The Specialist Community Practitioner District Nurse (SCPDN) role in the screening, health promotion and prevention of Chronic Obstructive Pulmonary Disease (COPD)

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Abstract

Chronic Obstructive Pulmonary Disease (COPD) is a long-term condition affecting all aspects of an individual's life. Specialist Community practitioner district nurses (SCPDN) manage patients with multiple co morbidities on their caseload, and as such require an extensive clinical knowledge base. COPD is a highly prevalent and complex disease; therefore, individualised holistic assessments are required to ensure patients receive personalised and evidence-based care. Care delivery must include health interventions encompassing, screening, health promotion and prevention. The SCPDN's consideration of the physical, mental, and social determinants which adversely affect the health of the individual with COPD is imperative to deliver high quality care to the individuals, families, and communities.

Keywords

Chronic Obstructive Pulmonary Disease, district nursing, health prevention, health promotion, optimisation

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a contemporary health care concern that remains of global and national significance, (Stolz et al, 2022). The United Kingdom (UK) population is living longer with multiple comorbidities and long-

term conditions, and a shift is needed to sustain the NHS service ethos of patient centred care (NHS England, 2019). The specialist community practitioner district nurse (SCPDN) role is recognised as clinically dedicated to lead and manage the care provision of those with complex long-term conditions within the community and in the home environment, (The Queens Nursing Institute (QNI), 2016). They are well placed to identify and support individuals with COPD and contribute towards healthier communities for a more sustainable NHS. This article aims to critically analyse aspects of COPD relating to individuals, focusing on prevalence, screening, optimisation, and the contribution of the SCPDN and District Nurse (DN) teams in these processes.

Impact and Prevalence

COPD is a highly prevalent disease reported as the third leading cause of death worldwide (The World Health Organisation (WHO), 2019). It is within the top ten global burden of diseases for 50 -75 and over 75-year age groups (Vos et al, 2020). The Global Initiative for Chronic Obstructive Lung Disease (GOLD) *(2021:1)* define COPD as,

"a common preventable and treatable disease, is characterized by airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases.'

Chronic inflammatory processes in the airways cause destruction of the alveoli and adjoining vasculature, resulting in debilitating symptoms (Lowe et al, 2019). The disease trajectory is variable with some individuals experiencing years of stability followed by periods of acute exacerbations to end stage respiratory failure (Lowe et al, 2019). GOLD (2022) recognises that comorbidities and exacerbations can

contribute to the severity of the disease in individuals in the long term. Madawala et al, (2023) identified the experiences of individuals in community settings with COPD often fell short of what they expected. They advocate strategies to improve experiences of care in the community such as improvements in self-management, quality of life, addressing expectations of health outcomes and prevent stigmatisation.

Prevalence data is troublesome in its reporting, with statistics heralded as ambiguous due to the cross over with other diseases such as asthma and late diagnosis, (Hosseini et al, 2019). Clinical features often present later in the disease process, and even smokers are occasionally asymptomatic, (Rothnie et al, 2022, Metha, Desai, and Patel, 2016). The latest estimation figures report 1 million people were diagnosed with COPD in England, with 2 million people thought to be undiagnosed (The Office for Health Improvement and Disparities, 2019). 52% of those with COPD are prevented from working as a result of the disease and hospitalisation (Foo et al, 2016) and mortality rates following admission in England are 3.9% (NACAP, 2021). This demonstrates the cost to the NHS, patients, families, and communities as a consequence of COPD.

The DN service cares for individuals with complex needs and is important in the future health of our population, (Mcrory, 2019). By 2035, 17% of over 65-year-olds in England are estimated to be living with four diseases or more (Kingston et al, 2018). Initial assessments of housebound patients on DN caseloads take a broad approach to assessment, informed by the nursing process; the new SCPDN standards specify an individualised holistic assessment, to ensure a patient centred, evidence-based plan (Toney-Butler and Thayer, 2022, NMC, 2022). The role of the SCPDN in COPD

is to support the home management of patients, although the QNI (2021) identified extra support and training is required particularly around diagnosis and assessment and management of exacerbations. Advanced clinical assessment and diagnostics skills which align to the advanced pillars of practice (HEE, 2017), are part of the SCPDN role and vital to support COPD patients with this unpredictable condition (NMC, 2022). The symptoms of COPD within the GOLD (2021) guidance determine shortness of breath, a chronic cough and sputum as indications of COPD, along with other risk factors such as tobacco smoking, pollution, occupational exposure, female gender and living in poverty. SCPDN's can educate their teams on risk factors and symptoms of COPD as best practice in order to manage the care of housebound patients as per NICE guidance (2018).

Increasingly SCPDN's and their teams are under pressure to prevent avoidable emergency hospital admissions or readmissions for patients on their caseloads who may have been discharged and recovering from a COPD exacerbation (Lee at all, 2017). Symptoms characteristic of COPD exacerbations can include dyspnoea, worsening exercise tolerance, wheezing, increased sputum production, which can lead to hospital admissions and reduced quality of life (Miravitlles and Ribera, 2017, NICE 2018). DN's can be proactive by looking out for fluctuations in these symptoms and alert G.P, community matrons and specialist respiratory services should they consider extra support is needed for individuals to manage their disease.

DN's can look to optimising treatments for COPD using targeted approaches and individualised treatment plans as best practice, (Sarwar, 2021). Optimisation does not merely refer to the control of symptoms but rather preventing and reducing exacerbations, to maintain quality of life and slow disease progression. Best

practice for the optimisation of those with COPD encompasses smoking cessation, vaccinations, personalised self-management plans, co morbidity optimisation and pulmonary rehabilitation to improve their health outcomes and quality of life (Foo et al, 2016, NICE, 2018).

