Coronavirus Paediatric Simulation
4/3/20

Scenario

- 7 year old boy
- Walk in patient to CED triage with history of cough, wheeze and increased work of breathing
- Recent arrival back from skiing holiday to Northern Italy
- Initially very wheezy with increased work of breathing and mild hypoxia
- Managed with nebulised bronchodilators and supplemental oxygen
- Transferred to C5 isolation ward for ongoing medical care
- Once on C5, clinical state deteriorates with increased work of breathing and wheeze not responding to bronchodilators (including iv therapy)
- Escalation to PICU team with decision to intubate on C5 and for transfer to GICU isolation bed

Summary

This simulation scenario has highlighted a number of challenges and learning points which will need to be addressed to manage an acutely unwell paediatric patient with COVID-19 in UHS. These challenges broadly relate to the correct use of PPE during the assessment and management of the child, implementing and maintaining isolation procedures during transfer between clinical areas and the availability of the correct paediatric equipment in a non-paediatric ward environment. Other areas related to the effect of PPE on communication and practical procedures during an emergency event should also be considered.

The simulation highlighted potential for harm relating to the shortage of PPE supplies. In addition the need to prepare clinical areas prior to the arrival of a patient was highlighted as a challenge. The opportunity to remove as much non-essential equipment and prepare a designated donning and doffing area is paramount and needs to be considered prior to transferring a patient for further assessment..
The need to consider specific Resus Room issues such as the ventilation system is an important consideration as well.

We intend to run this scenario again once the action plan below is completed to assess the impact of the changes and the experience gained in managing this case.

Dr C Chase (PEM Consultant) and
Dr J Edelman (Paediatric Consultant)

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OBSERVATIONS	
Triage	● Patients with recent travel to Category 1 or 2 regions could present to ED without prior warning from family or 111/PHE ● If a patient is seen in triage and felt to be at risk of being a Coronavirus contact, they should be moved immediately to either C5 (if well) or resus (if felt to be unwell needing immediate review and management) ○ For move to resus, 'Code Blue' (high acuity) or 'Code Orange' (Infection requirements) should be announced via tannoy prior to move ○ The patient, accompanying family and triage nurse should all wear masks for transfer ● Time should be allowed to remove non-essential equipment from the bays in resus prior to the arrival of the patient ● Time should be allowed to clear any necessary patients from resus prior to arrival of the patient in resus if practicable ● Specific consideration is needed for the ventilation system in resus - prior to the arrival of the patient this must be switched off
Resus	● Once patient in resus, full PPE precautions should be put into effect ● Bay 1 or Bay 6 will be allocated to 'Code Orange' patients and the adjoining bay cleared to provide a 'clean' zone ● If patient stable, aim to clear any non-essential equipment from resus prior to contamination with patient ● clearly allocating leadership of the 'Hot' (dirty) team and the 'Cold' (clean) team is essential for division and completion of tasks ● Once stabilised, patient should be moved to C5
Transfer	● Site team will facilitate transfer by providing security team to clear public from corridor areas - excellent management of members of the public by site co-ordinator and security team ● Transfer route to C5 will be from ED to east wing lift block, up to D floor, along D floor corridor to west wing lift block, down to C floor and along to C5 ● During transfer, staff members in PPE should stay within 2 metre radius of patient trolley
C5 Generic	● On arrival to C5, patient admitted to isolation cubicle ○ If stable, medical handover to senior paediatric doctor and inform paediatric professional bleep holder of need for allocated paediatric nurse (from pre-established rota) ○ Once handover has been completed and paediatric nurse present on C5, ED staff to return to department ○ Importance of remembering to take samples for Coronavirus on arrival to allow maximum time for results to be available
C5 Isolation	● Initial recognition that acute monitoring confined to saturation probe readout which may be insufficient for deteriorating patient ● Team in room during deterioration (nurse and paediatric outreach) highlighted challenges of communication with team outside room. This delayed the arrival of equipment and medications. ● Recognition that equipment entering isolation (Airvo machine) will confine it to the room until deep cleaning can occur - risk of build up of equipment in room during admission which would reduce available space. ● When an emergency situation is declared, discussion around decision on who to call for help - Difficult to accommodate full resus team in room and maintain isolation. Decision for direct referral to PICU for help. ● Preparing for intubation and emergency management requires: ○ Senior clinical staff member (ideally PICU consultant/registrar) inside isolation room to coordinate clinical care

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	○ Paediatric consultant/registrar outside room to co-ordinate equipment and onward care to GICU (usually via 2nd PICU consultant in hours or GICU consultant out of hours) ● When preparing for intubation in C5, the team inside the room felt that equipment and medications took a long time to arrive. This was exacerbated by the difficulty of receiving updates on progress from the team outside of the room - communication with anteroom staff would help with this. ● Recognition of the importance of mini team brief during intubation in an unfamiliar setting - helped by the availability of an intubation check list. ● It was acknowledged that Intubation may be made difficult while wearing full PPE, but in this scenario, intubation by an experienced practitioner was felt to be manageable.

