

Informing future nursing: An exploration of respiratory teaching in the pre-registration nurse curriculum

Abstract

Aim/Objective

The aim is to examine and map the respiratory skills taught in the pre-registration nursing curriculum (2010).

Background

Respiratory assessment and care are fundamental clinical skills enabling nurses to treat and care for people with acute and chronic respiratory diseases. The incidence of respiratory disease is rising, globally and most nurses will care for respiratory patients during their career.

The extent of pre-registration respiratory specific education delivered in UK NMC (Nursing and Midwifery Council) approved education institutions (AEIs) is currently unknown. The move to the 2018 revised NMC standards for pre-registration nursing offers AEIs the opportunity to review provision of respiratory education. This study describes respiratory education delivered to pre-registration nurses in UK AEIs prior to implementation of the new NMC standards. Curriculum re-design can be adapted for the global nursing community.

Design

This is a freedom of information survey; to gather, examine and map curriculum content.

Methods

A survey of UK AEIs was conducted to initially scope provision of respiratory education for pre-registration nursing programmes. AEIs were emailed a freedom of information (FOI) request and provided information about the curriculum between April-June 2019.

Results

Seventy-five UK AEIs providing pre-registration nursing programmes responded. Over half of AEIs dedicated over 4 hours of teaching respiratory anatomy and physiology (60.8%), respiratory pathophysiology (75.3%) and long- term respiratory conditions (60.3%). Less than half (44.4%) spent over 4 hours teaching respiratory health and prevention of respiratory disease. Just over a third spent over 4 hours

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on respiratory pharmacology (33.8%), local and national respiratory guidelines (33.3%) and information on pulmonary rehabilitation and other interventions for the management of respiratory conditions (35.2%). In most AEs, skills laboratories were used to teach respiratory skills. Student competence was not always assessed. Respiratory learning was reported to take place during practice placements, but this was variable.

Conclusions

Variation exists in provision of respiratory education in pre-registration nursing programmes across the UK. Whilst some respiratory topics appear to be covered adequately, others have limited time on knowledge and skills teaching. New standards and curricula offer AEs the opportunity to enhance this provision. Adaptations can be made and the curriculum transferred to the global nursing workforce.

Keywords

respiratory education, nursing education, Curriculum development, Education review, respiratory care.

Tweetable Abstract

Gaps have been identified in respiratory teaching pre-registration nurse education. Curriculum redesign to focus on respiratory care.

Abbreviations

The paper does not contain any abbreviations or acronyms and abbreviations are spelled out in full in the text.

Introduction

The incidence of respiratory disease is rising globally (Lozano et al., 2012). In the UK, there is an increasing number of hospital admissions and primary care consultations owing to respiratory conditions, leading to the inclusion of respiratory disease as a clinical priority in England's NHS Long Term Plan (England, 2019), Scotland's Respiratory care action plan (Gov.Scot., 2021), Wales 'Respiratory Health Delivery Plan (Llywodraeth Cymru, 2018) and Northern Ireland's Respiratory Health and Wellbeing framework (Northern Ireland Department of Health, 2015). Respiratory disease places significant strain on seasonal healthcare provision with twice as many respiratory admissions occurring in December compared with August (The British Lung Foundation, 2017). An aging population and a consequent increase in long-term conditions and co-morbidities, many of which are respiratory-related, requires nurses to be able to provide safe and effective respiratory care to diverse patient populations. The novel coronavirus disease (COVID-19) caused by the Severe Acute Respiratory Syndrome Coronavirus 2 has led to a rise in hospitalised patients with respiratory failure (ONS, 2021). The long-term respiratory effects of COVID-19 are, as yet, unknown but evidence from previous coronavirus epidemics such as severe acute respiratory syndrome (SARS) suggest that a subsection of patients will experience long-term respiratory complications (Fraser, 2020) which may need management by respiratory specialists (Deitrick K, 2020). As a result, most nurses will care for patients with either chronic or acute respiratory disease at some stage in their nursing career. Respiratory assessment therefore can be regarded as a fundamental clinical skill required to assess basic deterioration in a multitude of patient presentations; its prominence and common occurrence leading to a respiratory subsection of the UK National Early Warning System (NEWS)(Viglinoa, 2020).

