

From smoke and flames to safety: Evacuating ICU due to fire incident

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and

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The background of the slide is a close-up, high-angle shot of a fire. The flames are bright orange and yellow, with a dense, turbulent texture. The fire appears to be consuming something, with dark, charred material visible at the base of the flames. The overall color palette is dominated by warm tones of orange, red, and yellow, creating a sense of heat and danger.

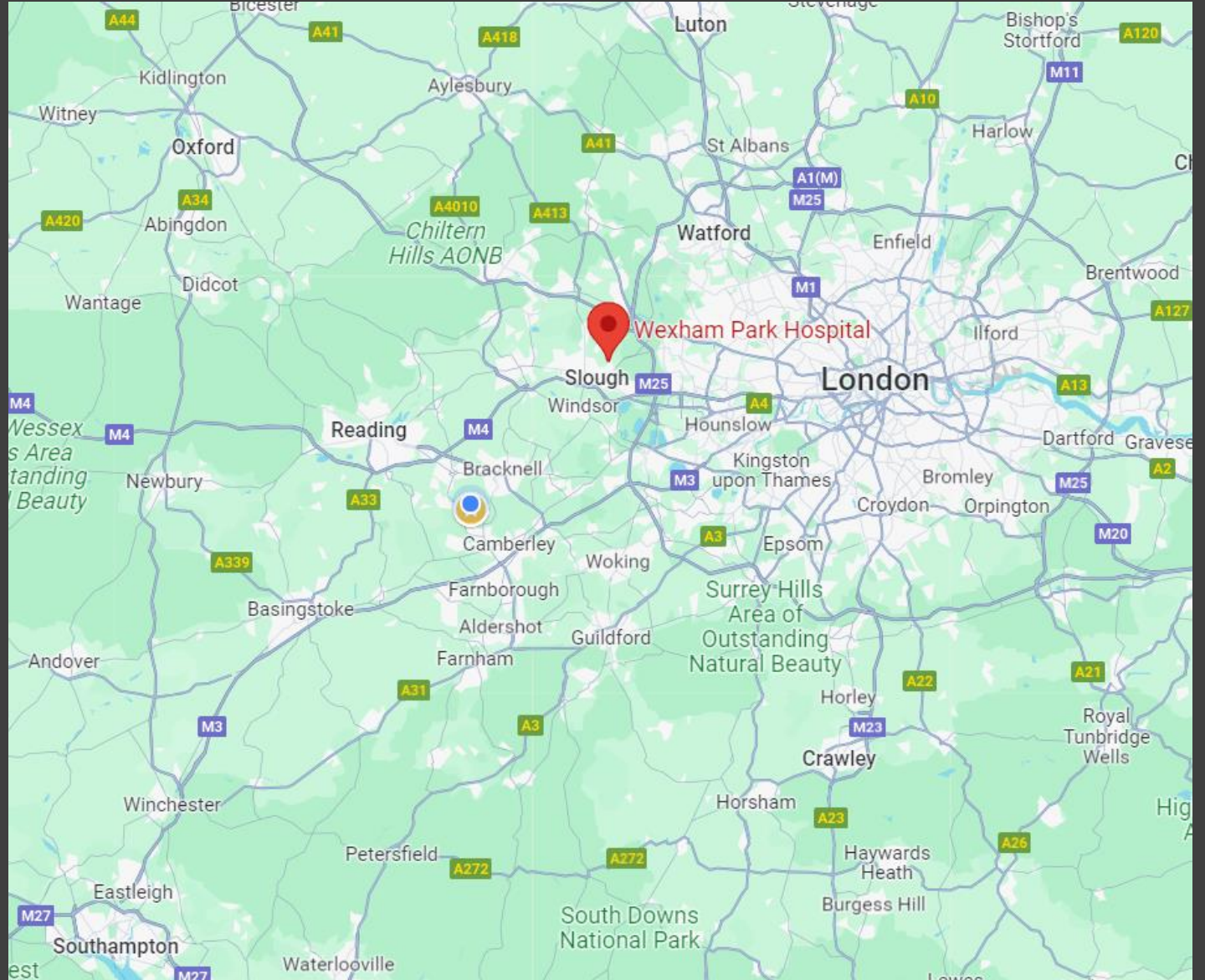
From smoke and flames to safety: Evacuating Intensive Care due to fire incident

