7 day service with 2 shifts (early and late) to ensure 12 hour physio cover with normal on-call service overnight
- 6 day service from dieticians and 7 day service from SLT
- Assisted critical care colleagues by being nurse buddies from 8am – 8pm
- Locum physio required to ensure we had staff with the right level of respiratory experience
- Deployed a support worker to critical care for 1 month due to previous experience
- Received deployed staff member from the Improvement Team (previous therapies staff) to assist on the wards and critical care
- Received deployed staff members from Knowsley Community Stroke team - Refresher training provided to facilitate ability to work on critical care and the wards and second staff member was able to boost OT numbers across the week.
- 3 newly qualified physios began with us during the COVID response – being supported to go on the temporary HCPC register

Post Covid Rehabilitation and Triage service at Warrington Hospital by Joanna Thomas – Advanced Physiotherapist and team lead for Respiratory and Surgical rehabilitation at Warrington Hospital

The work we are doing is around not just ICU patients but all patients that have had Covid. For the ward based patients it's basically the only follow up they get, other than a chest x-ray to ensure their pneumonic lung changes have resolved, unless they have any specific issues obviously.

For ICU patients the aim is to bridge that gap between discharge and follow up clinic which is approximately a three month wait. I'm hoping that once we've worked through the back log of Covid patients we can telephone all future discharges within 2 weeks of discharge, and then move on to continue it for post icu discharges, with a plan to put in place . a similar system to Chester.

The patient is given a rehab booklet on discharge with basic exercises and advice, patient is then phoned within two weeks to run through a basic triage questionnaire to signpost them to relevant services. We're 'pre' triaging for cardiac and pulmonary rehab, and others are being referred to lifestyle services as appropriate. Information is given regarding nutrition, fatigue and psychological support. There is still a massive gap in being able to refer to psychological support directly, which has always been an issue since CG83 was published.

COVID Patient Rehabilitation Story - Southport Critical Care Unit

Erwin is a 49 year old AED Charge Nurse working within our own Trust. He currently lives with another member of staff in a house share and both began displaying COVID 19 symptoms at the beginning of April 2020. Erwin's first symptoms started on 06.04.20, however his first COVID swab on 08.04.20 was negative. Erwin and his housemate continued to self-isolate together at home, but both their symptoms worsened over the next few days.

Both attended A&E on 14.04.20. Noel was admitted however Erwin condition at this time did not warrant an admission. He returned home to continue self-isolating. Erwin continued to display worsening respiratory symptoms over the next few days so was encouraged by nursing colleagues to re-attend A& E, which he did on 19.04.20.

It was noticed that his blood oxygen levels had dropped so he was transferred to an acute medical ward for oxygen therapy. Erwin's oxygen levels in his blood continued to drop and was therefore transferred to Critical Care 2 days later, for respiratory support therapy . Erwin continued to deteriorate rapidly and was intubated and place on a ventilator several hours later. He was proned (positioned on his front face down to help improve expansion and oxygenation to back regions of the lungs) immediately and referred for Extracorporeal Membrane Oxygenation (ECMO) – which is a technique that provides prolonged cardiac and respiratory support to a person whose heart and lungs are unable to provide an adequate amount of oxygenation to sustain their life. ECMO is performed in specialist centres throughout the United Kingdom.

After several episodes of proning with minimal improvements in oxygenation, he was accepted for ECMO at Wythenshawe and was transferred there on 25.04.20. He then spent 17 days receiving ECMO treatment, another 6 days on Wythenshawe general ITU before being repatriated back to Southport (still intubated and ventilated) on 18.05.20.

Erwin then had a tracheostomy performed on 20.05.20 to help facilitate weaning from the ventilator and weaning from the high levels of sedation he was on whilst being ventilated. We slowly started to commence his ventilator wean by halving his pressure support for very short periods. Pressure support is a ventilator setting that assists the patient breathing for themselves on a ventilator and attempted bed exercises. It took 7 days for him to become alert after the sedation was stopped.