In the UK, half of the current specialist respiratory nursing workforce are planning to retire in the next 10 years (8). Succession planning is required to ensure essential respiratory nursing skills are available for the future in acute care settings, health promotion, disease prevention and chronic disease management. As a response to this, UK-wide professional respiratory bodies, such as the British Thoracic Society (BTS) (Prigmore, 2020) have developed an educational framework including core skills and knowledge needed for

post-registration respiratory roles, ranging from Agenda for Change band 5 (newly qualified) (Table 1) to band 8 (nurse consultant) Table 1a (Prigmore, 2020).

Table 1a and Table 1b goes here.

Despite this clear guidance on standards for post-registration education for respiratory nurse specialists, there is no clear guidance for pre-registration nurses. The 2010 NMC standards for pre-registration nurse education (NMC, 2010) suggest values and proficiencies but do not specify what curricula should include. This has allowed Approved Education Institutions (AEIs) who are NMC approved education providers to deliver curricula with differing content resulting in variation, the extent to which is currently unknown. Given this, the content and the quality of the respiratory education included in pre-registration nurse curricula is also unknown. Revised pre-registration nursing standards published in 2018 (NMC, 2018) have necessitated a revision of the existing nursing curricula in the UK and, consequently, a requirement to revalidate all existing programmes. This offers a degree of autonomy for NMC AEIs to review the design and provision of pre-registration curricula to incorporate minimal standards for respiratory education and skills and for national professional respiratory bodies to lobby for upskilling of the pre-registration nursing workforce.

To determine the extent of respiratory content in the pre-registration nursing curricula nationally and to inform the development and implementation of future programmes, this study aimed to scope what components of respiratory skills and knowledge were delivered to pre-registration nurses in AEIs across the UK prior to implementation of the 2018 NMC standards. Although this is a UK based study, the exploration and reporting of the curriculum components can be helpful to guide other investigations from across the globe. The recommendations and suggested teaching components for respiratory education have a global resonance, as the importance of respiratory teaching has been brought to the fore through the COVID-19 global pandemic.

Methods

UK AEI's offering pre-registration nursing were identified through their websites. The 75 AEIs were the most established (delivering nurse education for three years or more) in their nursing education and

therefore able to provide retrospective educational audit data from previous cohorts of students and curricula.

AEIs were approached, rather than clinical providers, as they all have established links with clinical practice and are responsible for the design of the curriculum. The selected institutions were emailed using a Freedom of Information (FOI) request between April-June 2019 and asked to provide information about the curriculum. (Appendix 2). An appropriate FOI contact was identified for each AEI and the FOI request submitted (Appendix 2). AEI had 30 days to respond to the request; all 75 Universities that were approached, responded.

The first question in the FOI request focussed on the time spent during the pre-registration nursing programme delivering specific topics including: respiratory anatomy and physiology, respiratory pharmacology, local and national respiratory policy and guidelines, information around pulmonary rehabilitation and other specific respiratory interventions. Open supplementary questions asked whether this content was taught, was the content examined and how was knowledge assessed.

The second question focussed on respiratory specific skills (pulse, respiratory rate, pulse oximetry, chest examination, peak flow, spirometry, inhaler technique, chest clearance etc), where these skills were taught (ward, skills laboratory, class) and whether or not competence was assessed, either theoretically, in simulation or in clinical practice. Participants were also invited to provide free text comments on any other relevant information.

Ethical considerations

The study was ethically approved by the host university organisation (HLS/NCH/18/009, 11/1/2019).