Bruna Pitaes

Suman Shrestha

Wexham Park Hospital

NHS **Frimley Health**
NHS Foundation Trust



Wexham Park ICU





Fire evacuates Royal Marsden Hospital

By Natalie Paris

02 January 2008 • 4:31pm



Managing the aftermath of a fire on intensive care caused by an oxygen cylinder

2C07, 3C00

FE Kelly, R Hardy, TM Cook, JP Nolan, T Craft, M Osborn, C Bedor, J Hunt



Figure 1 The remains of the burnt oxygen cylinder. Published with permission from *Anaesthesia*.¹

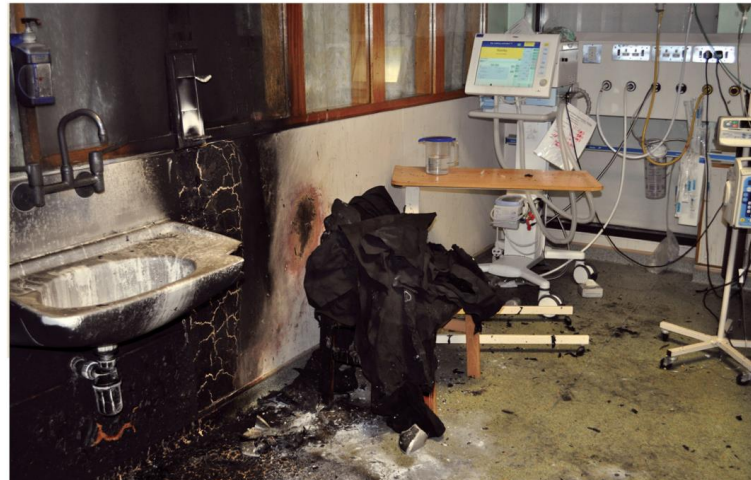


Figure 2 The bedspace where the fire started. Published with permission from *Anaesthesia*.¹



Figure 3 The remains of the bed on which the oxygen cylinder was lying. Published with permission from *Anaesthesia*.¹

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Patients evacuated in beds during fire at Royal Stoke Hospital

7 June 2017



PAUL BRADBURY

Patients were taken outside in their beds while fire crews dealt with the fire

Dozens of hospital patients were "dragged outside in their beds and on mattresses" when a fire broke out near an accident and emergency unit.

[S](#) News | [Stoke-on-Trent News](#) | [Royal Stoke University Hospital](#)

Royal Stoke arsonist jailed for life after starting 'extremely dangerous' hospital fire

Thomas Ashcroft's actions caused £445,000 of damage and meant hundreds of patients had to be evacuated

NEWS By [Phil Corrigan](#)

05:00, 24 FEB 2018

Bookmark



Guidelines

Fire safety and emergency evacuation guidelines for intensive care units and operating theatres: for use in the event of fire, flood, power cut, oxygen supply failure, noxious gas, structural collapse or other critical incidents



May 2021
Date of review: 2024

Preparation, planning and training

During a fire or life-threatening emergency

Following an emergency evacuation



GUIDELINES FOR THE PROVISION OF INTENSIVE CARE SERVICES

Version 2.1
July 2022

6.1 Fire and Evacuation

Authors: Fiona Kelly, Rowan Hardy, Jeremy Cordingley & Claire Hughes

INTRODUCTION

At least three fires have occurred in UK Critical Care Units in the past 10 years, all of which required a full-scale emergency evacuation of patients, staff and relatives¹². In Bath, a fire was caused by an oxygen cylinder which ignited as it was turned on; a fire in the Royal Marsden Hospital was caused by an electrical fault in the roof above the unit; a fire at the Royal Stoke University Hospital (RSUH) was caused by arson, originating in a corridor adjacent to the unit. Flood and power failure are other crises which may necessitate an emergency critical care unit evacuation.

