COVID and Flu Manual for IMRS

Contents

A. Infection Control

A1. Cleaning (COVID)

- RED COVID +ve bays: continue regular cleaning as per current practice

- If new COVID +ve (RED patient) identified in AMBER bay –
    - Move +ve patient ASAP to RED ward
    - Cohort the exposed patients (AMBER exposed) and close the bay to new admissions. Keep as 'amber exposed' family (do not mix with amber exposed patients from a different exposure)
    - Deep clean bay as soon as +ve moved

- If new COVID +ve (RED patient) identified in GREEN bay
    - Move +ve patient ASAP to RED ward
    - Close the bay to admissions
    - Cohort the exposed patients and move them to an AMBER exposed bay as an 'amber exposed family' (do not mix with amber exposed patients from a different exposure)
    - The AMBER exposed bay can be on any ward as agreed between the CSM and SMOC
    - Deep clean bay as soon as empty of all patients
    - Complete a Datix for review

A2. Personal Protective Equipment (PPE)

- A face mask must be worn at all times unless at your desk in a COVID secure environment

- For all patient contact:

- Standard PPE (PPE1)
    - For all patients not receiving an AGP
    - Surgical mask, plastic apron and gloves (eye protection if required)

- AGP PPE (PPE2)
    - For all patients receiving an AGP
    - FFP3 mask, gown, gloves and visor / eye protection (hair covering can also be used)

A3. Immunocompromised

List of immunosuppression can be found in section 7 of the following guidance: https://www.gov.uk/government/publications/covid-19-guidance-for-stepdown-of-infection-control-precautions-within-hospitals-and-discharging-covid-19-patients-from-hospital-to-home-settings/guidance-for-stepdown-of-infection-control-precautions-and-discharging-covid-19-patients#immsupp

A4. Aerosol Generating Procedures (AGPs)

The current list of agreed AGPs can be found here:

https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/covid-19-infection-prevention-and-control-guidance-aerosol-generating-procedures

https://www.gov.uk/government/publications/independent-high-risk-agp-panel-summary-of-recommendations

> This is the list of medical procedures for COVID-19 that have been reported to be aerosol generating and are associated with an increased risk of respiratory transmission:
>
> - tracheal intubation and extubation
> - manual ventilation
> - tracheotomy or tracheostomy procedures (insertion or removal)
> - bronchoscopy
> - dental procedures (using high speed devices, for example ultrasonic scalers/high speed drills
> - non-invasive ventilation (NIV); Bi-level Positive Airway Pressure Ventilation (BiPAP) and Continuous Positive Airway Pressure Ventilation (CPAP)
> - high flow nasal oxygen (HFNO)
> - high frequency oscillatory ventilation (HFOV)
> - induction of sputum using nebulised saline
> - respiratory tract suctioning
> - upper ENT airway procedures that involve respiratory suctioning
> - upper gastro-intestinal endoscopy where open suction of the upper respiratory tract occurs
> - high speed cutting in surgery/post-mortem procedures if respiratory tract/paranasal sinuses involved
>
> Certain other procedures or equipment may generate an aerosol from material other than patient secretions but are not considered to represent a significant infectious risk for COVID-19. Procedures in this category include administration of humidified oxygen, administration of Entonox or medication via nebulisation.

"The New and Emerging Respiratory Viral Threat Assessment Group (NERVTAG) advised that during nebulisation, the aerosol derives from a non-patient source (the fluid in the nebuliser chamber) and does not carry patient-derived viral particles. If a particle in the aerosol coalesces with a contaminated mucous membrane, it will cease to be airborne and therefore will not be part of an aerosol. Staff should use appropriate hand hygiene when helping patients to remove nebulisers and oxygen masks. In addition, the current expert consensus from NERVTAG is that chest compressions are not considered to be procedures that pose a higher risk for respiratory infections including COVID-19".

AGPs apply to both COVID and flu patients.

The precautions and PPE should be the same for COVID and flu.

A5. Swabs

a) Swab Types

Green and Red

- CEPHEID suitable
- Also RLH suitable

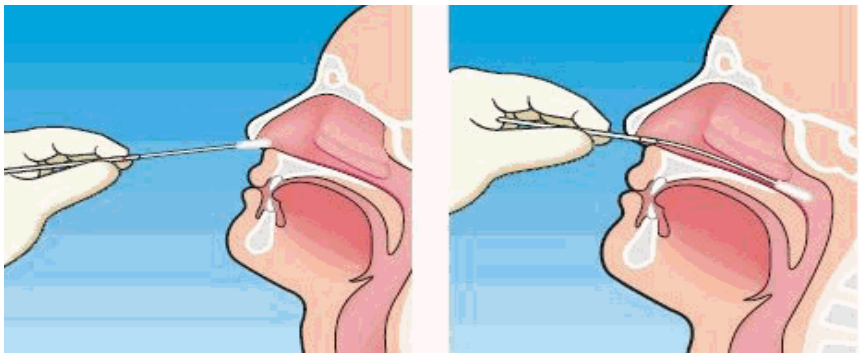
Yellow

- No longer used

b) Tests

- COVID – red and green swabs
- Flu – red and green swabs
- Both COVID and Flu can be tested for using a single patient swab

c) Swab Process

- Take a single swab to sample the throat in the area of the tonsils only, rotate it twice to collect epithelial cells then
- Insert the same swab into the nostril parallel to the palate
- Swab should reach depth equal to distance from nostrils to outer opening of the ear
- Leave swab in place for several seconds to absorb secretions
- Slowly remove swab while rotating it
  - 
- Order on EPR – "Swab Coronavirus – Swab"
  - If not visible, use the COVID19 Critically Unwell Order set and select "Swab Coronavirus – Swab"
- Place swab in a double bag and hand deliver the swab to the lab ASAP.
- Do NOT place the sample in the POD system.
- Do NOT wait for the porters to take the sample to the labs.

d) CEPHEID machine (RT-PCR)

- This is equipment within the Homerton lab that can run 4 cartridges at any one time.
- These cartridges can test for COVID, Flu A/B/RSV, Norovirus, C-difficile and TB as well as other infections.
- The supply of the cartridges to test for COVID is provided via the national chain as of 8th October and we have on average 23-27 per day available to the entire Trust. This is likely to decrease with time.
- Patients being admitted via the Amber wards (Lloyd) will be given priority, along with ITU and direct admission to theatres.
- Next priority areas are those that can be pooled (see below)
- Other specific cases can be discussed with microbiology consultant.
- The same equipment will be needed for Flu and Norovirus testing, hence less COVID tests will be able to be done during this time.
- The turnaround time for the actual test is approximately 60 minutes for COVID or flu.
- Samples for COVID can be 'pooled' where approximately 5-7 tests are run together using one cartridge. If +ve result received, all samples will then needed to be tested individually.
- This results in 15 CEPHEID cartridges providing approximately 50 patient tests.
- Pooling can be used until the positivity is approximately >10% after which efficiency gains are lost.

e) RLH Process

- The majority of swabs will be sent and processed at RLH lab.
- Samples are sent via courier from Homerton lab to RLH. The couriers departs Homerton at:
  - 07.00
  - 09.30
  - 11.30
  - 13.30
  - 15.30
  - 17.30 (last run)

- The RLH lab service runs from approximately 08.00-22.00 daily.
  The last swab will need to have arrived at RLH by 19.00 in order for the possibility of that result to be available the same day, but due to the inevitable backlog of samples needing processing, this is unlikely to be processed the same day.

- Once available results will be visible on EPR at Homerton.
  The results are available anywhere between 6-24 hours depending on the time of day the sample was sent. The earlier they receive the samples, then the quicker the results will be available.

- The RLH lab is part of a London 3 Network between:
  - Barts health
  - Lewisham
  - Barking
  - Homerton

- Reagents for all sites are nationally provided to the Network and then given to providers. There are no reagents at Homerton to enable direct processing.

f) Sample Priority

ACU

- Red or Green swabs
- Samples will be processed via the point of care (POCT) CEPHEID machine for as long as capacity allows
- Samples will be pooled when prevalence <10%

Lloyd ward

- Red or Green swabs
- Samples will get processed via the POCT CEPHEID machine for as long as capacity allows
- Samples will be pooled when prevalence <10%

Lamb

- Red or Green swabs
- Samples will be sent to RLH for processing

Emergency Department

- Adult patients:
  - Red or Green swabs
  - Samples for patients going to ITU or theatres will be processed via the POCT CEPHEID machine
  - Samples will NOT be pooled
  - No other swabs will be taken in ED unless discussed with duty Infection (microbiology) consultant

- Paediatrics (CEA and Starlight)
  - Red or Green swabs
  - Swabs will be taken in ED as much as possible
  - Samples will be sent to RLH for processing
  - Little benefit in CEPHEID or pooling as all 3 results required for decisions
    - COVID
    - RSV
    - Flu

Maternity

- Red or Green swabs
- Samples will be sent to RLH for processing

Elective Pathway

- Red or Green swabs
- Taken during the pre-admission process
- Samples will be sent to RLH for processing

Other wards

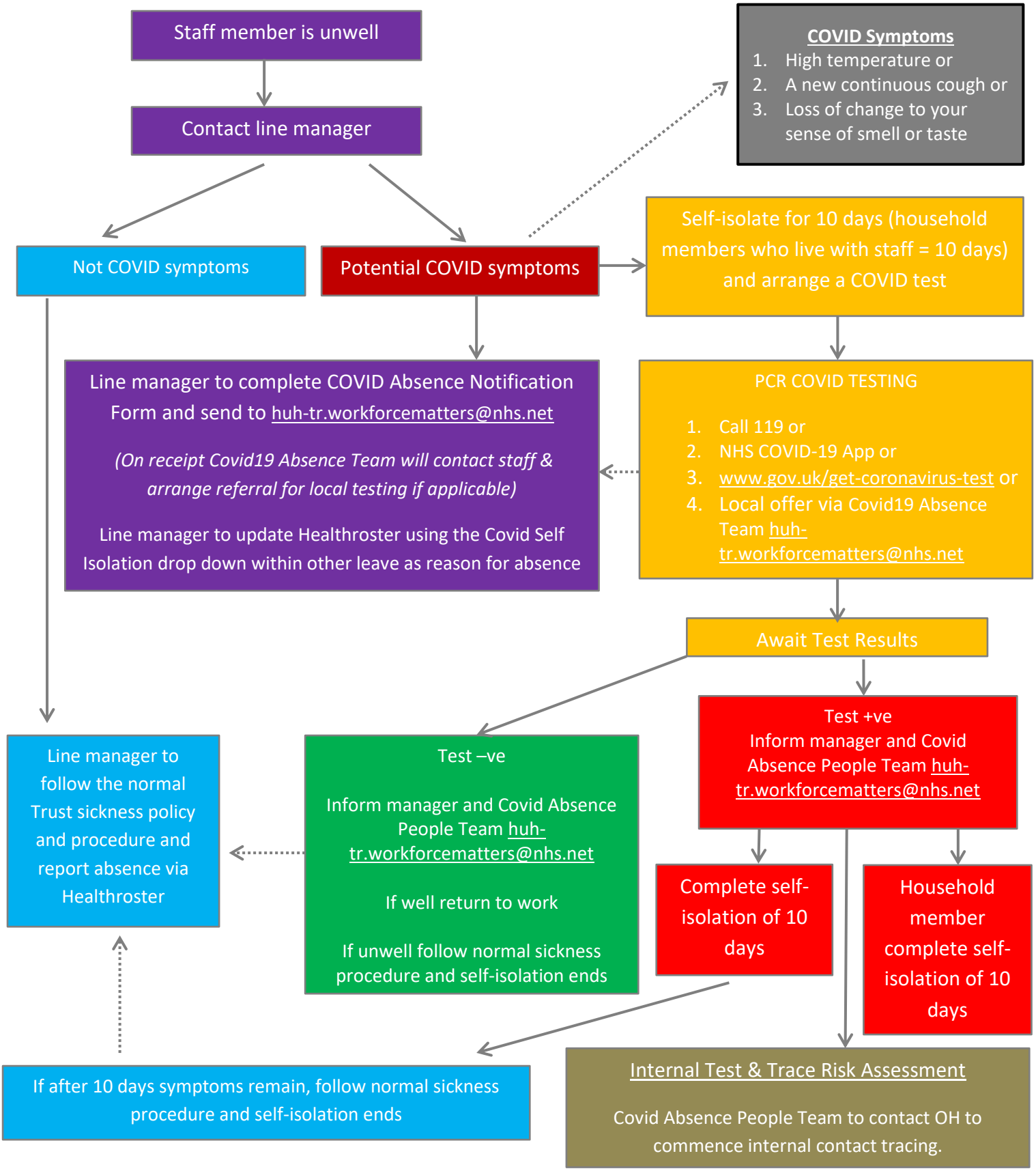
- All samples will get sent to the RLH except on a case by case agreement with the duty infection (microbiology) consultant.

g) Lateral Flow Testing in ED

Lateral flow testing has been introduced in the Emergency Department.
This allows quick identification of unexpected positive patients who can then be admitted via the 'red' pathway.
This is a rule in test and cannot be used to admit amber patients to green wards in the absence of a PCR result.

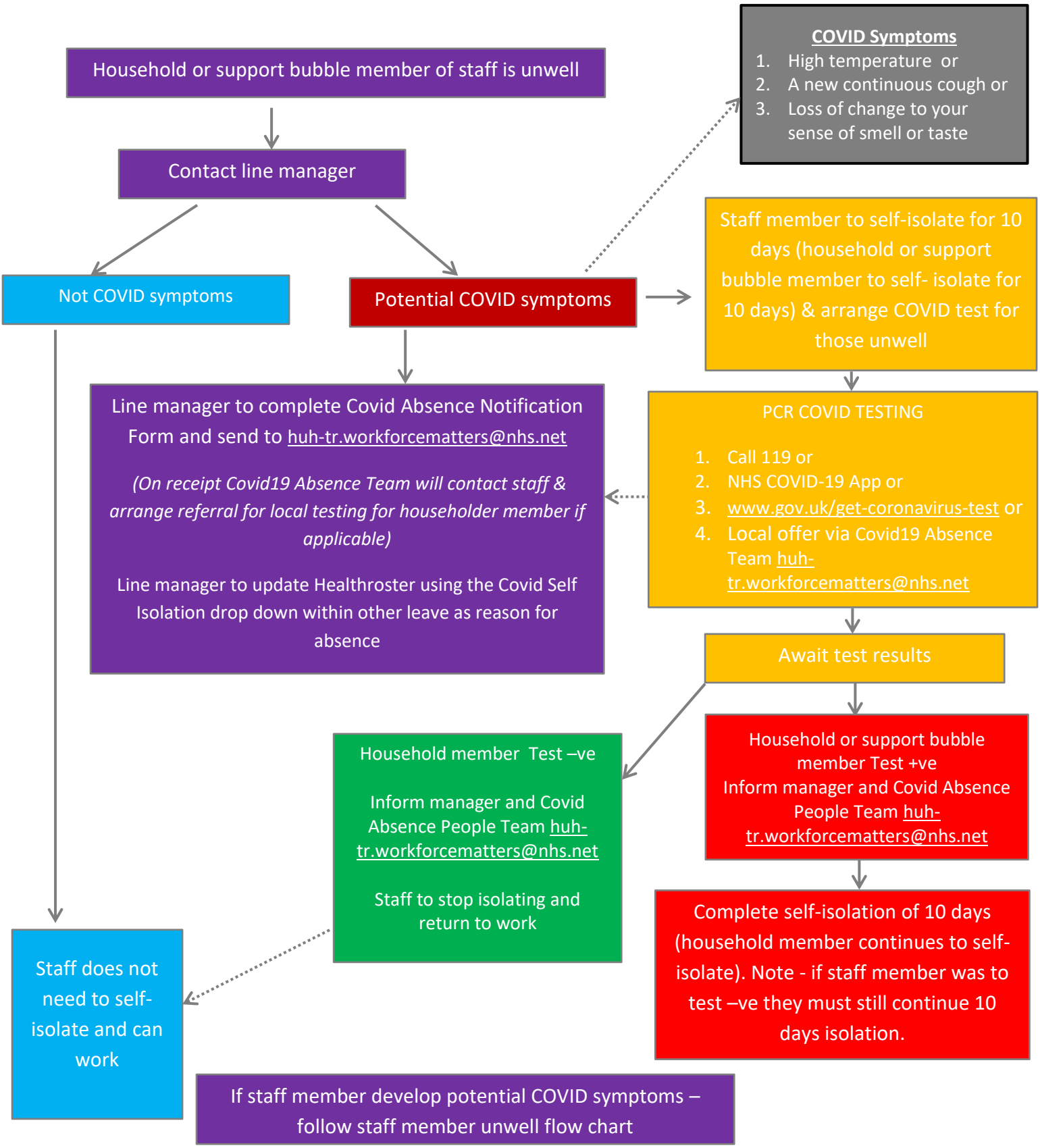
A6. COVID-19 Absence Sickness Process

a. Staff member (HCW) is unwell



b. Household or support bubble member is unwell

Staff member has a household or support bubble member who is unwell and staff member is not unwell themselves (asymptomatic)



c. Staff member is told to self-isolate by NHS Test and Trace

Staff member is contacted via NHS Test and Trace and told to self-isolate

This is because the staff has been in close contact with someone who has tested positive for coronavirus. The alert will usually come by text, email or phone call.

Staff member should log on to the NHS Test and Trace website which will walk through what they should do.

Staff member to self-isolate as advised for 10 days from last contact with the person who has tested +ve

It's really important to do this even if you don't feel unwell because, if you have been infected, you could become infectious to others at any point up to 10 days. Your household doesn't need to self-isolate with you, if you do not have symptoms, but they must take extra care to follow the guidance on social distancing and handwashing and avoid contact with you at home

Contact line manager

Line manager to complete Covid Absence Notification Form and send to huh-tr.workforcematters@nhs.net

Line manager to update Healthroster using the Covid Self Isolation drop down within other leave as reason for absence

Staff member has no symptoms –

Self-isolate as advised for 10 days from last contact with the person who has tested +ve

If staff member develops potential COVID symptoms during 10/7 – follow staff member is unwell flow chart, however refer to outcome of results below

Note, staff & household members must self-isolate.

Test –ve

Inform manager and Covid Absence People Team huh-tr.workforcematters@nhs.net

If test is negative, staff member must still complete 14 day self-isolation period because the virus may not be detectable yet - this is crucial to avoid unknowingly spreading the virus.

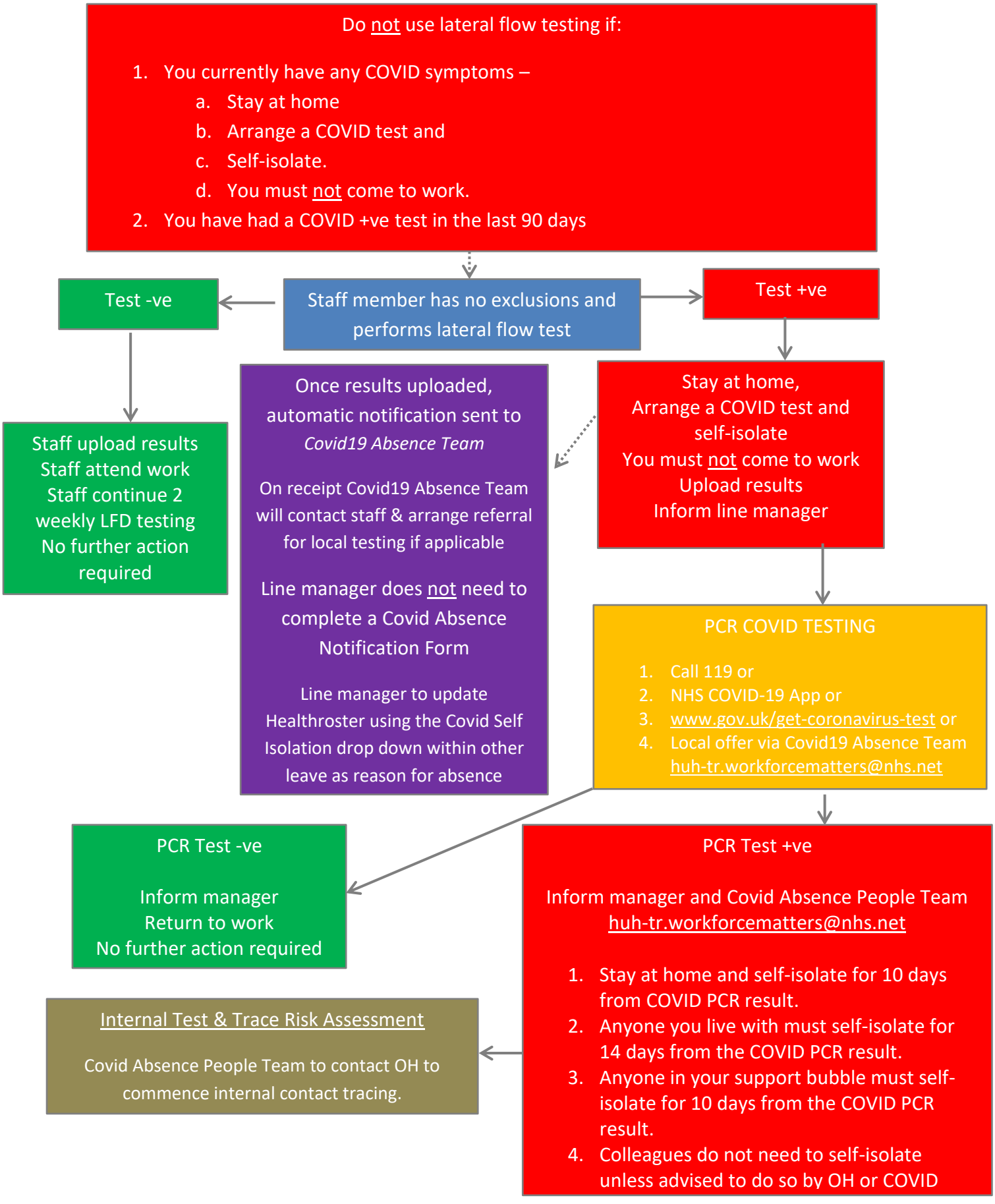
Test +ve

Inform manager and Covid Absence People Team huh-tr.workforcematters@nhs.net

Must still continue 10 days self-isolation from when symptoms started. Anyone you live with must self-isolate for 10 days from when your symptoms started. Anyone in your support bubble must self-isolate for 10 days from when your symptoms started

d. If household or support bubble member is told to self-isolate by NHS Test and Trace

e. Lateral Flow Testing



f. Medical sickness reporting process

Feeling Unwell – follow separate flow chart

If you have potential COVID symptoms:

1. **Stay at home**
2. **Self-isolate for 10 days (you and household)**
3. **Get a COVID swab**

    - Call 119 or
    - NHS COVID-19 App or
    - www.gov.uk/get-coronavirus-test or
    - Local offer via Covid19 Absence Team huh-tr.workforcematters@nhs.net

Only call OH if you are unsure whether the symptoms may be related to COVID.
Managerial teams to discuss with AMD (or DCN) if they are unsure about COVID symptoms and or the need and length of isolation required.

