**Environmental tobacco smoke exposure and COPD - A systematic review**

**Peter N Lee, Barbara A Forey, Katharine J Coombs, Jan S Hamling and Alison J Thornton**

**Supplementary file 1**

**Rejected studies**

 In preparing the tables and figure in this document certain papers which might be thought to provide relevant data have not been referred to. For each of these papers, this appendix notes the authors, date of publication and country and the reasons for not referring to them. However papers excluded because they give results for symptoms or lung function parameters which do not equate to COPD are not mentioned in this appendix (except where the symptoms are equivalent to chronic bronchitis).

* Hirayama *et al* 1981(1), Japan : Only results for emphysema and asthma combined given, with results for a more appropriate index (emphysema and chronic bronchitis) available elsewhere(2).
* Jones *et al* 1983(3), USA : Results given for comparison of lowest vs highest quartile of FEV1, which does not equate to COPD.
* Hirayama *et al* 1987(4), Japan : Gives less complete results than presented in the paper used(2).
* Kalandidi *et al* 1990(5), Greece : Gives essentially the same data as that presented in the letter used(6).
* Pope and Xu 1993(7), China : “Chest illness” defined as chest illness with increased cough or phlegm during the last 3 years does not equate to COPD.
* Robbins *et al* 1993(8), USA : This study describes results of a study in non-smokers relating definite symptoms of airway obstructive disease to ETS exposure. 15% of subjects had a history of past smoking. There is a statement that analyses were repeated using only data for never smokers, but detailed results are not given.
* Leuenberger *et al* 1994(9), Switzerland : “Chronic bronchitis symptoms” (cough or phlegm for 3 months per year for more than 2 years) does not equate to COPD.
* Knutsen *et al* 1995(10), USA : Based on same subjects as(11), therefore doubtful that analysis reported is restricted to never smokers.
* Whittemore *et al* 1995(12), USA : No results for ETS exposure.
* Dennis *et al* 1996(13), Colombia : No analyses restricted to never smokers.
* Piitulainen *et al* 1998(14), Sweden : A study of alpha 1-antitrypsin deficient non-smokers which mainly concerns lung function. The definition of chronic bronchitis used (daily cough with phlegm at least 3 months per year) does not equate to COPD.
* Berglund *et al* 1999(11), USA : No analyses restricted to never smokers.
* Simoni et al 2001(15), Italy : No results for COPD.
* Birring *et al* 2002(16), England : No control group.
* Garcia-Aymerich *et al* 2003(17), Spain : No control group. No analyses restricted to never smokers.
* Fidan *et al* 2004(18), Turkey : Uses coffeehouse employment as surrogate measure of ETS exposure. No analyses restricted to never smokers.
* Nihlen *et al* 2004(19), Sweden : No analyses restricted to never smokers.
* Svanes *et al* 2004(20), 17 countries in 3 continents : “Chronic bronchitis” (both regular cough and regular phlegm) does not equate to COPD.
* Upton *et al* 2004(21), UK : Results for endpoint of COPD available for ever smokers only, none of the measures of lung function considered for never smokers equates to COPD.
* Behrendt 2005(22), USA : Provides results for ETS exposure at home and at work, and by severity of COPD, in addition to results already included from this study(23), but non-smoker definition includes former smokers up to 5 pack-years.
* Eisner *et al* 2005(24), USA : No analyses restricted to never smokers.
* Kotaniemi *et al* 2005(25), Finland : No analyses restricted to never smokers.
* Vineis *et al* 2005(26), 6 European countries : No analyses restricted to never smokers.
* Wang *et al* 2005(27), China : No details of ETS exposure available for control subjects.
* Xu *et al* 2005(28), China : No analyses restricted to never smokers.
* Amigo *et al* 2006(29), Chile : No analyses restricted to never smokers.
* Eisner *et al* 2006(30), USA : No control group.
* Jindal *et al* 2006(31), India : The definition of COPD used “Presence of cough with expectoration for more than three months in a year for the past two or more years” is actually a definition of the chronic bronchitis syndrome and does not equate to COPD.
* Kałucka 2006(32), Poland : No analyses restricted to never smokers.
* Mohangoo *et al* 2006(33), Netherlands : No analyses restricted to never smokers.
* Price *et al* 2006(34), USA : Never smokers not studied.
* Sunyer *et al* 2006(35), 10 European countries : definition of chronic bronchitis used (chronic phlegm for more than three months each year) does not equate to COPD.
* Chan-Yeung *et al* 2007(36), Hong Kong: No analyses restricted to never smokers.
* Ebbert *et al* 2007(37), USA : No unexposed group.
* Eisner *et al* 2007(38), USA : Describes longitudinal decline in lung function rather than incidence of COPD. Includes smokers with less than 10 pack years or who quit 20 or more years ago.
* Hill *et al* 2007(39), New Zealand : Presents data for an endpoint of respiratory deaths which, although it includes COPD, is too wide to be considered in this review.
* Kalucka 2007(40), Poland : No analyses restricted to never smokers.
* Osman *et al* 2007(41), Scotland : No control group and no analyses restricted to never smokers.