STANDARDS

- All units must have well marked fire call points, fire extinguishers and oxygen shut-off valves^{14,14,17}
- Each unit must have a specific fire evacuation policy in place^{23,14,17} which takes account of:
 - the layout of the building, including any need to negotiate stairs during an evacuation
 - the provision of ventilatory support, intravenous therapies, and invasive monitoring for patients during such an evacuation^{14,17}
 - the fact that critical care staff may themselves be affected by a fire and therefore be unfit to continue working^{14,17}

Action cards summarising the evacuation procedure should be displayed within the unit, ideally next to fire call points,¹⁷ so that they can be referred to in an emergency.
- Recommendations for the safe use of oxygen cylinders must be adhered to at all times and include:
 - the safe use of oxygen cylinder bed brackets
 - the safe storage of oxygen cylinders, including storing oxygen cylinders turned off at both the valve and the flowmeter
 - following the recommended sequence of events when turning on an oxygen cylinder:
 - first connect the oxygen tubing and mask to the oxygen cylinder outlet
 - then turn on the oxygen cylinder and select the flow
 - finally attach the oxygen to the patient.^{14,17}
- Units must comply with current Department of Health regulations regarding the fire-retardant nature of mattresses, bedding, flooring and curtains.¹⁷
- New units must be designed using Department of Health guidance and in conjunction with the Trust fire safety officer, with consideration given to the provision of:
 - multiple exit routes
 - all pass, sit sheets or other evacuation aids for all bed spaces which are readily available
 - adopting small bays rather than open areas
 - splitting ICU departments into separate clinical and non-clinical areas.^{23,17}
- Units must have a major incident plan in place which allows for the transfer in of multiple critical care patients from a neighbouring hospital's critical care unit should it need to carry out an emergency evacuation.^{14,17}
 - the location of fire call points within their own unit and how to operate them
 - the location of fire extinguishers within their unit and which type to use in the event of a fire. **Selected staff should be trained to use and safely select fire extinguishers.** Medical and senior nursing staff must also know the location of the medical gas pipeline shut-off valves in their unit, how to operate them and the implications of doing so.^{14,17}
- All intensive care staff must be given basic training regarding the safe use of oxygen cylinders.^{14,14,17}

- Local unit evacuation policies must be drawn up, with consideration for:
 - other locations within the hospital where critical care might be provided on a temporary basis
 - provision of equipment and drugs
 - evacuation case at each bed space
 - triage of patients (the least unwell patients being evacuated first, and the most unwell patients last)
 - possible co-existing power and/or equipment battery failure
 - use of transport ventilators and hand ventilation if needed
 - temporary discontinuation of renal replacement therapy
 - transfer of hospital notes especially if electronic patient monitoring is in use.^{14,17}

In a major fire, it is possible that serial evacuations will be required with a staged move to the outside,¹⁷ and that the whole hospital may need to be evacuated.¹⁷

RECOMMENDATIONS

- Evacuation policies should include liaison with the Bronze (Operational), Silver (Tactical) and Gold (Strategic) commanders in conjunction with the senior fire officer on scene.¹⁷ Timing of evacuation is crucial: if evacuation occurs too early, then patients may be harmed by a transfer; if evacuation occurs too late, then patients and staff may be harmed by fire and smoke.¹⁷
- Local fire evacuation policies should be tested regularly, ideally as part of a simulation scenario.^{14,17} Evacuation at night should also be practised.¹⁷
- Ventilation of ICUs and clinical areas where high-flow nasal oxygen, face mask continuous positive airway pressure and non-invasive ventilation are in use should be 10 air changes per hour to prevent oxygen enrichment of the ambient atmosphere.¹⁹
- ICU and operating theatre fire alarms should be audible throughout the department unless a specific decision is made by clinicians to turn the sound feature off in that area. A computerised fire alarm handler system should be installed in hospital switchboards to make it quicker and easier to liaise with the fire and rescue services.¹⁷
- Modern sprinklers or water mist systems in intensive care units should be considered in conjunction with the overall package of fire safety precautions for the hospital's fire safety strategy.¹⁷
- Units should have a system whereby staff involved in a traumatic incident, such as a fire in the critical care unit, receive debriefing and are followed up for signs of a trauma stress reaction or post-traumatic stress disorder (PTSD).^{17,19} The Trauma Resilience Management (TRM) system is a screening tool used in the military and more recently used successfully in healthcare which could be considered.¹⁹
- Critical care networks should develop systems to support planning for, and management of, a major incident in one critical care unit within the network, so that other units can cooperate to accommodate all critically ill patients in this type of situation. A retrieval team approach, with staff from neighbouring units travelling to the affected unit to transfer patients, should be planned. Liaison with neighbouring units and local ambulance services at an early stage is advised.^{14,17}