Calling in Sick - In hours process

ED

1. Call ED consultant on 0208 510 7057 or bleep 601
2. Email the rota co-ordinator on huh-tr.edandacurota@nhs.net

    - ED consultant to inform managerial team (Miranda, Jaye and Annilie)
    - Managerial team to complete the COVID Absence Notification form and email to huh-tr.workforcematters@nhs.net
    - Decisions around COVID related symptoms and or the need and length of isolation required to be made by ED clinical lead, AMD or ED consultant rota lead (supported by HR)

ACU / Oncall team

SHOs

1. Call medical registrar or medical consultant
   (Medical registrar to inform the medical consultant)
2. SHO to email the rota co-ordinator on huh-tr.edandacurota@nhs.net

    - Medical registrar or consultant to inform managerial team (Miranda, Jaye and Annilie)
    - Managerial team to complete the COVID Absence Notification form and email to huh-tr.workforcematters@nhs.net
    - Managerial teams to discuss with AMD if they are unsure about COVID symptoms and or the need and length of isolation required

Registrar

1. Call medical consultant
2. Registrar to email the rota co-ordinator on huh-tr.edandacurota@nhs.net

    - Medical consultant to inform managerial team (Miranda, Jaye and Annilie)

- Managerial team to complete the COVID Absence Notification form and email to huh-tr.workforcematters@nhs.net
- Managerial team to inform ACU Clinical Lead
- Consider the need for triggering shadow registrar rota
- Managerial teams to discuss with AMD or DCN if they are unsure about COVID symptoms and or the need and length of isolation required

Consultant

1. Call CSM via bleep 118
2. Call service manager

- Managerial team to complete the COVID Absence Notification form and email to huh-tr.workforcematters@nhs.net
- Managerial team to inform ACU Clinical Lead and AMD
- Consider the need for triggering shadow consultant rota
- Managerial teams to discuss with AMD or DCN if they are unsure about COVID symptoms and or the need and length of isolation required

Calling in Sick - Out of hours process

ED

1. Call ED registrar on 0208 510 7057 or 7573
2. Email the rota co-ordinator on huh-tr.edandacurota@nhs.net
3. Call the ED consultant after 08.00am

- ED consultant to inform managerial team (Miranda, Jaye and Annilie)
- Managerial team to complete the COVID Absence Notification form and email to huh-tr.workforcematters@nhs.net
- Decisions around COVID related symptoms and or the need and length of isolation required to be made by ED clinical lead, AMD or ED consultant rota lead

ACU / Oncall team

Medical SHO / Registrar / Consultant

1. Call CSM via bleep 118
2. Email the rota co-ordinator on huh-tr.edandacurota@nhs.net
3. Consider the need for triggering shadow rota
4. To contact either the command centre or AMD or SMOC if they are unsure about COVID symptoms and or the need and length of isolation required.

- In hours –
  - Managerial team to complete the COVID Absence Notification form and email to huh-tr.workforcematters@nhs.net
  - Managerial team to inform ACU Clinical Lead and AMD
  - Managerial teams to discuss with AMD if they are unsure about COVID symptoms and or the need and length of isolation required.

B. Flow and Beds

B1. Ward Colours

Admission wards are divided into 3 colours:

- GREEN Admissions = *No COVID concerns*
- GREEN Admissions non AGP = ACU
- GREEN Admissions AGP = 1st - ACU

- AMBER Admissions = *COVID needs excluding*
- AMBER Admissions non AGP = Lloyd
- AMBER Admissions AGP = 1st - Lloyd side room if nursing staff able
  = 2nd - Lamb Side room
  = 3rd - ACU side room

- RED Admissions = *COVID is the most likely diagnosis*
- RED Admissions non AGP = Lamb
- RED Admissions AGP = 1st - Lamb Red room
  = 2nd - Lamb (Red) AGB bay

COVID is a syndrome = clinical + radiological + laboratory findings -> diagnosis

A negative COVID swab does not exclude the diagnosis of COVID

1) Select the coronavirus order set on EPR

2) The decision as to whether COVID is a possible diagnosis and which type of ward (RED/AMBER/GREEN) a patient should be placed on should be made by a senior decision maker and a 2nd opinion can be sought from the microbiology team or the respiratory team if required

3) All decisions regarding the rationale for the diagnosis of COVID or its exclusion, ward placement decisions and/or starting/stopping dexamethasone or remdesivir must be clearly documented in the EPR notes e.g. why was COVID excluded as a possible diagnosis and a patient was moved from an 'amber' (COVID needs excluding) to a 'green' ward (no COVID concerns)

4) New onset COVID must always be considered in the differential diagnosis for an inpatient with a new fever and/or chest symptoms e.g. oxygen requirement/cough. Please contact the Infection (Microbiology) team to discuss the case and to authorise rapid in-house COVID testing

B2. COVID and Flu - Beds

Whilst these guidelines should be adhered to as far as possible, bed management will require flexibility to manage flow safely throughout the hospital.

a. Admission wards

- The results of the COVID and flu swabs are likely to be unknown for several hours from the point of admission.
- Use the COVID based risk stratification to guide admission.
- If high risk for COVID then admit via the Red admission system.
- If there are specific additional risks re flu then try to aim for a side room.
- For all other patients, it is likely that most patients will get admitted via the amber admission system.

b. Inpatient wards – transfer on from admitting ward

COVID +ve; Flu +ve

- Admit to / remain on Lamb (or other COVID wards if open)
- Side Room ideally
- If not, cohort on COVID +ve ward in COVID plus Flu +ve bays, ideally cohort by Flu type (A or B)
- Do not put in bays with COVID only or Flu only patients

COVID +ve; Flu -ve

- Admit to / remain on Lamb (or other COVID wards if open)
- COVID bay where there are no confirmed flu cases

COVID –ve but Flu +ve

- Ideally admit to a designated 'flu ward' and cohort bays by Flu type (A or B)
- If no designated flu ward, then admit to a side room on a non COVID ward
- If no side room available, then admit to 'flu cohort' bays by flu type (A or B) on non COVID wards

Patient with Flu A and Flu B must be kept separate as they are different viruses.

COVID status	Flu status	Inpatient Option 1	Inpatient Option 2
COVID +ve	Flu +ve (Flu A)	Lamb (Red) side room (Or other COVID wards if open)	Lamb (Red) (Or other COVID wards if open) COVID plus Flu A bay (A and B separate if possible)
COVID +ve	Flu +ve (Flu B)	Lamb (Red) side room (Or other COVID wards if open)	Lamb (Red) (Or other COVID wards if open) COVID plus Flu B bay (A and B separate if possible)
COVID +ve	Flu -ve	Lamb (Red) (Or other COVID wards if open) Non flu bay	Lamb (Red) (Or other COVID ward if open) side room
COVID –ve	Flu +ve (Flu A)	Flu ward Flu A bay (cohort)	Green ward Flu A bay (cohort)
COVID –ve	Flu +ve (Flu B)	Flu ward Flu B bay (cohort)	Green ward Flu B bay (cohort)
COVID –ve	Flu –ve (or unknown as no Flu symptoms)	Green ward	Green ward

B3. COVID and Flu Exposure

a. Flu Exposure

Flu +ve patient removed from bay.

Remaining Flu exposed patients in a bay:

- Treat all exposed patients with Oseltamivir (Tamiflu) unless exempt
- Remain as bay for 3/7 observation
- If develop symptoms, isolate and test for Flu
- Bay remains open for admission unless there is a 2nd case
- If a 2nd case of Flu within the cohort, close to admissions and bay to remain as a 'unit', 'family' or 'bubble'.

b. COVID Exposure (including Amber exposed patients)

COVID +ve patient removed from bay and transferred to Lamb ward or other COVID ward if open.

Remaining COVID exposed patients in a bay:

- No new admissions to that bay / cohort
- Remain as one 'unit', family' or 'bubble' so patients not split up and moved elsewhere individually
- All patients within the exposed group to self-isolate for 10 days from exposure
    - Either at home if discharged
    - As 'unit' if staying within hospital
- Once 1-2 patients left within 'unit' consider the use of side rooms if available for bed flow efficiency
- If any exposed patients develop symptoms during the 10 days, then test for COVID
- After 10 days and no symptoms, patients are 'green' and can be moved as individuals into the green system

Any inpatient with new COVID type symptoms that they did not have at the point of admission, or new fever 72 hours after admission, without another clear source of infection, should receive a COVID and Flu swab. Please discuss all cases with duty infection (microbiology) consultant to authorise a rapid CEPHEID swab being performed.

B4. Side Rooms - Prioritisation

Clinical teams should request a side room for all patients that they consider requires one.

The decision around side room prioritisation, will always remain with the Clinical Site Mangers (CSMs) with advice from of the Infection Prevention & Control team (IPCT). If the CSMs have concerns or challenges then they should discuss this with the IPCT for advice and escalate to Senior Manager on call and if necessary the Executive Director on call.

To support the CSMs in their decision making, the following is an order of preference for patients to receive a side room linking to infection prevention & control measures:

1. Extreme shielding patients (e.g. those where COVID can't be excluded, but patients would also be at high risk of death from catching COVID, such as neutropenic sepsis)

2. AGP patients who are amber or red, or green with swab result awaited
   - One red or amber, or green (swab result awaited) patient = side room
   - Two or more red patients = cohort in a dedicated red AGP bay
   - Amber AGP patients with swab results awaited must be in side rooms and must not be mixed together in a bay

   (Green AGP patients that have a negative swab can be managed in an open bay)

3. Flu patients requiring AGPs

4. Patients with other highly likely infectious illness (e.g. Diarrhoea, TB, Measles, Chickenpox)

5. Patients confirmed or high risk of having CPE (known CPE contact e.g. outbreak on referring ward; hospital abroad in last 12 months)

6. Shielding patients e.g. Sickle cell
   - 1 patient = side room
   - 2 or more = cohort in a dedicated bay

7. MRSA positive patients on a surgical ward

8. Patients for end of life

B5. Emergency Pathway Admissions and Risk Stratification

○ AGP (NIV and CPAP) Pathway

Adult patient admitted to hospital via the Emergency Care Pathway –

All patients to receive a:

- COVID clinical risk stratification in ED
- COVID (& Flu if AMBER or RED) swab once arrived on the admitting ward

RED = HIGH risk COVID group

Patient is HIGH risk for COVID i.e. COVID pneumonitis is the most likely diagnosis (this may be clinical or radiological) but Flu cannot be completely excluded

OR

Confirmed COVID within last 6 weeks

Admit patient to:

Option 1

(preferred until flu swab result known)

RED admission ward side room

Option 2

RED admission ward AGP bay (cohort AGP patients)

AMBER risk COVID group

Patient is LOW risk for COVID i.e. patient meets the clinical criteria for a COVID swab (fever, short of breath) but an alternative diagnosis is more likely e.g. Flu, COPD exacerbation, heart failure.

Admit patient to:

Option 1

AMBER Admissions ward side room if there is the flexibility to move appropriate nursing staff

Option 2

RED admission ward side room

Option 3

GREEN Admissions ward side room

Patient to be prioritised on the post take ward round

Swabbing due to admission

Patient does not meet the COVID or Flu clinical criteria

Admit patient to:

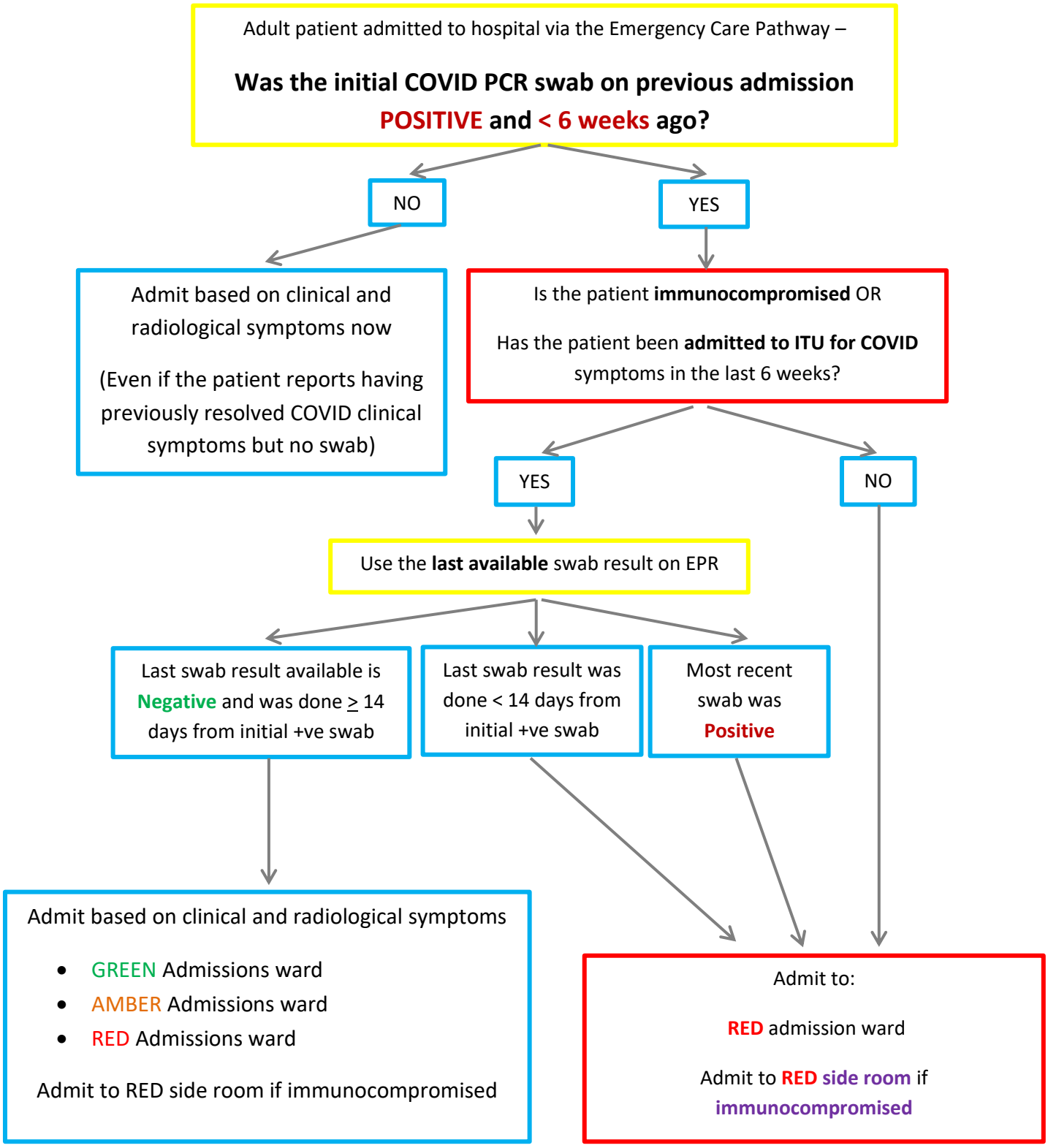
GREEN Admissions ward

side room

(Can cohort in a green AGP bay only once COVID swab results known and negative)

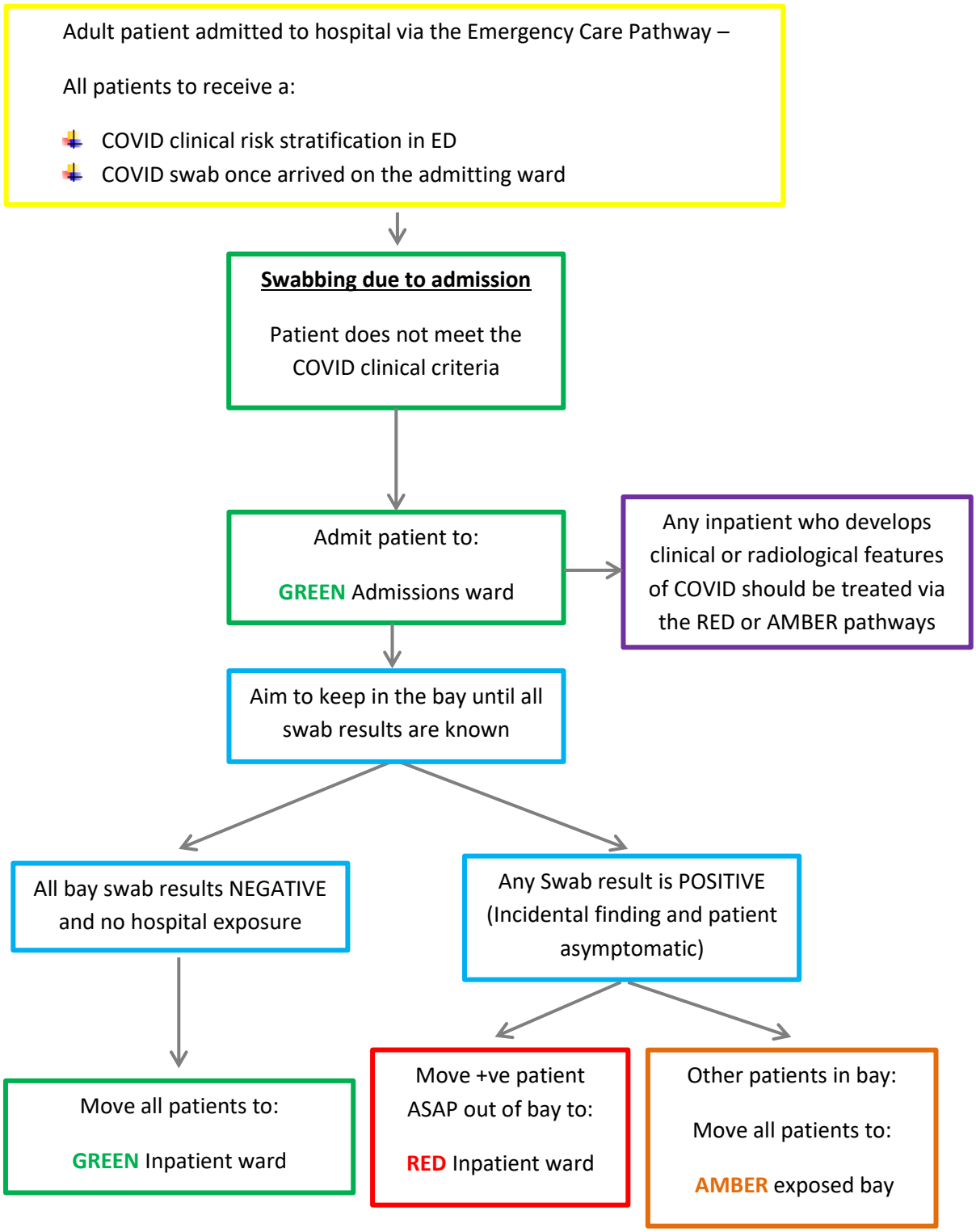
○ Patient Re-admission Pathway *(excludes maternity)*

This pathway relates to previous swab results and not antibody tests

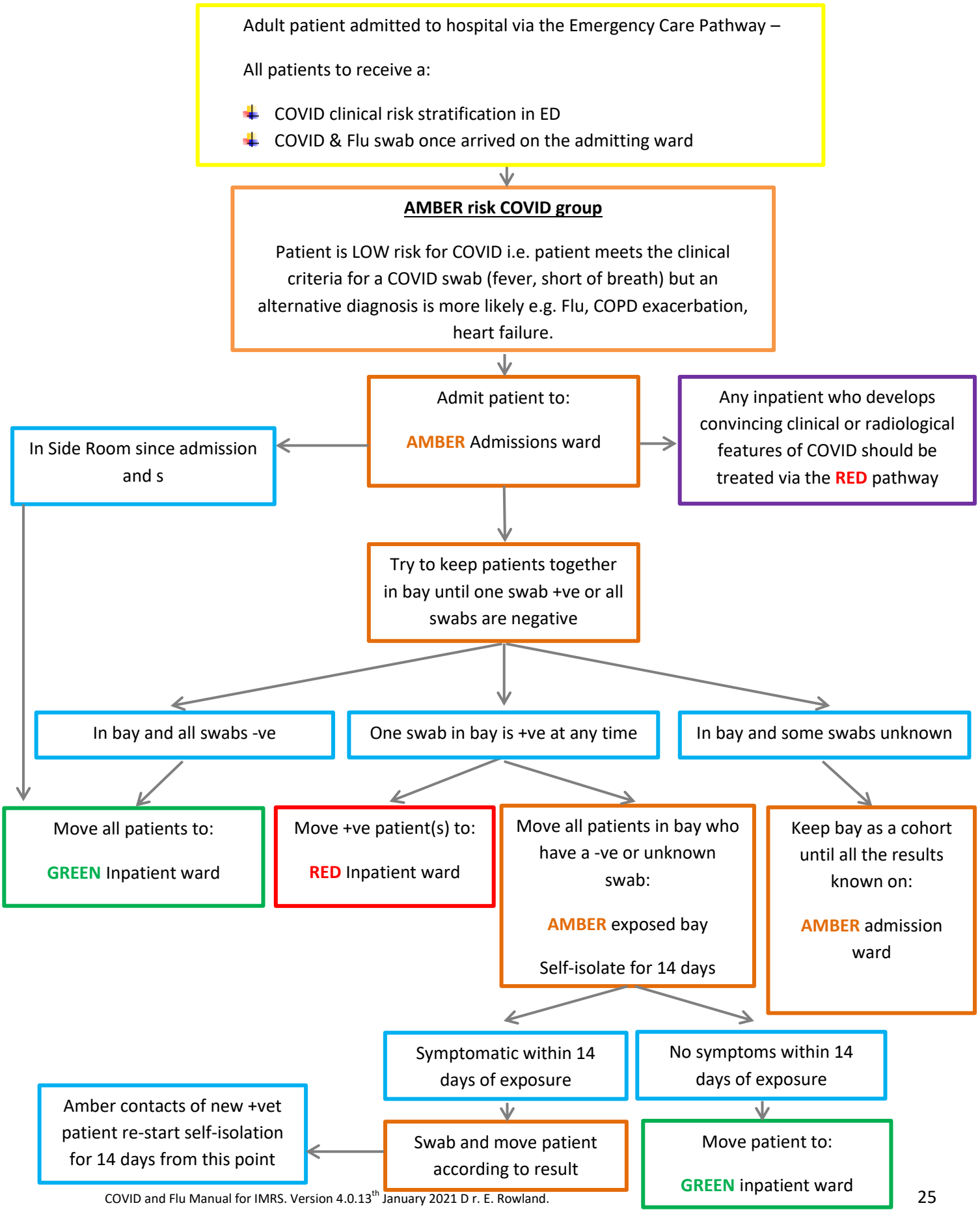


**Any concerns or questions, please contact the infection prevention & control team*

○ GREEN – Very Low Risk of COVID (Adult)



○ AMBER – Low Risk of COVID (Adult)



○ RED – High Risk of COVID (Adult)

Adult patient admitted to hospital via the Emergency Care Pathway –

All patients to receive a:

- COVID clinical risk stratification in ED
- COVID & Flu swab once arrived on the admitting ward

RED = HIGH risk COVID group

Patient is HIGH risk for COVID i.e. COVID pneumonitis is the most likely diagnosis (this may be clinical or radiological).