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LEARNING POINTS		
Resus	Definition of 'contact' with Code Orange patient	• Contact for 15 minutes or longer within 2 metres of patient
Resus	Air is recirculated throughout Resus bays.	• In the event of managing a patient with suspected Coronavirus, this air circulation should be switched off using the control panel by the Resus gas machine
Resus	'Code Orange' protocol should include removal of all unnecessary equipment to prevent possible contamination	• Aim to allow time to remove equipment from Resus bay before admitting patient if time allows
Resus	Application of PPE for any patient deemed as a suspected Coronavirus contact	• Code Orange box available in resus (new side) with 4 complete sets of PPE • Instructions for donning and doffing of PPE and ED protocol for managing Code Orange patients are available in Code Orange box
Resus	Once in resus, two senior clinical staff should take on the two lead roles for:	• Clinical assessment and active treatment • Management of external services (arranging bed on C5/PICU, informing Site Manager of patient and arranging security escort to destination ward) • Contact Control (preventing accidental contamination in 'hot zone' where PPE required) • Team Streamlining (minimising unnecessary staff from resus area to reduce risk of contamination)
Resus	Site team and security will facilitate movement of patient from ED - this should <u>not</u> be attempted by clinical staff alone	• Site Office • Security • C5 • PICU
Resus and C5	Protocol for blood gas analysis	• Contaminated blood samples cannot be taken to other clinical areas to process blood gas • Protocol developed by Infection Disease team for iSTAT machine (portable blood gas machine) to be brought from PICU to be used on C5 or ED • Blood gas to be taken from patient and placed in anteroom/clean area, iSTAT cartridges to be filled in isolation area and handed to non-PPE staff outside of room to be run in iSTAT.
Resus	Replacement of PPE in Resus once patient moved	• Due to potential for multiple patients with suspected COVID-19, 'Code Orange' PPE box in Resus should be restocked as soon as possible after transfer of patient
Transfer	Allocated non-PPE staff member should accompany transfer to carry grab bag and any other equipment to prevent unnecessary contamination of equipment	• Transfer checklists should be completed prior to transfer • Non-PPE staff member should place grab bag in lift to allow it to be available during lift journey and then remove it from lift on arrival. Non-PPE staff should not accompany patient in lift due to close proximity and contamination risk
C5	In C5 isolation rooms, communication between PPE and on-PPE staff is challenging	• Placing an staff member in full PPE in the anteroom allows for both teams to have direct communication with one person and preserves isolation procedures

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C5	Identification of team members in full PPE is difficult. This can impact team dynamics during acute management of the patient.	• Pens to be provided to write names and roles on face shields prior to donning.
C5	Monitoring in C5 cubicles only provided by saturation monitor readout	• In deteriorating patient, extra cardiac monitoring would be required from ward (transfer monitor, if available)
C5	Communication between inside and outside of isolation rooms is difficult	• Option for additional staff member in full PPE to be located in anteroom to allow full face to face communication with each team while maintaining isolation of patient
C5	Management of a patient requiring respiratory support (Airvo/CPAP/BiPAP)	• Advice from WHO (https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf) indicates that the use of NIV support should be associated with a low risk of airborne dispersion and is therefore safe to use. This report also notes that COVID-19 may cause rapid deterioration in respiratory function and therefore use of NIV should not delay progression to invasive ventilation if required. • Paediatric Critical Care Society Guidelines on Management of COVID-19 (https://picsociety.uk/wp-content/uploads/2020/02/PICS-Covid-19-guidance-27Feb2020-v2.0.pdf) contradicts this statement and states that "Aerosolisation of infected secretions may be higher with high flow nasal cannula therapy or non-invasive ventilation. Therefore, early intubation may be recommended". • It is therefore recommended that if children with suspected COVID-19 require additional respiratory support, this should be discussed on a case-by-case basis with the paediatric consultant/registrar on-call and the PICU consultant/registrar on-call.
C5	Difficulty of full resus team reaching patient in C5 cubicle with full PPE in an emergency situation	• Agreement that in full resuscitation, staff members to enter cubicle in minimal PPE to perform resuscitation and for staff to don PPE as soon as clinically safe to do so (Statement from Resus Council - https://www.resus.org.uk/media/statements/resuscitation-council-uk-statements-on-covid-19-coronavirus-cpr-and-resuscitation/covid-healthcare/)
C5	Communication and organisation outside cubicle needs clear leadership	• Non-PPE clinical leader to be Paediatric Consultant/Paediatric Registrar or Senior Paediatric nurse • Make clear lists of all equipment, drugs and personnel needed in cubicle and check these off as they are passed into isolation area
General	A child being managed under 'Code Orange' protocol will be very frightening	• Consideration needs to be given to making the process less scary for children
General	Debriefing for staff involved in managing emergency cases of suspected COVID-19	• Due to unfamiliarity of these situations, a short debrief should be offered to staff members in ED, Paediatrics, C5 and PICU following acute deteriorations to determine any learning and action points

