

Kirjandus

1. American Thoracic Society. Chronic bronchitis, asthma and pulmonary emphysema: a statement by the Committee on Diagnostic Standards for Nontuberculous Respiratory Diseases. *Am Rev Respir Dis.* 1962;85:762–8.
2. Buist AS, McBurnie MA, Vollmer WM et al. International variation in the prevalence of COPD (the BOLD Study): a population-based prevalence study. *Lancet.* 2007;370(9589):741–50.
3. Broström E, Jögi R, Gislason T et al. The prevalence of chronic airflow obstruction in three cities in the Nordic-Baltic region. *Respir Med.* 2018;143:8–13.
4. Sator L, Horner A, Studnicka A et al. Overdiagnosis of COPD in Subjects With Unobstructed Spirometry A BOLD Analysis. *Chest.* 2019;156(2):277–88.
5. Global Initiative for Chronic Obstructive Lung Disease. Report 2020 [Internet]. [tsiteeritud 9. november 2019]. Available at: <https://goldcopd.org/wp-content/uploads/2019/11/GOLD-2020-REPORT-ver1.0wms.pdf>
6. Lamprecht B, Schirnhöfer L, Kaiser B, Buist S, Studnicka M. Non-reversible airway obstruction in never smokers: results from the Austrian BOLD study. *Respir Med.* 2008;102:1833–8.
7. Burney, P et al. Prevalence and risk attribution associated with chronic airflow obstruction in a multicentre study. 2020 Submitted.
8. Halbert RJ, Natoli JL, Gano A et al. Global burden of COPD: systematic review and meta-analysis. *Eur Respir J.* 2006;28(3):523–32.
9. Lamprecht B, Soriano JB, Studnicka M et al. Determinants of underdiagnosis of COPD in national and international surveys. *Chest.* 2015;148(4):971–85.
10. Lamprecht B, McBurnie MA, Vollmer WM et al. COPD in never smokers: results from the population-based burden of obstructive lung disease study. *Chest.* 2011;139(4):752–63.
11. US Preventive Services Task Force (USPSTF). Screening for Chronic Obstructive Pulmonary Disease: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2016;315(13):1372–7.
12. Dirven JA, Tange HJ, Muris JW et al. Early detection of COPD in general practice: implementation, workload and socioeconomic status. A mixed methods observational study. 2013;22(3):338–43.
13. Stanley AJ, Hasan I, Crockett AJ et al. Validation of the COPD Diagnostic Questionnaire in an Australian general practice cohort: a cross-sectional study. *Prim Care Respir J.* 2014;23(1):92–7.
14. Frith P, Crockett A, Beilby J et al. Simplified COPD screening: validation of the PiKo-6® in primary care. *Primary Care Respiratory Journal.* 2011;20(2):190–8.
15. Sichletidis L, Spyros D, Papaioannou M et al. A combination of the IPAG questionnaire and PiKo-6® flow meter is a valuable screening tool for COPD in the primary care setting. *Prim Care Respir J.* 2011;20(2):184–9.
16. Kotz D, Nelemans P, van Schayck CP et al. External validation of a COPD diagnostic questionnaire. *Eur Respir J.* 2008;31(2):298–303.
17. Mintz ML, Yawn BP, Mannino DM et al. Prevalence of airway obstruction assessed by lung function questionnaire. *Mayo Clin Proc.* 2011;86(5):375–81.
18. Tsukuya G, Matsumoto K, Fukuyama S et al. Validation of a COPD screening questionnaire and establishment of diagnostic cut-points in a Japanese general population: the Hisayama study. *Allergol Int.* 2015;64(1):49–53.
19. Weiss G, Steinacher I, Lamprecht B et al. Development and validation of the Salzburg COPD-screening questionnaire (SCSQ): a questionnaire development and validation study. *NPJ Prim Care Respir Med.* 2017;4.
20. Spyros D, Haidich A-B, Chloros D et al. Comparison of Three Screening Questionnaires for Chronic Obstructive Pulmonary Disease in the Primary Care. *Respiration.* 2017;93(2):83–9.

21. Tsukuya G, Samukawa T, Matsumoto K et al. Comparison of the COPD Population Screener and International Primary Care Airway Group questionnaires in a general Japanese population: the Hisayama study. *International Journal of COPD*. 2016;11:1903–9.