* Simoni *et al* 2007(42), Italy : Presents results for workplace exposure, in addition to spousal exposure previously reported for this study.(43) However, the outcomes presented are less appropriate (OLD including asthma, and various respiratory symptoms).
* Sur and Mukhopadhyay 2007(44), India : Smoking habits of individuals not assessed, families being classified as containing or not containing a smoker.
* Beyer *et al* 2008(45), Germany : No control group. Study of exacerbation rate in subjects with pre-existing disease.
* Lamprecht et al 2008(46), Austria : Presents data for subset of subjects included in paper used for this study(47).
* Nataraja 2008(48), China : Gives less complete data than paper already used for this study(49).
* Vierikko *et al* 2008(50), Finland : Presents data for endpoint of emphysema only in asbestos-exposed workers. No analyses restricted to never smokers except statement that no significant differences were found.
* Vozoris and Lougheed 2008(51), Canada: Presents data for endpoints of self-reported physician-diagnosed chronic bronchitis and emphysema which cannot be combined due to lack of information on cases with both conditions.
* Eisner *et al* 2009(52), USA : No control group. Analyses not restricted to never smokers. Results for short-term ETS exposure already reported for this study(30).
* Evans and Chen 2009(53), Canada : Presents results for endpoint of self-reported physician-diagnosed chronic bronchitis, which does not equate to COPD.
* Lai *et al* 2009(54), Hong Kong : Adolescent subjects. Endpoint of respiratory symptoms (persistent cough or sputum for 3 consecutive months in past 12 months) does not equate to COPD.
* Schwartz *et al* 2009(55), USA: No analyses restricted to never smokers.
* Sleszycka *et al* 2009(56), Poland : Study of COPD prevalence in subjects with severe peripheral arterial disease. No analyses restricted to never smokers.
* Lam *et al* 2010(57), China : ETS exposure only considered as potential confounder in analyses for other exposures.
* Lovasi *et al* 2010(58), USA : Endpoint of emphysema only.
* Lu *et al* 2010(59), China: No results for ETS exposure.
* Naiman *et al* 2010(60), Canada : ETS exposure only considered as potential confounder in analyses for other exposures.
* Roche *et al* 2010(61), France : Endpoint of chronic bronchitis only. No analyses restricted to never smokers.
* Tiberti *et al* 2010(62), Italy : No analyses restricted to never smokers.
* Zhou *et al* 2010(63), China : No analyses restricted to never smokers.
* Al Zaabi *et al* 2011(64), UAE : No analyses restricted to never smokers.
* Beatty *et al* 2011(65), USA : No analyses restricted to never smokers for endpoint of COPD, only chronic bronchitis.
* Hersh *et al* 2011(66), USA : No analyses restricted to never smokers.
* Yin *et al* 2011(67), China : ETS exposure only considered as potential confounder in analyses for other exposures.
* González-Garcia *et al* 2012(68), Colombia : No control group. Participants selected for tobacco smoke exposure.
* Hagstad *et al* 2012(69), Sweden : Superseded by(70), of which it appears to be a subset of participants. (However, note that results for childhood exposure from the earlier paper are still cited in the paper).
* Hooper *et al* 2012(71), 14 countries : No analyses restricted to never smokers. Data already presented for this study(47).
* Jindal *et al* 2012(72), India : Endpoint of chronic bronchitis only.
* Johannessen *et al* 2012(73), Norway : No analyses restricted to never smokers.
* Salameh *et al* 2012(74), Lebanon : Case group includes COPD but is mostly made up of chronic bronchitis cases and results not given separately for COPD. No analyses restricted to never smokers.
* Mahesh *et al* 2013(75), India : Endpoint of chronic bronchitis only.
* Mohammad *et al* 2013(76), Syria : No analyses restricted to never smokers.
* Tutar *et al* 2013(77), Turkey : Endpoint of chronic bronchitis only.
* Zhang *et al* 2013(78), China : No results given for airway obstruction in relation to ETS exposure.
* Cai *et al* 2014(79), China : Economic study with no direct data on COPD incidence.
* Dijkstra *et al* 2014(80), The Netherlands : No analyses restricted to never smokers.
* Parasuramalu *et al* 2014(81), India : No analyses restricted to never smokers.
* Sekine *et al* 2014(82), Japan : No unexposed group.
* She *et al* 2014(83), China : No analyses restricted to never smokers.
* Zahran *et al* 2014(84), USA : No results given for COPD incidence in relation to ETS exposure.
* Golpe *et al* 2015(85), Spain : Study of prognosis in COPD patients rather than incidence.
* Guo *et al* 2015(86), China : Study of FEV1 decline rather than COPD.
* Hagsta *et al* 2015, (87), Sweden : Less detailed results than given by(70).
* Jebrak *et al* 2015(88), France : Case-series of COPD patients with no comparison group.
* O’Brien *et al* 2015(89), Ireland : No analyses restricted to never smokers.
* Örnek *et al* 2015(90), Turkey : No analyses restricted to never smokers.
* Turan 2015(91), Turkey : No analyses restricted to never smokers.
* Yang *et al* 2015(92), China : No analyses restricted to never smokers. No analyses with COPD as separate endpoint.
* Yang *et al* 2015(93), China : No analyses restricted to never smokers.
* Koeverden *et al* 2015(94), USA : No analyses restricted to never smokers.

