

Commentary

ACPRC statement and considerations for the teaching of airway clearance techniques in higher education institutions during the COVID-19 pandemic

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In March 2020 the World Health Organisation (WHO) declared the outbreak and spread of SARS-CoV-2 (COVID-19), a pandemic ‘that would touch every sector’ (WHO 2020a). At this point, 77 countries around the world had reported cases of COVID-19 (WHO 2020b), with 419 cases in the United Kingdom (UK) (Department of Health and Social Care (DHSC) 2020a). In response to the pandemic, Matt Hancock, Secretary of State for Health, told the House of Commons on 16th March 2020 that ‘unnecessary social contact’ should be avoided, with the UK government announcing strict measures including a full national lockdown from 23rd March 2020 (DHSC 2020b). These measures included immediate closure of non-essential industries, while higher education institutions (HEIs) rapidly reorganised their curriculum to deliver virtual/online teaching with significant associated implications for clinical placements. Such changes were guided by Health Education England (HEE 2020) and the Council of Deans for Health, but were not uniform across the UK, with individual HEIs creating their own action plans for the remainder of the 2019–20 academic year. The Chartered Society of Physiotherapists produced guidance for HEIs, which were broader than the remit of the current commentary.

Physiotherapy teaching teams had to find new ways to deliver academic content and assess students who were now at home, whilst still preparing them for clinical placements. By the Summer of 2020, it became evident that

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the 2020–21 academic year would need to be adjusted to reflect the ongoing challenges brought about by the pandemic. These adjustments included a marked reduction in face-to-face teaching, considerations for physical distancing and the balance between preparing students for clinical placements whilst also acknowledging the more limited scope for in-house practical sessions.

A survey was sent to academics in respiratory care to better understand the different approaches being taken by HEIs. Thirty-one responses were received, representing nearly all regions of the UK. Responders suggested that all universities were aiming to offer some face-to-face teaching, often with a blended approach involving both face-to-face and online sessions. Of the responders, 18 (58%) indicated asynchronous teaching was taking place, front loading theory with the practical application being delayed and (hopefully) taught later in the academic year. Higher risk techniques such as pulmonary function testing, positive pressure devices, respiratory adjuncts (for example, Intermittent Positive Pressure Breathing and mechanical insufflation/exsufflation (MI-E)) and expiratory manoeuvres were reported to be taught online only by 19 (61%), 18 (58%), 14 (45%), and 19 (61%) respectively. In comparison, these higher risk techniques were being taught using a combination of face to face and online by 3 (10%) for pulmonary function tests, 8 (26%) for positive pressure devices, 9 (29%) for respiratory adjuncts and 7 (23%) for teaching expiratory manoeuvres.

Students in many HEIs ($n = 29$, 93%) were taught in allocated 'pods' and personal protective equipment (PPE) was widely used for practical sessions. 29 (93%) of HEIs were equipped with surgical masks and 25 (82%) provided goggles/visors for teaching. Eight (26%) of HEIs were utilising FFP2 or 3 masks, with similar numbers taking students' temperatures ($n = 9$, 29%). Six (20%) HEIs were requiring regular COVID-19 tests for asymptomatic students and staff. It was suggested by 14 (45%) HEIs that students may feel more apprehensive about performing airway clearance techniques (ACTs) and aerosol generating procedures (AGPs), knowing the increased risk that such applications could carry. Conversely, 25 (81%) of responders felt that the pandemic could offer students the opportunity to develop their clinical reasoning and problem-solving skills.

Responders described a wide variety of adaptations they had made to deliver respiratory modules, including using already available videos on YouTube ($n = 27$, 87%), self-made videos ($n = 22$, 71%) and 'practorials' ($n = 19$, 61%) – a combination of theory with use of videos to support practical delivery, and adaptations such as practicing skills on mannequins ($n = 16$, 51%).

Where face-to-face teaching was undertaken, teaching teams were tasked with preparing risk assessments to enable recognition of the importance of continued face-to-face teaching for essential practical skills with healthcare students, and to reflect government guidance on the remobilisation of services (Public Health England (PHE) 2020). This PHE guidance, along with further NHS guidance on infection control and the appropriate use of

PPE (NHS 2020) was useful in identifying safe systems of work but raised further questions in relation to the safe teaching of respiratory physiotherapy. Questions were being asked by physiotherapists in clinical practice globally around which respiratory physiotherapy techniques could be considered AGPs, and therefore what level of PPE was indicated (Thomas et al. 2020). These questions were being reflected by respiratory physiotherapy academics and how they could, or should, teach ACTs safely. The ACPRC received an unprecedented number of requests from across the UK, and further afield, for further guidance on how to teach ACTs whilst following local and national infection control guidance in relation to COVID-19 and the risk of virus transmission.