22. Weiss G, Steinacher I, Lamprecht B et al. Development and validation of the Salzburg COPD-screening questionnaire (SCSQ): a questionnaire development and validation study. *NPJ Prim Care Respir Med*. 2017;27(1):4.
23. Thorn J, Tilling B, Lisspers K et al. Improved prediction of COPD in at-risk patients using lung function pre-screening in primary care: a real-life study and cost-effectiveness analysis. *Prim Care Respir J*. 2012;21(2):159–66.
24. Kotz D, Wesseling G, Huibers MJ, van Schayck OC. Efficacy of confronting smokers with airflow limitation for smoking cessation. *Eur Respir J*. 2009;33(4):754–62.
25. McClure JB, Ludman EJ, Grothaus L, Pabiniak C, Richards J. Impact of a brief motivational smoking cessation intervention: the Get PHIT randomized controlled trial. *Am J Prev Med*. 2009;37(2):116–23.
26. Parkes G, Greenhalgh T, Griffin M, Dent R. Effect on smoking quit rate of telling patients their lung age: the Step2quit randomised controlled trial. *BMJ*. 2008;336(7644):598–600.
27. Sippel JM, Osborne ML, Bjornson W, Goldberg B, Buist AS. Smoking cessation in primary care clinics. *J Gen Intern Med*. 1999;14(11):670–6.
28. Risser NL, Belcher DW. Adding spirometry, carbon monoxide, and pulmonary symptom results to smoking cessation counseling: a randomized trial. *J Gen Intern Med*. 1990;5(1):16–22.
29. National Institute for Health and Care Excellence. Chronic obstructive pulmonary disease in over 16s: diagnosis and management (NG115) [Internet]. Available at: <https://www.nice.org.uk/guidance/ng115/resources/chronic-obstructive-pulmonary-disease-in-over-16s-diagnosis-and-management-pdf-66141600098245>
30. van Dijk W, Tan W, Li P et al. Clinical relevance of fixed ratio vs lower limit of normal of FEV1/FVC in COPD: patient-reported outcomes from the CanCOLD cohort. *Ann Fam Med*. 2015;13(1):41–8.
31. Güder, G, Brenner S, Angermann CE et al. „GOLD or lower limit of normal definition? a comparison with expert-based diagnosis of chronic obstructive pulmonary disease in a prospective cohort-study”. *Respiratory Research*. 2012;13(1):13.
32. Shirtcliffe P, Weatherall M, Marsh S et al. COPD prevalence in a random population survey: a matter of definition. *Eur Respir J*. 2007;30(2):232–9.
33. Ko FW, Woo J, Tam W, et al. Prevalence and risk factors of airflow obstruction in an elderly Chinese population. *Eur Respir J*. 2008;32(6):1472–8.
34. Gupta RP, Perez-Padilla R, Marks G et al. Summarising published results from spirometric surveys of COPD: the problem of inconsistent definitions. *Int J Tuberc Lung Dis*. 2014;18(8):998–1003.
35. Miller MR, Haroon S, Jordan RE et al. Clinical characteristics of patients newly diagnosed with COPD by the fixed ratio and lower limit of normal criteria: a cross-sectional analysis of the TargetCOPD trial. *Int J Chron Obstruct Pulmon Dis*. 2018;13:1979–86.
36. Liu S, Zhou Y, Liu S et al. Clinical impact of the lower limit of normal of FEV1/FVC on detecting chronic obstructive pulmonary disease: A follow-up study based on cross-sectional data. *Respir Med*. 2018;139:27–33.
37. Calverley PMA, Mueller A, Fowler A et al. The Effect of Defining Chronic Obstructive Pulmonary Disease by the Lower Limit of Normal of FEV1/FVC Ratio in Tiotropium Safety and Performance in RespiMat Participants. *Ann Am Thorac Soc*. 2018;15(2):200–8.
38. Stanojevic S, Quanjer P, Miller MR et al. The Global Lung Function Initiative: dispelling some myths of lung function test interpretation. *Breathe*. 2013;9:462–74.
39. Alpha 1-antitrypsin deficiency: memorandum from a WHO meeting. *Bull World Health Organ*. 1997;75(5):397–415.
40. Sandhaus RA, Turino G, Brantly ML et al. The diagnosis and management of alpha-1 antitrypsin deficiency in the adult. *Chronic Obstr Pulm Dis*. 2016;3(3):668–82.