Data Analysis

Data were anonymised as part of the data entry process. Data were entered and analysed by the lead author (NR) using SPSS (IBM, Version 25.0). Frequencies and means were used to analyse the data descriptively.

Free text responses were thematically analysed (Braun & Clarke, 2006). This inductive approach required the researchers (CK/KL) to familiarise themselves with the data. Both researchers read and independently coded

the data. Once coded, the data were organised into “meaningful groups” reflecting repeated patterns identified by the researchers. Finally, the two researchers discussed the themes generated from the data (Brannen, 2005).

Results

The FOI request from the participating UK AEIs (n=75) yielded varied results across the curriculum. 57 were in England, 11-Scotland, 5-Wales, 2-Northern Ireland. The results are summarised in Tables 2 and 3.

Table 2 shows the percentage of AEIs dedicating four hours or more to respiratory education. Four hours was selected as benchmark as it indicates a set proportion of dedicated teaching time (at least half a day). Respiratory pathophysiology had the largest percentage of teaching time: 72% (54/75) of AEIs dedicated more than 4 hours to this aspect. 60% (45/75) of AEIs allocated over four hours to teaching respiratory anatomy and physiology and 59% (44/75) of AEIs allocated time to teaching long- term respiratory conditions. Less than half (43%, 32/75) spent more than four hours on respiratory health and prevention of respiratory disease. Just under a third spent more than four hours on respiratory pharmacology (32%, 24/75), local and national respiratory guidelines (32%, 24/72) and information on pulmonary rehabilitation and other interventions (31%, 23/75).

Table 3 displays how respiratory specific skills were taught in pre-registration programmes: on placement, in the skills laboratory and in classrooms. Respiratory rate, pulse oximetry, oxygen administration and relief of breathlessness were taught in all three settings (practice placement, skills laboratory, classroom) in over 70% of the AEIs. Most AEIs reported that skills laboratories were used to teach respiratory skills: respiratory rate (90.7%), pulse oximetry (90.7%), oxygen administration (89.3%) and peak flow (77.3%). Fewer AEIs used the skills laboratories to teach blood gas analysis (36.0%), chest examination (61.3%), chest drains (29.3%), NIV (26.7%) or spirometry (24.0%). AEI's reported that several respiratory skills were taught and assessed primarily on practice placement or objective structured clinical examination (OSCE). AEIs reported that respiratory rate (86.7%), pulse oximetry (81.3%), respiratory scoring tools (72.0%), peak flow (72.0%), oxygen administration (80.0%) and relief of breathlessness (73.3%) were primarily taught and assessed in clinical placement or OSCE. Inhaler technique (66.7%), chest examination (61.0%), blood gas analysis (53.3%), smoking cessation (53.3%) and chest drains (54.7%) were lower.

Table 4 shows that across the AEIs (over 65% of respondents), respiratory rate and pulse oximetry are assessed on placement and in the AEI environment. This is not the same for the other skills listed.

The inductive thematic analysis (Braun & Clarke, 2006) of the open comments yielded the following three themes: *respiratory learning as part of the core curriculum*, *respiratory learning as optional choice and practice placement central to respiratory learning*

Respiratory learning as part of core curriculum

Anatomy and Physiology seemed well covered and assessed by means of MCQs (multi choice questions), unseen exams and OSCEs. Pharmacology was featured but detail was lacking, some learning was self-directed. Public health and prevention approaches were not commonly mentioned, with only two references to smoking cessation and two references to flu vaccination. Spiral curriculum (a curriculum that builds on the depth of teaching in same subject area) (Harden, 1999) was referred to by a few providers, with the respiratory theme revisited throughout the three years. Overall emphasis was on clinical skills acquisition, often related to curriculum content, practice placement and assessments

The use of acute respiratory patient presentation and assessment were popular scenarios used to teach respiratory skills, this included reference to respiratory failure and non-invasive ventilation. The importance of respiratory assessment and understanding was recognised but some AEIs cited only one-hour key lectures during the whole programme concerning some essential topics such as oxygen delivery:

'They have a one-hour key lecture on respiratory assessment which includes an introduction to NIV (non-invasive ventilation), tracheostomy and oxygen delivery.'