References

1. Hirayama T. Non-smoking wives of heavy smokers have a higher risk of lung cancer: a study from Japan. *Br Med J* 1981;282:183-5.

2. Hirayama T. Lung cancer in Japan: effects of nutrition and passive smoking. In: Mizell M, Correa P, eds. *Lung cancer: causes and prevention.* Proceedings of International Lung Cancer Update Conference,March 3-5, 1983,New Orleans, Louisiana. Deerfield Beach, Florida: Verlag Chemie International, Inc; 1984. p. 175-95. Data clarifications appear in Passive smoking [Letter]. *N Z Med J* 1990;103(883):54 [PMID: 2304698].

3. Jones JR, Higgins ITT, Higgins MW, Keller JB. Effects of cooking fuels on lung function in nonsmoking women. *Arch Environ Health* 1983;38(4):219-22.

4. Hirayama T. Passive smoking and cancer: an epidemiological review. In: Aoki K, Kurihara M, Miller W, Muir CS, eds. *Changing cancer patterns and topics in cancer epidemiology. In Memory of Professor Mitsuo Segi*, vol 33. GANN Monograph on Cancer Research. Basel, Switzerland: S. Karger AG; 1987. p. 127-35.

5. Kalandidi A, Trichopoulos D, Hatzakis A, Tzannes S, Saracci R. The effect of involuntary smoking on the occurrence of chronic obstructive pulmonary disease. *Soz Praventivmed* 1990;35:12-6.

6. Kalandidi A, Trichopoulos D, Hatzakis A, Tzannes S, Saracci R. Passive smoking and chronic obstructive lung disease. [Letter] *Lancet* 1987;2:1325-6.

7. Pope CA, III, Xu X. Passive cigarette smoke, coal heating, and respiratory symptoms of nonsmoking women in China. *Environ Health Perspect* 1993;101:314-6.

8. Robbins AS, Abbey DE, Lebowitz MD. Passive smoking and chronic respiratory disease symptoms in non-smoking adults. *Int J Epidemiol* 1993;22(5):809-17.

9. Leuenberger P, Schwartz J, Ackermann-Liebrich U, Blaser K, Bolognini G, Bongard JP, et al. Passive smoking exposure in adults and chronic respiratory symptoms (SAPALDIA study). *Am J Respir Crit Care Med* 1994;150:1222-8.

10. Knutsen SF, Abbey D, Burchette R, Peters J. Passive smoking, chronic respiratory disease symptoms and lung function. [Abstract] *Epidemiology* 1995;6(4):13S.