41. The Alpha-1-Antitrypsin Deficiency Registry Study Group. Survival and FEV1 decline in individuals with severe deficiency of alphas-1-antitrypsin. *Am J Respir Crit Care Med*. 1998;158(1):49–59.
42. Tanash HA, Ekström M, Rönmark E et al. Survival in individuals with severe alpha 1-antitrypsin deficiency (PiZZ) in comparison to a general population with known smoking habits. *Eur Respir J*. 2017;50(3):1700198.
43. Dawkins PA, Dawkins CL, Wood AM et al. Rate of progression of lung function impairment in a1-antitrypsin deficiency. *Eur Respir J*. 2009;33(6):1338–44.
44. Tirado-Conde G, Lara B, Casas F et al. Factors Associated With the Evolution of Lung Function in Patients With Alpha-1 Antitrypsin Deficiency in the Spanish Registry. *Arch Bronconeumol*. 2011;47(10):495–503.
45. Needham M, Stockley RA. Exacerbations in a1-antitrypsin deficiency. *Eur Respir J*. 2005;25:992–1000.
46. Tejwani V, Nowacki AS, Fye E et al. The Impact of Delayed Diagnosis of Alpha-1 Antitrypsin Deficiency: The Association Between Diagnostic Delay and Worsened Clinical Status. *Respir Care*. 2019;64(8):915–22.
47. Montuschi P, Ciabattini G. Bronchodilating drugs for chronic obstructive pulmonary disease: current status and future trends. *J Med Chem*. 2015;58(10):4131–64.
48. Tashkin DP, Ferguson GT. Combination bronchodilator therapy in the management of chronic obstructive pulmonary disease. *Respir Res*. 2013;14:4.
49. Criner GJ, Bourbeau J, Diekemper RJ et al. Prevention of Acute Exacerbations of COPD: American College of Chest Physicians and Canadian Thoracic Society Guideline. *Chest*. 2015;147(4):894–942.
50. Cheyne L, Irvin-Sellers MJ, White J. Tiotropium versus ipratropium bromide for chronic obstructive pulmonary disease. *Cochrane Database of Systematic Reviews*. 2015;(9):CD009552.
51. Vincken W, Noord JA, Greefhorst A et al. Improved health outcomes in patients with COPD during 1 yr's treatment with tiotropium. 2002;19(2):209–16.
52. Dahl R, Greefhorst LA, Nowak D et al. Inhaled formoterol dry powder versus ipratropium bromide in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 2001;164(5):778–84.
53. Appleton S, Jones T, Poole P et al. Ipratropium bromide versus long-acting beta-2 agonists for stable chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2006;(3):CD006101.
54. Rosenkranz B, Rouzier R, Kruse M et al. Safety and tolerability of high-dose formoterol (via Aerolizer) and salbutamol in patients with chronic obstructive pulmonary disease. *Respir Med*. 2006;100(4):666–72.
55. Friedman M. A multicenter study of nebulized bronchodilator solutions in chronic obstructive pulmonary disease. *The American Journal of Medicine*. 1996;100(1A):30–9.
56. Anthonisen NR, Connett JE, Enright PL et al. Hospitalizations and mortality in the Lung Health Study. *Am J Respir Crit Care Med*. 2002;166(3):333–9.
57. Singh S, Loke YK, Furberg CD. Inhaled anticholinergics and risk of major adverse cardiovascular events in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. *JAMA*. 2008;300(12):1439–50.
58. Vogelmeier C, Hederer B, Glaab T et al. Tiotropium versus salmeterol for the prevention of exacerbations of COPD. *N Engl J Med*. 2011;364(12):1093–103.
59. Decramer ML, Chapman KR, Dahl R et al. Once-daily indacaterol versus tiotropium for patients with severe chronic obstructive pulmonary disease (INVIGORATE): a randomised, blinded, parallel-group study. *Lancet Respir Med*. 2013;1(7):524–33.
60. Cazzola M, Molimard M. The scientific rationale for combining long-acting beta2-agonists and muscarinic antagonists in COPD. *Pulm Pharmacol Ther*. 2010;23(4):257–67.