'The students have 1.5 hours lecture on life sciences relating to the respiratory system.' [ID89]

Respiratory learning as optional

A respiratory focus was often highlighted as an option rather than mandatory in teaching patient assessment. Words such as: *'may'*; *'could'*; *'choice'*; *'possibility'*; *'opportunity to select'* were used commonly. In some institutions, students appeared to be able to choose whether to study respiratory care. Indeed, in some cases, lecturers themselves appeared to be able to choose whether to include respiratory care as part of the

curriculum. Respiratory disease was often classed under ‘Long Term Conditions’ (LTCs) and therefore taught alongside, for example diabetes. Case studies were used to link disease, pharmacology and prevention but again ‘choice’ emphasised that respiratory was often ‘optional’:

‘So, while we do not teach specifically on respiratory, the student may choose something like air pollution.’ [ID3]

*‘Respiratory **may** be a question in the exam.’ [ID2]*

Practice placements central to respiratory learning

Practice placements were often cited as where ‘*respiratory learning takes place*’ but that depended on the placement and what exposure students had. Use of the PAD (Practice Assessment Document) to embed respiratory skills assessment was cited but little detail given regarding a systematic approach to this. There was a reliance on practice for exposure to specific extended skills such as blood gas analysis, spirometry etc. experience of which was not always monitored or recorded. Simulation of clinical skills included respiratory but again there was a choice from LTCs therefore inclusion was not mandated:

‘These will depend on the students’ exposure, for example a student on placement in intensive care will look at blood gas analysis and tracheostomy and a student in GP practice is likely to experience spirometry and smoking cessation.’ [ID25]

Discussion

This is the first study to scope the components of respiratory education delivered to pre-registration nurses in UK AEIs, prior to the implementation of the 2018 NMC pre-registration nursing standards. This study emphasises the variation in the delivery of teaching respiratory theory and skills in UK AEIs.

Overall, there is a lack of consistent teaching and assessment of fundamental respiratory skills in the core pre-registration nursing curricula. Concerningly, some AEIs did not report teaching core respiratory skills at all, including recognised fundamental respiratory skills such as measuring respiratory rate and using pulse oximetry correctly. Measuring respiratory rate is acknowledged to be a core nursing skill, often the first predictor of clinical deterioration, yet evidence suggests that it is an under-reported sign, often estimated by

nurses (Flenady, 2017) and poor monitoring continues to raise concerns ((UK), 2015). Whilst most AEIs did report teaching these fundamental skills, it was unclear what the intensity and/or frequency of such teaching was and what assessment was performed. As most AEIs reported that respiratory learning often takes place during practice placements, this learning may therefore be variable dependent on the area and acuity of the clinical placement, the student and mentor interactions and suitable learning opportunities, adding to the variation and inconsistency amongst individuals, AEIs and regions.

Perhaps unsurprisingly, topics such as anatomy and pathophysiology featured in the curricula of most providers, although not all. Enabling students to understand basic science can be regarded as a foundation for the application knowledge and, consequently, for the development of respiratory skills, although approaches to teaching and learning basic sciences have been identified as inconsistent and problematic (McVicar, 2014). Similarly, in this study checking competence of inhaler technique was only reported to be performed by approximately 30% of respondents. Many patients are unable to use their inhalers effectively. Inadequate inhaler technique reduces the amount of drug administered to patients, leading to poor disease control, reduced quality of life and increased healthcare use (Lavorini et al., 2008). In an observational study, only 7% of healthcare professionals recognised all the necessary steps to teach inhaler technique, though 75% said they were involved in teaching inhaler technique to patients (Baverstock M, 2010). Clearly, to educate patients adequately, nurses themselves need to be competent in this fundamental respiratory skill.