Once he was s alert, Erwin was transferred out into the combilizer chair for the first time on 27.05.20 where he could tolerate sitting for 1-2 hours. A comblizer chair is an aid that assists patients out of bed . He did this did this daily for the next few days, alongside active assisted limb exercises. On 01.06.20, when he displayed suitable power to his limbs to attempt an edge of bed sit Erwin also demonstrated improved general strength and was able to sit with minimal support so therefore stood with stand aid and was transferred into a normal armchair.

On the same day 01.06.20, 11 days after the tracheostomy was inserted, he tried a speaking valve for the first time – a speaking valve is a one way valve that is attached to the patients tracheostomy and can facilitate the patient to speak. Due to having the speaking valve he was able to participate in video chat with his family abroad which greatly improved his psychological well-being.

Erwin made huge steps with his rehabilitation over the next 10 days. He continued to transfer out of bed with the stand aid and on 03.06.20 The following day he was able to transfer using a Zimmer frame and assistance of 2. With intensive therapy input several times day his exercise tolerance gradually improved.

With continued rehabilitation and exercises his limb weakness improved. He also progressed rapidly being weaned from the ventilator and the tracheostomy tube was removed on 08.06.20, 19 days after his tracheostomy was inserted.

Two days later, Erwin was discharged from critical care to a medical ward where he continued with his rehabilitation daily with the ward therapists. He eventually was mobilising around the ward and completing personal care independently. He was discharged home after a total of 9.5 weeks in hospital, 7 weeks in Critical Care and 3 of those weeks on ECMO.

Although he is home, unsupported, mobile and not short of breath he is still suffering the consequences of a long critical care admission and his rehabilitation journey continues with our support.

Article written by Rehabilitation Coordinator & Advanced Practice Physio- Abi Oliver .Physiotherapists- Anna Williams, Kate Baker & Chris Gautrey —(full permission given by patient to share his covid journey and picture)

CMCCN team would like to thank Erwin for kindly sharing his story and send their best wishes for his recovery.

Major Trauma Centre Collaborative Cheshire and Mersey Network

NHS Cheshire & Mersey Major Trauma Network

The Major Trauma Network Response to the Covid-19 Outbreak

Introduction

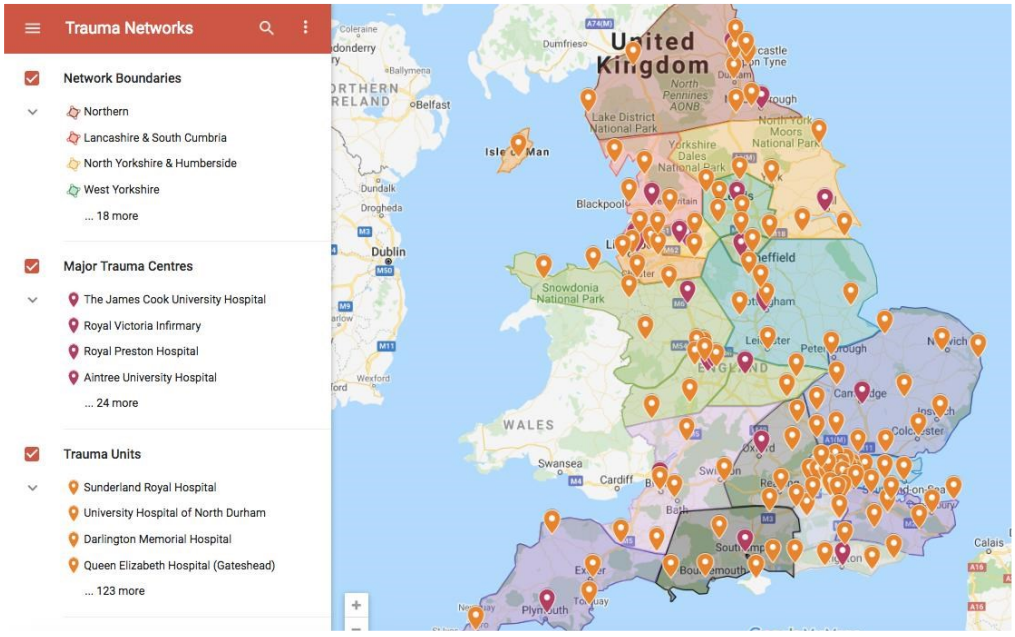
The following captures major trauma operational and network activity during the national response to the first wave of the Coronavirus pandemic and subsequently throughout the recovery and restoration phases of that first wave.