61. Mahler DA, Kerwin E, Ayers T et al. FLIGHT1 and FLIGHT2: Efficacy and Safety of QVA149 (Indacaterol/Glycopyrrolate) versus Its Monocomponents and Placebo in Patients with Chronic Obstructive Pulmonary Disease. *Am J Respir Crit Care Med*. 2015;192(9):1068–79.

62. Mahler DA, Decramer M, D'Urzo A et al. Dual bronchodilation with QVA149 reduces patient-reported dyspnoea in COPD: the BLAZE study. *Eur Respir J*. 2014;43(6):1599–609.
63. Singh D, Ferguson GT, Bolitschek J et al. Tiotropium + olodaterol shows clinically meaningful improvements in quality of life. *Respir Med*. 2015;109(10):1312–9.
64. Bateman ED, Chapman KR, Singh D et al. Aclidinium bromide and formoterol fumarate as a fixed-dose combination in COPD: pooled analysis of symptoms and exacerbations from two six-month, multicentre, randomised studies (ACLIFORM and AUGMENT). *Respir Res*. 2015;16:92.
65. Martinez FJ, Fabbri LM, Ferguson GT et al. Baseline Symptom Score Impact on Benefits of Glycopyrrolate/Formoterol Metered Dose Inhaler in COPD. *Chest*. 2017;152(6):1169–78.
66. Oba Y, Keeney E, Ghatehorde N, Dias S. Dual combination therapy versus long-acting bronchodilators alone for chronic obstructive pulmonary disease (COPD): a systematic review and network meta-analysis. *Cochrane Database Syst Rev*. 2018;12:CD012620.
67. Zayed Y, Barbarawi M, Kheiri B et al. Triple versus dual inhaler therapy in moderate-to-severe COPD: A systematic review and meta-analysis of randomized controlled trials. *Clin Respir J*. 2019;13(7):413–28.
68. Cazzola M, Calzetta L, Barnes PJ et al. Efficacy and safety profile of xanthines in COPD: a network meta-analysis. *Eur Respir Rev*. 2018;27(148):180010.
69. Zheng Y, Zhu J, Liu Y et al. Triple therapy in the management of chronic obstructive pulmonary disease: systematic review and meta-analysis. *BMJ*. 2018;363:k4388.
70. Stephenson A, Seitz D, Bell CM et al. Inhaled anticholinergic drug therapy and the risk of acute urinary retention in chronic obstructive pulmonary disease: a population-based study. *Arch Intern Med*. 2011;171(10):914–20.
71. Shroff S, Thomas R, D'Souza G et al. The effect of inhaled steroids on the intraocular pressure. *Digital journal of ophthalmology*. 2018;24:6–9.
72. Halpin DM, Dahl R, Hallmann C, Mueller A, Tashkin D. Tiotropium HandiHaler® and RespiMat® in COPD: a pooled safety analysis. *Int J Chron Obstruct Pulmon Dis*. 2015;10:239–59.
73. Lipson DA, Barnhart F, Brealey N et al. Once-Daily Single-Inhaler Triple versus Dual Therapy in Patients with COPD. *N Engl J Med*. 2018;378(18):1671–80.
74. Bafadhel M, Peterson S, De Blas MA et al. Predictors of exacerbation risk and response to budesonide in patients with chronic obstructive pulmonary disease: a post-hoc analysis of three randomised trials. *Lancet Respir Med*. 2018;6(2):117–26.
75. Chapman KR, Hurst JR, Frent SM et al. Long-Term Triple Therapy De-escalation to Indacaterol/Glycopyrronium in Patients with Chronic Obstructive Pulmonary Disease (SUNSET): A Randomized, Double-Blind, Triple-Dummy Clinical Trial. *Am J Respir Crit Care Med*. 2018;198(3):329–39.
76. Calverley PMA, Tetzlaff K, Vogelmeier C et al. Eosinophilia, Frequent Exacerbations, and Steroid Response in Chronic Obstructive Pulmonary Disease. *Am J Respir Crit Care Med*. 2017;196(9):1219–21.
77. Molino NA, Zhang P. A meta-analysis on the efficacy of oral theophylline in patients with stable COPD. *Int J Chron Obstruct Pulmon Dis*. 2006;1(3):261–6.