A webinar was held in June 2020 by the ACPRC, to discuss the teaching of respiratory physiotherapy within the constraints placed upon HEIs by the pandemic, and to consider ways forward in the 2020–21 academic year. Discussion topics included the use of PPE in the classroom (appropriate levels and purchasing), class sizes, practical skills bubbles, fit testing, simulation, risk assessment procedures and AGPs. There was consensus that it was essential to continue teaching as many respiratory skills as possible, including ACTs, to prepare students adequately for their clinical placements. This would help to alleviate the increased burden on clinical educators, who may otherwise need to teach such techniques to students on placement. Given the marked variation between HEIs in terms of arrangements for teaching in the 2020–21 academic year, the group were unable to provide universal recommendations, but instead wrote a set of considerations for best practice, to be used within the context of local guidance.

The resulting guidance document is entitled *ACPRC statement and considerations for the teaching of airway clearance techniques in higher education institutions during the COVID-19 pandemic* and is intended to be used for guidance only, with changes possible in response to further government and national recommendations. It should be considered within the context of inclusive curriculum, with appropriate adjustments made depending on the student cohort. The initial document is attached as an appendix, and is also available (with any necessary updates) on the ACPRC website, as a reference document for academics teaching respiratory physiotherapy in UK HEIs, and covers the following points:

- Where possible, face-to-face teaching should continue for *essential* practical skills, with others taught theoretically via case studies, ‘practorials’ and video-based resources, with greater emphasis on physiological justification and associated clinical reasoning.
- Techniques that could risk dispersion of aerosolised virus (by generating a cough or huff) should only be undertaken in the classroom following careful risk assessment and weighing up the risks versus benefits of the teaching. Some HEIs have local policies in place to enable this to take place.
- Techniques that HEIs are generally *not* planning to teach face-to-face for 2020–21 include: peak expiratory flow rate; spirometry/pulmonary function tests, forced expiratory technique component of ACBT; supported cough/cough augmentation; incentive spirometry; manual techniques (although could be completed on mannequins as able);

airway clearance devices (positive expiratory pressure (PEP)/flutter/MI-E and so on; non-invasive ventilatory support (IPPB, NI, for example).

- Some HEIs are planning to teach the above, following a ‘green pathway’ (or equivalent non-COVID-19 pathway), as per clinical practice. Those not planning to teach them will be encouraged to use video resources instead.
- Risk assessment processes might include:
 - Individual risk assessments for all staff and students.
 - Student preparation for attendance at practical sessions.
 - Specific measures for face-to-face teaching.
 - Infection control measures.
 - PPE.
- When ACTs cannot be taught practically, a ‘practical pack’ could be delivered to each student containing materials that they would need in order to participate in a virtual practical session (or a pack that students can make themselves out of materials easily accessible in the home); consider use of a simulation centre for a virtual sim-based practical.
- There will be occasions where students or staff are unable to attend scheduled face-to-face practical sessions due to self-isolation requirements. Lecturers will work towards ensuring alternative content is available or offer recorded/live streaming to ensure no student is disadvantaged. Institutions may consider having a ‘stand by’ staff member for this reason.

The statement of considerations was produced to offer a starting point for discussion for academics involved in the delivery of respiratory physiotherapy teaching. It is acknowledged that there will be some limitations on what can be taught safely within the University environment, and as such, students from the 2019–20 and 2020–21 may arrive on placement with reduced cardiorespiratory practical skills in comparison to previous years. Partner providers need to be aware of this, so that adjustments to both expectations and clinical teaching can be made, and HEIs will continue to work closely with clinical education leads to discuss which techniques may not have been taught prior to students attending placements. Due to the variety of brands of face masks being used in clinical practice, it is not expected that academics will fit test students prior to clinical placements. This testing will need to be undertaken by clinical educators on each placement, using the relevant brand of face mask to be used for that placement.

In summary, the COVID-19 pandemic has brought unprecedented challenges to physiotherapy clinicians across the world, with services being transformed to new ways of working. Challenges have also been felt within the academic community, as academic staff find new ways to teach essential physiotherapy practical skills, whilst following local HEI policy, decreased attendance on campus, and strict infection control policies. Despite these challenges, academic teams are working hard to provide innovative ways of teaching that prepare students for clinical placement and as future members of the workforce. The authors

would like to acknowledge all those who contributed constructive discussion points to the development of the document, which is a 'live' document and may be updated as our understanding of the risks associated with COVID-19 continue to change.