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ACTION PLAN			
	Question/Task	Current plan	Action
	When delivering oxygen to patients with PPE facemasks in situ – can the oxygen be delivered through the PPE mask?	Check plan with PICU	James E
	Contact numbers for essential teams/wards need to be displayed in Resus to facilitate movement of patients	Display contact numbers above phone in both sides of resus ● Paed SpR/Consultant ● Site co-ordinator ● Security ● C5 ● Paed outreach ● PICU contact (direct) ● PICU technician (for istat)	Clarissa C
	New Code to alert ED staff to potential COVID-19 case	Suggestion that for COVID-19 cases alternative 'Code Orange' call placed over tannoy	Clarissa C
	PPE donning and doffing procedures need to be easily accessible in Resus	Display donning and doffing posters Resus bays 2 and 5 to allow 'clean' area for PPE application and removal	Clarissa C
	What is the best route for transfer of a patient from ED to C5? Will site team be fully responsible for co-ordinating security and C5 admission?	Much discussion with Site team and security. Suggestions to be considered: ● Route via D floor corridor ● Route via C floor with public isolated in shops/cafe ● Route via C floor with fire evacuation protocol initiated to clear route	Nikki Harris to liaise with Site and Security
	If patient transferred via lifts, do any decontamination procedures need to happen in the lifts?	Potential for contamination of lifts by accidental contact from patient trolley or staff in PPE	Julian Sutton to investigate with infection prevention
	Respiratory drug pack	Grab pack containing respiratory treatment medications – Salbutamol nebs, Atrovent nebs, Magnesium sulphate vial, SORT acute asthma guideline	) fnxl Y¥¥Yxlfd ¨m¥z©lm ¢mY¥wYb±
	Issue with finding cannulation equipment for children	Packs already created by J Bull and J Thistlethwaite (age specific)	Mmf¦f Y¥f xz¯ ¦n¨©Y¨fdnx *Ą6S ¨¥zwf±
	Limited available surface space for preparation of drugs and intubation equipment	Source silver trolleys for C5 cubicles - aim for enough to allow one inside and one outside rooms	Axf ¦nv®f¥ ¨¥zwf± xz¯ Y®YnvYavf ¯n¨m ¢Yfdn Y¨¥nb l¥Ya aYl¦
	PICU tech team require list of equipment which would be needed in the event of a C5 intubation	Kit list to include: ● HMEs for non-closed circuit ventilator ● iSTAT gas machine ● etCO2 tubing	Vanessa S/Dave (PICU Tech)
	Clinical intubation kit list required in grab bag for ease	Should include: ● Intubation check list ● Resus drugs (Ketamine, Rocuronium, Adrenaline) ● Resus fluid with spike and 2 x 50ml syringes	4fxf¥nb !n¥¯Y± un¨ Yxd Ylf ¦¢fbnknb Yn¥¯Y± un¨n¦ Yw Y®YnvYavf nx HYfdnY¨¥nb 4¥ffx l¥Ya aYl nx *Ą

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		• Generic airway kit (NGT, 50ml syringe, 5ml syringe for cuff, ETT tape, Yankeur sucker) • Age specific airway kit to be available from stock in PICU transport bag - size specific mask, ETT (size plus 1 lower), guedel, ayres T piece, closed suction for ETT	HYfdnY¨¥nb Kf¦©¦ d¥©l¦ ¯nw af a¥z©lm¨ ¯n¨m H6*N ¥f¨¥nf®Yv ¨fYw ¯n¨m ¨mf H6*N l¥Ya aYl
	Intubation check list needs to be available in isolation rooms	Acknowledgment that intubation in isolation rooms with full PPE is more challenging.	*zw¢vf¨fd
	SORT calculator unable to be loaded on C5 computer	Options: 1. Finding out why SORT calculator does not load 2. Printing age based calculators to store in C5	LAKM d¥©l bYvb©vY¨z¥ ¯nw ¯z¥u zx az¨m *Ą bzw¢©¨f¥¦Ë a©¨ zxv± ¯mfx ©¦nxl 6x¨f¥xf¨ .°¢vz¥f¥ a¥z¯¦f¥
	Difficulty in identification of team members when in full PPE - This may impact on teamworking during stressful situations	Sharpie pens to be provided to C5 to enable staff to write names and roles on face shields prior to donning PPE	James E
	Intubation may be more challenging while wearing full PPE	Intubating staff to practice using PPE facemasks and shields during intubation	Vanessa S/PICU team
	Awareness of how frightening children will find the process of being managed by clinical team in full PPE	Co-ordinate play team support for children managed as inpatients in C5	Joyce S

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