Risk Factors

Tobacco smoking is still considered most important cause of COPD, whilst occupational exposure is associated with the development of COPD, and may contribute to greater disease severity (Onishi, 2017, Kraïm-Leleu et al, 2016). Other risk factors have been identified in the diagnosis of the disease which include age, indoor and outdoor air pollution, poor growth in early life, childhood asthma and a rare genetic condition called alpha-1 antitrypsin deficiency, causing COPD at an early age (World Health Organisation, 2023, Ho et al, 2019). Diseases such as asthma, heart failure, bronchiectasis, and previously treated illnesses such as tuberculosis or even HIV can co-exist with COPD and may account for under diagnosis of the disease and complicate symptoms, (Ho et al, 2019). Over 80% of patients with COPD are estimated to have at least one chronic condition, and multimorbidity along with some comorbidities have a robust correlation with patient related outcomes and mortality, (Putcha et al, 2015, Yin at al, 2017).

In addition, the association between frailty, COPD and poor prognosis is discussed in recent studies citing frailty as the main factor determining its management and optimisation, (Merengoni et al, 2018; Hanlon et al 2022, Zhang et al, 2022). Older people with COPD have two-fold increased probability of frailty (Merengoni et al,

2018). Frailty increases the risk of mortality, falls, adverse drug reactions and hospital admissions (Hoogendijk et al, 2019). DN teams have exposure to individuals living with COPD and frailty who are more vulnerable to decompensation and adverse health outcomes (Hanlon et al, 2022), even so this is not recognised in COPD diagnostic guidelines, (NICE, 2018; GOLD, 2021). Moody, Lyndon, and Stevens, (2017) suggest frailty is fundamental in care planning for 65yrs and over advocating the use of a frailty tool, therefore familiarisation of frailty assessments for the SCPDN and DN teams is essential to ensure holistic care. Best practice to reduce the risk associated with frailty can include use of the comprehensive geriatric assessment approach (CGA) supported by a toolkit for use within primary care, (British Geriatrics Society, 2019). It advocates a multidimensional holistic assessment of older people to consider their health and wellbeing and is crucial to the management strategy in suspected frailty to improve health outcomes.

Socio-economic influences, environmental and social circumstances which impact upon the health of communities must also be understood as risk factors. SCPDN's work collaboratively with patients and families to improve health, wellbeing, and self-management, (Gray, 2020, NMC, 2022). The Ministries of Housing, Communities and Local Government (2019) highlighted deprived areas in England, noting higher levels of COPD diagnosed in the North, (Public Health Institute, 2021). Care planning must take into consideration that those living in deprivation are more likely to have experienced adverse childhood experiences (ACE) and adverse health outcomes (Hughes et al, 2017). Hardcastle et al (2020) link ACE exposure to

smoking and diagnosed COPD. Health professionals must understand ACE's and have trauma informed education to support patient empowerment.

The current cost-of-living crisis faced by the UK population may also perpetuate the cycle of deprivation linked to higher health risk behaviours such as smoking, (Pleasents, Riley and Manimo, 2016, Royal College of Physicians, 2022). Understanding local populations is paramount to ensure DN services meet the needs of patients (NMC, 2022). Challenges with variations in demographics and high disease prevalence mean DN's must develop an awareness of how best to advocate and apply evidence-based practice to those in deprived areas (NMC, 2022; Marmot et al, 2010). Social circumstances which are of particular concern are unemployment or low income, low levels of education, residential segregation, stress, the physical environment, fragility, and accessibility to health services (Pleasants, Riley and Mannino, 2016). To identify areas of concern the SCPDN can contribute by continuous caseload profiling, auditing, and evaluating care by communicating with DN team members and safety huddles to highlight those at risk (Harper-McDonald, 2020, Gray, 2020). This can support patients by promoting inclusivity and equality, to influence service improvements within communities they work, (NMC, 2022; QNI, 2016).

Diagnosis

Spirometry is the gold standard for diagnosis of COPD, along with presenting symptoms (NICE, 2021; GOLD, 2021) and NICE (2018) suggest healthcare professionals must have access to spirometry and adequate training. Recent studies highlight concerns with overuse and misinterpretation of spirometry leading

to misdiagnosis, (Stoltz et al, 2022; O Sullivan et al, 2018, Gershan et al, 2016~~). The Right care pathway for COPD suggests education of healthcare staff for spirometry testing (NHS England, 2017).~~ SCPDN's are well placed to contribute towards identifying housebound patients who may have COPD by concise history taking and identification of symptoms. This offers an opportunity to use their skills in the quest to find "The Missing Millions" in areas with below average COPD prevalence (NHS England, 2020).

Genomic screening is a contemporary option in supporting diagnosis for some individuals. Genomics is a term to describe the study of a person's entire genes (also known as the genome), it includes the interactions of the genes with each other and a person's environment (Puddester et al, 2022). It provides underpinning knowledge to understand individuals' health risks for conditions, the manifestation of diseases, and therapeutic responses to interventions or new therapies, (Calzone et al, 2018). An example of genetic influence can be seen in COPD with alpha-1 antitrypsin deficiency, which is a genetic condition characterised by low levels of the main protease inhibitor in human serum (Silverman, 2020, Soriano et al, 2018).