Risk of infectivity - high

Admit patient to:

RED Admissions ward

COVID Swab result is POSITIVE

Move patient to:

RED Inpatient ward

Cohort according to Flu swab result

COVID Swab result is NEGATIVE

Is COVID still the most likely diagnosis?

Yes

Assume this is a false negative and patient to remain in:

RED Inpatient ward

Cohort according to Flu swab result

No

Move patient to:

Side Room until Flu swab result is known

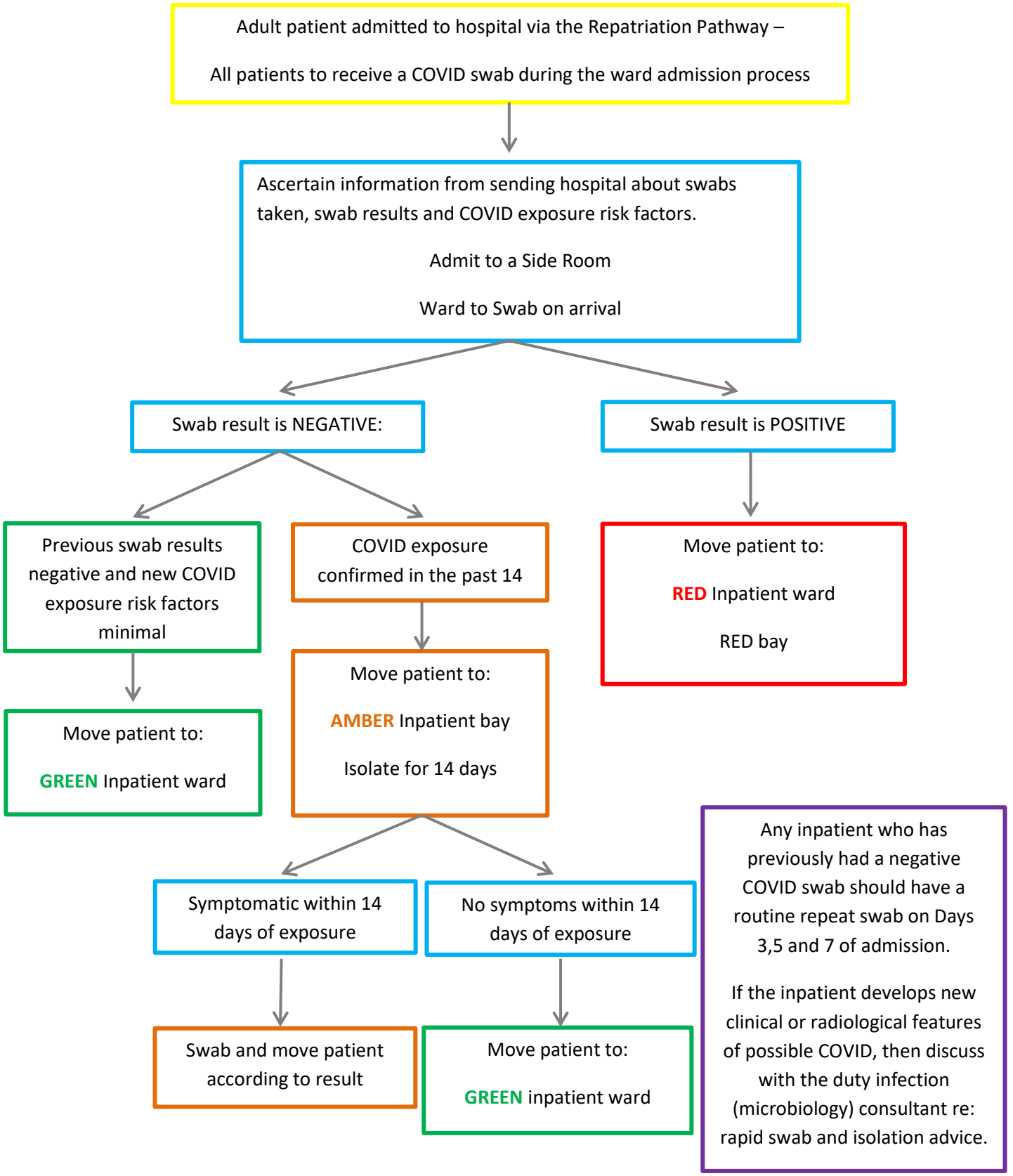
Flu negative:

Amber exposed bay

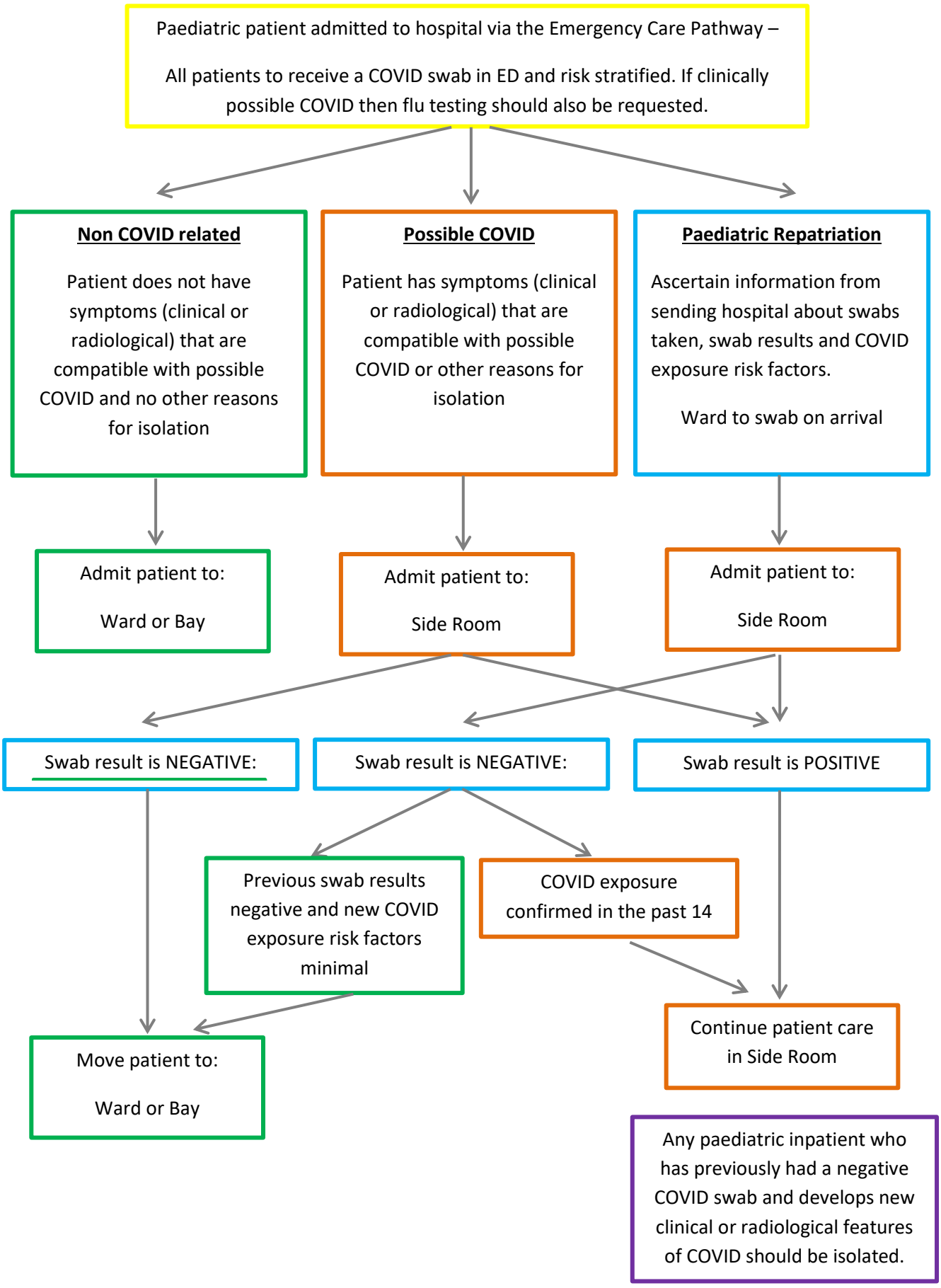
Flu positive:

Remain in side room or amber exposed flu cohort

○ Inter-hospital Transfers – Unknown COVID Risk (Adult)



○ Children's Starlight Admission Process



B6. Ward Escalation plan

Admission Ward	Max Capacity	Current operational Capacity
ACU	35	35
Lloyd	28	28
Lamb	28	26

Non Admission Ward	Max Capacity	Current operational Capacity
Cardiology	20	20
ECU North	28	28
ECU South	28	28
Edith Cavell	28	28
Thomas Audley	27	27
2012	7	0
Defoe	22	0
Graham	24	24
RNRU	27	21
Priestly	15	15

Ward Position as of 13th January 2021

Ward	Status
ACU	Green admitting
Lloyd	Amber and Red admitting; 1 CPAP bay
Lamb	Red admitting & Red inpatient; 1 CPAP Bay
Edith Cavell	Red
ECU North	Red
ECU South	Red
Cardiology	Red
Thomas Audley	Red
Priestley	Red
Starlight	Red (adults) 1 CPAP Bay
Graham Stroke Unit	Green/amber exposed medical
Defoe (incl MDU)	Green/amber-exposed medical/surgical
RNRU	Neuro-rehab and stroke CLOSED TO ADMISSIONS (due to outbreak)
2012	Closed – no patients

INPATIENT COVID WARD ESCALATION PLAN – SUGGESTED CONVERSION OF WARDS AS COVID ADMISSIONS AND OCCUPANCY INCREASES

With COVID cases rising nationally there needs to be a plan of how a significant increase in admissions for COVID would be managed on inpatient wards. Our overall aim in this regard is to minimise hospital acquired infections and to support staff in being able to deliver care in a safe way.

The current ward configuration is as follows:

Ward	COVID status	Patient group	Consultant team
Lamb	Red	Confirmed COVID Direct admissions for highly suspected COVID patients NIV for COVID (plus currently amber exposed*)	Respiratory Abrams
Lloyd	Amber	Admitting ward for possible COVID emergency admissions	On-call take team
ACU	Green	Admission ward for non-COVID (green) emergency admissions Non-COVID (green) NIV Haematology	On-call take team
Cardiology	Green	Cardiology Non-COVID (green) respiratory Non-COVID (green) NIV Gen Med	Cardiologists Respiratory Endocrinologists
ECU North	Green	Elderly Care patients	Geriatricians (Mufti/Harrod)
ECU South	Green	Elderly Care patients Non-COVID (green) trachy patients	Geriatricians (O'Sullivan/Quah)
Edith Cavell	Green	Gastroenterology Gen Med	Gastroenterologists Rheumatology (Reynolds)
Thomas Audley	Green	Emergency Surgery	On-call surgeons incl Gen Surg, T&O and Gynae
Priestley	Green	Elective Surgery	Surgical specialties
Graham Stroke Unit	Green	Acute Stroke Unit	Stroke consultants
RNRU	Green	Neuro-rehabilitation	Neurologists
Defoe ward	N/A	Urology and Allergy outpatient activity Monday to Friday	-
Pre-assessment	Green	HAMU is currently provided here but this is a space worth noting	HAMU

*In addition to the above, there will continue to be nominated "amber exposed" bays on inpatient wards. These are where patients in a bay have tested negative but have inadvertently been exposed to a patient in their bay who has tested positive. These are currently on Lamb ward but they will move to different wards depending on bed availability and where the exposure occurred. The allocation should be agreed by CSM and SMOC, with input from IMRS if requested.

COVID wards:

In order to minimise nosocomial infections, we should aim to maintain separation of COVID and non-COVID inpatients on different wards as far as possible.

It is difficult to predict the speed or scale of any potential surge in COVID admissions to either general wards or ITU and therefore the overall bed requirement is unknown at present. It is also difficult to predict what impact of any surge there will be on other, non-COVID emergency admissions, which in wave 1 reduced significantly. It is reasonable to assume there will not be such a large reduction in wave 2 as the population becomes more use to living alongside the coronavirus.

As a result, the following should serve as a guide and provide likely options to follow in the event of a surge. It is intended to demonstrate plans to the wider workforce and increase notice and communication of such plans so that staff do not feel that changes are being imposed in a rapid way with little consultation, as was necessarily done during the 1st wave. There will, however, always be a need to be flexible towards required changes in order to best serve the needs of all emergency patients.

Conversion of wards to COVID wards

In the event of Lamb ward becoming full, other wards will need to become nominated COVID wards. The following is a potential sequence of converting wards:

	Current COVID ward	**Next COVID ward**	**Remaining green***	**Considerations****
1	Lamb (28 COVID patients when full – including 5 CPAP beds)	Edith Cavell – to include a further 5 CPAP for COVID patients) This will be physically based on Edith Cavell due to oxygen supply – ward teams may need to be 'flipped' to provide CPAP trained staff on Edith Cavell	Cardiology ECU South Thomas Audley Priestley	Green trachy patients to remain on ECU South Amber-exposed will remain as a unit/family and be moved to any green ward firstly, if not then red ward.
2	Lamb Edith Cavell (56 COVID inpatients incl 10 CPAP)	ECU North	Cardiology ECU South Thomas Audley Priestley Defoe	Consideration of relocating elective activity on Defoe and opening as Green inpatient ward
3	Lamb ECU North Edith Cavell (84 COVID inpatients, incl 10 CPAP)	Cardiology	ECU South Priestley Thomas Audley Defoe	Consider relocating elective inpatient surgical beds to DSU and/or cohorting emergency and elective surgery of COVID-negative patients on 1 ward. Consider increasing oxygen supply to other wards through 'Backfeed' units
4	Lamb ECU North Edith Cavell Cardiology (104 COVID inpatients incl 10 CPAP)	Thomas Audley (possibly Priestley)	ECU South Priestley / Defoe	***This would be more COVID capacity than was reached during phase one.*** It is likely this would not be sufficient non-COVID (green) capacity to deal with significant winter pressures.
5	Lamb ECU North Edith Cavell	-	ECU South Priestley Defoe	

Cardiology Thomas Audley (132 COVID inpatients)			

* Amber-exposed bays are likely to be created on either red or green wards depending on bed availability, but preferably green, and will be retained as units/families within the bay.

**Graham Stroke Unit has previously and could again be used as a small escalation area for medical inpatients. This is excluded from numbers above.

The above gives staff an indication of the potential ward configuration changes that may occur in the event of a surge of COVID admissions. The position is and will be kept under daily review and efforts will be made to communicate changes with all relevant staff with as much notice as possible.

Factors that will influence day-to-day operational decision making

Other factors that will need to be considered include:

1) Admitting wards – it is necessary to maintain a Green and Amber/Red admitting ward throughout. Consideration will be given as to which ward would be best for which purpose depending on the size of the emergency take. Every effort will be made to maintain dedicated admitting wards and avoid admitting directly to non-admitting wards, COVID or otherwise. This was a key learning point from Wave 1.
2) Staffing availability – staffing shortages are likely to be felt in both nursing and medical teams from both potential sickness and the need to self-isolate. Redeployment could support some of this but elective services will be maintained to a much higher level than previously.
3) Staffing expertise – particularly to look after patients with tracheostomies or patients on NIV
4) Oxygen – the draw on the oxygen supply caused serious difficulties in wave one; the management of patients on high flows of oxygen, including NIV will need to be managed closely. Options are being explored to enhance resilience in this area and will be included in the Oxygen SOP.
5) Flu – as winter approaches it is likely the number of patients admitted with flu or suspected flu will increase. Enhanced rapid testing will be required in order to differentiate these from COVID patients and safely accommodate them in the correct ward quickly. Admission processes for suspected COVID and Flu patients are detailed elsewhere in this manual
6) Testing – capacity for rapid turnaround tests for COVID is limited and may reduce. Sample pooling has been piloted in an effort to increase the number of patients for whom a rapid test result can be available.
7) Paediatrics – in the first wave adult patients on NIV were placed on Starlight to support oxygen usage and paediatric inpatients were sent to the Royal London. The Royal London are unlikely to have the ability to accommodate that during this winter.
8) ITU Step-down – sadly a large number of COVID patients going to ITU in first wave died. With more being known about the management of COVID and with effective treatments it is possible that demand from ITU step-down will be higher than in the first wave. This demand will need to be factored in on medical wards. COVID patients will be stepped down to Red wards.