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Appendix

Statement and considerations for the teaching of airway clearance techniques (ACTs) in higher education institutions during the COVID-19 pandemic

Rationale

Over the Summer of 2020 the ACPRC received an unprecedented number of requests for information and guidance as to how undergraduate and postgraduate students could be taught important airway clearance techniques (ACTs) and other Aerosol Generating Procedures (AGPs), whilst adhering to local infection control guidelines and government guidance with regards to COVID-19, and minimising the risk of virus transmission. There was a perceived disconnection between students being unable to practice ACTs within the university but being expected to perform them with a degree of competence when on clinical placement.

Given the marked variation between higher education institutions (HEIs) in terms of arrangements for teaching in the 2020–21 academic year, we are unable to provide universal recommendations. Therefore, what follows are considerations for best practice, which should be used within the context of local guidance. This document is for guidance only and may change in response to further government and national recommendations.

Terms of reference

A definition of an aerosol generating procedure (AGP) can be found in the following document: *COVID-19: Guidance for the remobilisation of services within health and care settings. Infection prevention and control guidance (20 August 2020).*

The above document also lists certain other procedures or equipment that may generate an aerosol from material other than patient secretions but are not considered to represent a significant infectious risk for COVID-19. Please refer to the document above for further details.

Although not detailed in the above document, the ACPRC recognise that there are a number of other techniques that may increase the risk of dispersion of aerosolised virus by generating a cough or huff. With regards to specific respiratory physiotherapy techniques these also include:

- Manual techniques (for example, percussion/shaking/manual assisted cough) that may lead to coughing and expectoration of sputum.
- Use of positive pressure breathing devices (for example, IPPB, mechanical insufflation/exsufflation (cough assist) devices, intra/extra pulmonary high frequency oscillation devices).
- Any mobilisation or therapy that may result in coughing and expectoration of mucus (for example, ACBT; incentive spirometry; rehabilitation).
- Any diagnostic interventions that involve the use of video laryngoscopy that can result in airway irritation and coughing.
- Techniques that involve a forced expiratory manoeuvre, such as peak flow/spirometry.

Recommendations for institutions to consider for practical skills delivery

- Physical space is likely to be at a premium in the next academic year, owing to the size of classrooms needed to accommodate appropriate physical distancing. The ACPRC strongly recommends that HEIs carefully consider which physiotherapy techniques could reasonably be taught online, versus which ones might be ‘essential’ for a physical practical session. There was a consensus at the July 2020 ACPRC academic forum that, in instances where some techniques could not be taught, they should be replaced with more in-depth physiological justification for the technique, followed by a greater emphasis on clinical reasoning and case studies so that students would have a strong basis upon which to build their practical experience on placement.

- The general consensus from those academics that have attended the academic forums is that for the academic year 2020/21 techniques that could risk dispersion of aerosolised virus by generating a cough or huff should only be undertaken as practical sessions in the classroom, with careful risk assessment and weighing up the risks versus benefits of the teaching. The ACPRC acknowledges that local risk assessments may identify that this is still possible with certain measures in place and some HEIs may be planning to do so.
- The commonly reported techniques that HEIs are NOT planning to teach practically in face-to-face teaching for 2020/21 include: peak expiratory flow rate; spirometry/pulmonary function tests, forced expiratory technique component of ACBT; supported cough/cough augmentation; incentive spirometry; manual techniques (although could be completed on a mannequins as able); airway clearance devices (PEP/flutter, for example). Pre-made video recordings could be a useful tool to familiarise students with these techniques. Local HEIs have different arrangements for the teaching (or not) of these, with some teaching the full range of ACTs following a 'green pathway' similar to NHS institutions.
- For any respiratory practical session that is feasible to be completed face-to-face on campus, the following practical steps may be useful in informing any local risk assessment:

Risk assessment/local requirements

- Geographical location of the HEI will determine the country specific/public health organisations advice that needs to be followed.
- Advisable for students to complete their own individual risk assessment and any students that fall in moderate/high risk categories may need to be referred to occupational health. There are examples of variations in the risk assessments in use in the workplace across the UK countries, one example from Wales is [here](#). Completing a risk assessment of this nature is also likely to be useful for HEIs when considering clinical education placement.
- Number of students permissible in a teaching room will be dependent on its size and an assessment as to social distancing space that can be met between plinths. Staff: student ratios as recommended by CSP also need to be considered as part of this.
- Students should not be allowed unsupervised access in practical teaching rooms, to ensure infection control policies are always followed.