With regards to 'specialist skills' such as chest examination, spirometry and blood gas analysis, few AEIs taught these extended skills to pre-registration nurses. This would support the approach advocated by the professional development framework for respiratory nursing (Prigmore, 2020) which maps out the further development of such skills as registered nurses progress through their careers. The findings from this study suggested that competence in acquisition of these core respiratory skills was not always assessed, either in a theoretical way (i.e. examination) or in a practical way (i.e. skills simulation).

What wasn't in the UK curriculum?

Highlighting what was not taught in the UK curricula was as revealing as what was included. For instance, there was no mention of morbidity, assessment, or interventions with regards to the psychological status or

consequences of living with respiratory disease. This is concerning given the prevalence of anxiety and depression in this patient population (R Kellner, 1992). Similarly, there was no mention of symptom burden or management. Patients with respiratory presentations commonly present with cough, dyspnoea and fatigue, all significant manifestations that can have an impact on quality of life and daily activities (Bloom et al., 2020; Donaldson & Wedzicha, 2013). Overall, curricula appeared to lack a ‘patient centred’ approach to teaching and learning, more commonly focussing on pharmacology and medical management. Notably, however, respiratory health and prevention of respiratory disease was not a significant part of the curriculum in over half of the AEIs, despite being a feature of health policy in all four of the devolved UK nations (England, 2019). There was very little taught on prevention: even smoking cessation, a key component of public health messaging, was optional (Kumar & Gross, 2002; Llywodraeth Cymru, 2018).

Many chronic respiratory conditions are degenerative and life limiting, it was therefore disappointing that palliative care and end of life care for respiratory patients was also not featured. Palliative care, or end of life care, for respiratory patients has been shown to alleviate symptoms and enhance quality of life and therefore should be incorporated early in the patient’s care pathway (Narsavage et al., 2017).

There was also no direct mention of research knowledge skills or evidence-based practice and with only 33% of AEIs referencing clinical guidelines, this appears to be an important omission needed to underpin teaching of respiratory skills and knowledge. Building research confidence in the pre-registration nursing workforce is required to promote safe, effective and innovative practice which is needed at all career levels (McCormack, 2019).

Strengths and limitations

This study was able to scope comprehensively the provision of respiratory education to pre-registration nursing students owing to its 100% response rate from the 75 UK AEIs approached for the survey.

Responses were complete with significant numbers of additional open comments.

In common with all studies using FOI requests, this study was limited by its reliance on the accuracy of data provided, as it was impossible to crosscheck these data against other sources (Mackridge et al., 2017).

Furthermore, in the case of this study, this was often provided from a single individual in each AEI and

therefore may not have captured the full scope of provision. Further limitations, aligned with the nature of a FOI data request, include the qualitative narrative that would explore the curriculum detail. So, the study is missing detail with regards to exactly where in the curricula these study hours fall, whether they are entirely mandated or optional and who teaches them. This is important to aid in the development of future curricula aimed at building specialist and core skills. Therefore, a qualitative follow up study to AEIs may be required.

Conclusions

The global nursing workforce needs to be skilled in assessing and treating people presenting with acute respiratory symptoms and supporting the self-management and care of people living with chronic respiratory conditions. The COVID-19 global pandemic has emphasised the importance of this.

Fundamental respiratory skills therefore need to be embedded worldwide in pre-registration curricula to ensure nurses are adequately trained on qualification to care for patients with respiratory presentations and conditions. The new standards for pre-registration nursing programmes in the UK (NMC, 2018) offers an opportunity to providers of pre-registration nursing programmes to flexibly design their own curricula and the autonomy to decide on the proportion of generic and field specific hours provided.