B7. ITU Escalation plan

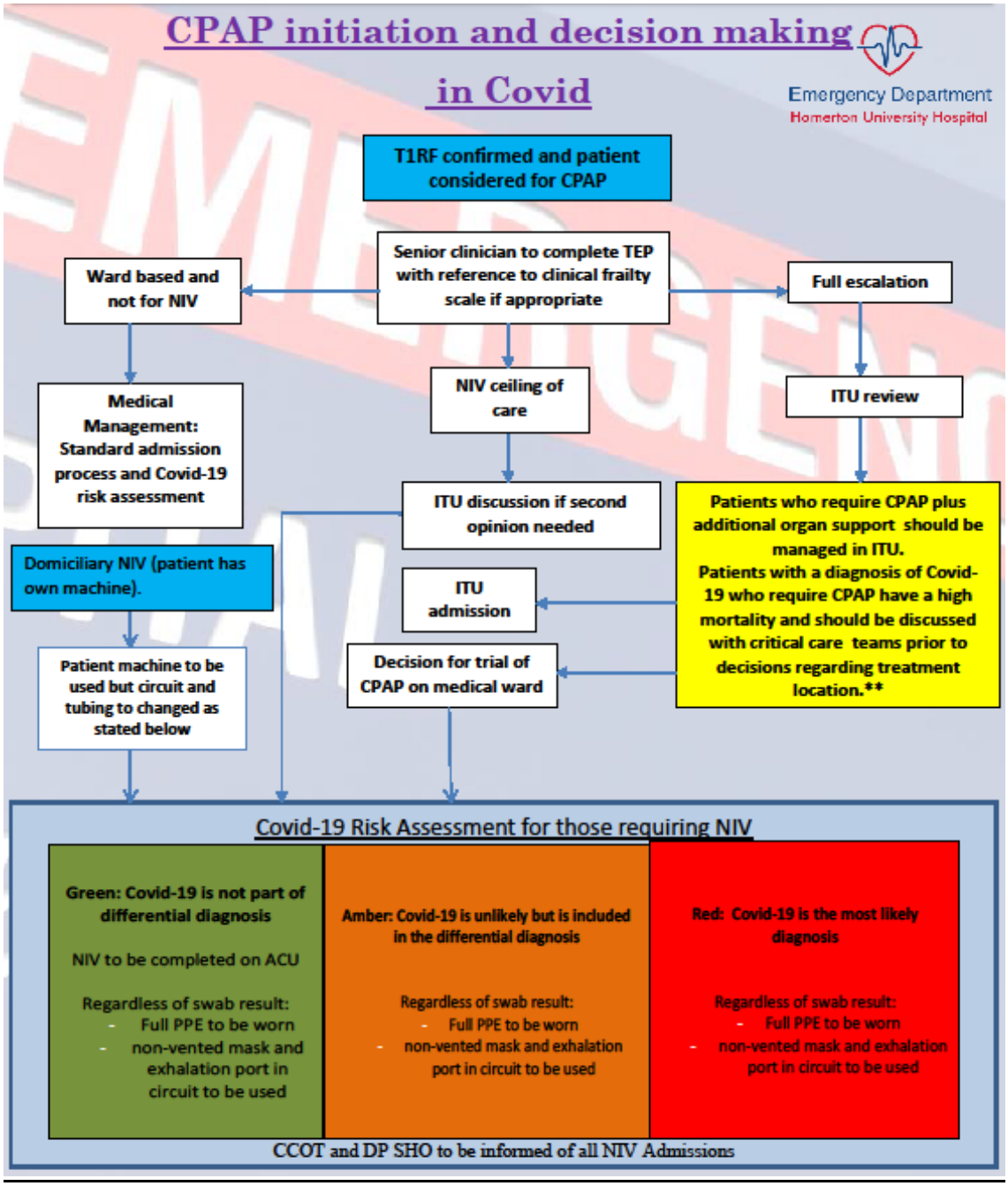
ITU Escalation options – 13.01.20 Draft agreed following discussion with nursing and clinical leads on 07.01.21 Approved by IMRS/SWSH DODs & COO		
ITU capacity	ITU is likely to remain at or close to capacity; there could be scenarios where, due to nurse staffing levels, ITU do not feel they are able to immediately admit a patient who requires ITU-level care. The appropriate course of action is likely to depend on multiple variables and departmental pressures at the time. The following is a proposed outline of actions and considerations for senior clinical and operational staff to agree and implement should these challenging situations arise.	Eg multiple staff isolating or being off sick; multiple admissions in short space of time
08:00-17:00 Monday to Friday	ITU/SWSH to oversee: - 10am sector ITU call to ascertain ability to decompress - SWSH to update 1pm site meeting and confirm day and night ITU staffing and capacity to admit. - SWSH or CSM to update 5pm site meeting and confirm night staffing and capacity to admit. *If concern over capacity to admit remains, SMOC and CC nurse to review overall hospital position*	SWSH management to manage operationally through the day. If ITU deem nursing level means they cannot admit, then SWSH mgmt to be contacted immediately
08:00-19:00 Saturday & Sunday	SMOC & Command Centre nurse to be notified of ITU staffing position for day & night after 10am sector call. *If concern over capacity to admit remains, SMOC and CC nurse to review overall hospital position*	If ITU deem nursing level means they cannot admit, then SMOC and Command Centre nurse to be contacted immediately
At 20:00 7/7	ITU nurse-in-charge to contact CSM at 20:00 to provide staffing position. - If ITU are concerned re ability to admit then CSM to review and make decision. - If CSM concerned re ability to admit then contact SMOC *If concern over capacity to admit remains, SMOC and CSM to review overall hospital position*	
20:00-08:00	Any concerns overnight regarding capacity to admit should be escalated to CSM first then if still concerned to SMOC who will review overall hospital position	If ITU deem they cannot admit, then CSM to be contacted immediately

If SWSH (in-hours) or CSM or SMOC agree ITU cannot admit due to nurse staffing levels being unsafe and outside the diluted ratios	- Exhaust all options for staff support e.g. ED, theatres. First priority is move staff to ITU to enable admission to ITU. If SWSH (in-hours), SMOC or CSM concern remains over ability to admit: - Review emergency surgery and obstetrics situation and discuss with theatres/anaesthetics - SMOC to arrange communication with on-call ITU consultant, ED consultant, consultant physician, anaesthetic consultant to update on the position. Agree on most appropriate location for next patient, from: - ITU - ED resus - Theatre recovery area ITU medical staff to remain with patient in agreed location. ED resus and Theatres recovery should both only be used as a holding strategy until ITU were able to admit.	Ideally face-to-face, if not consider Teams, phone call, email Consider: - Pressure in each area - Staffing levels - Outlook for next few hours
Recovery (for ward patient or ED patient)	Theatre & recovery staff to look after patient (or staff move to ITU to support ITU admission). If staff are in theatre then this might not be an option. Consideration should be given to how long they will be in theatre, which staff can be available and when. If Recovery is agreed, ITU medic to remain in Recovery.	Core out of hours theatre staffing is (TBC): 3 scrub staff (band 5/6) 1 HCA 2 recovery staff 2 ODPs To cover obstetric and surgical emergencies
Resus (for ED patient only)	It may, depending on the pressure in the department, be feasible/safer to keep a sick patient in ED resus for an agreed length of time. If this is agreed, ITU medic to attend ED.	
Inpatient ward	An intubated patient cannot remain on a general inpatient ward area and must be transferred to either Recovery or ITU.	
Escalation	If after all of the above actions are taken and agreement still cannot be reached, the Executive Director on-call will be contacted to confirm a decision.	

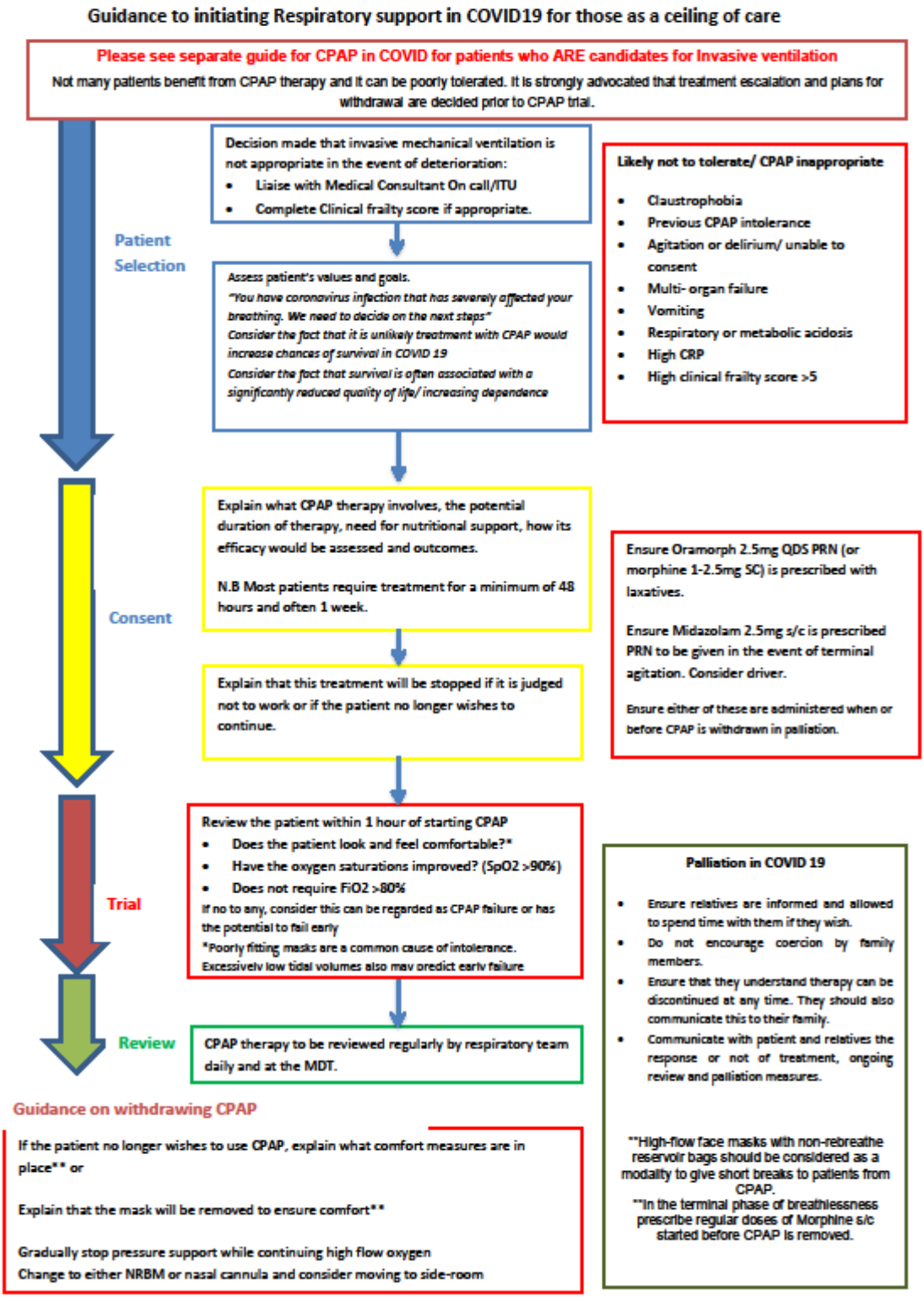
C. Medical Information

C1. NIV

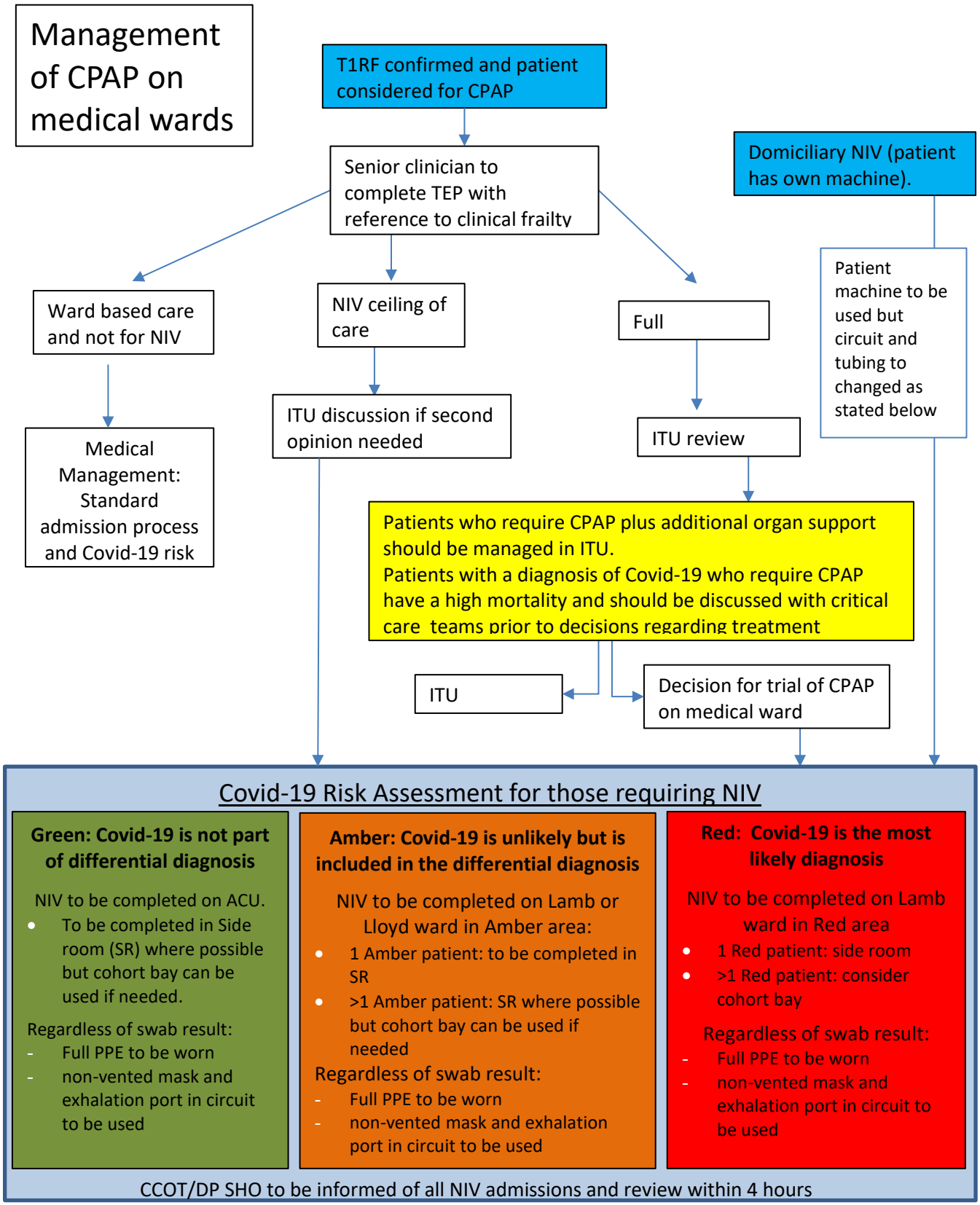
a. CPAP Initiation and decision making in COVID – ED



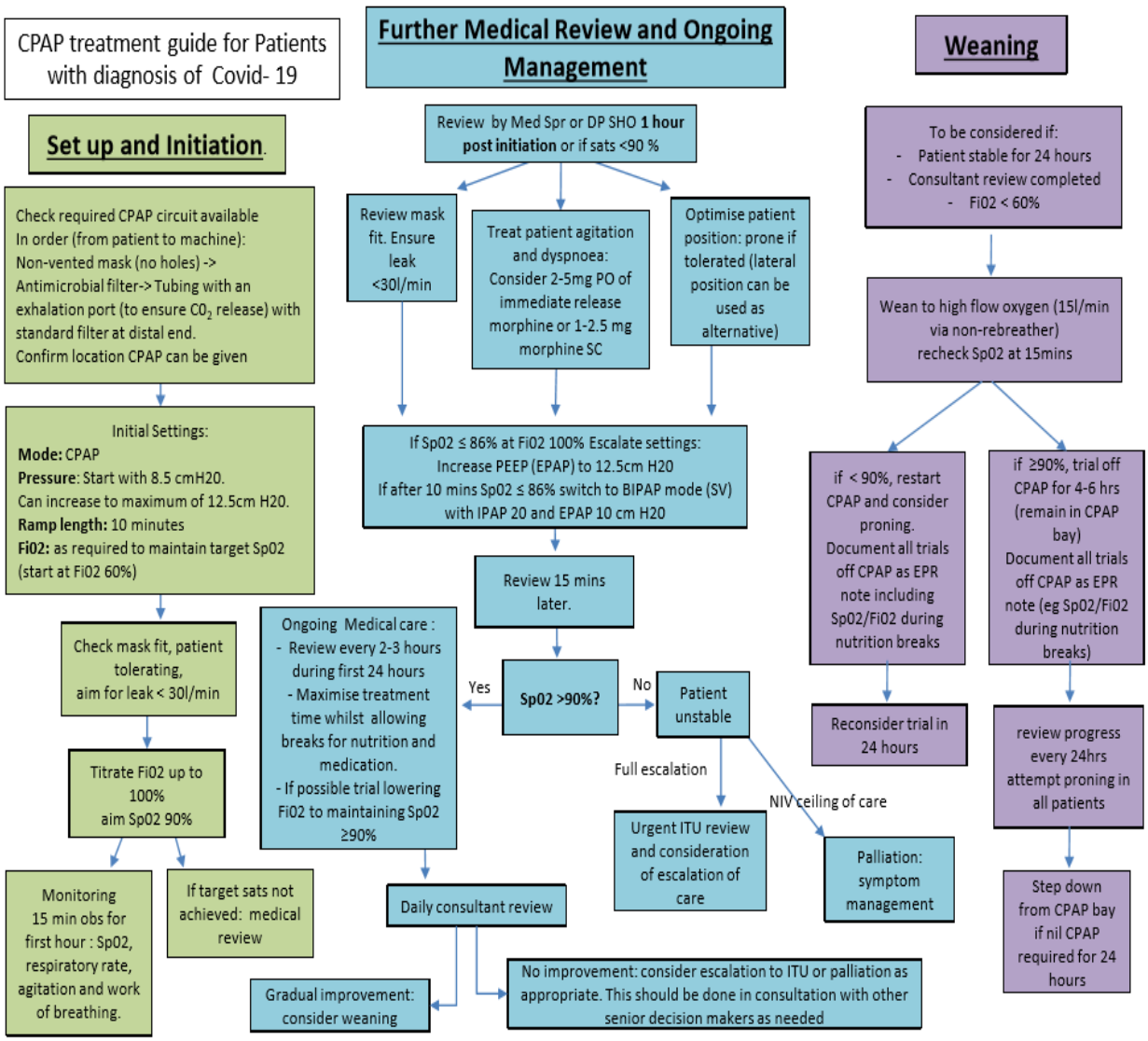
b. Guidance to initiating Respiratory support in COVID-19 as ceiling of care



c. Medical NIV Pathway for COVID



**Decisions regarding location of patients who have a diagnosis of covid-19 and who require CPAP should take into account the number of patients requiring such treatment(in both critical care and ward environments). In the event where large numbers of patients require CPAP decisions regarding the use of escalation wards may needed (including Lloyd ward or starlight).



d. Palliative care

Please remember to involve palliative care team for at least the following:

- Symptom control
- Issues around care (including end of life)
- Psychological support

The team are available via:

- On Lamb board rounds
- NIV daily meeting
- Direct contact

Specifically for withdrawing of CPAP patients consider the following 10-15 minutes before taking off mask or hood:

- Morphine 5mg s/c
- Midazolm 5mg s/c

C2. Transfer Protocols

a. Patients on NIV to ITU

Transfer of patients on NIV to ITU

Patient Selection

Decision made that a patient receiving NIV on a medical ward needs to be moved to ITU

The ITU or Anaesthetic consultant should review the patient prior to transfer. The consultant specifically needs to assess whether the patient requires intubation prior to transfer and whether NIV can be removed for transfer

Preparation for transfer

Transfer team needs to wear AGP PPE. The team should inform ITU prior to transfer to identify which bed space to admit to

Patient should be transferred onto Oxylog for transfer on NIV setting (can use same mask and filter)

Patient should have an AerosolShield placed over their heads with them sitting up immediately prior to transfer

Transfer

Prior to departure:

Ensure ITU bed space is identified and ready to prevent patient being held up

Transfer team to ensure patient is stable on Oxylog circuit and they have adequate oxygen cylinders

Undertake transfer in accordance with AAGBI guidelines

Clinical review of patient by Doctor to ensure stable for Transfer

Doctors Complete CPAP Handover template on EPR

Day started on CPAP		
TEP		
Current CPAP settings		
	PEEP	
	Fi02	
	Leak	
Observations on CPAP prior to transfer		
	Sats	
	RR	
	BP	
	HR	
	Tidal vol	

