

## **Publications on multimorbidity**

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## Section A – Publications of the research team

Sasseville M, Chouinard MC, Fortin M. **Patient-reported outcomes in multimorbidity intervention research: A scoping review.** *Int J Nurs Stud.* 2018;77:145-153. [\[Full text\]](#)

Fortin M, Almirall J, Nicholson K. **Development of a research tool to document self-reported chronic conditions in primary care.** *J Comorb.* 2017;7(1):117-123. [\[Full text\]](#)

Stewart M, Fortin M, **Patient-Centred Innovations for Persons with Multimorbidity T. Patient-Centred Innovations for Persons with Multimorbidity: funded evaluation protocol.** *CMAJ Open.* 2017;5(2):E365-E372. [\[Full text\]](#)

Sasseville M, Stewart M, Bouhali T, Fortin M. **Relevant Outcomes for Patient-Centered Interventions for Persons with Multimorbidity: Experts' Discussion.** *Ann Fam Med.* 2017;15(4):388-389. [\[Full text\]](#)

Mokraoui NM, Haggerty J, Almirall J, Fortin M. **Prevalence of self-reported multimorbidity in the general population and in primary care practices: a cross-sectional study.** *BMC Res Notes.* 2016;9:314. [\[Full text\]](#)

Smith SM, Wallace E, O'Dowd T, Fortin M: **Interventions for improving outcomes in patients with multimorbidity in primary care and community settings.** *Cochrane Database Syst Rev* (2):CD003638. 2016;3:CD006560. [\[Full text\]](#)

Ramond-Roquin A, Fortin M: **Towards increased visibility of multimorbidity research.** *Journal of Comorbidity.* 2016;6:42–45. [\[Full text\]](#)

Ramond-Roquin A, Haggerty J, Lambert M, Almirall J, Fortin M: **Different Multimorbidity Measures Result in Varying Estimated Levels of Physical Quality of Life in Individuals with Multimorbidity: A Cross-Sectional Study in the General Population.** *Biomed Res Int.* 2016;2016:7845438. [\[Full text\]](#)

Bélanger A, Hudon C, Fortin M, Almirall J, Bouhali T, Chouinard M-C: **Validation of a French-language version of the health education impact Questionnaire (heiQ) among chronic disease patients seen in primary care: a cross-sectional study.** *Health Qual Life Outcomes.* 2015;13:64. [\[Full text\]](#)

Nicholson K, Terry AL, Fortin M, Williamson T, Thind A: **Understanding multimorbidity in primary health care.** *Can Fam Physician.* 2015;61(10):918, e489-990. [\[Full text\]](#)

Stewart M, Fortin M, Bouhali T, Denomme LB: **Success in leading collaborative research.** *Can Fam Physician.* 2015;61(6):565-566. [\[Full text\]](#)

Tonelli M, Wiebe N, Fortin M, Guthrie B, Hemmelgarn BR, James MT et al: **Methods for identifying 30 chronic conditions: application to administrative data.** *BMC Med Inform Decis Mak.* 2015;15:31. [\[Full text\]](#)

Fortin M, Haggerty J, Almirall J, Bouhali T, Sasseville M, Lemieux M. **Lifestyle factors and multimorbidity: a cross sectional study.** *BMC Public Health.* Jul 5 2014;14(1):686. [\[Full text\]](#)

Duguay C, Gallagher F, and Fortin F. **The unique experience of adults with multimorbidity: a qualitative study.** *Journal of Comorbidity* 2014;4:11–21. [\[Full text\]](#)

Smith SM, Bayliss EA, Mercer SW, Gunn J, Vestergaard M, Wyke S, Salisbury C, Fortin M. **How to design and evaluate interventions to improve outcomes for patients with multimorbidity.** *Journal of Comorbidity.* 2013;3:10-17. [\[Full text\]](#)

Almirall J, Fortin M. **The coexistence of terms to describe the presence of multiple concurrent diseases.** *Journal of Comorbidity.* 2013;3(1):4-9. [\[Full text\]](#)

Stewart M, Fortin M, Britt HC, Harrison CM, Maddocks HL. **Comparisons of multimorbidity in family practice--issues and biases.** *Fam Pract.* Aug 2013;30(4):473-480. [\[Full text\]](#)

Fortin M, Chouinard MC, Bouhali T, Dubois MF, Gagnon C, Belanger M. **Evaluating the integration of chronic disease prevention and management services into primary health care.** *BMC Health Serv Res.* 2013;13(1):132. [\[Full text\]](#)

Grabovschi C, Loignon C, Fortin M. **Mapping the concept of vulnerability related to health care disparities: a scoping review.** *BMC Health Serv Res.* 2013;13:94. [\[Full text\]](#)

Robichaud-Hallé L, Beaudry M, Fortin M. **Obstructive sleep apnea and multimorbidity.** *BMC Pulmonary Medicine.* 2012;12:60. [\[Full text\]](#)

Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. **Managing patients with multimorbidity: systematic review of interventions in primary care and community settings.** *BMJ.* 2012;345:e5205. [\[Full text\]](#)

Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. **Interventions for improving outcomes in patients with multimorbidity in primary care and community settings.** *Cochrane Database Syst Rev (2):CD003638.* 2012;4:CD006560. [\[Abstract Pubmed\]](#)

Hudon C, Fortin M, Poitras M-E, Almirall J. **The relationship between literacy and multimorbidity in a primary care setting.** *BMC Family Practice.* 2012;13:33 [\[Full Text\]](#).

Fortin M, Stewart M, Poitras M-E, Almirall J, Maddocks H. **A Systematic Review of Prevalence Studies on Multimorbidity: Toward a More Uniform Methodology.** *Ann Fam Med* 2012; 10:142-151. [\[Full text\]](#)

Poitras M-E, Fortin M, Hudon C, Haggerty J, Almirall J. **Validation of the disease burden morbidity assessment by self-report in a French-speaking population.** *BMC Health Service Research.* 2012;12:35. [\[Full Text\]](#)

Birtwhistle R, Pottie K, Shaw E, Dickinson JA, Brauer P, Fortin M, Bell N, Singh H, Tonelli M, Connor Gorber S, Lewin G, Joffres M, Parkin P: **Canadian Task Force on Preventive Health Care: We're back!** *Can Fam Physician* 2012;58: 13-15. [\[Abstract PubMed\]](#)

Fortin M, Contant E, Savard C, Hudon C, Poitras M-E, Almirall J. **Canadian guidelines for clinical practice: an analysis of their quality and relevance to the care of adults with comorbidity.** *BMC Family Practice* 2011;12:74. [\[Full Text\]](#)

Boyd CM, Fortin M. **Future of Multimorbidity research: How Should Understanding of Multimorbidity Inform Health System Design?** *Public Health Reviews* 2010;32. [\[Full Text\]](#)

Aarts S, van den Akker M, Tan FE, Verhey FR, Metsemakers JF, van Boxtel MP. **Influence of multimorbidity on cognition in a normal aging population: a 12-**

**year follow-up in the Maastricht Aging Study.** Int J Geriatr Psychiatry. 2011 ;26:1046-53. [\[Abstract PubMed\]](#)

Aarts S, van den Akker M, Hajema KJ, van Ingen AM, Metsemakers JF, Verhey FR, van Boxtel MP. **Multimorbidity and its relation to subjective memory complaints in a large general population of older adults.** Int Psychogeriatr. 2011; 23:616-24. [\[Abstract PubMed\]](#)

Loignon C, Haggerty JL, Fortin M, Bedos CP, Barbeau D, Allen D. **What makes primary care effective for people in poverty living with multiple chronic conditions?: study protocol.** BMC Health Services Research 2010, 10:320. [\[Full Text\]](#)

Fortin M, Hudon C, Gallagher F, Ntetu AL, Maltais D, Soubhi H. **Nurses joining family doctors in primary care practices: perceptions of patients with multimorbidity.** BMC Fam Pract. 2010 Nov 4;11:84. [\[Full Text\]](#)

Hudon C, St-Cyr Tribble D, Bravo G, Poitras ME. **Enablement in health care context: a concept analysis.** J Eval Clin Pract. 2010 Sep 2. 2011;17:143-9. [\[Abstract PubMed\]](#)

Haggerty J, Fortin M, Beaulieu M-D, Hudon, C., Loignon, C., Prévillle, M., Roberge, D. **At the interface of community and healthcare systems: a longitudinal cohort study on evolving health and the impact of primary healthcare from the patient's perspective.** BMC Health Services Research 2010;10:258. [\[Full text\]](#)

Hudon C, St-Cyr Tribble D, Légaré F, Bravo G, Fortin M, Almirall J. **Assessing enablement in clinical practice: a systematic review of available instruments.** J Eval Clin Pract. 2010; 16(6):1301-1308. [\[Abstract PubMed\]](#)

Fortin M, Steenbakkens K, Hudon C, Poitras ME, Almirall J, van den Akker M. **The electronic Cumulative Illness Rating Scale: a reliable and valid tool to assess multi-morbidity in primary care.** J Eval Clin Pract. 2011; 17(6):1089-1093. [\[Abstract PubMed\]](#)

Fortin M, Hudon C, Haggerty J, Akker M, Almirall J. **Prevalence estimates of multimorbidity: a comparative study of two sources.** BMC Health Serv Res. 2010 May 6;10:111. [\[Full text\]](#)

Howlett J, Morin L, Fortin M, Heckman G, Strachan PH, Suskin N, Shamian J, Lewanczuk R, Aurthur HM. **End-of-life planning in heart failure: it should be the end of the beginning.** Can J Cardiol. 2010 Mar;26(3):135-41. [\[Abstract PubMed\]](#)

Loignon C, Haggerty JL, Fortin M, Bedos CP, Allen D, Barbeau D. **Physicians' social competence in the provision of care to persons living in poverty: research protocol.** BMC Health Serv Res. 2010 Mar 25;10:79. [\[Full text\]](#)

Arthur HM, Suskin N, Bayley M, Fortin M, Howlett J, Heckman G, Lewanczuk R. **The Canadian Heart Health Strategy and Action Plan: Cardiac rehabilitation as an exemplar of chronic disease management.** Can J Cardiol. 2010 Jan;26(1):37-41. [\[Abstract PubMed\]](#)

Soubhi H, Bayliss EA, Fortin M, Hudon C, van den Akker M, Thivierge R, Posel N, Fleiszer D. **Learning and caring in communities of practice: using relationships and collective learning to improve primary care for patients with multimorbidity.** Ann Fam Med. 2010;8(2):170-7. [\[Full text\]](#)

Soubhi H, Gilbert J, Halaas G. **JRIPE, a new journal with a distinct function, content, and identity.** Journal of Research in Interprofessional Practice and Education. 2009;1:1. [\[Full text\]](#)

- Soubhi H, Colet NR, Gilbert JH, Lebel P, Thivierge RL, Hudon C, Fortin M. **Interprofessional learning in the trenches: fostering collective capability.** J Interprof Care. 2009;23:52-57. [\[Abstract PubMed\]](#)
- Hudon C, Fortin M, Dubois M-F, Almirall J. **Comorbidity and glycemia control among patients with type 2 diabetes in primary care.** Diabetes, metabolic syndrome and obesity. 2008;1:33-37. [\[Full text\]](#)
- Bayliss EA, Ellis JL, Steiner JF. **Seniors' self-reported multimorbidity captured biopsychosocial factors not incorporated into two other data-based morbidity measures.** J Clin Epidemiol 2009;62(5):550-7. [\[Abstract PubMed\]](#)
- Bayliss EA, Edwards AE, Steiner JF, Main DS. **Processes of care desired by elderly patients with multimorbidities.** Fam Pract 2008;25(4):287-93. [\[Abstract PubMed\]](#)
- Hudon C, Fortin M, Soubhi H. **Single-risk-factor interventions to promote physical activity among patients with chronic diseases in primary care: a systematic review.** Can Fam Physician. 2008;54:1130-1137. [\[Full text\]](#)
- Hudon C, Fortin M, Soubhi S. **Conditions musculo-squelettiques chroniques et comorbidités en soins de première ligne.** Can Fam Physician 2008;54 74-75. [\[Full text\]](#)
- Bayliss EA, Bosworth HB, Noel PH, Wolff JL, Damush TM, Mciver L. **Supporting self-management for patients with complex medical needs: recommendations of a working group.** Chronic Illn 2007;3(2):167-75. [\[Abstract PubMed\]](#)
- Bayliss EA, Ellis JL, Steiner JF. **Barriers to self-management and quality-of-life outcomes in seniors with multimorbidities.** Ann Fam Med 2007; 5: 395-402. [\[Full text\]](#)
- Fortin M, Dubois M-F, Hudon C, Soubhi H, Almirall J. **Multimorbidity and quality of life: a closer look.** Health and Quality of Life Outcomes 2007; 5 :52. [\[Full text\]](#)
- Fortin M, Soubhi H, Hudon C, Bayliss EA, van den Akker M. **Multimorbidity's many challenges.** BMJ 2007; 334: 1016-1017.
- Soubhi H. **Toward an ecosystemic approach to chronic care design and practice in primary care.** Ann Fam Med 2007; 5: 263-269. [\[Full text\]](#)
- Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. **Interventions to improve outcomes in patients with multimorbidity in primary care and community settings.** (Protocol) Cochrane Database of Systematic Reviews 2007, Issue 2. Art. No.: CD006560. DOI: 10.1002/14651858.CD006560.
- Fortin M, Hudon C, Bayliss EA, Soubhi H, Lapointe L. **Caring for Body and Soul: The Importance of Recognizing and Managing Psychological Distress in Persons with Multimorbidity.** Int'l J Psychiatry in Medicine 2007; 37: 1-9. [\[Abstract PubMed\]](#)
- Hudon C, Fortin M, Soubhi H. **Abbreviated guidelines for scoring the Cumulative Inness Rating Scale (CIRS) in family practice.** J Clin Epidemiol 2007; 60 :212e1-212e3.
- Soubhi H, Fortin M, Hudon C. **Perceived conflict in the couple and chronic illness management: Preliminary analyses from the Quebec Health Survey.** BMC Family Practice 2006;7:59. [\[Full text\]](#)
- Fortin M, Bravo G, Hudon C, Lapointe L, Dubois M-F, Almirall J. **Psychological Distress and Multimorbidity in Primary Care.** Ann Fam Med 2006;4:417-22. [\[Full text\]](#)

Fortin M, Dionne J, Pinho G, Gignac J, Almirall J, Lapointe L. **Randomized Controlled Trials: Do They Have External Validity for Patients With Multiple Comorbidities?** Ann. Fam. Med 2006;4:104-8. [\[Full text\]](#)

Fortin M, Bravo G, Hudon C, Lapointe L, Almirall J, Dubois M-F, Vanasse A. **Relationship between multimorbidity and health-related quality of life of patients in primary care.** Qual Life Res 2006;15:83-91. [\[Abstract PubMed\]](#)

van den Akker M, Vos R, Knottnerus JA. **In an exploratory prospective study on multimorbidity general and disease-related susceptibility could be distinguished.** J Clin Epidemiol 2006;59:934-9. [\[Abstract PubMed\]](#)

Fortin M, Hudon C, Dubois M-F, Almirall J, Lapointe L, Soubhi H. **Comparative assessment of three different indices of multimorbidity for studies on health-related quality of life.** Health and Quality of Life Outcomes 2005;3:74. [\[Full text\]](#)

Fortin F, Bravo G, Hudon C, Vanasse A, Lapointe L. **Prevalence of Multimorbidity Among Adults Seen in Family Practice.** Ann Fam Med 2005;3:223-8. [\[Full text\]](#)

Hudon C, Fortin M, Vanasse A. **Cumulative Illness Rating Scale was a reliable and valid index in a family practice context.** J Clin Epidemiol 2005;58:603-8. [\[Abstract PubMed\]](#)

Bayliss EA, Ellis JL, Steiner JF. **Subjective assessments of comorbidity correlate with quality of life health outcomes: initial validation of a comorbidity assessment instrument.** Health Qual Life Outcomes 2005;3:51. [\[Full text\]](#)

Bayliss EA, Bayliss MS, Ware Jr JE, Steiner JF. **Predicting declines in physical function in persons with multiple chronic medical conditions: what we can learn from the medical problem list.** Health Qual Life Outcomes 2004;2:47. [\[Full texte\]](#)

van den Akker M, Schuurman A, Metsemakers J, Buntinx F. **Is depression related to subsequent diabetes mellitus?** Acta Psychiatrica Scandinavica 2004;110:178-83. [\[Abstract PubMed\]](#)

Fortin M, Lapointe L, Hudon C, Vanasse A, Ntetu AL, Maltais D. **Multimorbidity and quality of life in primary care: a systematic review.** Health Qual Life Outcomes 2004;2:51. [\[Full text\]](#)

Bayliss EA, John F. Steiner JF, Fernald DH, Crane LA, Main DS. **Descriptions of barriers to self-care by persons with comorbid chronic diseases.** Ann Fam Med 2003;1:15-21. [\[Full text\]](#)

Leentjens AFG, van den Akker M, Metsemakers JFM, Lousberg R, Verhey FRJ. **Higher incidence of depression preceding the onset of Parkinson's disease: a register study.** Mov Disord 2003;18:414-18. [\[Abstract Pubmed\]](#)

Buntinx F, Niclaes L, Suetens C, Jans B, Mertens R, van den Akker M. **Evaluation of Charlson's comorbidity index in elderly living in nursing homes.** J Clin Epidemiol 2002;55:1144-7. [\[Abstract Pubmed\]](#)

Schuurman AG, van den Akker M, Ensink KTJL, Metsemakers JFM, Knottnerus JA, Leentjens AFG, Buntinx F. **Increased risk of Parkinson's disease after depression: a retrospective cohort study.** Neurology 2002;58:1501-4. [\[Abstract PubMed\]](#)

van der Linden M, van den Akker M, Buntinx F. **The relation between health locus of control and multimorbidity; a case-control study.** Personality and Individual Differences 2001;30:1189-97.

van den Akker M, Buntinx F, Roos S, Knottnerus JA. **Problems in determining occurrence rates of multimorbidity.** J Clin Epidemiol 2001;54:675-9. [[Abstract PubMed](#)]

Van den Akker M, Buntinx F, Metsemakers JFM, Knottnerus JA. **Marginal impact of psychosocial factors on multimorbidity: results of an explorative nested case-control study.** Soc Sci Med 2000;50:1679-93. [[AbstractPubmed](#)]

Huitema HOM, van den Akker M, Buntinx F, Muris JW, Metsemakers JFM, Knottnerus JA. **Comorbidity of chronic gastro-intestinal disorders. A cross-sectional analysis in a large general practice population in the Netherlands.** Arch Public Health 2000;58:51-65.

Landwehr Johan STM, van den Akker M, Metsemakers JFM, Buntinx F. **Comorbidity of chronic cardiovascular disorders. A cross-sectional analysis in a large general practice population in the Netherlands.** Arch Public Health 2000;58:213-31.

van den Akker M, Buntinx F, Metsemakers JF, Knottnerus JA. **Morbidity in responders and non-responders in a register-based population survey.** Fam Pract 1998;15:261-3. [[Full text](#)]

van den Akker M, Buntinx F, Metsemakers JF, Roos S, Knottnerus JA. **Multimorbidity in general practice: prevalence, incidence, and determinants of co-occurring chronic and recurrent diseases.** J Clin Epidemiol 1998;51:367-75. [[Abstract PubMed](#)]

van den Akker M, Buntinx F, Knottnerus JA. **Comorbidity or multimorbidity: what's in a name? A review of literature.** Eur J Gen Pract 1996;2:65-70.

## Section B – Publications by subject

### 1. THEORETICAL & REVIEW ARTICLES AND PROTOCOLS

Backman R, Weber P, Turner AM, Lee M, Litchfield I. Assessing the extent of drug interactions among patients with multimorbidity in primary and secondary care in the West Midlands (UK): a study protocol for the Mixed Methods Multimorbidity Study (MiMMS). BMJ Open. 2017; **7**(9):e016713.

Masnoon N, Shakib S, Kalisch-Ellett L, Caughey GE. What is polypharmacy? A systematic review of definitions. BMC Geriatr. 2017; **17**(1):230.

Read JR, Sharpe L, Modini M, Dear BF. Multimorbidity and depression: A systematic review and meta-analysis. J Affect Disord. 2017; **221**:36-46.

Martinez YV, Renom-Guiteras A, Reeves D, et al. A set of systematic reviews to help reduce inappropriate prescribing to older people: study protocol. BMC Geriatr. 2017; **17**(Suppl 1):231.

Bujold M, Pluye P, Legare F, et al. Decisional needs assessment of patients with complex care needs in primary care: a participatory systematic mixed studies review protocol. BMJ Open. 2017; **7**(11):e016400.

Commisso E, McGilton KS, Ayala AP, et al. Identifying and understanding the health and social care needs of older adults with multiple chronic conditions and their caregivers: a protocol for a scoping review. *BMJ Open*. 2017;**7**(12):e018247.

Northwood M, Ploeg J, Markle-Reid M, Sherifali D. Integrative review of the social determinants of health in older adults with multimorbidity. *J Adv Nurs*. 2018;**74**(1):45-60.

Sasseville M, Chouinard MC, Fortin M. Patient-reported outcomes in multimorbidity intervention research: A scoping review. *Int J Nurs Stud*. 2018;**77**:145-153.

Struckmann V, Leijten FRM, van Ginneken E, et al. Relevant models and elements of integrated care for multi-morbidity: Results of a scoping review. *Health Policy*. 2018;**122**(1):23-35.

Fitzgerald SP, Bean NG, Ruberu RP. A method of decision analysis quantifying the effects of age and comorbidities on the probability of deriving significant benefit from medical treatments. *Journal of Comorbidity* 2017;**7**:50–63

Stewart M, Fortin M, Patient-Centred Innovations for Persons with Multimorbidity T. Patient-Centred Innovations for Persons with Multimorbidity: funded evaluation protocol. *CMAJ Open*. 2017;**5**(2):E365-E372. doi: 10.9778/cmajo.20160097.

Sirois C, Laroche ML, Guenette L, Kroger E, Cooper D, Emond V. Polypharmacy in multimorbid older adults: protocol for a systematic review. *Syst Rev*. 2017;**6**(1):104. doi: 10.1186/s13643-017-0492-9.

Rodriguez-Perez A, Alfaro-Lara ER, Albinana-Perez S, et al. Novel tool for deprescribing in chronic patients with multimorbidity: List of Evidence-Based Deprescribing for Chronic Patients criteria. *Geriatr Gerontol Int*. 2017. doi: 10.1111/ggi.13062.

Xu X, Mishra GD, Jones M. Mapping the global research landscape and knowledge gaps on multimorbidity: a bibliometric study. *J Glob Health*. 2017;**7**(1):010414. doi: 10.7189/jogh.07.010414.

Aguilar D, Pinart M, Koppelman GH, et al. Computational analysis of multimorbidity between asthma, eczema and rhinitis. *PLoS One*. 2017;**12**(6):e0179125. doi: 10.1371/journal.pone.0179125.

Tisminetzky M, Bayliss EA, Magaziner JS, et al. Research Priorities to Advance the Health and Health Care of Older Adults with Multiple Chronic Conditions. *J Am Geriatr Soc*. 2017;**65**(7):1549-1553. doi: 10.1111/jgs.14943.

Corazza GR, Klersy C, Formagnana P, Lenti MV, Padula D, Consensus P. A consensus for the development of a vector model to assess clinical complexity. *Intern Emerg Med*. 2017. doi: 10.1007/s11739-017-1709-6.

Vermunt N, Harmsen M, Westert GP, Olde Rikkert MGM, Faber MJ. Collaborative goal setting with elderly patients with chronic disease or multimorbidity: a systematic review. *BMC Geriatr*. 2017;**17**(1):167. doi: 10.1186/s12877-017-0534-0.

Xu X, Mishra GD, Jones M. Evidence on multimorbidity from definition to intervention: An overview of systematic reviews. *Ageing Res Rev*. 2017;**37**:53-68. doi: 10.1016/j.arr.2017.05.003.



- Northwood M, Ploeg J, Markle-Reid M, Sherifali D. Integrative review of the social determinants of health in older adults with multimorbidity. *J Adv Nurs*. 2017. doi: 10.1111/jan.13408.
- Wang L, Si L, Cocker F, Palmer AJ, Sanderson K. A Systematic Review of Cost-of-Illness Studies of Multimorbidity. *Appl Health Econ Health Policy*. 2017. doi: 10.1007/s40258-017-0346-6.
- Read JR, Sharpe L, Modini M, Dear BF. Multimorbidity and depression: A systematic review and meta-analysis. *J Affect Disord*. 2017; **221**:36-46. doi: 10.1016/j.jad.2017.06.009.
- van der Aa MJ, van den Broeke JR, Stronks K, Plochg T. Patients with multimorbidity and their experiences with the healthcare process: a scoping review. *Journal of Comorbidity*. 2017; **7**:11–21.
- Mercer SW, Fitzpatrick B, Grant L, et al. The Glasgow 'Deep End' Links Worker Study Protocol: a quasi-experimental evaluation of a social prescribing intervention for patients with complex needs in areas of high socioeconomic deprivation. *Journal of Comorbidity*. 2017; **7**:1–10.
- Bunn F, Goodman C, Manthorpe J, et al. Supporting shared decision-making for older people with multiple health and social care needs: a protocol for a realist synthesis to inform integrated care models. *BMJ Open*. 2017; **7**(2):e014026.
- Rohleder N. Translating biobehavioral research advances into improvements in health care—a "network of networks" approach to multimorbidity. *J Eval Clin Pract*. 2017; **23**(1):230-232.
- Holzer BM, Siebenhuener K, Bopp M, Minder CE. Evidence-based design recommendations for prevalence studies on multimorbidity: improving comparability of estimates. *Popul Health Metr*. 2017; **15**(1):9.
- Aron DC. Multimorbidity: an endocrinologist looks at multi-level network disruption and at what gets diabetes? *J Eval Clin Pract*. 2017; **23**(1):225-229.
- Watt J, Tricco AC, Vyas M, et al. Outcomes associated with prescribed medications in older adults with multimorbidity: protocol for a scoping review. *BMJ Open*. 2017; **7**(2):e014529.
- Trivedi D. Cochrane Review Summary: Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Prim Health Care Res Dev*. 2017; **18**(2):109-111.
- Bircher J, Hahn EG. "Multimorbidity" as the manifestation of network disturbances. From nosology to the Meikirch model. *J Eval Clin Pract*. 2017; **23**(1):222-224.
- Stewart D, Mair A, Wilson M, et al. Guidance to manage inappropriate polypharmacy in older people: systematic review and future developments. *Expert Opin Drug Saf*. 2017; **16**(2):203-213.
- Marcum JA. Multimorbidity, P4 medicine and holism. *J Eval Clin Pract*. 2017; **23**(1):213-215.
- Prados-Torres A, Del Cura-Gonzalez I, Prados-Torres D, et al. Effectiveness of an intervention for improving drug prescription in primary care patients with multimorbidity

and polypharmacy: study protocol of a cluster randomized clinical trial (Multi-PAP project). *Implement Sci.* 2017; **12**(1):54.

Miles A, Asbridge JE. Multimorbidity-A manifestation of network disturbances? How to investigate? How to treat? *J Eval Clin Pract.* 2017; **23**(1): 193-198.

Sturmberg JP, Bennett JM, Martin CM, Picard M. 'Multimorbidity' as the manifestation of network disturbances. *J Eval Clin Pract.* 2017; **23**(1): 199-208.

Walker C, Peterson CL. Multimorbidity: a sociological perspective of systems. *J Eval Clin Pract.* 2017; **23**(1):209-212.

Cohn J. Advanced serious illness, multimorbidity, and multibeneficence: The role of communication. *J Eval Clin Pract.* 2017.

Young CE, Boyle FM, Mutch AJ. Are care plans suitable for the management of multiple conditions? *Journal of Comorbidity.* 2016; **6**: 103–113.

Crowe M, Jordan J, Burrell B, et al. Clinical effectiveness of transdiagnostic health management interventions for older people with multimorbidity: a quantitative systematic review. *J Adv Nurs.* 2016; **72**(10):2315-2329.

Nunes BP, Flores TR, Mielke GI, Thume E, Facchini LA. Multimorbidity and mortality in older adults: A systematic review and meta-analysis. *Arch Gerontol Geriatr.* 2016; **67**: 130-138.

Trivedi D. Cochrane Review Summary: Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Prim Health Care Res Dev.* 2016: 1-3.

Wilson MG, Lavis JN, Gauvin FP. Designing Integrated Approaches to Support People with Multimorbidity: Key Messages from Systematic Reviews, Health System Leaders and Citizens. *Healthc Policy.* 2016; **12**(2):91-104.

Figueira I, Fernandes A, Mladenovic Djordjevic A, et al. Interventions for age-related diseases: Shifting the paradigm. *Mech Ageing Dev.* 2016; **160**:69-92.

Brown TT, Guaraldi G. Multimorbidity and Burden of Disease. *Interdiscip Top Gerontol Geriatr.* 2017; **42**:59-73.

Lewis C, Wallace E, Kyne L, Cullen W, Smith SM. Training doctors to manage patients with multimorbidity: a systematic review. *Journal of Comorbidity.* 2016; **6**:85–94.

Hopman P, de Bruin SR, Forjaz MJ, et al. Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: A systematic literature review. *Health Policy.* 2016; **120**: 818-32.

Boehmer KR, Gionfriddo MR, Rodriguez-Gutierrez R, et al. Patient capacity and constraints in the experience of chronic disease: a qualitative systematic review and thematic synthesis. *BMC Fam Pract.* 2016; **17**:127.

Pitkala KH, Suominen MH, Bell JS, Strandberg TE. Herbal medications and other dietary supplements. A clinical review for physicians caring for older people. *Annals of medicine.* 2016: 1-17.

- McPhail SM. Multimorbidity in chronic disease: impact on health care resources and costs. *Risk Manag Healthc Policy*. 2016;**9**:143-56.
- Buffel du Vaure C, Dechartres A, Battin C, Ravaud P, Boutron I. Exclusion of patients with concomitant chronic conditions in ongoing randomised controlled trials targeting 10 common chronic conditions and registered at ClinicalTrials.gov: a systematic review of registration details. *BMJ Open*. 2016;**6**:e012265.
- Figueira I, Fernandes A, Mladenovic A, et al. Interventions for age-related diseases: Shifting the paradigm. *Mech Ageing Dev*. 2016.
- Navickas R, Petric V-K, Feigl AB, Seychell M. Multimorbidity: What do we know? What should we do? *Journal of Comorbidity*. 2016;**6**:4-11.
- Albrecht T, Dyakova M, Schellevis F, Van den Broucke S. Many diseases, one model of care? *Journal of Comorbidity*. 2016;**6**:12-20.
- Colombo F, García-Goñi M, Schwierz C. Addressing multimorbidity to improve healthcare and economic sustainability. *Journal of Comorbidity*. 2016;**6**:21-2.
- Hasardzhiev S, Mendão L, Nolte W, Aben B, Karin Kadenbach K. Managing multimorbidity: how can the patient experience be improved? *Journal of Comorbidity*. 2016;**6**:28-32.
- Tinetti ME, Esterson J, Ferris R, Posner P, Blaum CS. Patient Priority-Directed Decision Making and Care for Older Adults with Multiple Chronic Conditions. *Clin Geriatr Med*. 2016;**32**:261-75.
- Zullig LL, Whitson HE, Hastings SN, et al. A Systematic Review of Conceptual Frameworks of Medical Complexity and New Model Development. *J Gen Intern Med*. 2016;**31**:329-37.
- Suls J, Green PA, Davidson KW. A Behavioral Framework to Address the Emerging Challenge of Multimorbidity. *Psychosom Med*. 2016;**78**:281-9.
- Willadsen TG, Bebe A, Koster-Rasmussen R, et al. The role of diseases, risk factors and symptoms in the definition of multimorbidity - a systematic review. *Scand J Prim Health Care*. 2016;**34**:112-21.
- Smith SM, Wallace E, O'Dowd T, Fortin M. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Cochrane Database Syst Rev* (2):CD003638. 2016;**3**:CD006560.
- [No authors listed]. Multimorbidity draft rules published for consultation. *Nurs Stand*. 2016;**30**:10.
- Wister AV, Coatta KL, Schuurman N, Lear SA, Rosin M, MacKey D. A Lifecourse Model of Multimorbidity Resilience: Theoretical and Research Developments. *Int J Aging Hum Dev*. 2016;**82**:290-313.
- Man MS, Chaplin K, Mann C, et al. Improving the management of multimorbidity in general practice: protocol of a cluster randomised controlled trial (The 3D Study). *BMJ Open*. 2016;**6**:e011261.

Mann C, Shaw A, Guthrie B, et al. Protocol for a process evaluation of a cluster randomised controlled trial to improve management of multimorbidity in general practice: the 3D study. *BMJ Open*. 2016; **6**:e011260.

Grudniewicz A, Nelson M, Kuluski K, et al. Treatment goal setting for complex patients: protocol for a scoping review. *BMJ Open*. 2016; **6**:e011869.

Mangin D, Stephen G, Bismah V, Risdon C. Making patient values visible in healthcare: a systematic review of tools to assess patient treatment priorities and preferences in the context of multimorbidity. *BMJ Open*. 2016; **6**:e010903.

Marcum JA. Multimorbidity, P4 medicine and holism. *J Eval Clin Pract*. 2016.

Lavan AH, Gallagher PF, O'Mahony D. Methods to reduce prescribing errors in elderly patients with multimorbidity. *Clinical interventions in aging*. 2016; **11**:857-66.

Lefevre T, d'Ivernois JF, De Andrade V, Crozet C, Lombrail P, Gagnayre R: What do we mean by multimorbidity? An analysis of the literature on multimorbidity measures, associated factors, and impact on health services organization. *Rev Epidemiol Sante Publique*. 2014; **62**(5):305-314.

Decache C, Albano MG, de Andrade V, Crozet C: Therapeutic patient education for patients with multimorbidity: a recent literature review. *Education Thérapeutique du Patient-Therapeutic Patient Education*. 2014; **6**(2):20105.

Nicholson K, Terry AL, Fortin M, Williamson T, Bauer M, Thind A. Examining the prevalence and patterns of multimorbidity in Canadian primary healthcare: a methodologic protocol using a national electronic medical record database. *Journal of Comorbidity* 2015; **5**(1):150–161.

Healey EL, Jinks C, Tan VA, Chew-Graham CA, Lawton SA, Nicholls E, Finney AG, Porcheret M, Cooper V, Lewis M, Dziedzic KS, Wathall S, Mallen CD. Improving the care of people with long-term conditions in primary care: protocol for the ENHANCE pilot trial. *Journal of Comorbidity* 2015; **5**(1):135–149.

McKenzie KJ, Pierce D, Gunn JM. A systematic review of motivational interviewing in healthcare: the potential of motivational interviewing to address the lifestyle factors relevant to multimorbidity. *Journal of Comorbidity* 2015; **5**(1):162–174.

Oni T, Unwin N: Why the communicable/non-communicable disease dichotomy is problematic for public health control strategies: implications of multimorbidity for health systems in an era of health transition. *Int Health*. 2015; **7**(6):390-399.

Pati S, Swain S, Hussain MA, van den Akker M, Metsemakers J, Knottnerus JA *et al*: Prevalence and outcomes of multimorbidity in South Asia: a systematic review. *BMJ Open*. 2015; **5**(10):e007235.

Ryan A, Wallace E, O'Hara P, Smith SM: Multimorbidity and functional decline in community-dwelling adults: a systematic review. *Health Qual Life Outcomes*. 2015; **13**:168.

Deruaz-Luyet A, N'Goran AA, Tandjung R, Frey P, Zeller A, Haller DM *et al*: Multimorbidity in primary care: protocol of a national cross-sectional study in Switzerland. *BMJ Open*. 2015; **5**(10):e009165.

Villalba-Moreno AM, Alfaro-Lara ER, Perez-Guerrero MC, Nieto-Martin MD, Santos-Ramos B: Systematic review on the use of anticholinergic scales in poly pathological patients. *Arch Gerontol Geriatr.* 2016; **62**: 1-8.

Coventry PA, Small N, Panagioti M, Adeyemi I, Bee P: Living with complexity; marshalling resources: a systematic review and qualitative meta-synthesis of lived experience of mental and physical multimorbidity. *BMC Fam Pract.* 2015; **16**(1): 171.

Stawicki SP, Kalra S, Jones C, Justiniano CF, Papadimos TJ, Galwankar SC *et al*: Comorbidity polypharmacy score and its clinical utility: A pragmatic practitioner's perspective. *J Emerg Trauma Shock.* 2015; **8**(4): 224-231.

Berntsen GK, Gammon D, Steinsbekk A, Salamonsen A, Foss N, Ruland C *et al*: How do we deal with multiple goals for care within an individual patient trajectory? A document content analysis of health service research papers on goals for care. *BMJ Open.* 2015; **5**(12): e009403.

Sonnichsen A, Trampisch US, Rieckert A, Piccoliori G, Vogele A, Flamm M *et al*: Polypharmacy in chronic diseases-Reduction of Inappropriate Medication and Adverse drug events in older populations by electronic Decision Support (PRIMA-eDS): study protocol for a randomized controlled trial. *Trials.* 2016; **17**(1):57.

Koch G, Wakefield BJ, Wakefield DS. Barriers and facilitators to managing multiple chronic conditions: a systematic literature review. *West J Nurs Res.* Apr 2015; **37**(4): 498-516.

Ricci-Cabello I, Violan C, Foguet-Boreu Q, Mounce LT, Valderas JM. Impact of multi-morbidity on quality of healthcare and its implications for health policy, research and clinical practice. A scoping review. *Eur J Gen Pract.* Sep 2015; **21**(3): 192-202.

Jellinger KA, Attems J. Challenges of multimorbidity of the aging brain: a critical update. *J Neural Transm.* Apr 2015; **122**(4): 505-521.

Alonso-Moran E, Nuno-Solinis R, Onder G, Tonnara G. Multimorbidity in risk stratification tools to predict negative outcomes in adult population. *Eur J Intern Med.* Apr 2015; **26**(3): 182-189.

Damery S, Flanagan S, Combes G. The effectiveness of interventions to achieve co-ordinated multidisciplinary care and reduce hospital use for people with chronic diseases: study protocol for a systematic review of reviews. *Syst Rev.* 2015; **4**: 64.

Hasler S, Senn O, Rosemann T, Neuner-Jehle S. Effect of a patient-centered drug review on polypharmacy in primary care patients: study protocol for a cluster-randomized controlled trial. *Trials.* 2015; **16**(1): 380.

Panagioti M, Stokes J, Esmail A, et al. Multimorbidity and Patient Safety Incidents in Primary Care: A Systematic Review and Meta-Analysis. *PLoS One.* 2015; **10**(8): e0135947.

Nelson MLA, Kelloway L, Dawson D, et al. Stroke rehabilitation and patients with multimorbidity: a scoping review protocol. *Journal of Comorbidity.* 2015; **5**: 1–10.

Doessing A, Burau V. Care coordination of multimorbidity: a scoping study. *Journal of Comorbidity.* 2015; **5**: 15–28.

Bratzke LC, Muehrer RJ, Kehl KA, Lee KS, Ward EC, Kwekkeboom KL. Self-management priority setting and decision-making in adults with multimorbidity: a narrative review of literature. *Int J Nurs Stud*. Mar 2015; **52**(3): 744-755.

Barnes PJ. Mechanisms of development of multimorbidity in the elderly. *Eur Respir J*. Mar 2015; **45**(3): 790-806.

Alonso-Moran E, Nuno-Solinis R, Onder G, Tonnara G. Multimorbidity in risk stratification tools to predict negative outcomes in adult population. *Eur J Intern Med*. Apr 2015; **26**(3): 182-189.

Hu X, Huang J, Lv Y, Li G, Peng X. Status of prevalence study on multimorbidity of chronic disease in China: systematic review. *Geriatr Gerontol Int*. Jan 2015; **15**(1): 1-10.

Doos L, Roberts EO, Corp N, Kadam UT. Multi-drug therapy in chronic condition multimorbidity: a systematic review. *Fam Pract*. Dec 2014; **31**(6): 654-663.

Shiner A, Ford J, Steel N, Salisbury C, Howe A. Managing multimorbidity in primary care. *InnovAiT*. 2014; **7**: 691-700.

Fried TR, O'Leary J, Towle V, Goldstein MK, Trentelange M, Martin DK. The effects of comorbidity on the benefits and harms of treatment for chronic disease: a systematic review. *PLoS One*. 2014; **9**(11): e112593.

Yurkovich M, Avina-Zubieta JA, Thomas J, Gorenchtein M, Lacaille D. A systematic review identifies valid comorbidity indices derived from administrative health data. *J Clin Epidemiol*. Jan 2015; **68**(1): 3-14.

Liddy C, Blazkho V, Mill K. Challenges of self-management when living with multiple chronic conditions: systematic review of the qualitative literature. *Can Fam Physician*. Dec 2014; **60**(12): 1123-1133.

Guaraldi G, Silva AR, Stentarelli C. Multimorbidity and functional status assessment. *Curr Opin HIV AIDS*. 2014; **9**(4): 386-397.

Boyd CM, Lucas GM. Patient-centered care for people living with multimorbidity. *Curr Opin HIV AIDS*. 2014; **9**(4): 419-427.

Violan C, Foguet-Boreu Q, Flores-Mateo G, Salisbury C, Blom J, Freitag M, Glynn L, Muth C, Valderas JM. Prevalence, determinants and patterns of multimorbidity in primary care: a systematic review of observational studies. *PLoS One*. 2014; **9**(7): e102149.

Holzer BM, Siebenhuener K, Bopp M, Minder CE. Overcoming cut-off restrictions in multimorbidity prevalence estimates. *BMC Public Health*. 2014; **14**: 780.

Wyatt KD, Stuart LM, Brito JP, Carranza Leon B, Domecq JP, Prutsky GJ, Egginton JS, Calvin AD, Shah ND, Murad MH, Montori VM. Out of context: clinical practice guidelines and patients with multiple chronic conditions: a systematic review. *Med Care*. Mar 2014; **52** Suppl 3: S92-S100.

Grembowski D, Schaefer J, Johnson KE, Fischer H, Moore SL, Tai-Seale M, Ricciardi R, Fraser JR, Miller D, LeRoy L. A conceptual model of the role of complexity in the care of patients with multiple chronic conditions. *Med Care*. Mar 2014; **52** Suppl 3: S7-S14.

Ong BN, Richardson JC, Porter T, Grime J. Exploring the relationship between multimorbidity, resilience and social connectedness across the lifecourse. *Health (London)*. May 2014; **18**(3): 302-318.

Zulman DM, Asch SM, Martins SB, Kerr EA, Hoffman BB, Goldstein MK. Quality of care for patients with multiple chronic conditions: the role of comorbidity interrelatedness. *J Gen Intern Med*. Mar 2014; **29**(3):529-537.

Prados-Torres A, Calderon-Larranaga A, Hanco-Saavedra J, Poblador-Plou B, van den Akker M. Multimorbidity patterns: a systematic review. *J Clin Epidemiol*. Mar 2014; **67**(3):254-266.

Haibach JP, Beehler GP, Dollar KM, Finnell DS. Moving toward integrated behavioral intervention for treating multimorbidity among chronic pain, depression, and substance-use disorders in primary care. *Med Care*. Apr 2014; **52**(4):322-327.

Pillay M, Dennis S, Harris MF. Quality of care measures in multimorbidity. *Aust Fam Physician*. Mar 2014; **43**(3):132-136.

Genuis SJ, Tymchak MG. Approach to patients with unexplained multimorbidity with sensitivities. *Can Fam Physician*. Jun 2014; **60**(6):533-538.

Quiñones AR, Richardson J, Freeman M, Fu R, O'Neil ME, Motu'apuaka M, Kansagara D. Educational group visits for the management of chronic health conditions: A systematic review. *Patient Educ Couns*. Jan 13 2014.

Vos R, Aarts S, van Mulligen E, Metsemakers J, van Boxtel MP, Verhey F, van den Akker M. Finding potentially new multimorbidity patterns of psychiatric and somatic diseases: exploring the use of literature-based discovery in primary care research. *J Am Med Inform Assoc*. Jan-Feb 2014; **21**(1):139-145.

Haibach JP, Beehler GP, Dollar KM, Finnell DS. Moving Toward Integrated Behavioral Intervention for Treating Multimorbidity Among Chronic Pain, Depression, and Substance-use Disorders in Primary Care. *Med Care*. Feb 19 2014.

de Decker L, Annweiler C, Launay C, Fantino B, Beauchet O. Do not resuscitate orders and aging: impact of multimorbidity on the decision-making process. *J Nutr Health Aging*. 2014; **18**(3):330-335.

Akner G. Frailty and Multimorbidity in Elderly People: A Shift in Management Approach. *Clinical Geriatrics*. 2013; **21** (<http://www.clinicalgeriatrics.com/article/frailty-multimorbidity-elderly-shift-management-approach>)

Boutayeb A, Boutayeb S, Boutayeb W. Multi-morbidity of non communicable diseases and Equity in WHO Eastern Mediterranean countries. *Int J Equity Health*. Aug 20 2013; **12**(1):60.