This study is the first to demonstrate that many UK AEIs do not include fundamental elements of respiratory skills and knowledge in their curriculum. We recommend that, as a minimum, AEIs should equip pre-registration nurses with the core clinical skills for Band 5 newly qualified nurses set out in Table 1. We call on professional respiratory organisations such as the Association for Respiratory Nurse Specialists and the British Thoracic Society to lobby AEIs to embed fundamental respiratory skills in the new curricula.

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Conflict of interest statement

Conflicts of interest: none

References

- (UK), R. C. (2015). The ABCDE Approach. In.
- Baverstock M, W. N., Maarman V. (2010). P94 Do healthcare professionals have sufficient knowledge of inhaler techniques in order to educate their patients effectively in their use. *Thorax* 65, A117-A118.
- Bloom, I., Welch, L., Vassilev, I., Rogers, A., Jameson, K., Cooper, C., Robinson, S., & Baird, J. (2020). Findings from an exploration of a social network intervention to promote diet quality and health behaviours in adults with COPD: a feasibility study [Article]. *Pilot and Feasibility Studies*, 6. <https://doi.org/10.1186/s40814-020-0553-z>
- Brannen, J. (2005). Mixing Methods: The Entry of Qualitative and Quantitative Approaches into the Research Process. *International Journal of Social Research Methodology*, 8(3), 173-184. <https://doi.org/10.1080/13645570500154642>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Deitrick K, A. J., Davis J. (2020). Emergency Nursing Care of Patients With Novel Coronavirus Disease *Journal of Emergency Nursing*. <https://doi.org/10.1016/j.jen.2020.07.010>
- Donaldson, G. C., & Wedzicha, J. A. (2013). Deprivation, winter season, and COPD exacerbations. *Primary care respiratory journal*, 22(3), 264-265. <https://doi.org/10.4104/pcrj.2013.00078>
- England, N. (2019). *The NHS Long Term Plan*. <https://www.longtermplan.nhs.uk/>
- Flenady, T. D., T. Applegarth, J. . (2017). Accurate respiratory rates count: So should you! *Australasian Emergency Nursing Journal*, 20(1), 45-47. <https://doi.org/https://doi.org/10.1016/j.aenj.2016.12.003>
- Fraser, E. (2020). Long term respiratory complications of covid-19. *BMJ*, 370, m3001. <https://doi.org/10.1136/bmj.m3001>
- Gov.Scot. (2021). *Respiratory Care-action plan:2021* (Healthcare quality and improvement, Issue. <https://www.gov.scot/publications/respiratory-care-action-plan-scotland-2021-2026/>
- Harden, R. M. (1999). What is a spiral curriculum? *Medical Teacher*, 21(2), 141-143. <https://doi.org/10.1080/01421599979752>
- Kumar, S., & Gross, N. J. (2002). The global initiative for COPD: what you need to know: smoking cessation is still the most effective way to reduce risk. *Journal of Respiratory Diseases*, 23(11), 549-556 548p. <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106818153&site=ehost-live>
- Lavorini, F., Magnan, A., Christophe Dubus, J., Voshaar, T., Corbetta, L., Broeders, M., Dekhuijzen, R., Sanchis, J., Viejo, J. L., Barnes, P., Corrigan, C., Levy, M., & Crompton, G. K. (2008). Effect of incorrect use of dry powder inhalers on management of patients with asthma and COPD. *Respiratory Medicine*, 102(4), 593-604. <https://doi.org/https://doi.org/10.1016/j.rmed.2007.11.003>
- Llywodraeth Cymru. (2018). *POLICY AND STRATEGY: Respiratory health delivery plan 2018 to 2020*. <https://gov.wales/respiratory-health-delivery-plan-2018-2020>
- Lozano, R., Naghavi, M., Foreman, K., Lim, S., Shibuya, K., Aboyans, V., Abraham, J., Adair, T., Aggarwal, R., Ahn, S. Y., Alvarado, M., Anderson, H. R., Anderson, L. M., Andrews, K. G., Atkinson, C., Baddour, L. M., Barker-Collo, S., Bartels, D. H., Bell, M. L., Benjamin, E. J., Bennett, D., Bhalla, K., Bikbov, B., Bin Abdulhak, A., Birbeck, G., Blyth, F., Bolliger, I., Boufous, S., Bucello, C., Burch, M., Burney, P., Carapetis, J., Chen, H., Chou, D., Chugh, S. S., Coffeng, L. E., Colan, S. D., Colquhoun, S., Colson, K. E., Condon, J., Connor, M. D., Cooper, L. T., Corriere, M., Cortinovis, M., de Vaccaro, K. C., Couser, W., Cowie, B. C., Criqui, M. H., Cross, M., Dabhadkar, K. C., Dahodwala, N., De Leo, D., Degenhardt, L., Delossantos, A., Denenberg, J., Des Jarlais, D. C., Dharmaratne, S. D., Dorsey, E. R., Driscoll, T., Duber, H., Ebel, B., Erwin, P. J., Espindola, P., Ezzati, M., Feigin, V., Flaxman, A. D., Forouzanfar, M. H., Fowkes, F. G. R.,