Screening for this deficiency is a quick and effective blood test which can lead to earlier detection, management, and smoking cessation interventions to optimise lung function in this high-risk group, (de Costa et al, 2019). However, this is not a conventional diagnostic pathway for those with COPD. Only those that present with COPD early in life, who rarely smoked or had familial history are tested in this way, (NICE, 2018). Earlier detection and optimisation of patients contributes to fewer hospitalisation, and it is imperative the SCPDN is fully educated on the impact that screening can have for the COPD patient and long-term management, (Metha, Desai, and Patel, 2016, NMC, 2022). Holistic DN assessments paying close attention to ongoing respiratory symptom, age

and family history may help to identify individuals who would benefit from genomic screening. SCPDN's must raise awareness within their teams to highlight rapid changes in genomic technology because genomic literacy among healthcare professionals remains low (Calzone et al, 2018). Patients with COPD may require DN involvement with regards to symptom control or psychosocial therapeutic support due to genetic components, rather than being responsible for diagnosing or assessing people's risk of disease (Saleh, Kerr, and Dunlop, 2019).

When diagnosing and treating individuals who are exacerbating SCPDNs need to consider antibiotic stewardship and antimicrobial resistance. Evidence suggests at least 50% of exacerbations involve bacteria which would benefit from antibiotic therapy, indicating many exacerbations are unrelated to bacterial infections (Jacobs, Pandit and Sethi, 2019, Sherell, 2021). Stolbrink, Bennett and Blakey's (2019) large retrospective study analysed antibiotics prescriptions for individuals with COPD experiencing non-pneumonic exacerbations. Their study supported amoxicillin as the index drug of choice and noted that a shorter duration of antibiotic prescribing was not associated with repeat prescriptions. Mccloskey et al (2023) identified a link between increased antibiotic prescribing and areas of poverty, with the North East and North West of England having increased prescribing rates for antibiotics and inhaled corticosteroid treatment. Clinicians who independently prescribe can access English Prescribing data to review local public health data to inform them of patterns of antibiotic prescribing and local guidelines for treating exacerbations, an example of this is the Pan Mersey Area Prescribing Committee Guidance (NHSBSA, 2023, Pan Mersey APC, 2023).

Patients on DN caseloads have multiple comorbidities and often access the multi-disciplinary team, resulting in antimicrobial treatment commenced by other clinicians (Sherrell, 2021, NICE, 2018). Medication reconciliation is important, by including a history of previous and current antibiotic therapy it can enable SCPDNs to identify individuals having successive courses of antibiotic treatment which may lead to resistance, (Stolbrink et al, 2018). COPD exacerbations can manifest harm to patients and the healthcare system as a consequence of recurrent antibiotic therapy, (Macleod et al, 2021). The risk to the patient is subtherapeutic treatment, recurrent infections requiring repeated treatment and antibiotic-resistant bloodstream infections, which are linked to high morbidity and mortality, (Leal et al, 2019). SCPDN's should educate both patients and the DN team about the risks associated with antibiotic therapy. Recommendations are to encourage health promotion which is proven to contribute to reductions in exacerbations and high antibiotic prescription rates, (WHO, 2022, Rockenschaub et al, 2020). Health promotion can include pharmacological management, environmental factors, and patient activation measures to individualise care planning for these individuals.

Pulmonary rehabilitation (PR) is a programme of education and exercise designed for people with lung disease such as COPD and who experience symptoms of breathlessness, (NHS England, 2019). It is found to relieve fatigue, improve emotional function, and enhance patient control over the disease and patients who complete a PR programme report higher activity and exercise levels, as well as better quality of life. (McCarthy et al, 2015; Osadnik and Singh, 2019, NHS England, 2019). It is considered a key intervention for those with COPD; however,

it remains accessible to those only with breathlessness (NHS England, 2019; GOLD 2021). Recent evidence reports a lack of referrals in primary care for PR, highlighting that female smoker and those from deprived areas are less likely to be referred (Stone et al, 2020). Patient experiences accessing services is often negative, with patients describing a struggle for referral, (Buttery et al, 2017, Casaburi, 2018). SCPDN's can support information giving to champion PR and escalate delayed referrals by communicating with PR teams. PR is recognised by Quality Outcome framework's (QOF) to avoid significant admissions and exacerbations over 10 years (NICE, 2021, NHS England,2019).

Prevention

Those who stop smoking have fewer lower respiratory tract infections and COPD exacerbations and the longer COPD patients have quit smoking the healthier they will be, (Au et al, 2009, Li et al, 2022). The WHO (2003) tobacco control framework implemented the highest taxation on tobacco products in Europe, (Branston, Arnott, and Gallagher,2021). Yet, The Office for Health Improvement & Disparities (2022) reported England would miss the target to make England smokefree by 2030 by 7 years, with those in poorer areas predicted to meet it in 2044. Accelerated action is needed to reduce smoking in England encouraging smoker advice and support at every interaction. NHS Digital (2022) report that between April and December 2021 54.5% of people used NHS Stop Smoking Service either via group therapy or one to one support had quit with more success coming from over 60-year-olds. Therefore, DN teams should advocate these services. Nicotine Replacement Therapy (NRT) is also recognised to support quitting smoking along with counselling (Rigotti et al, 2012). SCPDN's with non-medical prescribing can prescribe within their scope of practice initiating a prescription for NRT when in contact with patient discussion,

(The Royal Pharmaceutical Society, 2019). SCPDN's without prescribing can still identify a patients need for other treatment by communicating this to a General practitioners or non-medical prescriber for further assessment, to guarantee parity in care (Maybin, Charles and Honeyman, 2016).