BACKGROUND

A fire occurred on the ICU at the Royal United Hospital Bath one early evening in 2011. It was caused by an oxygen cylinder which caught fire as it was turned on while it was lying on a patient's bed.^{14,15} The fire immediately spread to the mattress, the bed, and the patient herself, rapidly followed by the curtains around her bed, the flooring and ceiling tiles. The unit was filled with thick, black, acrid smoke within seconds, reducing visibility to less than one metre and making breathing extremely difficult for both patients and staff. The patient on the burning bed was pulled to safety, 10 patients were evacuated within seven minutes, and a twelfth patient (ventilated in a side room and not immediately affected) 10 minutes later. The fire was put out by two doctors using five fire extinguishers. The patient on the bed suffered burns to her lower legs, but no other patient was harmed; two members of staff suffered smoke inhalational injury requiring hospital admission.^{14,15} Twenty-five consultant anaesthetists arrived within 30 minutes to help deal with the aftermath, transfer five patients to neighbouring units and set up a temporary overnight HDU in the Post Anaesthesia Care Unit (PACU) for the remaining seven patients. The oxygen

cylinder was almost completely destroyed in the fire, which hampered subsequent investigations, but it is thought that the fire started within the oxygen cylinder valve.¹⁶

In 2008, a fire in the roof of the Royal Marsden Hospital spread rapidly, resulting in destruction of the ICU and a complete evacuation of the building within 28 minutes.² At that time, there were six patients in the unit and three patients in the operating theatres. All ventilated patients were transferred to the critical care unit of the neighbouring Royal Brompton Hospital. No patients or staff were injured. The unlikely need for complete evacuation of the building had not been included in the major incident plan, and the timing (2nd January at 1pm) was fortunate in that both hospitals had relatively low occupancy as their workload is mainly elective.²

In 2017, a fire was deliberately started at 5.30pm in a shared corridor between theatres and the ICU at the Royal Stoke University Hospital. Although the fire was dealt with promptly, smoke permeated into the unit resulting in poor visibility and an acrid odour. A mass evacuation of 24 critical care patients ensued, with patients transferred into the PACU and theatre suites sited elsewhere in the hospital building. The consultant and nurse in charge coordinated and enacted the Major Incident Protocol. No patients or staff came to harm.

Following these incidents, several lessons were learned. These included:

- The need to prepare for such an incident, including a possible 'internal major incident' where intensive care staff are themselves victims and so are unfit to work.^{24,17}
- The importance of regular staff training in fire safety and oxygen cylinder use.^{23,14,17}
- The role of regional critical care networks in such unusual situations even when this is not normal practice and regional hazard response teams (who may be able to provide additional equipment).¹⁷
- The value of debriefs, clinical psychologist input and a staff follow-up system to ensure that staff members who do suffer a trauma stress reaction receive appropriate care.¹⁹