Student preparation for attendance on campus

- Students to be made aware of their responsibility in familiarising themselves with the guidance on donning/doffing of personal protective equipment (PPE) before they participate in any practical sessions. An example of a video that may be provided to the student is available [here](#). There are also posters [available](#) which may also be useful to provide students with, ahead of the session.

- Students need to be aware of the symptoms of COVID-19 and their responsibilities in not attending class if they have any symptoms, and the need to self-isolate and get tested. In the event that a student tests positive for COVID-19, the National Track and Trace Guidelines should be followed. HEIs may also have local ‘track and trace’ systems in place, that should be adhered to. Students should be directed to the NHS COVID-19 page and familiarise themselves with its content.
- Some universities are putting in place universal COVID-19 testing from the start of the academic year for asymptomatic staff and students (separate to the government testing programme); others also plan to complete temperature checks on arrival to campus/buildings/sessions. Local guidance therefore will need to be followed where these apply.

Measures in place for face-to-face teaching practical skills

- Students are taught in ‘pods’ and/or ‘bubbles’ to minimise interactions between individuals. As such, it is not recommended that students swap between groups if they are unable to attend their scheduled practical session.
- One-way systems will be in place in buildings. Movement of students in rooms to be considered and minimised to ensure social distancing can be maintained. Additional time should be allowed for students to move between spaces.
- Students to be advised *not* to congregate in corridors outside teaching rooms, before or after a session, but to leave the building immediately upon completion of a session.
- Practical spaces to be marked out to demonstrate physical distancing and ensure that students remain within their ‘space’ for the duration.
- Alcohol hand gel to be readily available in the practical classrooms – ideally one by each plinth.
- At the start/during/end of sessions handwashing to be completed and facilities made available for this.
- Lecturers can move between pods, bubbles or pairs to check and correct techniques, using PPE and hand hygiene if local guidance allows.
- Students are encouraged to work and remain in their designated practice pods/bubble/pairs for the session, maintaining social distancing from others in the room.
- Consideration must be given as to whose responsibility it will be for touch points to be cleaned (for example, door handles etc) and the frequency for this. A check list may assist with this.
- The processes in place for disposing of PPE waste.

Other considerations in relation to infection control

- Face coverings to be worn by all present in the room (likely that this will be a requirement in all university buildings anyway). Some HEIs are issuing a set number of face coverings to all students required to attend campus. If the practical session involves people being less than 2m apart, it is recommended that a surgical fluid proof mask is worn, rather than a face covering.

- Students should be reminded not to touch facemasks, and advised on correct method for removal.
- Consider how teaching spaces will be cleaned between student groups.
- The cleaning of plinths in between sessions to be completed by the students. Consider whether plinths need a disposable covering on during the sessions (for example, some HEIs planning to use 'blue-roll') or not. Some HEIs will be providing each student with their own pillowcase to bring to practicals, which they will then launder at home; other HEIs are only using pillows with a plastic cover that can be wiped with disinfectant at the end of a session. Use of blankets and towels to be kept to a minimum – some HEIs are providing students with one of each for them to bring clean to each session, and advised to wash them at home between sessions.
- Infection control procedures (for example, don/doff required PPE; handwashing) can be built into lesson plans to allow sufficient time to complete.
- Staff and students informed of the need to wear a clean uniform for each day attended for practical skills on campus.
- Students may be asked to bring a clean change of clothing only to be worn for the session to limit cross contamination. Changing facilities may be necessary to identify for use if this practice is adopted.
- Staff to consider how the laundering of their own uniform worn in practicals will be undertaken – some HEIs may provide scrubs for use in practicals which the staff member can change out of before leaving campus.
- For staff and student clothing that has been worn for a practical session and needs to be home laundered the following should be followed: washed separately from other household linens; in a load not more than half the machine capacity; at the maximum temperature the fabric can tolerate (recommended more than 60°C where possible). It should then be ironed or tumbled dried. This is also the guidance on home laundering students should follow whilst on clinical placement.
- Avoid using a paper register for student attendance – instead a staff member may need to read the names out loud for programmes where attendance monitoring is required, and electronic means are not in place.
- Students advised not to use pen/paper/laptop in the practical skills space for taking notes.
- Student to be advised to bring only the essentials required with them to a practical session; where possible students should use a bag that can easily be wiped with disinfectant wipes at the end of the session. All belongings can then be stored in the bag for the duration of the practical. Bags to be stored apart from each other so they are not touching.
- Students to not drink/eat during the practical sessions.
- Students to be made aware of the cleaning materials used in the classroom and to inform staff at the start of the session if they have any known allergies to any of these.