Salive ME. Multimorbidity in Older Adults. *Epidemiol Rev*. Jan 31 2013.

Attems J, Jellinger K. Neuropathological Correlates of Cerebral Multimorbidity. *Curr Alzheimer Res*. Apr 29 2013.

Kernick D. A theoretical framework for multimorbidity: from complicated to chaotic. *Br J Gen Pract*. Sep 2012; **62**(602):e659-662.

van den Brink AM, Gerritsen DL, Voshaar RC, Koopmans RT. Residents with mental-physical multimorbidity living in long-term care facilities: prevalence and characteristics. A systematic review. *Int Psychogeriatr*. Dec 4 2012:1-18.

Boyd CM, Vollenweider D, Puhan MA. Informing evidence-based decision-making for patients with comorbidity: availability of necessary information in clinical trials for chronic diseases. *PLoS One*. 2012; **7**(8):e41601.

de Bruin SR, Versnel N, Lemmens LC, et al. Comprehensive care programs for patients with multiple chronic conditions: A systematic literature review. *Health Policy*. Oct 2012; **107**(2-3): 108-145.

Huntley AL, Johnson R, Purdy S, Valderas JM, Salisbury C. Measures of multimorbidity and morbidity burden for use in primary care and community settings: a systematic review and guide. *Ann Fam Med*. Mar-Apr 2012; **10**(2): 134-141.

Fortin M, Stewart M, Poitras M-E, Almirall J, Maddocks H. A Systematic Review of Prevalence Studies on Multimorbidity: Toward a More Uniform Methodology. *Ann Fam Med*. 2012; **10**: 142-151.

Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Cochrane Database Syst Rev* (2): *CD003638*. 2012; **4**: CD006560.

France EF, Wyke S, Gunn JM, Mair FS, McLean G, Mercer SW. Multimorbidity in primary care: a systematic review of prospective cohort studies. *Br J Gen Pract*. Apr 2012; **62**(597): 297-307.

Nobili A, Garattini S, Mannucci PM. Multiple diseases and polypharmacy in the elderly: challenges for the internist of the third millennium. *Journal of Comorbidity*. 2011; **1**: 28-44.

Esper AM, Martin GS. The impact of comorbid conditions on critical illness. *Crit Care Med*. 2011; **39**: 2728-35.

Lehnert T, Heider D, Leicht H, Heinrich S, Corrieri S, Lupp M, Riedel-Heller S, König HH. Review: health care utilization and costs of elderly persons with multiple chronic conditions. *Med Care Res Rev*. 2011; **68**(4): 387-420.

Marengoni A, Angleman S, Melis R, et al. Aging with multimorbidity: A systematic review of the literature. *Ageing Res Rev* 2011; **10**(4): 430-9.

Lupari M, Coates V, Adamson G, Crealey GE. We're just not getting it right'--how should we provide care to the older person with multi-morbid chronic conditions? *J Clin Nurs* 2011; 20.

Jakovljević M et al. Comorbidity, multimorbidity and personalized psychosomatic medicine: epigenetics rolling on the horizon. *Psychiatr Danub*. 2010. **22**(2): 184-9.

Wehling M. Multimorbidity and polypharmacy: which betablocker to use in relation to the pharmacokinetic profile and interaction potential. *Arzneimittelforschung*. 2010. **60**(2): 57-63.

Junius-Walker U et al. Health and treatment priorities in patients with multimorbidity: report on a workshop from the European General Practice Network meeting 'Research on multimorbidity in general practice'. *Eur J Gen Pract*. 2010. **16**(1): 51-4.

Iezzoni LI. Multiple Chronic Conditions and Disabilities: Implications for Health Services Research and Data Demands. *Health Serv Res*. 2010; **45**(5 Pt 2): 1523-40.

Singer SJ et al. Defining and Measuring Integrated Patient Care: Promoting the Next Frontier in Health Care Delivery. *Med Care Res Rev*. 2011; **68**(1): 112-27.

Michel JP, Pautex S, Aapro M, Zulian G. Frail old patients as a target population for cancer trials. *J Nutr Health Aging*. 2009. **13**(1): 31-3.

Smith GC. From consultation-liaison psychiatry to integrated care for multiple and complex needs. *Aust N Z J Psychiatry*. 2009. **43**(1): 1-12.



Luck, J., P. Parkerton, et al. "What is the business case for improving care for patients with complex conditions?" *Journal of General Internal Medicine* 2007. **22** Suppl 3: 396-402.

Safford, M. M., J. J. Allison, et al. "Patient complexity: more than comorbidity. the vector model of complexity." *Journal of General Internal Medicine* 2007. **22** Suppl 3: 382-90.

Vogeli, C., A. E. Shields, et al.. "Multiple chronic conditions: prevalence, health consequences, and implications for quality, care management, and costs." *Journal of General Internal Medicine* 2007. **22** Suppl 3: 391-5.

Vitry AI, Zhang Y. Quality of Australian clinical guidelines and relevance to the care of older people with multiple comorbid conditions. *Med J Aust.* 2008. **189**(7):360-5.

Williams A, Manias E, Walker R. Interventions to improve medication adherence in people with multiple chronic conditions: a systematic review. *J Adv Nurs.* 2008. **63**(2):132-43.

Baumeister, H., K. Balke, and M. Harter, Psychiatric and somatic comorbidities are negatively associated with quality of life in physically ill patients. *Journal of Clinical Epidemiology*, 2005. **58**(11): p. 1090-100.

Bennahum, D.A., et al., Life expectancy, comorbidity, and quality of life. A framework of reference for medical decisions. *Clinics in Geriatric Medicine.*, 1997. **13**(1): p. 33-53.

Extermann, M., Measurement and impact of comorbidity in older cancer patients. *Crit Rev Oncol Hematol*, 2000. **35**: p. 181-200.

Gijsen, R., et al., Causes and consequences of comorbidity: a review. *Journal of Clinical Epidemiology.*, 2001. **54**: p.661-74.

de Groot, V., et al., How to measure comorbidity. a critical review of available methods. *J Clin Epidemiol*, 2003. **56**: p. 221-9.

Guralnik, J.M., Assessing the impact of comorbidity in the older population. *Ann Epidemiol*, 1996. **6**(5): p. 376-80.

Harboun, M. and J. Ankri, [Comorbidity indexes: review of the literature and application to studies of elderly population][French]. *Rev Epidemiol Sante Publique*, 2001. **49**(3): p. 287-98.

Rosen, A.K., et al., Applying a risk-adjustment framework to primary care: Can we improve on existing measures? *Ann Fam Med*, 2003. **1**: p. 44-51.

Schneeweiss, S. and M. Maclure, Use of comorbidity scores for control of confounding in studies using administrative databases. *International Journal of Epidemiology.*, 2000. **29**(5): p. 891-8.

Stuck, A.E., et al., Risk factors for functional status decline in community-living elderly people: a systematic literature review.[see comment]. *Social Science & Medicine.*, 1999. **48**(4): p. 445-69.

van den Akker, M., F. Buntinx, and J.A. Knottnerus, Comorbidity or multimorbidity: what's in a name? A review of literature. *The European Journal of General Practice*, 1996. **2**: p. 65-70.

Williams, A. and M. Botti, Issues concerning the on-going care of patients with comorbidities in acute care and post-discharge in Australia: a literature review. *Journal of Advanced Nursing.*, 2002. **40**(2): p. 131-40.

## 2. DEFINITION / CONCEPTUALISATION

N'Goran AA, Blaser J, Deruaz-Luyet A, et al. From chronic conditions to relevance in multimorbidity: a four-step study in family medicine. *Fam Pract*. 2016; **33**:439-44.

Le Reste JY, Nabbe P, Lazic D, et al. How do general practitioners recognize the definition of multimorbidity? A European qualitative study. *Eur J Gen Pract*. 2016; **22**:159-68.

Le Reste JY, Nabbe P, Lingner H, Kasuba Lazic D, Assenova R, Munoz M *et al*: What research agenda could be generated from the European General Practice Research Network concept of Multimorbidity in Family Practice? *BMC Fam Pract*. 2015; **16**(1):125.

Prazeres F, Santiago LM, Simoes JA: Defining Multimorbidity: From English to Portuguese Using a Delphi Technique. *Biomed Res Int*. 2015; **2015**:965025.

Le Reste JY, Nabbe P, Rivet C, et al. The European general practice research network presents the translations of its comprehensive definition of multimorbidity in family medicine in ten European languages. *PLoS One*. 2015; **10**(1):e0115796.

Oni T, McGrath N, BeLue R, Roderick P, Colagiuri S, May CR, Levitt NS. Chronic diseases and multi-morbidity - a conceptual modification to the WHO ICCM model for countries in health transition. *BMC Public Health*. 2014; **14**:575.

Almirall J, Fortin M. The coexistence of terms to describe the presence of multiple concurrent diseases. *Journal of Comorbidity*. 2013; **3**(1):4-9.

Le Reste JY, Nabbe P, Lygidakis C, et al. A research group from the European General Practice Research Network (EGPRN) explores the concept of multimorbidity for further research into long term care. *J Am Med Dir Assoc*. Feb 2013; **14**(2):132-133.

Goodman RA, Posner SF, Huang ES, Parekh AK, Koh HK. Defining and measuring chronic conditions: imperatives for research, policy, program, and practice. *Prev Chronic Dis*. 2013; **10**:E66.

Le Reste JY, Nabbe P, Lygidakis C, et al. A research group from the European General Practice Research Network (EGPRN) explores the concept of multimorbidity for further research into long term care. *J Am Med Dir Assoc*. Feb 2013; **14**(2):132-133.

Valderas JM, Starfield B, Sibbald B, Salisbury C, Roland M. Defining comorbidity: implications for understanding health and health services. *Ann Fam Med*. 2009; **7**(4):357-63.

Karlamangla, A., M. Tinetti, et al. "Comorbidity in older adults: nosology of impairment, diseases, and conditions." *Journals of Gerontology Series A-Biological Sciences & Medical Sciences* 2007. **62**(3): 296-300.

de Groot, V., et al., How to measure comorbidity. a critical review of available methods. *J Clin Epidemiol*, 2003. **56**: p. 221-9.

Feinstein, A.R., The pre-therapeutic classification of co-morbidity in chronic diseases. *J Chronic Diseases*, 1970. **23**: p. 455-469.

Fried, L.P., et al., Untangling the concepts of disability, frailty, and comorbidity: implications for improved targeting and care. *Journals of Gerontology Series A Biological Sciences & Medical Sciences*, 2004. **59**: p. 255-63.

Gijsen, R., et al., Causes and consequences of comorbidity: a review. *Journal of Clinical Epidemiology.*, 2001. **54**: p. 661-74.

Gray, L.K., et al., Heterogeneity in older people: examining physiologic failure, age, and comorbidity. *Journal of the American Geriatrics Society.*, 2002. **50**(12): p. 1955-61.

John, R., D.S. Kerby, and C.H. Hennessy, Patterns and impact of comorbidity and multimorbidity among community-resident American Indian elders. *Gerontologist*, 2003. **43**: p. 649-60.

Kaplan, M.H. and A.R. Feinstein, The importance of classifying initial co-morbidity in evaluating the outcome of diabetes mellitus. *J Chron Dis*, 1974. **27**: p. 387-404.

Kraemer, H.C., Statistical issues in assessing comorbidity. *Stat Med*, 1995. **14**(8): p. 721-33.

Krishnan, K.R., et al., Comorbidity of depression with other medical diseases in the elderly. *Biological Psychiatry*, 2002. **52**(6): p. 559-88.

van den Akker, M., et al., Problems in determining occurrence rates of multimorbidity. *J Clin Epidemiol*, 2001. **54**: p. 675-9.

van den Akker, M., F. Buntinx, and J.A. Knottnerus, Comorbidity or multimorbidity: what's in a name? A review of literature. *The European Journal of General Practice*, 1996. **2**: p. 65-70.

### **3. CLINICAL AND EPIDEMIOLOGICAL STUDIES**

#### **3.1 Prevalence**

Pengpid S, Peltzer K. Multimorbidity in Chronic Conditions: Public Primary Care Patients in Four Greater Mekong Countries. *Int J Environ Res Public Health*. 2017; **14**(9).

Puth MT, Weckbecker K, Schmid M, Munster E. Prevalence of multimorbidity in Germany: impact of age and educational level in a cross-sectional study on 19,294 adults. *BMC Public Health*. 2017; **17**(1):826.

Roche S, De Vries E. Multimorbidity in a large district hospital: A descriptive cross-sectional study. *S Afr Med J*. 2017; **107**(12):1110-1115.

Nunes BP, Chiavegatto Filho ADP, Pati S, et al. Contextual and individual inequalities of multimorbidity in Brazilian adults: a cross-sectional national-based study. *BMJ Open*. 2017; **7**(6):e015885. doi: 10.1136/bmjopen-2017-015885.

Feely A, Lix LM, Reimer K. Estimating multimorbidity prevalence with the Canadian Chronic Disease Surveillance System. *Health Promot Chronic Dis Prev Can*. 2017; **37**(7):215-222. doi: 10.24095/hpcdp.37.7.02.

Hayek S, Ifrah A, Enav T, Shohat T. Prevalence, Correlates, and Time Trends of Multiple Chronic Conditions Among Israeli Adults: Estimates From the Israeli National Health Interview Survey, 2014-2015. *Prev Chronic Dis*. 2017; **14**:E64. doi: 10.5888/pcd14.170038.

- Staimez LR, Wei MY, Kim M, Narayan KMV, Saydah SS. Multimorbidity of four cardiometabolic and chronic pulmonary disease groups: prevalence and attributable fraction in US adults, 2007–2012. *Journal of Comorbidity*. 2017; **7**:22–32.
- Harrison C, Henderson J, Miller G, Britt H. The prevalence of diagnosed chronic conditions and multimorbidity in Australia: A method for estimating population prevalence from general practice patient encounter data. *PLoS One*. 2017; **12**(3):e0172935.
- Gu J, Chao J, Chen W, et al. Multimorbidity in the community-dwelling elderly in urban China. *Arch Gerontol Geriatr*. 2017; **68**:62-67.
- Carvalho JN, Roncalli AG, Cancela MC, Souza DL. Prevalence of multimorbidity in the Brazilian adult population according to socioeconomic and demographic characteristics. *PLoS One*. 2017; **12**(4):e0174322.
- Mini GK, Thankappan KR. Pattern, correlates and implications of non-communicable disease multimorbidity among older adults in selected Indian states: a cross-sectional study. *BMJ Open*. 2017; **7**(3):e013529.
- Lowe DB, Taylor MJ, Hill SJ. Cross-sectional examination of musculoskeletal conditions and multimorbidity: influence of different thresholds and definitions on prevalence and association estimates. *BMC Res Notes*. 2017; **10**(1):51.
- Rzewuska M, de Azevedo-Marques JM, Coxon D, et al. Epidemiology of multimorbidity within the Brazilian adult general population: Evidence from the 2013 National Health Survey (PNS 2013). *PLoS One*. 2017; **12**(2):e0171813.
- Gupta S. Burden of Multiple Chronic Conditions in Delaware, 2011-2014. *Prev Chronic Dis*. 2016; **13**:E160.
- Bobo WV, Yawn BP, St Sauver JL, Grossardt BR, Boyd CM, Rocca WA. Prevalence of Combined Somatic and Mental Health Multimorbidity: Patterns by Age, Sex, and Race/Ethnicity. *J Gerontol A Biol Sci Med Sci*. 2016.
- Lim E, Gandhi K, Davis J, Chen JJ. Prevalence of Chronic Conditions and Multimorbidities in a Geographically Defined Geriatric Population With Diverse Races and Ethnicities. *J Aging Health*. 2016.
- Lenzi J, Avaldi VM, Rucci P, Pieri G, Fantini MP. Burden of multimorbidity in relation to age, gender and immigrant status: a cross-sectional study based on administrative data. *BMJ Open*. 2016; **6**(12):e012812.
- Weston C, Gilkes A, Durbaba S, Schofield P, White P, Ashworth M. Long term condition morbidity in English general practice: a cross-sectional study using three composite morbidity measures. *BMC Fam Pract*. 2016; **17**(1):166.
- Nunes BP, Camargo-Figuera FA, Guttier M, et al. Multimorbidity in adults from a southern Brazilian city: occurrence and patterns. *Int J Public Health*. 2016; **61**(9):1013-1020.

Ward BW, Black LI. State and Regional Prevalence of Diagnosed Multiple Chronic Conditions Among Adults Aged  $\geq 18$  Years - United States, 2014. *MMWR Morb Mortal Wkly Rep.* 2016;**65**:735-8.

Weimann A, Dai D, Oni T. A cross-sectional and spatial analysis of the prevalence of multimorbidity and its association with socioeconomic disadvantage in South Africa: A comparison between 2008 and 2012. *Soc Sci Med.* 2016;**163**:144-56.

van Oostrom SH, Gijzen R, Stirbu I, et al. Time Trends in Prevalence of Chronic Diseases and Multimorbidity Not Only due to Aging: Data from General Practices and Health Surveys. *PLoS One.* 2016;**11**:e0160264.

Gu J, Chao J, Chen W, et al. Multimorbidity in the community-dwelling elderly in urban China. *Arch Gerontol Geriatr.* 2016;**68**:62-7.

Buurman BM, Frenkel WJ, Abu-Hanna A, Parlevliet JL, de Rooij SE: Acute and chronic diseases as part of multimorbidity in acutely hospitalized older patients. *Eur J Intern Med.* 2016;**27**:68-75.

Jovic D, Vukovic D, Marinkovic J. Prevalence and Patterns of Multi-Morbidity in Serbian Adults: A Cross-Sectional Study. *PLoS One.* 2016;**11**:e0148646.

Ahmadi B, Alimohammadian M, Yaseri M, et al. Multimorbidity: Epidemiology and Risk Factors in the Golestan Cohort Study, Iran: A Cross-Sectional Analysis. *Medicine (Baltimore).* 2016;**95**:e2756.

Marengoni A, Angleman S, Meinow B, et al. Coexisting chronic conditions in the older population: Variation by health indicators. *Eur J Intern Med.* 2016;**31**:29-34.

Harrison C, Henderson J, Miller G, Britt H. The prevalence of complex multimorbidity in Australia. *Aust N Z J Public Health.* 2016;**40**:239-44.

Hewitt J, McCormack C, Tay HS, et al. Prevalence of multimorbidity and its association with outcomes in older emergency general surgical patients: an observational study. *BMJ Open.* 2016;**6**:e010126.

Lowe D, Taylor M, Hill S. Changing definitions altered multimorbidity prevalence, but not burden associations, in a musculoskeletal population. *J Clin Epidemiol.* 2016.

Nunes BP, Camargo-Figuera FA, Guttier M, et al. Multimorbidity in adults from a southern Brazilian city: occurrence and patterns. *Int J Public Health.* 2016;**61**(9):1013-1020

Mokraoui NM, Haggerty J, Almirall J, Fortin M. Prevalence of self-reported multimorbidity in the general population and in primary care practices: a cross-sectional study. *BMC Res Notes.* 2016;**9**:314.

Jovic D, Marinkovic J, Vukovic D. Association between body mass index and prevalence of multimorbidity: a cross-sectional study. *Public Health.* 2016.

Nunes BP, Thume E, Facchini LA: Multimorbidity in older adults: magnitude and challenges for the Brazilian health system. *BMC Public Health.* 2015;**15**:1172.

- Wang SB, D'Arcy C, Yu YQ, Li B, Liu YW, Tao YC *et al*: Prevalence and patterns of multimorbidity in northeastern China: a cross-sectional study. *Public Health*. 2015; **129**(11): 1539-1546.
- Wang R, Yan Z, Liang Y, Tan EC, Cai C, Jiang H *et al*: Prevalence and Patterns of Chronic Disease Pairs and Multimorbidity among Older Chinese Adults Living in a Rural Area. *PLoS One*. 2015; **10**(9):e0138521.
- Prazeres F, Santiago L: Prevalence of multimorbidity in the adult population attending primary care in Portugal: a cross-sectional study. *BMJ Open*. 2015; **5**(9):e009287.
- Mwangi J, Kulane A, Van Hoi L: Chronic diseases among the elderly in a rural Vietnam: prevalence, associated socio-demographic factors and healthcare expenditures. *Int J Equity Health*. 2015; **14**(1):134.
- Hussain MA, Huxley RR, Al Mamun A: Multimorbidity prevalence and pattern in Indonesian adults: an exploratory study using national survey data. *BMJ Open*. 2015; **5**(12):e009810.
- Kumar D, Raithatha SJ, Gupta S, Raj R, Kharod N: Burden of Self-Reported Noncommunicable Diseases in 26 Villages of Anand District of Gujarat, India. *Int J Chronic Dis*. 2015; **2015**:260143.
- Pati S, Swain S, Hussain MA, Kadam S, Salisbury C. Prevalence, Correlates, and Outcomes of Multimorbidity Among Patients Attending Primary Care in Odisha, India. *Ann Fam Med*. Sep 2015; **13**(5):446-450.
- Joshi R, Santoshi JA, Rai N, Pakhare A. Prevalence and Patterns of Coexistence of Multiple Chronic Conditions: A Study from Indian Urban Outpatient Setting. *J Family Med Prim Care*. Jul-Sep 2015; **4**(3):411-415.
- Pefoyo AJ, Bronskill SE, Gruneir A, et al. The increasing burden and complexity of multimorbidity. *BMC Public Health*. 2015; **15**:415.
- Gough H, Grabenhenrich L, Reich A, et al. Allergic multimorbidity of asthma, rhinitis, and eczema over 20 years in the German birth cohort MAS. *Pediatr Allergy Immunol*. May 22 2015.
- Ha NT, Le NH, Khanal V, Moorin R. Multimorbidity and its social determinants among older people in southern provinces, Vietnam. *Int J Equity Health*. 2015; **14**(1):50.
- Roberts KC, Rao DP, Bennett TL, Loukine L, Jayaraman GC. Prevalence and patterns of chronic disease multimorbidity and associated determinants in Canada. *Health Promot Chronic Dis Prev Can*. Aug 2015; **35**(6):87-94.
- Navickas R, Visockiene Z, Purnaite R, Rukseniene M, Kasiulevicius V, Jureviciene E. Prevalence and structure of multiple chronic conditions in Lithuanian population and the distribution of the associated healthcare resources. *Eur J Intern Med*. Apr 2015; **26**(3):160-168.
- Hien H, Berthe A, Drabo MK, et al. Prevalence and patterns of multimorbidity among the elderly in Burkina Faso: cross-sectional study. *Trop Med Int Health*. Nov 2014; **19**(11):1328-1333.
- Fu S, Huang N, Chou YJ. Trends in the prevalence of multiple chronic conditions in taiwan from 2000 to 2010: a population-based study. *Prev Chronic Dis*. 2014; **11**:E187.

- Rocca WA, Boyd CM, Grossardt BR, Bobo WV, Finney Rutten LJ, Roger VL, Ebbert JO, Therneau TM, Yawn BP, St Sauver JL. Prevalence of multimorbidity in a geographically defined American population: patterns by age, sex, and race/ethnicity. *Mayo Clin Proc.* 2014; **89**(10): 1336-1349.
- Gallacher KI, Batty GD, McLean G, Mercer SW, Guthrie B, May CR, Langhorne P, Mair FS. Stroke, multimorbidity and polypharmacy in a nationally representative sample of 1,424,378 patients in Scotland: implications for treatment burden. *BMC Med.* 2014; **12**(1): 151.
- Wang H, Wang J, Wong S, Wong M, Li F, Wang P, Zhou Z, Zhu C, Griffiths SM, Mercer SW. Epidemiology of multimorbidity in China and implications for the healthcare system: cross-sectional survey among 162,464 community household residents in southern China. *BMC Med.* 2014; **12**(1): 188.
- Ward BW, Schiller JS, Goodman RA. Multiple chronic conditions among US adults: a 2012 update. *Prev Chronic Dis.* 2014; **11**: E62.
- Violan C, Foguet-Boreu Q, Roso-Llorach A, Rodriguez-Blanco T, Pons-Vigues M, Pujol-Ribera E, Munoz-Perez MA, Valderas JM. Burden of multimorbidity, socioeconomic status and use of health services across stages of life in urban areas: a cross-sectional study. *BMC Public Health.* 2014; **14**: 530.
- Abad-Diez JM, Calderon-Larranaga A, Poncel-Falco A, Poblador-Plou B, Calderon-Meza JM, Sicras-Mainar A, Clerencia-Sierra M, Prados-Torres A. Age and gender differences in the prevalence and patterns of multimorbidity in the older population. *BMC Geriatr.* 2014; **14**: 75.
- Islam MM, Valderas JM, Yen L, Dawda P, Jowsey T, McRae IS. Multimorbidity and comorbidity of chronic diseases among the senior Australians: prevalence and patterns. *PLoS One.* 2014; **9**(1): e83783.
- Orueta JF, Garcia-Alvarez A, Garcia-Goni M, Paolucci F, Nuno-Solinis R. Prevalence and costs of multimorbidity by deprivation levels in the basque country: a population based study using health administrative databases. *PLoS One.* 2014; **9**(2): e89787.
- Hermans H, Evenhuis HM. Multimorbidity in older adults with intellectual disabilities. *Res Dev Disabil.* Apr 2014; **35**(4): 776-783.
- Agborsangaya CB, Ngwakongnwi E, Lahtinen M, Cooke T, Johnson JA. Multimorbidity prevalence in the general population: the role of obesity in chronic disease clustering. *BMC Public Health.* 2013; **13**: 1161.
- Pfortmueller CA, Stotz M, Lindner G, Muller T, Rodondi N, Exadaktylos AK. Multimorbidity in adult asylum seekers: a first overview. *PLoS One.* 2013; **8**(12): e82671.
- Alaba O, Chola L. The social determinants of multimorbidity in South Africa. *Int J Equity Health.* Aug 20 2013; **12**(1): 63.
- Ford ES, Croft JB, Posner SF, Goodman RA, Giles WH. Co-occurrence of leading lifestyle-related chronic conditions among adults in the United States, 2002-2009. *Prev Chronic Dis.* 2013; **10**: E60.
- Lochner KA, Cox CS. Prevalence of multiple chronic conditions among medicare beneficiaries, United States, 2010. *Prev Chronic Dis.* 2013; **10**: E61.

Ashman JJ, Beresovsky V. Multiple Chronic Conditions Among US Adults Who Visited Physician Offices: Data From the National Ambulatory Medical Care Survey, 2009. *Prev Chronic Dis.* 2013; **10**:E64.

Ward BW, Schiller JS. Prevalence of Multiple Chronic Conditions Among US Adults: Estimates From the National Health Interview Survey, 2010. *Prev Chronic Dis.* 2013; **10**:E65.

van den Brink AM, Gerritsen DL, Voshaar RC, Koopmans RT. Residents with mental-physical multimorbidity living in long-term care facilities: prevalence and characteristics. A systematic review. *Int Psychogeriatr.* Apr 2013; **25**(4):531-548.

van den Bussche H, Schafer I, Wiese B, et al. A comparative study demonstrated that prevalence figures on multimorbidity require cautious interpretation when drawn from a single database. *J Clin Epidemiol.* Feb 2013; **66**(2):209-217.

Jerliu N, Toci E, Burazeri G, Ramadani N, Brand H. Prevalence and socioeconomic correlates of chronic morbidity among elderly people in Kosovo: a population-based survey. *BMC Geriatr.* 2013; **13**:22.

Violan C, Foguet-Boreu Q, Hermosilla-Perez E, et al. Comparison of the information provided by electronic health records data and a population health survey to estimate prevalence of selected health conditions and multimorbidity. *BMC Public Health.* 2013; **13**:251.

de S. Santos Machado V, Valadares AL, Costa-Paiva LH, Osis MJ, Sousa MH, Pinto-Neto AM. Aging, obesity, and multimorbidity in women 50 years or older: a population-based study. *Menopause.* Apr 1 2013.

Rizza A, Kaplan V, Senn O, et al. Age- and gender-related prevalence of multimorbidity in primary care: the swiss fire project. *BMC Fam Pract.* Nov 24 2012; **13**(1):113.

Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet.* Jul 7 2012; **380**(9836):37-43.

van Oostrom SH, Picavet HS, van Gelder BM, et al. Multimorbidity and comorbidity in the Dutch population-data from general practices. *BMC Public Health.* Aug 30 2012; **12**(1):715.

Schneider F, Kaplan V, Rodak R, Battegay E, Holzer B. Prevalence of multimorbidity in medical inpatients. *Swiss Med Wkly.* 2012; **142**:w13533.

Agborsangaya CB, Lau D, Lahtinen M, Cooke T, Johnson JA. Multimorbidity prevalence and patterns across socioeconomic determinants: a cross-sectional survey. *BMC Public Health.* 2012; **12**:201.

Fuchs J, Busch M, Lange C, Scheidt-Nave C. Prevalence and patterns of morbidity among adults in Germany. Results of the German telephone health interview survey German Health Update (GEDA) 2009. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz.* Apr 2012; **55**(4):576-586.

Marengoni A, Angleman S, Fratiglioni L. Prevalence of disability according to multimorbidity and disease clustering: a population-based study. *Journal of Comorbidity.* 2011; **1**:11-8.

Khanam, M.A., et al., Prevalence and patterns of multimorbidity among elderly people in rural Bangladesh: a cross-sectional study. *J Health Popul Nutr,* 2011. **29**: p. 406-14.



van Baal, P.H., et al., Co-occurrence of diabetes, myocardial infarction, stroke, and cancer: quantifying age patterns in the Dutch population using health survey data. *Popul Health Metr*, 2011. **9**: p. 51.

van den Bussche H, Koller D, Kolonko T, et al. Which chronic diseases and disease combinations are specific to multimorbidity in the elderly? Results of a claims data based cross-sectional study in Germany. *BMC Public Health* 2011; **11**:101.

Glynn LG, Valderas JM, Healy P, et al. The prevalence of multimorbidity in primary care and its effect on health care utilization and cost. *Fam Pract* 2011; **28**(5):516-23.

Taylor AW, Price K, Gill TK, et al. Multimorbidity - not just an older person's issue. Results from an Australian biomedical study. *BMC Public Health*. 2010; **10**:718.

Schneider KM, O'Donnell BE, Dean D. Prevalence of multiple chronic conditions in the United States' Medicare population. *Health Qual Life Outcomes*. 2009; **7**:82.

Cullen W, O'Brien S, O'Carroll A, O'Kelly FD, Bury G. Chronic illness and multimorbidity among problem drug users: a comparative cross sectional pilot study in primary care. *BMC Fam Pract*. 2009 Apr 21; **10**:25.

Lee PG, Cigolle C, Blaum C. The co-occurrence of chronic diseases and geriatric syndromes: the health and retirement study. *J Am Geriatr Soc*. 2009 Mar; **57**(3):511-6.

Loza, E., L. Abasolo, et al. "Burden of disease across chronic diseases: a health survey that measured prevalence, function, and quality of life." *Journal of Rheumatology* 2008. **35**(1): 159-65.

Uijen AA, van de Lisdonk EH. Multimorbidity in primary care: prevalence and trend over the last 20 years. *Eur J Gen Pract*. 2008; **14** Suppl 1:28-32.

Britt HC, Harrison CM, Miller GC, Knox SA. Prevalence and patterns of multimorbidity in Australia. *Med J Aust*. 2008. **189**(2):72-7.

Schram MT, Frijters D, van de Lisdonk EH, Ploemacher J, de Craen AJ, de Waal MW, van Rooij FJ, Heeringa J, Hofman A, Deeg DJ, Schellevis FG. Setting and registry characteristics affect the prevalence and nature of multimorbidity in the elderly. *J Clin Epidemiol*. 2008 **61**(11):1104-12.

Marengoni A, Winblad B, Karp A, Fratiglioni L. Prevalence of chronic diseases and multimorbidity among the elderly population in Sweden. *Am J Public Health*. 2008. **98**(7):1198-200. Epub 2008 May 29.

Alonso, J., et al., Health-related quality of life associated with chronic conditions in eight countries: results from the International Quality of Life Assessment (IQOLA) Project. *Quality of Life Research*, 2004. **13**(2): p. 283-98.

Cuijpers, P., P. van Lammeren, and B. Duzijn, Relation between quality of life and chronic illnesses in elderly living in residential homes: a prospective study. *Int Psychogeriatr*, 1999. **11**: p. 445-54.

Fortin F, Bravo G, Hudon C, Vanasse A, Lapointe L. Prevalence of Multimorbidity Among Adults Seen in Family Practice. *Ann Fam Med* 2005; **3**:223-8.

Fried, L.P., et al., Association of comorbidity with disability in older women: the Women's Health and Aging Study. *J Clin Epidemiol*, 1999. **52**: p. 27-37.

Fuchs, Z., et al., Morbidity, comorbidity, and their association with disability among community-dwelling oldest-old in Israel. *Journals of Gerontology Series A-Biological Sciences & Medical Sciences.*, 1998. **53**(6): p. M447-55.

Grau, L. and C. Kovner, Comorbidity, age, and hospital use among elderly Medicare patients. *Journal of Aging & Health.*, 1991. **3**(3): p. 352-67.

Guralnik, J.M., Assessing the impact of comorbidity in the older population. *Ann Epidemiol*, 1996. **6**(5): p. 376-80.

Grimby, A. and A. Svanborg, Morbidity and health-related quality of life among ambulant elderly citizens. *Aging Clin Exp Res*, 1997. **9**: p. 356-64.

Fillenbaum, G.G., et al., Comorbidity of five chronic health conditions in elderly community residents: determinants and impact on mortality. *Journals of Gerontology Series A-Biological Sciences & Medical Sciences.*, 2000. **55**(2): p. M84-9.

Hoffman, C., D. Rice, and H.Y. Sung, Persons with chronic conditions. Their prevalence and costs. *JAMA*, 1996. **276**(18): p. 1473-1479.

Iron, K.S., D.G. Manuel, and J. Williams, Using a linked data set to determine the factors associated with utilization and costs of family physician services in Ontario: effects of self-reported chronic conditions. *Chronic Diseases in Canada*, 2003. **24**(4): p. 124-32.

Kempen, G.I., M. Jelicic, and J. Ormel, Personality, chronic medical morbidity, and health-related quality of life among older persons. *Health Psychol*, 1997. **16**(6): p. 539-46.

Kempen, G.I., et al., Adaptive responses among Dutch elderly: the impact of eight chronic medical conditions on health-related quality of life.[see comment]. *American Journal of Public Health.*, 1997. **87**(1): p. 38-44.

Macleod, U., et al., Comorbidity and socioeconomic deprivation: an observational study of the prevalence of comorbidity in general practice. *European Journal of General Practice*, 2004. **10**(1): p. 24-6.

Menotti, A., et al., Prevalence of morbidity and multimorbidity in elderly male populations and their impact on 10-year all-cause mortality: The FINE study (Finland, Italy, Netherlands, Elderly). *Journal of Clinical Epidemiology.*, 2001. **54**(7): p. 680-6.

Metsemakers, J.F., et al., Computerized health information in The Netherlands: a registration network of family practices. *Br J Gen Pract*, 1992. **42**: p. 102-106.

Poli, L., et al., Autopsy and multiple pathology in the elderly. *Gerontology.*, 1993. **39**(1): p. 55-63.

Rigler, S.K., et al., Co-morbidity adjustment for functional outcomes in community-dwelling older adults. *Clinical Rehabilitation.*, 2002. **16**(4): p. 420-8.

Rapoport, J., et al., Refining the measurement of the economic burden of chronic diseases in Canada. *Chronic Diseases in Canada*, 2004. **25**(1): p. 13-21.

Rice, D.P. and M.P. LaPlante, Chronic illness, disability and increasing longevity, in *Ethics and economics of long term care.*, E.-L.M. Sullivan S., Editor. 1988. p. 9-55.

Rochon, P.A., et al., Comorbid illness is associated with survival and length of hospital stay in patients with chronic disability. A prospective comparison of three comorbidity indices. *Med Care*, 1996. **34**(11): p. 1093-101.

Schellevis, F.G., et al., Consultation rates and incidence of intercurrent morbidity among patients with chronic disease in general practice. *British Journal of General Practice.*, 1994. **44**(383): p. 259-62.

- Schellevis, F.G., et al., Comorbidity of chronic diseases in general practice. *J Clin Epidemiol*, 1993. **46**: p. 469-73.
- Starfield, B., et al., Comorbidity: Implications for the importance of primary care in "case" management. *Ann Fam Med*, 2003. **1**: p. 8-14.
- Starfield, B., et al., Ambulatory care groups: a categorization of diagnoses for research and management. *Health Services Research.*, 1991. **26**(1): p. 53-74.
- Stewart, A.L., et al., Functional status and well-being of patients with chronic conditions. Results from the Medical Outcomes Study. *JAMA*, 1989. **262**: p. 907-13.
- van den Akker, M., et al., Problems in determining occurrence rates of multimorbidity. *J Clin Epidemiol*, 2001. **54**: p. 675-9.
- van den Akker, M., et al., Marginal impact of psychosocial factors on multimorbidity: results of an explorative nested case-control study. *Social Science & Medicine.*, 2000. **50**(11): p. 1679-93.
- van den Akker, M., et al., Multimorbidity in general practice: prevalence, incidence, and determinants of co-occurring chronic and recurrent diseases. *J Clin Epidemiol*, 1998. **51**: p. 367-375.
- Van Weel, C., Chronic diseases in general practice: the longitudinal dimension. *Eur J Gen Pract*, 1996. **2**: p. 17-21.
- Wensing, M., E. Vingerhoets, and R. Grol, Functional status, health problems, age and comorbidity in primary care patients. *Qual Life Res*, 2001. **10**: p. 141-8.
- Wolff, J.L., B. Starfield, and G. Anderson, Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Archives of Internal Medicine*, 2002. **162**: p. 2269-76.
- Wun, Y.T., K. Chan, and A. Lee, Co-morbidity in general practice. *Family Practice.*, 1998. **15**(3): p. 266-8.

### 3.2 Aetiology

- Gabet S, Just J, Couderc R, Bousquet J, Seta N, Momas I. Early polysensitization is associated with allergic multimorbidity in PARIS birth cohort infants. *Pediatr Allergy Immunol*. 2016; **27**(8):831-837.
- Liu W, Huang C, Wang X, et al. Multimorbidities of Asthma, Allergies, and Airway Illnesses in Childhood: Chance or not Chance? *J Asthma*. 2016; Nov 23: 1-12. doi: 10.1080/02770903.2016.1263648.
- Schottker B, Sau m KU, Jansen EH, Holleczeck B, Brenner H: Associations of metabolic, inflammatory and oxidative stress markers with total morbidity and multi-morbidity in a large cohort of older German adults. *Age Ageing*. 2016; **45**(1):127-135.
- Meems LM, de Borst MH, Postma DS, Vonk JM, Kremer HP, Schuttelaar ML *et al*: Low levels of vitamin D are associated with multimorbidity: results from the LifeLines Cohort Study. *Annals of medicine*. 2015; **47**(6):474-481.
- Ballardini N, Bergstrom A, Wahlgren CF, van Hage M, Hallner E, Kull I *et al*: IgE antibodies in relation to prevalence and multimorbidity of eczema, asthma, and rhinitis from birth to adolescence. *Allergy*. 2016; **71**(3):342-349.

Pavela G, Latham K. Childhood Conditions and Multimorbidity Among Older Adults. *J Gerontol B Psychol Sci Soc Sci*. May 14 2015.

Tomasdottir MO, Sigurdsson JA, Petursson H, et al. Self Reported Childhood Difficulties, Adult Multimorbidity and Allostatic Load. A Cross-Sectional Analysis of the Norwegian HUNT Study. *PLoS One*. 2015; **10**(6):e0130591.

Wikstrom K, Lindstrom J, Harald K, Peltonen M, Laatikainen T. Clinical and lifestyle-related risk factors for incident multimorbidity: 10-year follow-up of Finnish population-based cohorts 1982-2012. *Eur J Intern Med*. Apr 2015; **26**(3):211-216.

Park J, Lee DS, Christakis NA, Barabási AL. The impact of cellular networks on disease comorbidity. *Mol Syst Biol*. 2009; **5**:262.

Neeleman, J., J. Ormel, and R.V. Bijl, The distribution of psychiatric and somatic III health: associations with personality and socioeconomic status. *Psychosomatic Medicine*., 2001. **63**(2): p. 239-47.

Neeleman, J., S. Sytema, and M. Wadsworth, Propensity to psychiatric and somatic ill-health: evidence from a birth cohort. *Psychological Medicine*, 2002. **32**(5): p. 793-803.

Rhee, S.H., et al., The validity of the Neale and Kendler model-fitting approach in examining the etiology of comorbidity. *Behavior Genetics*, 2004. **34**(3): p. 251-65.

### 3.3 Correlation with biological markers

Garrafa E, Casnici N, Squazzoni F, Uberti D, Marengoni A. C-reactive protein, lipoprotein (a) and cystatin C levels increase with multimorbidity in older persons. *Eur J Intern Med*. 2017; **42**:e25-e26. doi: 10.1016/j.ejim.2017.04.010.

Gabet S, Just J, Couderc R, Bousquet J, Seta N, Momas I. Early polysensitization is associated with allergic multimorbidity in PARIS birth cohort infants. *Pediatr Allergy Immunol*. 2016.

Isaac V, Wu CY, Huang CT, Baune BT, Tseng CL, McLachlan CS. Elevated neutrophil to lymphocyte ratio predicts mortality in medical inpatients with multiple chronic conditions. *Medicine (Baltimore)*. 2016; **95**:e3832.

Ballardini N, Bergstrom A, Wahlgren CF, et al. IgE antibodies in relation to prevalence and multimorbidity of eczema, asthma, and rhinitis from birth to adolescence. *Allergy*. 2016; **71**:342-9.

Pupek M, Pawlowicz R, Lindner K, et al. Occurrence of fibronectin-fibrin complexes in plasma of patients with multimorbidity due to the inflamm-aging phenomenon. *Exp Gerontol*. 2016; **77**:19-28.

Vassilaki M, Aakre JA, Mielke MM, et al. Multimorbidity and neuroimaging biomarkers among cognitively normal persons. *Neurology*. 2016; **86**:2077-84.

Fabbi E, Tanaka T, An Y, et al. Loss of Weight in Obese Older Adults: A Biomarker of Impending Expansion of Multimorbidity? *J Am Geriatr Soc*. Sep 2015; **63**(9):1791-1797.

Friedman EM, Christ SL, Mroczek DK. Inflammation Partially Mediates the Association of Multimorbidity and Functional Limitations in a National Sample of Middle-Aged and Older Adults: The MIDUS Study. *J Aging Health*. Feb 2 2015.

Cervellati C, Romani A, Bosi C, et al. Serum levels of hydroperoxides and multimorbidity among older patients with mild cognitive impairment or late-onset Alzheimer's disease. *Aging Clin Exp Res*. Mar 21 2015.

Stepanova M, Rodriguez E, Biredinc A, Baranova A. Age-independent rise of inflammatory scores may contribute to accelerated aging in multi-morbidity. *Oncotarget*. Jan 30 2015; **6**(3): 1414-1421.

Fabbri E, An Y, Schrack JA, et al. Energy Metabolism and the Burden of Multimorbidity in Older Adults: Results From the Baltimore Longitudinal Study of Aging. *J Gerontol A Biol Sci Med Sci*. Nov 18 2014.

Fabbri E, An Y, Zoli M, et al. Aging and the burden of multimorbidity: associations with inflammatory and anabolic hormonal biomarkers. *J Gerontol A Biol Sci Med Sci*. Jan 2015; **70**(1):63-70.

Marengoni A, Petroboni B, Casella S, Martinelli D, Cossi S. Total lymphocyte count and in-hospital mortality in older persons with multimorbidity. *Aging Clin Exp Res*. 2008. **20**(4):290-6.

Castle, S.C., et al., Comorbidity is a better predictor of impaired immunity than chronological age in older adults. *Journal of the American Geriatrics Society*, 2005. **53**(9): p. 1565-9.

Rafi, A., W. Crawford, and W. Klaustermeyer, Declining cell-mediated immunity and increased chronic disease burden. *Ann Allergy Asthma Immunol*, 2005. **94**: p. 445-50.

### 3.4 Interactions and patterns

Pati S, Swain S, Metsemakers J, Knottnerus JA, van den Akker M. Pattern and severity of multimorbidity among patients attending primary care settings in Odisha, India. *PLoS One*. 2017; **12**(9):e0183966.

Gellert P, von Berenberg P, Zahn T, Neuwirth J, Kuhlmeier A, Dräger D. Multimorbidity Profiles in German Centenarians: A Latent Class Analysis of Health Insurance Data. *J Aging Health*. 2017;898264317737894.

Kalgotra P, Sharda R, Croff JM. Examining health disparities by gender: A multimorbidity network analysis of electronic medical record. *Int J Med Inform*. 2017; **108**:22-28.