11. Berglund DJ, Abbey DE, Lebowitz MD, Knutsen SF, McDonnell WF. Respiratory symptoms and pulmonary function in an elderly nonsmoking population. *Chest* 1999;115:49-59.

12. Whittemore AS, Perlin SA, DiCiccio Y. Chronic obstructive pulmonary disease in lifelong nonsmokers: results from NHANES. *Am J Public Health* 1995;85(5):702-6.

13. Dennis RJ, Maldonado D, Norman S, Baena E, Martinez G. Woodsmoke exposure and risk for obstructive airways disease among women. *Chest* 1996;109:115-9.

14. Piitulainen E, Tornling G, Eriksson S. Environmental correlates of impaired lung function in non-smokers with severe α1-antitrypsin deficiency (PiZZ). *Thorax* 1998;53:939-43.

15. Simoni M, Carrozzi L, Baldacci S, Pedreschi M, Di Pede F, Angino A, et al. Characteristics of women exposed and unexposed to environmental tobacco smoke (ETS) in a general population sample of North Italy (Po River Delta epidemiological study). *Eur J Epidemiol* 2001;17(4):363-8.

16. Birring SS, Brightling CE, Bradding P, Entwisle JJ, Vara DD, Grigg J, et al. Clinical, radiologic, and induced sputum features of chronic obstructive pulmonary disease in nonsmokers: a descriptive study. *Am J Respir Crit Care Med* 2002;166(8):1078-83.

17. Garcia-Aymerich J, Farrero E, Felez MA, Izquierdo J, Marrades RM, Anto JM. Risk factors of readmission to hospital for a COPD exacerbation: a prospective study. *Thorax* 2003;58(2):100-5.

18. Fidan F, Cimrin AH, Ergor G, Sevinc C. Airway disease risk from environmental tobacco smoke among coffeehouse workers in Turkey. *Tob Control* 2004;13(2):161-6.

19. Nihlén U, Nyberg P, Montnémery P, Löfdahl C-G. Influence of family history and smoking habits on the incidence of self-reported physician's diagnosis of COPD. *Respir Med* 2004;98(3):263-70.

20. Svanes C, Omenaas E, Jarvis D, Chinn S, Gulsvik A, Burney P. Parental smoking in childhood and adult obstructive lung disease: results from the European Community Respiratory Health Survey. *Thorax* 2004;59:295-302. Available from: Additional tables available from [www.thoraxjnl.com/supplemental](file:///%5C%5CQnap-1%5Cndrive%5CRLMETA%5CETSCOPD%5Cwww.thoraxjnl.com%5Csupplemental).

21. Upton MN, Davey Smith G, McConnachie A, Hart CL, Watt GCM. Maternal and personal cigarette smoking synergize to increase airflow limitation in adults. *Am J Respir Crit Care Med* 2004;169(4):479-87.

22. Behrendt CE. Mild and moderate-to-severe COPD in nonsmokers: distinct demographic profiles. *Chest* 2005;128(3):1239-44.

23. Celli BR, Halbert RJ, Nordyke RJ, Schau B. Airway obstruction in never smokers: results from the Third National Health and Nutrition Examination Survey. *Am J Med* 2005;118(12):1364-72.

24. Eisner MD, Balmes J, Katz PP, Trupin L, Yelin EH, Blanc PD. Lifetime environmental tobacco smoke exposure and the risk of chronic obstructive pulmonary disease. *Environ Health* 2005;4(1):7-14.

25. Kotaniemi J-T, Sovijärvi A, Lundbäck B. Chronic obstructive pulmonary disease in Finland: prevalence and risk factors. *COPD* 2005;2(3):331-9.

26. Vineis P, Airoldi L, Veglia F, Olgiati L, Pastorelli R, Autrup H, et al. Environmental tobacco smoke and risk of respiratory cancer and chronic obstructive pulmonary disease in former and never smokers in the EPIC prospective study. *BMJ* 2005;330:277-80.

27. Wang X, Zhou Y, Zeng X, Liu S, Qiu R, Xie J, et al. (Study on the prevalence rate of chronic obstructive pulmonary disease in northern part of Guangdong province). *Zhonghua Liu Xing Bing Xue Za Zhi* 2005;26(3):211-3.