It details local as well as national activity, including CMMTN's involvement with the National Major Trauma System, developed in response to the Coronavirus outbreak and in line with other specialised cells.

One of the effects of the Covid 19 outbreak and subsequent Government imposed lockdown measures was a marked reduction in cases of major trauma. People were forced to stay at home, there were very few vehicles on the roads and normal leisure activities were curtailed.

This was without doubt a major factor in the ability of the NHS as a whole to respond to the crisis as it did.

Major Trauma Network-Map shows Network boundaries, Major Trauma Centres (Red) and Trauma Units (orange)



Response , Wave 1

Professor Chris Moran, the National Clinical Director (NCD) for Trauma was seconded to the National Covid-19 response and Mr Rob Bentley, Consultant Craniofacial and Oral and Maxillofacial Surgeon, stepped into the role of NCD temporarily.

Rob, along with several Major Trauma Network (MTN) managers formed the National Major Trauma System (NMTS) and the Major Trauma Specialised Services Covid-19 Response Cell was stood up. EDIT

Regular lines of communication were set up between the 23 Major Trauma Operational Delivery Networks (ODN's) and the NMTS with initial weekly teleconferences taking place to plan a response, review progress and address any problems that had arisen.

A 7/7 MTN sit rep was rapidly developed representing the prehospital, Major Trauma Centre (MTC) and Trauma Units (TU) operational capabilities with agreed core data which was embedded in the ODN's host trust's daily global sit rep. These were reviewed by the National Team to help identify developing system pressures and the potential need for mutual aid. Sit rep reporting by the MTN's, which was to be by exception, would inform a RAG rating which would in turn prompt the NMTS to contact any network rated orange or red to offer support.

CMMTN contacted the MTCC and the TU's appraising them of this information and provided the MTCC with a SitRep template, distributed by the NMTS, to be completed daily by 11.00. Any issues would then be reported back to the NMTS at 11.30. The TU's were not required to complete a SitRep template but were asked to report any issues, by exception, to the Network in the same manner. Throughout the response to Covid-19 the Network was in regular contact with the MTC and TU's and further monitoring was carried out by the Major Trauma Network Medical Lead John Matthews, in contact with regions ED Clinical Directors. Throughout the response to the pandemic no issues were reported to the Network and the Major Trauma pathway and overall system continued to function effectively.

Cheshire and Mersey Major Trauma Network

Contingency plans were also discussed with senior North West Ambulance Service (NWAS) and North West Air Ambulance (NWAA) colleagues . It was confirmed that the current Major Trauma Pathfinder would be fit for purpose at this time and changes to a 2 stage triage system, as suggested by the NMTS, were unnecessary and would likely cause confusion to an already stressed workforce. The question of mutual aid across the North West was raised and following a meeting of the North West Major Trauma ODN's (NWMTODN's) and further discussions with NWAS it was been agreed to follow the dispersal principles that are set out in the 'Mass Casualty Management Principles for the North of England' document, which inform divert destination based on geographical location of

To further help support MTODN's an agreed Trauma OPEL escalation rating was also developed by the NMTS in conjunction with Regional NHSE Teams and Incident Control Centre's (ICC's). These OPEL triggers were activated by the SitRep RAG rating for each network and allowed visibility across networks and their commissioning teams to help solve any issues in a timely manner. (Below)

National Major Trauma SitRep Dashboard and OPEL escalation categories

Date: 31.05.2020

Network	RAG Status	Comments
NORTHERN		
LANCASHIRE & SOUTH CUMBRIA		
NORTH WEST CHILDRENS		Temp cessation of Wythenshawe as a paeds TU.
CHESHIRE & MERSEY		
GREATER MANCHESTER		
WEST YORKSHIRE		
NORTH YORKSHIRE & HUMBER		
CENTRAL ENGLAND		
NORTH MIDLANDS & NORTH WALES		
BIRMINGHAM, BLACK COUNTRY, HEREFORD & WORCESTER		
EAST OF ENGLAND		Reduction of EAAA Cambridge flying hours.
EAST MIDLANDS		
NORTH EAST LONDON & ESSEX		Formal pathway has been set up for paeds trauma due to several TU's losing paeds inpatient capability
NORTH WEST LONDON		1 x TU on full divert
SOUTH EAST LONDON, KENT & MEDWAY		
SOUTH WEST LONDON & SURREY		MTC helipad open. Only 1 TU helipad open
SOUTH YORKSHIRE		
PENINSULA		Devon Air Amb conveying patients; daylight hours only.
SEVERN		One LEH closed to all attendances; Ambulances are diverted to nearest appropriate ED. May be some impact on local TUs. All SWAS Air Ambulance Teams are flying to jobs. Following publication of guidance from PHE units are working with air operators to develop pathways for conveying patients.
SUSSEX		
THAMES VALLEY		
WESSEX		