The importance of vaccinations beyond the pandemic also remains high on the UK agenda. NICE (2018) guidelines suggest pneumococcal, and influenza (flu) vaccination are offered for all COPD patients and the COVID 19 vaccine is also hailed as offering significant protection, (Gerayeli et al, 2021). High flu vaccination rates of over 65-year-olds were reported (82.3%) between 2021 -2022, superseding the WHO vaccine uptake level in the same group of 75% (UK Health Security Agency, 2022). Information must be inclusive of advice that echoes the efficacy of vaccinations for flu and COVID 19 for those with a diagnosis of COPD, (Medicines and Healthcare products Regulatory Agency, 2022). Vaccine rates are lower in deprived areas and in those of ethnic minority, therefore the SCPDN must maximise opportunities for those on the caseload by promoting and educating the benefits, hence, 'making every contact count' (Tan et al, 2021; Watkinson et al, 2022, While 2021, PHE, 2016). High rates of uptake are inextricably linked to the Covid19 vaccination booster programme which demonstrates the benefit of education on immunisations and their role in maintaining health (Department of Health & Social Care, 2021). If SCPDN's can advocate the relevant vaccinations to this patient group, it may help to reduce unplanned admissions in those with COPD moving forward.

Public Health England (2016) stated a making every contact count (MECC) behaviour change model, can contribute to preventative measures. MECC (2016) is

an evidence-based method to encourage health care professionals to improve people's health and wellbeing by facilitating behaviour change. It aims to encourage and improve an individual's health and wellbeing by the dissemination of reliable information. MECC recognises that practitioners such as SCPDN's are well placed to engage in conversations to address a number of risk factors for health such as smoking, alcohol and mental wellbeing and must take the opportunity to do so in practice. The intensity of the level of interaction for behaviour change cannot be ignored, with differing techniques needed (Health Education England, 2022) and NHS policies must reflect this resource and support training for staff on behaviour change (Public Health England, 2016). SCPDN's could benefit from specialised training and could facilitate implementation for wider DN teams if the model is developed further.

Workforce challenges

NHS England's (2020) recommendation for a whole system integrated approach advocating interdependencies between services is regarded as best practice, to ensure a place-base service for those with COPD. The strength of SCPDN's and DN teams may not lie in performing diagnostic testing, but rather detection of COPD symptoms and the ability to provide personalised care, ensuring collaborative working relationships across primary and community care teams (NICE, 2018, QNI, 2019). Key teams and services involved in the care of those with COPD are in fig 1, although this list is not exhaustive and also incorporates financial, contractual, business intelligence services and neighbouring CCG's and communities (NHS England, 2020). Collaboration with other teams is necessary to inform the SCPDN

about associated local services and understand criteria to access and discharge patients with COPD (Chew and Mahadeva, 2018).

Fig 1.

NHS England (2022) priorities are to make the NHS a better place to work and empower staff to deliver outstanding high-quality care. Evidence acknowledges that DN services provide valuable contributions towards the assessment, management, and optimisation of COPD patients, although demand for the service must be determined. The assessment for risk and demand of DN teams falls within the responsibility of the SCPDN and the recent staffing crisis cannot be ignored (NMC, 2022). Maybin, Charles and Honeyman (2016) highlighted the lack of data analysed for community health services in contrast to hospital data, which is extensively collated to predict workforce pressures, yet currently little data exists to quantify demands in community services (NHS Digital, 2022). The Workforce Standards for District Nurses (QNI, 2022) recognise that DN services remain a service to fill the gap of more specialised services unable to meet the demands of their patients. The SCPDN has a responsibility to lead, advocate for staff and escalate to commissioning bodies, when challenged with patients who fall out with the criteria of DN services. This aims to protect and safeguard staff wellbeing and patients alike (QNI, 2022). Compassionate leadership skills prioritise staff support and development the opportunities mentioned to enahnce the care of this patient group, (Institute of Health Equality, 2022).

Conclusion

COPD is determined as a health care priority and the SCPDN is well placed to contribute to the diagnosis, management, and optimisation of the disease. Globally, COPD is a leading cause of hospitalisation and death. It is underdiagnosed and there are challenges in prevention, screening and managing COPD in the long-term. The UK population is predicted to live longer with more co morbidities; therefore, it is fundamental that SCPDN's and DN teams holistically assess individuals to provide quality, patient centred care. Opportunities to improve management are prevalent pertaining to frailty assessment, nutritional input, genomic testing, and spirometry. Strategies such as pulmonary rehabilitation, integrating healthcare systems, holistic assessments, and health promotional approaches are endorsed. Current guidance provides the latest evidence that DN services have the skills to support COPD populations further. However, there must be recognition of poor accessibility to current services and a shortfall in the DN workforce before teams can provide sustainable patient centred care for those with COPD.

Key points

DN teams deliver long term care to individuals with chronic complex conditions.

The chronic management of COPD embodies health promotion, prevention, and optimisation.

Social determinants of health can adversely affect outcomes in care for patient with COPD.

Workforce challenges and accessibility are barriers for DN's when providing care to the COPD population.

Reflective questions

Consider current health needs assessments in planning care for patients with COPD.

Reflect on opportunities for DN teams to optimise the care of individuals with COPD.

Identify evidence-based strategies highlighted in the article in the promotion of COPD patients locally.

REFERENCES

Au, D.H., Bryson, C.L., Chien, J.W., Sun, H., Udris, E.M., Evans, L.E. and Bradley, K.A., 2009. The effects of smoking cessation on the risk of chronic obstructive pulmonary disease exacerbations. *Journal of general internal medicine*, *24*(4), pp.457-463.