78. Devereux G, Cotton S, Fielding S et al. Low-dose oral theophylline combined with inhaled corticosteroids for people with chronic obstructive pulmonary disease and high risk of exacerbations a RCT. *Health Technology Assessment [Internet]*. 2019. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK544387/>
79. Barr G, Rowe B, Camargo C. Methylxanthines for exacerbations of chronic obstructive pulmonary disease: meta-analysis of randomised trials. *BMJ*. 2003;327(7416):643.
80. Cosio BG, Tsaprouni L, Ito K et al. Theophylline restores histone deacetylase activity and steroid responses in COPD macrophages. *J Exp Med*. 2004;200(5):689–95.

81. Horita N, Miyazawa N, Kojima R et al. Chronic Use of Theophylline and Mortality in Chronic Obstructive Pulmonary Disease: A Meta-analysis. *Arch Bronconeumol*. 2016;52(5):233–8.
82. ZuWallack R, Mahler D, Reilly D et al. Salmeterol Plus Theophylline Combination Therapy in the Treatment of COPD. *Chest*. 2001;119(6):1667–70.
83. Tartu Ülikooli Kliinikum. Ühendlabori käsiraamat [Internet]. Available at: <https://www.kliinikum.ee/yhendlabor/pildid/kasiraamat/T/teofylliin.pdf>
84. Barnes PJ. Theophylline. *Pharmaceuticals (Basel)*. 2010;3(3):725–47.
85. Wedzicha JA, Calverley PMA, Albert RK et al. Prevention of COPD exacerbations: a European Respiratory Society/American Thoracic Society guideline. *Eur Respir J*. 2017;50(3):1602265.
86. Poole P, Sathananthan K, Fortescue R. Mucolytic agents versus placebo for chronic bronchitis or chronic obstructive pulmonary disease. *Cochrane Database of Systematic Reviews*. 2019;5:CD001287.
87. Gavish R, Levy A, Dekel OK et al. The Association Between Hospital Readmission and Pulmonologist Follow-up Visits in Patients With COPD. *Chest*. 2015;148(2):375–81.
88. Fidahusseini SS, Croghan IT, Cha SS, Klocke DL. Posthospital follow-up visits and 30-day readmission rates in chronic obstructive pulmonary disease. *Risk Manag Healthc Policy*. 2014;7:105–12.
89. Sharma G, Kuo YF, Freeman JL, Zhang DD, Goodwin JS. Outpatient follow-up visit and 30-day emergency department visit and readmission in patients hospitalized for chronic obstructive pulmonary disease. *Arch Intern Med*. 2010;170(18):1664–70.
90. Sharif R, Parekh TM, Pierson KS, Kuo YF, Sharma G. Predictors of early readmission among patients 40 to 64 years of age hospitalized for chronic obstructive pulmonary disease. *Ann Am Thorac Soc*. 2014;11(5):685–94.
91. Casanova C, Aguirre-Jaime A, de Torres JP et al. Longitudinal assessment in COPD patients: multidimensional variability and outcomes. *Eur Respir J*. 2014;43(3):745–53.
92. Ferrone M, Masciantonio MG, Malus N, et al. The impact of integrated disease management in high-risk COPD patients in primary care. *NPJ Prim Care Respir Med*. 2019;29(1):8.
93. Dransfield MT, Kunisaki KM, Strand MJ et al. Acute Exacerbations and Lung Function Loss in Smokers with and without Chronic Obstructive Pulmonary Disease. Dransfield MT, Kunisaki KM, Strand MJ et al. *Am J Respir Crit Care Med*. 2017;195(3):324–30.
94. Bekkat-Berkani R, Wilkinson T, Buchy P et al. Seasonal influenza vaccination in patients with COPD: a systematic literature review. Bekkat-Berkani R, Wilkinson T, Buchy P et al. *BMC Pulm Med*. 2017;17(1):79.
95. Teo E, Lockhart K, Purchuri SN et al. Haemophilus influenzae oral vaccination for preventing acute exacerbations of chronic bronchitis and chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2017;6:CD010010.
96. Walters JA, Tang JN, Poole P et al. Pneumococcal vaccines for preventing pneumonia in chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2017;1:CD001390.
97. Kopsaftis Z, Wood-Baker R, Poole P. Influenza vaccine for chronic obstructive pulmonary disease (COPD). *Cochrane Database Syst Rev*. 2018;6:CD002733.