MAJOR TRAUMA	Major Trauma Specific Trigger Points
MT - OPEL 1	MAJOR TRAUMA CENTRE MTC able to receive critically injured patients into appropriate critical care area MAJOR TRAUMA NETWORK Network functioning as currently; triage tool at steps 1 & 2 (limited) only
MT - OPEL 2	MAJOR TRAUMA CENTRE Unable to accept time dependent secondary transfers from TUs/LEHs. MAJOR TRAUMA NETWORK One MTC at OPEL 2 and/or 1-3 TUs not accepting triage positive trauma and/or Pre-hospital running only primary transfers
MT - OPEL 3	MAJOR TRAUMA CENTRE MTC can provide immediate resuscitation, emergency surgery and specialist critical care; no capacity for ward level patients (must stay in Trauma Units) MAJOR TRAUMA NETWORK At least one MTC in network at OPEL-3 or OPEL-4 (but OPEL-4 if only one MTC in a network) Pre-hospital services only running primary transfers Inter-network cooperation to match patients to capacity and specialty care Mutual Aid with neighbouring networks explored Primary bypass to remaining/neighbouring MTCs where possible Increased use of helicopter transfer across region MTCs in region without capacity aim to stay at OPEL-3 Onward transfer to receiving MTCs on case by case basis Increased use of air ambulance + critical transfer services where available Receiving MTCs maintain a COVID negative critical care area Actively protect viable MTCs in region Able to transfer out some COVID+ patients Redeployment of some staff to support trauma care at remaining MTCs
MT - OPEL 4	MAJOR TRAUMA CENTRE No capacity for critical care MTC cannot provide immediate resuscitation and/or emergency surgery MAJOR TRAUMA NETWORK All MTCs in network at OPEL-4 (including where one MTC in a network) All major trauma to local hospital No rapid access to specialist care Pre-hospital service unable to run primary transfers

An automated electronic dashboard was also developed in conjunction with the MTC's Business Information Units for MTC's to record their ability to receive primary and secondary time critical transfers together with their position in being able to perform time dependent surgery for pelvic, spinal and complex lower limb trauma.

National Major Trauma System
Prospective Capacity

08/04/20

NHS England and NHS Improvement

Region: East of England | London | Midlands | North East & Yor... | North West | South East | South West | Wales

MTC: Major Trauma Ce...

Network: Birmingham, Bla... | Central England | Cheshire and M... | East Midlands | East of England | Greater Manche... | Lancashire and S... | North East Lond... | North Midlands ... | North West Chil... | North West Lon... | North Yorkshire ... | Northern | Peninsula | Severn | South East Lond... | South West Lon... | South Yorkshire | Sussex | Thames Valley | Wessex | West Yorkshire

		Critical Care				Theatre Capacity				Bed capacity		
Site	Trust	Total Beds	Empty Beds	Full Beds	Capacity	Minimum theatre capacity?	Open to Primary Triage?	Open to time critical secondary transfers?	Open to time dependent secondary transfers?	Unoccupied Beds	Occupied non-Covid-19	Occupied Covid-19
University Hospital Aintree	Aintree University Hospital NHS Foundatior	1	1	1	10%	Yes	No	Yes	No	1	2	3
Alder Hey Children's NHS Foundation Trust	Alder Hey Children's NHS Foundation Trust	3	3	3	12%	Yes	No	Yes	No	3	4	5
The Royal London Hospital	Barts Health NHS Trust	8	8	8	17%	Yes	No	Yes	No	8	9	10
Birmingham Children's Hospital	Birmingham Women's and Children's NHS F	15	15	15	24%	Yes	No	Yes	No	15	16	17
Royal Sussex County Hospital	Brighton And Sussex University Hospitals NI	20	20	20	29%	Yes	No	Yes	No	20	21	22
Addenbrooke's Hospital	Cambridge University Hospitals NHS Found	23	23	23	32%	Yes	No	Yes	No	23	24	25

For planning purposes it was felt that it was important to have Major Trauma identified as one of the services that might have been significantly impacted by service reconfigurations for Covid which could potentially affect morbidity and mortality.