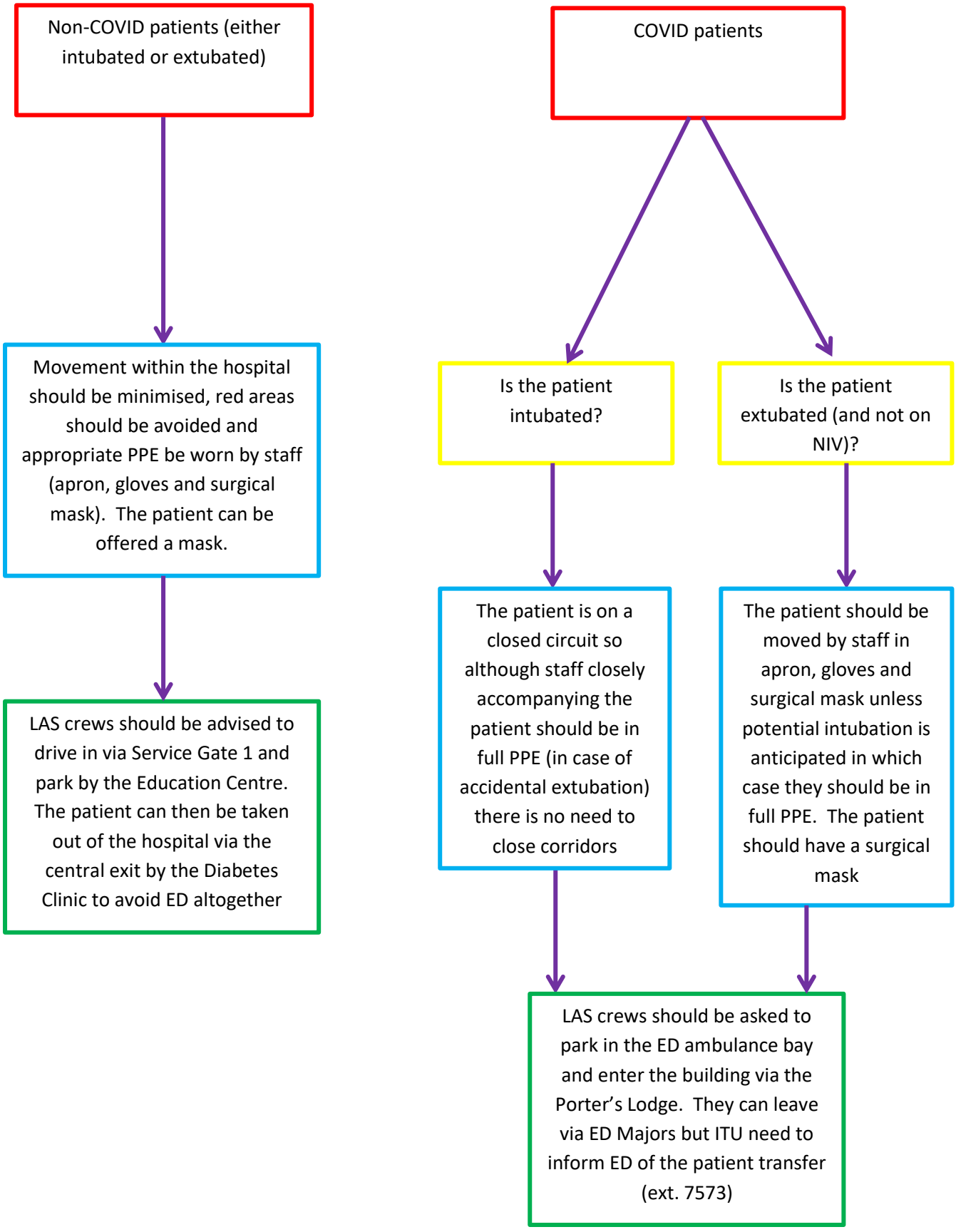
Patient is informed of Move

Nurses inform patient's Next of Kin of transfer

Cleaning post transfer

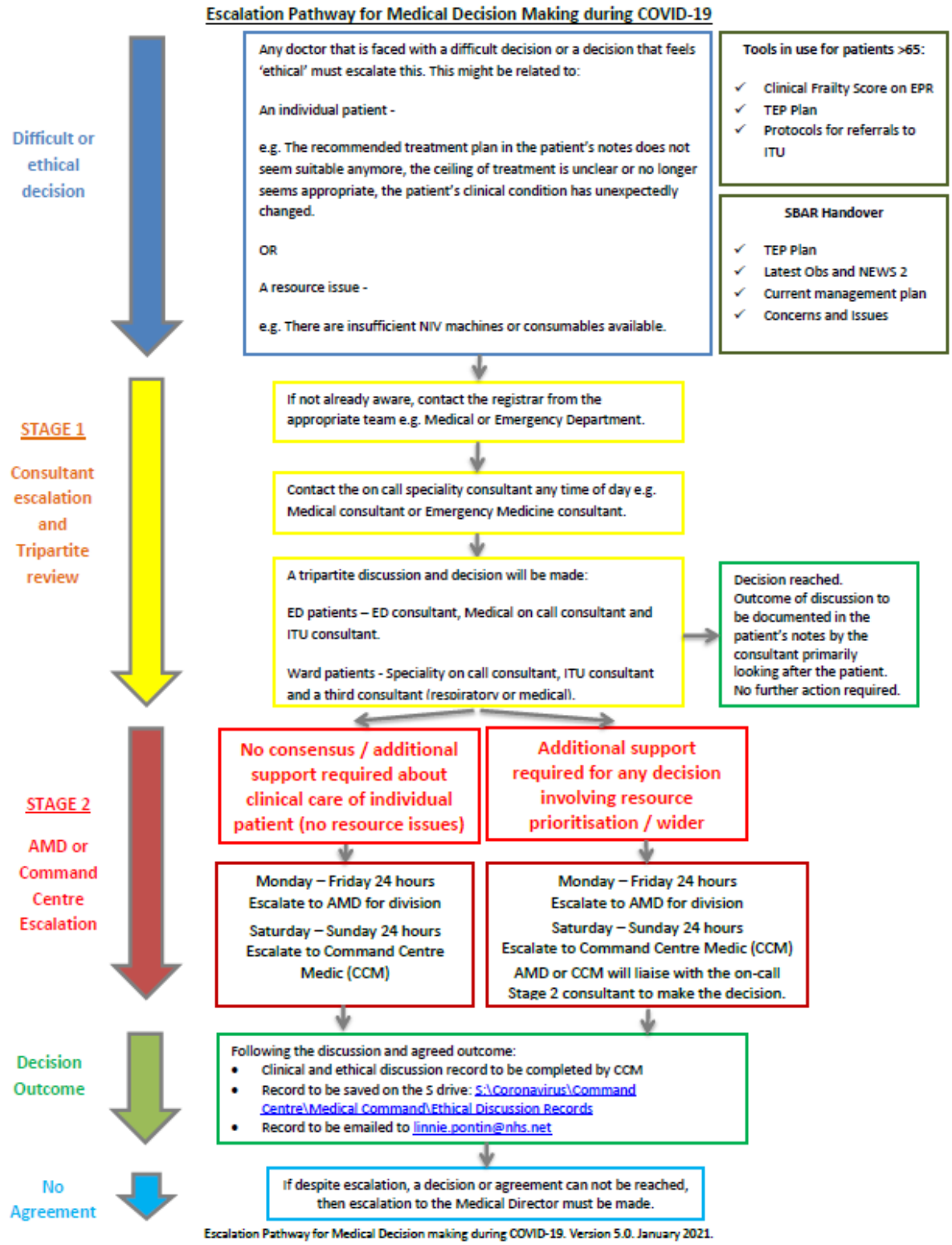
- ✓ Route to remain closed for at least 20mins
- ✓ Floor and window sills to be cleaned
- ✓ Staff cleaning should be in appropriate PPE

b. Patients out of ITU (excluding NIV)



C3. Escalation and Ethics

a. Medical Escalation Pathway

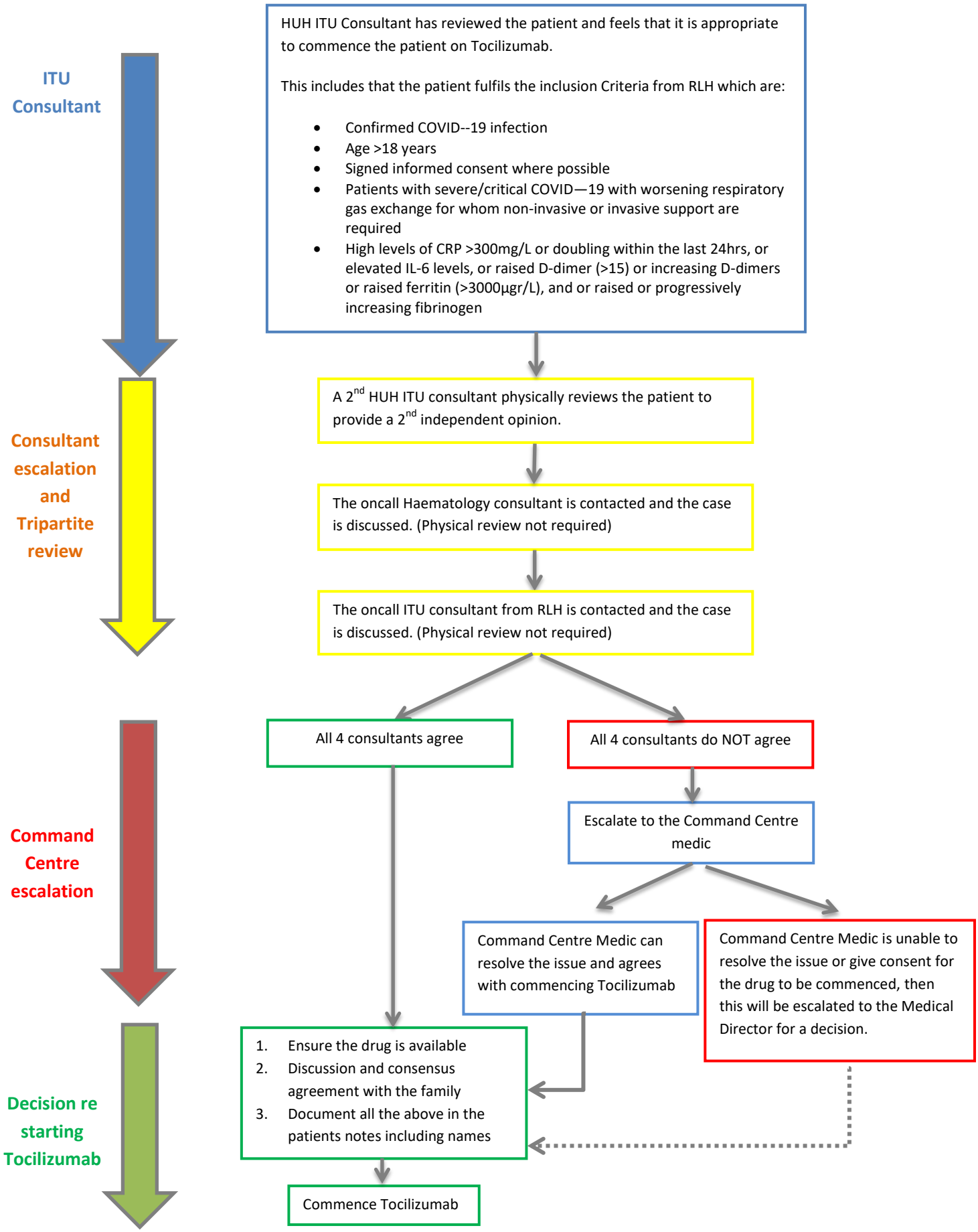


b. Clinical and ethical discussion record

Clinical and ethical discussion record

Patient name(s)	
Patient's Hospital Number	
Patient's placement at time of discussion	
Patient's ceiling of care if known	
Date of discussion / review	
Time of discussion / review	
Location of discussion / review	
Name / role of person completing form	
Name of second consultant (if applicable) and anyone else involved in decision	
Summary of issue / decision to be made	
Summary of discussion and view of clinicians involved **Consider:** • **Autonomy - Person's rights/best interest** • **Beneficence - What will benefit the patient?** • **Non-Maleficence - Will the decision cause harm to anyone else?** • **Justice - What is fair, legal?**	
View of patient / family (if appropriate)	
Outcome / recommendations	

c. ITU escalation pathway for decisions around Tocilizumab



C4. Treatments and Medications

a. Awake proning in COVID patients

intensive care society 50 YEARS
proud to be the voice of critical care since 1970

Figure 1 – Flow diagram decision tool for Conscious Proning process

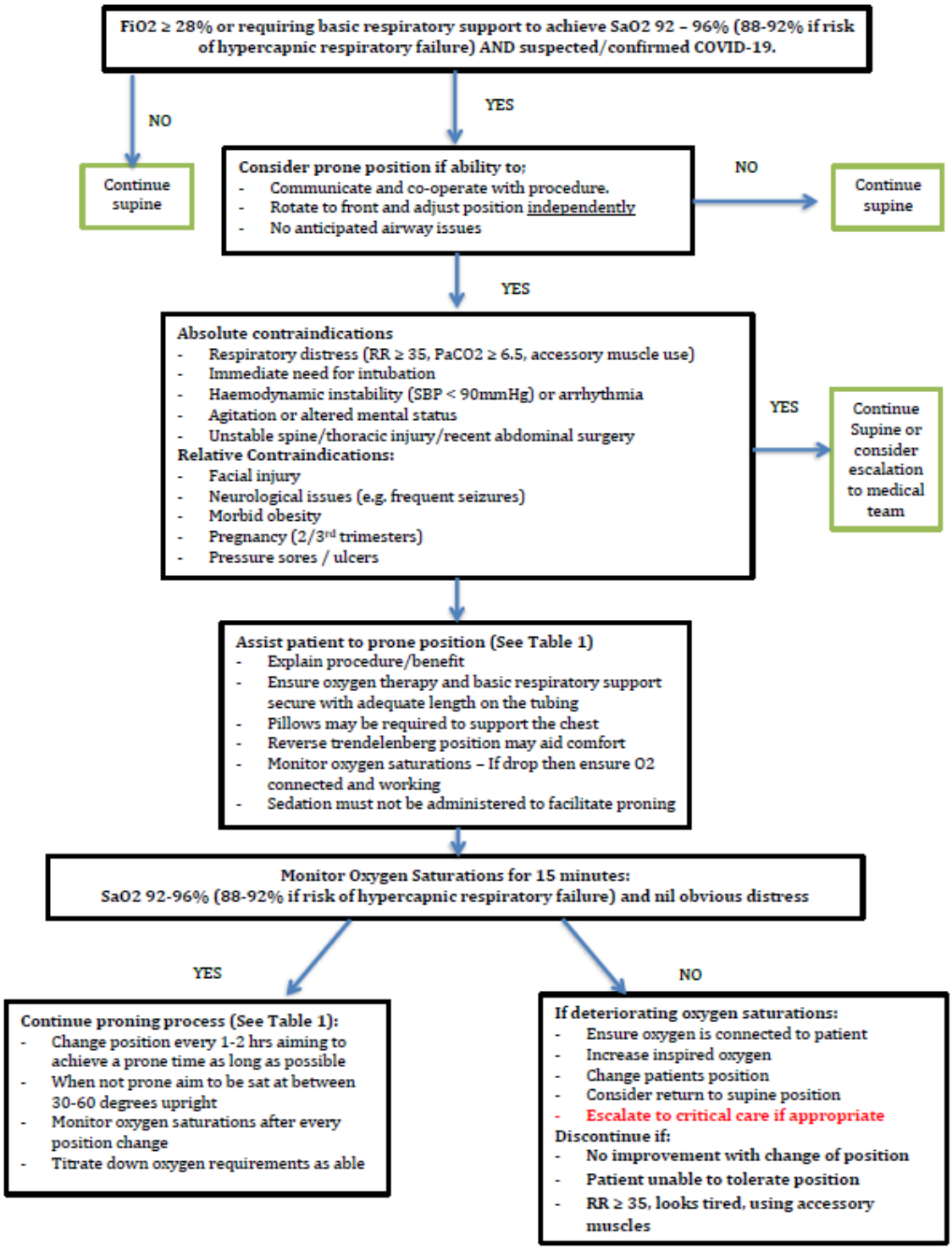


Table 1 – Timed position changes for patients undergoing conscious proning process

Timed Position Changes:

If patient fulfils criteria for proning ask the patient to switch positions as follows. Monitor oxygen saturations 15 minutes after each position change to ensure oxygen saturation has not decreased. Continue to monitor oxygen saturations as per the National Early Warning Score (NEWS)

- 30 minutes to 2 hours lying fully prone (bed flat)
- 30 minutes to 2 hours lying on right side (bed flat)
- 30 minutes to 2 hours sitting up (30-60 degrees) by adjusting head of the bed
- 30 minutes to 2 hours lying on left side (bed flat)
- 30 minutes to 2 hours lying prone again
- Continue to repeat the cycle.....

References used in the preparation of Figure 1 and Table 1

1. Ding L et al. Critical Care 2020;24(1):28
2. Emergency Department Critical Care (EMCrit). 2016. PulmCrit Wee- Proning the non-intubated patient. Retrieved from https://emcrit.org/pulmcrit/proning-nonintubated/ [Accessed 10th April, 2020]

If patients find it difficult to prone, or to give them an alternative position some of the time, for their comfort, it might be worth them considering lying lateral, better lung down. This may both help their breathing by reducing shunting in the bad lung and minimise their oxygen requirement.

Have a look at the most recent chest X ray and if there is a side with less consolidation/infiltrate (the clearer side), you could suggest they lie on that side (i.e. GOOD lung down) to better perfuse the better lung.

It may be worth writing this behind their bed on a whiteboard or piece of paper.

If they lie (laterally) on their bad side (through habit), the nurses and doctors could encourage to make them swap sides.

It might be worth checking if this is effective on the ward round.

Sometimes it can take a few minutes for the sats to pick up after they've moved, and patients may well desaturate a little initially when exerting themselves to swap sides, but this should resolve in a minute or two.

b. Dexamethasone

Use the microguide which can be found at – https://viewer.microguide.global/huh/adult#content,cacab35f-5ebd-4d2c-85ec-1cacb0bbb161

Indications for use

Clinically suspected or proven COVID-19 **PLUS requiring:**

- supplementary oxygen to maintain Saturations > 94%, AND/OR
- ventilatory support

Dose

Dexamethasone 6mg OD (oral or, if oral route unavailable, IV)

Pregnant/ breastfeeding women: Prednisolone 40mg OD PO, or Hydrocortisone 80mg IV BD

Duration

10 days or until hospital discharge if sooner.

Do NOT continue post-discharge.

Other Considerations

- Interactions can be checked here https://www.covid19-druginteractions.org/checker
- consider PPI for gastric ulcer protection.
- monitor blood sugar if patient known to be diabetic/ at risk of hyperglycaemia
- consider sending Strongyloides serology +- discuss empiric Ivermectin treatment with Duty Infection Doctor if patient at epidemiological risk of Strongyloidiasis.
- **Safety reporting:** any suspected adverse drug reactions (ADRs) for patients receiving dexamethasone (or prednisolone, or hydrocortisone) for this indication should be reported directly to the MHRA via the dedicated COVID-19 yellow card reporting site**: https://coronavirus-yellowcard.mhra.gov.uk/**
- An individual patient can receive Remdesivir and Dexamethasone concurrently if they meet the relevant criteria for each and the treating physician deems both appropriate. No clinically significant interaction of remdesivir with either dexamethasone or hydrocortisone is expected, although, co-administration of dexamethasone with remdesivir has not been widely studied. Dexamethasone could potentially reduce remdesivir concentrations due to induction of CYP3A4.
- Hydrocortisone 50mg IV TDS for 7-10 days is an alternative regimen recommended for adults (generally in intensive care) based on the available current evidence.

c. Dexamethasone for the Diabetic patient

Before deciding on a treatment strategy to manage blood glucose levels it is helpful to consider the following if they are available:–

1. Your patient's usual diabetic treatment- please ask the patient, next of kin and utilise eLPR (HIE).
2. Their most recent HbA1c reading (which will give an idea about whether the treatment was working successfully, or not - insulin is much more likely to be needed in patients on unsuccessful tablet treatment when dexamethasone is introduced). Blood tests performed in surrounding trusts may be available on HIE.
3. The approximate body mass index (BMI) of your patient (if insulin is needed, bigger patients have bigger insulin requirements)
4. If appropriate, the number of years that the patient has needed more treatment than just diet and metformin. The more years on more extensive tablet therapy, the less effective extending that tablet therapy will be.
5. For patients on one tablet (80 mg) of gliclazide produces 65% of the blood glucose lowering effect achieved if this is increased to the maximum dose (160 mg twice daily). Increasing pre-existing gliclazide doses thus often produces disappointingly modest results.
6. Dexamethasone takes 18 to 24 hours to push up blood glucose levels (and 24 to 36 hours for the dexamethasone effect to wear off after the last dose)
7. Dexamethasone predominantly raises the post-prandial blood glucose, with a lesser effect on fasting blood glucose levels
8. Know what insulin is available in the fridge on the ward where the patient is located, to avoid prescribing an insulin that is not there.

Capillary blood glucose testing

Dexamethasone produces very large changes in insulin resistance and can produce very marked hyperglycaemia within a day of commencing. This hyperglycaemia can easily cause patients to slip into a hyperosmolar state.

For this reason, and to obtain enough data to aid the titration of treatment, people with diabetes on dexamethasone needed their capillary blood glucose measured just before and 2 hours after each meal in the day.

Some patients will need a capillary blood glucose test in the middle of the night in addition. (Please see patient categorisation in the document later for appropriate patient group for whom this would be indicated).

Titration of treatment

The following sections describe changes to diabetes management that may be needed for different patient groups in different situations.

However it is important to state that starting additional treatment in the setting of dexamethasone therapy is just a first step.

Following any change the patient's diabetes needs to be monitored closely in order that their treatment can be adjusted in the light of their capillary blood glucose test results. Adjustment of insulin treatment in particular should be made at least once, and more frequently twice daily. Please continue to liaise with the diabetes team if there any any concerns.

Without regular review of the capillary blood glucose readings, and action based on the results, you will not achieve adequate control of the diabetes.

It is easiest to consider treatment based on the type of therapy that your patient was on before admission. The following pages describe a way forward for the various pre-existing therapeutic regimens.

Group 1: Patients treated with diet, or diet and metformin alone

A minority of patients in this situation, who have previously had very well controlled diabetes, may be able to mount a sufficient insulin response to combat the effect of dexamethasone. For them it is worth watching their capillary blood glucose levels for the first 24 to 30 hours. If the trend is for a rise into double figures, more treatment will be needed.

a) Blood glucose levels trending into the low teens Add in gliclazide at a dose of 80 mg twice daily in the first instance
b) Blood glucose levels in the higher teens Start insulin using Humulin S vials or Actrapid insulin vials (know what is in the insulin fridge before you prescribe)

For very slim patients a reasonable starting dose would be 6/6/6 (diabetologists' shorthand for 6 units of mealtime insulin with breakfast, lunch and evening meal)

For patients carrying a modest degree of additional weight a reasonable starting dose for patients carrying a modest degree of additional weight would be 8/8/8

For heavier patients a reasonable starting dose would be 10/10/10

Please note these are guides for initial treatment and regular review and up-titration of doses will be required for most patients.

Group 2: Patients treated with more tablets than just metformin alone

a) Patients treated with metformin and 40 or 80 mg of gliclazide once daily only

Some of patients might be able to maintain reasonable glycaemic control with dexamethasone treatment if the gliclazide dose is increased to maximum (160 mg twice daily). The majority will not.
Increasing the gliclazide dose to maximum is a prudent first step. Regular careful monitoring of the capillary blood glucose readings will then be needed, to spot the substantial proportion of patients who will need insulin treatment instead.
When insulin treatment is needed, **continue the metformin, stop the gliclazide**, and introduce Humulin S insulin with breakfast lunch and evening meal instead.

b) Patients treated with metformin and more than 40 or 80 mg of gliclazide once daily (plus or minus other diabetes tablets)

The great majority of these patients will not be controllable on tablet treatment when dexamethasone is introduced. Early introduction of mealtime insulin instead of all of their tablet treatment (keeping just metformin alone) offers a straightforward way ahead
For very slim patients a reasonable starting dose would be 8/8/8 (diabetologists' shorthand for 8 units of mealtime insulin with breakfast, lunch and evening meal)

For patients carrying a modest degree of additional weight a reasonable starting dose for patients carrying a modest degree of additional weight would be 10/10/10

For heavier patients a reasonable starting dose would be 12/12/12

Please note that these are guides for initial treatment and regular review and up-titration of doses will be required for most patients.

<u>Elderly patients treated with once daily insulin (sometimes self-administered, but often district nurse administered)</u>
These patients are best converted to mealtime insulin. Once the hyperglycaemic effect of dexamethasone kicks in after 18 to 24 hours, their insulin requirement will rise markedly.
A reasonable way forward is to replace the once daily long acting insulin with 3 times daily mealtime insulin.
Take the patient's usual total daily dose of insulin, add 33% to that dose, and split that between the 3 meals
For example: For a patient on 26 units of once daily long acting insulin, add one third to the total dose bringing it to 36 units. Then split that between the three meals giving 12/12/12
Please note these are guides for initial treatment and regular review and up-titration of doses will be required for most patients.

<u>Patients on premixed twice daily insulin</u>
(e.g. Novomix 30, Humalog Mix 25, Humalog Mix 50 – and many other mixtures)
There are two reasonable ways to manage people on premixed twice daily insulin

- **Firstly** add 33% to the patient's usual doses, starting 18 to 24 hours after dexamethasone has been given. Then regularly review their capillary blood glucose readings and up-titrate the doses further. This may work for some patients.

The difficulty is that as the doses rise, the patient receives more and more long acting insulin. This long acting insulin can cause hypoglycaemia in the night as a result.
For this group of patients checking a middle of the night capillary blood glucose level is very important.