Quinones AR, Markwardt S, Thielke S, Rostant O, Vasquez E, Botosaneanu A. Prospective Disability in Different Combinations of Somatic and Mental Multimorbidity. *J Gerontol A Biol Sci Med Sci*. 2017. doi: 10.1093/gerona/glx100.

Deruaz-Luyet A, N'Goran AA, Senn N, et al. Multimorbidity and patterns of chronic conditions in a primary care population in Switzerland: a cross-sectional study. *BMJ Open*. 2017; **7**(6):e013664. doi: 10.1136/bmjopen-2016-013664.

van Timmeren EA, Waninge A, van Schrojenstein Lantman-de HMJ, van der Putten AAJ, van der Schans CP. Patterns of multimorbidity in people with severe or profound intellectual and motor disabilities. *Res Dev Disabil*. 2017; **67**:28-33. doi: 10.1016/j.ridd.2017.05.002.

Olaya B, Moneta MV, Caballero FF, et al. Latent class analysis of multimorbidity patterns and associated outcomes in Spanish older adults: a prospective cohort study. *BMC Geriatr*. 2017; **17**(1):186. doi: 10.1186/s12877-017-0586-1.

Koroukian SM, Schiltz NK, Warner DF, et al. Multimorbidity: constellations of conditions across subgroups of midlife and older individuals, and related Medicare expenditures. *Journal of Comorbidity*. 2017; **7**: 33–43.

Schiltz NK, Warner DF, Sun J, et al. Identifying Specific Combinations of Multimorbidity that Contribute to Health Care Resource Utilization: An Analytic Approach. *Med Care*. 2017; **55**(3):276-284.

Larsen FB, Pedersen MH, Friis K, Glumer C, Lasgaard M. A Latent Class Analysis of Multimorbidity and the Relationship to Socio-Demographic Factors and Health-Related Quality of Life. A National Population-Based Study of 162,283 Danish Adults. *PLoS One*. 2017; **12**(1):e0169426.

Simoes D, Araujo FA, Severo M, et al. Patterns and Consequences of Multimorbidity in the General Population: There is No Chronic Disease Management Without Rheumatic Disease Management. *Arthritis Care Res (Hoboken)*. 2017; **69**(1):12-20.

Ferrer A, Formiga F, Sanz H, Almeda J, Padros G. Multimorbidity as specific disease combinations, an important predictor factor for mortality in octogenarians: the Octabaix study. *Clinical interventions in aging*. 2017; **12**: 223-231.

Cromley EK, Wilson-Genderson M, Heid AR, Pruchno RA. Spatial Associations of Multiple Chronic Conditions Among Older Adults. *J Appl Gerontol*. 2016.

Simoes D, Araujo FA, Severo M, et al. Patterns and Consequences of Multimorbidity in the General Population: There is No Chronic Disease Management Without Rheumatic Disease Management. *Arthritis Care Res (Hoboken)*. 2017; **69**(1):12-20.

Pruchno RA, Wilson-Genderson M, Heid AR. Multiple Chronic Condition Combinations and Depression in Community-Dwelling Older Adults. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:910-5.

Whitson HE, Johnson KS, Sloane R, et al. Identifying Patterns of Multimorbidity in Older Americans: Application of Latent Class Analysis. *J Am Geriatr Soc*. 2016; **64**:1668-73.

Li J, Green M, Kearns B, et al. Patterns of multimorbidity and their association with health outcomes within Yorkshire, England: baseline results from the Yorkshire Health Study. *BMC Public Health*. 2016; **16**:649.

An KO, Kim J. Association of Sarcopenia and Obesity With Multimorbidity in Korean Adults: A Nationwide Cross-Sectional Study. *J Am Med Dir Assoc*. 2016; **17**:960 e1-7.

Rocca WA, Gazzuola-Rocca L, Smith CY, et al. Accelerated Accumulation of Multimorbidity After Bilateral Oophorectomy: A Population-Based Cohort Study. *Mayo Clin Proc* **67**(2): 144-57. 2016.

Garin N, Koyanagi A, Chatterji S, et al. Global Multimorbidity Patterns: A Cross-Sectional, Population-Based, Multi-Country Study. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:205-14.

Goodman RA, Ling SM, Briss PA, Parrish RG, Salive ME, Finke BS. Multimorbidity Patterns in the United States: Implications for Research and Clinical Practice. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:215-20.

Koroukian SM, Schiltz N, Warner DF, et al. Combinations of Chronic Conditions, Functional Limitations, and Geriatric Syndromes that Predict Health Outcomes. *J Gen Intern Med*. 2016; **31**:630-7.

Bobo WV, Yawn BP, St Sauver JL, Grossardt BR, Boyd CM, Rocca WA. Prevalence of Combined Somatic and Mental Health Multimorbidity: Patterns by Age, Sex, and Race/Ethnicity. *J Gerontol A Biol Sci Med Sci*. 2016.

Quinones AR, Markwardt S, Botosaneanu A. Multimorbidity Combinations and Disability in Older Adults. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:823-30.

Jackson CA, Dobson AJ, Tooth LR, Mishra GD. Lifestyle and Socioeconomic Determinants of Multimorbidity Patterns among Mid-Aged Women: A Longitudinal Study. *PLoS One*. 2016; **11**:e0156804.

Scherer M, Hansen H, Gensichen J, et al. Association between multimorbidity patterns and chronic pain in elderly primary care patients: a cross-sectional observational study. *BMC Fam Pract*. 2016; **17**:68.

Whitson HE, Johnson KS, Sloane R, et al. Identifying Patterns of Multimorbidity in Older Americans: Application of Latent Class Analysis. *J Am Geriatr Soc*. 2016.

Ng SK: A two-way clustering framework to identify disparities in multimorbidity patterns of mental and physical health conditions among Australians. *Stat Med*. 2015; **34**(26):3444-3460

Sinnige J, Korevaar JC, Westert GP, Spreeuwenberg P, Schellevis FG, Braspenning JC: Multimorbidity patterns in a primary care population aged 55 years and over. *Fam Pract*. 2015; **32**(5):505-513.

Jackson CA, Jones M, Tooth L, Mishra GD, Byles J, Dobson A: Multimorbidity patterns are differentially associated with functional ability and decline in a longitudinal cohort of older women. *Age Ageing*. 2015; **44**(5):810-816.

Garin N, Koyanagi A, Chatterji S, Tyrovolas S, Olaya B, Leonardi M *et al*: Global Multimorbidity Patterns: A Cross-Sectional, Population-Based, Multi-Country Study. *J Gerontol A Biol Sci Med Sci*. 2016; **71**(2):205-214.

Held FP, Blyth F, Gnjdic D, Hirani V, Naganathan V, Waite LM *et al*: Association Rules Analysis of Comorbidity and Multimorbidity: The Concord Health and Aging in Men Project. *J Gerontol A Biol Sci Med Sci*. 2015.

Foguet-Boreu Q, Violan C, Rodriguez-Blanco T, Roso-Llorach A, Pons-Vigues M, Pujol-Ribera E *et al*: Multimorbidity Patterns in Elderly Primary Health Care Patients in a South Mediterranean European Region: A Cluster Analysis. *PLoS One*. 2015; **10**(11):e0141155.

Vetrano DL, Foebel AD, Marengoni A, Brandi V, Collamati A, Heckman GA *et al*: Chronic diseases and geriatric syndromes: The different weight of comorbidity. *Eur J Intern Med*. 2016; **27**:62-67.

Diaz E, Poblador-Pou B, Gimeno-Feliu LA, Calderon-Larranaga A, Kumar BN, Prados-Torres A: Multimorbidity and Its Patterns according to Immigrant Origin. A Nationwide Register-Based Study in Norway. *PLoS One*. 2015; **10**(12):e0145233.

Clark NM, Lachance L, Benedict MB, et al. The extent and patterns of multiple chronic conditions in low-income children. *Clin Pediatr (Phila)*. Apr 2015; **54**(4):353-358.

Mujica-Mota RE, Roberts M, Abel G, et al. Common patterns of morbidity and multimorbidity and their impact on health-related quality of life: evidence from a national survey. *Qual Life Res*. Apr 2015; **24**(4):909-918.

Hsu HC. Trajectories of multimorbidity and impacts on successful aging. *Exp Gerontol*. Jun 2015; **66**:32-38.

Sinnige J, Korevaar JC, Westert GP, Spreeuwenberg P, Schellevis FG, Braspenning JC. Multimorbidity patterns in a primary care population aged 55 years and over. *Fam Pract*. Oct 2015; **32**(5):505-513.

Clerencia-Sierra M, Calderon-Larranaga A, Martinez-Velilla N, et al. Multimorbidity Patterns in Hospitalized Older Patients: Associations among Chronic Diseases and Geriatric Syndromes. *PLoS One*. 2015; **10**(7):e0132909.

Jackson CA, Jones M, Tooth L, Mishra GD, Byles J, Dobson A. Multimorbidity patterns are differentially associated with functional ability and decline in a longitudinal cohort of older women. *Age Ageing*. Sep 2015; **44**(5):810-816.

Kuwornu JP, Lix LM, Shooshtari S. Multimorbidity disease clusters in Aboriginal and non-Aboriginal Caucasian populations in Canada. *Chronic Dis Inj Can*. Nov 2014; **34**(4):218-225.

Schafer I, Kaduszkiewicz H, Wagner HO, Schon G, Scherer M, van den Bussche H. Reducing complexity: a visualisation of multimorbidity by combining disease clusters and triads. *BMC Public Health*. 2014; **14**:1285.

Vos R, van den Akker M, Boesten J, Robertson C, Metsemakers J. Trajectories of multimorbidity: exploring patterns of multimorbidity in patients with more than ten chronic health problems in life course. *BMC Fam Pract*. Jan 22 2015; **16**(1):2.

Boeckxstaens P, Peersman W, Goubin G, Ghali S, De Maeseneer J, Brusselle G, De Sutter A. A practice-based analysis of combinations of diseases in patients aged 65 or older in primary care. *BMC Fam Pract*. 2014; **15**:159.

Hermans H, Evenhuis HM. Multimorbidity in older adults with intellectual disabilities. *Res Dev Disabil*. Apr 2014; **35**(4):776-783.

Moore KL, Boscardin WJ, Steinman MA, Schwartz JB. Patterns of chronic co-morbid medical conditions in older residents of U.S. nursing homes: differences between the sexes and across the agespan. *J Nutr Health Aging*. Apr 2014; **18**(4):429-436.

Woodhead C, Ashworth M, Schofield P, Henderson M. Patterns of physical co-/multimorbidity among patients with serious mental illness: a London borough-based cross-sectional study. *BMC Fam Pract*. 2014; **15**(1):117.

Poblador-Plou B, van den Akker M, Vos R, Calderon-Larranaga A, Metsemakers J, Prados-Torres A. Similar multimorbidity patterns in primary care patients from two European regions: results of a factor analysis. *PLoS One*. 2014; **9**(6):e100375.



Garin N, Olaya B, Perales J, Moneta MV, Miret M, Ayuso-Mateos JL, Haro JM. Multimorbidity patterns in a national representative sample of the Spanish adult population. *PLoS One*. 2014;9(1):e84794.

Akushevich I, Kravchenko J, Ukrainitseva S, Arbeev K, Kulminski A, Yashin AI. Morbidity risks among older adults with pre-existing age-related diseases. *Exp Gerontol*. Dec 2013;48(12):1395-1401.

McCarron M, Swinburne J, Burke E, McGlinchey E, Carroll R, McCallion P. Patterns of multimorbidity in an older population of persons with an intellectual disability: results from the intellectual disability supplement to the Irish longitudinal study on aging (IDS-TILDA). *Res Dev Disabil*. Jan 2013;34(1):521-527.

Formiga F, Ferrer A, Sanz H, Marengoni A, Alburquerque J, Pujol R. Patterns of comorbidity and multimorbidity in the oldest old: the Octabaix study. *Eur J Intern Med*. Jan 2013;24(1):40-44.

Vos HM, Bor HH, Rangelrooij-Minkels MJ, Schellevis FG, Lagro-Janssen AL. Multimorbidity in older women: The negative impact of specific combinations of chronic conditions on self-rated health. *Eur J Gen Pract*. Jan 22 2013;19(2):117-22.

Marengoni A, Nobili A, Pirali C, et al. Comparison of Disease Clusters in Two Elderly Populations Hospitalized in 2008 and 2010. *Gerontology*. Jan 25 2013.

Schafer I. Does multimorbidity influence the occurrence rates of chronic conditions? A claims data based comparison of expected and observed prevalence rates. *PLoS One*. 2012;7(9):e45390.

Steinman MA, Lee SJ, John Boscardin W, et al. Patterns of multimorbidity in elderly veterans. *J Am Geriatr Soc*. Oct 2012;60(10):1872-1880.

McCarron M, Swinburne J, Burke E, McGlinchey E, Carroll R, McCallion P. Patterns of multimorbidity in an older population of persons with an intellectual disability: Results from the intellectual disability supplement to the Irish longitudinal study on aging (IDS-TILDA). *Res Dev Disabil*. Jan 2013;34(1):521-527.

Henninger DE, Whitson HE, Cohen HJ, Ariely D. Higher medical morbidity burden is associated with external locus of control. *J Am Geriatr Soc*. Apr 2012;60(4):751-755.

Perruccio AV, Katz JN, Losina E. Health burden in chronic disease: multimorbidity is associated with self-rated health more than medical comorbidity alone. *J Clin Epidemiol*. Jan 2012;65(1):100-106.

Cheung CL, Nguyen US, Au E, Tan KC, Kung AW. Association of handgrip strength with chronic diseases and multimorbidity : A cross-sectional study. *Age (Dordr)*. Feb 8 2012.

Prados-Torres A, Poblador-Plou B, Calderon-Larranaga A, et al. Multimorbidity patterns in primary care: interactions among chronic diseases using factor analysis. *PLoS One*. 2012;7(2):e32190.

Spruit-van Eijk M, Zuidema SU, Buijck BI, Koopmans RT, Geurts AC. To what extent can multimorbidity be viewed as a determinant of postural control in stroke patients? *Arch Phys Med Rehabil* 80(1):103-11. Jun 2012;93(6):1021-1026.

Holden, L., et al., Patterns of multimorbidity in working Australians. *Popul Health Metr*, 2011. 9: p. 15.

Schäfer I, von Leitner EC, Schön G, et al. Multimorbidity patterns in the elderly: a new approach of disease clustering identifies complex interrelations between chronic conditions. *PLoS ONE* 2010;5:e15941.

Galenkamp H, Braam AW, Huisman M, J. DD. Somatic Multimorbidity and Self-rated Health in the Older Population. *J Gerontol B Psychol Sci Soc Sci* 2011; **66**:380-6.

Guh DP, Zhang W, Bansback N, Amarsi Z, Birmingham CL, Anis AH. The incidence of co-morbidities related to obesity and overweight: A systematic review and meta-analysis. *BMC Public Health*. 2009 Mar 25; **9**(1):88.

Ekundayo OJ, Muchimba M, Aban IB, Ritchie C, Campbell RC, Ahmed A. Multimorbidity due to diabetes mellitus and chronic kidney disease and outcomes in chronic heart failure. *Am J Cardiol*. 2009 Jan 1; **103**(1):88-92.

Ritchie C, Ekundayo OJ, Muchimba M, Campbell RC, Frank SJ, Liu B, Aban IB, Ahmed A. Effects of diabetes mellitus in patients with heart failure and chronic kidney disease: A propensity-matched study of multimorbidity in chronic heart failure. *Int J Cardiol*. 2009; **134**(3):330-5.

Fleming, S.T., et al., A comprehensive prognostic index to predict survival based on multiple comorbidities: a focus on breast cancer. p. 601-14, 1999 Jun.

Rao, A.V., P.H. Seo, and H.J. Cohen, Geriatric assessment and comorbidity. p. 149-59, 2004 Apr.

Rijken, M., et al., Comorbidity of chronic diseases: effects of disease pairs on physical and mental functioning. *Qual Life Res*, 2005. **14**: p. 45-55.

Repetto, L., et al., Comprehensive geriatric assessment adds information to Eastern Cooperative Oncology Group performance status in elderly cancer patients: an Italian Group for Geriatric Oncology Study. p. 494-502, 2002 Jan 15.

van den Akker M, Buntinx F, Roos S, Knottnerus JA. Problems in determining occurrence rates of multimorbidity. *J Clin Epidemiol* 2001; **54**:675-9.

Wee, H.L., et al., The impact of diabetes mellitus and other chronic medical conditions on health-related Quality of Life: is the whole greater than the sum of its parts? *Health & Quality of Life Outcomes*, 2005. **3**(1): p. 2.

### **3.5 Socio-demographic, socio-economic, and psychosocial variables**

Thavorn K, Maxwell CJ, Gruneir A, et al. Effect of socio-demographic factors on the association between multimorbidity and healthcare costs: a population-based, retrospective cohort study. *BMJ Open*. 2017; **7**(10):e017264.

Lund Jensen N, Pedersen HS, Vestergaard M, Mercer SW, Glumer C, Prior A. The impact of socioeconomic status and multimorbidity on mortality: a population-based cohort study. *Clin Epidemiol*. 2017; **9**:279-289. doi: 10.2147/CLEP.S129415.

Schiotz ML, Stockmarr A, Host D, Glumer C, Frolich A. Social disparities in the prevalence of multimorbidity - A register-based population study. *BMC Public Health*. 2017; **17**(1):422. doi: 10.1186/s12889-017-4314-8.

Kunna R, San Sebastian M, Stewart Williams J. Measurement and decomposition of socioeconomic inequality in single and multimorbidity in older adults in China and Ghana: results from the WHO study on global AGEing and adult health (SAGE). *Int J Equity Health*. 2017; **16**(1):79. doi: 10.1186/s12939-017-0578-y.

Ranstad K, Midlov P, Halling A. Socioeconomic status and geographical factors associated with active listing in primary care: a cross-sectional population study accounting for

multimorbidity, age, sex and primary care. *BMJ Open*. 2017; **7**(6):e014984. doi: 10.1136/bmjopen-2016-014984.

Walker ER, Druss BG. Cumulative burden of comorbid mental disorders, substance use disorders, chronic medical conditions, and poverty on health among adults in the U.S.A. *Psychol Health Med*. 2017; **22**(6):727-735. doi: 10.1080/13548506.2016.1227855.

Leiser S, Deruaz-Luyet A, N'Goran AA, et al. Determinants associated with deprivation in multimorbid patients in primary care-A cross-sectional study in Switzerland. *PLoS One*. 2017; **12**(7):e0181534. doi: 10.1371/journal.pone.0181534.

Katikireddi SV, Skivington K, Leyland AH, Hunt K, Mercer SW. The contribution of risk factors to socioeconomic inequalities in multimorbidity across the lifecourse: a longitudinal analysis of the Twenty-07 cohort. *BMC Med*. 2017; **15**(1):152. doi: 10.1186/s12916-017-0913-6.

Ki M, Lee YH, Kim YS, Shin JY, Lim J, Nazroo J. Socioeconomic inequalities in health in the context of multimorbidity: A Korean panel study. *PLoS One*. 2017; **12**(3):e0173770.

Habib RR, Mikati D, Hojeij S, El Asmar K, Chaaya M, Zurayk R. Associations between poor living conditions and multi-morbidity among Syrian migrant agricultural workers in Lebanon. *Eur J Public Health*. 2016; **26**(6):1039-1044.

Walker ER, Druss BG. Cumulative burden of comorbid mental disorders, substance use disorders, chronic medical conditions, and poverty on health among adults in the U.S.A. *Psychol Health Med*. 2016:1-9.

Yokota RT, Van der Heyden J, Nusselder WJ, et al. Impact of Chronic Conditions and Multimorbidity on the Disability Burden in the Older Population in Belgium. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:903-9.

Wister A, Kendig H, Mitchell B, Fyffe I, Loh V. Multimorbidity, health and aging in Canada and Australia: a tale of two countries. *BMC Geriatr*. 2016; **16**:163.

Eckardt M, Brettschneider C, van den Bussche H, Konig HH, MultiCare Study G. Analysis of Health Care Costs in Elderly Patients with Multiple Chronic Conditions Using a Finite Mixture of Generalized Linear Models. *Health economics*. 2016.

van der Zee-Neuen A, Putrik P, Ramiro S, et al. Impact of chronic diseases and multimorbidity on health and healthcare costs: The additional role of musculoskeletal disorders. *Arthritis Care Res (Hoboken)*. 2016.

Picco L, Achilla E, Abdin E, et al. Economic burden of multimorbidity among older adults: impact on healthcare and societal costs. *BMC Health Serv Res*. 2016; **16**:173.

Assari S, Lankarani MM: Does Multi-morbidity Mediate the Effect of Socioeconomics on Self-rated Health? Cross-country Differences. *Int J Prev Med*. 2015; **6**:85.

Jackson CA, Dobson A, Tooth L, Mishra GD: Body mass index and socioeconomic position are associated with 9-year trajectories of multimorbidity: A population-based study. *Prev Med*. 2015; **81**:92-98.

Chung RY, Mercer S, Lai FT, Yip BH, Wong MC, Wong SY: Socioeconomic Determinants of Multimorbidity: A Population-Based Household Survey of Hong Kong Chinese. *PLoS One*. 2015; **10**(10):e0140040.

- McLean G, Guthrie B, Mercer SW, Watt GC: General practice funding underpins the persistence of the inverse care law: cross-sectional study in Scotland. *Br J Gen Pract.* 2015; **65**(641):e799-805.
- Brilleman SL, Purdy S, Salisbury C, Windmeijer F, Gravelle H, Hollinghurst S. Implications of comorbidity for primary care costs in the UK: a retrospective observational study. *Br J Gen Pract.* Apr 2013; **63**(609):e274-282.
- Sinnott C, Mc Hugh S, Fitzgerald AP, Bradley CP, Kearney PM. Psychosocial complexity in multimorbidity: the legacy of adverse childhood experiences. *Fam Pract.* Jun 2015; **32**(3):269-275.
- Lee JT, Hamid F, Pati S, Atun R, Millett C. Impact of Noncommunicable Disease Multimorbidity on Healthcare Utilisation and Out-Of-Pocket Expenditures in Middle-Income Countries: Cross Sectional Analysis. *PLoS One.* 2015; **10**(7):e0127199.
- Jason KJ, Carr DC, Washington TR, Hilliard TS, Mingo CA. Multiple Chronic Conditions, Resilience, and Workforce Transitions in Later Life: A Socio-Ecological Model. *Gerontologist.* Jul 25 2015.
- Arokiasamy P, Uttamacharya U, Jain K, et al. The impact of multimorbidity on adult physical and mental health in low- and middle-income countries: what does the study on global ageing and adult health (SAGE) reveal? *BMC Med.* 2015; **13**:178.
- Afshar S, Roderick PJ, Kowal P, Dimitrov BD, Hill AG. Multimorbidity and the inequalities of global ageing: a cross-sectional study of 28 countries using the World Health Surveys. *BMC Public Health.* 2015; **15**(1):776.
- Jackson CA, Dobson A, Tooth L, Mishra GD. Body mass index and socioeconomic position are associated with 9-year trajectories of multimorbidity: A population-based study. *Prev Med.* Aug 24 2015; **81**:92-98.
- Brett T, Arnold-Reed DE, Troeung L, Bulsara MK, Williams A, Moorhead RG. Multimorbidity in a marginalised, street-health Australian population: a retrospective cohort study. *BMJ Open.* 2014; **4**(8):e005461.
- Habib RR, Hojeij S, Elzein K, Chaaban J, Seyfert K. Associations between life conditions and multi-morbidity in marginalized populations: the case of Palestinian refugees. *Eur J Public Health.* Oct 2014; **24**(5):727-733.
- McLean G, Gunn J, Wyke S, Guthrie B, Watt GC, Blane DN, Mercer SW. The influence of socioeconomic deprivation on multimorbidity at different ages: a cross-sectional study. *Br J Gen Pract.* Jul 2014; **64**(624):e440-447.
- Banjare P, Pradhan J. Socio-Economic Inequalities in the Prevalence of Multi-Morbidity among the Rural Elderly in Bargarh District of Odisha (India). *PLoS One.* 2014; **9**(6):e97832.
- Yoon J, Zulman D, Scott JY, Maciejewski ML. Costs associated with multimorbidity among VA patients. *Med Care.* Mar 2014; **52** Suppl 3:S31-36.
- Greene R, Dasso E, Ho S, Frank J, Scandrett G, Genaidy A. Patterns and expenditures of multi-morbidity in an insured working population in the United States: insights for a sustainable health care system and building healthier lives. *Popul Health Manag.* Dec 2013; **16**(6):381-389
- Ataguba JE. Inequalities in multimorbidity in South Africa. *Int J Equity Health.* 2013; **12**(1):64.

Greene R, Dasso E, Ho S, Frank J, Scandrett G, Genaidy A. Patterns and Expenditures of Multi-Morbidity in an Insured Working Population in the United States: Insights for a Sustainable Health Care System and Building Healthier Lives. *Popul Health Manag.* Aug 22 2013.

Konig HH, Leicht H, Bickel H, et al. Effects of multiple chronic conditions on health care costs: an analysis based on an advanced tree-based regression model. *BMC Health Serv Res.* Jun 15 2013; **13**(1):219.

Kadam UT, Uttley J, Jones PW, Iqbal Z. Chronic disease multimorbidity transitions across healthcare interfaces and associated costs: a clinical-linkage database study. *BMJ Open.* 2013; **3**(7).

Doos L, Uttley J, Onyia I, Iqbal Z, Jones PW, Kadam UT. Mosaic segmentation, COPD and CHF multimorbidity and hospital admission costs: a clinical linkage study. *J Public Health (Oxf).* Jul 30 2013.

Vila-Rodriguez F, Panenka WJ, Lang DJ, et al. The Hotel Study: Multimorbidity in a Community Sample Living in Marginal Housing. *Am J Psychiatry.* Aug 9 2013.

Cornish RP, Boyd AW, Van Staa T, Salisbury C, Macleod J. Socio-economic position and childhood multimorbidity: a study using linkage between the Avon Longitudinal study of parents and children and the general practice research database. *Int J Equity Health.* Aug 20 2013; **12**(1):66.

Demirchyan A, Khachadourian V, Armenian HK, Petrosyan V. Short and long term determinants of incident multimorbidity in a cohort of 1988 earthquake survivors in Armenia. *Int J Equity Health.* 2013; **12**(1):68.

Wilkie R, Blagojevic M, Jordan KP, Lacey R, McBeth J. Reasons why multimorbidity increases the risk of participation restriction in older adults with lower limb osteoarthritis: A prospective cohort study in primary care. *Arthritis Care Res (Hoboken).* Dec 6 2012.

Friedman EM, Ryff CD. Living well with medical comorbidities: a biopsychosocial perspective. *J Gerontol B Psychol Sci Soc Sci.* Sep 2012; **67**(5):535-544.

Kirchberger I, Meisinger C, Heier M, et al. Patterns of multimorbidity in the aged population. Results from the KORA-Age study. *PLoS One.* 2012; **7**(1):e30556

Schafer I, Hansen H, Schon G, et al. The influence of age, gender and socio-economic status on multimorbidity patterns in primary care. first results from the multicare cohort study. *BMC Health Serv Res.* 2012; **12**:89.

Quiñones, A.R., et al., How Does the Trajectory of Multimorbidity Vary Across Black, White, and Mexican Americans in Middle and Old Age? *J Gerontol B Psychol Sci Soc Sci.* 2011; **66**(6):739-49.

Andrade LH et al. Clustering of psychiatric and somatic illnesses in the general population: multimorbidity and socioeconomic correlates. *Braz J Med Biol Res.* 2010. **43**(5):483-91.

Goldstein G, Luther JF, Haas GL, Gordon AJ, Appelt C. Comorbidity Between Psychiatric and General Medical Disorders in Homeless Veterans. *Psychiatr Q.* 2009; **80**(4):199-212.

Wong, S. Y., S. W. Mercer, et al. "The influence of multi-morbidity and self-reported socio-economic standing on the prevalence of depression in an elderly Hong Kong population." *BMC Public Health* 2008. **8**: 119.

Bayliss EA, Ellis JL, Steiner JF. Seniors' self-reported multimorbidity captured biopsychosocial factors not incorporated into two other data-based morbidity measures. *J Clin Epidemiol.* 2009; **62**(5):550-7.

Schoen C, Osborn R, How SK, Doty MM, Peugh J. In Chronic Condition: Experiences Of Patients With Complex Health Care Needs, In Eight Countries, 2008. *Health Aff (Millwood).* 2009; **28**(1):w1-16.

Hassan Soubhi, Martin Fortin and Catherine Hudon. Perceived conflict in the couple and chronic illness management: Preliminary analyses from the Quebec Health Survey. *BMC Family Practice* 2006; 7:59. Hou, F. and J. Chen, Neighbourhood low income, income inequality and health in Toronto. *Health Reports*, 2003. **14**(2): p. 21-34.

Kempen, G.I., et al., Adaptive responses among Dutch elderly: the impact of eight chronic medical conditions on health-related quality of life. *American Journal of Public Health.*, 1997. **87**(1): p. 38-44.

Knottnerus, J.A., et al., Chronic illness in the community and the concept of 'social prevalence'. *Fam Pract*, 1992. **9**: p. 15-21.

Macleod, U., et al., Comorbidity and socioeconomic deprivation: an observational study of the prevalence of comorbidity in general practice. *European Journal of General Practice*, 2004. **10**(1): p. 24-6.

Neeleman, J., J. Ormel, and R.V. Bijl, The distribution of psychiatric and somatic III health: associations with personality and socioeconomic status. *Psychosomatic Medicine.*, 2001. **63**(2): p. 239-47.

Neeleman, J., S. Sytema, and M. Wadsworth, Propensity to psychiatric and somatic ill-health: evidence from a birth cohort. *Psychological Medicine*, 2002. **32**(5): p. 793-803.

van den Akker, M., R. Vos, and J.A. Knottnerus, In an exploratory prospective study on multimorbidity general and disease-related susceptibility could be distinguished. *Journal of Clinical Epidemiology*, 2006. **59**(9): p. 934-9.

van den Akker, M., et al., Psychosocial patient characteristics and GP-registered chronic morbidity: a prospective study. *Journal of Psychosomatic Research.*, 2001. **50**(2): p. 95-102.

van der Linden, M., M. van der Akker, and F. Buntinx, The relation between health locus of control and multimorbidity; a case-control study. *Personality and Individual Differences*, 2001. **30**: p. 1189-97.

van den Akker, M., et al., Marginal impact of psychosocial factors on multimorbidity: results of an explorative nested case-control study. *Social Science & Medicine.*, 2000. **50**(11): p. 1679-93.

### **3.6 Variables related to hospitalization**

Teh RO, Menzies OH, Connolly MJ, et al. Patterns of multi-morbidity and prediction of hospitalisation and all-cause mortality in advanced age. *Age Ageing.* 2017.

Nunes BP, Soares MU, Wachs LS, et al. Hospitalization in older adults: association with multimorbidity, primary health care and private health plan. *Rev Saude Publica.* 2017; **51**:43. doi: 10.1590/S1518-8787.2017051006646.

Park S, Kim B, Kwon E. The Role of Senior Housing in Hospitalizations Among Vulnerable Older Adults With Multiple Chronic Conditions: A Longitudinal Perspective. *Gerontologist*. 2017. doi: 10.1093/geront/gnx046.

Ensrud KE, Lui LY, Langsetmo L, et al. Effects of Mobility and Multimorbidity on Inpatient and Post-Acute Health Care Utilization. *J Gerontol A Biol Sci Med Sci*. 2017. doi: 10.1093/gerona/glx128.

Berry JG, Ash AS, Cohen E, Hasan F, Feudtner C, Hall M. Contributions of Children With Multiple Chronic Conditions to Pediatric Hospitalizations in the United States: A Retrospective Cohort Analysis. *Hosp Pediatr*. 2017; **7**(7):365-372. doi: 10.1542/hpeds.2016-0179.

Powell MP, Yu X, Isehunwa O, Chang CF. National Trends in Hospital Emergency Department Visits among Those with and without Multiple Chronic Conditions, 2007-2012. *Hosp Top*. 2017: 1-8. doi: 10.1080/00185868.2017.1349523.

Dattalo M, DuGoff E, Ronk K, Kennelty K, Gilmore-Bykovskiy A, Kind AJ. Apples and Oranges: Four Definitions of Multiple Chronic Conditions and their Relationship to 30-Day Hospital Readmission. *J Am Geriatr Soc*. 2017; **65**(4):712-720.

Hijazi HH, Alyahya MS, Hammouri HM, Alshraideh HA. Risk assessment of comorbidities on 30-day avoidable hospital readmissions among internal medicine patients. *J Eval Clin Pract*. 2017; **23**(2):391-401.

Schamess A, Foraker R, Kretovics M, et al. Reduced emergency room and hospital utilization in persons with multiple chronic conditions and disability receiving home-based primary care. *Disabil Health J*. 2016.

Prior A, Vestergaard M, Davydow DS, Larsen KK, Ribe AR, Fenger-Gron M. Perceived Stress, Multimorbidity, and Risk for Hospitalizations for Ambulatory Care-sensitive Conditions: A Population-based Cohort Study. *Med Care*. 2016.

Chung RY, Mercer SW, Yip BH, et al. The association between types of regular primary care and hospitalization among people with and without multimorbidity: A household survey on 25,780 Chinese. *Sci Rep*. 2016; **6**:29758.

Shakib S, Dundon BK, Maddison J, et al. Effect of a Multidisciplinary Outpatient Model of Care on Health Outcomes in Older Patients with Multimorbidity: A Retrospective Case Control Study. *PLoS One*. 2016; **11**:e0161382.

Wallace E, McDowell R, Bennett K, Fahey T, Smith SM. Comparison of count-based multimorbidity measures in predicting emergency admission and functional decline in older community-dwelling adults: a prospective cohort study. *BMJ Open*. 2016; **6**:e013089.

Basu J, Avila R, Ricciardi R. Hospital Readmission Rates in U.S. States: Are Readmissions Higher Where More Patients with Multiple Chronic Conditions Cluster? *Health Serv Res*. 2016; **51**:1135-51.

Harris LJ, Graetz I, Podila PS, Wan J, Waters TM, Bailey JE. Characteristics of Hospital and Emergency Care Super-utilizers with Multiple Chronic Conditions. *J Emerg Med*. 2016; **50**:e203-14.

Takahashi PY, Ryu E, Hathcock MA, et al. A novel housing-based socioeconomic measure predicts hospitalisation and multiple chronic conditions in a community population. *J Epidemiol Community Health*. 2016; **70**:286-91.

Jackson C, Kasper EW, Williams C, DuBard CA. Incremental Benefit of a Home Visit Following Discharge for Patients with Multiple Chronic Conditions Receiving Transitional Care. *Popul Health Manag*. 2016; **19**:163-70.

Skinner HG, Coffey R, Jones J, Heslin KC, Moy E. The effects of multiple chronic conditions on hospitalization costs and utilization for ambulatory care sensitive conditions in the United States: a nationally representative cross-sectional study. *BMC Health Serv Res*. 2016; **16**:77.

Gruneir A, Bronskill SE, Maxwell CJ, et al. The association between multimorbidity and hospitalization is modified by individual demographics and physician continuity of care: a retrospective cohort study. *BMC Health Serv Res*. 2016; **16**:154.

Buurman BM, Frenkel WJ, Abu-Hanna A, Parlevliet JL, de Rooij SE. Acute and chronic diseases as part of multimorbidity in acutely hospitalized older patients. *Eur J Intern Med*. 2016; **27**:68-75.

Ruiz M, Bottle A, Long S, Aylin P. Multi-Morbidity in Hospitalised Older Patients: Who Are the Complex Elderly? *PLoS One*. 2015; **10**(12):e0145372.

Ticinesi A, Nouvenne A, Folesani G, Prati B, Morelli I, Guida L *et al*: Multimorbidity in elderly hospitalised patients and risk of *Clostridium difficile* infection: a retrospective study with the Cumulative Illness Rating Scale (CIRS). *BMJ Open*. 2015; **5**(10):e009316.

Bayliss EA, Ellis JL, Shoup JA, Zeng C, McQuillan DB, Steiner JF. Effect of continuity of care on hospital utilization for seniors with multiple medical conditions in an integrated health care system. *Ann Fam Med*. Mar 2015; **13**(2):123-129.

Wang HH, Wang JJ, Lawson KD, et al. Relationships of multimorbidity and income with hospital admissions in 3 health care systems. *Ann Fam Med*. Mar 2015; **13**(2):164-167.

de Souto Barreto P, Lapeyre-Mestre M, Vellas B, Rolland Y. Multimorbidity type, hospitalizations and emergency department visits among nursing home residents: a preliminary study. *J Nutr Health Aging*. Jul 2014; **18**(7):705-709.

Hempstead K, Delia D, Cantor JC, Nguyen T, Brenner J. The fragmentation of hospital use among a cohort of high utilizers: implications for emerging care coordination strategies for patients with multiple chronic conditions. *Med Care*. Mar 2014; **52** Suppl 3:S67-74.

Surate Solaligue DE, Hederman L, Martin CM. What weekday? How acute? An analysis of reported planned and unplanned GP visits by older multi-morbid patients in the Patient Journey Record System database. *J Eval Clin Pract*. May 19 2014.

Diez-Manglano J, de Escalante Yanguela B, Garcia-Arilla Calvo E, Ubis Diez E, Munilla Lopez E, Clerencia Sierra M, Revillo Pinilla P, Omiste Sanvicente T. Differential characteristics in polypathological inpatients in internal medicine departments and acute geriatric units: The PLUPAR study. *Eur J Intern Med*. Dec 2013; **24**(8):767-771.

Steiner CA, Friedman B. Hospital utilization, costs, and mortality for adults with multiple chronic conditions, nationwide inpatient sample, 2009. *Prev Chronic Dis*. 2013; **10**:E62.



Payne RA, Abel GA, Guthrie B, Mercer SW. The effect of physical multimorbidity, mental health conditions and socioeconomic deprivation on unplanned admissions to hospital: a retrospective cohort study. *CMAJ*. Mar 19 2013; **185**(5):E221-228.

Longman JM, M IR, Passey MD, et al. Frequent hospital admission of older people with chronic disease: a cross-sectional survey with telephone follow-up and data linkage. *BMC Health Serv Res*. 2012; **12**:373.

Freund T, Kunz CU, Ose D, Szecsenyi J, Peters-Klimm F. Patterns of multimorbidity in primary care patients at high risk of future hospitalization. *Popul Health Manag*. Apr 2012; **15**(2):119-124.

Condelius, A., A. K. Edberg, et al. "Hospital admissions among people 65+ related to multimorbidity, municipal and outpatient care." *Archives of Gerontology & Geriatrics* 2008. **46**(1): 41-55.

Fernández Miera, M. F. "[Patients with multimorbidity in the hospital setting.][Spanish]." *Gac Sanit* 2008. **22**: 137-41.

Marengoni A et al. Poor mental and physical health differentially contributes to disability in hospitalized geriatric patients of different ages. *Int J Geriatr Psychiatry*. 2004. **19**(1): p. 27-34.

Beddhu, S., et al., A simple comorbidity scale predicts clinical outcomes and costs in dialysis patients. *Am J Med*, 2000. **108**: p. 609-13.

Beddhu, S., et al., The effects of comorbid conditions on the outcomes of patients undergoing peritoneal dialysis. *American Journal of Medicine.*, 2002. **112**(9): p. 696-701.

Bergeron, E., et al., Comorbidity and age are both independent predictors of length of hospitalization in trauma patients. *Canadian Journal of Surgery*, 2005. **48**(5): p. 361-6.

van den Bos, G.A., The burden of chronic diseases in terms of disability, use of health care and healthy life expectancies. *Eur J Public Health*, 1995. **5**: p. 29-34.

Buntinx, F., et al., Evaluation of Charlson's comorbidity index in elderly living in nursing homes. *Journal of Clinical Epidemiology.*, 2002. **55**(11): p. 1144-7.

Christakis, N.A. and J.J. Escarce, Survival of Medicare patients after enrollment in hospice programs.[see comment]. *New England Journal of Medicine.*, 1996. **335**(3): p. 172-8.

Clough, R.A., et al., The effect of comorbid illness on mortality outcomes in cardiac surgery. *Archives of Surgery.*, 2002. **137**(4): p. 428-32; discussion 432-3.

Ettinger, W.H., et al., Long-term physical functioning in persons with knee osteoarthritis from NHANES. I: Effects of comorbid medical conditions. *Journal of Clinical Epidemiology*, 1994. **47**(7): p. 809-15.

Fan, V.S., et al., Validation of case-mix measures derived from self-reports of diagnoses and health. *J Clin Epidemiol*, 2002. **55**: p. 371-80.

Fillenbaum, G.G., et al., Comorbidity of five chronic health conditions in elderly community residents: determinants and impact on mortality. *Journals of Gerontology Series A-Biological Sciences & Medical Sciences.*, 2000. **55**(2): p. M84-9.

Fried, L.P., et al., Risk factors for 5-year mortality in older adults: the Cardiovascular Health Study.[see comment]. *Jama*, 1998. **279**(8): p. 585-92.

- Grau, L. and C. Kovner, Comorbidity, age, and hospital use among elderly Medicare patients. *Journal of Aging & Health.*, 1991. **3**(3): p. 352-67.
- Gray, L.K., et al., Heterogeneity in older people: examining physiologic failure, age, and comorbidity. *Journal of the American Geriatrics Society.*, 2002. **50**(12): p. 1955-61.
- Greenfield, S., et al., The importance of co-existent disease in the occurrence of postoperative complications and one-year recovery in patients undergoing total hip replacement. *Comorbidity and outcomes after hip replacement. Med Care*, 1993. **31**: p. 141-54.
- Holman, C.D., et al., A multipurpose comorbidity scoring system performed better than the Charlson index. *Journal of Clinical Epidemiology*, 2005. **58**(10): p. 1006-14.
- Incalzi, R.A., et al., The interaction between age and comorbidity contributes to predicting the mortality of geriatric patients in the acute-care hospital. *J Intern Med*, 1997. **242**: p. 291-8.
- Librero, J., S. Peiro, and R. Ordinana, Chronic comorbidity and outcomes of hospital care: length of stay, mortality, and readmission at 30 and 365 days. *J Clin Epidemiol*, 1999. **52**: p. 171-9.
- Lyketsos, C.G., et al., Medical comorbidity in psychiatric inpatients: relation to clinical outcomes and hospital length of stay. *Psychosomatics.*, 2002. **43**(1): p. 24-30.
- Lyketsos, C.G., et al., The General Medical Health Rating: a bedside global rating of medical comorbidity in patients with dementia. *Journal of the American Geriatrics Society.*, 1999. **47**(4): p. 487-91.
- McGee, D., et al., Patterns of comorbidity and mortality risk in blacks and whites. *Annals of Epidemiology.*, 1996. **6**(5): p. 381-5.
- McPherson, C.P., K.K. Swenson, and M.W. Lee, The effects of mammographic detection and comorbidity on the survival of older women with breast cancer. *Journal of the American Geriatrics Society.*, 2002. **50**(6): p. 1061-8.
- Menotti, A., et al., Prevalence of morbidity and multimorbidity in elderly male populations and their impact on 10-year all-cause mortality: The FINE study (Finland, Italy, Netherlands, Elderly). *Journal of Clinical Epidemiology.*, 2001. **54**(7): p. 680-6.
- Naessens, J.M. and T.R. Huschka, Distinguishing hospital complications of care from pre-existing conditions. *International Journal for Quality in Health Care*, 2004. **16 Suppl 1**: p. i27-35.
- Orwelius, L., et al., Role of preexisting disease in patients' perceptions of health-related quality of life after intensive care.[see comment]. *Critical Care Medicine*, 2005. **33**(7): p. 1557-64.
- Perkins, A.J., et al., Common comorbidity scales were similar in their ability to predict health care costs and mortality. *J Clin Epidemiol*, 2004. **57**: p. 1040-1048.
- Piccirillo, J.F., et al., Prognostic importance of comorbidity in a hospital-based cancer registry. *JAMA*, 2004. **291**(20): p. 2441-7.
- Poli, L., et al., Autopsy and multiple pathology in the elderly. *Gerontology.*, 1993. **39**(1): p. 55-63.
- Pompei, P., M.E. Charlson, and R.G. Douglas, Jr., Clinical assessments as predictors of one year survival after hospitalization: implications for prognostic stratification. *J Clin Epidemiol*, 1988. **41**: p. 275-84.

Poses, R.M., et al., Prediction of survival of critically ill patients by admission comorbidity. *J Clin Epidemiol*, 1996. **49**(7): p. 743-7.

Rochon, P.A., et al., Comorbid illness is associated with survival and length of hospital stay in patients with chronic disability. A prospective comparison of three comorbidity indices. *Med Care*, 1996. **34**(11): p. 1093-101.

Roe, C.J., et al., Comorbidities and prediction of length of hospital stay. *Australian & New Zealand Journal of Medicine.*, 1998. **28**(6): p. 811-5.

Turesson, C., et al., Occurrence of extraarticular disease manifestations is associated with excess mortality in a community based cohort of patients with rheumatoid arthritis. *Journal of Rheumatology.*, 2002. **29**(1): p. 62-7.