This was achieved by the NMTS and Major Trauma was identified by James Palmer, Specialised Services NHS England National Medical Director, as one of 14 key service areas where there was a high risk of mortality or substantial harm due to limited access to acute hospital beds.

As stated above, due to the relative reduction in major trauma cases, and the preparations of the National Major Trauma ODN's and the NMTS this fortunately did not prove to be the case. One region saw as much as a 60% reduction in major trauma cases and this was generally reflected nationally.

During week commencing 27/04/2020 a letter from NHS Chief Executive Sir Simon Stevens stated the following:

"Emergency hospital admissions were at 63% of their level in the same week last year. This is likely due to a combination of: a) changed healthcare seeking behaviour by patients, b) reductions in the incidence of some health problems such as ***major trauma and road traffic accidents***

As a result the anticipated stresses on the major trauma system did not arise and cases remained low throughout the first lockdown period.

Locally and especially around the Liverpool area Covid infection rates had spiked in April (Fig 1.) which placed a significant burden on hospital services across the city, in particular ED and critical care. The associated reduction in emergency activity and major trauma cases meant that staff could be redeployed to other clinical areas(Fig 2. shows reduction in Trauma Team activations between April 2018 and April 2019 and the further reduction to April 2020, red , black and green arrows respectively)

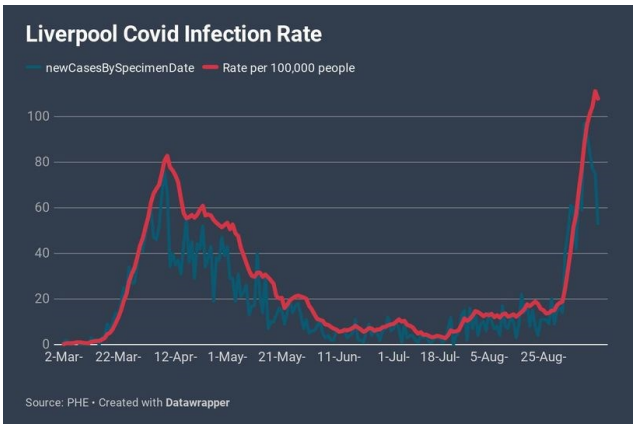


Fig 1. Liverpool Covid Infection Rates 2019

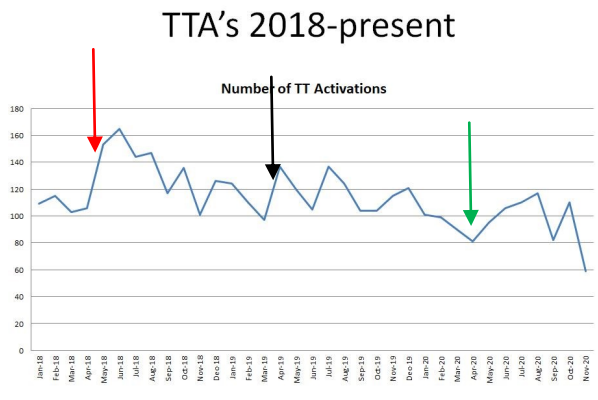


Fig 2.Trauma Team Activations 2018 to present

The beginning of May saw an increase in emergency activity nationally and it was recognised that as Emergency Departments, and hospitals in general, were running at high capacity before the Covid outbreak there was every reason to suspect that there would be a return to normal if not "Supra normal" levels of Major Trauma activity as the effects of the easing of lockdown measures started to filter into the system.