REFERENCES

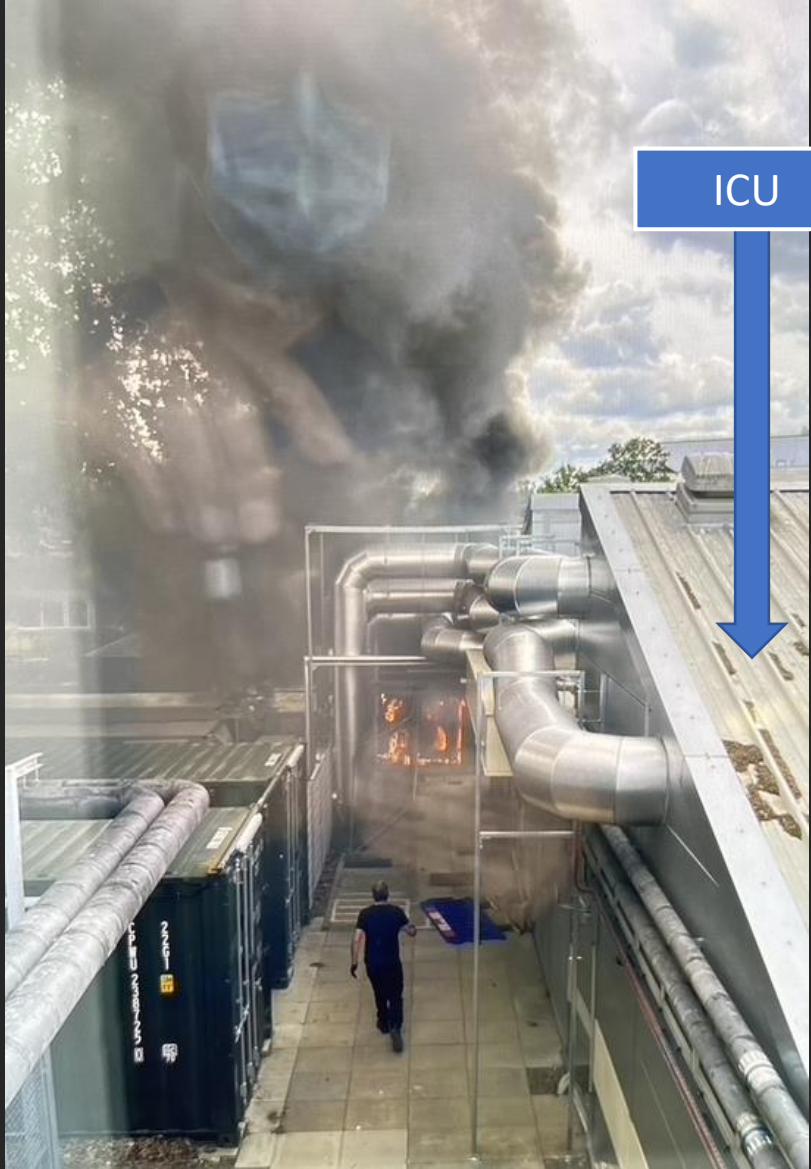
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26th June 2023

13:40

Fire started

The point of ignition being very close to a well-used, and hidden staff smoking spot. This location is a little, tucked away footpath, out of sight from prying eyes.



ICU



26th June 2023

13:40

Fire started



13:53

The fire safety team first became aware of the fire after receiving a bleep from the WPH switchboard

13:57

Switchboard contacted the emergency services on 999




14:05

ICU was evacuated to Theatres/PACU/Day surgery

14:06

The fire and rescue service arrived





“From the initial investigations conducted by both the Trust fire safety team and the operational officers of the fire and rescue service that attended the incident, **it would appear that a fire started due to the careless disregard of smoking material.**”





The fire started in, or close to an external cupboard constructed from fibreglass. The cupboard contained the town mains gas meters for supplies and services in that area.

The gas supplies isolated by the Trust's Estates teams, and the scene was made safe.

The isolation of the mains gas had a significant impact upon the delivery of operational services at WPH for a number of hours.