If there are Low blood glucose readings in the night this suggests the need to change to a mealtime insulin regime:

- **Secondly** add 33% to the patient's usual total daily insulin dose. Starting 18 to 24 hours after dexamethasone has been given, split that dose between the three meals using a mealtime insulin (Humulin S or Actrapid).
  For example: For patient taking Novomix 30, 35 units with their breakfast and 25 units with their lunch under normal circumstances. Their total insulin dose is 60 units/day. Adding 33% to this gives 80 units/day. This gives mealtime insulin doses of 27/27/27

Patients on basal-bolus insulin treatment
(A rapid acting insulin with each of the 3 meals, and a dose of long acting insulin at bed time)

Add 33% to the patient's usual mealtime doses, starting 18 to 24 hours after dexamethasone has been given.
Consider being slightly more cautious if your patient is eating particularly poorly
Carefully review the capillary blood glucose levels overnight. If these climb overnight, then an increase in the long acting bedtime insulin is warranted.
Very frequently they do not climb, and sometimes fall overnight. In this situation the bed time long acting insulin should be maintained at the patient's usual dose, or if necessary reduced especially if there is any hypoglycaemia overnight.
Then regularly review their capillary blood glucose readings and up-titrate the doses further.

Insulin dose titration
A reasonable dataset is needed to successfully titrate insulin doses. This data is provided by regular ward capillary blood glucose monitoring with a minimum of **one test before, and one test 2-hours after each meal of the day.**

Whilst on dexamethasone the aim is to achieve capillary blood glucose levels that are frequently in single figures during the day and night.

A general rule of thumb to be considered when adjusting dosages is given below. Decisions taken need to be interpreted in the light of what is happening to your particular patient (for example some patients will need different mealtime insulin doses at different times of day - either because they eat more at some times of day compared to others, or because they are particularly insulin resistant in the morning -reviewing their capillary blood glucose data tells you when this is happening in your patient).

- **Blood glucose readings in the low teens** - Consider a 10% increase in insulin doses
- **Blood glucose readings in the mid-teens** - Consider a 20% increase in insulin doses

- **Blood glucose readings in the higher teens** - Consider a 25-30% increase in insulin doses
- **Blood glucose readings in the high teens/ lower 20s** - Consider a 30-35% increase in insulin doses

Regular review and titration of insulin doses will be required for most patients.

Practical Points to consider

1. The trust has four diabetes/endocrinology consultants, two diabetes/endocrinology registrars (one of whom is usually on the acute medical admission rota) and two diabetes nurses managing inpatients. Have a low threshold for involving them in your in the care of your patient. Consider walking into the Diabetes Centre, and talking to one of them about your patient's diabetes.
2. If things are complicated or the guidance here has not worked/ the patient is developing a diabetic emergency, speak to one of the consultants over the phone in the early or mid evening for advice (if you cannot find one of them still working in the diabetes Centre). The hospital switchboard has the home numbers.
3. The main reasons why we advocate the use of mealtime insulin to treat dexamethasone induced hyperglycaemia are
    - Because the response to each dose can be seen rapidly (you do not need to wait a day to see the results) which allows more rapid titration.
    - Because dexamethasone has a strong tendency to cause meal-associated hyperglycaemia with a lesser effect overnight.
4. In the setting of dexamethasone therapy, if you generally increase insulin doses by 2 units because of hyperglycaemia, you will often be treating yourself, and not the patient.

Contacts:
Dr John Anderson : john.anderson@nhs.net
Dr. Francesco Medici : Francesco.medici@nhs.net
Dr. Michelle Emery : michelle.emery@nhs.net
Diabetes Nurse specialists : Bleep 065 (Mon- Fri 9-5)

d. Remdesivir for severe COVID-19 in adult patients

Use the microguide which can be found at – https://viewer.microguide.global/huh/adult#content,cacab35f-5ebd-4d2c-85ec-1cacb0bbb161

Access criteria

Access to Remdesivir is Monday - Sunday 8am - 8pm.

In most cases it will be reasonable to await the SARS-CoV2 PCR result prior to initiating remdesivir. Patients with a negative (or pending) PCR result should only receive remdesivir if there is a very strong index of suspicion of COVID-19 with typical clinical and radiological features of COVID pneumonia.

ALL of the following criteria must be met:

- Hospitalised with suspected or confirmed SARS-CoV2 infection AND severe disease
  - with pneumonia requiring supplemental oxygen.
- Age 12 yrs. or older
- Weight at least 40kg
- Creatinine clearance ≥30ml/min*
- ALT <5 x Upper Limit of normal (ULN)
- No history of Chronic Liver Disease (Childs Pugh C)
- Within 10 days of symptom onset**
- Not receiving ongoing mechanical ventilation or ECMO. [NB Patients who present with an initial rapid deterioration requiring early IMV can be considered for treatment with remdesivir.]

EXCLUSION criteria:

- Creatinine clearance <30ml/min or on renal replacement therapy.

NOTE: eGFR can be used as an estimate of creatinine clearance UNLESS patient is over 75yrs of age, or at extreme of body weight e.g. BMI <18 or >40 kg/m2, in which case creatinine clearance should be calculated using Cockroft and Gault formula

MDT assessment of suitability of initiating remdesivir is required for patients who meet the above eligibility criteria **BUT**:

- Are not suitable for escalation beyond ward based care
- Are pregnant. There is a lack of evidence of safety/efficacy of remdesivir in pregnancy. Remdesivir should be avoided in pregnancy unless clinicians believe the benefits of treatment outweigh the risks to the individual. Gilead compassionate use

scheme in place for pregnant women - access available here: https://rdvcu.gilead.com/

Prescribing Remdesivir

Prescription should only be written after Consultant review (i.e. on/after PTWR at earliest).

Use the EPR Power plan "COVID-19 Remdesivir EAMS medicines plan"

5 day course: 200mg IV loading dose; followed by 100mg IV OD on the 4 subsequent days.

Inform patient of intention to treat with remdesivir – Patient Information Leaflet should also be given and can be found here.

Pregnant patients: case submission for Gilead compassionate use via https://rdvcu.gilead.com/ in addition to EPR prescription.

Monitoring and STOPPING criteria

- Baseline and DAILY FBC, LFTs and renal function whilst on remdesivir
- Reassess need/appropriateness of remdesivir daily.
    - Consider stopping after 72hrs if patient clinically improved and no longer requiring supplemental oxygen.
- **Discontinue** remdesivir if:
    - ALT >5x Upper Limit Normal.
    - Rise in AST/ALT and signs or symptoms of liver inflammation or increasing conjugated bilirubin or alkaline phosphatase.
    - Calculated creatinine clearance <30ml/min.
- If a patient on remdesivir requires escalation, then suitability of continuation of the drug should be considered by multi-disciplinary assessment. If patient continues to deteriorate despite 48hrs sustained IMV consider stopping.

Coadministration and drug interactions

For further information visit the University of Liverpool COVID-19 Drug Interactions website https://www.covid19-druginteractions.org/checker

- Steroids: No clinically significant interaction of remdesivir with either dexamethasone or hydrocortisone is expected. Dexamethasone could potentially reduce remdesivir concentrations due to induction of CYP3A4.
- Chloroquine phosphate or hydroxychloroquine sulphate co-administration with remdesivir is NOT recommended based on in vitro data demonstrating an antagonistic effect of chloroquine on the intracellular metabolic activation and antiviral activity of remdesivir.

Emergency Department
Homerton University Hospital

NHS
Homerton University Hospital
NHS Foundation Trust

Patient Meets Criteria to receive Remdesivir?

Disease Criteria:

Suspected or Confirmed COVID 19

With pneumonia requiring supplemental oxygen.

Not mechanically ventilated.

≤ 10 days since symptom onset

Patient Criteria:

Weight ≥40kg

Cr Clearance ≥30ml/min

ALT < 5 x Upper Limit Normal (ULN)

No Chronic Liver disease of Childs Pugh C severity or worse

Named treating Consultant Physician Agrees with decision to treat

Does Patient have capacity to consent to treatment?

Yes

Give Patient Information leaflet

Explain treatment plan to patient and document discussion on EPR

Second Medical Opinion

Patient on ITU: independent ITU consultant.

Patient on general medical ward: Monday – Friday: Respiratory or Medical consultant covering patients on Lamb ward. Saturday – Sunday: ITU consultant on call.

No

Document mental capacity assessment EPR form

Best Interest Medical Decision:

Seek second Independent Consultant Opinion re: decision to treat

If they agree: Proceed to treat, inform next of Kin and offer them patient information leaflet

Treatment and Monitoring

8am – 8pm: Prescribe using EPR Powerplan ("COVID-19 Remdesivir EAMS Medicines Plan"): Standard course **5 days**: Single loading dose of remdesivir 200mg IV infusion on Day 1, followed by once-daily maintenance doses of 100mg IV infusion for 4 days. Inform Pharmacy via **bleep 087** (or oncall pharmacist via switch if out of hrs).

Check baseline and **daily FBC, U and E, LFT**- Discontinue if Cr Clearance <30ml/min; or AST/ALT >5xULN; or rise in AST/ALT or conjugated bilirubin or ALP and signs of liver inflammation (see full SOP)

Monitor **adverse events**: e.g. hypotension, ALT/AST rise/liver inflammation, hypersensitivity. See full SOP for detail

Contact Remdesivir MDT Mon – Fri 9am – 5pm if considering remdesivir but above criteria not met. Treating physician to contact Duty Infection consultant via switchboard and email patient details and the specific query to: Katherine.woods3@nhs.net; luisa.cabrero-moreno@nhs.net; louiseabrams@nhs.net.

e. Thromboprophylaxis and treatment of VTE complications in COVID-19 infection

Newly diagnosed VTEs in COVID-19 patients will all continue to be treated with LMWH at standard doses during their acute admission, with possible conversion to other treatment modalities including DOACs once the infection is fully resolved and the patient back in the community without signs of early recurrence.

Severe pulmonary embolisms may require Alteplase thrombolysis in the hospital setting as per the protocol outlined below.

There is increasing discussion that the prothrombotic tendency of COVID -19 patients may persist for a period of time post discharge from hospital. As such patients deemed to have continued risk of VTE will be given a further 3 week course of prophylactic anticoagulation on discharge.

All patients admitted to hospital should be assessed for their VTE risk and started on Enoxaparin 40mg daily if necessary.
The dose should be increased for those tested positive for COVID-19 infection from swabs and in patients with highly suggestive symptoms and radiology.

D-dimer, creatinine and body weight are part of the blood tests and observations on admission for all suspected COVID-19 patients. Creatinine clearance should be calculated through the Gault-Cockcroft formula for those with confirmed infection or highly suggestive results. The following link: https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation provides a calculator based on the patient's age, actual body weight and creatinine levels.

The following tables summarise the recommended doses according to patients' d-dimer levels, actual body weight and renal function. The doses should be re-adjusted throughout admission according to the variations in patients' renal function and d-dimer.

Thromboprophylaxis should be discussed with Haematology in case of significant coagulopathy or severe thrombocytopenia with platelets below 50.

Creatinine clearance > 30 ml/min

D-dimer levels	Weight	Enoxaparin dose (SC)
< 1000	< 100 Kg	40mg OD
	100 – 150 Kg	60mg OD
	> 150 Kg	80mg OD
1000 - 3000	< 100 Kg	40mg BD
	100 – 150 Kg	60mg BD
	> 150 Kg	80mg BD
> 3000	< 150 Kg	1.5mg/kg OD
	> 150 Kg	1mg/kg BD

Creatinine clearance 15 – 30 ml/min

D-dimer levels	Patient's actual body weight	Enoxaparin dose (SC)
< 1000	< 125 Kg	20mg OD
	> 125 Kg	40mg OD
1000 - 3000	< 125 Kg	20 mg BD
	> 125 Kg	40 mg BD
> 3000	All patients	1mg/Kg OD

Creatinine clearance < 15 ml/min

D-dimer levels	Patient's actual body weight	Dalteparin dose (SC)
< 1000	All patients	Dalteparin 2500 units OD
1000 - 3000	All patients	Dalteparin 5000 units OD
> 3000	All patients	Dalteparin 133 units/kg od (Please discuss anti factor-Xa monitoring with oncall haeamatologist) For PFS sizes see appendix 2

Continuation of thromboprophylaxis on discharge

Extended thromboprophylaxis for 3 additional weeks should be offered to high risk patients who are discharged to the community following their acute admission. These include patients with

- D-dimer level > 400 on discharge
- Required ITU stay during their admission
- D- dimer level > 3000 at any time during their admission

Patients can be converted to low dose DOAC (Apixaban 2.5mg BD) provided:
Their creatinine clearance is stable above 30 ml/min.

- No significantly deranged LFTs
- Platelets > 50 x 109/L
- Haemoglobin > 80 g/L).

Otherwise, they should be kept on LMWH therapy as per the doses above.

Patients who are transferred to a rehab facility should be stepped down to normal thromboprophylaxis and remain on this until discharged back to the community.

Thromboprophylaxis in arterial disease

Thromboprophylaxis for complications from arterial disease is based on antiplatelet therapy rather than anticoagulation. Patients with history of ischemic arterial stroke non-related to AF or severe peripheral vascular disease with previous ischemic episodes who are not already on antiplatelet therapy should be considered for low dose Aspirin 75mg OD or Clopidogrel 75mg OD on top of their LMWH prophylaxis.

Treatment of VTE complications in COVID-19 infection

Patients newly diagnosed with venous thromboembolisms during a confirmed or suspected COVID-19 infection should be started on standard therapeutic dose LMWH as per our VTE management policy below:

Weight	Renal function (CrCl)		
	> 30 ml/min	15 – 30 ml/min	< 15 ml/min
< 150 Kg	Enoxaparin 1.5 mg/Kg OD	Enoxaparin 1mg Kg OD	Dalteparin 133 units/kg od SC (Please discuss anti factor-Xa monitoring with oncall haeamatologist) For PFS sizes see appendix 2
> 150 Kg	Enoxaparin 1mg/Kg BD	Enoxaparin 1mg Kg OD	Dalteparin 133 units/kg od SC (Please discuss anti factor-Xa monitoring with oncall haeamatologist) For PFS sizes see appendix 2

At discharge, patients should be offered a telephone consultation with the Anticoagulation team three weeks later to discuss the duration of their treatment and the possible conversion of their LMWH therapy to oral anticoagulation with DOACs. Their TTA's should include Enoxaparin/ Dalteparin to cover four weeks.

Patients with coagulopathy or severe thrombocytopenia with platelets < 50 should be discussed with the Haematology team.

Thrombolysis of significant Pulmonary Embolisms (PE)

Significant PE can be classified into massive PE and submassive PE.
Massive PEs are PEs so severe as to cause circulatory collapse and are due to acute right heart failure. They are defined as PE with hypotension (either systolic BP <90 mmHg or a pressure drop ≥40 mmHg, for more than 15 mins), that are not caused by a cardiac arrhythmia, hypovolaemia or sepsis. They may cause pulselessness or persistent profound bradycardia (heart rate <40 bpm with signs or symptoms of shock).

Submassive PEs are acute PE without systemic hypotension (SBP ≥90 mm Hg) but with either RV dysfunction or myocardial necrosis. RV dysfunction means the presence of at least 1 of the following:

- RV dilation (apical 4-chamber RV diameter divided by LV diameter >0.9) or RV systolic dysfunction on echocardiography
- RV dilation (4-chamber RV diameter divided by LV diameter >0.9) on CT
- Elevation of BNP (>90 pg/mL)
- Elevation of N-terminal pro-BNP (>500 pg/mL); or

- Electrocardiographic changes (new complete or incomplete right bundle-branch block, anteroseptal ST elevation or depression, or anteroseptal T-wave inversion)

Thrombolysis is an established therapy for massive pulmonary embolism. The use of thrombolysis for the treatment of submassive PE is controversial as there is little evidence that it improves mortality, or prevents long term pulmonary hypertension, but is associated with a significantly higher risk of haemorrhage – this should be discussed with the On Call Medical consultant (or the respiratory team).

Contraindication to thrombolysis

Absolute contraindications include *

- any prior intracranial haemorrhage
- known structural intracranial cerebrovascular disease (e.g., arteriovenous malformation)
- known malignant intracranial neoplasm
- ischemic stroke within 3 months
- suspected aortic dissection
- active bleeding
- known bleeding diathesis (Please discuss with the haematology consultant on call if required)
- recent surgery encroaching on the spinal canal or brain, and
- recent significant closed-head or facial trauma with radiographic evidence of bony fracture or brain injury

*Contraindications to thrombolysis that are considered absolute might become relative in a patient with immediately life threatening massive PE where alternative therapy is not immediately available

Relative contraindications include

- age >75 years
- current use of anticoagulation (Please discuss with the haematology consultant on call if required)
- pregnancy
- non compressible vascular punctures
- traumatic or prolonged cardiopulmonary resuscitation (>10 minutes)
- recent internal bleeding (within 2 to 4 weeks)
- history of chronic, severe, and poorly controlled hypertension
- severe uncontrolled hypertension on presentation (systolic blood pressure >180 mm Hg or diastolic blood pressure >110 mm Hg)
- dementia

- remote (>3 months) ischemic stroke; and
- major surgery within 3 weeks

Administration of systemic thrombolytics

Patients should be treated with therapeutic anticoagulation whilst waiting for tests to confirm PE. Thrombolysis is the first line treatment for massive PE. Please discontinue the heparin infusion/LMWH whilst thrombolysis is being administered. Please give thrombolysis peripherally not centrally as otherwise there is increased risk of bleeding.

Administration for PE causing cardiac arrest or peri-arrest:

- 50 mg IV bolus of alteplase (tPA) over 1-2 minutes

Administration for massive PE but not in cardiac or peri-arrest:

- Dilute 100mg alteplase in water for injection to give a resulting solution of 2mg/ml concentration
- Give 10 mg as bolus over 1-2 minutes
- Give the remaining 90 mg over 2 hours via syringe driver.

N.B In patients less than 65kg, the total dose should not be more than 1.5mg/kg (but bolus dose of 10mg remains the same)

Following thrombolysis immediately check APTT:

- If APTT ratio < 2, commence/resume IV heparin infusion (Maintenance Infusion 1000 U/hr). If APTT ratio is >2, wait and repeat after 4 hours
- Adjust to aim for an APTT ratio of around 2 (range 1.5-2.5)
- Check APTT 6 hours after any dose change
- Continue heparin for at least 5 days and then convert to treatment dose apixaban

N.B. If therapeutic LMWH has been administered prior to thrombolysis, start the heparin infusion as above but delay commencement for 18 h following the last dose of LMWH if once-daily dosing and 8–10 h if twice-daily dosing has been used.

C5. Viral Filters

All ventilators need to have a filter as well as a HME filter being used at the patient end after intubations.

This will require 2x Supersets.

1 for the Green filter (near the patient) and the other for the extra tubing for the Yellow Viral Filter.

If these filters are not used, then the ventilator must be sealed and 'quarantined' for 72 hours.

C6. Oxygen

Oxygen use is monitored:

- NEL ICS
    - ITU Network daily meetings
    - Urgent care Network hub daily meetings
        - Influences ambulance flow – new clinical pathway such as patient on >10 L oxygen to go to RLH directly
        - Enhance Intelligence conveyance
        - Intelligence conveyance
- Trust specific
    - Dashboard for CSM bed flow and senior awareness
    - Risk Register to improve awareness

Oxygen use needs to be:

- **Effective**
    1. Patient selection – NIV
    2. Patient reviews
        - Daily consultant respiratory review
        - Daily MDT meeting to include those on NIV and in possible need of future NIV

- **Efficient** – optimisation
    1. Oxygen prescribing targets
        - Target saturations 94-98% - for non COVID patients unless exceptions
        - Target saturations 92-96% for COVID patients during the pandemic
        - Target saturations 90-94% for COVID patients during the pandemic when oxygen capacity is an issue
    2. Weaning
    3. Proning
    4. Concentrators
    5. Equipment
        - NIV machines
        - Hoods (wall driven oxygen)
        - Full face masks
    6. Cylinders
    7. Regular de-icing

The main areas of use include:

- Intensive Care
- Surgical centre (as ITU expansion area)
- Theatres (mainly as an ITU expansion area but also as operating theatres in exceptional circumstance)
- Recovery (mainly as an ITU expansion area but also as operating theatres in exceptional circumstance)

- NICU
- Inpatient wards
- Emergency Department
- Day Stay Theatres (as emergency theatres)

Oxygen is kept within a large storage system - the VIE (Vacuum Insulated Evaporator) or bulk liquid oxygen plant as liquid oxygen which is then evaporated into a concentrated oxygen supply. The pressure for this is kept at 4.2 bar – recently increased from 3.7 bar.

Hospital Engineering

The use of oxygen needs to be considered on 2 levels:

- Total hospital limits
- Ward based limits

Total Hospital Limits

The total oxygen limit is controlled mainly by the VIE. The total oxygen flow rates that are achievable for this hospital's VIE are 3000L/min. The estimated background use prior to COVID-19 and which includes NICU usage is approximately 500L/min. Therefore the total available oxygen flow is 2500L/min for use over this 'normal' requirement.

Ward based Limits

The hospital is divided into 4 blocks, but the exact oxygen pipework connections are not 100% clear.

There are 2 main oxygen feeds to the Trust:

1. A 35mm pipe – the original pipework
2. A 22mm pipe – the 'new' pipework

Block 1

This runs from the initial 35mm pipe and then drops into 22mm then 15mm feeds. These provide the oxygen for:

Block 1 Front:

- ACU
- Lloyd
- Edith Cavell
- ECU South

Block 1 Back:

- Thomas Audley

- Cardiology
- Lamb
- ECU North

Is it estimated that each of these medical wards were designed to have an oxygen flow rate of approximately 50L/min running through them.

The estimated maximum flow rate capacity is thought to be 150L/min if only 3 out of the 4 wards are being used per feed within block 1. Hence a maximum of 450L/min per block of 4 wards.

There is a degree of flow reduction both across the block (so between wards) and also within the wards across the bays although it is not clear which ends of the ward get priority.

This all needs to be considered when placing patients in certain beds, bays and wards when reviewing their oxygen requirement.