At this point hospitals were operating differently from how they were pre Covid-19 with reduced capabilities, reduced staffing levels and were faced with repurposing theatres, recovery suites, ICU's and wards. It was recognised that in many cases hospitals would have to be adapted for both Covid and non-Covid patients and as a result may be less efficient.

All hospitals had significantly changed core services in an attempt to free up CCU and bed capacity for Covid patients and this had significant effects on how non Covid emergency services were and will be delivered.

With this in mind the Major Trauma ODN's were asked to complete a gap analysis for their respective MTC's outlining preparedness for a return to the provision of Major Trauma facilities and capabilities against pre Covid levels . The Cheshire and Mersey Major Trauma Network and the MTCC identified no gaps in service at that time.

On the 18th of June the MTN sit rep was reviewed and stepped down from a 7/7 to a once weekly return by excep-

Rehabilitation

Major Trauma Rehabilitation nationally was reviewed recognising that much of the Acute Hospital Rehabilitation facilities and staff were impacted quite significantly by the Covid preparations and response. Work was undertaken with the 23 Major Trauma ODN's and their Clinical Directors of Rehabilitation in conjunction with the National CRG for Rehabilitation and also the British Society for Rehabilitation Medicine to outline what "Good looks like." This would not only benefit Covid patients in the immediate recovery phase but also major Trauma patients given that many would require a very similar multidisciplinary assessment of their complex needs.

A document was also produced by the Intensive Care Society and British Society of Rehabilitation Medicine "Responding to COVID-19 and Beyond:
Framework for assessing early rehabilitation needs following treatment in intensive care ".

CMRN road to recovery...
Specialist, person centred rehabilitation to give people the best opportunities for recovery

The Cheshire and Mersey Rehabilitation Network was made aware of developments in case this had the potential to impact on their systems.

Work on this has continued to see how measures put in place may build towards a more long term transformational piece of work to address the rehabilitation needs of Major Trauma patients.

On the 3rd of June 2020 Mr Rob Bentley and the NMTS contacted the national MTN's stating the following:

"NHSE has in recent weeks been reviewing the need for the ongoing work of the 14 Specialised Services Covid-19 Response Cells. They recognise that there is a very real need for some of them to remain active given the impact to their services, such as Cancer, and that their restoration and recovery represent significant challenges over a prolonged period of time. Major Trauma, whilst being identified as one of those services that might have been significantly impacted by service reconfigurations for Covid, has fortunately not seen this impact due to the preparations by the MTN's and the relative reduction in levels of Major Trauma.

Indeed the overall reflection from NHSE is that Major Trauma provision has been well managed throughout and this has been a testimony to the pre-existing strong ODN arrangements.

It is for this reason that NHSE has informed the Regional commissioning teams that the Major Trauma COVID-19 Cell should be stood down from its current level of operation but retains the ability to be reactivated should the need arise. Ongoing coordination of Major Trauma would return to the previous framework where work streams were coordinated through the National Major Trauma Clinical Reference Group (CRG) and Trauma National Programme of Care Group (NPOC).

Over the last 9 weeks it's been a real pleasure as NCD, together with the co-opted National Team to work closely and collaboratively with the ODN teams, prehospital services and regional commissioners as we have looked to develop a National Major Trauma System (NMTS) supporting the ODN's and adapted to meet the challenge of the Covid pandemic.

Below is a summary of achievements and changes instigated by the close working relationship of all of the Major Trauma Networks with the National Major Trauma System and the National Clinical Director for Major Trauma:

- *The identification of Major Trauma by James Palmer, Specialised Services NHS England National Medical Director as one of 14 key service areas where there was a high risk of mortality or substantial harm due to limited access to acute hospital beds. This was communicated in a letter to the Regional Directors of commissioning and through them to the CEO's of both the Major Trauma Centres (MTC's) and the ODN hosts of the Major Trauma Networks (MTN's).*
- *A co-ordinated National approach for each regional team in conjunction with their ODN's and prehospital service providers to move to a two stage triage decision tree to help maintain capacity at the MTC's. Whilst the need for this to continue will be up to the regional teams to decide upon in conjunction with their ODN's and prehospital services, it has ensured that the necessary process by which this can be rapidly achieved has been rehearsed and we know that many networks will be looking to retain aspects in their modified decision trees after reflection of their detailed analysis.*
- *Restored the ability for time critical Air Ambulance Transfer capability for potentially Covid positive patients after discussions with PHE and CAA.*
- *A completed gap analysis of the 23 MTN's against the Covid preparation responses which helped to ensure alignment of prehospital services and the 172 hospitals that make up the NMTS consisting of 26 MTC's, and 144 Trauma Units (TU's) and Local Emergency Hospitals (LEH's), which in many cases has led to enhanced resource and resilience such as the provision of control desk capability and 24/7 MTC consultant cover.*
- *Daily MTN's sit reps representing the prehospital, MTC and TU's operational capabilities with agreed core data embedded in the ODN's host trust's overall daily sit rep. This has helped to ensure that Major Trauma features as an essential service for both the MTC and the host of the ODN. These reports are currently reviewed by the National Team on a daily basis to help identify developing system pressures and potential need for mutual aid in conjunction with the ODN's and their regional teams. Whilst there will no longer be a need to review the Sit Reps on a daily basis given the level of activity, the frequency of the exceptional reporting might continue to be delivered on a weekly basis as hospitals step down their Covid response teams.*
- *An agreed Trauma OPEL escalation rating and process for ODN's in conjunction with their Regional NHSE commissioning teams and Incident Control Centre's (ICC's) that allows for enhanced visibility of evolving issues and their resolution, including the need for potential mutual aid, both within and across the regions.*
- *An agreed Supra- regional response to an OPEL 4 PICU status to ensure National co-ordinated provision of*

- *An automated electronic dashboard in conjunction with the MTC's Information Business Unit that now informs the daily operational capability for CCU and standard bed base availability for all 172 hospitals and 13 MTC's that have started to upload the ability to receive primary and secondary time critical transfers together with their ability to perform time dependent surgery for pelvic, spinal and complex lower limb trauma. We are working with the National IT team to further develop this with the "Tableau" platform which will allow interactive capability and map to ODN's, MTC's, TU's, Regions, ICS and STP's and our own updated Directory of Services.*
- *Guidance for repatriation that includes definitions and timelines and will help inform local escalation policies and will hopefully be reflected in the proposed Trauma Unit Best Practice Tariff.*
- *Guidance for the governance, funding and lines of communication between ODN's and their evolving Regional NHSE, ICS and STP commissioning frameworks.*
- *A suggested approach for restoration of Major Trauma Rehabilitation and longer term transformational change as part of a comprehensive rehabilitation system based on a Regional ODN model based in an ICS which both Adult and Paediatric Major Trauma patients would benefit from an integrated pathway of care.*

Summary: Major Trauma Response

As a mature Network, CMMTN and Major Trauma Networks nationally have had systems in place for many years to deal with service disruption. These plans were further cemented following the terrorist incidents in 2017 and the subsequent development of the mass casualty matrices, patient distribution plans and the North of England Mass Casualty Principles guidance.
As a Network we found that these plans, along with the robust processes that were in place in NWAS should they have been be denied access to an TU or an MTC, were sufficient and functioned normally in regard to the provision of major trauma services across the North West. The Major Trauma Pathfinder was also fit for purpose and following review it was felt that it was unnecessary to move to a 2 stage triage system.
The three NW Networks all have combined Critical Care and Major Trauma Network Director roles and were in daily contact as they coordinated the NW Critical Care response to Covid-19.

The formation of the NMTS served to further bolster the plans already in place by the national MTN's and prepare for what could have been a significant impact to major trauma services.
This was thankfully avoided by the reduction in the levels of major trauma related to the period of lockdown.
It created a coordinated national response by the networks and associated specialities and kept major trauma on the map by having it recognised as one of he 14 services that may be impacted by the Covid response.
Significant changes were identified and delivered in a short space of time and, a nationally agreed framework for trauma repatriations was produced and a suggested approach for restoration of Trauma Rehabilitation Services was identified and explored.

We hope you have found this issue of the CMODNs newsletter interesting and informative. Thanks again to all who contributed.
The next edition will focus on the recovery phase from wave 1 and how the Networks responded to and recovered from the subsequent waves of the pandemic.

It will also cover new projects and developments within both Networks and their return to business as usual.

Many Thanks

The CMODNs Team