- Franklin, R., Fransen, M., Freeman, M. K., Gabriel, S. E., Gakidou, E., Gaspari, F., Gillum, R. F., Gonzalez-Medina, D., Halasa, Y. A., Haring, D., Harrison, J. E., Havmoeller, R., Hay, R. J., Hoen, B., Hotez, P. J., Hoy, D., Jacobsen, K. H., James, S. L., Jarasaria, R., Jayaraman, S., Johns, N., Karthikeyan, G., Kassebaum, N., Keren, A., Khoo, J.-P., Knowlton, L. M., Kobusingye, O., Koranteng, A., Krishnamurthi, R., Lipnick, M., Lipshultz, S. E., Ohno, S. L., Mabweijano, J., MacIntyre, M. F., Mallinger, L., March, L., Marks, G. B., Marks, R., Matsumori, A., Matzopoulos, R., Mayosi, B. M., McAnulty, J. H., McDermott, M. M., McGrath, J., Mensah, G. A., Merriman, T. R., Michaud, C., Miller, M., Miller, T. R., Mock, C., Mocumbi, A. O., Mokdad, A. A., Moran, A., Mulholland, K., Nair, M. N., Naldi, L., Narayan, K. M. V., Nasser, K., Norman, P., O'Donnell, M., Omer, S. B., Ortblad, K., Osborne, R., Ozgediz, D., Pahari, B., Pandian, J. D., Rivero, A. P., Padilla, R. P., Perez-Ruiz, F., Perico, N., Phillips, D., Pierce, K., Pope, C. A., 3rd, Porrini, E., Pourmalek, F., Raju, M., Ranganathan, D., Rehm, J. T., Rein, D. B., Remuzzi, G., Rivara, F. P., Roberts, T., De León, F. R., Rosenfeld, L. C., Rushton, L., Sacco, R. L., Salomon, J. A., Sampson, U., Sanman, E., Schwebel, D. C., Segui-Gomez, M., Shepard, D. S., Singh, D., Singleton, J., Sliwa, K., Smith, E., Steer, A., Taylor, J. A., Thomas, B., Tleyjeh, I. M., Towbin, J. A., Truelsen, T., Undurraga, E. A., Venketasubramanian, N., Vijayakumar, L., Vos, T., Wagner, G. R., Wang, M., Wang, W., Watt, K., Weinstock, M. A., Weintraub, R., Wilkinson, J. D., Woolf, A. D., Wulf, S., Yeh, P.-H., Yip, P., Zabetian, A., Zheng, Z.-J., Lopez, A. D., Murray, C. J. L., AlMazroa, M. A., & Memish, Z. A. (2012). Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, *380*(9859), 2095-2128. [https://doi.org/10.1016/S0140-6736\(12\)61728-0](https://doi.org/10.1016/S0140-6736(12)61728-0)
- Mackridge, A. J., Gray, N. J., & Krska, J. (2017). A cross-sectional study using freedom of information requests to evaluate variation in local authority commissioning of community pharmacy public health services in England. *BMJ Open*, *7*(7), e015511. <https://doi.org/10.1136/bmjopen-2016-015511>
- McCormack, B. B., D and Cooke, D. . (2019). *Becoming research confident: Research in pre-registration curricula for nursing, midwifery and allied health programmes in the UK*. https://councilofdeans.org.uk/wp-content/uploads/2019/05/CODH.RIPR_report_v3-002.pdf
- McVicar, A. A., S. Kemble, R. (2014). Biosciences within the pre-registration (pre-requisite) curriculum: An integrative literature review of curriculum interventions 1990–2012. *Nurse Education Today* *34*(4), 560-568. <https://www.sciencedirect.com/science/article/abs/pii/S0260691713003031?via%3Dihub>
- Narsavage, G. L., Chen, Y.-J., Korn, B., & Elk, R. (2017). The potential of palliative care for patients with respiratory diseases. *Breathe*, *13*(4), 278. <https://doi.org/10.1183/20734735.014217>
- NMC. (2010). *Standards for pre-registration nursing education*. . <https://www.nmc.org.uk/globalassets/sitedocuments/standards/nmc-standards-for-pre-registration-nursing-education.pdf>
- NMC. (2018). *Realising Professionalism: Standards for education and training*. . <https://www.nmc.org.uk/standards/standards-for-nurses/standards-for-pre-registration-nursing-programmes/>
- NMC. (2018). *Standards framework for nursing and midwifery education*. Nursing and Midwifery Council <https://www.nmc.org.uk/standards-for-education-and-training/standards-framework-for-nursing-and-midwifery-education/>
- Northern Ireland Department of Health. (2015). *Service Framework for Respiratory Health and Wellbeing*. https://www.health-ni.gov.uk/sites/default/files/publications/dhssps/service-framework-respiratory-2015-18_0.pdf
- ONS. (2021). *Coronavirus (COVID-19) weekly insights: latest health indicators in England*. . Retrieved 27.02.2021 from <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsa>