28. Xu F, Yin X, Zhang M, Shen H, Lu L, Xu Y. Prevalence of physician-diagnosed COPD and its association with smoking among urban and rural residents in regional mainland China. *Chest* 2005;128(4):2818-23.

29. Amigo H, Erazo M, Oyarzun M, Bello S, Peruga A. Tabaquismo y enfermedad pulmonar obstructiva crónica: determinación de fracciones atribuibles (Smoking and chronic obstructive pulmonary disease: attributable risk determination). *Rev Med Chil* 2006;134(10):1275-82.

30. Eisner MD, Balmes J, Yelin EH, Katz PP, Hammond SK, Benowitz N, et al. Directly measured secondhand smoke exposure and COPD health outcomes. *BMC Pulm Med* 2006;6:12.

31. Jindal SK, Aggarwal AN, Chaudhry K, Chhabra SK, D'Souza GA, Gupta D, et al. A multicentric study on epidemiology of chronic obstructive pulmonary disease and its relationship with tobacco smoking and environmental tobacco smoke exposure. *Indian J Chest Dis Allied Sci* 2006;48(1):23-9.

32. Kałucka S. Występowanie POChP w rodzinie osoby palącej papierosy (The occurrence of chronic obstructive pulmonary disease (COPD) in cigarette smoking families). *Przegl Lek* 2006;63(10):848-57.

33. Mohangoo AD, van der Linden MW, Schellevis FG, Raat H. Prevalence estimates of asthma or COPD from a health interview survey and from general practitioner registration: what's the difference? *Eur J Public Health* 2006;16(1):101-5.

34. Price DB, Tinkelman DG, Halbert RJ, Nordyke RJ, Isonaka S, Nonikov D, et al. Symptom-based questionnaire for identifying COPD in smokers. *Respiration* 2006;73(3):285-95.

35. Sunyer J, Jarvis D, Gotschi T, Garcia-Esteban R, Jacquemin B, Aguilera I, et al. Chronic bronchitis and urban air pollution in an international study. *Occup Environ Med* 2006;63(12):836-43.

36. Chan-Yeung M, Ho ASS, Cheung AHK, Liu RWT, Yee WKS, Sin KM, et al. Determinants of chronic obstructive pulmonary disease in Chinese patients in Hong Kong. *Int J Tuberc Lung Dis* 2007;11(5):502-7.

37. Ebbert JO, Croghan IT, Schroeder DR, Murawski J, Hurt RD. Association between respiratory tract diseases and secondhand smoke exposure among never smoking flight attendants: a cross-sectional survey. *Environ Health* 2007;6:28.

38. Eisner MD, Wang Y, Haight TJ, Balmes J, Hammond SK, Tager IB. Secondhand smoke exposure, pulmonary function, and cardiovascular mortality. *Ann Epidemiol* 2007;17(5):364-73.

39. Hill SE, Blakely T, Kawachi I, Woodward A. Mortality among lifelong nonsmokers exposed to secondhand smoke at home: cohort data and sensitivity analyses. *Am J Epidemiol* 2007;165(5):530-40.

40. Kałucka S. Następstwa biernego tytoniu palenia w środowisku domowym (Consequences of passive smoking in home environment). *Przegl Lek* 2007;64(10):632-41.

41. Osman LM, Douglas JG, Garden C, Reglitz K, Lyon J, Gordon S, et al. Indoor air quality in homes of patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2007;176(5):465-72.

42. Simoni M, Baldacci S, Puntoni R, Pistelli F, Farchi S, Lo Presti E, et al. Respiratory symptoms/diseases and environmental tobacco smoke (ETS) in never smoker Italian women. *Respir Med* 2007;101(3):531-8.

43. Forastiere F, Mallone S, Lo Presti E, Baldacci S, Pistelli F, Simoni M, et al. Characteristics of nonsmoking women exposed to spouses who smoke: epidemiologic study on environment and health in women from four Italian areas. *Environ Health Perspect* 2000;108(12):1171-89.

44. Sur D, Mukhopadhyay SP. A study on smoking habits among slum dwellers and the impact on health and economics. *J Indian Med Assoc* 2007;105(9):492-6, 8.

45. Beyer D, Mitfessel H, Gillissen A. Einfluss einer elterlichen passivrauchexposition im kindes- und jagendalter auf lungenfunktion und exazerbationstrate bei COPD-patienten (Parental smoking and passive smoke exposure in childhood promotes the COPD exacerbation rate). *Pneumologie* 2008;62(9):520-6.