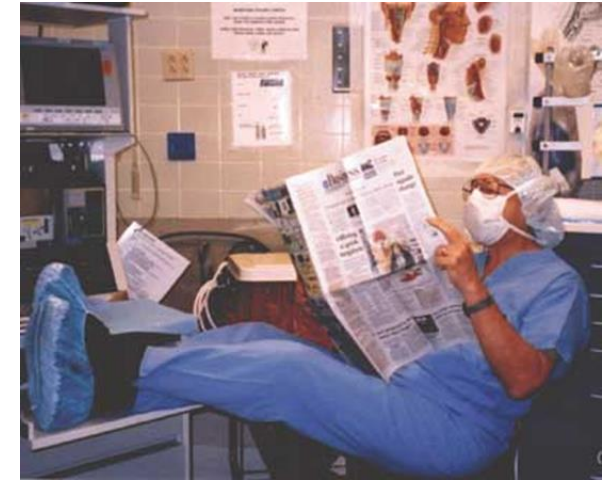


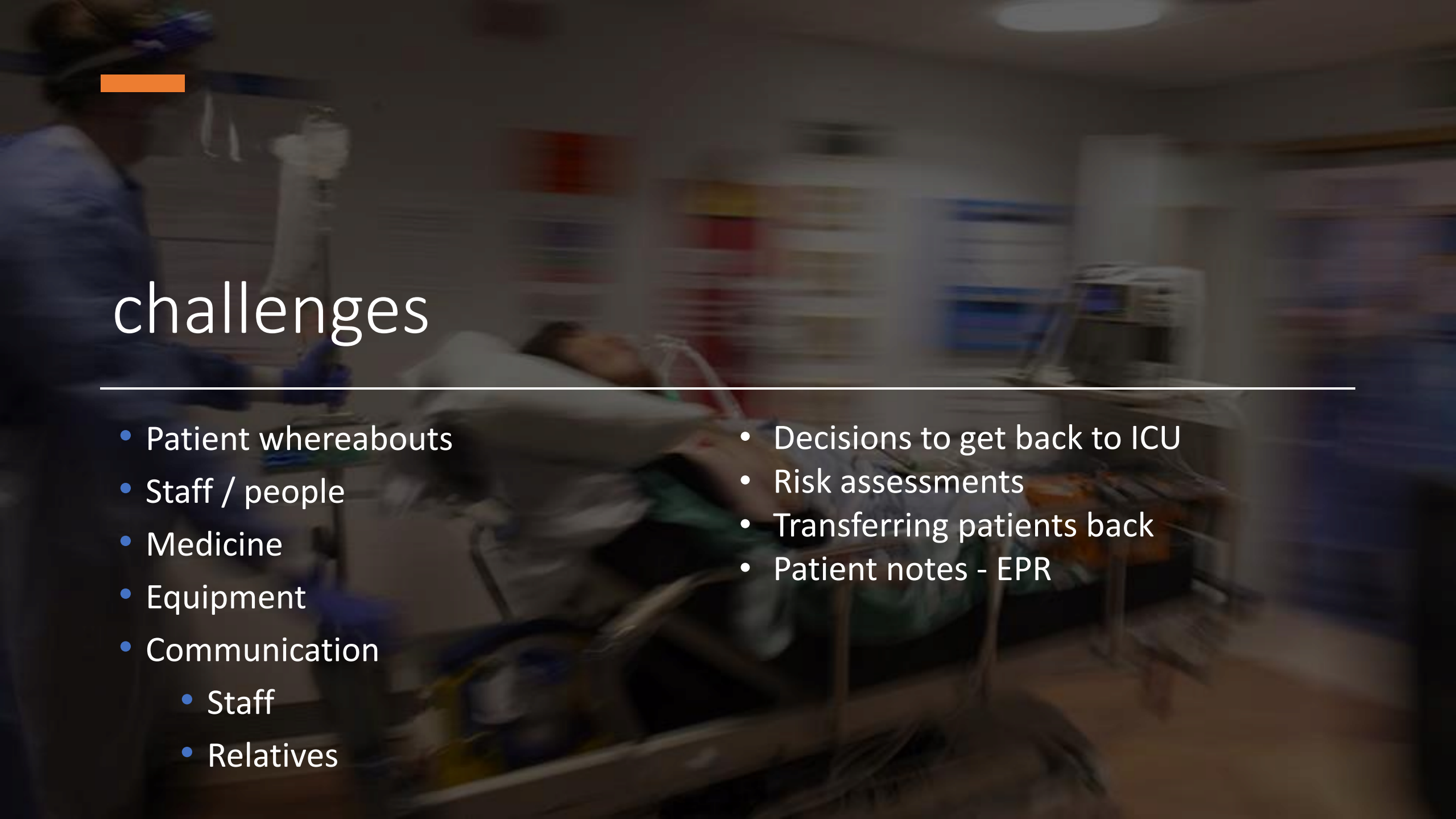
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Evacuating critical care: the challenges....