Branston, J.R., Arnott, D., and Gallagher, A.W., 2021. What does Brexit mean for UK tobacco control? *International Journal of Drug Policy*, *92*, p.103044.

British Geriatrics Society, 2019. Comprehensive geriatric assessment toolkit for primary care practitioners.

Buttery, S., Lewis, A., Oey, I., Hargrave, J., Waller, D., Steiner, M., Shah, P.L., Kemp, S.V., Jordan, S., and Hopkinson, N.S., 2017. Patient experience of lung volume reduction procedures for emphysema: a qualitative service improvement project. *ERJ Open Research*, *3*(3).

Calzone, K.A., Kirk, M., Tonkin, E., Badzek, L., Benjamin, C. and Middleton, A., 2018. Increasing nursing capacity in genomics: Overview of existing global genomics resources. *Nurse education today*, *69*, pp.53-59.

Casaburi, R., 2018. Pulmonary rehabilitation: where we've succeeded and where we've failed. *COPD: Journal of Chronic Obstructive Pulmonary Disease*, *15*(3), pp.219-222.

Chew, J. and Mahadeva, R., 2018. The role of a multidisciplinary severe chronic obstructive pulmonary disease hyperinflation service in patient selection for lung volume reduction. *Journal of Thoracic Disease*, *10*(Suppl 27), p.S3335.

da Costa, C.H., Noronha Filho, A.J., Marques e Silva, R.M.F., da Cruz, T.F., de Oliveira Monteiro, V., Pio, M. and Rufino, R.L., 2019. Alpha 1-antitrypsin deficiency in patients with chronic obstructive pulmonary disease patients: is systematic screening necessary? *BMC Research Notes*, *12*, pp.1-5.

Department of Health and Social care (2021) JCVI statement regarding a Covid-19 booster vaccine programme for winter 2021-2022. Published 14th September 2021.

Foo, J., Landis, S.H., Maskell, J., Oh, Y.M., Van Der Molen, T., Han, M.K., Mannino, D.M., Ichinose, M. and Punekar, Y., 2016. Continuing to confront COPD international patient survey: economic impact of COPD in 12 countries. *PloS one*, *11*(4), p.e0152618.

Gerayeli, F.V., Milne, S., Cheung, C., Li, X., Yang, C.W.T., Tam, A., Choi, L.H., Bae, A., and Sin, D.D., 2021. COPD and the risk of poor outcomes in COVID-19: A systematic review and meta-analysis. *EClinicalMedicine*, *33*, p.100789.

Gershon, A.S., Hwee, J., Chapman, K.R., Aaron, S.D., O'Donnell, D.E., Stanbrook, M.B., Bourbeau, J., Tan, W., Su, J., Victor, J.C. and To, T., 2016. Factors associated with undiagnosed and over diagnosed COPD. *European Respiratory Journal*, *48*(2), pp.561-564.

Global initiative for Chronic obstructive lung disease (2021) https://goldcopd.org/wp-content/uploads/2020/11/GOLD-REPORT-2021-v1.0-11Nov20_WMV.pdf (last accessed 13/04/23).

Gray, T., 2020. Safety huddle in a community nursing setting. *British Journal of Community Nursing*, *25*(9), pp.446-450.

Hanlon, P., Lewsey, J., Quint, J.K., Jani, B.D., Nicholl, B.I., McAllister, D.A. and Mair, F.S., 2022. Frailty in COPD: an analysis of prevalence and clinical impact using UK Biobank. *BMJ Open Respiratory Research*, *9*(1), p.e001314.

Hardcastle, K., Bellis, M.A., Sharp, C.A. and Hughes, K., 2020. Exploring the health and service utilisation of general practice patients with a history of adverse childhood experiences (ACEs): an observational study using electronic health records. *BMJ open*, *10*(9), p.e036239.

Harper-McDonald, B., 2020. District nurses' experiences with a caseload profiling tool: a service evaluation. *British Journal of Community Nursing*, *25*(7), pp.318-326.

Health Education England, N.H.S., 2017. Multi-professional framework for advanced clinical practice in England. *London: Health Education England*.

Ho, T., Cusack, R.P., Chaudhary, N., Satia, I., and Kurmi, O.P., 2019. Under-and over-diagnosis of COPD: a global perspective. *Breathe*, *15*(1), pp.24-35.

Hoogendijk, E.O., Afilalo, J., Ensrud, K.E., Kowal, P., Onder, G. and Fried, L.P., 2019. Frailty: implications for clinical practice and public health. *The Lancet*, *394*(10206), pp.1365-1375.

Hosseini, M., Almasi-Hashiani, A., Sepidarkish, M. and Maroufizadeh, S., 2019. Global prevalence of asthma-COPD overlap (ACO) in the general population: a systematic review and meta-analysis. *Respiratory research*, *20*(1), pp.1-10.

Hughes, K., Bellis, M.A., Hardcastle, K.A., Sethi, D., Butchart, A., Mikton, C., Jones, L., and Dunne, M.P., 2017. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *The Lancet Public Health*, *2*(8), pp. e356-e366.

Institute of Health Equality, 2022

Jacobs, D.M., Pandit, U. and Sethi, S., 2019. Acute exacerbations in chronic obstructive pulmonary disease: should we use antibiotics and if so, which ones? *Current Opinion in Infectious Diseases*, *32*(2), pp.143-151.

Kingston, A., Robinson, L., Booth, H., Knapp, M. and Jagger, C., MODEM project. *Forecasting the care needs of the older population in England over the next*, *20*.