98. Ya Tseimakh I, Martynenko I, Paraeva S. Prophylactic efficacy of pneumococcal vaccination for chronic obstructive pulmonary disease (COPD). *Eur Respir J*. 2006;28(Suppl 50):178s.
99. Dransfield MT, Nahm MH, Han MK et al. Superior immune response to protein-conjugate versus free pneumococcal polysaccharide vaccine in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 2009;180(6):499–505.
100. Rugbjerg M, Iepsen UW, Jørgensen KJ, Lange P. Effectiveness of pulmonary rehabilitation in COPD with mild symptoms: a systematic review with meta-analyses. *Int J Chron Obstruct Pulmon Dis*. 2015;10:791–801.
101. Güell Rous MR, Díaz Lobato S, Rodríguez Trigo G et al. Pulmonary rehabilitation. Sociedad Española de Neumología y Cirugía Torácica (SEPAR). *Arch Bronconeumol*. 2014;50(8):332–44.

102. McCarthy B, Casey D, Devane D et al. Pulmonary rehabilitation for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2015;2:CD003793.
103. Yang J, Lin R, Xu Z et al. Significance of Pulmonary Rehabilitation in Improving Quality of Life for Subjects With COPD. *Respir Care*. 2019;64(1):99–107.
104. Paneroni M, Simonelli C, Vitacca M et al. Aerobic Exercise Training in Very Severe Chronic Obstructive Pulmonary Disease: A Systematic Review and Meta-Analysis. *Am J Phys Med Rehabil*. 2017;96(8):541–8.
105. Stolz D, Barandun J, Borer H et al. Diagnosis, Prevention and Treatment of Stable COPD and Acute Exacerbations of COPD: The Swiss Recommendations 2018. *Respiration*. 2018;96(4):382–98.
106. Yang IA, Brown JL, George J et al. COPD-X Australian and New Zealand guidelines for the diagnosis and management of chronic obstructive pulmonary disease: 2017 update. *Med J Aust*. 2017;207(10):436–42.
107. Scanlon PD, Connett JE, Waller LA, et al. Smoking cessation and lung function in mild-to-moderate chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 2000;161(2):381–90.
108. Anthonisen NR, Connett JE, Murray RP. Smoking and Lung Function of Lung Health Study Participants after 11 Years. *Am J Respir Crit Care Med*. 2002;166(5):675–9.
109. Anthonisen NR, Skeans MA, Wise RA, et al. The effects of a smoking cessation intervention on 14.5-year mortality. A randomized trial. *Ann Intern Med*. 2005;142(4):233–9.
110. Josephs L, Culliford D, Johnson M, et al. Improved outcomes in ex-smokers with COPD: a UK primary care observational cohort study. *Eur Respir J*. 2017;49(5):1602114.
111. Au DH, Bryson CL, Chien JW, et al. The effects of smoking cessation on the risk of chronic obstructive pulmonary disease exacerbations. *J Gen Intern Med*. 2009;24(4):457–63.
112. Papadopoulos G, Vardavas C, Limperiet M et al. Smoking cessation can improve quality of life among COPD patients: Validation of the clinical COPD questionnaire into Greek. *BMC Pulmonary Medicine*. 2011;11:13.
113. Lenferink A, Brusse-Keizer M, van der Valk PD, et al. Self-management interventions including action plans for exacerbations versus usual care in patients with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 8:CD011682.
114. Stoddart A, van der Pol M, Pinnock H et al. Telemonitoring for chronic obstructive pulmonary disease: a cost and cost-utility analysis of a randomised controlled trial. *J Telemed Telecare*. 2015;21(2):108–18.
115. McDowell JE, McClean S, FitzGibbon F, Tate S. A randomised clinical trial of the effectiveness of home-based health care with telemonitoring in patients with COPD. *J Telemed Telecare*. 2015;21(2):80–7.
116. Vitacca M, Paneroni M, Grossetti F, Ambrosino N. Is There Any Additional Effect of Tele-Assistance on Long-Term Care Programmes in Hypercapnic COPD Patients? A Retrospective Study. *COPD*. 2016;13(5):572–82.
117. McLean S, Nurmatov U, Liu JL et al. Telehealthcare for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2011;7:CD007718.
118. Koff PB, Jones RH, Cashman JH et al. Proactive integrated care improves quality of life in patients with COPD. *Eur Respir J*. 2009;33(5):1031–8.