<https://www.britishtoracic.org/articles/coronaviruscovid19weeklyinsights/latesthealthindicatorsinengland12february2021>

- Prigmore, S. M., H. Armstrong, A. Hope, S. Heslop-Marshall, K. Pollington, J. . (2020). *A professional development framework for respiratory nursing*. https://www.britishtoracic.org/media/455355/a-professional-development-framework-for-respiratory-nursing_may2020.pdf
- R Kellner, J. S., D Pathak. (1992). Dyspnea, anxiety, and depression in chronic respiratory impairment. *General Hospital Psychiatry*, 14, 20-28.
[https://doi.org/https://doi.org/10.1016/0163-8343\(92\)90022-3](https://doi.org/https://doi.org/10.1016/0163-8343(92)90022-3).
- The British Lung Foundation, B. (2017). *Out in the cold. Lung disease, the hidden driver of NHS winter pressure*. BLF.
[https://cdn.shopify.com/s/files/1/0221/4446/files/Out in the cold Dec 2017.pdf?15282568839826487629&_ga=2.162587516.1521474390.1606746125-1902837507.1606746125](https://cdn.shopify.com/s/files/1/0221/4446/files/Out_in_the_cold_Dec_2017.pdf?15282568839826487629&_ga=2.162587516.1521474390.1606746125-1902837507.1606746125)
- Viglino, D. L. h., E. Maltaisa, F. Maignan, M. Lellouchea, F. (2020). Evaluation of a new respiratory monitoring tool “Early Warning ScoreO2” for patients admitted at the emergency department with dyspnea. *Resuscitation*, 148.
<https://doi.org/10.1016/j.resuscitation.2020.01.004>