Kraïm-Leleu, M., Lesage, F.X., Drame, M., Lebargy, F. and Deschamps, F., 2016. Occupational risk factors for COPD: a case-control study. *PLoS One*, *11*(8), p.e0158719.

Leal, H.F., Azevedo, J., Silva, G.E.O., Amorim, A.M.L., de Roma, L.R.C., Arraes, A.C.P., Gouveia, E.L., Reis, M.G., Mendes, A.V., de Oliveira Silva, M. and Barberino, M.G., 2019. Bloodstream infections caused by multidrug-resistant gram-negative bacteria: epidemiological, clinical, and microbiological features. *BMC infectious diseases*, *19*(1), pp.1-11.

Lee, G., Pickstone, N., Facultad, J. and Titchener, K., 2017. The future of community nursing: Hospital in the Home. *British journal of community nursing*, *22*(4), pp.174-180.

Li, X., Wu, Z., Xue, M. and Du, W., 2022. An observational study of the effects of smoking cessation earlier on the clinical characteristics and course of acute exacerbations of chronic obstructive pulmonary disease. *BMC Pulmonary Medicine*, *22*(1), p.390.

Lowe, K.E., Regan, E.A., Anzueto, A., Austin, E., Austin, J.H., Beaty, T.H., Benos, P.V., Benway, C.J., Bhatt, S.P., Bleecker, E.R. and Bodduluri, S., 2019. COPDGene® 2019: redefining the diagnosis of chronic obstructive pulmonary disease. *Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation*, *6*(5), p.384.

Madawala, S., Osadnik, C.R., Warren, N., Kasiviswanathan, K. and Barton, C., 2023. Healthcare experiences of adults with COPD across community care settings: a meta-ethnography. *ERJ Open Research*, *9*(1).

Marmot, M., 2010. *Fair Society, Health Lives: Strategic Review of Health Inequalities in England Post-2010-Executive Summary*.

Marengoni, A., Vetrano, D.L., Manes-Gravina, E., Bernabei, R., Onder, G. and Palmer, K., 2018. The relationship between COPD and frailty: a systematic review and meta-analysis of observational studies. *Chest*, *154*(1), pp.21-40.

Maybin, J., Charles, A. and Honeyman, M., 2016. Understanding quality in district nursing services. *London: Kings Fund*.

MacLeod, M., Papi, A., Contoli, M., Beghé, B., Celli, B.R., Wedzicha, J.A. and Fabbri, L.M., 2021. Chronic obstructive pulmonary disease exacerbation fundamentals: Diagnosis, treatment, prevention, and disease impact. *Respirology*, *26*(6), pp.532-551.

McCloskey, A.P., Malabar, L., McCabe, P.G., Gitsham, A. and Jarman, I., 2023. Antibiotic prescribing trends in primary care 2014–2022. *Research in Social and Administrative Pharmacy*.

McCrory, V., 2019. An overview of the role of the district nurse caring for individuals with complex needs. *British journal of community nursing*, *24*(1), pp.20-26.

Medicines & Healthcare products Regulatory Agency (2022) guidance on Coronavirus. https://www.gov.uk/government/collections/mhra-guidance-on-coronavirus-covid-19 (Last accessed 13/04/23).

Mehta, V., Desai, N. and Patel, S., 2016. When pulmonary function test is available, should we wait for the COPD symptoms to develop? *Journal of Clinical and Diagnostic Research: JCDR*, *10*(10), p.OE08.

Miravitlles, M. and Ribera, A., 2017. Understanding the impact of symptoms on the burden of COPD. *Respiratory research*, *18*(1), pp.1-11.

Moody, D., Lyndon, H. and Stevens, G., 2017. Toolkit for general practice in supporting older people living with frailty. *NHS Engl*, *1*(2), pp.8-14.

NHSBSA English prescribing data (EPD) (2023). NHSBSA Published https://www.nhsbsa.nhs.uk/prescription-data/prescribing-data/english-prescribing-data-epd (last accessed 29.08.23

NHS Digital (2022) Community services statistics. https://digital.nhs.uk/data-and-information/publications/statistical/community-services-statistics-for-children-young-people-and-adults/august-2022#top (Last accessed 13/04/23).

NHS England (2020) Spirometry commissioning guidance. NHS England and NHS Improvement. spirometry-commissioning-guidance.pdf (england.nhs.uk) (Last accessed 03/04/23).

NHS England (2019) The NHS Long term plan. NHS Long Term Plan (last accessed 02/08/23).

NHS England and NHS Improvement (2022) 2022/2023 priorities and operational planning. NHS England » 2022/23 priorities and operational planning guidance (last accessed 02/08/23).

NICE Guidance (2018) Chronic obstructive pulmonary disease in over 16s: diagnosis and management. NICE guideline (NG115) Published:05 December 2018. Last updated:26 July 2019. Overview | Chronic obstructive pulmonary disease in over 16s: diagnosis and management | Guidance | NICE (Last accessed 31/03/23).

NICE (2021) Acute exacerbation of chronic obstructive pulmonary disease. https://cks.nice.org.uk/topics/chronic-obstructive-pulmonary-disease/management/acute-exacerbation/ (Last accessed 13/04/23).

Nursing & Midwifery Council, (2022). *Standards of proficiency for community nursing specialist practice qualifications* [Online] Available at: Standards of proficiency for community nursing specialist practice qualifications - The Nursing and Midwifery Council (nmc.org.uk)

Onishi, K., 2017. Total management of chronic obstructive pulmonary disease (COPD) as an independent risk factor for cardiovascular disease. *Journal of cardiology*, *70*(2), pp.128-134.