Verbrugge, L.M., J.M. Lepkowski, and Y. Imanaka, Comorbidity and its impact on disability. *Milbank Quarterly*, 1989. **67**: p. 450-84.

Wasielewski, R.C., et al., Patient comorbidity: relationship to outcomes of total knee arthroplasty. *Clinical Orthopaedics & Related Research*, 1998(356): p. 85-92.

West, D.W., et al., Comorbidity and breast cancer survival: a comparison between black and white women. *Ann Epidemiol*, 1996. **6**(5): p. 413-9.

Wolff, J.L., B. Starfield, and G. Anderson, Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Archives of Internal Medicine*, 2002. **162**: p. 2269-76.

Williams, A. and M. Botti, Issues concerning the on-going care of patients with comorbidities in acute care and post-discharge in Australia: a literature review. *Journal of Advanced Nursing.*, 2002. **40**(2): p. 131-40.

### **3.7 Resource utilisation**

Fryer AK, Friedberg MW, Thompson RW, Singer SJ. patient perceptions of integrated care and their relationship to utilization of emergency, inpatient and outpatient services. *Healthc (Amst)*. 2017;**5**(4):183-193.

Wang L, Palmer AJ, Otahal P, Cocker F, Sanderson K. Multimorbidity and Health Care Service Utilization in the Australian Workforce: Findings From the National Health Survey. *J Occup Environ Med*. 2017;**59**(8):795-802. doi: 10.1097/JOM.0000000000001089.

Fryer AK, Friedberg MW, Thompson RW, Singer SJ. patient perceptions of integrated care and their relationship to utilization of emergency, inpatient and outpatient services. *Healthc (Amst)*. 2017.

Ward BW. Barriers to Health Care for Adults With Multiple Chronic Conditions: United States, 2012-2015. *NCHS Data Brief*. **2017**(275):1-8.

Mondor L, Maxwell CJ, Hogan DB, et al. Multimorbidity and healthcare utilization among home care clients with dementia in Ontario, Canada: A retrospective analysis of a population-based cohort. *PLoS Med*. 2017;**14**(3):e1002249.

Schiltz NK, Warner DF, Sun J, et al. Identifying Specific Combinations of Multimorbidity that Contribute to Health Care Resource Utilization: An Analytic Approach. *Med Care*. 2017;**55**(3):276-284.

Hopman P, Heins MJ, Korevaar JC, Rijken M, Schellevis FG. Health care utilization of patients with multiple chronic diseases in the Netherlands: Differences and underlying factors. *Eur J Intern Med.* 2016; **35**:44-50.

van der Zee-Neuen A, Putrik P, Ramiro S, et al. Impact of Chronic Diseases and Multimorbidity on Health and Health Care Costs: The Additional Role of Musculoskeletal Disorders. *Arthritis Care Res (Hoboken).* 2016; **68**(12):1823-1831.

Palladino R, Tayu Lee J, Ashworth M, Triassi M, Millett C. Associations between multimorbidity, healthcare utilisation and health status: evidence from 16 European countries. *Age Ageing.* 2016; **45**:431-5.

Zulman DM, Pal Chee C, Wagner TH, et al. Multimorbidity and healthcare utilisation among high-cost patients in the US Veterans Affairs Health Care System. *BMJ Open.* 2015; **5**(4):e007771.

Hopman P, Heins MJ, Rijken M, Schellevis FG. Health care utilization of patients with multiple chronic diseases in The Netherlands: Differences and underlying factors. *Eur J Intern Med.* Apr 2015; **26**(3):190-196.

Bahler C, Huber CA, Brungger B, Reich O. Multimorbidity, health care utilization and costs in an elderly community-dwelling population: a claims data based observational study. *BMC Health Serv Res.* Jan 22 2015; **15**(1):23.

Surate Solaligüe DE, Hederman L, Martin CM. What weekday? How acute? An analysis of reported planned and unplanned GP visits by older multi-morbid patients in the Patient Journey Record System database. *J Eval Clin Pract.* Aug 2014; **20**(4):522-526.

Smits FT, Brouwer HJ, Zwinderman AH, Mohrs J, Schene AH, van Weert HC, Ter Riet G. Why do they keep coming back? Psychosocial etiology of persistence of frequent attendance in primary care: A prospective cohort study. *J Psychosom Res.* Aug 21 2014.

Ranstad K, Midlov P, Halling A. Importance of healthcare utilization and multimorbidity level in choosing a primary care provider in Sweden. *Scand J Prim Health Care.* Jun 2014; **32**(2):99-105.

Foguet-Boreu Q, Violan C, Roso-Llorach A, Rodriguez-Blanco T, Pons-Vigues M, Munoz-Perez MA, Pujol-Ribera E, Valderas JM. Impact of multimorbidity: acute morbidity, area of residency and use of health services across the life span in a region of south Europe. *BMC Fam Pract.* 2014; **15**:55.

van Oostrom SH, Picavet HS, de Bruin SR, Stirbu I, Korevaar JC, Schellevis FG, Baan CA. Multimorbidity of chronic diseases and health care utilization in general practice. *BMC Fam Pract.* 2014; **15**(1):61.

Hauswaldt J, Hummers-Pradier E, Junius-Walker U. Health service use among patients with chronic or multiple illnesses, and frequent attenders: secondary analysis of routine primary care data from 1996 to 2006. *Dtsch Arztebl Int.* Nov 2012; **109**(47):814-820.

van den Bussche, H., et al., Patterns of ambulatory medical care utilization in elderly patients with special reference to chronic diseases and multimorbidity - Results from a claims data based observational study in Germany. *BMC Geriatrics*, 2011. **11**: p. 54.

Beasley, J.W., et al., How many problems do family physicians manage at each encounter? A WReN study. *Ann Fam Med*, 2004. **2**: p. 405-10.

- Beddhu, S., et al., The effects of comorbid conditions on the outcomes of patients undergoing peritoneal dialysis. *American Journal of Medicine.*, 2002. **112**(9): p. 696-701.
- Blumenthal, D., et al., The duration of ambulatory visits to physicians. *Journal of Family Practice.*, 1999. **48**(4): p. 264-71.
- Buntinx, F., et al., Evaluation of Charlson's comorbidity index in elderly living in nursing homes. *Journal of Clinical Epidemiology.*, 2002. **55**(11): p. 1144-7.
- Elixhauser, A., et al., Comorbidity measures for use with administrative data.[comment]. *Medical Care.*, 1998. **36**(1): p. 8-27.
- Fan, V.S., et al., Using quality of life to predict hospitalization and mortality in patients with obstructive lung diseases. *Chest*, 2002. **122**(2): p. 429-36.
- Flocke, S.A., S.H. Frank, and D.A. Wenger, Addressing multiple problems in the family practice office visit. *J Fam Pract*, 2001. **50**: p. 211-6.
- Fryback, D.G., et al., The Beaver Dam Health Outcomes Study: initial catalog of health-state quality factors. *Med Decis Making.*, 1993. **13**(2): p. 89-102.
- Fuchs, Z., et al., Morbidity, comorbidity, and their association with disability among community-dwelling oldest-old in Israel. *Journals of Gerontology Series A-Biological Sciences & Medical Sciences.*, 1998. **53**(6): p. M447-55.
- Grau, L. and C. Kovner, Comorbidity, age, and hospital use among elderly Medicare patients. *Journal of Aging & Health.*, 1991. **3**(3): p. 352-67.
- Hansagi, H., et al., Frequent use of the hospital emergency department is indicative of high use of other health care services. *Ann Emerg Med*, 2001. **37**: p. 561-7.
- Iron, K.S., D.G. Manuel, and J. Williams, Using a linked data set to determine the factors associated with utilization and costs of family physician services in Ontario: effects of self-reported chronic conditions. p. 124-32, 2003.
- Østbye, T., et al., Is there time for management of patients with chronic diseases in primary care? *Ann Fam Med*, 2005. **3**: p. 209-214.
- Payne, S.M., et al., Utilization of medical services by Veterans Health Study (VHS) respondents. *Journal of Ambulatory Care Management*, 2005. **28**(2): p. 125-40.
- Rapoport, J., et al., Refining the measurement of the economic burden of chronic diseases in Canada. *Chronic Diseases in Canada*, 2004. **25**(1): p. 13-21.
- Schellevis, F.G., et al., Consultation rates and incidence of intercurrent morbidity among patients with chronic disease in general practice. *British Journal of General Practice.*, 1994. **44**(383): p. 259-62.
- Stafford, R.S., et al., Trends in adult visits to primary care physicians in the United States.[see comment]. *Archives of Family Medicine.*, 1999. **8**(1): p. 26-32.
- Stange, K.C., et al., The value of a family physician. *Journal of Family Practice*, 1998. **46**(5): p. 363-8.
- Stange, K.C., et al., Illuminating the 'black box'. A description of 4454 patient visits to 138 family physicians. *Journal of Family Practice*, 1998. **46**(5): p. 377-89.
- Starfield, B., et al., Comorbidity: Implications for the importance of primary care in "case" management. *Ann Fam Med*, 2003. **1**: p. 8-14.

Starfield, B., et al., Comorbidity and the use of primary care and specialist care in the elderly. *Ann Fam Med*, 2005. **3**: p. 215-22.

Starfield, B., et al., Ambulatory care groups: a categorization of diagnoses for research and management. *Health Services Research.*, 1991. **26**(1): p. 53-74.

Vozechova, S., et al., Trends in primary health care consumption by the elderly. *Acta Medica Austriaca.*, 2003. **30**(2): p. 48-50.

Westert, G.P., et al., Patterns of comorbidity and the use of health services in the Dutch population. *European Journal of Public Health*, 2001. **11**(4): p. 365-72.

Wyke, S., et al., Frequent attendance, socioeconomic status and burden of ill health. An investigation in the west of Scotland.[comment]. *European Journal of General Practice*, 2003. **9**(2): p. 48-55.

van den Bos, G.A., The burden of chronic diseases in terms of disability, use of health care and healthy life expectancies. *Eur J Public Health*, 1995. **5**: p. 29-34.

Hoffman, C., D. Rice, and H.Y. Sung, Persons with chronic conditions. Their prevalence and costs. *JAMA*, 1996. **276**(18): p. 1473-1479.

Wolff, J.L., B. Starfield, and G. Anderson, Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Archives of Internal Medicine*, 2002. **162**: p. 2269-76.

Xakellis, G.C., Are patients who use a generalist physician healthier than those who seek specialty care directly? *Family Medicine*, 2005. **37**(10): p. 719-26.

Zailinawati, A.H., et al., Why do patients with chronic illnesses fail to keep their appointments? A telephone interview. *Asia-Pacific Journal of Public Health*, 2006. **18**(1): p. 10-5.

### **3.8 Quality of life and functional level**

Portz JD, Kutner JS, Blatchford PJ, Ritchie CS. High Symptom Burden and Low Functional Status in the Setting of Multimorbidity. *J Am Geriatr Soc*. 2017; **65**(10):2285-2289.

Quah JHM, Wang P, Ng RRG, Luo N, Tan NC. Health-related quality of life of older Asian patients with multimorbidity in primary care in a developed nation. *Geriatr Gerontol Int*. 2017; **17**(10):1429-1437.

Vancampfort D, Stubbs B, Koyanagi A. Physical chronic conditions, multimorbidity and sedentary behavior amongst middle-aged and older adults in six low- and middle-income countries. *Int J Behav Nutr Phys Act*. 2017; **14**(1):147.

Ortiz PJ, Tello T, Aliaga EG, et al. Effect of multimorbidity on gait speed in well-functioning older people: A population-based study in Peru. *Geriatr Gerontol Int*. 2017.

McAvay G, Allore HG, Cohen AB, Gnjdic D, Murphy TE, Tinetti ME. Guideline-Recommended Medications and Physical Function in Older Adults with Multiple Chronic Conditions. *J Am Geriatr Soc*. 2017; **65**(12):2619-2626.

N'Goran AA, Deruaz-Luyet A, Haller DM, et al. Comparing the self-perceived quality of life of multimorbid patients and the general population using the EQ-5D-3L. *PLoS One*. 2017; **12**(12):e0188499.

Gonzalez-Chica DA, Hill CL, Gill TK, Hay P, Haag D, Stocks N. Individual diseases or clustering of health conditions? Association between multiple chronic diseases and health-related quality of life in adults. *Health Qual Life Outcomes*. 2017; **15**(1):244.

Gu J, Chao J, Chen W, et al. Multimorbidity and health-related quality of life among the community-dwelling elderly: A longitudinal study. *Arch Gerontol Geriatr*. 2018; **74**:133-140.

Rizzuto D, Melis RJF, Angleman S, Qiu C, Marengoni A. Effect of Chronic Diseases and Multimorbidity on Survival and Functioning in Elderly Adults. *J Am Geriatr Soc*. 2017; **65**(5):1056-1060. doi: 10.1111/jgs.14868.

Clay OJ, Perkins M, Wallace G, Crowe M, Sawyer P, Brown CJ. Associations of Multimorbid Medical Conditions and Health-Related Quality of Life Among Older African American Men. *J Gerontol B Psychol Sci Soc Sci*. 2017. doi: 10.1093/geronb/gbx090.

Taype-Rondan A, Abbs ES, Lazo-Porras M, et al. Association between chronic conditions and health-related quality of life: differences by level of urbanization in Peru. *Qual Life Res*. 2017. doi: 10.1007/s11136-017-1649-7.

Portz JD, Kutner JS, Blatchford PJ, Ritchie CS. High Symptom Burden and Low Functional Status in the Setting of Multimorbidity. *J Am Geriatr Soc*. 2017. doi: 10.1111/jgs.15045.

Waterhouse P, van der Wielen N, Banda PC, Channon AA. The impact of multi-morbidity on disability among older adults in South Africa: do hypertension and socio-demographic characteristics matter? *Int J Equity Health*. 2017; **16**(1):62.

Muller F, Hagedoorn M, Tuinman MA. Chronic multimorbidity impairs role functioning in middle-aged and older individuals mostly when non-partnered or living alone. *PLoS One*. 2017; **12**(2):e0170525.

Rizzuto D, Melis RJF, Angleman S, Qiu C, Marengoni A. Effect of Chronic Diseases and Multimorbidity on Survival and Functioning in Elderly Adults. *J Am Geriatr Soc*. 2017; **65**(5):1056-1060.

Wang L, Palmer AJ, Cocker F, Sanderson K. Multimorbidity and health-related quality of life (HRQoL) in a nationally representative population sample: implications of count versus cluster method for defining multimorbidity on HRQoL. *Health Qual Life Outcomes*. 2017; **15**(1):7.

Wang XX, Lin WQ, Chen XJ, et al. Multimorbidity associated with functional independence among community-dwelling older people: a cross-sectional study in Southern China. *Health Qual Life Outcomes*. 2017; **15**(1):73.

Tyack Z, Frakes KA, Barnett A, Cornwell P, Kuys S, McPhail S. Predictors of health-related quality of life in people with a complex chronic disease including multimorbidity: a longitudinal cohort study. *Qual Life Res*. 2016; **25**(10):2579-2592.

Mondor L, Maxwell CJ, Bronskill SE, Gruneir A, Wodchis WP. The relative impact of chronic conditions and multimorbidity on health-related quality of life in Ontario long-stay home care clients. *Qual Life Res*. 2016; **25**(10):2619-2632.

Su P, Ding H, Zhang W, et al. The association of multimorbidity and disability in a community-based sample of elderly aged 80 or older in Shanghai, China. *BMC Geriatr*. 2016; **16**(1):178.

Prazeres F, Santiago L. Relationship between health-related quality of life, perceived family support and unmet health needs in adult patients with multimorbidity attending primary care in Portugal: a multicentre cross-sectional study. *Health Qual Life Outcomes*. 2016; **14**(1): 156.

Jindai K, Nielson CM, Vorderstrasse BA, Quinones AR. Multimorbidity and Functional Limitations Among Adults 65 or Older, NHANES 2005-2012. *Prev Chronic Dis*. 2016; **13**:E151.

Walker V, Perret-Guillaume C, Kesse-Guyot E, et al. Effect of Multimorbidity on Health-Related Quality of Life in Adults Aged 55 Years or Older: Results from the SU.VI.MAX 2 Cohort. *PLoS One*. 2016; **11**(12):e0169282.

Dhalwani NN, Zaccardi F, O'Donovan G, et al. Association Between Lifestyle Factors and the Incidence of Multimorbidity in an Older English Population. *J Gerontol A Biol Sci Med Sci*. 2016.

Williams JS, Egede LE. The Association Between Multimorbidity and Quality of Life, Health Status and Functional Disability. *Am J Med Sci*. 2016; 352: 45-52.

Wei MY, Kawachi I, Okereke OI, Mukamal KJ. Diverse Cumulative Impact of Chronic Diseases on Physical Health-Related Quality of Life: Implications for a Measure of Multimorbidity. *Am J Epidemiol*. 2016; **184**: 357-65.

Quah JH, Wang P, Ng RR, Luo N, Tan NC. Health-related quality of life of older Asian patients with multimorbidity in primary care in a developed nation. *Geriatr Gerontol Int*. 2016.

Tyack Z, Frakes KA, Barnett A, Cornwell P, Kuys S, McPhail S. Predictors of health-related quality of life in people with a complex chronic disease including multimorbidity: a longitudinal cohort study. *Qual Life Res*. 2016.

Mondor L, Maxwell CJ, Bronskill SE, Gruneir A, Wodchis WP. The relative impact of chronic conditions and multimorbidity on health-related quality of life in Ontario long-stay home care clients. *Qual Life Res*. 2016.

Ramond-Roquin A, Haggerty J, Lambert M, Almirall J, Fortin M. Different Multimorbidity Measures Result in Varying Estimated Levels of Physical Quality of Life in Individuals with Multimorbidity: A Cross-Sectional Study in the General Population. *Biomed Res Int*. 2016; **2016**: 7845438.

Chin WY, Choi EP, Wan EY, Lam CL: Health-related quality of life mediates associations between multi-morbidity and depressive symptoms in Chinese primary care patients. *Fam Pract*. 2016; **33**(1): 61-68.

Hopman P, Schellevis FG, Rijken M. Health-related needs of people with multiple chronic diseases: differences and underlying factors. *Qual Life Res*. 2016; **25**: 651-60.

Heins MJ, Korevaar JC, Hopman PE, Donker GA, Schellevis FG, Rijken MP: Health-related quality of life and health care use in cancer survivors compared with patients with chronic diseases. *Cancer*. 2016.

Lang K, Alexander IM, Simon J, et al. The impact of multimorbidity on quality of life among midlife women: findings from a U.S. nationally representative survey. *J Womens Health (Larchmt)*. May 2015; **24**(5): 374-383.



Alonso-Moran E, Nuno-Solinis R, Orueta JF, Fernandez-Ruanova B, Alday-Jurado A, Gutierrez-Fraile E. Health-related quality of life and multimorbidity in community-dwelling telecare-assisted elders in the Basque Country. *Eur J Intern Med.* Apr 2015; **26**(3):169-175.

Forjaz MJ, Rodriguez-Blazquez C, Ayala A, et al. Chronic conditions, disability, and quality of life in older adults with multimorbidity in Spain. *Eur J Intern Med.* Apr 2015; **26**(3):176-181.

Garin N, Olaya B, Moneta MV, et al. Impact of multimorbidity on disability and quality of life in the Spanish older population. *PLoS One.* 2014; **9**(11):e111498.

Aguiar LB, Baccaro LF, de Souza Santos Machado V, Pinto-Neto AM, Costa-Paiva L. Disability and multimorbidity in women older than 50 years: a population-based household survey. *Menopause.* Nov 6 2014.

Mujica-Mota RE, Roberts M, Abel G, Elliott M, Lyratzopoulos G, Roland M, Campbell J. Common patterns of morbidity and multi-morbidity and their impact on health-related quality of life: evidence from a national survey. *Qual Life Res.* Oct 26 2014.

Parker L, Moran GM, Roberts LM, Calvert M, McCahon D. The burden of common chronic disease on health-related quality of life in an elderly community-dwelling population in the UK. *Fam Pract.* Oct 2014; **31**(5):557-563.

Marventano S, Ayala A, Gonzalez N, Rodriguez-Blazquez C, Garcia-Gutierrez S, Forjaz MJ. Multimorbidity and functional status in community-dwelling older adults. *Eur J Intern Med.* Sep 2014; **25**(7):610-616.

Agborsangaya CB, Lahtinen M, Cooke T, Johnson JA. Comparing the EQ-5D 3L and 5L: measurement properties and association with chronic conditions and multimorbidity in the general population. *Health Qual Life Outcomes.* 2014; **12**:74

Wicke FS, Guthlin C, Mergenthal K, Gensichen J, Loffler C, Bickel H, Maier W, Riedel-Heller SG, Weyerer S, Wiese B, Konig HH, Schon G, Hansen H, van den Bussche H, Scherer M, Dahlhaus A. Depressive mood mediates the influence of social support on health-related quality of life in elderly, multimorbid patients. *BMC Fam Pract.* 2014; **15**:62.

Nutzen A, Dahlhaus A, Fuchs A, Gensichen J, Konig HH, Riedel-Heller S, Maier W, Schafer I, Schon G, Weyerer S, Wiese B, Scherer M, van den Bussche H, Bickel H. Self-rated health in multimorbid older general practice patients: a cross-sectional study in Germany. *BMC Fam Pract.* 2014; **15**:1.

Dy SM, Pfoh ER, Salive ME, Boyd CM. Health-related quality of life and functional status quality indicators for older persons with multiple chronic conditions. *J Am Geriatr Soc.* Dec 2013; **61**(12):2120-2127.

Agborsangaya CB, Lau D, Lahtinen M, Cooke T, Johnson JA. Health-related quality of life and healthcare utilization in multimorbidity: results of a cross-sectional survey. *Qual Life Res.* May 2013; **22**(4):791-799.

McDaid O, Hanly MJ, Richardson K, Kee F, Kenny RA, Savva GM. The effect of multiple chronic conditions on self-rated health, disability and quality of life among the older populations of Northern Ireland and the Republic of Ireland: a comparison of two nationally representative cross-sectional surveys. *BMJ Open.* 2013; **3**(6).

Brettschneider C, Leicht H, Bickel H, et al. Relative impact of multimorbid chronic conditions on health-related quality of life--results from the MultiCare Cohort Study. *PLoS One*. 2013; **8**(6):e66742.

Lawson KD, Mercer SW, Wyke S, et al. Double trouble: the impact of multimorbidity and deprivation on preference-weighted health related quality of life a cross sectional analysis of the Scottish Health Survey. *Int J Equity Health*. 2013; **12**(1):67.

Aarts S, den Akker M, Bosma H, et al. The effect of multimorbidity on health related functioning: temporary or persistent? Results from a longitudinal cohort study. *J Psychosom Res*. Sep 2012; **73**(3):211-217.

Kim KI, Lee JH, Kim CH. Impaired health-related quality of life in elderly women is associated with multimorbidity: results from the Korean National Health and Nutrition Examination Survey. *Gen Med*. Oct 2012; **9**(5): 309-318.

Wijlhuizen GJ, Perenboom RJ, Garre FG, Heerkens YF, van Meeteren N. Impact of multimorbidity on functioning: evaluating the ICF Core Set approach in an empirical study of people with rheumatic diseases. *J Rehabil Med*. Jul 2012; **44**(8):664-668.

Vogel I, Miksch A, Goetz K, Ose D, Szecsenyi J, Freund T. The impact of perceived social support and sense of coherence on health-related quality of life in multimorbid primary care patients. *Chronic Illn*. 2012 **8**(4):296-307.

Hunger, M., et al., Multimorbidity and health-related quality of life in the older population: results from the German KORA-age study. *Health Qual Life Outcomes*, 2011. **9**: p. 53.

Drewes YM, den Elzen WP, Mooijaart SP, de Craen AJ, Assendelft WJ, Gussekloo J. The effect of cognitive impairment on the predictive value of multimorbidity for the increase in disability in the oldest old: the Leiden 85-plus Study. *Age Ageing* 2011; **40**:352-7.

Warner LM et al. Giving and taking--differential effects of providing, receiving and anticipating emotional support on quality of life in adults with multiple illnesses. *J Health Psychol*. 2010. **15**(5):660-70.

Hodek JM, Ruhe AK, Greiner W. Relationship Between Health-Related Quality of Life and Multimorbidity. *Gesundheitswesen*. 2009 Sep 29. [Epub ahead of print]

Heyworth IT, Hazell ML, Linehan MF, Frank TL. How do common chronic conditions affect health-related quality of life? *Br J Gen Pract*. 2009. **59**:e353-8.

Miranda de Nóbrega TC, Jaluul O, Machado AN, Paschoal SM, Jacob Filho W. Quality of life and multimorbidity of elderly outpatients. *Clinics*. 2009. **64**(1):45-50.

Kadam UT, Schellevis FG, Lewis M, van der Windt DA, de Vet HC, Bouter LM, Croft PR. Does age modify the relationship between morbidity severity and physical health in English and Dutch family practice populations?. *Qual Life Res*. 2009. **18**(2):209-20.

Marengoni A, von Strauss E, Rizzuto D, Winblad B, Fratiglioni L. The impact of chronic multimorbidity and disability on functional decline and survival in elderly persons. A community-based, longitudinal study. *J Intern Med*. 2009. **265**(2):288-95.

Bayliss, E. A., J. L. Ellis, et al. "Barriers to self-management and quality-of-life outcomes in seniors with multimorbidities." *Annals of Family Medicine* 2007. **5**(5): 395-402.

Kadam, U. T., P. R. Croft, et al. "Clinical multimorbidity and physical function in older adults: a record and health status linkage study in general practice." *Family Practice* 2007. **24**(5): 412-9

Takayama, M., N. Hirose, et al. "Morbidity of Tokyo-area centenarians and its relationship to functional status." *Journals of Gerontology Series A-Biological Sciences & Medical Sciences* 2007. **62**(7): 774-82.

Walker, A. E. "Multiple chronic diseases and quality of life: patterns emerging from a large national sample, Australia." *Chronic Illness* 2007. **3**(3): 202-18.

Bounthavong M, Law AV. Identifying health-related quality of life (HRQL) domains for multiple chronic conditions (diabetes, hypertension and dyslipidemia): patient and provider perspectives. *J Eval Clin Pract.* 2008. **14**(6):1002-11.

Adams, R.J., et al., Coexistent chronic conditions and asthma quality of life: a population-based study. *Chest*, 2006. **129**: p. 285-91.

Alonso, J., et al., Health-related quality of life associated with chronic conditions in eight countries: results from the International Quality of Life Assessment (IQOLA) Project. *Quality of Life Research*, 2004. **13**(2): p. 283-98.

Baumeister, H., K. Balke, and M. Harter, Psychiatric and somatic comorbidities are negatively associated with quality of life in physically ill patients. *Journal of Clinical Epidemiology*, 2005. **58**(11): p. 1090-100.

Bayliss, E.A., et al., Predicting declines in physical function in persons with multiple chronic medical conditions: what we can learn from the medical problem list. *Health Qual Life Outcomes*, 2004. **2**: p. 47.

Bayliss, E.A., J.L. Ellis, and J.F. Steiner, Subjective assessments of comorbidity correlate with quality of life health outcomes: Initial validation of a comorbidity assessment instrument. *Health and Quality of life Outcomes*, 2005. **3**: p. 51.

Berardi, D., et al., Mental, physical and functional status in primary care attenders. *International Journal of Psychiatry in Medicine.*, 1999. **29**(2): p. 133-48.

Chen, A.Y., J. Daley, and G.E. Thibault, Angina patients' ratings of current health and health without angina: associations with severity of angina and comorbidity.[see comment]. *Medical Decision Making.*, 1996. **16**(2): p. 169-77.

Cheng, L., et al., Health related quality of life in pregeriatric patients with chronic diseases at urban, public supported clinics. *Health and Quality of Life Outcomes*, 2003. **1**:63.

Crabtree, H.L., et al., The Comorbidity Symptom Scale: a combined disease inventory and assessment of symptom severity. *Journal of the American Geriatrics Society.*, 2000. **48**(12): p. 1674-8.

Cuijpers, P., P. van Lammeren, and B. Duzijn, Relation between quality of life and chronic illnesses in elderly living in residential homes: a prospective study. *Int Psychogeriatr*, 1999. **11**: p. 445-54.

Doll, H.A., S.E. Petersen, and S.L. Stewart-Brown, Obesity and physical and emotional well-being: associations between body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire. *Obesity Research.*, 2000. **8**(2): p. 160-70.

Erickson, S.R., et al., Relationship between patient and disease characteristics, and health-related quality of life in adults with asthma. *Respiratory Medicine*, 2002. **96**(6): p. 450-460.

- Ettinger, W.H., et al., Long-term physical functioning in persons with knee osteoarthritis from NHANES. I: Effects of comorbid medical conditions. *Journal of Clinical Epidemiology*, 1994. **47**(7): p. 809-15.
- Ferrer, M., et al., Chronic obstructive pulmonary disease stage and health-related quality of life. The Quality of Life of Chronic Obstructive Pulmonary Disease Study Group. *Annals of Internal Medicine.*, 1997. **127**(12): p. 1072-9.
- Fortin M, Bravo G, Hudon C, Lapointe L, Almirall J, Dubois M-F, Vanasse A. Relationship between multimorbidity and health-related quality of life of patients in primary care. *Qual Life Res* 2006; **15**:83-91.
- Fortin M, Lapointe L, Hudon C, Vanasse A, Ntetu AL, Maltais D. Multimorbidity and quality of life in primary care: a systematic review. *Health Qual Life Outcomes* 2004; **2**: 51.
- Fried, L.P., et al., Association of comorbidity with disability in older women: the Women's Health and Aging Study. *J Clin Epidemiol*, 1999. **52**: p. 27-37.
- Fried, L.P. and J.M. Guralnik, Disability in older adults: evidence regarding significance, etiology, and risk. *Journal of the American Geriatrics Society*, 1997. **45**(1): p. 92-100.
- Fryback, D.G., et al., The Beaver Dam Health Outcomes Study: initial catalog of health-state quality factors. *Med Decis Making.*, 1993. **13**(2): p. 89-102.
- Fuchs, Z., et al., Morbidity, comorbidity, and their association with disability among community-dwelling oldest-old in Israel. *Journals of Gerontology Series A-Biological Sciences & Medical Sciences.*, 1998. **53**(6): p. M447-55.
- Glasgow, R.E., et al., Quality of life and associated characteristics in a large national sample of adults with diabetes. *Diabetes Care.*, 1997. **20**(4): p. 562-7.
- Grimby, A. and A. Svanborg, Morbidity and health-related quality of life among ambulant elderly citizens. *Aging Clin Exp Res*, 1997. **9**: p. 356-64.
- Haan, M.N. and M. Weldon, The influence of diabetes, hypertension, and stroke on ethnic differences in physical and cognitive functioning in an ethnically diverse older population. *Annals of Epidemiology.*, 1996. **6**(5): p. 392-8.
- Hoffman, C., D. Rice, and H.Y. Sung, Persons with chronic conditions. Their prevalence and costs. *JAMA*, 1996. **276**(18): p. 1473-1479.
- Katz, D.A. and C.A. McHorney, The relationship between insomnia and health-related quality of life in patients with chronic illness. *Journal of Family Practice.*, 2002. **51**(3): p. 229-35.
- Katz, D.A., C.A. McHorney, and R.L. Atkinson, Impact of obesity on health-related quality of life in patients with chronic illness. *Journal of General Internal Medicine.*, 2000. **15**(11): p. 789-96.
- Kempen, G.I., M. Jelacic, and J. Ormel, Personality, chronic medical morbidity, and health-related quality of life among older persons. *Health Psychol*, 1997. **16**(6): p. 539-46.
- Kempen, G.I., et al., Adaptive responses among Dutch elderly: the impact of eight chronic medical conditions on health-related quality of life.[see comment]. *American Journal of Public Health.*, 1997. **87**(1): p. 38-44.
- Kusek, J.W., et al., Cross-sectional study of health-related quality of life in African Americans with chronic renal insufficiency: the African American Study of Kidney

Disease and Hypertension Trial. *American Journal of Kidney Diseases.*, 2002. **39**(3): p. 513-24.

Lahad, A. and Y. Yodfat, Impact of comorbidity on well-being in hypertension: case control study. *Journal of Human Hypertension.*, 1993. **7**(6): p. 611-4.

Lam, C.L.K., Reliability and construct validity of the Chinese (Hong Kong) SF-36 patients in primary care. *Hong Kong Practitioner*, 2003. **25**(10): p. 468-475.

Lyketsos, C.G., et al., Medical comorbidity in psychiatric inpatients: relation to clinical outcomes and hospital length of stay. *Psychosomatics.*, 2002. **43**(1): p. 24-30.

Maddigan, S.L., D.H. Feeny, and J.A. Johnson, Health-related quality of life deficits associated with diabetes and comorbidities in a Canadian National Population Health Survey. *Qual Life Res*, 2005. **14**: p. 1311-20.

Merkus, M.P., et al., Quality of life in patients on chronic dialysis: self-assessment 3 months after the start of treatment. The Necosad Study Group. *American Journal of Kidney Diseases*, 1997. **29**(4): p. 584-92.

Michelson, H., C. Bolund, and Y. Brandberg, Multiple chronic health problems are negatively associated with health related quality of life (HRQoL) irrespective of age. *Qual Life Res*, 2000. **9**: p. 1093-104.

Miller, R.R., et al., Effect of medical conditions on improvement in self-reported and observed functional performance of elders. *Journal of the American Geriatrics Society*, 2004. **52**(2): p. 217-23.

Noel, P.H., et al., Depression and comorbid illness in elderly primary care patients: impact on multiple domains of health status and well-being. p. 555-**62**, 2004 Nov-Dec.

Oldridge, N.B., et al., Prevalence and outcomes of comorbid metabolic and cardiovascular conditions in middle- and older-age adults. *Journal of Clinical Epidemiology*, 2001. **54**(9): p. 928-934.

Orwelius, L., et al., Role of preexisting disease in patients' perceptions of health-related quality of life after intensive care.[see comment]. *Critical Care Medicine*, 2005. **33**(7): p. 1557-64.

Osterhaus, J.T., et al., Measuring the functional status and well-being of patients with migraine headache. *Headache*, 1994. **34**(6): p. 337-343.

Rice, D.P. and M.P. LaPlante, Chronic illness, disability and increasing longevity, in *Ethics and economics of long term care.*, E.-L.M. Sullivan S., Editor. 1988. p. 9-55.

Rigler, S.K., et al., Co-morbidity adjustment for functional outcomes in community-dwelling older adults. *Clinical Rehabilitation.*, 2002. **16**(4): p. 420-8.

Rijken, M., et al., Comorbidity of chronic diseases: effects of disease pairs on physical and mental functioning. *Qual Life Res*, 2005. **14**: p. 45-55.

Rozzini, R., et al., Geriatric Index of Comorbidity: validation and comparison with other measures of comorbidity. *Age Ageing*, 2002. **31**(4): p. 277-85.

Sapp, A.L., et al., Social networks and quality of life among female long-term colorectal cancer survivors. *Cancer*, 2003. **98**(8): p. 1749-1758.

Small, G.W., et al., Impact of physical illness on quality of life and antidepressant response in geriatric major depression. Fluoxetine Collaborative Study Group. *Journal of the American Geriatrics Society.*, 1996. **44**(10): p. 1220-5.

Sprangers, M.A., et al., Which chronic conditions are associated with better or poorer quality of life? *Journal of Clinical Epidemiology*, 2000. **53**(9): p. 895-907.

Stein, M.B. and E. Barrett-Connor, Quality of life in older adults receiving medications for anxiety, depression, or insomnia: Findings from a community-based study. *American Journal of Geriatric Psychiatry*, 2002. **10**(5): p. 568-574.

Stewart, A.L., et al., Functional status and well-being of patients with chronic conditions. Results from the Medical Outcomes Study. *JAMA*, 1989. **262**: p. 907-13.

Sturm, R. and K.B. Wells, Does obesity contribute as much to morbidity as poverty or smoking? *Public Health*, 2001. **115**(3): p. 229-235.

Talamo, J., et al., Use of the short form 36 (SF36) for health status measurement in rheumatoid arthritis. *British Journal of Rheumatology*, 1997. **36**(4): p. 463-9.

Vacek, P.M., et al., Factors influencing quality of life in breast cancer survivors. *Quality of Life Research*, 2003. **12**(5): p. 527-37.

van den Bos, G.A., The burden of chronic diseases in terms of disability, use of health care and healthy life expectancies. *Eur J Public Health*, 1995. **5**: p. 29-34.

Van Manen, J.G., et al., The influence of COPD on health-related quality of life independent of the influence of comorbidity. *Journal of Clinical Epidemiology*, 2003. **56**(12): p. 1177-1184.

van Manen, J.G., et al., Added value of co-morbidity in predicting health-related quality of life in COPD patients. *Respiratory Medicine*, 2001. **95**(6): p. 496-504.

Verbrugge, L.M., J.M. Lepkowski, and Y. Imanaka, Comorbidity and its impact on disability. *Milbank Quarterly*, 1989. **67**: p. 450-84.

Wang, S.J., et al., Quality of life differs among headache diagnoses: analysis of SF-36 survey in 901 headache patients. *Pain*, 2001. **89**(2-3): p. 285-92.

Wensing, M., E. Vingerhoets, and R. Grol, Functional status, health problems, age and comorbidity in primary care patients. *Qual Life Res*, 2001. **10**: p. 141-8.

Xuan, J., et al., Effects of comorbidity on health-related quality-of-life scores: an analysis of clinical trial data. *Clin Ther*, 1999. **21**(2): p. 383-403.

### **3.9 Psychological distress, depression, and cognition**

Alhussain K, Meraya AM, Sambamoorthi U. Serious Psychological Distress and Emergency Room Use among Adults with Multimorbidity in the United States. *Psychiatry J*. 2017; **2017**:8565186.

Stubbs B, Vancampfort D, Veronese N, et al. Depression and physical health multimorbidity: primary data and country-wide meta-analysis of population data from 190 593 people across 43 low- and middle-income countries. *Psychol Med*. 2017; **47**(12):2107-2117.

Quirk SE, Stuart AL, Berk M, et al. Personality disorder is an excess risk factor for physical multimorbidity among women with mental state disorders. *Psychiatry Res*. 2017; **257**:546-549.

Petersen I, Rathod S, Kathree T, Selohilwe O, Bhana A. Risk correlates for physical-mental multimorbidities in South Africa: a cross-sectional study. *Epidemiol Psychiatr Sci*. 2017; 1-9.

Bhalla IP, Rosenheck RA. A Change in Perspective: From Dual Diagnosis to Multimorbidity. *Psychiatr Serv*. 2018; **69**(1):112-116.

Stubbs B, Vancampfort D, Veronese N, et al. Multimorbidity and perceived stress: a population-based cross-sectional study among older adults across six low- and middle-income countries. *Maturitas*. 2018; **107**:84-91.

DiNapoli EA, Bramoweth AD, Whiteman KL, Hanusa BH, Kasckow J. Mood Disorders in Middle-Aged and Older Veterans With Multimorbidity. *J Aging Health*. 2017; **29**(4):657-668. doi: 10.1177/0898264316641082.

Vancampfort D, Koyanagi A, Ward PB, et al. Perceived Stress and Its Relationship With Chronic Medical Conditions and Multimorbidity Among 229,293 Community-Dwelling Adults in 44 Low- and Middle-Income Countries. *Am J Epidemiol*. 2017; **186**(8):979-989.

Holvast F, van Hattem BA, Sinnige J, et al. Late-life depression and the association with multimorbidity and polypharmacy: a cross-sectional study. *Fam Pract*. 2017; **34**(5):539-545.

Vancampfort D, Koyanagi A, Hallgren M, Probst M, Stubbs B. The relationship between chronic physical conditions, multimorbidity and anxiety in the general population: A global perspective across 42 countries. *Gen Hosp Psychiatry*. 2017; **45**:1-6.

Bustos-Vazquez E, Fernandez-Nino JA, Astudillo-Garcia CI. Self-rated health, multimorbidity and depression in Mexican older adults: Proposal and evaluation of a simple conceptual model. *Biomedica*. 2017; **37**(0):92-103.

Stubbs B, Koyanagi A, Veronese N, et al. Physical multimorbidity and psychosis: comprehensive cross sectional analysis including 242,952 people across 48 low- and middle-income countries. *BMC Med*. 2016; **14**(1):189.

Kavalidou K, Smith DJ, O'Connor RC. The role of physical and mental health multimorbidity in suicidal ideation. *J Affect Disord*. 2017; **209**:80-85.

Prior A, Fenger-Gron M, Larsen KK, et al. The Association Between Perceived Stress and Mortality Among People With Multimorbidity: A Prospective Population-Based Cohort Study. *Am J Epidemiol*. 2016; **184**:199-210.

Gould CE, O'Hara R, Goldstein MK, Beaudreau SA. Multimorbidity is associated with anxiety in older adults in the Health and Retirement Study. *Int J Geriatr Psychiatry*. 2016; **31**:1105-15.

Gallo JJ, Hwang S, Joo JH, et al. Multimorbidity, Depression, and Mortality in Primary Care: Randomized Clinical Trial of an Evidence-Based Depression Care Management Program on Mortality Risk. *J Gen Intern Med*. 2016; **31**:380-6.

Ekdahl AW, Odzakovic E, Hellstrom I. Living Unnoticed: Cognitive Impairment in Older People with Multimorbidity. *J Nutr Health Aging*. 2016; **20**:275-9.

Pruchno RA, Wilson-Genderson M, Heid AR. Multiple Chronic Condition Combinations and Depression in Community-Dwelling Older Adults. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:910-5.

Thomeer MB. Multiple Chronic Conditions, Spouse's Depressive Symptoms, and Gender within Marriage. *J Health Soc Behav.* 2016;**57**:59-76.

Fabrizi E, An Y, Zoli M, et al. Association Between Accelerated Multimorbidity and Age-Related Cognitive Decline in Older Baltimore Longitudinal Study of Aging Participants without Dementia. *J Am Geriatr Soc.* 2016;**64**:965-72.

Vassilaki M, Aakre JA, Cha RH, Kremers WK, St Sauver JL, Mielke MM *et al*: Multimorbidity and Risk of Mild Cognitive Impairment. *J Am Geriatr Soc.* 2015;**63**(9):1783-1790.

Gallo JJ, Hwang S, Joo JH, Bogner HR, Morales KH, Bruce ML *et al*: Multimorbidity, Depression, and Mortality in Primary Care: Randomized Clinical Trial of an Evidence-Based Depression Care Management Program on Mortality Risk. *J Gen Intern Med.* 2015.

Loprinzi PD: Multimorbidity, cognitive function, and physical activity. *Age (Dordr).* 2016;**38**(1):8.

Villarreal AE, Grajales S, Lopez L, Britton GB, Initiative PA: Cognitive Impairment, Depression, and Cooccurrence of Both among the Elderly in Panama: Differential Associations with Multimorbidity and Functional Limitations. *Biomed Res Int.* 2015;**2015**:718701.

Cooper SA, McLean G, Guthrie B, et al. Multiple physical and mental health comorbidity in adults with intellectual disabilities: population-based cross-sectional analysis. *BMC Fam Pract.* 2015;**16**:110.

Vassilaki M, Aakre JA, Cha RH, et al. Multimorbidity and Risk of Mild Cognitive Impairment. *J Am Geriatr Soc.* Sep 2015;**63**(9):1783-1790.

Smith DJ, Court H, McLean G, et al. Depression and multimorbidity: a cross-sectional study of 1,751,841 patients in primary care. *The Journal of clinical psychiatry.* Nov 2014;**75**(11):1202-1208; quiz 1208.

Swartz JA, Jantz I. Association between nonspecific severe psychological distress as an indicator of serious mental illness and increasing levels of medical multimorbidity. *Am J Public Health.* Dec 2014;**104**(12):2350-2358.

Bock JO, Luppia M, Brettschneider C, Riedel-Heller S, Bickel H, Fuchs A, Gensichen J, Maier W, Mergenthal K, Schafer I, Schon G, Weyerer S, Wiese B, van den Bussche H, Scherer M, Konig HH. Impact of depression on health care utilization and costs among multimorbid patients--from the MultiCare Cohort Study. *PLoS One.* 2014;**9**(3):e91973.

Hill N, Joubert L, Epstein I. Encouraging self-management in chronically ill patients with co-morbid symptoms of depression and anxiety: an emergency department study and response. *Soc Work Health Care.* 2013;**52**(2-3):207-221.

Gunn JM, Ayton DR, Densley K, et al. The association between chronic illness, multimorbidity and depressive symptoms in an Australian primary care cohort. *Soc Psychiatry Psychiatr Epidemiol.* Feb 2012;**47**(2):175-184.

Spangenberg L, Forkmann T, Brähler E, Glaesmer H. The association of depression and multimorbidity in the elderly: implications for the assessment of depression. *Psychogeriatrics.* 2011;**11**:227-34.