119. Jódar-Sánchez F, Ortega F, Parra C et al. Implementation of a telehealth programme for patients with severe chronic obstructive pulmonary disease treated with long-term oxygen therapy. *J Telemed Telecare*. 2013;19(1):11–7.
120. Tupper OD, Gregersen TL, Ringbaek T et al. Effect of tele-health care on quality of life in patients with severe COPD: a randomized clinical trial. *Int J Chron Obstruct Pulmon Dis*. 2018;13:2657–62.
121. Soriano JB, García-Río F, Vázquez-Espinosa E et al. A multicentre, randomized controlled trial of telehealth for the management of COPD. *Respir Med*. 2018;144:74–81.
122. Bentley CL, Mountain GA, Thompson J et al. A pilot randomised controlled trial of a Telehealth intervention in patients with chronic obstructive pulmonary disease: challenges of clinician-led data collection. *Trials*. 2014;15:313.

123. Janson C, Johansson G, Ställberg B et al. Identifying the associated risks of pneumonia in COPD patients: ARCTIC an observational study. *Respir Res.* 2018;19(1):172.
124. Guidelines for diagnosis and management of chronic obstructive pulmonary disease: joint recommendations of Indian Chest Society and National College of Chest Physicians. *Indian J Chest Dis Allied Sci* [Internet]. 2014 [tsiteeritud 24. november 2019];56. Available at: <http://medind.nic.in/iae/t14/s1/iaet14s1.pdf>
125. McCrory DC, Brown CD. Anti-cholinergic bronchodilators versus beta2-sympathomimetic agents for acute exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2002;(4):CD003900.
126. van Geffen WH, Douma WR, Slebos DJ, Kerstjens HA. Bronchodilators delivered by nebuliser versus pMDI with spacer or DPI for exacerbations of COPD. *Cochrane Database Syst Rev.* 2016;(8):CD011826.
127. Vollenweider DJ, Frei A, Steurer-Stey CA et al. Antibiotics for exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2018;10:CD010257.
128. Stockley RA, O'Brien C, Pye A, Hill SL. Relationship of sputum color to nature and outpatient management of acute exacerbations of COPD. *Chest.* 2000;117(6):1638–45.
129. Miravittles M, Kruesmann F, Haverstock D et al. Sputum colour and bacteria in chronic bronchitis exacerbations: a pooled analysis. *Eur Respir J.* 2012;39(6):1354–60.
130. Stolbrink M, Amiry J, Blakey JD. Does antibiotic treatment duration affect the outcomes of exacerbations of asthma and COPD? A systematic review. *Chron Respir Dis.* 2018;15(3):225–40.
131. National Institute for Health and Care Excellence. Chronic obstructive pulmonary disease (acute exacerbation): antimicrobial prescribing (NG114) [Internet]. 2019. Available at: <https://www.nice.org.uk/guidance/ng114/resources/chronic-obstructive-pulmonary-disease-acute-exacerbation-antimicrobial-prescribing-pdf-66141598418629>
132. Dimopoulos G, Siempos II, Korbil IP et al. Comparison of First-Line With Second- Line Antibiotics for Acute Exacerbations of Chronic Bronchitis. *Chest.* 2007;132(2):447–55.
133. Siempos II, Dimopoulos G, Korbila IP et al. Macrolides, quinolones and amoxicillin/clavulanate for chronic bronchitis: a meta-analysis. *Eur Respir J.* 2007;29(6):1127–37.
134. Petitpretz P, Choné C, Trémolières F and Investigator Study Group. Levofloxacin 500 mg once daily versus cefuroxime 250 mg twice daily in patients with acute exacerbations of chronic obstructive bronchitis: clinical efficacy and exacerbation-free interval. *Int J Antimicrob Agents.* 2007;30(1):52–9.
135. Korbila IP, Manta KG, Siempos II et al. Penicillins vs trimethoprim-based regimens for acute bacterial exacerbations of chronic bronchitis: meta-analysis of randomized controlled trials. *Can Fam Physician.* 2009;55(1):60–7.
136. Maltais F, Ostinelli J, Bourbeau J, et al. Comparison of nebulized budesonide and oral prednisolone with placebo in the treatment of acute exacerbations of chronic obstructive pulmonary disease: a randomized controlled trial. *Am J Respir Crit Care Med.* 2002;165(5):698–703.