46. Lamprecht B, Schirnhofer L, Kaiser B, Buist S, Studnicka M. Non-reversible airway obstruction in never smokers: results from the Austrian BOLD study. *Respir Med* 2008;102(12):1833-8.

47. Lamprecht B, McBurnie MA, Vollmer WM, Gudmundsson G, Welte T, Nizankowska-Mogilnicka E, et al. COPD in never smokers: results from the population-based Burden of Obstructive Lung Disease study. *Chest* 2011;139(4):752-63.

48. Nataraja A. Passive smoking exposure is associated with an increased risk of COPD. *Thorax* 2008;63(1):48.

49. Yin P, Jiang CQ, Cheng KK, Lam TH, Lam KH, Miller MR, et al. Passive smoking exposure and risk of COPD among adults in China: the Guangzhou Biobank Cohort Study. *Lancet* 2007;370(9589):751-7.

50. Vierikko T, Järvenpää R, Uitti J, Virtema P, Oksa P, Jaakkola MS, et al. The effects of secondhand smoke exposure on HRCT findings among asbestos-exposed workers. *Respir Med* 2008;102(5):658-64.

51. Vozoris N, Lougheed MD. Second-hand smoke exposure in Canada: prevalence, risk factors, and association with respiratory and cardiovascular diseases. *Can Respir J* 2008;15(5):263-9.

52. Eisner MD, Jacob P, III, Benowitz NL, Balmes J, Blanc PD. Longer term exposure to secondhand smoke and health outcomes in COPD: impact of urine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol. *Nicotine Tob Res* 2009;11(8):945-53.

53. Evans J, Chen Y. The association between home and vehicle environmental tobacco smoke (ETS) and chronic bronchitis in a Canadian population: the Canadian Community Health Survey, 2005. *Inhal Toxicol* 2009;21(3):244-9.

54. Lai H-K, Ho S-Y, Wang M-P, Lam T-H. Secondhand smoke and respiratory symptoms among adolescent current smokers. *Pediatrics* 2009;124(5):1306-10.

55. Schwartz AG, Cote ML, Wenzlaff AS, Van Dyke A, Chen W, Ruckdeschel JC, et al. Chronic obstructive lung diseases and risk of non-small cell lung cancer in women. *J Thorac Oncol* 2009;4(3):291-9.

56. Śleszycka J, Woźniak K, Banaszek M, Wiechno W, Domagała-Kulawik J. Częstość występowania oraz trudności w diagnozowaniu POchP u chroych na zaawansowaną miażdżycę zarostową tętnic kończyn dolnych (Prevalence and difficulties in chronic obstructive pulmonary disease diagnosis in patients suffering from severe peripheral arterial disease). *Pol Merkur Lekarski* 2009;27(158):92-6.

57. Lam K-BH, Jiang CQ, Jordan RE, Miller MR, Zhang WS, Cheng KK, et al. Prior TB, smoking, and airflow obstruction: a cross-sectional analysis of the Guangzhou Biobank Cohort Study. *Chest* 2010;137(3):593-600.

58. Lovasi GS, Diez-Roux AV, Hoffman EA, Kawut SM, Jacobs DR, Jr., Barr RG. Association of environmental tobacco smoke exposure in childhood with early emphysema in adulthood among nonsmokers: the MESA-Lung Study. *Am J Epidemiol* 2010;171(1):54-62.

59. Lu M, Yao W, Zhong N, Zhou Y, Wang C, Chen P, et al. Chronic obstructive pulmonary disease in the absence of chronic bronchitis in China. *Respirology* 2010;15(7):1072-8.

60. Naiman A, Glazier RH, Moineddin R. Association of anti-smoking legislation with rates of hospital admission for cardiovascular and respiratory conditions. *Can Med Assoc J* 2010;182(8):761-7.

61. Roche N, Gaillat J, Garre M, Meunier JP, Lemaire N, Bendjenana H. Acute respiratory illness as a trigger for detecting chronic bronchitis in adults at risk of COPD: a primary care survey. *Prim Care Respir J* 2010;19(4):371-7.

62. Tiberti S, Masedu F, Valenti M. BPCO: studio trasversale di prevalenza e programma di screening in un'area a rischio nel delta del Po (COPD: cross-sectional study and screening in the Po River delta (Italy)). *Ann Ig* 2010;22(6):583-99.