Vyas, A. and U. Sambamoorthi, Multimorbidity and depression treatment. *Gen Hosp Psychiatry*, 2011. **33**: p. 238-45.

Findley, P., C. Shen, and U. Sambamoorthi, Multimorbidity and persistent depression among veterans with diabetes, heart disease, and hypertension. *Health Soc Work*, 2011. **36**: p. 109-19.

Gunn JM, Ayton DR, Densley K, et al. The association between chronic illness, multimorbidity and depressive symptoms in an Australian primary care cohort. *Soc Psychiatry Psychiatr Epidemiol* Dec 25 [Epub ahead of print] 2010.

Fortin M, Hudon C, Bayliss EA, Soubhi H, Lapointe L. Caring for Body and Soul: The Importance of Recognizing and Managing Psychological Distress in Persons with Multimorbidity. *Int'l J Psychiatry in Medicine* 2007; **37**: 1-9.

Brown, C., H.C. Schulberg, and H.G. Prigerson, Factors associated with symptomatic improvement and recovery from major depression in primary care patients. *General Hospital Psychiatry*, 2000. **22**(4): p. 242-50.

Coulehan, J.L., et al., Depressive symptomatology and medical co-morbidity in a primary care clinic. *International Journal of Psychiatry in Medicine*, 1990. **20**(4): p. 335-47.

Coulehan, J.L., et al., Medical comorbidity of major depressive disorder in a primary medical practice. *Archives of Internal Medicine*, 1990. **150**(11): p. 2363-7.

Druss, B. and H. Pincus, Suicidal ideation and suicide attempts in general medical illnesses. *Arch Intern Med*, 2000. **160**: p. 1522-6.

Fortin M, Bravo G, Hudon C, Lapointe L, Dubois M-F, Almirall J. Psychological Distress and Multimorbidity in Primary Care. *Ann Fam Med* 2006; **4**: 417-22.

Goodwin, R.D., A. Marusic, and C.W. Hoven, Suicide attempts in the United States: the role of physical illness. *Soc Sci Med*, 2003. **56**: p. 1783-8.

Johnson, E.H. and A. Arbor, Psychiatric morbidity and health problems among black Americans: a national survey. *Journal of the National Medical Association*, 1989. **81**: p. 1217-23.

Joshi, K., R. Kumar, and A. Avasthi, Morbidity profile and its relationship with disability and psychological distress among elderly people in Northern India. *International Journal of Epidemiology*, 2003. **32**: p. 978-87.

Katon, W., et al., Behavioral and clinical factors associated with depression among individuals with diabetes. *Diabetes Care*, 2004. **27**(4): p. 914-20.

Leentjens AFG, van den Akker M, Metsemakers JFM, Lousberg R, Verhey FRJ. Higher incidence of depression preceding the onset of Parkinson's disease: a register study. *Mov Disord* 2003; **18**: 414-18.

Lowe, B., et al., Predictors of psychiatric comorbidity in medical outpatients. *Psychosomatic Medicine*, 2003. **65**(5): p. 764-70.

Lyketsos, C.G., et al., Medical comorbidity in psychiatric inpatients: relation to clinical outcomes and hospital length of stay. *Psychosomatics*, 2002. **43**(1): p. 24-30.

Nuyen, J., et al., Accuracy of diagnosing depression in primary care: the impact of chronic somatic and psychiatric co-morbidity. *Psychological Medicine*, 2005. **35**(8): p. 1185-95.

Rabinowitz, J., et al., Primary care physicians' detection of psychological distress among elderly patients. *Am J Geriatr Psychiatry*, 2005. **13**: p. 773-80.

Schuurman AG, van den Akker M, Ensink KTJL, Metsemakers JFM, Knottnerus JA, Leentjens AFG, Buntinx F. Increased risk of Parkinson's disease after depression: a retrospective cohort study. *Neurology* 2002;**58**: 1501-4.

Seeman, T.E., et al., The health consequences of multiple morbidity in the elderly. The Alameda County study. *Journal of Aging & Health*, 1989. **1**(1): p. 50-66.

Thurston-Hicks, A., et al., Functional impairment associated with psychological distress and medical severity in rural primary care patients. *Psychiatric Services*, 1998. **49**(7): p. 951-5.

van den Akker M, Schuurman A, Metsemakers J, Buntinx F. Is depression related to subsequent diabetes mellitus? *Acta Psychiatrica Scandinavica* 2004;**110**: 178-83.

### **3.10 Medication**

Inauen J, Bierbauer W, Luscher J, et al. Assessing adherence to multiple medications and in daily life among patients with multimorbidity. *Psychol Health*. 2017;**32**(10): 1233-1248.

Bachmann M, Kool J, Oesch P, Weber M, Bachmann S. Association of potentially inappropriate medications with outcomes of inpatient geriatric rehabilitation : A prospective cohort study. *Z Gerontol Geriatr*. 2017.

Rodriguez-Perez A, Alfaro-Lara ER, Albinana-Perez S, et al. Novel tool for deprescribing in chronic patients with multimorbidity: List of Evidence-Based Deprescribing for Chronic Patients criteria. *Geriatr Gerontol Int*. 2017;**17**(11): 2200-2207.

Ihle A, Inauen J, Scholz U, et al. Prospective and retrospective memory are differentially related to self-rated omission and commission errors in medication adherence in multimorbidity. *Appl Neuropsychol Adult*. 2017;**24**(6): 505-511.

Storms H, Marquet K, Aertgeerts B, Claes N. Prevalence of inappropriate medication use in residential long-term care facilities for the elderly: A systematic review. *Eur J Gen Pract*. 2017;**23**(1): 69-77.

Narayan SW, Nishtala PS. Development and validation of a Medicines Comorbidity Index for older people. *Eur J Clin Pharmacol*. 2017;**73**(12): 1665-1672.

Gorup EC, Ster MP. Number of medications or number of diseases: what influences underprescribing? *Eur J Clin Pharmacol*. 2017;**73**(12): 1673-1679.

Kim S, Bennett K, Wallace E, Fahey T, Cahir C. Measuring medication adherence in older community-dwelling patients with multimorbidity. *Eur J Clin Pharmacol*. 2017.

Fredericksen RJ, Gibbons L, Brown S, et al. Medication understanding among patients living with multiple chronic conditions: Implications for patient-reported measures of adherence. *Res Social Adm Pharm*. 2017. doi: 10.1016/j.sapharm.2017.06.009.

Toscano Guzman MD, Galvan Banqueri M, Otero MJ, Alfaro Lara ER, Casajus Lagranja P, Santos Ramos B. Development of a Trigger Tool to Identify Adverse Drug Events in Elderly Patients With Multimorbidity. *J Patient Saf*. 2017. doi: 10.1097/PTS.0000000000000389.

van Summeren JJ, Schuling J, Haaijer-Ruskamp FM, Denig P. Outcome prioritisation tool for medication review in older patients with multimorbidity: a pilot study in general practice. *Br J Gen Pract*. 2017; **67**(660):e501-e506. doi: 10.3399/bjgp17X690485.

Feng X, Tan X, Riley B, Zheng T, Bias T, Sambamoorthi U. Polypharmacy and Multimorbidity Among Medicaid Enrollees: A Multistate Analysis. *Popul Health Manag*. 2017. doi: 10.1089/pop.2017.0065.

McCarthy C, Clyne B, Corrigan D, et al. Supporting prescribing in older people with multimorbidity and significant polypharmacy in primary care (SPPiRE): a cluster randomised controlled trial protocol and pilot. *Implement Sci*. 2017; **12**(1):99. doi: 10.1186/s13012-017-0629-1.

Schottker B, Saum KU, Muhlack DC, Hoppe LK, Holleczeck B, Brenner H. Polypharmacy and mortality: new insights from a large cohort of older adults by detection of effect modification by multi-morbidity and comprehensive correction of confounding by indication. *Eur J Clin Pharmacol*. 2017; **73**(8):1041-1048. doi: 10.1007/s00228-017-2266-7.

Caughey GE, Tait K, Vitry AI, Shakib S. Influence of medication risks and benefits on treatment preferences in older patients with multimorbidity. *Patient Prefer Adherence*. 2017; **11**:131-140.

Inauen J, Bierbauer W, Luscher J, et al. Assessing adherence to multiple medications and in daily life among patients with multimorbidity. *Psychol Health*. 2017:1-16.

Sanchez-Fidalgo S, Guzman-Ramos MI, Galvan-Banqueri M, Bernabeu-Wittel M, Santos-Ramos B. Prevalence of drug interactions in elderly patients with multimorbidity in primary care. *Int J Clin Pharm*. 2017; **39**(2):343-353.

Jager C, Freund T, Steinhauser J, et al. Impact of a tailored program on the implementation of evidence-based recommendations for multimorbid patients with polypharmacy in primary care practices-results of a cluster-randomized controlled trial. *Implement Sci*. 2017; **12**(1):8.

Surbhi S, Munshi KD, Bell PC, Bailey JE. Drug therapy problems and medication discrepancies during care transitions in super-utilizers. *J Am Pharm Assoc (2003)*. 2016; **56**(6):633-642 e631.

Aubert CE, Streit S, Da Costa BR, et al. Polypharmacy and specific comorbidities in university primary care settings. *Eur J Intern Med*. 2016; **35**:35-42.

Allore HG, Zhan Y, Cohen AB, Tinetti ME, Trentalange M, McAvay G. Methodology to Estimate the Longitudinal Average Attributable Fraction of Guideline-recommended Medications for Death in Older Adults With Multiple Chronic Conditions. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:1113-6.

Sinnige J, Braspenning JC, Schellevis FG, et al. Inter-practice variation in polypharmacy prevalence amongst older patients in primary care. *Pharmacoepidemiol Drug Saf*. 2016; **25**:1033-41.

Sinnige J, Korevaar JC, van Lieshout J, Westert GP, Schellevis FG, Braspenning JC. Medication management strategy for older people with polypharmacy in general practice: a qualitative study on prescribing behaviour in primary care. *Br J Gen Pract*. 2016; **66**:e540-51.

Linnet K, Gudmundsson LS, Birgisdottir FG, et al. Multimorbidity and use of hypnotic and anxiolytic drugs: cross-sectional and follow-up study in primary healthcare in Iceland. *BMC Fam Pract*. 2016; **17**:69.

[No authors listed]. Frailty, polypharmacy and deprescribing. *Drug Ther Bull*. 2016; **54**:69-72.

Aubert CE, Streit S, Da Costa BR, et al. Polypharmacy and specific comorbidities in university primary care settings. *Eur J Intern Med*. 2016.

Delcher A, Hily S, Boureau AS, Chapelet G, Berrut G, de Decker L: Multimorbidities and Overprescription of Proton Pump Inhibitors in Older Patients. *PLoS One*. 2015; **10**(11):e0141779.

Kersten H, Hvidsten LT, Gloersen G, Wyller TB, Wang-Hansen MS: Clinical impact of potentially inappropriate medications during hospitalization of acutely ill older patients with multimorbidity. *Scand J Prim Health Care*. 2015; **33**(4):243-251.

Cooper JA, Moriarty F, Ryan C, Smith SM, Bennett K, Fahey T *et al*: Potentially inappropriate prescribing in two populations with differing socio-economic profiles: a cross-sectional database study using the PROMPT criteria. *Eur J Clin Pharmacol*. 2016.

Mudge A, Radnedge K, Kasper K, et al. Effects of a pilot multidisciplinary clinic for frequent attending elderly patients on deprescribing. *Aust Health Rev*. Jul 6 2015.

Hansen RA, Voils CI, Farley JF, et al. Prescriber continuity and medication adherence for complex patients. *Ann Pharmacother*. Mar 2015; **49**(3):293-302.

Reich O, Rosemann T, Rapold R, Blozik E, Senn O. Potentially inappropriate medication use in older patients in Swiss managed care plans: prevalence, determinants and association with hospitalization. *PLoS One*. 2014; **9**(8):e105425.

Mannucci PM, Nobili A. Multimorbidity and polypharmacy in the elderly: lessons from REPOSI. *Intern Emerg Med*. Oct 2014; **9**(7):723-734.

Doos L, Roberts EO, Corp N, Kadam UT. Multi-drug therapy in chronic condition multimorbidity: a systematic review. *Fam Pract*. 2014; **31**(6):654-63.

Stock S, Redaelli M, Simic D, Siegel M, Henschel F. Risk factors for the prescription of potentially inappropriate medication (PIM) in the elderly : An analysis of sickness fund routine claims data from Germany. *Wien Klin Wochenschr*. Oct 2014; **126**(19-20):604-612.

Payne RA, Abel GA, Avery AJ, Mercer SW, Roland MO. Is polypharmacy always hazardous? A retrospective cohort analysis using linked electronic health records from primary and secondary care. *Br J Clin Pharmacol*. Jun 2014; **77**(6):1073-1082.

Payne RA, Avery AJ, Duerden M, Saunders CL, Simpson CR, Abel GA. Prevalence of polypharmacy in a Scottish primary care population. *Eur J Clin Pharmacol*. May 2014; **70**(5):575-581.

Tsoi CS, Chow JY, Choi KS, Li HW, Nie JX, Tracy CS, Wang L, Upshur RE. Medical characteristics of the oldest old: retrospective chart review of patients aged 85+ in an academic primary care centre. *BMC Res Notes*. 2014; **7**(1):340.

Lorgunpai SJ, Grammas M, Lee DS, McAvay G, Charpentier P, Tinetti ME. Potential therapeutic competition in community-living older adults in the u.s.: use of medications that may adversely affect a coexisting condition. *PLoS One*. 2014;9(2):e89447.

Tinetti ME, Han L, McAvay GJ, Lee DS, Peduzzi P, Dodson JA, Gross CP, Zhou B, Lin H. Anti-hypertensive medications and cardiovascular events in older adults with multiple chronic conditions. *PLoS One*. 2014;9(3):e90733.

Calderon-Larranaga A, Gimeno-Feliu LA, Gonzalez-Rubio F, Poblador-Plou B, Lairla-San Jose M, Abad-Diez JM, Poncel-Falco A, Prados-Torres A. Polypharmacy Patterns: Unravelling Systematic Associations between Prescribed Medications. *PLoS One*. 2013;8(12):e84967.

Koberlein J, Gottschall M, Czarnecki K, Thomas A, Bergmann A, Voigt K. General practitioners' views on polypharmacy and its consequences for patient health care. *BMC Fam Pract*. 2013;14(1):119.

Galvan-Banqueri M, de la Higuera-Vila L, Vega-Coca MD, Nieto Martin MD, Perez-Guerrero C, Santos-Ramos B. Reliability of a questionnaire for pharmacological treatment appropriateness in patients with multiple chronic conditions. *Eur J Intern Med*. Feb 18 2013.

Ose D, Mahler C, Vogel I, Ludt S, Szecsenyi J, Freund T. Let's talk about medication: concordance in rating medication adherence among multimorbid patients and their general practitioners. *Patient Prefer Adherence*. 2012;6:839-845.

Calderon-Larrañaga A, Poblador-Plou B, Gonzalez-Rubio F, Gimeno-Feliu LA, Abad-Diez JM, Prados-Torres A. Multimorbidity, polypharmacy, referrals, and adverse drug events: are we doing things well? *Br J Gen Pract*. Dec 2012;62(605):821-826.

Cherubini A, Corsonello A, Lattanzio F. Underprescription of beneficial medicines in older people: causes, consequences and prevention. *Drugs Aging*. Jun 1 2012;29(6):463-475.

Vyas A, Pan X, Sambamoorthi U. Chronic Condition Clusters and Polypharmacy among Adults. *Int J Family Med*. 2012;2012:193168.

Heppner HJ, Christ M, Gosch M, et al. Polypharmacy in the elderly from the clinical toxicologist perspective. *Z Gerontol Geriatr*. Aug 2012;45(6):473-478.

Haverhals LM, Lee CA, Siek KA, Darr CA, Linnebur SA, Ruscini JM, et al. Older adults with multi-morbidity: medication management processes and design implications for personal health applications. *J Med Internet Res*. 2011;13:e44.

Nobili A, Marengoni A, Tettamanti M, Salerno F, Pasina L, Franchi C, et al. Association between clusters of diseases and polypharmacy in hospitalized elderly patients: results from the REPOSI study. *Eur J Intern Med*. 2011;22:597-602.

Richardson, K., et al., Variation over time in the association between polypharmacy and mortality in the older population. *Drugs Aging*, 2011. 28: p.:547-60.

Schüz B, Marx C, Wurm S, et al. Medication beliefs predict medication adherence in older adults with multiple illnesses. *J Psychosom Res* 37(6):565-74 2011;70:179-87.

Jansà M et al. Multidimensional analysis of treatment adherence in patients with multiple chronic conditions. A cross-sectional study in a tertiary hospital. *Patient Educ Couns*. 2010;81(2):161-8.

Lewis, N. J., C. Bugdalski-Stutrud, et al. "The Medication Assessment Program: comprehensive medication assessments for persons taking multiple medications for

chronic diseases." *Journal of the American Pharmacists Association: JAPhA* 2008. **48**(2): 171-80.

Lin, H. Y., C. C. Liao, et al. "Association of potentially inappropriate medication use with adverse outcomes in ambulatory elderly patients with chronic diseases: experience in a Taiwanese medical setting." *Drugs & Aging* 2008. **25**(1): 49-59.

Salazar, J. A., I. Poon, et al. "Clinical consequences of polypharmacy in elderly: expect the unexpected, think the unthinkable." *Expert Opinion on Drug Safety* 2007. **6**(6): 695-704.

Thier, S. L., K. S. Yu-Isenberg, et al. "In chronic disease, nationwide data show poor adherence by patients to medication and by physicians to guidelines." *Manag Care* 2008. **17**: 48-52, 55-7.

Bayliss, E.A., et al., Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann Fam Med*, 2003. **1**: p. 15-21.

Biollaz, J. and T. Buclin, [Multiple diseases: should we treat them all?][French]. *Revue Medicale Suisse*, 2005. **1**(14): p. 941-7.

Froom, J. and J. Trilling, Reducing antihypertensive medication use in nursing home patients. *Archives of Family Medicine*, 2000. **9**(4): p. 378-83.

Fryback, D.G., et al., The Beaver Dam Health Outcomes Study: initial catalog of health-state quality factors. *Med Decis Making.*, 1993. **13**(2): p. 89-102.

Kusek, J.W., et al., Cross-sectional study of health-related quality of life in African Americans with chronic renal insufficiency: the African American Study of Kidney Disease and Hypertension Trial. *American Journal of Kidney Diseases.*, 2002. **39**(3): p. 513-24.

Retta, T.M. and O.S. Randall, Hypertension and concomitant diseases: a guide for evidence-based therapy. *Journal of the National Medical Association*, 2004. **96**(4): p. 450-60.

Wang, P.S., et al., Effects of noncardiovascular comorbidities on antihypertensive use in elderly hypertensives. *Hypertension*, 2005. **46**(2): p. 273-9.

Zhan, C., et al., Potentially inappropriate medication use in the community-dwelling elderly: findings from the 1996 Medical Expenditure Panel Survey. *JAMA*, 2001. **286**: p. 2823-9.

Stafford, R.S., et al., Trends in adult visits to primary care physicians in the United States. *Archives of Family Medicine.*, 1999. **8**(1): p. 26-32.

Stevenson, J., et al., Managing comorbidities in patients at the end of life. *BMJ*, 2004. **329**: p. 909-12.

Stuck, A.E., et al., Risk factors for functional status decline in community-living elderly people: a systematic literature review. *Social Science & Medicine.*, 1999. **48**(4): p. 445-69.

Townsend, A., K. Hunt, and S. Wyke, Managing multiple morbidity in mid-life: a qualitative study of attitudes to drug use. *BMJ*, 2003. **327**(7419): p. 837.

### **3.11 Social support**

Olaya B, Domenech-Abella J, Moneta MV, et al. All-cause mortality and multimorbidity in older adults: The role of social support and loneliness. *Exp Gerontol.* 2017;**99**:120-126.

Kangovi S, Mitra N, Grande D, Huo H, Smith RA, Long JA. Community Health Worker Support for Disadvantaged Patients With Multiple Chronic Diseases: A Randomized Clinical Trial. *Am J Public Health.* 2017;**107**(10):1660-1667. doi: 10.2105/AJPH.2017.303985.

Ahn S, Kim S, Zhang H. Changes in Depressive Symptoms among Older Adults with Multiple Chronic Conditions: Role of Positive and Negative Social Support. *Int J Environ Res Public Health.* 2016;**14**(1).

Warner LM, Schuz B, Aiken L, et al. Interactive effects of social support and social conflict on medication adherence in multimorbid older adults. *Soc Sci Med.* Jun 2013;**87**:23-30.

Bayliss, E.A., et al., Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann Fam Med,* 2003. **1**: p. 15-21.

van den Akker, M., et al., Psychosocial patient characteristics and GP-registered chronic morbidity: a prospective study. *Journal of Psychosomatic Research.*, 2001. **50**(2): p. 95-102.

van den Akker, M., et al., Marginal impact of psychosocial factors on multimorbidity: results of an explorative nested case-control study. *Social Science & Medicine.*, 2000. **50**(11): p. 1679-93.

### **3.12 Other clinical variables**

Helbig AK, Stockl D, Heier M, et al. Relationship between sleep disturbances and multimorbidity among community-dwelling men and women aged 65-93 years: results from the KORA Age Study. *Sleep Med.* 2017;**33**:151-159. doi: 10.1016/j.sleep.2017.01.016.

Kivimaki M, Kuosma E, Ferrie JE, et al. Overweight, obesity, and risk of cardiometabolic multimorbidity: pooled analysis of individual-level data for 120 813 adults from 16 cohort studies from the USA and Europe. *Lancet Public Health.* 2017;**2**(6):e277-e285. doi: 10.1016/S2468-2667(17)30074-9.

Yorke AM, Curtis AB, Shoemaker M, Vangsnes E. The impact of multimorbidity on grip strength in adults age 50 and older: Data from the health and retirement survey (HRS). *Arch Gerontol Geriatr.* 2017;**72**:164-168. doi: 10.1016/j.archger.2017.05.011.

Wang YM, Song M, Wang R, et al. Insomnia and Multimorbidity in the Community Elderly in China. *J Clin Sleep Med.* 2017;**13**(4):591-597.

Helbig AK, Stockl D, Heier M, et al. Relationship between sleep disturbances and multimorbidity among community-dwelling men and women aged 65-93 years: results from the KORA Age Study. *Sleep Med.* 2017;**33**:151-159.

Olivares DE, Chambi FR, Chani EM, Craig WJ, Pacheco SO, Pacheco FJ. Risk Factors for Chronic Diseases and Multimorbidity in a Primary Care Context of Central Argentina: A Web-Based Interactive and Cross-Sectional Study. *Int J Environ Res Public Health.* 2017;**14**(3).

Jovic D, Marinkovic J, Vukovic D. Association between body mass index and prevalence of multimorbidity: a cross-sectional study. *Public Health*. 2016; **139**:103-111.

An KO, Kim J. Association of Sarcopenia and Obesity With Multimorbidity in Korean Adults: A Nationwide Cross-Sectional Study. *J Am Med Dir Assoc*. 2016; **17**(10):960 e961-967.

Eckerblad J, Theander K, Ekdahl AW, Jaarsma T. Symptom trajectory and symptom burden in older people with multimorbidity, secondary outcome from the RCT AGE-FIT study. *J Adv Nurs*. 2016; **72**(11):2773-2783.

Volaklis KA, Halle M, Thorand B, et al. Handgrip strength is inversely and independently associated with multimorbidity among older women: Results from the KORA-Age study. *Eur J Intern Med*. 2016; **31**:35-40.

Eckerblad J, Theander K, Ekdahl AW, Jaarsma T. Symptom trajectory and symptom burden in older people with multimorbidity, secondary outcome from the RCT AGE-FIT study. *J Adv Nurs*. 2016.

Fabbi E, Tanaka T, An Y, Zoli M, Bandinelli S, Guralnik JM *et al*: Loss of Weight in Obese Older Adults: A Biomarker of Impending Expansion of Multimorbidity? *J Am Geriatr Soc*. 2015; **63**(9):1791-1797.

Folb N, Timmerman V, Levitt NS, Steyn K, Bachmann MO, Lund C *et al*: Multimorbidity, control and treatment of noncommunicable diseases among primary healthcare attenders in the Western Cape, South Africa. *S Afr Med J*. 2015; **105**(8):642-647.

Yokota RT, Van der Heyden J, Nusselder WJ, Robine JM, Tafforeau J, Deboosere P *et al*: Impact of Chronic Conditions and Multimorbidity on the Disability Burden in the Older Population in Belgium. *J Gerontol A Biol Sci Med Sci*. 2016.

Laditka JN, Laditka SB. Associations of multiple chronic health conditions with active life expectancy in the United States. *Disabil Rehabil*. May 20 2015:1-8.

Aguiar LB, Baccaro LF, de Souza Santos Machado V, Pinto-Neto AM, Costa-Paiva L. Disability and multimorbidity in women older than 50 years: a population-based household survey. *Menopause*. Jun 2015; **22**(6):660-666.

Friedman EM, Christ SL, Mroczek DK. Inflammation Partially Mediates the Association of Multimorbidity and Functional Limitations in a National Sample of Middle-Aged and Older Adults: The MIDUS Study. *J Aging Health*. Aug 2015; **27**(5):843-863.

Koroukian SM, Warner DF, Owusu C, Given CW. Multimorbidity redefined: prospective health outcomes and the cumulative effect of co-occurring conditions. *Prev Chronic Dis*. 2015; **12**:E55.

Lu FP, Chang WC, Wu SC. Geriatric conditions, rather than multimorbidity, as predictors of disability and mortality among octogenarians: A population-based cohort study. *Geriatr Gerontol Int*. Apr 23 2015.

Emerging Risk Factors Collaboration, Di Angelantonio E, Kaptoge S, et al. Association of Cardiometabolic Multimorbidity With Mortality. *JAMA*. Jul 7 2015; **314**(1):52-60.

Jones SM, Amtmann D, Gell NM. A psychometric examination of multimorbidity and mental health in older adults. *Aging Ment Health*. Feb 12 2015:1-9.



Agborsangaya CB, Majumdar SR, Sharma AM, Gregg EW, Padwal RS. Multimorbidity in a prospective cohort: Prevalence and associations with weight loss and health status in severely obese patients. *Obesity*. Mar 2015; **23**(3): 707-712.

Calderon-Larranaga A, Hernandez-Olivan P, Gonzalez-Rubio F, Gimeno-Feliu LA, Poblador-Plou B, Prados-Torres A. Multimorbidity and weight loss in obese primary care patients: longitudinal study based on electronic healthcare records. *BMJ Open*. 2015; **5**(3): e006227.

Mavaddat N, Valderas JM, van der Linde R, Khaw KT, Kinmonth AL. Association of self-rated health with multimorbidity, chronic disease and psychosocial factors in a large middle-aged and older cohort from general practice: a cross-sectional study. *BMC Fam Pract*. 2014; **15**: 185.

Eckerblad J, Theander K, Ekdahl A, et al. Symptom burden in community-dwelling older people with multimorbidity: a cross-sectional study. *BMC Geriatr*. 2015; **15**(1): 1.

Weir DL, Majumdar SR, McAlister FA, Marrie TJ, Eurich DT. The impact of multimorbidity on short-term events in patients with community-acquired pneumonia: prospective cohort study. *Clin Microbiol Infect*. Nov 11 2014.

Boeckxstaens P, Vaes B, Legrand D, Dalleur O, De Sutter A, Degryse JM. The relationship of multimorbidity with disability and frailty in the oldest patients: A cross-sectional analysis of three measures of multimorbidity in the BELFRAIL cohort. *Eur J Gen Pract*. Jul 1 2014: 1-6.

Melis R, Marengoni A, Angleman S, Fratiglioni L. Incidence and predictors of multimorbidity in the elderly: a population-based longitudinal study. *PLoS One*. 2014; **9**(7): e103120.

Appa AA, Creasman J, Brown JS, Van Den Eeden SK, Thom DH, Subak LL, Huang AJ. The impact of multimorbidity on sexual function in middle-aged and older women: beyond the single disease perspective. *J Sex Med*. Nov 2014; **11**(11): 2744-2755.

Domino ME, Beadles CA, Lichstein JC, Farley JF, Morrissey JP, Ellis AR, Dubard CA. Heterogeneity in the quality of care for patients with multiple chronic conditions by psychiatric comorbidity. *Med Care*. Mar 2014; **52** Suppl 3: S101-109.

Woo J, Leung J. Multi-morbidity, dependency, and frailty singly or in combination have different impact on health outcomes. *Age (Dordr)*. Apr 2014; **36**(2): 923-931.

Zeng C, Ellis JL, Steiner JF, Shoup JA, McQuillan DB, Bayliss EA. Assessment of morbidity over time in predicting health outcomes. *Med Care*. Mar 2014; **52** Suppl 3: S52-59.

Ruel G, Levesque JF, Stocks N, Sirois C, Kroger E, Adams RJ, Doucet M, Taylor AW. Understanding the Evolution of Multimorbidity: Evidences from the North West Adelaide Health Longitudinal Study (NWAHS). *PLoS One*. 2014; **9**(5): e96291.

St John PD, Tyas SL, Menec V, Tate R. Multimorbidity, disability, and mortality in community-dwelling older adults. *Can Fam Physician*. May 2014; **60**(5): e272-280.

Schuz B, Wolff JK, Warner LM, Ziegelmann JP, Wurm S. Multiple illness perceptions in older adults: Effects on physical functioning and medication adherence. *Psychol Health*. Dec 12 2013.

Smith DJ, Martin D, McLean G, Langan J, Guthrie B, Mercer SW. Multimorbidity in bipolar disorder and undertreatment of cardiovascular disease: a cross sectional study. *BMC Med*. 2013; **11**: 263.

Melis RJ, Marengoni A, Rizzuto D, Teerenstra S, Kivipelto M, Angleman SB, Fratiglioni L. The influence of multimorbidity on clinical progression of dementia in a population-based cohort. *PLoS One*. 2013; **8**(12):e84014.

Diez-Manglano J, de Escalante Yanguela B, Garcia-Arilla Calvo E, et al. Differential characteristics in polypathological inpatients in internal medicine departments and acute geriatric units: The PLUPAR study. *Eur J Intern Med*. Aug 9 2013.

Wrede J, Voigt I, Bleidorn J, Hummers-Pradier E, Dierks ML, Junius-Walker U. Complex health care decisions with older patients in general practice: patient-centeredness and prioritization in consultations following a geriatric assessment. *Patient Educ Couns*. Jan 2013; **90**(1):54-60.

de Souza Santos Machado V, Valadares AL, da Costa-Paiva LS, Moraes SS, Pinto-Neto AM. Multimorbidity and associated factors in Brazilian women aged 40 to 65 years: a population-based study. *Menopause*. May 2012; **19**(5):569-575.

Spruit-van Eijk M, Zuidema SU, Buijck BI, Koopmans RT, Geurts AC. To what extent can multimorbidity be viewed as a determinant of postural control in stroke patients? *Arch Phys Med Rehabil* **80**(1):103-11. Jun 2012; **93**(6):1021-1026.

Gilbert AL, Caughey GE, Vitry AI, Clark A, Ryan P, McDermott RA, et al. Ageing well: Improving the management of patients with multiple chronic health problems. *Australas J Ageing*. 2011; **30** (SUPPL.2):32-7.

Tinetti, M.E., et al., Contribution of Multiple Chronic Conditions to Universal Health Outcomes. *J Am Geriatr Soc*. 2011 Aug 30. doi: 10.1111/j.1532-5415.

Perruccio, A.V., J.N. Katz, and E. Losina, Health burden in chronic disease: multimorbidity is associated with self-rated health more than medical comorbidity alone. *J Clin Epidemiol*. Aug 9. [Epub ahead of print], 2011.

Landi F et al. Disability, more than multimorbidity, was predictive of mortality among older persons aged 80 years and older. *J Clin Epidemiol*. 2010. **63**(7):752-9.

Caughey GE, Ramsay EN, Vitry AI, et al. Comorbid chronic diseases, discordant impact on mortality in the elderly; a 14 year longitudinal population study. *J Epidemiol Community Health*. 2010; **64**(12):1036-42.

Butchart A, Kerr EA, Heisler M, Piette JD, Krein SL. Experience and management of chronic pain among patients with other complex chronic conditions. *Clin J Pain*. 2009. **25**(4):293-8.

Lee, T. A., A. E. Shields, et al. "Mortality rate in veterans with multiple chronic conditions." *Journal of General Internal Medicine* 2007. **22** Suppl 3: 403-7.

Mercer, S. W., B. Fitzpatrick, et al. "More time for complex consultations in a high-deprivation practice is associated with increased patient enablement." *British Journal of General Practice* 2007. **57**(545): 960-6.

Min, L. C., N. S. Wenger, et al. "Multimorbidity is associated with better quality of care among vulnerable elders." *Medical Care* 2007. **45**(6): 480-8.

Bae S, Rosenthal MB. Patients with Multiple Chronic Conditions Do Not Receive Lower Quality of Preventive Care. *J Gen Intern Med*. 2008; **23**(12):1933-9.

Bergland, A., G.B. Jarnlo, and K. Laake, Predictors of falls in the elderly by location. *Aging-Clinical & Experimental Research*, 2003. **15**(1): p. 43-50.

Doll, H.A., S.E. Petersen, and S.L. Stewart-Brown, Obesity and physical and emotional well-being: associations between body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire. *Obesity Research.*, 2000. **8**(2): p. 160-70.

Katz, D.A. and C.A. McHorney, The relationship between insomnia and health-related quality of life in patients with chronic illness. *Journal of Family Practice.*, 2002. **51**(3): p. 229-35.

Katz, D.A., C.A. McHorney, and R.L. Atkinson, Impact of obesity on health-related quality of life in patients with chronic illness. *Journal of General Internal Medicine.*, 2000. **15**(11): p. 789-96.

Lyketsos, C.G., et al., Medical comorbidity in psychiatric inpatients: relation to clinical outcomes and hospital length of stay. *Psychosomatics.*, 2002. **43**(1): p. 24-30.

Sharkey, J.R., Risk and presence of food insufficiency are associated with low nutrient intakes and multimorbidity among homebound older women who receive home-delivered meals. *Journal of Nutrition*, 2003. **133**(11): p. 3485-91.

Tan, C.P., A. Ng, and I. Civil, Co-morbidities in trauma patients: common and significant. *New Zealand Medical Journal*, 2004. **117**(1201): p. U1044.

Wang, S.J., et al., Quality of life differs among headache diagnoses: analysis of SF-36 survey in 901 headache patients. *Pain.*, 2001. **89**(2-3): p. 285-92.

### **3.13 Generalisation of clinical trials / Guidelines**

Zamborlini V, da Silveira M, Pruski C, et al. Analyzing interactions on combining multiple clinical guidelines. *Artif Intell Med.* 2017; **81**: 78-93.

Guthrie B, Thompson A, Dumbreck S, et al. Better guidelines for better care: accounting for multimorbidity in clinical guidelines - structured examination of exemplar guidelines and health economic modelling. Southampton (UK)2017.

Wilk S, Michalowski M, Michalowski W, Rosu D, Carrier M, Kezadri-Hamiaz M. Comprehensive Mitigation Framework for Concurrent Application of Multiple Clinical Practice Guidelines. *J Biomed Inform.* 2016.

Farmer C, Fenu E, O'Flynn N, Guthrie B. Clinical assessment and management of multimorbidity: summary of NICE guidance. *BMJ.* 2016; **354**: i4843.

National Guideline Centre (UK): Multimorbidity: Assessment, Prioritisation and Management of Care for People with Commonly Occurring Multimorbidity. 2016. at <https://www.ncbi.nlm.nih.gov/pubmed/27683922>.)

Buffel du Vaure C, Ravaud P, Baron G, Barnes C, Gilberg S, Boutron I. Potential workload in applying clinical practice guidelines for patients with chronic conditions and multimorbidity: a systematic analysis. *BMJ Open.* 2016; **6**: e010119.

Young CE, Boyle FM, Brooker KS, Mutch AJ Incorporating patient preferences in the management of multiple long-term conditions: is this a role for clinical practice guidelines? *Journal of Comorbidity* 2015; **5**(1): 122–131.

Muth C, Kirchner H, van den Akker M, Scherer M, Glasziou PP. Current guidelines poorly address multimorbidity: pilot of the interaction matrix method. *J Clin Epidemiol*. Nov 2014; **67**(11): 1242-1250.

Bernabeu-Wittel M, Alonso-Coello P, Rico-Blazquez M, Rotaecche Del Campo R, Sanchez Gomez S, Casariego Vales E. Development of clinical practice guidelines for patients with comorbidity and multiple diseases. *Rev Clin Esp*. August - September 2014; **214**(6): 328-335.

Muth C, Kirchner H, van den Akker M, Scherer M, Glasziou PP. Current guidelines poorly address multimorbidity: pilot of the interaction matrix method. *J Clin Epidemiol*. Sep 9 2014.

Markun S, Holzer BM, Rodak R, Kaplan V, Wagner CC, Battegay E, Zimmerli L. Therapeutic conflicts in emergency department patients with multimorbidity: a cross-sectional study. *PLoS One*. 2014; **9**(10): e110309.

Goodman RA, Boyd C, Tinetti ME, Von Kohorn I, Parekh AK, McGinnis JM. IOM and DHHS meeting on making clinical practice guidelines appropriate for patients with multiple chronic conditions. *Ann Fam Med*. May-Jun 2014; **12**(3): 256-259.

Uhlig K, Leff B, Kent D, Dy S, Brunnhuber K, Burgers JS, Greenfield S, Guyatt G, High K, Leipzig R, Mulrow C, Schmader K, Schunemann H, Walter LC, Woodcock J, Boyd CM. A framework for crafting clinical practice guidelines that are relevant to the care and management of people with multimorbidity. *J Gen Intern Med*. Apr 2014; **29**(4): 670-679.

Hughes LD, McMurdo ME, Guthrie B. Guidelines for people not for diseases: the challenges of applying UK clinical guidelines to people with multimorbidity. *Age Ageing*. Jan 2013; **42**(1): 62-69.

Nichol MB et al. Nonadherence to clinical practice guidelines and medications for multiple chronic conditions in a California Medicaid population. *J Am Pharm Assoc* (2003). 2010. **50**(4): 496-507.

Boyd, C.M., et al., Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: implications for pay for performance. *JAMA*, 2005. **294**: p. 716-24.

Cabana, M.D., et al., Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA*, 1999. **282**: p. 1458-65.

Caro, J.J. and K. Migliaccio-Walle, Generalizing the results of clinical trials to actual practice: the example of clopidogrel therapy for the prevention of vascular events. CAPRA (CAPRIE Actual Practice Rates Analysis) Study Group. Clopidogrel versus Aspirin in Patients at Risk of Ischaemic Events. *Am J Med*, 1999. **107**(6): p. 568-72.

CMAJ, Patient n plus 1. *CMAJ*, 2005. **172**: p. 1525.

Fortin M, Dionne J, Pinho G, Gignac J, Almirall J, Lapointe L. Randomized Controlled Trials: Do They Have External Validity for Patients With Multiple Comorbidities? *Ann. Fam. Med* 2006; **4**: 104-8.

Moroney, J.T., et al., Treatment for the secondary prevention of stroke in older patients: the influence of dementia status. *Journal of the American Geriatrics Society*, 1999. **47**: p. 824-9.

Gurwitz, J.H., N.F. Col, and J. Avorn, The exclusion of the elderly and women from clinical trials in acute myocardial infarction. *JAMA*, 1992. **268**: p. 1417-22.

Oliveria, S.A., et al., Physician-related barriers to the effective management of uncontrolled hypertension. *Arch Intern Med*, 2002. **162**: p. 413-20.

Rothwell, P.M., External validity of randomised controlled trials: "to whom do the results of this trial apply?" *Lancet.*, 2005. **365**: p. 82-93.

Tinetti, M.E., S.T. Bogardus, Jr., and J.V. Agostini, Potential pitfalls of disease-specific guidelines for patients with multiple conditions. *N Engl J Med*, 2004. **351**: p. 2870-4.

van Weel, C. and F.G. Schellevis, Comorbidity and guidelines: conflicting interests. *Lancet*, 2006. **367**: p. 550-1.

Biollaz, J. and T. Buclin, [Multiple diseases: should we treat them all?][French]. *Revue Medicale Suisse*, 2005. **1**(14): p. 941-7.

### **3.14 Other subjects**

Bynum JPW, Chang CH, Austin A, Carmichael D, Meara E. Outcomes in Older Adults with Multimorbidity Associated with Predominant Provider of Care Specialty. *J Am Geriatr Soc*. 2017;**65**(9):1916-1923.

Adams ML. Differences Between Younger and Older US Adults With Multiple Chronic Conditions. *Prev Chronic Dis*. 2017;**14**:E76.

Polenick CA, Leggett AN, Webster NJ, Han BH, Zarit SH, Piette JD. Multiple Chronic Conditions in Spousal Caregivers of Older Adults With Functional Disability: Associations With Caregiving Difficulties and Gains. *J Gerontol B Psychol Sci Soc Sci*. 2017.

Kang J, Song YM. The association between submarine service and multimorbidity: a cross-sectional study of Korean naval personnel. *BMJ Open*. 2017;**7**(9):e017776.

Eton DT, Ridgeway JL, Linzer M, et al. Healthcare provider relational quality is associated with better self-management and less treatment burden in people with multiple chronic conditions. *Patient Prefer Adherence*. 2017;**11**:1635-1646.

Chi WC, Wolff J, Greer R, Dy S. Multimorbidity and Decision-Making Preferences Among Older Adults. *Ann Fam Med*. 2017;**15**(6):546-551.

Le Reste JY, Nabbe P, Billot Grasset A, et al. Multimorbid outpatients: A high frequency of FP appointments and/or family difficulties, should alert FPs to the possibility of death or acute hospitalization occurring within six months; A primary care feasibility study. *PLoS One*. 2017;**12**(11):e0186931.

MacLean RR, Sofuoglu M, Rosenheck R. Tobacco and alcohol use disorders: Evaluating multimorbidity. *Addict Behav*. 2017;**78**:59-66.

Gimeno-Feliu LA, Calderon-Larranaga A, Diaz E, et al. Multimorbidity and immigrant status: associations with area of origin and length of residence in host country. *Fam Pract*. 2017;**34**(6):662-666.

Adams ML, Grandpre J, Katz DL, Shenson D. Linear association between number of modifiable risk factors and multiple chronic conditions: Results from the Behavioral Risk Factor Surveillance System. *Prev Med*. 2017;**105**:169-175.

Wang L, Cocker F, Kilpatrick M, et al. The Associations of Multimorbidity With Health-Related Productivity Loss in a Large and Diverse Public Sector Setting: A Cross-Sectional Survey. *J Occup Environ Med*. 2017.

Drye EE, Altaf FK, Lipska KJ, et al. Defining Multiple Chronic Conditions for Quality Measurement. *Med Care*. 2017.

Sharpe L, McDonald S, Correia H, et al. Pain severity predicts depressive symptoms over and above individual illnesses and multimorbidity in older adults. *BMC Psychiatry*. 2017; **17**(1):166. doi: 10.1186/s12888-017-1334-y.

Alimohammadian M, Majidi A, Yaseri M, et al. Multimorbidity as an important issue among women: results of a gender difference investigation in a large population-based cross-sectional study in West Asia. *BMJ Open*. 2017; **7**(5):e013548. doi: 10.1136/bmjopen-2016-013548.

Brenk-Franz K, Strauss B, Tiesler F, Fleischhauer C, Schneider N, Gensichen J. Patient-provider relationship as mediator between adult attachment and self-management in primary care patients with multiple chronic conditions. *J Psychosom Res*. 2017; **97**:131-135. doi: 10.1016/j.jpsychores.2017.04.007.

van den Brink AMA, Gerritsen DL, de Valk MMH, Oude Voshaar RC, Koopmans R. Characteristics and health conditions of a group of nursing home patients with mental-physical multimorbidity - the MAPPING study. *Int Psychogeriatr*. 2017; **29**(6):1037-1047. doi: 10.1017/S1041610217000230.

Greenberg AJ, Falisi AL, Finney Rutten LJ, et al. Access to Electronic Personal Health Records Among Patients With Multiple Chronic Conditions: A Secondary Data Analysis. *J Med Internet Res*. 2017; **19**(6):e188. doi: 10.2196/jmir.7417.

Tetzlaff J, Muschik D, Epping J, Eberhard S, Geyer S. Expansion or compression of multimorbidity? 10-year development of life years spent in multimorbidity based on health insurance claims data of Lower Saxony, Germany. *Int J Public Health*. 2017; **62**(6):679-686. doi: 10.1007/s00038-017-0962-9.

Lawson C, Pati S, Green J, et al. Development of an international comorbidity education framework. *Nurse Educ Today*. 2017; **55**:82-89. doi: 10.1016/j.nedt.2017.05.011.

Mortsiefer A, Altiner A, Ernst A, et al. Satisfaction with general practice care in German patients with multimorbidity: a cross-sectional study. *Fam Pract*. 2017; **34**(4):452-458. doi: 10.1093/fampra/cmw141.