Personal-protective equipment

- Where social distancing cannot be maintained in order to complete a skill, PPE will be required. General consensus across HEIs, and planning that is already being undertaken, indicates that this will involve:
 - Fluid-repellent surgical masks; disposable apron and disposable gloves (refer to the CSP guidance for HEIs). Face visor to also be used. Masks, aprons and gloves are disposed of in an appropriate bin at the end of the session. Cleaning procedures to be followed for the face visor at the end of the session – it may be possible for some visors to be appropriately cleaned and to be quarantined for at least 72 hours before being able to be used again.
 - Lecturers should consider the length of time it may take for students to enter a teaching room, wash hands, and don PPE whilst remaining 2m apart. This time may need to be added onto a session at start and end, to minimise loss of available teaching time. A safety briefing may also be appropriate, particularly at the beginning of each new term.

Considerations for teaching

The ACPRC academic forum made several suggestions for the teaching of ACTs that will not be completed practically in face-to-face teaching:

- Videos created by lecturers that demonstrate correct technique with regards to ACTs.
- ‘Practorials’ that combine practical skills (via video) with tutorials.
- A ‘practical pack’ that could be delivered to each student containing materials that they would need to participate in a virtual practical session. Or a pack that students can make themselves out of materials easily accessible in the home.
- Use of a simulation centre for a virtual sim-based practical.

It is also acknowledged that it is reasonable to expect that not all students may be able to attend their scheduled face-to-face practical session. Academics are therefore advised to consider an alternative learning activity that the students can complete if they are unable to attend campus (for example, the student is required to self-isolate). Having such plans already in place would also help to mitigate against another lock-down where face-to-face teaching may not be possible.

The fact that there may be instances where staff may need to self-isolate and not be able to complete their scheduled teaching may also need to be considered. In HEIs with larger cardiorespiratory teaching teams, having a ‘shadow’ member of staff on stand-by to cover sessions if required may be a feasible option. More facilitators than usual may be required if students are being taught in larger rooms, to ensure that they adhere to physical distancing.

If feasible, it may be possible to use ‘Zoom’ or similar, with the lead session facilitator in a practical room for international students and others unable to attend in person. A laptop could be placed on a trolley so it is portable and can move around room to watch other

students and listen to clinical educators/facilitators providing feedback and discussing technique, rationale, and so on, with students in the room. Appropriate cleaning of equipment would need to be considered.

Considerations for clinical placements

It is likely that students in both the 2019/20 (depending on teaching delivery pre/post-lock-down) and 2020/21 cohorts will arrive on placement with reduced cardiorespiratory practical skills in comparison to previous years. It is essential that placement centres are aware of this, so that appropriate adjustments to clinical teaching can be made. HEIs should be encouraged to collaborate closely with clinical education leads to agree upon which techniques should be taught prior to students attending placements, and which ones clinical educators would be happy to lead on. It should be emphasised that, where students may have had less hands-on skills practice, they should instead have an increased level of theoretical knowledge that will provide a solid grounding for their placement. Expectations on clinical placement are therefore unlikely to differ from previous years.

There are some HEIs that are planning to undertake *Mask Fit Testing* to prepare the student for clinical placement. During the academic forums it became evident that across placement providers for one HEI there may be different brands of masks used – therefore before an HEI undertakes any testing it is recommended placement providers are asked which masks are used. For many HEIs it was reported the responsibility to undertake *Mask Fit Testing* will be with the clinical placement provider and not completed by the programme.

As with previous years, it may not be possible for all students to access a respiratory placement. If this is the case, students could seek respiratory experience whilst on placement in other areas, as appropriate.

Other considerations

The ACPRC recommends that academics are aware of the procedures in place locally that they are required to adhere to, should there be an emergency whilst they are on campus and their responsibilities in relation to this. The response to some of these may have changed as a consequence of COVID-19 and staff should be guided by their employer's advice and local procedures.

Examples of emergencies may include:

- Fire: there may be a reduced number of fire wardens on site; the building exits may have changed as a consequence of one-way systems being instigated.
- First aid: the location of equipment may have moved; the number of trained first aiders may not be as great as previously.
- Need to complete CPR – this is particularly relevant in the context of COVID-19 and potential risk of cross infection from both rescue breaths and chest compressions (the latter are considered AGPs). All academics should be guided by employer's advice.

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