Osadnik, C.R. and Singh, S., 2019. Pulmonary rehabilitation for obstructive lung disease. *Respirology*, *24*(9), pp.871-878

O'Sullivan, J.W., Albasri, A., Nicholson, B.D., Perera, R., Aronson, J.K., Roberts, N. and Heneghan, C., 2018. Overtesting and undertesting in primary care: a systematic review and meta-analysis. *BMJ open*, *8*(2), p.e018557

Pan Mersey Area Prescribing Committee Guidance (2023) Formulary - Pan Mersey APC (last accessed 29.08.23).

Pleasants, Roy A et al. "Defining and targeting health disparities in chronic obstructive pulmonary disease." *International journal of chronic obstructive pulmonary disease* vol. 11 2475-2496. 4 Oct. 2016, [Online] Available at: doi:10.2147/COPD.S79077

Pleasants, R.A., Riley, I.L. and Mannino, D.M., 2016. Defining and targeting health disparities in chronic obstructive pulmonary disease. *International journal of chronic obstructive pulmonary disease*, pp.2475-2496.

Public Health England (2016) *Making Every Contact Count (MECC): Consensus statement* [Online] Available at: Main heading (england.nhs.uk)

Public Health Institute, (2021) *Vulnerable individuals and groups profile Liverpool City Region March 2021* [Online] Available at: Vulnerable groups LCR FINAL 23_3_21 (ljmu.ac.uk)

Puddester, R., Pike, A., Maddigan, J. and Farrell, A., 2022. Nurses' Knowledge, Attitudes, Confidence, and Practices with Genetics and Genomics: A Theory-Informed Integrative Review Protocol. *Journal of Personalized Medicine*, *12*(9), p.1358.

Putcha, N., Drummond, M.B., Wise, R.A. and Hansel, N.N., 2015, August. Comorbidities and chronic obstructive pulmonary disease: prevalence, influence on outcomes, and management. In *Seminars in respiratory and critical care medicine* (Vol. 36, No. 04, pp. 575-591). Thieme Medical Publishers.

Raad, S., Smith, C. and Allen, K., 2019. Nutrition status and chronic obstructive pulmonary disease: can we move beyond the body mass index? *Nutrition in Clinical Practice*, *34*(3), pp.330-339.

Rockenschaub, Patrick et al. “Opportunities to reduce antibiotic prescribing for patients with COPD in primary care: a cohort study using electronic health records from the Clinical Practice Research Datalink (CPRD).” *The Journal of antimicrobial chemotherapy* vol. 75,1 (2020): 243-251. [Online] Available at: doi:10.1093/jac/dkz411

Rothnie, Kieran J et al. “Characteristics of New Users of Single- and Multiple-Inhaler Triple Therapy for COPD in Primary Care in England.” *International journal of chronic obstructive pulmonary disease* vol. 17 1455-1466. 22 Jun. 2022, [Online] Available at: doi:10.2147/COPD.S338436

Royal College of Physicians (2022) *RCP briefing for House of Lords debate on the ‘Impact of the cost of living on the public wellbeing’| 20 October 2022*

Saleh, M., Kerr, R. and Dunlop, K., 2019. Scoping the scene: What do nurses, midwives, and allied health professionals need and want to know about genomics? *Frontiers in genetics*, *10*, p.1066.

Sarwar, M.R., McDonald, V.M., Abramson, M.J., Paul, E. and George, J., 2021. Treatable traits in an English cohort: prevalence and predictors of future decline in lung function and quality of life in COPD. *ERJ open research*, *7*(2)024.

Sherrell, Z., 2021. Antibiotic use in patients with chronic obstructive pulmonary disease: considerations and risks. *British Journal of Healthcare Management*, *27*(9), pp.227-230.

Silverman, E.K., 2020. Genetics of COPD. *Annual review of physiology*, *82*, p.413. [

Soriano, J.B., Lucas, S.J., Jones, R., Miravitlles, M., Carter, V., Small, I., Price, D. and Mahadeva, R., 2018. Trends of testing for and diagnosis of α1-antitrypsin deficiency in the UK: more testing is needed. *European Respiratory Journal*, *52*(1).

Stolbrink, M., Bonnett, L.J. and Blakey, J.D., 2019. Antibiotics for COPD exacerbations: does drug or duration matter? A primary care database analysis. *BMJ Open Respiratory Research*, *6*(1), p.e000458.

Stolbrink, M., Amiry, J. and Blakey, J.D., 2018. Does antibiotic treatment duration affect the outcomes of exacerbations of asthma and COPD? A systematic review. *Chronic respiratory disease*, *15*(3), pp.225-240.

Stolz, D., Mkorombindo, T., Schumann, D.M., Agusti, A., Ash, S.Y., Bafadhel, M., Bai, C., Chalmers, J.D., Criner, G.J., Dharmage, S.C. and Franssen, F.M., 2022. Towards the elimination of chronic obstructive pulmonary disease: a Lancet Commission. *The Lancet*, *400*(10356), pp.921-972.

Stone PW, Hickman K, Steiner MC, Roberts CM, Quint JK, Singh SJ. Predictors of Referral to Pulmonary Rehabilitation from UK Primary Care. Int J Chron Obstruct Pulmon Dis. 2020 Nov 16; 15:2941-2952. doi: 10.2147/COPD.S273336.