Neuner-Jehle S, Zechmann S, Grundmann Maissen D, Rosemann T, Senn O. Patient-provider concordance in the perception of illness and disease: a cross-sectional study among multimorbid patients and their general practitioners in Switzerland. *Patient Prefer Adherence*. 2017; **11**:1451-1458. doi: 10.2147/PPA.S137388.

Blokh D, Stambler I, Lubart E, Mizrahi EH. The application of information theory for the estimation of old-age multimorbidity. *Geroscience*. 2017. doi: 10.1007/s11357-017-9996-4.

Lujic S, Simpson JM, Zwar N, Hosseinzadeh H, Jorm L. Multimorbidity in Australia: Comparing estimates derived using administrative data sources and survey data. *PLoS One*. 2017; **12**(8):e0183817. doi: 10.1371/journal.pone.0183817.

Jason KJ, Carr DC, Washington TR, Hilliard TS, Mingo CA. Multiple Chronic Conditions, Resilience, and Workforce Transitions in Later Life: A Socio-Ecological Model. *Gerontologist*. 2017;**57**(2):269-281.

Sundstrup E, Jakobsen MD, Mortensen OS, Andersen LL. Joint association of multimorbidity and work ability with risk of long-term sickness absence: a prospective cohort study with register follow-up. *Scand J Work Environ Health*. 2017;**43**(2):146-154.

Espeland MA, Crimmins EM, Grossardt BR, et al. Clinical Trials Targeting Aging and Age-Related Multimorbidity. *J Gerontol A Biol Sci Med Sci*. 2017;**72**(3):355-361.

Mortsiefer A, Altiner A, Ernst A, et al. Satisfaction with general practice care in German patients with multimorbidity: a cross-sectional study. *Fam Pract*. 2017.

Dhalwani NN, Zaccardi F, O'Donovan G, et al. Association Between Lifestyle Factors and the Incidence of Multimorbidity in an Older English Population. *J Gerontol A Biol Sci Med Sci*. 2017;**72**(4):528-534.

Canizares M, Hogg-Johnson S, Gignac MAM, Glazier RH, Badley EM. Increasing Trajectories of Multimorbidity Over Time: Birth Cohort Differences and the Role of Changes in Obesity and Income. *J Gerontol B Psychol Sci Soc Sci*. 2017.

Kavalidou K, Smith DJ, O'Connor RC. The role of physical and mental health multimorbidity in suicidal ideation. *J Affect Disord*. 2017;**209**:80-85.

Ubalde-Lopez M, Delclos GL, Benavides FG, Calvo-Bonacho E, Gimeno D. The effect of multimorbidity on sickness absence by specific diagnoses. *Occup Med (Lond)*. 2017;**67**(2):93-100.

Tetzlaff J, Muschik D, Epping J, Eberhard S, Geyer S. Expansion or compression of multimorbidity? 10-year development of life years spent in multimorbidity based on health insurance claims data of Lower Saxony, Germany. *Int J Public Health*. 2017.

Lowe DB, Taylor MJ, Hill SJ. Associations between multimorbidity and additional burden for working-age adults with specific forms of musculoskeletal conditions: a cross-sectional study. *BMC Musculoskelet Disord*. 2017;**18**(1):135.

Garg R, Shen C, Sambamoorthi N, Kelly K, Sambamoorthi U. Type of Multimorbidity and Patient-Doctor Communication and Trust among Elderly Medicare Beneficiaries. *Int J Family Med*. 2016;**2016**:8747891.

Lowe D, Taylor M, Hill S. Changing definitions altered multimorbidity prevalence, but not burden associations, in a musculoskeletal population. *J Clin Epidemiol*. 2016;**78**:116-126.

Blakemore A, Hann M, Howells K, et al. Patient activation in older people with long-term conditions and multimorbidity: correlates and change in a cohort study in the United Kingdom. *BMC Health Serv Res*. 2016;**16**(1):582.

Tomasdottir MO, Sigurdsson JA, Petursson H, et al. Does 'existential unease' predict adult multimorbidity? Analytical cohort study on embodiment based on the Norwegian HUNT population. *BMJ Open*. 2016;**6**(11):e012602.

Rocca WA, Gazzuola-Rocca L, Smith CY, et al. Accelerated Accumulation of Multimorbidity After Bilateral Oophorectomy: A Population-Based Cohort Study. *Mayo Clin Proc* 67(2):144-57. 2016;**91**(11):1577-1589. Garg R, Shen C, Sambamoorthi N, Kelly K,

- Sambamoorthi U. Type of Multimorbidity and Patient-Doctor Communication and Trust among Elderly Medicare Beneficiaries. *Int J Family Med.* 2016; **2016**:8747891.
- Lowe D, Taylor M, Hill S. Changing definitions altered multimorbidity prevalence, but not burden associations, in a musculoskeletal population. *J Clin Epidemiol.* 2016; **78**:116-126.
- Blakemore A, Hann M, Howells K, et al. Patient activation in older people with long-term conditions and multimorbidity: correlates and change in a cohort study in the United Kingdom. *BMC Health Serv Res.* 2016; **16**(1):582.
- Tomasdottir MO, Sigurdsson JA, Petursson H, et al. Does 'existential unease' predict adult multimorbidity? Analytical cohort study on embodiment based on the Norwegian HUNT population. *BMJ Open.* 2016; **6**(11):e012602.
- Rocca WA, Gazzuola-Rocca L, Smith CY, et al. Accelerated Accumulation of Multimorbidity After Bilateral Oophorectomy: A Population-Based Cohort Study. *Mayo Clin Proc* 67(2):144-57. 2016; **91**(11):1577-1589.
- Bowling CB, Plantinga L, Phillips LS, et al. Association of Multimorbidity with Mortality and Healthcare Utilization in Chronic Kidney Disease. *J Am Geriatr Soc.* 2016.
- Violan C, Bejarano-Rivera N, Foguet-Boreu Q, et al. The burden of cardiovascular morbidity in a European Mediterranean population with multimorbidity: a cross-sectional study. *BMC Fam Pract.* 2016; **17**(1):150.
- Bowling CB, Plantinga L, Phillips LS, et al. Association of Multimorbidity with Mortality and Healthcare Utilization in Chronic Kidney Disease. *J Am Geriatr Soc.* 2016.
- Wong ES, Rosland AM, Fihn SD, Nelson KM. Patient-Centered Medical Home Implementation in the Veterans Health Administration and Primary Care Use: Differences by Patient Comorbidity Burden. *J Gen Intern Med.* 2016.
- Eton DT, Yost KJ, Lai JS, et al. Development and validation of the Patient Experience with Treatment and Self-management (PETS): a patient-reported measure of treatment burden. *Qual Life Res.* 2016.
- Pavela G, Latham K. Childhood Conditions and Multimorbidity Among Older Adults. *J Gerontol B Psychol Sci Soc Sci.* 2016; **71**:889-901.
- Afrin N, Honkanen R, Koivumaa-Honkanen H, et al. Multimorbidity predicts falls differentially according to the type of fall in postmenopausal women. *Maturitas.* 2016; **91**:19-24.
- Bernabeu-Wittel M, Moreno-Gavino L, Ollero-Baturone M, et al. Validation of PROFUND prognostic index over a four-year follow-up period. *Eur J Intern Med.* 2016.
- Ubalde-Lopez M, Delclos GL, Benavides FG, Calvo-Bonacho E, Gimeno D. The effect of multimorbidity on sickness absence by specific diagnoses. *Occup Med (Lond).* 2016.
- Hilderink HB, Plasmans MH, Snijders BE, Boshuizen HC, Poos MJ, van Gool CH. Accounting for multimorbidity can affect the estimation of the Burden of Disease: a comparison of approaches. *Arch Public Health.* 2016; **74**:37.
- Rodriguez-Fernandez R, Ng N, Susilo D, Prawira J, Bangs MJ, Amiya RM. The double burden of disease among mining workers in Papua, Indonesia: at the crossroads between Old and New health paradigms. *BMC Public Health.* 2016; **16**:951.



Balbale SN, Etingen B, Malhiot A, Miskevics S, LaVela SL. Perceptions of Chronic Illness Care Among Veterans With Multiple Chronic Conditions. *Mil Med.* 2016; **181**:439-44.

Falci L, Shi Z, Greenlee H. Multiple Chronic Conditions and Use of Complementary and Alternative Medicine Among US Adults: Results From the 2012 National Health Interview Survey. *Prev Chronic Dis.* 2016; **13**:E61.

Yuen HK, Vogtle LK. Multi-morbidity, disability and adaptation strategies among community-dwelling adults aged 75 years and older. *Disabil Health J.* 2016.

Agur K, McLean G, Hunt K, Guthrie B, Mercer SW. How Does Sex Influence Multimorbidity? Secondary Analysis of a Large Nationally Representative Dataset. *Int J Environ Res Public Health.* 2016; **13**:391.

Galenkamp H, Gagliardi C, Principi A, et al. Predictors of social leisure activities in older Europeans with and without multimorbidity. *Eur J Ageing.* 2016; **13**:129-43.

Diaz E, Kumar BN, Gimeno-Feliu LA, Calderon-Larranaga A, Poblador-Pou B, Prados-Torres A: Multimorbidity among registered immigrants in Norway: the role of reason for migration and length of stay. *Trop Med Int Health.* 2015; **20**(12):1805-1814.

Jensen LF, Pedersen AF, Andersen B, Vestergaard M, Vedsted P: Non-participation in breast cancer screening for women with chronic diseases and multimorbidity: a population-based cohort study. *BMC Cancer.* 2015; **15**:798.

Zielinski A, Halling A: Association between age, gender and multimorbidity level and receiving home health care: a population-based Swedish study. *BMC Res Notes.* 2015; **8**:714.

Allore HG, Zhan Y, Cohen AB, Tinetti ME, Trentalange M, McAvay G: Methodology to Estimate the Longitudinal Average Attributable Fraction of Guideline-recommended Medications for Death in Older Adults With Multiple Chronic Conditions. *J Gerontol A Biol Sci Med Sci.* 2016.

Weir DL, McAlister FA, Majumdar SR, Eurich DT: The Interplay Between Continuity of Care, Multimorbidity, and Adverse Events in Patients With Diabetes. *Med Care.* 2016.

Salisbury C, Procter S, Stewart K, et al. The content of general practice consultations: cross-sectional study based on video recordings. *Br J Gen Pract.* Nov 2013; **63**(616):e751-759.

Cheng TY, Chou YJ, Huang N, Pu C, Chou YJ, Chou P. Exploring the role of multiple chronic conditions in traditional Chinese medicine use and three types of traditional Chinese medicine therapy among adults in Taiwan. *J Altern Complement Med.* Jun 2015; **21**(6):350-357.

Ward BW. Multiple chronic conditions and labor force outcomes: A population study of U.S. adults. *Am J Ind Med.* Sep 2015; **58**(9):943-954.

Onder G, Palmer K, Navickas R, et al. Time to face the challenge of multimorbidity. A European perspective from the joint action on chronic diseases and promoting healthy ageing across the life cycle (JA-CHRODIS). *Eur J Intern Med.* Apr 2015; **26**(3):157-159.

Loprinzi PD. Health-enhancing multibehavior and medical multimorbidity. *Mayo Clin Proc* 67(2):144-57. May 2015; **90**(5):624-632.

Islam MM, McRae IS, Yen L, Jowsey T, Valderas JM. Time spent on health-related activities by senior Australians with chronic diseases: what is the role of multimorbidity and comorbidity? *Aust N Z J Public Health*. Jun 2015; **39**(3):277-283.

Adeniji C, Kenning C, Coventry PA, Bower P. What are the core predictors of 'hassles' among patients with multimorbidity in primary care? A cross sectional study. *BMC Health Serv Res*. 2015; **15**:255.

Sarkar C, Dodhia H, Crompton J, et al. Hypertension: a cross-sectional study of the role of multimorbidity in blood pressure control. *BMC Fam Pract*. 2015; **16**:98.

Guilcher SJ, Lofters A, Glazier RH, Jaglal SB, Voth J, Bayoumi AM. Level of disability, multi-morbidity and breast cancer screening: does severity matter? *Prev Med*. Oct 2014; **67**:193-198.

Lofters A, Guilcher S, Glazier RH, Jaglal S, Voth J, Bayoumi AM. Screening for cervical cancer in women with disability and multimorbidity: a retrospective cohort study in Ontario, Canada. *CMAJ Open*. Oct 2014; **2**(4):E240-247.

St Sauver JL, Boyd CM, Grossardt BR, et al. Risk of developing multimorbidity across all ages in an historical cohort study: differences by sex and ethnicity. *BMJ Open*. 2015; **5**(2):e006413.

Kenning C, Coventry PA, Gibbons C, Bee P, Fisher L, Bower P. Does patient experience of multimorbidity predict self-management and health outcomes in a prospective study in primary care? *Fam Pract*. Feb 24 2015.

Paddison CA, Saunders CL, Abel GA, Payne RA, Campbell JL, Roland M. Why do patients with multimorbidity in England report worse experiences in primary care? Evidence from the General Practice Patient Survey. *BMJ Open*. 2015; **5**(3):e006172.

Martin CM. Self-rated health: patterns in the journeys of patients with multi-morbidity and frailty. *J Eval Clin Pract*. Dec 2014; **20**(6):1010-1016.

Frei H. Homeopathic treatment of multimorbid patients: a prospective outcome study with polarity analysis. *Homeopathy : the journal of the Faculty of Homeopathy*. Jan 2015; **104**(1):57-65.

Alwhaibi M, Bhattacharya R, Sambamoorthi U. Type of Multimorbidity and Complementary and Alternative Medicine Use among Adults. *Evid Based Complement Alternat Med*. 2015; **2015**:362582.

Parekh AK, Kronick R, Tavenner M. Optimizing health for persons with multiple chronic conditions. *JAMA*. Sep 24 2014; **312**(12):1199-1200.

Fortin M, Haggerty J, Almirall J, Bouhali T, Sasseville M, Lemieux M. Lifestyle factors and multimorbidity: a cross sectional study. *BMC Public Health*. Jul 5 2014; **14**(1):686.

DuGoff EH, Canudas-Romo V, Buttorff C, Leff B, Anderson GF. Multiple chronic conditions and life expectancy: a life table analysis. *Med Care*. Aug 2014; **52**(8):688-694.

Strauss VY, Jones PW, Kadam UT, Jordan KP. Distinct trajectories of multimorbidity in primary care were identified using latent class growth analysis. *J Clin Epidemiol*. Oct 2014; **67**(10):1163-1171.

Min L, Kerr EA, Blaum CS, Reuben D, Cigolle C, Wenger N. Contrasting effects of geriatric versus general medical multimorbidity on quality of ambulatory care. *J Am Geriatr Soc*. Sep 2014; **62**(9):1714-1721.

Streit S, da Costa BR, Bauer DC, Collet TH, Weiler S, Zimmerli L, Frey P, Cornuz J, Gaspoz JM, Battegay E, Kerr E, Aujesky D, Rodondi N. Multimorbidity and quality of preventive care in Swiss university primary care cohorts. *PLoS One*. 2014; **9**(4):e96142.

Chrischilles E, Schneider K, Wilwert J, Lessman G, O'Donnell B, Gryzlak B, Wright K, Wallace R. Beyond comorbidity: expanding the definition and measurement of complexity among older adults using administrative claims data. *Med Care*. Mar 2014; **52** Suppl 3:S75-84.

Ruel G, Shi Z, Zhen S, Zuo H, Kroger E, Sirois C, Levesque JF, Taylor AW. Association between nutrition and the evolution of multimorbidity: the importance of fruits and vegetables and whole grain products. *Clin Nutr*. Jun 2014; **33**(3):513-520.

Boyd CM, Wolff JL, Giovannetti E, Reider L, Weiss C, Xue QL, Leff B, Boulton C, Hughes T, Rand C. Healthcare task difficulty among older adults with multimorbidity. *Med Care*. Mar 2014; **52** Suppl 3:S118-125.

Brilleman SL, Gravelle H, Hollinghurst S, Purdy S, Salisbury C, Windmeijer F. Keep it simple? Predicting primary health care costs with clinical morbidity measures. *J Health Econ*. May 2014; **35**:109-122.

Doos L, Bradley E, Rushton CA, Satchithananda D, Davies SJ, Kadam UT. Heart failure and chronic obstructive pulmonary disease multimorbidity at hospital discharge transition: a study of patient and carer experience. *Health Expectations*. May 16 2014.

Koller D, Schon G, Schafer I, Glaeske G, van den Bussche H, Hansen H. Multimorbidity and long-term care dependency-a five-year follow-up. *BMC Geriatr*. 2014; **14**:70.

Sibley KM, Voth J, Munce SE, Straus SE, Jaglal SB. Chronic disease and falls in community-dwelling Canadians over 65 years old: a population-based study exploring associations with number and pattern of chronic conditions. *BMC Geriatr*. 2014; **14**:22.

Booth HP, Prevost AT, Gulliford MC. Impact of body mass index on prevalence of multimorbidity in primary care: cohort study. *Fam Pract*. Feb 2014; **31**(1):38-43.

Vila-Rodriguez F, Panenka WJ, Lang DJ, Thornton AE, Vertinsky T, Wong H, Barr AM, Procyshyn RM, Sidhu JJ, Smith GN, Buchanan T, Krajden M, Krausz M, Montaner JS, Macewan GW, Honer WG. The hotel study: multimorbidity in a community sample living in marginal housing. *Am J Psychiatry*. Dec 1 2013; **170**(12):1413-1422.

Lappenschaar M, Hommersom A, Lucas PJ, Lagro J, Visscher S, Korevaar JC, Schellevis FG. Multilevel temporal Bayesian networks can model longitudinal change in multimorbidity. *J Clin Epidemiol*. Dec 2013; **66**(12):1405-1416.

Galvan-Banqueri M, de la Higuera-Vila L, Vega-Coca MD, Nieto Martin MD, Perez-Guerrero C, Santos-Ramos B. Reliability of a questionnaire for pharmacological treatment appropriateness in patients with multiple chronic conditions. *Eur J Intern Med*. Jul 2013; **24**(5):420-424.

de S Santos Machado V, Valadares AL, Costa-Paiva LH, Osis MJ, Sousa MH, Pinto-Neto AM. Aging, obesity, and multimorbidity in women 50 years or older: a population-based study. *Menopause*. Apr 1 2013.

Ruel G, Shi Z, Zhen S, et al. Association between nutrition and the evolution of multimorbidity: The importance of fruits and vegetables and whole grain products. *Clin Nutr*. Jul 22 2013. <http://dx.doi.org/10.1016/j.clnu.2013.07.009>.

Jowsey T, McRae IS, Valderas JM, et al. Time's up. descriptive epidemiology of multimorbidity and time spent on health related activity by older Australians: a time use survey. *PLoS One*. 2013; **8**(4):e59379.

Teljeur C, Smith SM, Paul G, Kelly A, O'Dowd T. Multimorbidity in a cohort of patients with type 2 diabetes. *Eur J Gen Pract*. Mar 2013; **19**(1): 17-22.

Caracciolo B, Gatz M, Xu W, Marengoni A, Pedersen NL, Fratiglioni L. Relationship of Subjective Cognitive Impairment and Cognitive Impairment No Dementia to Chronic Disease and Multimorbidity in a Nation-Wide Twin Study. *J Alzheimers Dis*. Apr 19 2013.

Maeng DD, Martsof GR, Scanlon DP, Christianson JB. Care coordination for the chronically ill: understanding the patient's perspective. *Health Serv Res*. Oct 2012; **47**(5):1960-1979.

Chan CL, You HJ, Huang HT, Ting HW. Using an integrated COC index and multilevel measurements to verify the care outcome of patients with multiple chronic conditions. *BMC Health Serv Res*. 2012; **12**:405.

Sullivan PW, Ghushchyan VH, Bayliss EA. The impact of co-morbidity burden on preference-based health-related quality of life in the United States. *Pharmacoeconomics*. May 2012; **30**(5): 431-442.

Gadermann AM, Alonso J, Vilagut G, Zaslavsky AM, Kessler RC. Comorbidity and disease burden in the national comorbidity survey replication (ncs-R). *Depress Anxiety*. Sep 2012; **29**(9): 797-806.

Tran VT, Montori VM, Eton DT, Baruch D, Falissard B, Ravaud P. Development and description of measurement properties of an instrument to assess treatment burden among patients with multiple chronic conditions. *BMC Med*. 2012; **10**: 68.

Moth G, Vestergaard M, Vedsted P. Chronic care management in Danish general practice - a crosssectional study of workload and multimorbidity. *BMC Fam Pract*. 2012; **13**:52.

von Wild T, Stollwerck PL, Namdar T, Stang FH, Mailander P, Siemers F. Are Multimorbidities Underestimated in Scoring Systems of Stevens-Johnson Syndrome and Toxic Epidermal Necrolysis Like in SCORTEN? *Eplasty*. 2012; **12**:e35.

Busato A, Bhend H, Chmiel C, et al. Improving the quality of morbidity indicators in electronic health records in Swiss primary care. *Swiss Med Wkly*. 2012; **142**:w13611.

Garcia-Olmos L, Salvador CH, Alberquilla A, et al. Comorbidity patterns in patients with chronic diseases in general practice. *PLoS One*. 2012; **7**(2):e32141.

Hudon C, Fortin M, Poitras M-E, Almirall J. The relationship between literacy and multimorbidity in a primary care setting. *BMC Family Practice*. 2012; **13**: 33.

Grant RW, Ashburner JM, Hong CC, Chang Y, Barry MJ, Atlas SJ. Defining Patient Complexity From the Primary Care Physician's Perspective: A Cohort Study. *Ann Intern Med*. 2011; **155**: 797-804.

Gulley, S.P., E.K. Rasch, and L. Chan, The complex web of health: relationships among chronic conditions, disability, and health services. *Public Health Rep*, 2011. **126**: p. 495-507.

Fried, T.R., et al., Health Outcome Prioritization as a Tool for Decision Making Among Older Persons With Multiple Chronic Conditions. *Arch Intern Med.* 2011; **171**(20): 1854-6.

Naessens JM, Stroebe RJ, Finnie DM, et al. Effect of multiple chronic conditions among working-age adults. *Am J Manag Care* 2011; **17**: 118-22.

Wong A, Boshuizen HC, Schellevis FG, Kommer GJ, Polder JJ. Longitudinal administrative data can be used to examine multimorbidity, provided false discoveries are controlled for. *J Clin Epidemiol* 2011; **64**(10): 1109-17.

Tucker-Seeley RD, Li Y, Sorensen G, Subramanian S. Lifecourse socioeconomic circumstances and multimorbidity among older adults. *BMC Public Health* 2011; **11**: 313.

Schäfer I, Hansen H, Schon G, et al. The German MultiCare-study: Patterns of multimorbidity in primary health care - Protocol of a prospective cohort study. *BMC Health Services Research.* 2009; **9**(145).

Akner G. Analysis of multimorbidity in individual elderly nursing home residents. Development of a multimorbidity matrix. *Arch Gerontol Geriatr.* 2009 Jan 28. [Epub ahead of print]

Marengoni A, Rizzuto D, Wang HX, Winblad B, Fratiglioni L. Patterns of chronic multimorbidity in the elderly population. *J Am Geriatr Soc.* 2009; **57**(2): 225-30.

Charlson, M., R. E. Charlson, et al. "Can disease management target patients most likely to generate high costs? The impact of comorbidity." *Journal of General Internal Medicine* 2007. **22**(4): 464-9.

Duff, K., J. W. Mold, et al. "Medical burden and cognition in older patients in primary care: selective deficits in attention." *Archives of Clinical Neuropsychology* 2007. **22**(5): 569-75.

Fung, C. H., C. M. Setodji, et al. "The relationship between multimorbidity and patients' ratings of communication." *J Gen Intern Med* 2008. **23**: 788-93.

Laux, G., T. Kuehlein, et al. "Co- and multimorbidity patterns in primary care based on episodes of care: results from the German CONTENT project." *BMC Health Services Research* 2008. **8**: 14.

Noel, P. H., M. L. Parchman, et al. "The challenges of multimorbidity from the patient perspective." *Journal of General Internal Medicine* 2007. **22** Suppl 3: 419-24.

Perruccio, A. V., J. D. Power, et al. "The relative impact of 13 chronic conditions across three different outcomes." *Journal of Epidemiology and Community Health* 2007. **61**: 1056-1061.

Nagel G, Peter R, Braig S, Hermann S, Rohrmann S, Linseisen J. The impact of education on risk factors and the occurrence of multimorbidity in the EPIC-Heidelberg cohort. *BMC Public Health.* 2008 Nov 11; **8**(1): 384

Huitema HOM, van den Akker M, Buntinx F, Muris JW, Metsemakers JFM, Knottnerus JA. Comorbidity of chronic gastro-intestinal disorders. A cross-sectional analysis in a large general practice population in the Netherlands. *Arch Public Health* 2000; **58**: 51-65.

Landwehr Johan STM, van den Akker M, Metsemakers JFM, Buntinx F. Comorbidity of chronic cardiovascular disorders. A cross-sectional analysis in a large general practice population in the Netherlands. *Arch Public Health* 2000; **58**: 213-31.

van den Akker M, Vos R, Knottnerus JA. In an exploratory prospective study on multimorbidity general and disease-related susceptibility could be distinguished. *J Clin Epidemiol* 2006; **59**: 934-9.

van den Akker, M., et al., Morbidity in responders and non-responders in a register-based population survey. *Fam Pract*, 1998. **15**: p. 261-3.

#### 4. ECONOMIC STUDIES

Eckardt M, Brettschneider C, van den Bussche H, Konig HH, MultiCare Study G. Analysis of Health Care Costs in Elderly Patients with Multiple Chronic Conditions Using a Finite Mixture of Generalized Linear Models. *Health economics*. 2017; **26**(5): 582-599. doi: 10.1002/hec.3334.

Soni A. Out-of-Pocket Expenditures for Adults with Health Care Expenses for Multiple Chronic Conditions, U.S. Civilian Noninstitutionalized Population, 2014 (<https://www.ncbi.nlm.nih.gov/books/NBK425788/>). Medical Expenditure Panel Survey Statistical Briefs. Rockville (MD)2001 (Updated February 2017).

Soto-Gordoa M, Arrospide A, Merino Hernandez M, et al. Incorporating Budget Impact Analysis in the Implementation of Complex Interventions: A Case of an Integrated Intervention for Multimorbid Patients within the CareWell Study. *Value Health*. 2017; **20**(1): 100-106.

Matthews KA, Holt J, Gaglioti AH, et al. County-Level Variation in Per Capita Spending for Multiple Chronic Conditions Among Fee-for-Service Medicare Beneficiaries, United States, 2014. *Prev Chronic Dis*. 2016; **13**: E162.

Lanzeta I, Mar J, Arrospide A. Cost-utility analysis of an integrated care model for multimorbid patients based on a clinical trial. *Gac Sanit*. 2016; **30**: 352-8.

Ruscitto A, Mercer SW, Morales D, Guthrie B. Accounting for multimorbidity in pay for performance: a modelling study using UK Quality and Outcomes Framework data. *Br J Gen Pract*. 2016; **66**: e561-7.

Rezaee ME, Pollock M. Prevalence and Associated Cost and Utilization of Multiple Chronic Conditions in the Outpatient Setting among Adult Members of an Employer-based Health Plan. *Popul Health Manag*. Apr 28 2015.

Zhong W, Finnie DM, Shah ND, Wagie AE, St Sauver JL, Jacobson DJ, Naessens JM. Effect of Multiple Chronic Diseases on Health Care Expenditures in Childhood. *J Prim Care Community Health*. 2015; **6**(1): 2-9.

Naci H, Soumerai SB, Ross-Degnan D, Zhang F, Briesacher BA, Gurwitz JH, Madden JM. Medication affordability gains following Medicare Part D are eroding among elderly with multiple chronic conditions. *Health Aff (Millwood)*. Aug 2014; **33**(8): 1435-1443.

Pati S, Agrawal S, Swain S, Lee JT, Vellakkal S, Hussain MA, Millett C. Non communicable disease multimorbidity and associated health care utilization and expenditures in India: cross-sectional study. *BMC Health Serv Res*. 2014; **14**: 451.

Kuo RN, Lai MS. The influence of socio-economic status and multimorbidity patterns on healthcare costs: a six-year follow-up under a universal healthcare system. *Int J Equity Health*. 2013; **12**(1): 69.

Machlin SR, Soni A. Health care expenditures for adults with multiple treated chronic conditions: estimates from the medical expenditure panel survey, 2009. *Prev Chronic Dis*. 2013; **10**: E63.

Nagl A, Witte J, Hodek JM, Greiner W. Relationship between multimorbidity and direct healthcare costs in an advanced elderly population. Results of the PRISCUS trial. *Z Gerontol Geriatr*. Feb 2012; 45(2):146-154.

Cunningham PJ. Chronic burdens: the persistently high out-of-pocket health care expenses faced by many Americans with chronic conditions. Issue Brief (Commonw Fund). 2009. **63**:1-14.

Wehling M. Multimorbidity and polypharmacy: how to reduce the harmful drug load and yet add needed drugs in the elderly? Proposal of a new drug classification: fit for the aged. *J Am Geriatr Soc*. 2009. **57**(3):560-1.

Schoenberg, N. E., H. Kim, et al. "Burden of common multiple-morbidity constellations on out-of-pocket medical expenditures among older adults." *Gerontologist* 2007. **47**(4): 423-37.

Rice, D.P. and M.P. LaPlante, Medical expenditures for disability and disabling comorbidity. *Am J Public Health*, 1992. **82**(5): p. 739-41.

Shah, A.N., et al., Comorbid illness affects hospital costs related to hip arthroplasty: quantification of health status and implications for fair reimbursement and surgeon comparisons. *Journal of Arthroplasty*, 2004. **19**(6): p. 700-5.

Shwartz, M., et al., The importance of comorbidities in explaining differences in patient costs. *Medical Care.*, 1996. **34**(8): p. 767-82.

Young, D.S., B.S. Sachais, and L.C. Jefferies, Effect of disease complications on hospital costs. *Clinical Chemistry.*, 2002. **48**(1): p. 140-9.

Wolff, J.L., B. Starfield, and G. Anderson, Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Archives of Internal Medicine*, 2002. **162**: p. 2269-76.

Beddhu, S., et al., A simple comorbidity scale predicts clinical outcomes and costs in dialysis patients. *Am J Med*, 2000. **108**: p. 609-13.

## **5. METHODS TO MEASURE MULTIMORBIDITY AND COMORBIDITY**

Fortin M, Almirall J, Nicholson K. Development of a research tool to document self-reported chronic conditions in primary care. *J Comorb*. 2017; **7**(1):117-123.

Calderon-Larranaga A, Vetrano DL, Onder G, et al. Assessing and Measuring Chronic Multimorbidity in the Older Population: A Proposal for Its Operationalization. *J Gerontol A Biol Sci Med Sci*. 2017; **72**(10):1417-1423.

Wen YC, Chen LK, Hsiao FY. Predicting mortality and hospitalization of older adults by the multimorbidity frailty index. *PLoS One*. 2017; **12**(11):e0187825.

Corazza GR, Klersy C, Formagnana P, Lenti MV, Padula D, Consensus P. A consensus for the development of a vector model to assess clinical complexity. *Intern Emerg Med*. 2017; **12**(8):1313-1318.

Stanley J, Sarfati D. The new measuring multimorbidity index predicted mortality better than Charlson and Elixhauser indices among the general population. *J Clin Epidemiol*. 2017; **92**:99-110.

Blokh D, Stambler I, Lubart E, Mizrahi EH. The application of information theory for the estimation of old-age multimorbidity. *Geroscience*. 2017; **39**(5-6):551-556.

Wei MY, Kabeto MU, Langa KM, Mukamal KJ. Multimorbidity and physical and cognitive function: performance of a new multimorbidity-weighted index. *J Gerontol A Biol Sci Med Sci*. 2017. doi: 10.1093/gerona/glx114.

Martin S, Wagner J, Lupulescu-Mann N, et al. Comparison of EHR-based diagnosis documentation locations to a gold standard for risk stratification in patients with multiple chronic conditions. *Appl Clin Inform*. 2017; **8**(3):794-809. doi: 10.4338/ACI-2016-12-RA-0210.

Min H, Avramovic S, Wojtusiak J, et al. A Comprehensive Multimorbidity Index for Predicting Mortality in Intensive Care Unit Patients. *J Palliat Med*. 2017; **20**(1):35-41.

Gassmann D, Cheetham M, Siebenhuener K, et al. The multimorbidity interaction severity index (MISI): A proof of concept study. *Medicine (Baltimore)*. 2017; **96**(8):e6144.

Alemi F, Levy CR, Kheirbek RE. The Multimorbidity Index: A Tool for Assessing the Prognosis of Patients from Their History of Illness. *EGEMS (Wash DC)*. 2016; **4**(1):1235.

Fraccaro P, Kontopantelis E, Sperrin M, et al. Predicting mortality from change-over-time in the Charlson Comorbidity Index: A retrospective cohort study in a data-intensive UK health system. *Medicine (Baltimore)*. 2016; **95**(43):e4973.

Calderon-Larranaga A, Vetrano DL, Onder G, et al. Assessing and Measuring Chronic Multimorbidity in the Older Population: A Proposal for Its Operationalization. *J Gerontol A Biol Sci Med Sci*. 2016.

Bernabeu-Wittel M, Moreno-Gavino L, Ollero-Baturone M, et al. Validation of PROFUND prognostic index over a four-year follow-up period. *Eur J Intern Med*. 2016; **36**:20-24.

Held FP, Blyth F, Gnjjidic D, et al. Association Rules Analysis of Comorbidity and Multimorbidity: The Concord Health and Aging in Men Project. *J Gerontol A Biol Sci Med Sci*. 2016; **71**:625-31.

Ubalde-Lopez M, Delclos GL, Benavides FG, Calvo-Bonacho E, Gimeno D. Measuring multimorbidity in a working population: the effect on incident sickness absence. *Int Arch Occup Environ Health*. 2016; **89**:667-78.

Pati S, Hussain MA, Swain S, et al. Development and Validation of a Questionnaire to Assess Multimorbidity in Primary Care: An Indian Experience. *Biomed Res Int*. 2016; **2016**:6582487.

N'Goran AA, Blaser J, Deruaz-Luyet A, et al. From chronic conditions to relevance in multimorbidity: a four-step study in family medicine. *Fam Pract*. 2016; **33**:439-44.

Diez-Manglano J, Cabrerizo Garcia JL, Garcia-Arilla Calvo E, Jimeno Sainz A, Calvo Begueria E, Martinez-Alvarez RM *et al*: External validation of the PROFUND index in polypathological patients from internal medicine and acute geriatrics departments in Aragon. *Intern Emerg Med*. 2015; **10**(8):915-926.

Radner H, Yoshida K, Mjaavatten MD, Aletaha D, Frits M, Lu B *et al*: Development of a multimorbidity index: Impact on quality of life using a rheumatoid arthritis cohort. *Semin Arthritis Rheum*. 2015; **45**(2):167-173.



- Tonelli M, Wiebe N, Fortin M, et al. Methods for identifying 30 chronic conditions: application to administrative data. *BMC Med Inform Decis Mak*. 2015; **15**:31.
- Boeckxstaens P, Vaes B, Legrand D, Dalleur O, De Sutter A, Degryse JM. The relationship of multimorbidity with disability and frailty in the oldest patients: A cross-sectional analysis of three measures of multimorbidity in the BELFRAIL cohort. *Eur J Gen Pract*. Mar 2015; **21**(1):39-44.
- Mc Sharry J, Bishop FL, Moss-Morris R, Holt RI, Kendrick T. A new measure of multimorbid illness and treatment representations: The example of diabetes and depression. *J Affect Disord*. 2015; **174**:192-200.
- Boeckxstaens P, Vaes B, Van Pottelbergh G, et al. Multimorbidity measures were poor predictors of adverse events in patients aged  $\geq 80$  years: a prospective cohort study. *J Clin Epidemiol*. Feb 2015; **68**(2):220-227.
- Harrison C, Britt H, Miller G, Henderson J. Examining different measures of multimorbidity, using a large prospective cross-sectional study in Australian general practice. *BMJ Open*. 2014; **4**(7):e004694.
- Gibbons CJ, Kenning C, Coventry PA, Bee P, Bundy C, Fisher L, Bower P. Development of a Multimorbidity Illness Perceptions Scale (MULTIPIeS). *PLoS One*. 2013; **8**(12):e81852.
- Brilleman SL, Salisbury C. Comparing measures of multimorbidity to predict outcomes in primary care: a cross sectional study. *Fam Pract*. Apr 2013; **30**(2):172-178.
- Poitras M-E, Fortin M, Hudon C, Haggerty J, Almirall J. Validation of the disease burden morbidity assessment by self-report in a French-speaking population. *BMC Health Service Research*. 2012; **12**:35.
- Diederichs CP, Wellmann J, Bartels DB, Ellert U, Hoffmann W, Berger K. How to weight chronic diseases in multimorbidity indices? Development of a new method on the basis of individual data from five population-based studies. *J Clin Epidemiol*. Jun 2012; **65**(6):679-685.
- Steinhaeuser J, Miksch A, Ose D, Glassen K, Natanzon I, Szecsenyi J, et al. Questionnaire of chronic illness care in primary care-psychometric properties and test-retest reliability. *BMC Health Serv Res*. 2011; **11**:295.
- Starfield, B. and K. Kinder, Multimorbidity and its measurement. *Health Policy*. 2011; **103**(1):3-8.
- Diederichs C, Berger K, Bartels DB. The Measurement of Multiple Chronic Diseases--A Systematic Review on Existing Multimorbidity Indices. *J Gerontol A Biol Sci Med Sci* 2011; **66**:301-11.
- Holzhausen M, Fuchs J, Busch M, et al. Operationalizing multimorbidity and autonomy for health services research in aging populations--the OMAHA study. *BMC Health Serv Res* 2011; **11**:47.
- Vitry A, Wong SA, Roughead EE, Ramsay E, Barratt J. Validity of medication-based comorbidity indices in the Australian elderly population. *Aust N Z J Public Health*. 2009 Apr; **33**(2):126-30.
- Md Yusof MY, Horan MA, Jones M, McInnes L, Rabbitt PM, Pendleton N. Developing a self-reported comorbidity index to predict mortality of community-dwelling older adults. *Arch Gerontol Geriatr*. 2009 Jun 20. 2010; **50**(3):e63-7.

Salvi F, Miller MD, Grilli A, et al. A manual of guidelines to score the modified cumulative illness rating scale and its validation in acute hospitalized elderly patients. *J Am Geriatr Soc.* 2008; **56**:1926-31.

Boyd, C. M., C. O. Weiss, et al. "Framework for evaluating disease severity measures in older adults with comorbidity." *Journals of Gerontology Series A-Biological Sciences & Medical Sciences* 2007. **62**(3): 286-95.

Lash, T. L., V. Mor, et al. "Methodology, design, and analytic techniques to address measurement of comorbid disease." *Journals of Gerontology Series A-Biological Sciences & Medical Sciences* 2007. **62**(3): 281-5.

Tooth, L., R. Hockey, et al. "Weighted multimorbidity indexes predicted mortality, health service use, and health-related quality of life in older women." *Journal of Clinical Epidemiology* 2008. **61**(2): 151-9.

Hudon C, Fortin M, Soubhi H. Abbreviated guidelines for scoring the Cumulative Illness Rating Scale (CIRS) in family practice. *J Clin Epidemiol* 2007; **60** :212e1-212e3.

Bayliss, E.A., J.L. Ellis, and J.F. Steiner, Subjective assessments of comorbidity correlate with quality of life health outcomes: Initial validation of a comorbidity assessment instrument. *Health and Quality of life Outcomes*, 2005. **3**: p. 51.

Bravo, G., et al., A prospective evaluation of the Charlson Comorbidity Index for use in long-term care patients. *Journal of the American Geriatrics Society.*, 2002. **50**(4): p. 740-5.

Buntinx, F., et al., Evaluation of Charlson's comorbidity index in elderly living in nursing homes. *Journal of Clinical Epidemiology.*, 2002. **55**(11): p. 1144-7.

Byles, J.E., et al., Single index of multimorbidity did not predict multiple outcomes. *J Clin Epidemiol*, 2005. **58**: p. 997-1005.

Charlson, M.E., et al., A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis*, 1987. **40**: p. 373-83.

Charlson, M., et al., Validation of a combined comorbidity index.

Conwell, Y., et al., Validation of a measure of physical illness burden at autopsy: the Cumulative Illness Rating Scale. *Journal of the American Geriatrics Society.*, 1993. **41**(1): p. 38-41.

Crabtree, H.L., et al., The Comorbidity Symptom Scale: a combined disease inventory and assessment of symptom severity. *Journal of the American Geriatrics Society.*, 2000. **48**(12): p. 1674-8.

de Groot, V., et al., How to measure comorbidity. a critical review of available methods. *J Clin Epidemiol*, 2003. **56**: p. 221-9.

Desai MM, Bogardus STJ, Williams CS, Vitagliano G, Inouye SK. Development and validation of a risk-adjustment index for older patients: the high-risk diagnoses for the elderly scale. *J Am Geriatr Soc* 2002; **50**(3):474-481.

Deyo, R.A., D.C. Cherkin, and M.A. Ciol, Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. *Journal of Clinical Epidemiology.*, 1992. **45**(6): p. 613-9.

D'Hoore, W., C. Sicotte, and C. Tilquin, Risk adjustment in outcome assessment: the Charlson comorbidity index. *Methods of Information in Medicine.*, 1993. **32**(5): p. 382-7.

Elixhauser, A., et al., Comorbidity measures for use with administrative data. *Medical Care.*, 1998. **36**(1): p. 8-27.

Extermann, M., et al., Comorbidity and functional status are independent in older cancer patients. *Journal of Clinical Oncology.*, 1998. **16**(4): p. 1582-7.

Fan, V.S., et al., Validation of case-mix measures derived from self-reports of diagnoses and health. *J Clin Epidemiol*, 2002. **55**: p. 371-80.

Fleming, S.T., et al., A comprehensive prognostic index to predict survival based on multiple comorbidities: a focus on breast cancer. *Medical Care*, 1999. **37**(6): p. 601-14.

Fortin M, Hudon C, Dubois M-F, Almirall J, Lapointe L, Soubhi H. Comparative assessment of three different indices of multimorbidity for studies on health-related quality of life. *Health and Quality of Life Outcomes* 2005; **3**: 74.

Fried LP, Bandeen-Roche K, Kasper JD, Guralink JM. Association of comorbidity with disability in older women: The Women's Health and Aging Study. *Journal of Clinical Epidemiology* 1999; **52**(1):27-37.

Greenfield S, Apolone G, McNeil BJ, Cleary PD. The importance of co-existent disease in the occurrence of postoperative complications and one-year recovery in patients undergoing total hip replacement. *Comorbidity and outcomes after hip replacement. Med Care* 1993; **31**(2):141-154.

Groll, D.L., et al., The development of a comorbidity index with physical function as the outcome. *J Clin Epidemiol*, 2005. **58**: p. 595-602.

Harboun, M. and J. Ankri, [Comorbidity indexes: review of the literature and application to studies of elderly population][French]. *Rev Epidemiol Sante Publique*, 2001. **49**(3): p. 287-98.

Harse, J.D. and C.D. Holman, Charlson's Index was a poor predictor of quality of life outcomes in a study of patients following joint replacement surgery. *Journal of Clinical Epidemiology*, 2005. **58**(11): p. 1142-9.

Holman, C.D., et al., A multipurpose comorbidity scoring system performed better than the Charlson index. *Journal of Clinical Epidemiology*, 2005. **58**(10): p. 1006-14.

Hudon C, Fortin M, Vanasse A. Cumulative Illness Rating Scale was a reliable and valid index in a family practice context. *J Clin Epidemiol* 2005; **58**:603-8.

Imamura, K., et al., Reliability of a comorbidity measure: the Index of Co-Existent Disease (ICED). *J Clin Epidemiol*, 1997. **50**: p. 1011-6.

Incalzi RA, Capparella O, Gemma A, Landi F, Bruno E, Di Meo F et al. The interaction between age and comorbidity contributes to predicting the mortality of geriatric patients in the acute-care hospital. *J Int Med* 1997; **242**:291-298.

Inouye SK, Bogardus STJ, Vitagliano G, Desai MM, Williams CS, Grady JN et al. Burden of illness score for elderly persons. Risk adjustment incorporating the cumulative impact of diseases, physiologic abnormalities, and functional impairments. *Med Care* 2003; **41**(1):70-83.

John, R., D.S. Kerby, and C.H. Hennessy, Patterns and impact of comorbidity and multimorbidity among community-resident American Indian elders. *Gerontologist*, 2003. **43**: p. 649-60.

Knaus WA, Wagner DP, Draper EA, Zimmerman JE, Bergner M, Bastos PG et al. The APACHE III Prognostic System. Risk prediction of hospital mortality for critically ill hospitalized adults. *Chest* 1991; **100**:1619-1636.