137. Thompson WH, Nielson CP, Carvalho P, Charan NB, Crowley JJ. Controlled trial of oral prednisone in outpatients with acute COPD exacerbation. *Am J Respir Crit Care Med.* 1996;154(2):407–12.
138. Alia I, de la Cal MA, Esteban A, et al. Efficacy of corticosteroid therapy in patients with an acute exacerbation of chronic obstructive pulmonary disease receiving ventilatory support. *Arch Intern Med.* 2011;171(21):1939–46.
139. Aaron SD, Vandemheen KL, Hevert P et al. Outpatient oral prednisone after emergency treatment of chronic obstructive pulmonary disease. *N Engl J Med.* 2003;348(26):2618–25.
140. Niewoehner DE, Erbland ML, Deupree RH, et al. Effect of systemic glucocorticoids on exacerbations of chronic obstructive pulmonary disease. Department of Veterans Affairs Cooperative Study Group. *N Engl J Med.* 1999;340(25):1941–7.
141. de Jong YP, Uil SM, Grotjohan HP et al. Oral or IV prednisolone in the treatment of COPD exacerbations: a randomized, controlled, double-blind study. *Chest.* 2007;132(6):1741–7.

142. Wedzicha JA, Miravittles M, Hurs JR et al. Management of COPD exacerbations: a European Respiratory Society/American Thoracic Society guideline. *Eur Respir J*. 2017;49(3).
143. Walters JA, Tan DJ, White CJ, Wood-Baker R. Different durations of corticosteroid therapy for exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2018;3:CD006897.
144. Alison JA, McKeough ZJ, Johnston K et al. Australian and New Zealand Pulmonary Rehabilitation Guidelines. *Respirology*. 2017;22(4):800–19.
145. Revitt O, Swewll L, Singh S. Early versus delayed pulmonary rehabilitation: A randomized controlled trial – Can we do it? *Chronic Respiratory Disease*. 2018;15(3):323–6.
146. Greening NJ, Williams JEA, Hussain SF et al. An early rehabilitation intervention to enhance recovery during hospital admission for an exacerbation of chronic respiratory disease: randomised controlled trial. *BMJ*. 2014;349:g4315.
147. Puhan MA, Spaar A, Frey M, et al. Early versus Late Pulmonary Rehabilitation in Chronic Obstructive Pulmonary Disease Patients with Acute Exacerbations: A Randomized Trial. *Respiration*. 2012;83(6):499–506.
148. Rysør CK, Godtfredsen NS, Kofod LM, et al. Lower mortality after early supervised pulmonary rehabilitation following COPD-exacerbations: a systematic review and meta-analysis. *BMC Pulm Med*. 2018;18(1):154.
149. Puhan MA, Gimeno-Santos E, Cates CJ et al. Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2016;12:CD005305.
150. Ko FWS, Cheung NK, Rainer TH et al. Comprehensive care programme for patients with chronic obstructive pulmonary disease: a randomised controlled trial. *Thorax*. 2017;72(2):122–8.
151. Spruit MA, Singh SJ, Garvey C et al. An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. *Am J Respir Crit Care Med*. 2013;188(8):13–64.
152. Bolton CE, Bevan-Smith EF, Blakey JD et al. British Thoracic Society guideline on pulmonary rehabilitation in adults. *Thorax*. 2013;68 Suppl 2:1–30.
153. Quanjer PH, Stanojevic S, Cole TJ et al. Multi-ethnic reference values for spirometry for the 3-95-yr age range: the global lung function 2012 equations. *Eur Respir J*. 2012;40(6):1324–43.
154. Miller MR, Hankinson J, Brusasco V et al. Standardisation of spirometry. *Eur Respir J*. 2005;26(2):319–38.
155. Graham BL, Steenbruggen I, Miller MR et al. Standardization of Spirometry 2019 Update. An Official American Thoracic Society and European Respiratory Society Technical Statement. *Am J Respir Crit Care Med*. 2019;200(8):70–88.
156. Anaesthetic and respiratory equipment: spirometers intended for the measurement of time forced expired volumes in humans [Internet]. International Organization for Standardization; 2016. Available at: <https://www.iso.org/standard/43761.html>