63. Zhou Y, Hu G, Wang D, Wang S, Wang Y, Liu Z, et al. Community based integrated intervention for prevention and management of chronic obstructive pulmonary disease (COPD) in Guangdong, China: cluster randomised controlled trial. *BMJ* 2010;341:c6387.

64. Al Zaabi A, Asad F, Abdou J, Al Musaabi H, Al Saiari MB, Buhussien ASM, et al. Prevalence of COPD in Abu Dhabi, United Arab Emirates. *Respir Med* 2011;105(4):566-70.

65. Beatty AL, Haight TJ, Redberg RF. Associations between respiratory illnesses and secondhand smoke exposure in flight attendants: A cross-sectional analysis of the Flight Attendant Medical Research Institute Survey. *Environ Health* 2011;10(1):81.

66. Hersh CP, Hokanson JE, Lynch DA, Washko GR, Make BJ, Crapo JD, et al. Family history is a risk factor for COPD. *Chest* 2011;140(2):343-50.

67. Yin P, Zhang M, Li Y, Jiang Y, Zhao W. Prevalence of COPD and its association with socioeconomic status in China: findings from China Chronic Disease Risk Factor Surveillance 2007. *BMC Public Health* 2011;11:586.

68. González-García M, Torres-Duque CA, Bustos A, Jaramillo C, Maldonado D. Bronchial hyperresponsiveness in women with chronic obstructive pulmonary disease related to wood smoke. *Int J Chron Obstruct Pulmon Dis* 2012;7:367-73.

69. Hagstad S, Ekerljung L, Lindberg A, Backman H, Rönmark E, Lundbäck B. COPD among non-smokers - report from the obstructive lung disease in Northern Sweden (OLIN) studies. *Respir Med* 2012;106(7):980-8.

70. Hagstad S, Bjerg A, Ekerljung L, Backman H, Lindberg A, Ronmark E, et al. Passive smoking exposure is associated with increased risk of COPD in never-smokers. *Chest* 2014;145(6):1298-304.

71. Hooper R, Burney P, Vollmer WM, McBurnie MA, Gislason T, Tan WC, et al. Risk factors for COPD spirometrically defined from the lower limit of normal in the BOLD project. *Eur Respir J* 2012;39(6):1343-53.

72. Jindal SK, Aggarwal AN, Gupta D, Agarwal R, Kumar R, Kaur T, et al. Indian study on epidemiology of asthma, respiratory symptoms and chronic bronchitis in adults (INSEARCH). *Int J Tuberc Lung Dis* 2012;16(9):1270-7.

73. Johannessen A, Bakke PS, Hardie JA, Eagan TML. Association of exposure to environmental tobacco smoke in childhood with chronic obstructive pulmonary disease and respiratory symptoms in adults. *Respirology* 2012;17(3):499-505.

74. Salameh P, Salame J, Khayat G, Akhdar A, Ziadeh C, Azizi S, et al. Exposure to outdoor air pollution and chronic bronchitis in adults: a case-control study. *Int J Occup Environ Med* 2012;3(4):165-77.

75. Mahesh PA, Jayaraj BS, Prabhakar AK, Chaya SK, Vijaysimha R. Identification of a threshold for biomass exposure index for chronic bronchitis in rural women of Mysore district, Karnataka, India. *Indian J Med Res* 2013;137(1):87-94.

76. Mohammad Y, Shaaban R, Al-Zahab BA, Khaltaev N, Bousquet J, Dubaybo B. Impact of active and passive smoking as risk factors for asthma and COPD in women presenting to primary care in Syria: first report by the WHO-GARD survey group. *Int J Chron Obstruct Pulmon Dis* 2013;8:473-82.

77. Tutar N, Yeşilkaya S, Memetoğlu ME, Özel D, Boşnak E. Gümüşhane il merkezinde yaşayan erişkinlerde kronik bronşit prevalansı [The prevalence of chronic bronchitis in adults living in the center of Gumushane]. *Tuberk Toraks* 2013;61(3):209-15.

78. Zhang Q, Li L, Smith M, Guo Y, Whitlock G, Bian Z, et al. Exhaled carbon monoxide and its associations with smoking, indoor household air pollution and chronic respiratory diseases among 512,000 Chinese adults. *Int J Epidemiol* 2013;42(5):1464-75.