Kaplan, M.H. and A.R. Feinstein, The importance of classifying initial co-morbidity in evaluating the outcome of diabetes mellitus. *J Chron Dis*, 1974. **27**: p. 387-40

Katz, J.N., et al., Can comorbidity be measured by questionnaire rather than medical record review? *Medical Care.*, 1996. **34**: p. 73-84.

Knoefel, F.D. and L. Patrick, Improving outcomes in geriatric rehabilitation: The impact of reducing cumulative illness. *Geriatrics Today*, 2003. **6**: p. 153-7.

Linn, B.S., M.W. Linn, and L. Gurel, Cumulative illness rating scale. *J Am Geriatr Soc*, 1968. **16**: p. 622-6.

Liu, M., K. Domen, and N. Chino, Comorbidity measures for stroke outcome research: a preliminary study. *Archives of Physical Medicine & Rehabilitation.*, 1997. **78**(2): p. 166-72.

Lyketsos, C.G., et al., The General Medical Health Rating: a bedside global rating of medical comorbidity in patients with dementia. *Journal of the American Geriatrics Society.*, 1999. **47**(4): p. 487-91.

Miller, M.D., et al., Rating chronic medical illness burden in geropsychiatric practice and research: application of the Cumulative Illness Rating Scale. *Psychiatry Res*, 1992. **41**: p. 237-48.

Monfardini, S., et al., Validation of a multidimensional evaluation scale for use in elderly cancer patients. *Cancer*, 1996. **77**(2): p. 395-401.

Mulrow CD, Gerety MB, Cornell JE, Lawrence VA, Kanten DN. The relationship between disease and function and perceived health in very frail elders. *J Am Geriatr Soc* 1994; **42**:374-380.

Parkerson, G.R., Jr., W.E. Broadhead, and C.K. Tse, The Duke Severity of Illness Checklist (DUSOI) for measurement of severity and comorbidity. *J Clin Epidemiol*, 1993. **46**: p. 379-93.

Parmelee, P.A., et al., Validation of the Cumulative Illness Rating Scale in a geriatric residential population. *Journal of the American Geriatrics Society*, 1995. **43**(2): p. 130-7.

Perkins, A.J., et al., Common comorbidity scales were similar in their ability to predict health care costs and mortality. *J Clin Epidemiol*, 2004. **57**: p. 1040-1048.

Piccirillo, J.F. and I. Costas, The impact of comorbidity on outcomes. *Orl; Journal of Oto-Rhino-Laryngology & its Related Specialties*, 2004. **66**(4): p. 180-5.

Piccirillo JF. Importance of comorbidity in head and neck cancer. *Laryngoscope* 2000; **110**:593-602.

Rao, A.V., P.H. Seo, and H.J. Cohen, Geriatric assessment and comorbidity. *Seminars in Oncology*, 2004. **31**(2): p. 149-59.

Repetto, L., et al., Comprehensive geriatric assessment adds information to Eastern Cooperative Oncology Group performance status in elderly cancer patients: an Italian Group for Geriatric Oncology Study. *Journal of Clinical Oncology*, 2002. **20**(2): p. 494-502.

Rigler SK, Studenski S, Wallace D, et al. Co-morbidity adjustment for functional outcomes in community-dwelling older adults. *Clin Rehab* 2002; **16**:420-428.

Rochon, P.A., et al., Comorbid illness is associated with survival and length of hospital stay in patients with chronic disability. A prospective comparison of three comorbidity indices. *Med Care*, 1996. **34**(11): p. 1093-101.

Romano PS, Roos LL, Jollis JG. Adapting a clinical comorbidity index for use with ICD-9 administrative data: differing perspectives. *J Clin Epidemiol* 1993; 46(10):1075-1079.

Rozzini, R., et al., Geriatric Index of Comorbidity: validation and comparison with other measures of comorbidity. *Age Ageing*, 2002. **31**(4): p. 277-85.

Sangha, O., et al., The Self-Administered Comorbidity Questionnaire: a new method to assess comorbidity for clinical and health services research. *Arthritis & Rheumatism*, 2003. **49**(2): p. 156-63.

Shwartz M, Iezzoni L, Moskowitz MA, Ash AS, Sawitz E. The importance of comorbidities in explaining differences in patient costs. *Med Care* 1996; **34**(8):767-782.

Schneeweiss, S., et al., Consistency of performance ranking of comorbidity adjustment scores in Canadian and U.S. utilization data. *Journal of General Internal Medicine*, 2004. **19**(5 Pt 1): p. 444-50.

Schneeweiss, S. and M. Maclure, Use of comorbidity scores for control of confounding in studies using administrative databases. *International Journal of Epidemiology*, 2000. **29**(5): p. 891-8.

Shiels, C., et al., The inter-rater reliability of a generic measure of severity of illness. *Family Practice*, 1997. **14**(6): p. 466-71.

Starfield B, Weiner J, Mumford L, Steinwachs D. Ambulatory care groups: a categorization of diagnoses for research and management. *Health Serv Res* 1991; **26**(1):53-74.

Verbrugge LM, Lepkowski JM, Imanaka Y. Comorbidity and its impact on disability. *The Milbank Quarterly* 1989; 67(3-4):450-484.

Von Korff M, Wagner EH, Saunders K. A chronic disease score from automated pharmacy data. *J Clin Epidemiol* 1992; 45(2):197-203.

Waldman, E. and J.F. Potter, A prospective evaluation of the cumulative illness rating scale. *Aging Clinical & Experimental Research*, 1992. **4**(2): p. 171-8.

Ware JE, Bayliss MS, Rogers WH, Kosinski M, Tarlov AR. Differences in 4-year health outcomes for elderly and poor, chronically ill patients treated in HMO and fee-for-service systems. Results from the Medical Outcomes Study. *JAMA* 1996; **276**(13):1039-1047.

Yancik R, Havlik RJ, Ries L, Long S, Rossi WK, Edwards BK. Cancer and comorbidity in older patients: a descriptive profile. *Ann Epidemiol* 1996; **6**(5):399-412.

## **6. EDITORIALS / OPINION ARTICLES**

Bastian LA, Brandt CA, Justice AC. Measuring Multimorbidity: A Risky Business. *J Gen Intern Med*. 2017; **32**(9):959-960.

Vetrano DL, Calderon-Larranaga A, Marengoni A, et al. An international perspective on chronic multimorbidity: approaching the elephant in the room. *J Gerontol A Biol Sci Med Sci*. 2017.

Bernabeu-Wittel M, Baron-Franco B, Nieto-Martin D, Moreno-Gavino L, Ramirez-Duque N, Ollero-Baturone M. Prognostic stratification and healthcare approach in patients with multiple pathologies. *Rev Clin Esp*. 2017;**217**(7):410-419.

Rizzuto D, Melis RJF, Marengoni A. Reply to: Function but not Multimorbidity at the Cornerstone of Geriatric Medicine. *J Am Geriatr Soc*. 2017;**65**(10):2334-2335.

Abizanda P, Rodriguez-Manas L. Function But Not Multimorbidity at The Cornerstone of Geriatric Medicine. *J Am Geriatr Soc*. 2017;**65**(10):2333-2334.

Riano D, Ortega W. Computer technologies to integrate medical treatments to manage multimorbidity. *J Biomed Inform*. 2017;**75**:1-13.

Heisler M. Eliciting Personal Values of Patients with Multiple Chronic Conditions: Why and How. *J Gen Intern Med*. 2017;**32**(12):1273-1274.

Yarnall AJ, Sayer AA, Clegg A, Rockwood K, Parker S, Hindle JV. New horizons in multimorbidity in older adults. *Age Ageing*. 2017;**46**(6):882-888.

Battegay EJ, Cheetham M. Choosing Wisely - An international and multimorbid perspective. *Z Evid Fortbild Qual Gesundheitswes*. 2017;**129**:27-30.

Tsiachristas A, van Ginneken E, Rijken M. Tackling the challenge of multi-morbidity: Actions for health policy and research. *Health Policy*. 2018;**122**(1):1-3.

Marengoni A, Fratiglioni L, Onder G. Improving Public Awareness of Multimorbidity. *J Am Med Dir Assoc*. 2017;**18**(5):372-373. doi: 10.1016/j.jamda.2017.01.010.

Mazza D, Mitchell G. Cancer, ageing, multimorbidity and primary care. *Eur J Cancer Care (Engl)*. 2017;**26**(3). doi: 10.1111/ecc.12717.

Kernick D, Chew-Graham CA, O'Flynn N. Clinical assessment and management of multimorbidity: NICE guideline. *Br J Gen Pract*. 2017;**67**(658):235-236. doi: 10.3399/bjgp17X690857.

Gallo JJ. Multimorbidity and Mental Health. *Am J Geriatr Psychiatry*. 2017;**25**(5):520-521. doi: 10.1016/j.jagp.2017.02.007.

Molokhia M, Majeed A. Current and future perspectives on the management of polypharmacy. *BMC Fam Pract*. 2017;**18**(1):70. doi: 10.1186/s12875-017-0642-0.

Mair FS, Gallacher KI. Multimorbidity: what next? *Br J Gen Pract*. 2017;**67**(659):248-249. doi: 10.3399/bjgp17X690965.

Watt G. The subversive challenges of multimorbidity. *Br J Gen Pract*. 2017;**67**(659):280-281. doi: 10.3399/bjgp17X691289.

Bastian LA, Brandt CA, Justice AC. Measuring Multimorbidity: A Risky Business. *J Gen Intern Med*. 2017. doi: 10.1007/s11606-017-4110-2.

Bickford J, Cohen A. Multimorbidity: what next? *Br J Gen Pract*. 2017;**67**(660):300. doi: 10.3399/bjgp17X691637.

Sasseville M, Stewart M, Bouhali T, Fortin M. Relevant Outcomes for Patient-Centered Interventions for Persons with Multimorbidity: Experts' Discussion. *Ann Fam Med*. 2017; **15**(4):388-389. doi: 10.1370/afm.2116.

Abizanda P, Rodriguez-Manas L. Function But Not Multimorbidity at The Cornerstone of Geriatric Medicine. *J Am Geriatr Soc*. 2017. doi: 10.1111/jgs.15021.

Brockmoller J, Stingl JC. Multimorbidity, polypharmacy and pharmacogenomics in old age. *Pharmacogenomics*. 2017; **18**(6):515-517.

de Souto Barreto P. Exercise for Multimorbid Patients in Primary Care: One Prescription for All? *Sports Med*. 2017.

Leland NE, Fogelberg DJ, Halle AD, Mroz TM. Occupational Therapy and Management of Multiple Chronic Conditions in the Context of Health Care Reform. *Am J Occup Ther*. 2017; **71**(1):7101090010p1-7101090010p6.

Stott DJ, Young J. 'Across the pond'-a response to the NICE guidelines for management of multi-morbidity in older people. *Age Ageing*. 2017:1-2.

Manning E, Gagnon M. The complex patient: A concept clarification. *Nurs Health Sci*. 2017; **19**(1):13-21.

Onder G, Cesari M, Maggio M, Palmer K. Defining a care pathway for patients with multimorbidity or frailty. *Eur J Intern Med*. 2017; **38**:1-2.

Dean E. Multiple morbidities assessment. *Nurs Stand*. 2017; **31**(34):15.

Melis RJ, Gijzel SM, Olde Rikkert MG. Moving beyond multimorbidity as a simple count of diseases. *J Eval Clin Pract*. 2017; **23**(1):216-218.

Marengoni A, Fratiglioni L, Onder G. Improving Public Awareness of Multimorbidity. *J Am Med Dir Assoc*. 2017; **18**(5):372-373.

DeHaven MJ. Multimorbidity, chronic disease, and community health science. *J Eval Clin Pract*. 2017; **23**(1):219-221.

Cesari M, Perez-Zepeda MU, Marzetti E. Frailty and Multimorbidity: Different Ways of Thinking About Geriatrics. *J Am Med Dir Assoc*. 2017; **18**(4):361-364.

Gallo JJ. Multimorbidity and Mental Health. *Am J Geriatr Psychiatry*. 2017; **25**(5):520-521.

Villacampa-Fernandez P, Navarro-Pardo E, Tarin JJ, Cano A. Frailty and multimorbidity: Two related yet different concepts. *Maturitas*. 2017; **95**:31-35.

Sturmberg JP, Botelho RJ, Kissling B. Integrated multimorbidity management in primary care: why, what, how, and how to? *Journal of Comorbidity*. 2016; **6**:114-119.

O'Hara R, Beaudreau SA, Gould CE, Froehlich W, Kraemer HC. Handling clinical comorbidity in randomized clinical trials in psychiatry. *J Psychiatr Res*. 2017; **86**:26-33.

Payne RA. The epidemiology of polypharmacy. *Clin Med (Lond)*. 2016; **16**(5):465-469.

Rohleder N. Translating biobehavioral research advances into improvements in health care—a "network of networks" approach to multimorbidity. *J Eval Clin Pract*. 2016.

Hughes CM, Cadogan CA, Patton D, Ryan CA. Pharmaceutical strategies towards optimising polypharmacy in older people. *Int J Pharm*. 2016; **512**(2):360-365.

Dhere A. Managing complex long-term conditions and multimorbidity. *Clin Med (Lond)*. 2016; **16**(6):545-547.

Wise J. Patients with multimorbidity need longer GP consultations, says RCGP. *BMJ*. 2016; **355**:i5961.

Dean E. Multiple morbidities assessment. *Nurs Manag (Harrow)*. 2016; **23**(7):13.

Dean E. Multiple morbidities assessment. *Nurs Older People*. 2016; **28**(10):11.

Villacampa-Fernandez P, Navarro-Pardo E, Tarin JJ, Cano A. Frailty and multimorbidity: Two related yet different concepts. *Maturitas*. 2017; **95**:31-35.

Nichter M. Comorbidity: Reconsidering the Unit of Analysis. *Med Anthropol Q*. 2016; **30**(4):536-544.

Bierman AS, Tinetti ME. Precision medicine to precision care: managing multimorbidity. *Lancet*. 2016; **388**(10061):2721-2723.

Grinberg C, Hawthorne M, LaNoue M, Brenner J, Mautner D. The Core of Care Management: The Role of Authentic Relationships in Caring for Patients with Frequent Hospitalizations. *Popul Health Manag*. 2016; **19**:248-56.

Clarke JL, Bourn S, Skoufalos A, Beck EH, Castillo DJ. An Innovative Approach to Health Care Delivery for Patients with Chronic Conditions. *Popul Health Manag*. 2016.

Kennedy GJ, Castro J, Chang M, Chauhan-James J, Fishman M. Psychiatric and Medical Comorbidity in the Primary Care Geriatric Patient—An Update. *Current psychiatry reports*. 2016; **18**:62.

Xu Y, Wells PS. Getting (Along) With the Guidelines: Reconciling Patient Autonomy and Quality Improvement Through Shared Decision Making. *Acad Med*. 2016; **91**:925-9.

Rashid A. A theatrical approach to multimorbidity consultations. *Clin Teach*. 2016; **13**:305-6.

Sturmberg JP, Bennett JM, Martin CM, Picard M. 'Multimorbidity' as the manifestation of network disturbances. *J Eval Clin Pract*. 2016.

Walker C, Peterson CL. Multimorbidity: a sociological perspective of systems. *J Eval Clin Pract*. 2016.

DeHaven MJ. Multimorbidity, chronic disease, and community health science. *J Eval Clin Pract*. 2016.

Bircher J, Hahn EG. "Multimorbidity" as the manifestation of network disturbances. From nosology to the Meikirch model. *J Eval Clin Pract*. 2016.

Martin CM. What matters in "multimorbidity"? Arguably resilience and personal health experience are central to quality of life and optimizing survival. *J Eval Clin Pract*. 2016.



Ramond-Roquin A, Fortin M. Towards increased visibility of multimorbidity research. *Journal of Comorbidity*. 2016; **6**: 42–5.

Luijks HD, Lagro-Janssen ALM, van Weel C. Multimorbidity and the primary healthcare perspective. *Journal of Comorbidity*. 2016; **6**: 46–9.

Dennis S. Secondary prevention of chronic health conditions in patients with multimorbidity: what can physiotherapists do? *Journal of Comorbidity*. 2016; **6**: 50–2.

Chew-Graham CA, Rasmussen J, Maskrey N. Considering the healthcare needs of older people with multimorbidity: managing Alice. *Journal of Comorbidity*. 2016; **6**: 53–5.

Azaïs B, Bowis J, Wismar M. Facing the challenge of multimorbidity. *Journal of Comorbidity*. 2016; **6**: 1–3.

Boeckxstaens P, De Sutter A, Vaes B, Degryse JM. Should we keep on measuring multimorbidity? *J Clin Epidemiol*. 2016; **71**: 113–4.

Meschi T, Ticinesi A, Prati B, et al. A novel organizational model to face the challenge of multimorbid elderly patients in an internal medicine setting: a case study from Parma Hospital, Italy. *Intern Emerg Med*. 2016; **11**: 667–76.

Marengoni A, Melis RJ, Prados Torres A, Onder G. Multimorbidity: Epidemiology and Models of Care. *Biomed Res Int*. 2016; **2016**: 7029027.

Deccache C, Khau CA, d'Ivernois JF, de Andrade V, Gagnayre R: What therapeutic education for multimorbid psychiatric patients? *Gen Hosp Psychiatry*. 2014; **36**(6): 769.

Haslam D “You’re an expert in me”: the role of the generalist doctor in the management of patients with multimorbidity. *Journal of Comorbidity* 2015; **5**(1): 132–134.

McKee M: What do people die from? The challenges of measuring disease burden posed by multi-morbidity. *Isr J Health Policy Res*. 2015; **4**: 53.

Gray R: Transforming nurse training to address multi-morbidity: the missed opportunity of the shape of caring review. *J Psychiatr Ment Health Nurs*. 2015; **22**(9): 653–654.

Birriel TJ, Uchino R, Barry N, Butryn T, Sabol DM, Valenza PL *et al*: Adverse drug reactions in the era of multi-morbidity and polypharmacy. *J Basic Clin Pharm*. 2015; **6**(4): 122–123.

Bousquet J, Anto JM, Wickman M, Keil T, Valenta R, Haahtela T *et al*: Are allergic multimorbidities and IgE polysensitization associated with the persistence or re-occurrence of foetal type 2 signalling? The MeDALL hypothesis. *Allergy*. 2015; **70**(9): 1062–1078.

Rodriguez Perez A, Alfaro Lara ER, Nieto Martin MD, Ruiz Cantero A, Santos Ramos B: Deprescribing in patients with multimorbidity: a necessary process. *Eur J Intern Med*. 2015; **26**(7): e18–19.

Bunn F, Goodman C, Burn AM: Multimorbidity and frailty in people with dementia. *Nurs Stand*. 2015; **30**(1): 45–50.

Muth C, Glasziou PP: Guideline recommended treatments in complex patients with multimorbidity. *BMJ*. 2015; **351**: h5145.

- Moffat K, Mercer SW: Challenges of managing people with multimorbidity in today's healthcare systems. *BMC Fam Pract.* 2015; **16**(1): 129.
- Nicholson K, Terry AL, Fortin M, Williamson T, Thind A: Understanding multimorbidity in primary health care. *Can Fam Physician.* 2015; **61**(10): 918, e489-990.
- Millan E, Lopez Arbeloa G, Samper R, Carneiro M, Pocheville E, Aurrekoetxea J *et al*: Assessment of a Predictive Risk Model for Classifying Patients with Multimorbidity in the Basque Country. *Value Health.* 2015; **18**(7): A374.
- Caballer-Tarazona V, Vivas-Consuelo D, Guadalajara-Olmeda N, Clemente-Collado A: Cost Of Multimorbidity: The Influence Of Ambulatory Pharmaceutical And Hospital Expenditure. *Value Health.* 2015; **18**(7): A537.
- Valderas JM: Multimorbidity, not a health condition or complexity by another name. *Eur J Gen Pract.* 2015; **21**(4): 213-214.
- Goodman RA, Ling SM, Briss PA, Parrish RG, Salive ME, Finke BS: Multimorbidity Patterns in the United States: Implications for Research and Clinical Practice. *J Gerontol A Biol Sci Med Sci.* 2016; **71**(2): 215-220.
- van den Akker M, Gunn J, Mercer SW, Fortin M, Smith SM. Secondary analysis of data on comorbidity/multimorbidity: a call for papers. *Journal of Comorbidity.* 2015; **5**: 120–121.
- Rodriguez Perez A, Alfaro Lara ER, Nieto Martin MD, Ruiz Cantero A, Santos Ramos B. Deprescribing in patients with multimorbidity: A necessary process. *Eur J Intern Med.* Sep 2015; **26**(7): e18-19.
- Vivas-Consuelo D, Uso-Talamantes R, Trillo-Mata JL, Mendez-Valera P. Methods to control the pharmaceutical cost impact of chronic conditions in the elderly. *Expert Rev Pharmacoecon Outcomes Res.* Jun 2015; **15**(3): 425-437.
- Meranius MS, Hammar LM. How does the healthcare system affect medication self-management among older adults with multimorbidity? *Scand J Caring Sci.* Apr 28 2015.
- Fabrizi E, Zoli M, Gonzalez-Freire M, Salive ME, Studenski SA, Ferrucci L. Aging and Multimorbidity: New Tasks, Priorities, and Frontiers for Integrated Gerontological and Clinical Research. *J Am Med Dir Assoc.* Aug 1 2015; **16**(8): 640-647.
- Ng SK. A two-way clustering framework to identify disparities in multimorbidity patterns of mental and physical health conditions among Australians. *Stat Med.* May 31 2015.
- Atun R. Transitioning health systems for multimorbidity. *Lancet.* Aug 22 2015; **386**(9995): 721-722.
- Kowal P, Arokiasamy P, Afshar S, Pati S, Snodgrass JJ. Multimorbidity: health care that counts "past one" for 1.2 billion older adults. *Lancet.* Jun 6 2015; **385**(9984): 2252-2253.
- Oni T, Unwin N. Why the communicable/non-communicable disease dichotomy is problematic for public health control strategies: implications of multimorbidity for health systems in an era of health transition. *Int Health.* Jun 23 2015.
- Rashid A. A theatrical approach to multimorbidity consultations. *Clin Teach.* Jul 16 2015.

- Sinnott C, Bradley CP. Multimorbidity or polypharmacy: two sides of the same coin? *Journal of Comorbidity*. 2015; **5**: 29–31.
- Treadwell J. Coping with complexity: working beyond the guidelines for patients with multimorbidities. *Journal of Comorbidity*. 2015; **5**: 11–14.
- Bower P. Better management of multimorbidity: a critical look at the 'Ariadne principles'. *BMC Med*. 2014; **12**: 222.
- Gunn J. Designing care for people with mixed mental and physical multimorbidity. *BMJ*. 2015; **350**: h712.
- Marengoni A, Onder G. Guidelines, polypharmacy, and drug-drug interactions in patients with multimorbidity. *BMJ*. 2015; **350**: h1059.
- Onder G, Palmer K, Navickas R, et al. Time to face the challenge of multimorbidity. A European perspective from the joint action on chronic diseases and promoting healthy ageing across the life cycle (JA-CHRODIS). *Eur J Intern Med*. Apr 2015; **26**(3): 157-159.
- Peytremann-Bridevaux I, Ebert ST, Senn N. Involvement of family physicians in structured programs for chronic diseases or multi-morbidity in Switzerland. *Eur J Intern Med*. Mar 2015; **26**(2): 150-151.
- Rushton CA, Green J, Jaarsma T, Walsh P, Stromberg A, Kadam UT. The challenge of multimorbidity in nurse education: an international perspective. *Nurse Educ Today*. Jan 2015; **35**(1): 288-292.
- Banerjee S. Multimorbidity--older adults need health care that can count past one. *Lancet*. Feb 14 2015; **385**(9968): 587-589.
- O'Dowd T. Depression and multimorbidity in psychiatry and primary care. *The Journal of clinical psychiatry*. Nov 2014; **75**(11): e1319-1320.
- Stevens PE, Lamb EJ, Levin A. Integrating Guidelines, CKD, Multimorbidity, and Older Adults. *American journal of kidney diseases : the official journal of the National Kidney Foundation*. Mar 2015; **65**(3): 494-501.
- Miller D, Steele Gray C, Kuluski K, Cott C. Patient-Centered Care and Patient-Reported Measures: Let's Look Before We Leap. *Patient*. Oct 30 2014.
- Sturmberg JP. Multimorbidity and chronic disease: an emergent perspective. *J Eval Clin Pract*. Aug 2014; **20**(4): 508-512.
- van den Brink AM, Gerritsen DL, Oude Voshaar RC, Koopmans RT. Patients with mental-physical multimorbidity: do not let them fall by the wayside. *Int Psychogeriatr*. Oct 2014; **26**(10): 1585-1589.
- Divo MJ, Martinez CH, Mannino DM. Ageing and the epidemiology of multimorbidity. *Eur Respir J*. Oct 2014; **44**(4): 1055-1068.
- Drazen JM, Fabbri LM. Ageing and multimorbidity. *Eur Respir J*. Sep 2014; **44**(3): 557.
- Posner SF, Goodman RA. Multimorbidity at the local level: implications and research directions. *Mayo Clin Proc* 67(2): 144-57. Oct 2014; **89**(10): 1321-1323.
- Lindquist LA, Covinsky K, Langa KM, Petty BG, Williams BC, Kutner JS. Making general internal medicine research relevant to the older patient with multiple chronic comorbidities. *J Gen Intern Med*. Jun 2014; **29**(6): 915-919.

Parekh AK, Meyers DS. The Strategic Framework on Multiple Chronic Conditions. *Med Care*. Mar 2014;**52** Suppl 3:S1-2.

Leroy L, Bayliss E, Domino M, Miller BF, Rust G, Gerteis J, Miller T. The Agency for Healthcare Research and Quality Multiple Chronic Conditions Research Network: overview of research contributions and future priorities. *Med Care*. Mar 2014;**52** Suppl 3:S15-22.

Tinetti ME, Basu J. Research on multiple chronic conditions: where we are and where we need to go. *Med Care*. Mar 2014;**52** Suppl 3:S3-6.

AHRO updates on primary care research: raising awareness about caring for patients with multiple chronic conditions. *Ann Fam Med*. Mar-Apr 2014;**12**(2):177-178.

Radner H, Yoshida K, Smolen JS, Solomon DH. Multimorbidity and rheumatic conditions-enhancing the concept of comorbidity. *Nat Rev Rheumatol*. Apr 2014;**10**(4):252-256.

Boyd CM, Kent DM. Evidence-based medicine and the hard problem of multimorbidity. *J Gen Intern Med*. Apr 2014;**29**(4):552-553.

Richardson WS, Doster LM. Comorbidity and multimorbidity need to be placed in the context of a framework of risk, responsiveness, and vulnerability. *J Clin Epidemiol*. Mar 2014;**67**(3):244-246.

Covinsky KE. Multimorbidity, guidelines, and clinical inertia. *JAMA Intern Med*. May 2014;**174**(5):819.

Sturmberg JP. Multimorbidity and chronic disease: an emergent perspective. *J Eval Clin Pract*. Apr 5 2014.

Sturmberg J, Lanham HJ. Understanding health care delivery as a complex system: Achieving best possible health outcomes for individuals and communities by focusing on interdependencies. *J Eval Clin Pract*. May 5 2014.

Murphy ME, Glynn L, Murphy AW. General practice, multimorbidity and evidence based policy making: a key challenge. *Ir Med J*. Apr 2014;**107**(4):125.

Rushton CA, Green J, Jaarsma T, Walsh P, Stromberg A, Kadam UT. The challenge of multimorbidity in nurse education: An international perspective. *Nurse Educ Today*. May 29 2014.

Genuis SJ. Pandemic of idiopathic multimorbidity. *Can Fam Physician*. Jun 2014;**60**(6):511-514.

Lindquist LA, Covinsky K, Langa KM, Petty BG, Williams BC, Kutner JS. Making General Internal Medicine Research Relevant to the Older Patient with Multiple Chronic Comorbidities. *J Gen Intern Med*. Feb 21 2014.

Uhlig K, Leff B, Kent D, Dy S, Brunnhuber K, Burgers JS, Greenfield S, Guyatt G, High K, Leipzig R, Mulrow C, Schmader K, Schunemann H, Walter LC, Woodcock J, Boyd CM. A Framework for Crafting Clinical Practice Guidelines that are Relevant to the Care and Management of People with Multimorbidity. *J Gen Intern Med*. Jan 18 2014.

Weiss CO, Varadhan R, Puhan MA, Vickers A, Bandeen-Roche K, Boyd CM, Kent DM. Multimorbidity and Evidence Generation. *J Gen Intern Med*. Jan 18 2014.

Trikalinos TA, Segal JB, Boyd CM. Addressing Multimorbidity in Evidence Integration and Synthesis. *J Gen Intern Med*. Jan 18 2014.

Schulze T, Maercker A, Horn AB. Mental Health and Multimorbidity: Psychosocial Adjustment as an Important Process for Quality of Life. *Gerontology*. Feb 28 2014.

Martin M, Battegay E, Rocke C. Editorial: Quality of Life in Multimorbidity. *Gerontology*. Feb 28 2014.

Saxe JM, Smith V, McNerney K. Chronic Pain Perspectives: A blueprint to managing multiple chronic conditions and pain. *J Fam Pract*. Dec 2013; **62**(12 Suppl 1):S4-S11.

Marengoni A. Guidelines for elderly patients with multimorbidity: how to cope with a dark night without fear. *Aging Clin Exp Res*. Dec 2013; **25**(6):703-705.

Harrison C, Britt H, Miller G, Henderson J. Multimorbidity. *Aust Fam Physician*. Dec 2013; **42**(12):845.

Harris MF, Dennis S, Pillay M. Multimorbidity - Negotiating priorities and making progress. *Aust Fam Physician*. Dec 2013; **42**(12):850-854.

Ceramidas DM, Glasgow NJ. Multi-morbidity: a system design challenge in delivering patient-centred care. *Aust Health Rev*. Jun 2013; **37**(3):309-311.

Reeve J, Blakeman T, Freeman GK, et al. Generalist solutions to complex problems: generating practice-based evidence--the example of managing multi-morbidity. *BMC Fam Pract*. 2013; **14**:112.

Roland M, Paddison C. Better management of patients with multimorbidity. *BMJ*. 2013; **346**:f2510

Langan J, Mercer SW, Smith DJ. Multimorbidity and mental health: can psychiatry rise to the challenge? *British Journal of Psychiatry*. Jun 2013; **202**:391-393.

Rudland S, Macey N. Value of a well organised team approach in primary care in managing patients with multimorbidity. *BMJ*. 2013; **346**:f3555.

Ritchie CS, Zulman DM. Research priorities in geriatric palliative care: multimorbidity. *J Palliat Med*. Aug 2013; **16**(8):843-847.

Ording AG, Sorensen HT. Concepts of comorbidities, multiple morbidities, complications, and their clinical epidemiologic analogs. *Clin Epidemiol*. 2013; **5**:199-203.

Marengoni A. Guidelines for elderly patients with multimorbidity: how to cope with a dark night without fear. *Aging Clin Exp Res*. Jul 26 2013.

Capobianco E, Lio P. Comorbidity: a multidimensional approach. *Trends Mol Med*. Sep 2013; **19**(9):515-521.

Shadmi E. Multimorbidity and equity in health. *Int J Equity Health*. Aug 20 2013; **12**(1):59.

Jakovljevic M, Ostojic L. Comorbidity and multimorbidity in medicine today: challenges and opportunities for bringing separated branches of medicine closer to each other. *Psychiatr Danub*. Jun 2013; **25** Suppl 1:18-28.

Wallace RB, Salive ME. The dimensions of multiple chronic conditions: where do we go from here? A commentary on the special issue of preventing chronic disease. *Prev Chronic Dis*. 2013; **10**:E59.

de Souto Barreto P, Vellas B, Morley JE, Rolland Y. The nursing home population: an opportunity to make advances on research on multimorbidity and polypharmacy. *J Nutr Health Aging*. Apr 2013; **17**(4):399-400.

Thomason C. Changes needed to cope with multimorbidity. *Nurs Times*. Mar 12-18 2013; **109**(10):32.

- Salisbury C. Multimorbidity: time for action rather than words. *Br J Gen Pract.* Feb 2013; **63**(607):64-65.
- Sturmberg JP. Caring for people with chronic disease: is 'muddling through' the best way to handle the multiple complexities? *J Eval Clin Pract.* Dec 2012; **18**(6): 1220-1225.
- Mercer SW, Gunn J, Bower P, Wyke S, Guthrie B. Managing patients with mental and physical multimorbidity. *BMJ.* 2012; **345**:e5559.
- Burge F, Lawson B, Mitchell G. How to move to a palliative approach to care for people with multimorbidity. *BMJ.* 2012; **345**:e6324.
- Kadam U. Redesigning the general practice consultation to improve care for patients with multimorbidity. *BMJ.* 2012; **345**:e6202.
- Haggerty JL. Ordering the chaos for patients with multimorbidity. *BMJ.* 2012; **345**:e5915.
- Guthrie B, Payne K, Alderson P, McMurdo ME, Mercer SW. Adapting clinical guidelines to take account of multimorbidity. *BMJ.* 2012; **345**:e6341.
- Sturmberg JP. Caring for people with chronic disease: is 'muddling through' the best way to handle the multiple complexities? *J Eval Clin Pract.* Jul 30 2012.
- Salisbury C. Multimorbidity: redesigning health care for people who use it. *Lancet.* Jul 7 2012; **380**(9836):7-9.
- Hawkes N. Better training is needed to deal with increasing multimorbidity. *BMJ.* 2012; **344**:e3336.
- Mangin D, Heath I, Jamouille M. Beyond diagnosis: rising to the multimorbidity challenge. *BMJ.* 2012; **344**:e3526.
- Mercer SW, Guthrie B, Furler J, Watt GC, Hart JT. Multimorbidity and the inverse care law in primary care. *BMJ.* 2012; **344**:e4152.
- De Maeseneer J, Boeckxstaens P. James Mackenzie Lecture 2011: multimorbidity, goal-oriented care, and equity. *Br J Gen Pract.* Jul 2012; **62**(600):e522-524.
- Tinetti ME, Fried TR, Boyd CM. Designing health care for the most common chronic condition--multimorbidity. *JAMA.* Jun 20 2012; **307**(23):2493-2494.
- Shepherd DJ. We need a system that accounts for multimorbidity at practice level. *BMJ.* 2012; **345**:e5464.
- Kamerow D. How can we treat multiple chronic conditions? *BMJ.* 2012; **344**:e1487.
- Goodman RA, Parekh AK, Koh HK. Toward a more cogent approach to the challenges of multimorbidity. *Ann Fam Med.* Mar-Apr 2012; **10**(2):100-101.
- Valderas JM, Mercer SW, Fortin M. Research on patients with multiple health conditions: different constructs, different views, one voice. *Journal of Comorbidity.* 2011; **1**:1-3.
- Mercer SW, Gunn J, Wyke S. Improving the health of people with multimorbidity: the need for prospective cohort studies. *Journal of Comorbidity.* 2011; **1**:4-7.
- Caughey GE, Roughead EE. Multimorbidity research challenges: where to go from here? *Journal of Comorbidity.* 2011; **1**:8-10.
- Tinetti, M.E. and S.A. Studenski. Comparative effectiveness research and patients with multiple chronic conditions. *N Engl J Med.* 2011. **364**(26): p. 2478-81.

Starfield B. Challenges to primary care from co- and multi-morbidity. *Prim Health Care Res Dev* 2011; **12**:1-2.

Cheng LI, Oladapo A, Rascati KL. The need for validation studies of comorbidity adjustment instruments. *Clin Ther.* 2009; **31**(7): 1578-80.

Cassil A. Rising rates of chronic health conditions: what can be done?. *Issue Brief Cent Stud Health Syst Change.* 2008 Nov; (125):1-4.

Michel JP, Pautex S, Apro M, Zulian G. Frail old patients as a target population for cancer trials. *J Nutr Health Aging.* 2009 Jan; **13**(1): 31-3.

Mercer SW, Smith SM, Wyke S, O'Dowd T, Watt GC. Multimorbidity in primary care: developing the research agenda. *Fam Pract.* 2009 Apr; **26**(2): 79-80.

Montague, T. J., A. Gogovor, et al. "Time for chronic disease care and management." *Canadian Journal of Cardiology* 2007. **23**(12): 971-5.

Norris, S. L., K. High, et al. "Health care for older Americans with multiple chronic conditions: a research agenda." *Journal of the American Geriatrics Society* 2008. **56**(1): 149-59.

Starfield, B. "Global health, equity, and primary care." *Journal of the American Board of Family Medicine: JABFM* 2007. **20**(6): 511-3.

Weiss, K. B. "Managing complexity in chronic care: an overview of the VA state-of-the-art (SOTA) conference." *Journal of General Internal Medicine* 2007. **22** Suppl 3: 374-8.

Clarke LH, Griffin M; PACC Research Team. Failing bodies: body image and multiple chronic conditions in later life. *Qual Health Res.* 2008 Aug; **18**(8): 1084-95.

Bayliss, E.A. Continuity of care in a changing health care system. Invited commentary. *Ann Fam Med* 2004; **2**: TRACK comments. 2004 [cited November 29, 2005]; Available from: [www.AnnFamMed.org](http://www.AnnFamMed.org).

Bayliss, E.A. Expanding our knowledge about processes of care for persons with multimorbidities. Invited commentary. *Ann Fam Med* 2005; **3**: TRACK comments. 2005 [cited November 29, 2005]; Available from: [www.AnnFamMed.org](http://www.AnnFamMed.org).

Bayliss, E.A., Proposals for US National Health Insurance. [Letter]. *JAMA*, 2003. **290**: p. 2799.

Bernardi, D., et al., Comprehensive geriatric evaluation in elderly patients with lymphoma: feasibility of a patient-tailored treatment plan. [comment]. p. 754; author reply 755, 2003 Feb 15.

Bodenheimer, T., Disease management: promises and pitfalls. *N Engl J Med*, 1999. **340**: p. 1202-5.

Grumbach, K., Chronic illness, comorbidities, and the need for medical generalism. *Annals of Family Medicine*, 2003. **1**: p. 4-7.

Huyse, F.J., Integration of psychiatric and physical health. *British Journal of Psychiatry*, 2005. **186**: p. 263-4.

Saltman, D., Comorbidities in general practice. *Australian Family Physician*, 2004. **33**(4): p. 197.

Stange, K.C., The paradox of the parts and the whole in understanding and improving general practice. *Int J Qual Health Care*, 2002. **14**: p. 267-8.

Stange K. C., P.W.R., Acheson L. S., Crabtree B. F., Zyzanski S. J., Miller W. L., Gotler R. S., Welcome to the Annals of Family Medicine. *Ann Fam Med*, 2003. **1**: p. 2-4.

Starfield, B., Primary care visits and health policy. *CMAJ Canadian Medical Association Journal*, 1998. **159**(7): p. 795-6.

Summerskill, W., Evidence-based practice and the individual. *Lancet*, 2005. **365**: p. 13-14.

Weingart, S.N., et al., Epidemiology of medical error. *BMJ*, 2000. **320**: p. 774-7.

Wright, N., L. Smeeth, and I. Heath, Moving beyond single and dual diagnosis in general practice: many patients have multiple morbidities, and their needs have to be addressed. *BMJ*, 2003. **326**: p. 512-4.

## 7. QUALITATIVE RESEARCH

Knowles S, Hays R, Senra H, et al. Empowering people to help speak up about safety in primary care: Using codesign to involve patients and professionals in developing new interventions for patients with multimorbidity. *Health Expect*. 2017.

Schoenborn NL, Cayea D, McNabney M, Ray A, Boyd C. Prognosis communication with older patients with multimorbidity: Assessment after an educational intervention. *Gerontol Geriatr Educ*. 2017; **38**(4):471-481.

Pagones R, Lee JL, Hurst S. Long-Term Acupuncture Therapy for Low-Income Older Adults with Multimorbidity: A Qualitative Study of Patient Perceptions. *J Altern Complement Med*. 2017.

Schiotz ML, Host D, Christensen MB, et al. Quality of care for people with multimorbidity - a case series. *BMC Health Serv Res*. 2017; **17**(1): 745.

Hays R, Daker-White G, Esmail A, et al. Threats to patient safety in primary care reported by older people with multimorbidity: baseline findings from a longitudinal qualitative study and implications for intervention. *BMC Health Serv Res*. 2017; **17**(1): 754.

Vermunt NP, Harmsen M, Elwyn G, et al. A three-goal model for patients with multimorbidity: A qualitative approach. *Health Expect*. 2017.

O'Malley AS, Sarwar R, Keith R, Balke P, Ma S, McCall N. Provider Experiences with Chronic Care Management (CCM) Services and Fees: A Qualitative Research Study. *J Gen Intern Med*. 2017; **32**(12):1294-1300.

Lim CY, Berry ABL, Hirsch T, et al. Understanding What Is Most Important to Individuals with Multiple Chronic Conditions: A Qualitative Study of Patients' Perspectives. *J Gen Intern Med*. 2017; **32**(12):1278-1284.



Ho JW, Kuluski K, Im J. "It's a fight to get anything you need" - Accessing care in the community from the perspectives of people with multimorbidity. *Health Expect*. 2017; **20**(6):1311-1319.

Christensen LD, Petersen J, Andersen O, Kaae S. Physicians' Non-Uniform Approach to Prescribing Drugs to Older Patients - A Qualitative Study. *Basic Clin Pharmacol Toxicol*. 2017; **121**(6):505-511.

Kristensen MAT, Holge-Hazelton B, Waldorff FB, Guassora AD. How general practitioners perceive and assess self-care in patients with multiple chronic conditions: a qualitative study. *BMC Fam Pract*. 2017; **18**(1):109

Runz-Jørgensen SM, Schiøtz ML, Christensen U. Perceived value of eHealth among people living with multimorbidity: a qualitative study. *Journal of Comorbidity*. 2017; **7**:96–111

McKinlay EM, Morgan SJ, Gray BV, Macdonald LM, Pullon SRH. Exploring interprofessional, interagency multimorbidity care: case study based observational research. *Journal of Comorbidity*. 2017; **7**:64–78

Signal L, Semper K, Stairmand J, et al. A walking stick in one hand and a chainsaw in the other: patients' perspectives of living with multimorbidity. *N Z Med J*. 2017; **130**(1455):65-76

Ho JW, Kuluski K, Im J. "It's a fight to get anything you need" - Accessing care in the community from the perspectives of people with multimorbidity. *Health Expect*. 2017. doi: 10.1111/hex.12571.

Larsen A, Broberger E, Petersson P. Complex caring needs without simple solutions: the experience of interprofessional collaboration among staff caring for older persons with multimorbidity at home care settings. *Scand J Caring Sci*. 2017; **31**(2):342-350. doi: 10.1111/scs.12352.

Portalupi LB, Lewis CL, Miller CD, et al. Developing a patient and family research advisory panel to include people with significant disease, multimorbidity and advanced age. *Fam Pract*. 2017; **34**(3):364-369. doi: 10.1093/fampra/cmw138.

Leijten FRM, Struckmann V, van Ginneken E, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. *Health Policy*. 2017. doi: 10.1016/j.healthpol.2017.06.002.

Rosbach M, Andersen JS. Patient-experienced burden of treatment in patients with multimorbidity - A systematic review of qualitative data. *PLoS One*. 2017; **12**(6):e0179916. doi: 10.1371/journal.pone.0179916.

Bennett WL, Robbins CW, Bayliss EA, et al. Engaging Stakeholders to Inform Clinical Practice Guidelines That Address Multiple Chronic Conditions. *J Gen Intern Med*. 2017; **32**(8):883-890. doi: 10.1007/s11606-017-4039-5.

Lim CY, Berry ABL, Hirsch T, et al. Understanding What Is Most Important to Individuals with Multiple Chronic Conditions: A Qualitative Study of Patients' Perspectives. *J Gen Intern Med*. 2017. doi: 10.1007/s11606-017-4154-3.

van Dongen JJ, de Wit M, Smeets HW, Stoffers E, van Bokhoven MA, Daniels R. "They Are Talking About Me, but Not with Me": A Focus Group Study to Explore the Patient Perspective on Interprofessional Team Meetings in Primary Care. *Patient*. 2017.

Peacock S, Sethi B, Williams A, et al. Older Adult Spouses with Multiple Chronic Conditions: Challenges, Rewards, and Coping Strategies. *Can J Aging*. 2017;**36**(2):209-222.

Bennett WL, Robbins CW, Bayliss EA, et al. Engaging Stakeholders to Inform Clinical Practice Guidelines That Address Multiple Chronic Conditions. *J Gen Intern Med*. 2017.

Ploeg J, Matthew-Maich N, Fraser K, et al. Managing multiple chronic conditions in the community: a Canadian qualitative study of the experiences of older adults, family caregivers and healthcare providers. *BMC Geriatr*. 2017;**17**(1):40.

Sinnott C, Byrne M, Bradley CP. Improving medication management for patients with multimorbidity in primary care: a qualitative feasibility study of the MY COMRADE implementation intervention. *Pilot Feasibility Stud*. 2017;**3**:14.