Block 2

There are 2 parts to block 2:

Block 2 first floor:

- NICU
- SCBU
- Templar
- Picton

Block 2 ground floor:

- Bryning
- Graham
- Defoe

Block 3

This has 2 pipes.

A 35mm pipe providing oxygen flow for:

- Theatres (via a combination of 28mm, 22mm and 15mm feeds)
- ITU (via a 22mm feed)
- Priestly (via a 15mm feed)
- 2012 (via a 15mm feed)
- Maternity (via a 15mm feed)

The newer 22mm pipe directly from the VIE provides oxygen for:

- X-ray and Cardiology department (via a 15mm feed)
- Starlight (via a direct 22mm then 15mm feed)

Block 4

This is part of the newer build and has a 22mm pipe providing oxygen flow for

- ED
- CEA
- Annex (Green Majors)

Within Block 4 there are also 15mm feeds from the original hospital 35mm feed to:

- Resus
- Surgical centre
- ITU

Pipe section	Block	Ward group
35mm pipe	Block 1 front	ACU Lloyd Edith Cavell ECU South
35mm pipe	Block 1 back	Thomas Audley Cardiology Lamb ECU North
35mm pipe	Block 3 1st flr	Theatres ITU Priestley 2012 Maternity
22mm pipe	Block 4 ground flr	ED/Annexe
22mm pipe	Block 3 1st flr	Starlight
22mm pipe	Block 2 ground flr	Graham Defoe

For this hospital, it is therefore the ward based limits that are more of a constraint due to the limited pipework rings and the diameter of the feeds rather than the overarching VIE capacity.

Flow Rates

Depending on how the oxygen is delivered, depends on the amount of oxygen needed, the pressure and the flow rates.

Method of Oxygen Delivery	Flow rates
Ventilators in ITU / Recovery / Surgical centre (Maquet Servo U and Servo Is)	3-6L/min – likely average for COVID-19 10L/min – average used for calculations 20L/min – maximal amount, rarely needed
Anaesthetic Machine in theatres	0.5L/min (excluding driver for bellows)
CPAP / NIV –Trilogy Machines	25L/min (average)
CPAP – Vivo-3 Breas	Mechanically driven so oxygen flow only that entrained (Flowmeter value)
Face Masks	1-15L/min plus any supplementary via additional nasal cannula (6-10L/min worked as average)
NICU Use (Independent of method)	Total 500L

NIV

NIV is delivered predominantly on the medical wards.

There are currently 12 patient NIV/CPAP Trilogy machines available within the Trust and due to oxygen pressure constraints, these should be split across as many different wards as possible, each on different blocks. The ability to deliver this is limited by staff and safety.

There are 10 Vivo-3 Breas CPAP machines. These are mechanically driven and hence do not require such large amounts of oxygen to work but can entrain oxygen and hence use the equivalent amount of oxygen as per the flowmeter. These machines are more suited for patients who have low peak inspiratory pressure, a lower respiratory rate and require less than 60% FiO_2 (Fraction inspired oxygen) as there is less ability to provide the same level of oxygen with these machines as with the Trilogy ones.

Face Masks

The majority of patients are treated with a non re-breath facemask. Oxygen comes from the wall supply which is controlled by a flowmeter. This can go to 15L/min. In exceptional circumstances, as has been seen with COVID, additional oxygen may be required. This is achieved by also delivering oxygen via nasal prongs at the same time.

The average oxygen flow rate used per patient has been calculated to be 6L/min on one occasion and 10L/min on another occasion. Whilst this may give a global picture, this does not help define the peaks of oxygen use either within a ward or within a block. Hence ward based approaches are needed.

The ward based oxygen use is now monitored several times per day by use of an oxygen dashboard.

Oxygen Optimisation

A. Oxygen prescribing targets

For adults in hospital the target saturations for patients who do not have a diagnosis of COPD, is 92-96% in the first instance.

A target range of 90-94% may be considered if clinically appropriate if the oxygen demand requires this.

https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/04/C0256-specialty-guide-oxygen-therapy-and-coronavirus-9-april-2020.pdf

B. Weaning

All patients should continually have their oxygen flows reviewed with the aim to wean their oxygen needs by minimal amounts with appropriate clinical review. This is likely to have minimal clinical impact on the direct patient, but will provide a cumulative gain across the

oxygen reservoir of the Trust. Flowmeters need to be switched off when oxygen delivery methods are not attached to patients to ensure there is no wasting of oxygen.

C. Proning

Proning is a technique where patients lay 'prone' (on their stomachs) or partially prone (on their sides) in order to increase the blood flow to the dependent part of the lungs and hence aims to reduce the ventilation / perfusion (V/Q) mismatching that occurs in COVID.

For patients all patients who require hospital admission for COVID, proning should be actively encouraged from the first arrival of the patient and throughout their admission.

This should be for patients who are intubated and ventilated, on CPAP and those receiving oxygen via facemasks. For those that are awake and able to do so, this should be actively encouraged for the patient to do this themselves.

Proning is not required if patients are end of life unless this helps with comfort.

D. Cylinders

Oxygen cylinders are an alternative supply of oxygen that is independent of the VIE and hospital engineering system.

They come in a variety of sizes and hence different oxygen capacities:

Size	Capacity (L)	Pressure (psi)	Weight (kg)	Valve Type
B	200	1900	2.27	Pin Index
D	400	1900	3.4	Pin Index
E	660	1900	5.4	Pin Index
F	1360	1900	14.5	Bull nose
G	3400	1900	34.5	Bull nose
H	6900	2200	53.2	Bull nose
M	3450	2200	29.0	Bull nose
J	6800	137 Bar	78.0	
W	11,300	230 Bar	85.0	

There are several risks associated with using oxygen cylinders which include:

- They have no internal alarm – they is no alarm when the oxygen supply runs out hence this is reliant on people remembering to check
- They are heavy and hence can be difficult to move around and could potentially fall over; the larger cylinders require individual oxygen holders in order to move them
- Storage can be challenging as they can be quite large
- If oxygen cylinders are required on wards that do not normally contain these items, there are additional fire and health and safety risks

At present cylinders are only to be used:

- For patient transfers
- For patients on an end of life pathway
- During a critical situation after discussion with Command and Control

Safety

Oxygen behaves differently to air. The air we breathe contains about 21% oxygen. Even a small increase in the oxygen level can cause issues such as increased risk of starting a fire. It is also very reactive and as such oxygen from cylinders which is under high pressure can react with common material such as oils and grease.

The main causes of fires and explosions when using medical oxygen are:

- Oxygen enrichment from leaking equipment
- Use of oxygen in equipment not designed for oxygen service
- Incorrect operation of oxygen equipment

This associated fire and health and safety risks can be minimised via instigating:

- Ward based good practice behaviours
- Daily ward based checks
- Specific checks at the point of exceptional use

Ward based good practice

This practice is expected to take place on every ward at all times. If there are concerns that any of this is not taking place on the wards, then this must be escalated to the ward manager or nurse in charge. If there are still ongoing concerns please contact the Clinical Site Managers.

- No smoking permitted on the wards at any time.
- Reasonable measures taken to minimise electrical equipment in the vicinity.
- Flammable liquids and combustible materials to be kept away from oxygen.
- Wards to report immediately any issues with ventilation.
- Oxygen ports (wall flowmeters and those from cylinders) to be turned off when not in use.
- Oxygen cylinders (including spares) are being stored safely:
  - Not obstructing the ward flow, fire exits
  - Are secure
  - Are not trip hazards
  - Are not left in direct sunshine or heat
- Empty cylinders are collected and removed from the ward on a regular basis via the porters.
- Any defective cylinders are reported to the ward manager or nurse in charge.

Daily ward based checks

It is expected that the following happens during all nursing shifts.

- Nursing staff to be aware which patients are receiving oxygen via cylinders as part of handover and documented on the handover sheet.
- If a patient's oxygen is noted to not be on the patient, the nursing and medical team will ensure the oxygen is either:
    - Replaced on the patient
    - Switched off

Specific checks at the point of using Oxygen cylinders

If a patient is being commenced onto an oxygen cylinder for any reason the following checks must be made and the Oxygen Cylinder Transfer Checklist must be used prior to transfer:

- Staff hands are washed and adequately dried including drying after using any alcohol gel.
- Oxygen cylinder (including the outlets and regulators) are clean – if do not appear clean, the staff will use an alternative cylinder.
- The oxygen cylinder is safe either near the patient in a holder or securely attached to the bed or trolley if a transfer is being done.
- Prior to any transfer being completed, that there is enough oxygen to complete the transfer and significant spare oxygen capacity is also available (>50% spare).

Appendix A - Oxygen Cylinder Transfer Checklist

Oxygen Cylinder Transfer Checklist - BEFORE THE TRANSFER		
Is Oxygen required for the patient transfer?	**Yes**	No No need to use this checklist
Patient identity checked as correct?	**Yes**	No Do not transfer until issue resolved
Are staff hands washed and dried completely including being dry from alcohol gel?	**Yes**	No Do not transfer until issue resolved
Are the Oxygen cylinders clean and useable?	**Yes**	No Do not transfer until issue resolved
Is the Oxygen cylinder safely secured for transfer?	**Yes**	No Do not transfer until issue resolved
Is there enough oxygen for the transfer with at least 50% spare.	**Yes**	No Do not transfer until issue resolved

Appendix B - Risk of death and severe harm from failure to obtain and continue flow from oxygen cylinders

Classification: Official

NHS Improvement

Patient Safety Alert

Risk of death and severe harm from failure to obtain and continue flow from oxygen cylinders

9 January 2018

Alert reference number: NHS/PSA/W/2018/001

Warning Alert

Some patients need to be given additional oxygen[1] as part of their treatment. Where there is no access to piped or concentrated oxygen, it is provided in cylinders, the design of which has changed over recent years. Cylinders with integral valves are now in common use and require several steps (typically removing a plastic cap, turning a valve and adjusting a dial) before oxygen starts to flow. To reduce the risk of fire[2] valves must be closed when cylinders are not in use, and cylinders carried in special holders that can be out of the direct line of sight and hearing of staff caring for the patient.

An unintended consequence of these changes is that staff may believe oxygen is flowing when it is not, and/or may be unable to turn the oxygen flow on in an emergency.

In a recent three-year period, over 400 incidents involving incorrect operation of oxygen cylinder controls were reported to the National Reporting and Learning System (NRLS). Six patients died, although most were already critically ill and may not have survived even if their oxygen supply had been maintained. Five patients had a respiratory and/or a cardiac arrest but were resuscitated, and four became unconscious. Other incident reports described patients experiencing difficulty breathing and low oxygen saturations that required urgent medical attention. Incidents involved portable oxygen cylinders of all sizes on trolleys, wheelchairs, resuscitation trolleys and neonatal resuscitaires, and larger cylinders in hospital areas without piped oxygen.

A typical incident report reads: "Patient arrived on coronary care unit with oxygen saturations of 72%. Oxygen in situ and set to correct rate on the flow dial but unfortunately [the valve] was not opened and the patient was not therefore receiving oxygen. Peri-arrest on arrival, [crash team] called .....condition improved .....registered nurse continued to check cylinder was not running out but failed to notice not turned on as indicator green."

Insights from local investigations include:

- prioritising training for staff groups and clinical areas where the risk is high
- reinforcing theoretical training with regular opportunities to practise operating the cylinder controls
- linking safe operation of cylinder controls with other key safety issues, including fire hazards and how long a full cylinder will last on various flow rates
- placing laminated guides close to the point of use.

NHS Improvement and the Medicines and Healthcare products Regulatory Agency (MHRA) are supporting the distribution of training materials and resources for different manufacturers' designs of oxygen cylinder via the Medication Safety Officer (MSO) and Medical Device Safety Officer (MDSO) networks.[3] The MHRA will continue to work with industry partners to improve oxygen cylinder design. The Healthcare Safety Investigation Branch (HSIB) is also currently conducting an investigation into this safety issue.[4]

Actions

Who: All organisations providing NHS funded-care where oxygen cylinders are used, including hospitals, GP practices, ambulance services and mental health units.*

When: To commence immediately and be completed no later than 20 February 2018.

1. Identify if oxygen cylinders are used in your organisation, even if only in emergencies
2. Bring this alert to the attention of all those with a leadership role in ensuring clinical staff understand how to operate oxygen cylinders safely
3. Consider if immediate local action is needed and ensure that an action plan is underway to reduce the risk of incorrect use of oxygen cylinders
4. Communicate the key messages in this alert and your local action plan to all relevant medical, nursing, therapy, pharmacy and support staff

*While this alert is directed at improving safe use by clinical staff, home oxygen services may also be able to use these findings to improve training and support for people using oxygen at home and their family/carers.

Sharing resources and examples of work

If there are any resources or examples of work developed in relation to this alert you think would be useful to others, please share them with us by emailing patientsafety.enquiries@nhs.net

Patient Safety
improvement.nhs.uk/resources/patient-safety-alerts

See page two for technical notes, stakeholder engagement and advice on who this alert should be directed to.

NHS Improvement (January 2018) Contact us: patientsafety.enquiries@nhs.net Publication code: IT 01/18

Appendix C - Interruption of high flow nasal oxygen during transfer

National Patient Safety Alert

NHS

Interruption of high flow nasal oxygen during transfer

Date of issue:	01/04/2020	Reference no:	NatPSA/2020/002/NHSPS

This alert is for action by: Acute and specialist hospital providers (adult and children's hospitals)

This is a safety critical and complex National Patient Safety Alert. Implementation should be co-ordinated by an executive lead (or equivalent role in organisations without executive boards) and supported by clinical leaders in respiratory and emergency medicine

Explanation of identified safety issue:

Specialised equipment is used to deliver high flow nasal oxygen (HFNO) to babies, children and adults in acute respiratory failure without hypercapnia.[1] **Current national guidance[2] (see Note) states that HFNO is not advocated in COVID-19 patients based on lack of efficacy, oxygen use and infection spread; if used temporarily, or for other patients, it must be included as part of the daily count of the number of high flow ventilatory systems in use.[3]**

Some HFNO delivery devices have a transport mode, but most require mains power and will not deliver oxygen during transfer* unless attached to a compatible uninterruptible power supply (UPS) device. We identified four deaths in a recent two-year period from interrupted HFNO during patient transfer; further reports described hypoxia, cyanosis, collapse and respiratory arrest. Our review of these incidents suggests:

- some staff may assume devices have an internal battery
- staff do not realise how rapidly the patient is likely to deteriorate with even brief interruption of HFNO
- a misconception is that less intensive methods of oxygen delivery (eg reservoir masks with an oxygen cylinder on full flow) are an adequate substitute during transfer; however, most patients requiring HFNO need more intensive intervention such as intubation if HFNO is interrupted
- staff have no obvious visual cue to the criticality of HFNO and may confuse it with low-flow nasal oxygen
- emergency departments starting a patient on HFNO then find they have no access to a supplementary battery source or transport mode to move the patient safely out of the department.

In the longer term, purchasing additional equipment supported by the manufacturer of your HFNO device, and redesigning patient pathways, protocols and staff training could address the underlying causes, but the actions in this alert help reduce the immediate risk.

** 'Transfer' in the context of this alert means between wards, departments and rooms within a hospital; HFNO is not used for ambulance transfer between hospitals.*

Actions required

Actions to be completed by 08/04/2020

1. Identify all devices used to provide HFNO that do not have an in-built transport mode.
2. Add clear and visible labels to these HFNO delivery devices stating:
   a. even brief interruptions to mains power supply will lead to interruption of oxygen therapy and subsequent respiratory or cardiac arrest.
   b. do **not** start HFNO in any emergency department or short stay unit without a plan for how to transfer the patient onwards.
3. If your organisation has already purchased UPS device/s to use with HFNO:
   a. identify a storage place for your UPS that can be accessed 24/7
   b. label all HFNO devices with the location of a compatible UPS
   c. allocate responsibility for ensuring the UPS is returned, charged and prepared for next use.

For further detail, resources and supporting materials see: www.england.nhs.uk/2020/04/interruption-of-high-flow-nasal-oxygen-during-transfer

For any enquiries about this alert contact: patientsafety.enquiries@nhs.net 1/2

Failure to take the actions required under this National Patient Safety Alert may lead to CQC taking regulatory action

Appendix D - Risk of harm from inappropriate placement of pulse oximeter probes

Classification: Official

NHS Improvement

Patient Safety Alert

Risk of harm from inappropriate placement of pulse oximeter probes

18 December 2018

Alert reference number: NHS/PSA/W/2018/009

Warning Alert

Measurement of oxygen saturation, using a pulse oximeter probe, is routinely undertaken as part of patients' vital signs during diagnosis and ongoing monitoring. Oxygen saturation readings are a key component of the National Early Warning Score (NEWS2).[1]

Oximeter probes can be single or multiple use and are designed to attach to specific parts of the body. Adult oximeter probes can be attached to either a finger or an ear, but are not interchangeable between these sites, whilst probes for babies and children need to be selected according to the patient's weight.

If an oximeter probe intended for the finger is attached to the ear (or vice versa), or a probe intended for an adult is attached to a baby or a child (or vice versa), it can produce a reading up to 50% lower or 30% higher than the real value.[2,3,4] The clinical implication of an inaccurately high reading, especially as part of NEWS2, is that staff may be falsely reassured about a patient's condition, when in reality the patient is deteriorating, or may make an inappropriate intervention when in fact a patient is stable or improving.

The national patient safety team was made aware that this issue may be under-recognised. To gain further information, we carried out a survey of clinical staff and observed clinical practice. Key issues identified were:

- a substantial proportion of staff do not know that finger probes can give misleading results if attached to ears
- a quarter said they do not have access to probes specifically for the ear, even though in almost all clinical settings some patients will need these
- once probes are removed from their packaging there is no easily visible prompt to remind the user where to attach the probe
- staff may not be aware of other factors that can affect the accuracy of the reading.

Although no reports were found in the National Reporting and Learning System (NRLS) relating to this issue, the scale of these gaps in knowledge and equipment suggests the potential for severe patient harm is high.

The local actions required by this alert will help reduce the risk of incorrect probe selection and placement. To reinforce and embed these local changes, NHS Improvement and the Medicines and Healthcare products Regulatory Agency (MHRA) are asking manufacturers to review device labelling and provide prompts for correct attachment. NHS Improvement have also asked the Clinical and Products Assurance (CAPA) arm of NHS Supply Chain (NHSSC) to review the oximeter probe descriptions in its catalogue.

Actions

Who: All organisations providing NHS funded-care where oxygen saturation probes are used as part of routine or emergency monitoring of patients

When: To commence immediately and actions completed by 18 June 2019

1. Identify a clinical leader to bring together people with responsibilities for medical device training and education, clinical skills assessment, NEWS2 implementation and procurement of pulse oximeters.
2. Develop an action plan to reduce the risk of inappropriate placement of pulse oximetry probes. This should:
   - arrange for ongoing access to adult finger and ear probes in all clinical areas where oximetry is used (including for the range required for babies and children where appropriate)
   - provide point-of-use reminders on why it is vital to use the correct probe for fingers and for ears, and for babies and children
   - provide point-of-use reminders on other factors that may interfere with the accuracy of the reading.
3. Once your organisation's action plan for managing these risks has been agreed, communicate the key messages in this alert and the plan to relevant clinical staff, clinical education/training staff, and patients or their carers who self-monitor oxygen saturation levels.

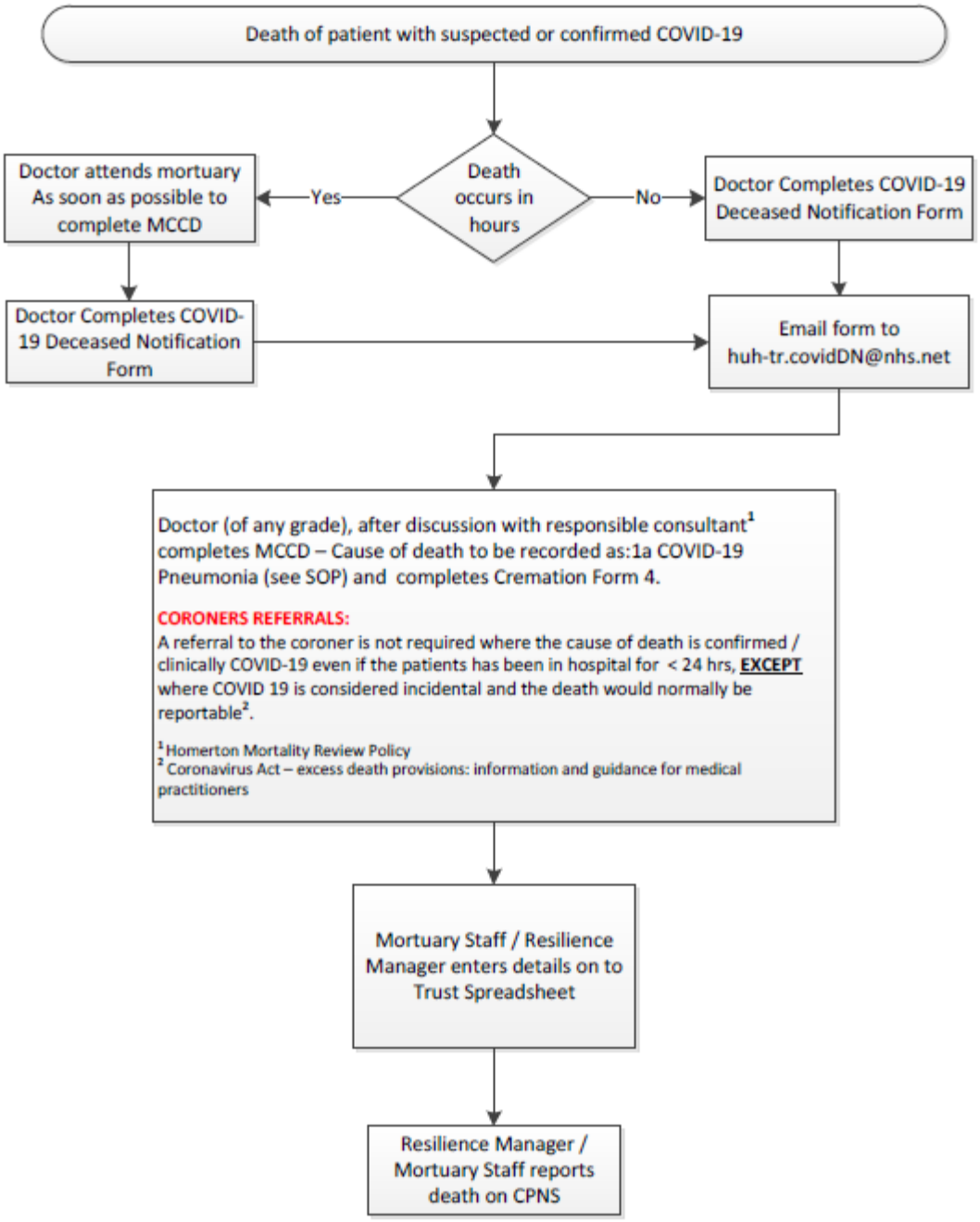
Patient Safety
improvement.nhs.uk/resources/patient-safety-alerts

See page two for technical notes, stakeholder engagement and advice on who this alert should be directed to.