Tan, P.S., Patone, M., Clift, A.K., Dambha-Miller, H., Saatci, D., Ranger, T., Garriga, C., Zaccardi, F., Shah, B.R., Coupland, C. and Griffin, S., 2021. Influenza, shingles, and pneumococcal vaccine uptake, offer and refusal in adult populations at high-risk for COVID-19: a UK population-based cohort study. *Available at SSRN 3783784*.

The Ministries of Housing, Communities and Local Government (2019) *The English Indices of Deprivation 2019 (IoD2019)* [Online] Available at: The English Indices of Deprivation 2019 (publishing.service.gov.uk)

The National Asthma and Chronic Obstructive Pulmonary Disease Audit Programme (2021) *COPD clinical audit 2019/20 (people with COPD exacerbations discharged from acute hospitals in England, Scotland and Wales between October 2019 and February 2020) Data analysis and methodology report* [Online] available at: https://www.nacap.org.uk/nacap/welcome.nsf/vwFiles/COPD+Clinical+Audit+2019-20/$File/NACAP_COPD_SC_Data_And_Methodology_Report_2019-20_Jun_2021.pdf?openelement

The NMC register England. (2022). [online] Available at: https://www.nmc.org.uk/globalassets/sitedocuments/data-reports/march-2022/nmc-register-data-march-2022-england.pdf [Last accessed 28 Oct. 2022].

The Office for Health Improvement and Disparities (2019) *The 2nd Atlas of Variation in risk factors and healthcare for Respiratory disease in England 2019* [Online] Available at: Respiratory Atlas of Variation (england.nhs.uk) (Last accessed 19/01/23)

The Office for Health Improvement and Disparities (2021) *Health Profile for the North West of England 2021* [Online] Available at: Health Profile for the North West of England 2021 (phe.org.uk) (Last accessed 19/01/23)

The Office for Health Improvement and Disparities (2022) *Making Smoking Obsolete: summary* [Online] Available at: Making smoking obsolete: summary - GOV.UK (www.gov.uk)

The Queens Nursing Institute (2016). *The Value of the SPQ Nurse Qualification* [Online] Available at: District Nursing SPQ Report – The Queen's Nursing Institute (qni.org.uk) (Last accessed 19/01/23)

The Queens Nursing Institute (2022) *Workforce Standards for District Nursing Service* [Online] Available at: Workforce-Standards-for-the-District-Nursing-Service.pdf (qni.org.uk) (Last accessed 19/01/23)

The Queens Nursing Institute (2019) Outstanding models of district nursing report. Online] Available at: Oustanding-Models-of-District-Nursing-Report-web.pdf (qni.org.uk) (Last accessed 03/04/23)

The Queens Nursing Institute untapped potential district nursing services report (2021) https://www.qni.org.uk/wp-content/uploads/2021/11/Untapped-Potential-District-Nursing-Services-report-2021.pdf (Last accessed 13/04/23).

The Royal Pharmaceutical Society (2021) *A Competency Framework for All Prescribers* [Online]

https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Prescribing%20Competency%20Framework/RPS%20English%20Competency%20Framework%203.pdf?ver=mctnrKo4YaJDh2nA8N5G3A%3d%3d (Last accessed 02/08/23)

The World Health Organisation (2019) *World health statistics 2019: monitoring health for the SDGs, sustainable development goals* [Online] Available at: World health statistics 2019: monitoring health for the SDGs, sustainable development goals (who.int) (Last accessed 19/01/23)

Toney-Butler TJ, Thayer JM. (2022) Nursing Process. [Updated 2022 Apr 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan.

UK Health Security Agency (2022) Seasonal influenza vaccine uptake in GP patients Winter season 2021 to 2022 [Online] Available at: Seasonal influenza vaccine uptake in GP patients: winter season 2021 to 2022 (publishing.service.gov.uk)

Vos, T., Lim, S.S., Abbafati, C., Abbas, K.M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A. and Abdollahi, M., 2020. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, *396*(10258), pp.1204-1222.

Watkinson, R.E., Williams, R., Gillibrand, S., Sanders, C. and Sutton, M., 2022. Ethnic inequalities in COVID-19 vaccine uptake and comparison to seasonal influenza vaccine uptake in Greater Manchester, UK: A cohort study. *PLoS medicine*, *19*(3), p.e1003932

While, A., 2021. Evidence-based strategies to promote vaccine acceptance. *British journal of community nursing*, *26*(7), pp.338-343.

World Bank Group (2019) *Confronting Illicit Tobacco Trade A Global Review of Country Experiences United Kingdom: Tackling Tobacco Trade* [Online] Available at: WBGTobaccoIllicitTradeUnitedKingdom.pdf (worldbank.org)

World Health Organisation (2023) Chronic Obstructive Pulmonary Disease. Chronic obstructive pulmonary disease (COPD) (who.int) (Last accessed 31/03/23).

World Health Organisation (2022) *Health Promotion*.

World Health Organisation (2019) Chronic Obstructive Pulmonary Disease. Chronic obstructive pulmonary disease (COPD) (who.int) (Last accessed 20/03/23)

World Health Organisation (2003) *WHO Framework Convention on Tobacco Control Overview* [Online] Available at: WHO Framework Convention on Tobacco Control overview

Yin, H.L., Yin, S.Q., Lin, Q.Y., Xu, Y., Xu, H.W. and Liu, T., 2017. Prevalence of comorbidities in chronic obstructive pulmonary disease patients: a meta-analysis. *Medicine*, *96*(19).

Zhang, D., Tang, W., Dou, L.Y., Luo, J. and Sun, Y., 2022. Four different frailty models predict health outcomes in older patients with stable chronic obstructive pulmonary disease. *BMC geriatrics*, *22*(1), pp.1-11. [