Blessing...





challenges

- Patient whereabouts
- Staff / people
- Medicine
- Equipment
- Communication
 - Staff
 - Relatives
- Decisions to get back to ICU
- Risk assessments
- Transferring patients back
- Patient notes - EPR

Team debrief



Name board on each ICU bed space

- removable and goes along with the patient on evacuation.
- The back of this could have the ICU Bedside nurse action plan.

Command point

- a location/office in Theatres as a command centre where ICU Consultant/ICU NIC/ICU Senior nurse will be based and found during the incident.

Mobile White board

- stays at the command centre/office/point
- where we can write patients name and location etc. and that. This should have the name of the patient, Level of care and who is looking after them etc.

Evacuation Box:

- Key infusions such as vasopressors, sedation, fluids, and cardiac arrest drugs.
- Have a box which can see us through few hours.

Family liaison: This could be ICU ward clerk's role but can be nominated to appropriate staff/helper by NIC or senior nurse during out of hours.

Communication strategy:

We need to consider how we communicate with staff scattered around the location?

Would it be appropriate to use a group WhatsApp?

Can we use EPIC chat function, but this may be down.

How others particularly patient's relatives communicate with us? Action card for family liaison person to divert calls to the command centre.

Roll call: On reflection, we did not do this but can be incorporated ICU Nurse in charge action card. We may need to consider alternative for an on-duty book. Should all professions have something like the doctors CLWrota which tells us who are on shift on an app.

Training and education

Action cards:

ICU Doctor in charge

ICU Nurse in charge

ICU Senior nurse

ICU Doctor

ICU Nurse

ICU Care Assistant

ICU Ward clerk

ICU Runner

ICU Pharmacist

ICU Physiotherapist

Action cards and fire plan including key contact details etc. into

Frimley Health Guidelines app

so it is easily accessible during the incident as trying to find a fire folder may not always be practical.

Oxygen shut
off valves
(area valve
service units)





NHS
Frimley Health
NHS Foundation Trust

FIRE SAFETY INFORMATION MANUAL

CONTENTS

Section	CONTENTS
1	Policy on Fire Safety document.
2	Site Specific Procedures (Fire Incident Procedure WPH/FPH).
3	Arson Guidance Note.
4	Guidance for management of Fire Precautions.
5	Guidance note Working with Oxygen.
6	Guidance note Textiles & Furniture.
7	D.S.E.A.R. log
8	Location Emergency Action Plan.
9	Fire Safety Logbook.
10	Workplace Fire Risk Assessment.

The Regulatory Reform (Fire Safety) Order 2005 places a legal responsibility on the employer to ensure that fire safety management is to a good standard. The requirements of this Order states that the employer must inform all personnel of their fire safety duties, have plans in place to effectively manage fire safety and maintain appropriate records pertaining to fire safety.

This folder will assist the Trust in complying with the Fire Safety Order. It is the responsibility of the Department Manager to ensure that the folder is correctly maintained and kept on the premises for inspection by relevant persons.

RISK ASSESSMENT

Item	RARE (A)	UNLIKELY (B)	POSSIBLE (C)	LIKELY (D)	ALMOST CERTAIN (E)
Severity	MEDIUM	MEDIUM	HIGH	HIGH	HIGH
CRITICAL (5)	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM

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