NHS Improvement (December 2018) Contact us: patientsafety.enquiries@nhs.net Publication code: IT 14/18

D. Death Management

D1. Death Management Process Flow chart



D2. Death Notification Form

Organisation	
Hospital / Community / Residential	
Location of death Ward/ITU/ED/Other	
Sex	
Age	
Date of Birth	
Hospital Number	
NHS Number	
Date of Admission	
Date Swabbed	
Date of Result	
Swab Result	
Date/Time of Death	
Relatives Aware, Yes/No	
Relatives Support	
Pre-existing Conditions	
Travel History	

E. Governance

E1. Risks for IMRS (Risk Register)

Various risks have been identified and recorded via the IMRS governance system or central trust committees.

These include:

1. COVID amber exposed patients (1088)

- Ideally all COVID amber exposed patients would be cohorted to an amber ward.
- There is not sufficient bed capacity to enable the delivery of an amber ward.
- Amber exposed patients therefore may need to be cohorted in bays, either on red or green wards.
- Green wards should be the first preference.
- Risk –
    - There may be an increased risk to the amber exposed cohort group if they are admitted to the red wards; there may be an increased risk to the patients on the rest of the ward due to the amber exposed cohort group if they are admitted to the green wards.
    - Category – Patient Care
    - Rating –
        - Likelihood – 5
        - Consequence – 3
        - Total = 15

2. Flu exposed patients (1089)

- The bay remains as an open bay if only one patient, admitted flu +ve, is identified in that bay (and moved to a side room/flu cohort bay on diagnosis), rather than closing to admissions due to bed flow requirements.
- If a 2nd, hospital-acquired case of flu is identified in the bay, then it would be shut to admissions.
- All flu exposed patients would be given oseltamivir prophylaxis (if no contra-indications)
- Risk –
    - New patients might be being admitted to a bay where flu is present
    - Category – Infection control
    - Rating –
        - Likelihood – 4
        - Consequence – 2

- Total = 8

3. NIV (1090)

- Amber NIV patients can't always be admitted to an amber ward due to nursing and medical staffing and competencies.
- Hence they may require to be admitted to side rooms via either the green or red admission wards.
- Risk –
    - There may as a result be a slight increased risk to the individual receiving NIV (if admitted via red ward) or to the ward and other patients (if admitted via the green ward) because NIV is an AGP and the COVID result for the individual is not yet known.
    - Category – Patient Care
    - Rating –
        - Likelihood - 4
        - Consequence - 2
        - Total = 8

4. Distance between beds in bays (1091 and 1092)

- Inpatient beds would ideally be 4 per bay in order to comply with current DH building guidance 'Health Building Note 04-01: Adult in-patient facilities' (2013) and COVID social distancing guidelines.
- This may not be delivered due to the resultant loss of bed capacity. The only ward this is currently being delivered on is RNRU.
- The risk is potentially higher on some wards than others due to the potential prevalence of COVID patients within certain cohorts.
- Risk –
    - Lack of 2m distancing between beds, increases the risk of nosocomial infection (COVID and flu) with the risk theoretically being greater on the amber and red wards than the green wards.
    - Category – Infection Control
    - Rating for green wards:
        - Likelihood - 5
        - Consequence - 1
        - Total = 5
    - Rating for Amber wards:
        - Likelihood - 5
        - Consequence - 3
        - Total = 15

5. Mixed sex bays (1093)

- Due to the need to cohort flu patients if no side rooms are available, and the likely incremental occupancy levels of flu patients, it is possible that flu patients may need to be placed in a cohorted bay with other flu patients of different sexes.
- Any decision to mix sexes should be made by the Executive Director on call.
- In hours this needs to be escalated via the IMRS Management team and via the CSM and SMOC out of hours.
- All efforts will be made to avoid this if bed flow and occupancy permit.
- Risk –
    - Patients may need to be admitted to mixed sex bays.
    - Category – Patient care
    - Rating –
        - Likelihood - 5
        - Consequence - 3
        - Total = 15

6. Emergency Pathway – Risk that we cannot safely cohort patients (1041 – was a trust wide risk)

- Ideally patients would only be admitted on to a ward when their COVID status is known. This is not feasible and hence decisions about patient placement have to be made based on clinical and radiological findings.
- All patients are risk stratified into red, amber or green and admitted to the appropriately coloured admission ward.
- On occasions, this decision may be incorrect.
- Risk –
    - Patients may be contracting or transmitting COVID due to not being able to cohort with 100% accuracy leading to harm to patients.
    - Category – Infection control
    - Rating –
        - Likelihood – 4
        - Consequence – 4
        - Total = 16

7. Emergency pathway – risk of increase in covid or non-covid demand (1042 – was a trust wide risk)

- The trust runs the risk of running out of bed capacity to safely accommodate non-elective demand due to peaks in COVID demand, and/or non-COVID demand
- Risk – Lack of bed capacity for flow and/or elective care to be maintained

- Category – Bed flow
- Rating –
  - Likelihood – 5
  - Consequence – 4
  - Total = 20

8. Oxygen (1108)

- Risk - There is a risk that the medical management of patients is changed because of the ability to deliver oxygen across the wards. This could include decisions around ceilings of care.
  - The three limitations are:
    1. The total oxygen supply via the VIE (not a significant issue for this trust)
    2. The flow rate to the block (significant issue)
    3. The ward based flow rates (significant issue).
  - Rating –
    - Likelihood – 4
    - Consequence – 4
    - Total = 16

9. Medical and Nursing Staffing across IMRS (1109)

- Risk – 3 main concerns:
  1. Increased areas that require coverage by the medical and nursing team from IMRS due to the increased needs of G&A bed capacity. The same number of staff are covering increased number of areas, which means that there are less staff allocated to each area. There is also disruption to the 'normal' team working model of ward based care by speciality.
     The additional areas include escalation areas such as Defoe and 2012, but also areas that were previously under other divisions (Priestly and Starlight) and also areas that are not normally inpatient areas (e.g. MDU) all of which have been converted into medical inpatient areas due to the recent increase in demand for beds. The increased staffing includes medical consultant cover, medical junior cover and nursing cover.

  2. Increased acuity of patients being admitted (including NIV, which previously was done on ITU and not on the medical wards).

  3. Sickness

There are multiple staff members off from both the medical and nursing workforce due to COVID related sickness or self isolation. There are also staff that are clinically extremely vulnerable and hence are limited to which patient cohorts they can manage. As a result, there are less staff to cover increased areas.

This affects the staff work schedules, intensity and morale, and has the potential to impact on patient care including communication with relatives and also efficiencies of working.

- Category – Staffing and patient care
- Rating –
  - Likelihood – 5
  - Consequence – 4
  - Total = 20

10. ED Functional Capacity (1110)

- Risk –
  - Increased medical inpatients have outstripped the medical inpatient beds. This causes exit block to the Emergency Department and hence patients remain in ED for extended periods of time. This results in ambulances being delayed in off-loading and hence time 'wasted' of ambulance crews when they should be responding to new calls.
  - This is leading to LAS being delayed to respond to Category 2 calls and being completely unable to respond to category 3 calls.
  - LAS have suggested that this has resulted in increased number of patients with cardiac arrests.
  - Category – Bed flow and patient care
  - Rating –
    - Likelihood – 5
    - Consequence – 5
    - Total = 25

E2. Safety Alerts linked to COVID

The Royal College of Emergency Medicine

Royal College of Physicians

Safety Brief December 2020

COVID-19

NEWS2 and oxygen requirement

NEWS2 has a binary score for oxygen supplementation

Physiological parameter	Score 3	2	1	0	1	2	3
Air or oxygen?		Oxygen		Air			

Patients with COVID-19 may have a rapid increase in oxygen requirement, this may not result in any additional increase in NEWS2 score.

- More frequent observations may be required for these patients
- Rapidly increasing oxygen requirement is a **condition specific trigger**
- **Clinical judgement** should guide the **need for escalation**

For more information, see the Royal College of Physicians guidance:

https://www.rcplondon.ac.uk/news/news2-and-deterioration-covid-19

Published Papers:

National Early Warning Scores (NEWS2) and component physiology in COVID-19 positive hospitalised patients in the West of England

https://www.researchsquare.com/article/rs-111849/v1

Validation of home oxygen saturations as a marker of clinical deterioration in patients with suspected COVID-19

https://www.medrxiv.org/content/10.1101/2020.11.06.20225938v1.full.pdf

For Safety Alerts and RCEM issued Safety Flashes see:

www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Safety Flash

July 2020

COVID-19

Communication errors with PPE

Possible problems

- Speech is muffled, exacerbated by ambient noise
- Verbal requests could be misunderstood leading to error
- Telephone communication can be affected
- Non-verbal cues are lost making empathy difficult to convey
- Lip reading is difficult for people with impaired hearing

Suggestions/solutions

- Try to reduce ambient noise when handing over
- Move to a non PPE area for vital phone calls
- Communicate slowly, clearly and with increased volume
- Check what was said and ask for the communication loop to be closed (i.e. to repeat back what has been heard)
- Use small portable white boards to write instructions/advice on
- Consider Silent Simulation OSCE's, Simulation (Adult and Paediatric) scenario's in full PPE as part of educational training in the department
- Use A3 copy of photo of face without mask on

With Thanks to Dr Rajesh Vasiraju, Dr Ffion Davis and Professor Tim Coats

Disclaimer– Professor Coats has not received formal patient feedback on the use of an A3 photo but, would encourage trying and gathering feedback.

References: Reducing medical error during a pandemic and Communication in Emergency Medical Teams

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Clinical Brief

June 2020

COVID-19

CHILDREN & COVID-19

Paediatric multisystem inflammatory syndrome associated with SARS-CoV2

A rare syndrome sharing common features with other paediatric inflammatory conditions: sepsis, Kawasaki disease & toxic shock syndromes.

How to recognize and manage it?

- Consider in children with **fever, inflammation** (including full/partial criteria for Kawasaki disease) and **evidence of organ dysfunction**
- Respiratory failure is **less common**
- **Shock** is the commonest presenting feature
- Shock may be **refractory** to volume resuscitation
- Acute abdominal and **GI symptoms** may be seen
- **Early senior review**; standard APLS resuscitation & empirical antibiotics
- **Early referral to Paediatric Intensive Care** using local pathways

References:

https://www.rcpch.ac.uk/sites/default/files/2020-05/COVID-19-Paediatric-multisystem%20inflammatory%20syndrome-20200501.pdf

https://picsociety.uk/wp-content/uploads/2020/05/PIMS-TS-Critical-Care-Clinical-Guidance-v4.pdf

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Safety Flash

November 2020

COVID-19

PPE fatigue

Don't drop your guard

Our patient's protection is our responsibility

Your own protection is your own responsibility

Know your PPE

Wear your PPE

Hospital acquired infection kills

Communication using PPE:

https://www.rcem.ac.uk/docs/Safety Resources + Guidance/Covid%2019%20Pandemic%20-%20Communication%20Error%20Safety%20Flash%20FINAL.pdf

Buddy System:

https://www.rcem.ac.uk/docs/Safety/Buddy%20System%20v9.pdf

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Safety Flash

April 2020

Buddy System

Pairing with another colleague (Your BUDDY) can improve the safety of you, your buddy and the patient. Your buddy will:

- Assist with the correct order of donning and doffing PPE, ideally using a checklist
- Receive bloods and samples outside the cubicle door
- Pass any equipment to you
- Remind you about regular hand hygiene

"IT TAKES TWO"

PPE Guidance from PHE

https://www.gov.uk/government/publications/covid-19-personal-protective-equipment-use-for-aerosol-generating-procedures

https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/covid-19-personal-protective-equipment-ppe

For other RCEM issued Safety Alerts and Safety Newsflashes see:
www.rcem.ac.uk/safetyalerts

The Royal College of Emergency Medicine

Safety Awareness

April 2020

COVID-19

AIRWAY MANAGEMENT IN COVID PANDEMIC

Airway management and ventilation can generate aerosols, putting staff at risk of exposure.

To minimise the risk:

- Use *FULL PPE* for airway management (Full gown, FFP3 mask, gloves & eye protection) [1]
- Mask ventilation carries the highest risk to rescuer - Use 2 person technique [2]
- To protect the rescuers, priority should be given to inserting a *supraglottic airway (SGA) (better)* or *cuffed endotracheal tube (ETT) (best)*
- Place an *appropriate filter which incorporates viral filtration* between the airway (SGA or ETT) and the ventilation device (self-inflating bag or anaesthetic circuit)
- Not all Heat & Moisture Exchange (HME) filters have **adequate viral filtration efficiency** *but could look similar.* Check product labelling to confirm

See Faculty of Intensive Care Medicine/Intensive Care Society/Association of Anaesthetist/Royal College of Anaesthetists guidelines: https://icmanaesthesiacovid-19.org/covid-19-airway-management-principles

With thanks to Dr Daniel Stephenson, Consultant at Rotherham Foundation Trust

[1] PPE additional considerations

[2] European Resuscitation Council COVID-19 Guidelines

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

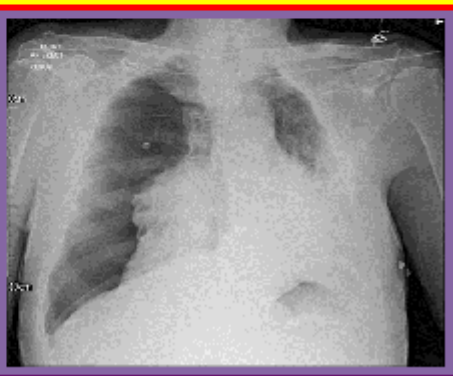
Safety Flash

May 2020

COVID-19

All that glitters…

Things to remember during the COVID pandemic



Case 1: A patient was pre-alerted as a sudden deterioration and hypoxia in a likely COVID patient, and greeted by ITU team in Respiratory ED. Following initial assessment and management, the patient had a CXR revealing an unsuspected tension pneumothorax… COVID swabs were negative.

This is an example of a failed heuristic ('Cognitive Disposition to response, or CDR' [1]), specifically 'Sutton's slip'- going for the obvious and not failure to make additional diagnoses. Protective strategies against CDR bias include metacognition, and forced consideration of alternatives [2].

Do not forget alternative diagnoses during COVID, consider and investigate alternative diagnoses

Case 2: A patient was pre-alerted as a sudden deterioration and hypoxia in a likely COVID patient, and greeted by ED team in Respiratory ED. Following initial assessment and management, it became clear that the patient had delirium and meningism, and antibiotics given. CTPA performed as part of COVID pathway workup revealed an aortitis (as an delayed addendum and incidental finding), and bacterial chest infection. Pneumococcus was identified. COVID swabs were positive.

Patients may have multiple diagnoses, sometimes including COVID

Case 3: An older patient was brought to the ED with severe abdominal pain. They had fallen a few days previously, were self-treating with NSAIDS for back pain, and had decreased mobility. The patient had been reluctant to attend hospital due to concerns about COVID risk. The patient had an abdominal CT with contrast which revealed: perforated duodenal ulcer, a fractured neck of femur, and multiple PEs.

There is increasing evidence that patients are delaying (and avoiding) attendance to ED, including cardiac disease [4], stroke [5] as well as traumatic conditions.

Patients may present late in the clinical course of disease, affecting clinical signs and care needs

1: Croskerry P. Achieving Quality in Clinical Decision Making: Cognitive strategies and Detection of Bias. Acad Emerg Med 2002; 9(11): 1184-1198

2: Croskerry P, Nimmo GR. Better clinical decision making and reducing diagnostic error. J R Coll Physicians Edinb 2011; 41: 155–62

3: Borden N, Linklater D. Hickam's Dictum. Available at: https://emergencymedicinecases.com/hickams-dictum-html

4: Garcia S, Albaghdadi MS, Meraj PM, et al. Reduction in ST-Segment Elevation Cardiac Catheterization Laboratory Activations in the United States during COVID-19 Pandemic. J Am Coll Cardiol. 2020 Apr 10. Epublished DOI:10.1016/j.jacc.2020.04.011

5: European Stroke Organisation Statement. Available at: https://eso-stroke.org/eso/likely-increase-in-the-risk-of-death-or-disability-from-stroke-during-the-covid-19-pandemic/

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Safety Flash

April 2020

COVID-19

Salbutamol, peak flow and nebulisation advice during Covid-19

Peak flow meters and nebulisation

The Public Health England current position is that nebulisation is NOT an aerosol generating procedure. The mist seen around the nebulisation mask is a mist of the nebulised drug solution, considered to be sterile.

- Do not record a peak expiratory flow rate (PEFR) until after salbutamol treatment is completed and **only if** you are considering discharging the patient home. The peak flow meter cannot be used for other patients as it carries a potential infection risk. The use of a peak flow meter is not an aerosol generating procedure.
- Consider the use of MDI and spacer for patients with mild and moderate asthma , nebulisation should ideally be reserved for acute severe and life-threatening asthma and severe exacerbation of COPD.
- Use the minimum flow rate of oxygen to achieve nebulisation, this is normally around 6 litres / min (or as indicated by the mask manufacturer). For COPD patients, where available, use air driven nebulisation.

For the complete supplementary guidance visit:

http://www.rcem.ac.uk/docs/Safety/Supplementary BTS Guidance on Asthma in Adults and Children and COPD in Adults.pdf

http://www.rcem.ac.uk/docs/Safety/NASMeD salbutamol MDI spacer salbutamol guidance Covid.pdf

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Safety Alert

April 2020

COVID-19

People with diabetes (all types) and COVID-19

People with COVID-19 infection appear to have a greater risk of hyperglycaemia and ketosis with or without a known diagnosis of diabetes.

COVID-19 disease precipitates atypical presentations of diabetes emergencies (e.g. mixed DKA and hyperosmolar states).

- Blood glucose should be checked in everyone on admission plus a blood ketone check in those with known diabetes and everyone with a glucose over 12mmol/l
- **When admitting people with diabetes** with suspected or confirmed COVID -19 to hospital, **please STOP metformin and SGLT2 inhibitors (flozins)** and review the safety of continuing other oral hypoglycaemic agents.

This is based on **Concise Advice on Inpatient Diabetes during COVID19 - Front door guidance** from The Association of British Clinical Diabetologists, which can be found using this link: https://bit.ly/CovidDiabetesED

For other Safety Alerts and RCEM issued Safety Newsflashes see:
www.rcem.ac.uk/safetyalerts

The Royal College of Emergency Medicine

Safety Flash

December 2020

COVID-19

Appropriate PPE and Risk Assessment

Results from an RCEM survey revealed ethnic disparities in access to appropriate PPE.

- All staff must have access to appropriate PPE at all times. If you are concerned about the adequacy of PPE call the BMA PPE hotline.
- All doctors should have a risk assessment at their workplace, including those returning to the NHS and existing staff.
- This must take account of COVID-19 hazards and mitigation for them including the use of social distancing and PPE.
- If you are identified as being at high risk, your employer should take steps to mitigate the risk, as far as they are able.

Please find more guidance here:

Government guidance—COVID-19: infection prevention and control
BMA Guidance COVID-19: risk assessment
RCEM Guidance COVID-19

This Safety Flash was produced by RCEM's Equity, Diversity, and Inclusion Committee. With thanks to Dr Kamal Badmus.

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

The Royal College of Emergency Medicine

Royal College of Physicians

Safety Brief

December 2020

COVID-19

NEWS2 and oxygen requirement

NEWS2 has a binary score for oxygen supplementation

Physiological parameter	Score						
	3	2	1	0	1	2	3
Air or oxygen?		Oxygen		Air			

Patients with COVID-19 may have a rapid increase in oxygen requirement, this may not result in any additional increase in NEWS2 score.

- More frequent observations may be required for these patients
- Rapidly increasing oxygen requirement is a **condition specific trigger**
- **Clinical judgement** should guide the **need for escalation**

For more information, see the Royal College of Physicians guidance:
https://www.rcplondon.ac.uk/news/news2-and-deterioration-covid-19

Published Papers:

National Early Warning Scores (NEWS2) and component physiology in COVID-19 positive hospitalised patients in the West of England
https://www.researchsquare.com/article/rs-111849/v1

Validation of home oxygen saturations as a marker of clinical deterioration in patients with suspected COVID-19
https://www.medrxiv.org/content/10.1101/2020.11.06.20225938v1.full.pdf

For Safety Alerts and RCEM issued Safety Flashes see:
www.rcem.ac.uk/SafetyAlerts

F. Appendices

F1. Homerton COVID-19 Treatment Guide

https://docs.google.com/document/d/1_VxuDDmWxFifXDKPsmbPgkLNzyOlSBZFmJNiHo7WZzQ/edit?usp=sharing

F2. The ED COVID-19 SOP

https://docs.google.com/document/d/1MjMFknwzboTea9eAqcnOkPKwtLChY_3GbZMTTvOSw4o/edit?usp=sharing