79. Cai Y, Schikowski T, Adam M, Buschka A, Carsin AE, Jacquemin B, et al. Cross-sectional associations between air pollution and chronic bronchitis: an ESCAPE meta-analysis across five cohorts. *Thorax* 2014;69(11):1005-14.

80. Dijkstra AE, de Jong K, Boezen HM, Kromhout H, Vermeulen R, Groen HJ, et al. Risk factors for chronic mucus hypersecretion in individuals with and without COPD: influence of smoking and job exposure on CMH. *Occup Environ Med* 2014;71(5):346-52.

81. Parasuramalu BG, Huliraj N, Prashanth Kumar SP, Gangaboraiah, Ramesh Masthi NR, Srinivasa Babu CR. Prevalence of chronic obstructive pulmonary disease and its association with tobacco smoking and environmental tobacco smoke exposure among rural population. *Indian J Public Health* 2014;58(1):45-9.

82. Sekine Y, Yanagibori R, Suzuki K, Sugiyama S, Yamaji H, Ishibashi M, et al. Surveillance of chronic obstructive pulmonary disease in high-risk individuals by using regional lung cancer mass screening. *Int J Chron Obstruct Pulmon Dis* 2014;9:647-56.

83. She J, Yang P, Wang Y, Qin X, Fan J, Wang Y, et al. Chinese water-pipe smoking and the risk of COPD. *Chest* 2014;146(4):924-31.

84. Zahran HS, Bailey CM, Qin X, Moorman JE. Assessing asthma severity among children and adults with current asthma. *J Asthma* 2014;51(6):610-7.

85. Golpe R, Mengual-Macenlle N, Sanjuan-Lopez P, Cano-Jimenez E, Castro-Anon O, Perez-de-Llano LA. Prognostic indices and mortality prediction in COPD caused by biomass smoke exposure. *Lung* 2015;193(4):497-503.

86. Guo C, Zhao Y, Cheng Y, Wang X, Li N, Liu J, et al. Analysis of factors associated with decline of FEV1 among community population in urban area of Beijing. *Zhonghua Jie He He Hu Xi Za Zhi* 2015;38(5):361-5.

87. Hagstad S, Backman H, Bjerg A, Ekerljung L, Ye X, Hedman L, et al. Prevalence and risk factors of COPD among never-smokers in two areas of Sweden - Occupational exposure to gas, dust or fumes is an important risk factor. *Respir Med* 2015;109(11):1439-45.

88. Jebrak G, Vicaire M, Murez A. BPCO : les patients parlent aux soignants. Enquete de la Federation francaise des associations et amicales de malades insuffisants ou handicapes respiratoires (FFAAIR). [COPD: Patients speak to doctors. Survey from the Federation francaise des associations et amicales de malades insuffisants ou handicapes respiratoires (FFAAIR)]. *Rev Mal Respir* 2015;32(5):500-12.

89. O'Brien ME, Pennycooke K, Carroll TP, Shum J, Fee LT, O'Connor C, et al. The impact of smoke exposure on the clinical phenotype of alpha-1 antitrypsin deficiency in Ireland: exploiting a national registry to understand a rare disease. *COPD* 2015;12 (Suppl 1):2-9.

90. Örnek T, Tor M, Kiran S, Atalay F. Prevalence of chronic obstructive pulmonary disease in Zonguldak province of Turkey. *Tuberk Toraks* 2015;63(3):170-7.

91. Turan O. Smoking status and the presence of chronic obstructive pulmonary disease in prison. *J Addict Med* 2015;9(2):118-22.

92. Yang J, Yu W, Zhou Q, Mahapatra T, Li Y, Zhang X, et al. Burden and correlates of non-communicable-diseases among rural residents: a cross-sectional study in Hebei, China. *BMC Public Health* 2015;15:571.

93. Yang L, Lu X, Deng J, Zhou Y, Huang D, Qiu F, et al. Risk factors shared by COPD and lung cancer and mediation effect of COPD: two center case-control studies. *Cancer Causes Control* 2015;26(1):11-24.

94. Koeverden I, Blanc PD, Bowler RP, Arjomandi M. Secondhand tobacco smoke and COPD risk in smokers: A COPD gene study cohort subgroup analysis. *COPD* 2015;12(2):182-9.