Stokes T, Tumilty E, Doolan-Noble F, Gauld R. Multimorbidity, clinical decision making and health care delivery in New Zealand Primary care: a qualitative study. *BMC Fam Pract*. 2017;**18**(1):51.

Slightam CA, Brandt K, Jenchura EC, Lewis ET, Asch SM, Zulman DM. "I had to change so much in my life to live with my new limitations": Multimorbid patients' descriptions of their most bothersome chronic conditions. *Chronic Illn*. 2017:1742395317699448.

Meranius MS, Josefsson K. Health and social care management for older adults with multimorbidity: a multiperspective approach. *Scand J Caring Sci*. 2017;**31**(1):96-103.

Mc Namara KP, Breken BD, Alzubaidi HT, et al. Health professional perspectives on the management of multimorbidity and polypharmacy for older patients in Australia. *Age Ageing*. 2017;**46**(2):291-299.

Boeckxstaens P, Willems S, Lanssens M, et al. A qualitative interpretation of challenges associated with helping patients with multiple chronic diseases identify their goals. *Journal of Comorbidity*. 2016;**6**:120–126.

Mc Namara KP, Breken BD, Alzubaidi HT, et al. Health professional perspectives on the management of multimorbidity and polypharmacy for older patients in Australia. *Age Ageing*. 2016.

Prazeres F, Santiago L. The Knowledge, Awareness, and Practices of Portuguese General Practitioners Regarding Multimorbidity and its Management: Qualitative Perspectives from Open-Ended Questions. *Int J Environ Res Public Health*. 2016;**13**(11).

Yuen HK, Vogtle LK. Multi-morbidity, disability and adaptation strategies among community-dwelling adults aged 75 years and older. *Disabil Health J.* 2016; **9**(4):593-599.

DiNapoli EA, Cinna C, Whiteman KL, Fox L, Appelt CJ, Kasckow J. Mental health treatment preferences and challenges of living with multimorbidity from the veteran perspective. *Int J Geriatr Psychiatry.* 2016; **31**(10):1097-1104.

van Summeren JJ, Haaijer-Ruskamp FM, Schuling J. Eliciting Preferences of Multimorbid Elderly Adults in Family Practice Using an Outcome Prioritization Tool. *J Am Geriatr Soc.* 2016; **64**(11):e143-e148.

Schiøtz ML, Høst D, Frølich A. Involving patients with multimorbidity in service planning: perspectives on continuity and care coordination. *Journal of Comorbidity.* 2016; **6**: 95–102.

Bayliss EA, McQuillan DB, Ellis JL, et al. Using Electronic Health Record Data to Measure Care Quality for Individuals with Multiple Chronic Medical Conditions. *J Am Geriatr Soc.* 2016; **64**:1839-44.

Mallow JA, Theeke LA, Theeke E, Mallow BK. Using Multidisciplinary Focus Groups to Inform the Development of mI SMART: A Nurse-Led Technology Intervention for Multiple Chronic Conditions. *Nurs Res Pract.* 2016; **2016**:7416728.

Lyles CR, Altschuler A, Chawla N, et al. User-Centered Design of a Tablet Waiting Room Tool for Complex Patients to Prioritize Discussion Topics for Primary Care Visits. *JMIR Mhealth Uhealth.* 2016; **4**:e108.

Boehmer KR, Hargraves IG, Allen SV, Matthews MR, Maher C, Montori VM. Meaningful conversations in living with and treating chronic conditions: development of the ICAN discussion aid. *BMC Health Serv Res.* 2016; **16**:514.

Steele Gray C, Khan AI, Kuluski K, et al. Improving Patient Experience and Primary Care Quality for Patients With Complex Chronic Disease Using the Electronic Patient-Reported Outcomes Tool: Adopting Qualitative Methods Into a User-Centered Design Approach. *JMIR research protocols.* 2016; **5**:e28.

DiNapoli EA, Cinna C, Whiteman KL, Fox L, Appelt CJ, Kasckow J. Mental health treatment preferences and challenges of living with multimorbidity from the veteran perspective. *Int J Geriatr Psychiatry.* 2016; **31**:1097-104.

Larsen A, Broberger E, Petersson P. Complex caring needs without simple solutions: the experience of interprofessional collaboration among staff caring for older persons with multimorbidity at home care settings. *Scand J Caring Sci.* 2016.

Clyne B, Cooper JA, Hughes CM, Fahey T, Smith SM, team O-Ss. 'Potentially inappropriate or specifically appropriate?' Qualitative evaluation of general practitioners views on prescribing, polypharmacy and potentially inappropriate prescribing in older people. *BMC Fam Pract.* 2016; **17**:109.

de Vos A, Cramm JM, van Wijngaarden JD, Bakker TJ, Mackenbach JP, Nieboer AP. Understanding implementation of comprehensive geriatric care programs: a multiple perspective approach is preferred. *Int J Health Plann Manage*. 2016.

Meranius MS, Josefsson K. Health and social care management for older adults with multimorbidity: a multiperspective approach. *Scand J Caring Sci*. 2016.

Fried TR, Niehoff K, Tjia J, Redeker N, Goldstein MK. A Delphi process to address medication appropriateness for older persons with multiple chronic conditions. *BMC Geriatr*. 2016; **16**:67.

Meranius MS, Hammar LM. How does the healthcare system affect medication self-management among older adults with multimorbidity? *Scand J Caring Sci*. 2016; **30**:91-8.

Mason B, Nanton V, Epiphaniou E, et al. 'My body's falling apart.' Understanding the experiences of patients with advanced multimorbidity to improve care: serial interviews with patients and carers. *BMJ Support Palliat Care*. 2016; **6**:60-5.

White C, Lentin P, Farnworth L. Multimorbidity and the process of living with ongoing illness. *Chronic Illn*. 2016; **12**:83-97.

Schoenborn NL, Cayea D, McNabney M, Ray A, Boyd C. Prognosis Communication with Older Patients with Multimorbidity: Assessment after an Educational Intervention. *Gerontol Geriatr Educ*. 2016.

Ailabouni NJ, Nishtala PS, Mangin D, Tordoff JM. General practitioners' insight into deprescribing for the multimorbid older individual: a qualitative study. *Int J Clin Pract*. 2016; **70**:261-76.

Lindvall A, Kristensson J, Willman A, Holst G. Informal Care Provided by Family Caregivers: Experiences of Older Adults With Multimorbidity. *J Gerontol Nurs* 24(12):34-40. 2016; **42**:24-31.

Reed RL, Isherwood L, Ben-Tovim D: Why do older people with multi-morbidity experience unplanned hospital admissions from the community: a root cause analysis. *BMC Health Serv Res*. 2015; **15**(1):525.

Hjelm M, Holst G, Willman A, Bohman D, Kristensson J: The work of case managers as experienced by older persons (75+) with multi-morbidity - a focused ethnography. *BMC Geriatr*. 2015; **15**:168.

Cottrell E, Yardley S: Lived experiences of multimorbidity: An interpretative meta-synthesis of patients', general practitioners' and trainees' perceptions. *Chronic Illn*. 2015; **11**(4):279-303.

Zhou Y, Lundy JM, Humphris G, Mercer SW: Do multimorbidity and deprivation influence patients' emotional expressions and doctors' responses in primary care consultations?-- An exploratory study using multilevel analysis. *Patient Educ Couns*. 2015; **98**(9):1063-1070.

- Summer Meranius M, Engstrom G: Experience of self-management of medications among older people with multimorbidity. *J Clin Nurs*. 2015; **24**(19-20):2757-2764.
- Loeb DF, Binswanger IA, Candrian C, Bayliss EA: Primary care physician insights into a typology of the complex patient in primary care. *Ann Fam Med*. 2015; **13**(5):451-455.
- McKinlay E, Graham S, Horrill P: Culturally and linguistically diverse patients' views of multimorbidity and general practice care. *J Prim Health Care*. 2015; **7**(3):228-235.
- White C, Lentin P, Farnworth L: Multimorbidity and the process of living with ongoing illness. *Chronic Illn*. 2015.
- Eckerblad J, Theander K, Ekdahl A, Jaarsma T, Hellstrom I: To adjust and endure: a qualitative study of symptom burden in older people with multimorbidity. *Appl Nurs Res*. 2015; **28**(4):322-327.
- Procter S, Stewart K, Reeves D, Bowen L, Purdy S, Ridd M, Salisbury C. Complex consultations in primary care: a tool for assessing the range of health problems and issues addressed in general practice consultations. *BMC Fam Pract*. 2014; **15**:105.
- Ancker JS, Witteman HO, Hafeez B, Provencher T, Van de Graaf M, Wei E. The invisible work of personal health information management among people with multiple chronic conditions: qualitative interview study among patients and providers. *J Med Internet Res*. 2015; **17**(6):e137.
- Zulman DM, Jenchura EC, Cohen DM, Lewis ET, Houston TK, Asch SM. How Can eHealth Technology Address Challenges Related to Multimorbidity? Perspectives from Patients with Multiple Chronic Conditions. *J Gen Intern Med*. Aug 2015; **30**(8):1063-1070.
- Kuluski K, Tracy CS, Upshur RE. Perceived risk factors of health decline: a qualitative study of hospitalized patients with multimorbidity. *Risk Manag Healthc Policy*. 2015; **8**:63-72.
- Hansen H, Pohontsch N, van den Bussche H, Scherer M, Schafer I. Reasons for disagreement regarding illnesses between older patients with multimorbidity and their GPs - a qualitative study. *BMC Fam Pract*. 2015; **16**:68.
- Zhou Y, Lundy JM, Humphris G, Mercer SW. Do multimorbidity and deprivation influence patients' emotional expressions and doctors' responses in primary care consultations? - An exploratory study using multilevel analysis. *Patient Educ Couns*. Sep 2015; **98**(9):1063-1070.
- Sondergaard E, Willadsen TG, Guassora AD, et al. Problems and challenges in relation to the treatment of patients with multimorbidity: General practitioners' views and attitudes. *Scand J Prim Health Care*. Jun 2015; **33**(2):121-126.
- Summer Meranius M, Engstrom G. Experience of self-management of medications among older people with multimorbidity. *J Clin Nurs*. Oct 2015; **24**(19-20):2757-2764.

Schoenborn NL, Boyd CM, McNabney M, Ray A, Cayea D. Current Practices and Opportunities in a Resident Clinic Regarding the Care of Older Adults with Multimorbidity. *J Am Geriatr Soc*. Aug 2015; **63**(8):1645-1651.

Tarrant C, Windridge K, Baker R, Freeman G, Boulton M. 'Falling through gaps': primary care patients' accounts of breakdowns in experienced continuity of care. *Fam Pract*. Feb 2015; **32**(1):82-87.

Eton DT, Ridgeway JL, Egginton JS, et al. Finalizing a measurement framework for the burden of treatment in complex patients with chronic conditions. *Patient Relat Outcome Meas*. 2015; **6**:117-126.

Gross CP, Fried TR, Tinetti ME, et al. Decision-making and cancer screening: A qualitative study of older adults with multiple chronic conditions. *Journal of geriatric oncology*. Mar 2015; **6**(2):93-100.

Zulman DM, Jenchura EC, Cohen DM, Lewis ET, Houston TK, Asch SM. How Can eHealth Technology Address Challenges Related to Multimorbidity? Perspectives from Patients with Multiple Chronic Conditions. *J Gen Intern Med*. Feb 18 2015.

Sinnott C, Hugh SM, Boyce MB, Bradley CP. What to give the patient who has everything? A qualitative study of prescribing for multimorbidity in primary care. *Br J Gen Pract*. Mar 2015; **65**(632):e184-191.

Cottrell E, Yardley S. Lived experiences of multimorbidity: An interpretative meta-synthesis of patients', general practitioners' and trainees' perceptions. *Chronic Illn*. Mar 12 2015.

Steele Gray C, Miller D, Kuluski K, Cott C. Tying eHealth Tools to Patient Needs: Exploring the Use of eHealth for Community-Dwelling Patients With Complex Chronic Disease and Disability. *JMIR research protocols*. 2014; **3**(4):e67.

Voils CI, Sleath B, Maciejewski ML. Patient perspectives on having multiple versus single prescribers of chronic disease medications: results of a qualitative study in a veteran population. *BMC Health Serv Res*. Oct 25 2014; **14**(1):490.

Coventry PA, Dickens C, Todd C. How does mental-physical multimorbidity express itself in lived time and space? A phenomenological analysis of encounters with depression and chronic physical illness. *Soc Sci Med*. Oct 2014; **118**:108-118.

Wensing M, Huntink E, van Lieshout J, Godycki-Cwirko M, Kowalczyk A, Jager C, Steinhauser J, Aakhus E, Flottorp S, Eccles M, Baker R. Tailored implementation of evidence-based practice for patients with chronic diseases. *PLoS One*. 2014; **9**(7):e101981.

Coventry PA, Fisher L, Kenning C, Bee P, Bower P. Capacity, responsibility, and motivation: a critical qualitative evaluation of patient and practitioner views about barriers to self-management in people with multimorbidity. *BMC Health Serv Res*. Oct 31 2014; **14**(1):536.

Clarke LH, Bennett EV, Korotchenko A. Negotiating vulnerabilities: how older adults with multiple chronic conditions interact with physicians. *Can J Aging*. Mar 2014; **33**(1):26-37.

Bayliss EA, Bonds DE, Boyd CM, Davis MM, Finke B, Fox MH, Glasgow RE, Goodman RA, Heurtin-Roberts S, Lachenmayr S, Lind C, Madigan EA, Meyers DS, Mintz S, Nilsen WJ, Okun S, Ruiz S, Salive ME, Stange KC. Understanding the context of health for persons

with multiple chronic conditions: moving from what is the matter to what matters. *Ann Fam Med*. May-Jun 2014; **12**(3):260-269.

Ridgeway JL, Egginton JS, Tiedje K, Linzer M, Boehm D, Poplau S, de Oliveira DR, Odell L, Montori VM, Eton DT. Factors that lessen the burden of treatment in complex patients with chronic conditions: a qualitative study. *Patient Prefer Adherence*. 2014; **8**:339-351.

Gill A, Kuluski K, Jaakkimainen L, Naganathan G, Upshur R, Wodchis WP. "Where Do We Go from Here?" Health System Frustrations Expressed by Patients with Multimorbidity, Their Caregivers and Family Physicians. *Healthc Policy*. May 2014; **9**(4):73-89.

Ong BN, Richardson JC, Porter T, Grime J. Exploring the relationship between multimorbidity, resilience and social connectedness across the lifecourse. *Health (London)*. Aug 28 2013.

Vos HM, Bor HH, Rangelrooij-Minkels MJ, Schellevis FG, Lagro-Janssen AL. Multimorbidity in older women: the negative impact of specific combinations of chronic conditions on self-rated health. *Eur J Gen Pract*. Jun 2013; **19**(2):117-122.

Mc Sharry J, Bishop FL, Moss-Morris R, Kendrick T. 'The chicken and egg thing': cognitive representations and self-management of multimorbidity in people with diabetes and depression. *Psychol Health*. 2013; **28**(1):103-119.

Walker C. Multiple conditions: exploring literature from the consumer perspective in Australia. *Health Expectations*. Oct 11 2012.

Grundberg A, Ebbeskog B, Dahlgren MA, Religa D. How community-dwelling seniors with multimorbidity conceive the concept of mental health and factors that may influence it: A phenomenographic study. *Int J Qual Stud Health Well-being*. 2012; **7**:1-13.

Newbould J, Burt J, Bower P, et al. Experiences of care planning in England: interviews with patients with long term conditions. *BMC Fam Pract*. 2012; **13**:71.

Junius-Walker U, Wrede J, Schleef T, et al. What is important, what needs treating? How GPs perceive older patients' multiple health problems: a mixed method research study. *BMC Res Notes*. Aug 16 2012; **5**(1):443.

Loffler C, Kaduszkiewicz H, Stolzenbach CO, et al. Coping with multimorbidity in old age - a qualitative study. *BMC Fam Pract*. 2012; **13**:45.

Ekdahl AW, Hellstrom I, Andersson L, Friedrichsen M. Too complex and time-consuming to fit in! Physicians' experiences of elderly patients and their participation in medical decision making: a grounded theory study. *BMJ Open*. 2012; **2**(3).

Schuling J, Gebben H, Veehof LJ, Haaijer-Ruskamp FM. Deprescribing medication in very elderly patients with multimorbidity: the view of Dutch GPs. A qualitative study. *BMC Fam Pract*. 2012; **13**:56.

Luijckx HD, Loeffen MJ, Lagro-Janssen AL, van Weel C, Lucassen PL, Schermer TR. GPs' considerations in multimorbidity management: a qualitative study. *Br J Gen Pract*. Jul 2012; **62**(600):e503-510.

Stanners MN, Barton CA, Shakib S, Winefield HR. A qualitative investigation of the impact of multimorbidity on GP diagnosis and treatment of depression in Australia. *Aging Ment Health*. Jul 27 2012.

Wrede J, Voigt I, Bleidorn J, Hummers-Pradier E, Dierks ML, Junius-Walker U. Complex health care decisions with older patients in general practice: Patient-centeredness and prioritization in consultations following a geriatric assessment. *Patient Educ Couns*. Aug 8 2012.

Mc Sharry J, Bishop FL, Moss-Morris R, Kendrick T. 'The chicken and egg thing': Cognitive representations and self-management of multimorbidity in people with diabetes and depression. *Psychol Health*. Aug 28 2012.

McCann L, Lloyd F, Parsons C, et al. "They come with multiple morbidities": a qualitative assessment of pharmacist prescribing. *J Interprof Care*. Mar 2012; **26**(2): 127-133.

Bower P, Harkness E, Macdonald W, Coventry P, Bundy C, Moss-Morris R. Illness representations in patients with multimorbid long-term conditions: Qualitative study. *Psychol Health*. Mar 5 2012.

Townsend A. Applying Bourdieu's theory to accounts of living with multimorbidity. *Chronic Illn* 2011 Dec 2 [Epub ahead of print]. 2011.

Bower P, Macdonald W, Harkness E, et al. Multimorbidity, service organization and clinical decision making in primary care: a qualitative study. *Fam Pract* 2011; **28**(5):579-87.

O'Brien R, Wyke S, Guthrie B, Watt G, Mercer S. An 'endless struggle': a qualitative study of general practitioners' and practice nurses' experiences of managing multimorbidity in socio-economically deprived areas of Scotland. *Chronic Illn*. 2011. **7**:45-59.

Smith SM, O'Kelly S, O'Dowd T. GPs' and pharmacists' experiences of managing multimorbidity: a 'Pandora's box'. *Br J Gen Pract*. 2010. **60**(576):285-94.

Lugtenberg M, Zegers-van Schaick JM, Westert GP, Burgers JS. Why don't physicians adhere to guideline recommendations in practice? An analysis of barriers among Dutch general practitioners. *Implement Sci*. 2009. **4**:54.

Sells D, Sledge WH, Wieland M, Walden D, Flanagan E, Miller R, Davidson L. Cascading crises, resilience and social support within the onset and development of multiple chronic conditions. *Chronic Illn*. 2009. **5**(2):92-102.

Schoenberg NE, Leach C, Edwards W. "It's a toss up between my hearing, my heart, and my hip": prioritizing and accommodating multiple morbidities by vulnerable older adults. *J Health Care Poor Underserved*. 2009. **20**(1):134-51.

Elliott, R. A., D. Ross-Degnan, et al. "Strategies for coping in a complex world: adherence behavior among older adults with chronic illness." *Journal of General Internal Medicine* 2007. **22**(6): 805-10.

Leach CR, Schoenberg NE. Striving for control: cognitive, self-care, and faith strategies employed by vulnerable black and white older adults with multiple chronic conditions. *J Cross Cult Gerontol*. 2008. **23**(4):377-99.

Bayliss, E.A., et al., Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann Fam Med*, 2003. **1**: p. 15-21.

Christensen, R.E., M.D. Fetters, and L.A. Green, Opening the black box: Cognitive strategies in family practice. *Ann Fam Med*, 2005. **3**: p. 144-150.

Jerant, A.F., M.M. von Friederichs-Fitzwater, and M. Moore, Patients' perceived barriers to active self-management of chronic conditions. *Patient Education & Counseling*, 2005. **57**(3): p. 300-7.

Noel, P.H., et al., Collaborative care needs and preferences of primary care patients with multimorbidity. *Health Expectations*, 2005. **8**(1): p. 54-63.



Roberto, K.A., C.M. Gigliotti, and E.K. Husser, Older women's experiences with multiple health conditions: daily challenges and care practices. *Health Care Women Int*, 2005. **26**: p. 672-92.

Townsend, A., K. Hunt, and S. Wyke, Managing multiple morbidity in mid-life: a qualitative study of attitudes to drug use. *BMJ*, 2003. **327**(7419): p. 837.

Williams, A., Patients with comorbidities: perceptions of acute care services. *Journal of Advanced Nursing*, 2004. **46**(1): p. 13-22.

## 8. INTERVENTION IDEAS

Stokes J, Man MS, Guthrie B, Mercer SW, Salisbury C, Bower P. The Foundations Framework for Developing and Reporting New Models of Care for Multimorbidity. *Ann Fam Med*. 2017; **15**(6):570-577.

Palmer K, Marengoni A, Forjaz MJ, et al. Multimorbidity care model: Recommendations from the consensus meeting of the Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (JA-CHRODIS). *Health Policy*. 2018; **122**(1):4-11.

Rijken M, Hujala A, van Ginneken E, Melchiorre MG, Groenewegen P, Schellevis F. Managing multimorbidity: Profiles of integrated care approaches targeting people with multiple chronic conditions in Europe. *Health Policy*. 2018; **122**(1):44-52.

van der Heide I, Snoeijs S, Quattrini S, et al. Patient-centeredness of integrated care programs for people with multimorbidity. Results from the European ICARE4EU project. *Health Policy*. 2018; **122**(1):36-43.

Zimmerman L, Wilson FA, Schmaderer MS, et al. Cost-Effectiveness of a Care Transition Intervention Among Multimorbid Patients. *West J Nurs Res*. 2017; **39**(5):622-642. doi: 10.1177/0193945916673834.

Muche-Borowski C, Luhmann D, Schafer I, et al. Development of a meta-algorithm for guiding primary care encounters for patients with multimorbidity using evidence-based and case-based guideline development methodology. *BMJ Open*. 2017; **7**(6):e015478. doi: 10.1136/bmjopen-2016-015478.

Stokes J, Kristensen SR, Checkland K, Cheraghi-Sohi S, Bower P. Does the impact of case management vary in different subgroups of multimorbidity? Secondary analysis of a quasi-experiment. *BMC Health Serv Res*. 2017; **17**(1):521. doi: 10.1186/s12913-017-2475-x.

Melchiorre MG, Papa R, Rijken M, van Ginneken E, Hujala A, Barbabella F. eHealth in integrated care programs for people with multimorbidity in Europe: Insights from the ICARE4EU project. *Health Policy*. 2017. doi: 10.1016/j.healthpol.2017.08.006.

Jager C, Steinhauser J, Freund T, Kuse S, Szecsenyi J, Wensing M. A tailored programme to implement recommendations for multimorbid patients with polypharmacy in primary care practices-process evaluation of a cluster randomized trial. *Implement Sci*. 2017; **12**(1):31.

Sampalli T, Dickson R, Hayden J, Edwards L, Salunkhe A. Meeting the needs of a complex population: a functional health- and patient-centered approach to managing multimorbidity. *Journal of Comorbidity*. 2016; **6**:76-84.

Meschi T, Ticinesi A, Prati B, et al. A novel organizational model to face the challenge of multimorbid elderly patients in an internal medicine setting: a case study from Parma Hospital, Italy. *Intern Emerg Med*. 2016; **11**:667-76.

Mercer SW, O'Brien R, Fitzpatrick B, et al. The development and optimisation of a primary care-based whole system complex intervention (CARE Plus) for patients with multimorbidity living in areas of high socioeconomic deprivation. *Chronic Illn*. 2016; **12**:165-81.

Grundberg A, Hansson A, Hilleras P, Religa D. District nurses' perspectives on detecting mental health problems and promoting mental health among community-dwelling seniors with multimorbidity. *J Clin Nurs*. 2016; **25**:2590-9.

Muth C, Harder S, Uhlmann L, et al. Pilot study to test the feasibility of a trial design and complex intervention on PRIoritising MULtimedication in Multimorbidity in general practices (PRIMUMpilot). *BMJ Open*. 2016; **6**:e011613.

Crowe M, Jordan J, Burrell B, et al. Clinical effectiveness of transdiagnostic health management interventions for older people with multimorbidity: a quantitative systematic review. *J Adv Nurs*. 2016.

Mercer SW, Fitzpatrick B, Guthrie B, et al. The CARE Plus study - a whole-system intervention to improve quality of life of primary care patients with multimorbidity in areas of high socioeconomic deprivation: exploratory cluster randomised controlled trial and cost-utility analysis. *BMC Med*. 2016; **14**:88.

Sinnott C, Mercer SW, Payne RA, Duerden M, Bradley CP, Byrne M: Improving medication management in multimorbidity: development of the Multimorbidity COLlaborative Medication Review And DEcision Making (MY COMRADE) intervention using the Behaviour Change Wheel. *Implement Sci*. 2015; **10**:132.

Pratt R, Hibberd C, Cameron IM, Maxwell M. The Patient Centered Assessment Method (PCAM): integrating the social dimensions of health into primary care. *Journal of Comorbidity*. 2015; **5**:110-119.

Sampalli T, Desy M, Dhir M, Edwards L, Dickson R, Blackmore G. Improving wait times to care for individuals with multimorbidities and complex conditions using value stream mapping. *Int J Health Policy Manag*. Jul 2015; **4**(7):459-466.

Vila A, Villegas E, Cruanyes J, et al. Cost-effectiveness of a Barcelona home care program for individuals with multimorbidity. *J Am Geriatr Soc*. May 2015; **63**(5):1017-1024.

Garvey J, Connolly D, Boland F, Smith SM. OPTIMAL, an occupational therapy led self-management support programme for people with multimorbidity in primary care: a randomized controlled trial. *BMC Fam Pract*. 2015; **16**:59.

Morgan MA, Coates MJ, Dunbar JA. Using care plans to better manage multimorbidity. *Australas Med J*. 2015; **8**(6):208-215.

Wharton T, Manu E, Vitale CA. Enhancing provider knowledge and patient screening for palliative care needs in chronic multimorbid patients receiving home-based primary care. *Am J Hosp Palliat Care*. Feb 2015; **32**(1):78-83.

Coventry P, Lovell K, Dickens C, et al. Integrated primary care for patients with mental and physical multimorbidity: cluster randomised controlled trial of collaborative care for

patients with depression comorbid with diabetes or cardiovascular disease. *BMJ*. 2015; **350**:h638.

Ivbijaro GO, Enum Y, Khan AA, Lam SS, Gabzdyl A. Collaborative care: models for treatment of patients with complex medical-psychiatric conditions. *Current psychiatry reports*. Nov 2014; **16**(11):506.

Muth C, van den Akker M, Blom JW, et al. The Ariadne principles: how to handle multimorbidity in primary care consultations. *BMC Med*. 2014; **12**:223.

Lin EH, Von Korff M, Peterson D, Ludman EJ, Ciechanowski P, Katon W. Population targeting and durability of multimorbidity collaborative care management. *Am J Manag Care*. Nov 2014; **20**(11):887-895.

Wallace E, Salisbury C, Guthrie B, Lewis C, Fahey T, Smith SM. Managing patients with multimorbidity in primary care. *Bmj*. 2015; **350**:h176.

Rijken M, Bekkema N, Boeckxstaens P, Schellevis FG, De Maeseneer JM, Groenewegen PP. Chronic Disease Management Programmes: an adequate response to patients' needs? *Health Expectations*. Oct 2014; **17**(5):608-621.

Park YH, Chang H. Effect of a health coaching self-management program for older adults with multimorbidity in nursing homes. *Patient Prefer Adherence*. 2014; **8**:959-970.

Daker-White G, Hays R, Esmail A, Minor B, Barlow W, Brown B, Blakeman T, Bower P. MAXimising Involvement in MULTiMorbidity (MAXIMUM) in primary care: protocol for an observation and interview study of patients, GPs and other care providers to identify ways of reducing patient safety failures. *BMJ Open*. 2014; **4**(8):e005493.

Trikalinos TA, Segal JB, Boyd CM. Addressing multimorbidity in evidence integration and synthesis. *J Gen Intern Med*. Apr 2014; **29**(4):661-669.

Smith SM, Bayliss EA, Mercer SW, Gunn J, Vestergaard M, Wyke S, Salisbury C, Fortin M. How to design and evaluate interventions to improve outcomes for patients with multimorbidity. *Journal of Comorbidity*. 2013; **3**:10-17.

Mc Sharry J, Bishop FL, Moss-Morris R, Kendrick T. 'The chicken and egg thing': cognitive representations and self-management of multimorbidity in people with diabetes and depression. *Psychol Health*. 2013; **28**(1):103-119.

Martin CM, Vogel C, Grady D, et al. Implementation of complex adaptive chronic care: the Patient Journey Record system (PaJR). *J Eval Clin Pract*. Dec 2012; **18**(6):1226-1234.

Patient-centered care for older adults with multiple chronic conditions: a stepwise approach from the American Geriatrics Society: American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. *J Am Geriatr Soc*. Oct 2012; **60**(10):1957-1968.

Guiding principles for the care of older adults with multimorbidity: an approach for clinicians: American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. *J Am Geriatr Soc*. Oct 2012; **60**(10):E1-E25.

Sampalli T, Fox RA, Dickson R, Fox J. Proposed model of integrated care to improve health outcomes for individuals with multimorbidities. *Patient Prefer Adherence*. 2012; **6**:757-764.

Altiner A, Schafer I, Mellert C, et al. Activating GENERAL practitioners dialogue with patients on their Agenda (MultiCare AGENDA) study protocol for a cluster randomized controlled trial. *BMC Fam Pract*. Dec 12 2012; **13**(1):118.

Cohen E, Bruce-Barrett C, Kingsnorth S, Keilty K, Cooper A, Daub S. Integrated Complex Care Model: Lessons Learned from Inter-organizational Partnership. *Healthc Q.* 2011; **14** Spec No 3:64-70.

Parekh, A.K., et al., Managing multiple chronic conditions: a strategic framework for improving health outcomes and quality of life. *Public Health Rep*, 2011. **126**: p. 460-71.

Thiem U, Theile G, Junius-Walker U, et al. Prerequisites for a new health care model for elderly people with multimorbidity: the PRISCUS research consortium. *Z Gerontol Geriatr* 2011; **44**: 115-20.

Braithwaite RS, Fiellin D, Justice AC. The payoff time: a flexible framework to help clinicians decide when patients with comorbid disease are not likely to benefit from practice guidelines. *Med Care.* 2009 Jun; **47**(6):610-7.

Smith GC. From consultation-liaison psychiatry to integrated care for multiple and complex needs. *Aust N Z J Psychiatry.* 2009 Jan; **43**(1):1-12.

Bayliss, E. A., H. B. Bosworth, et al. "Supporting self-management for patients with complex medical needs: recommendations of a working group." *Chronic Illness* 2007. **3**(2): 167-75.

Boult, C., L. Reider, et al. "Early effects of "Guided Care" on the quality of health care for multimorbid older persons: a cluster-randomized controlled trial." *J Gerontol A Biol Sci Med Sci* 2008. **63**: 321-7.

Boyd, C. M., C. Boult, et al. "Guided care for multimorbid older adults." *Gerontologist* 2007. **47**(5): 697-704.

Boyd, C. M., E. Shadmi, et al. "A pilot test of the effect of guided care on the quality of primary care experiences for multimorbid older adults." *Journal of General Internal Medicine* 2008. **23**(5): 536-42.

Hanni, K. D., E. Mendoza, et al. "A methodology for evaluating organizational change in community-based chronic disease interventions." *Preventing Chronic Disease* 2007. **4**(4): A105.

Kahn, L. S., C. H. Fox, et al. "Facilitating quality improvement in physician management of comorbid chronic disease in an urban minority practice." *Journal of the National Medical Association* 2007. **99**(4): 377-83.

Lavori, P. W. and R. Dawson "Adaptive treatment strategies in chronic disease." *Annual Review of Medicine* 2008. **59**: 443-53.

Berenson, R.A. and J. Horvath, Confronting the barriers to chronic care management in Medicare. *Health Affairs*, 2003. **Suppl Web Exclusives**: p. W3-37-53.

Brown, A.F., et al., Guidelines for improving the care of the older person with diabetes mellitus. *Journal of the American Geriatrics Society*, 2003. **51**(5 Suppl Guidelines): p. S265-80.

Davis, B., Assessing adults with mental disorders in primary care. *Nurse Practitioner*, 2004. **29**: p. 19-27; quiz 27-9.

Durso, S.C., Using clinical guidelines designed for older adults with diabetes mellitus and complex health status. *JAMA*, 2006. **295**: p. 1935-40.

Howell, T., Managing medical and psychiatric comorbidities. *WMJ*, 2004. **103**(6): p. 23-7.

Macleod, U. and E. Mitchell, Comorbidity in general practice. *Practitioner*, 2005. **249**(1669): p. 282-4.

Mollica, R.L. and J. Gillespie. Care coordination for people with chronic conditions. 2003 [cited 7 Nov 2005]; Available from: [http://www.partnershipforsolutions.org/DMS/files/Care\\_coordination.pdf](http://www.partnershipforsolutions.org/DMS/files/Care_coordination.pdf).

Pierce, D. and I. Wilson, Psychiatric comorbidity in general practice. *Aust Fam Physician*, 2004. **33**: p. 217-220.

Redelmeier, D.A., S.H. Tan, and G.L. Booth, The treatment of unrelated disorders in patients with chronic medical diseases. *N Engl J Med*, 1998. **338**: p. 1516-20.

Schraeder, C., et al., Managing elders with comorbidities. *Journal of Ambulatory Care Management*, 2005. **28**(3): p. 201-9.

Stevenson, J., et al., Managing comorbidities in patients at the end of life. *BMJ*, 2004. **329**: p. 909-12.

Wagner, E.H., B.T. Austin, and M. Von Korff, Organizing care for patients with chronic illness. *Milbank Quarterly*, 1996. **74**(4): p. 511-44.

Welch, H.G., et al., Estimating treatment benefits for the elderly: the effect of competing risks. *Annals of Internal Medicine*, 1996. **124**(6): p. 577-84.

## **9. OTHERS**

### **9.1 Physical activity**

de Souto Barreto P. Exercise for Multimorbid Patients in Primary Care: One Prescription for All? *Sports Med*. 2017; **47**(11):2143-2153.

Loprinzi PD. Associations between bouted and non-bouted physical activity on multimorbidity. *Clin Physiol Funct Imaging*. 2017; **37**(6):782-784.

Keats MR, Cui Y, DeClercq V, et al. Multimorbidity in Atlantic Canada and association with low levels of physical activity. *Prev Med*. 2017; **105**:326-331.

Jones J, Jones GD, Thacker M, Faithfull S. Physical activity interventions are delivered consistently across hospitalized older adults but multimorbidity is associated with poorer rehabilitation outcomes: A population-based cohort study. *J Eval Clin Pract*. 2017; **23**(6):1469-1477.

Dankel SJ, Loenneke JP, Loprinzi PD. Combined Associations of Muscle-Strengthening Activities and Accelerometer-Assessed Physical Activity on Multimorbidity: Findings From NHANES. *Am J Health Promot*. 2017; **31**(4):274-277. doi: 10.4278/ajhp.150520-QUAN-894.

Martinez-Gomez D, Guallar-Castillon P, Garcia-Esquinas E, Bandinelli S, Rodriguez-Artalejo F. Physical Activity and the Effect of Multimorbidity on All-Cause Mortality in Older Adults. *Mayo Clin Proc* 67(2):144-57. 2017; **92**(3):376-382.

Vancampfort D, Koyanagi A, Ward PB, et al. Chronic physical conditions, multimorbidity and physical activity across 46 low- and middle-income countries. *Int J Behav Nutr Phys Act*. 2017; **14**(1):6.

Volaklis KA, Thorand B, Peters A, et al. Physical activity, muscular strength, and polypharmacy among older multimorbid persons: Results from the KORA-Age study. *Scand J Med Sci Sports*. 2017.

Martinez-Gomez D, Guallar-Castillon P, Rodriguez-Artalejo F, Bandinelli S. Attenuation of the Effect of Multimorbidity on Cardiovascular Mortality by Physical Activity in Older Adults. *J Am Med Dir Assoc*. 2016.

Loprinzi PD, Addoh O, Joyner C. Multimorbidity, mortality, and physical activity. *Chronic Illn*. 2016; **12**(4):272-280.

Loprinzi PD. Multimorbidity, cognitive function, and physical activity. *Age (Dordr)*. 2016; **38**:8.

Loprinzi PD. Associations between bouted and non-bouted physical activity on multimorbidity. *Clin Physiol Funct Imaging*. 2016.

Loprinzi PD. Light-Intensity Physical Activity and Medical Multimorbidity. *South Med J*. 2016; **109**:174-7.

Loprinzi PD, Addoh O, Joyner C. Multimorbidity, mortality, and physical activity. *Chronic Illn*. 2016.

Dankel SJ, Loenneke JP, Loprinzi PD: Combined Associations of Muscle-Strengthening Activities and Accelerometer-Assessed Physical Activity on Multimorbidity: Findings From NHANES. *Am J Health Promot*. 2016.

Dhalwani NN, O'Donovan G, Zaccardi F, Hamer M, Yates T, Davies M *et al*: Long terms trends of multimorbidity and association with physical activity in older English population. *Int J Behav Nutr Phys Act*. 2016; **13**(1):8.

Dankel SJ, Loenneke JP, Loprinzi PD. Participation in muscle-strengthening activities as an alternative method for the prevention of multimorbidity. *Prev Med*. Aug 9 2015; **81**:54-57.

Loprinzi PD. Sedentary behavior and medical multimorbidity. *Physiol Behav*. Nov 1 2015; **151**:395-397.

Cimarras-Otal C, Calderon-Larranaga A, Poblador-Plou B, et al. Association between physical activity, multimorbidity, self-rated health and functional limitation in the Spanish population. *BMC Public Health*. 2014; **14**:1170.

Autenrieth CS, Kirchberger I, Heier M, et al. Physical activity is inversely associated with multimorbidity in elderly men: Results from the KORA-Age Augsburg Study. *Prev Med*. 2013; **57**:17-19.

Welmer AK, Kareholt I, Angleman S, Rydwick E, Fratiglioni L. Can chronic multimorbidity explain the age-related differences in strength, speed and balance in older adults? *Aging Clin Exp Res*. Sep 5 2012.

De Vries NM, Van Ravensberg CD, Hobbelen JS, Olde Rikkert MG, Staak SB, Nijhuis-van der Sanden MW. Effects of physical exercise therapy on mobility, physical functioning, physical activity and quality of life in community-dwelling older adults with impaired mobility, physical disability and/or multi-morbidity: A meta-analysis. *Ageing Resource Review*, 11 novembre 2011 (Epub ahead of print). 2011.

Liu-Ambrose T, Ashe MC, Marra C, Conditions Research Team PA. Among Older Adults with Multiple Chronic Conditions, Physical Activity is Independently and Inversely Associated with Health Care Utilization. *Br J Sports Med.* 2010; **44**(14): 1024-8.

Rydwik, E., K. Frandin, and G. Akner, Physical training in institutionalized elderly people with multiple diagnoses--a controlled pilot study. [erratum appears in *Arch Gerontol Geriatr.* 2005 Nov-Dec; 41(3): 319 Note: Kerstin, Frandin [corrected to Frandin, Kerstin]]. *Archives of Gerontology & Geriatrics*, 2005. **40**(1): p. 29-44.

## 9.2 Continuity of care

Ehman KM, Deyo-Svensden M, Merten Z, Kramlinger AM, Garrison GM. How Preferences for Continuity and Access Differ Between Multimorbidity and Healthy Patients in a Team Care Setting. *J Prim Care Community Health.* 2017; **8**(4): 319-323.

DuGoff EH. Continuity of Care in Older Adults With Multiple Chronic Conditions: How Well Do Administrative Measures Correspond With Patient Experiences? *J Healthc Qual.* 2017.

Bynum JP, Chang CH, Austin A, Carmichael D, Meara E. Outcomes in Older Adults with Multimorbidity Associated with Predominant Provider of Care Specialty. *J Am Geriatr Soc.* 2017.

Ehman KM, Deyo-Svensden M, Merten Z, Kramlinger AM, Garrison GM. How Preferences for Continuity and Access Differ Between Multimorbidity and Healthy Patients in a Team Care Setting. *J Prim Care Community Health.* 2017:2150131917704556.

Napolitano F, Napolitano P, Garofalo L, Recupito M, Angelillo IF. Assessment of Continuity of Care among Patients with Multiple Chronic Conditions in Italy. *PLoS One.* 2016; **11**: e0154940.

Cheng SH, Chen CC. Effects of continuity of care on medication duplication among the elderly. *Med Care.* Feb 2014; **52**(2): 149-156.

Golden SL, Nageswaran S. Caregiver voices: coordinating care for children with complex chronic conditions. *Clin Pediatr (Phila).* Aug 2012; **51**(8): 723-729.

Alfaro Lara ER, Vega Coca MD, Galvan Banqueri M, et al. Selection of tools for reconciliation, compliance and appropriateness of treatment in patients with multiple chronic conditions. *Eur J Intern Med.* Sep 2012; **23**(6): 506-512.

Salisbury C, Johnson L, Purdy S, Valderas JM, Montgomery AA. Epidemiology and impact of multimorbidity in primary care: a retrospective cohort study. *Br J Gen Pract* 2011; **61**: e12-21.

Aspin C et al. Health policy responses to rising rates of multi-morbid chronic illness in Australia and New Zealand. *Aust N Z J Public Health.* 2010. **34**(4): 386-93.

Higashi, T., N. S. Wenger, et al. "Relationship between number of medical conditions and quality of care." *New England Journal of Medicine* 2007. **356**(24): 2496-504.

Smith, S. M., A. Ferede, et al. "Multimorbidity in younger deprived patients: an exploratory study of research and service implications in general practice." *BMC Family Practice* 2008. **9**: 6.

Nutting, P.A., et al., Continuity of primary care: to whom does it matter and when? *Ann Fam Med*, 2003. **1**: p. 149-55.

### 9.3 Self-care

Finney Rutten LJ, Hesse BW, St Sauver JL, et al. Health Self-Efficacy Among Populations with Multiple Chronic Conditions: the Value of Patient-Centered Communication. *Adv Ther*. 2016; **33**:1440-51.

Kenning C, Coventry PA, Gibbons C, Bee P, Fisher L, Bower P. Does patient experience of multimorbidity predict self-management and health outcomes in a prospective study in primary care? *Fam Pract*. Jun 2015; **32**(3):311-316

O'Toole L, Connolly D, Smith S. Impact of an occupation-based self-management programme on chronic disease management. *Aust Occup Ther J*. Feb 2013; **60**(1):30-38.

Clarke LH, Bennett EV. Constructing the moral body: Self-care among older adults with multiple chronic conditions. *Health (London)*. Jul 5 2012.

Schuz B, Wurm S, Warner LM, Ziegelmann JP. Self-efficacy and multiple illness representations in older adults: a multilevel approach. *Psychol Health*. Jan 2012; **27**(1):13-29.

Harrison M, Reeves D, Harkness E, et al. A secondary analysis of the moderating effects of depression and multimorbidity on the effectiveness of a chronic disease self-management programme. *Patient Educ Couns*. Apr 2012; **87**(1):67-73.

Morris RL, Sanders C, Kennedy AP, Rogers A. Shifting priorities in multimorbidity: a longitudinal qualitative study of patient's prioritization of multiple conditions. *Chronic Illn* 2011; **7**:147-61.

Bayliss EA, John F, Steiner JF, Fernald DH, Crane LA, Main DS. Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann Fam Med* 2003; **1**:15-21.

Jerant, A.F., M.M. von Friederichs-Fitzwater, and M. Moore, Patients' perceived barriers to active self-management of chronic conditions. *Patient Education & Counseling*, 2005. **57**(3): p. 300-7.

### 9.4 Medical errors / Medical Education

Schoenborn NL, Boyd C, Cayea D, Nakamura K, Xue QL, Ray A *et al*: Incorporating prognosis in the care of older adults with multimorbidity: description and evaluation of a novel curriculum. *BMC Med Educ*. 2015; **15**:215.

Maguire S, Hanley K, Quinn K, Sheeran J, Stewart P: Teaching multimorbidity management to GP trainees: a pilot workshop. *Educ Prim Care*. 2015; **26**(6):410-415.

Bodenheimer, T., Disease management: promises and pitfalls. *N Engl J Med*, 1999. **340**: p. 1202-5.

Brennan, T.A., et al., Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. *New England Journal of Medicine*, 1991. **324**(6): p. 370-6.

Wilson, R.M., et al., Quality in Australian Health Care Study. *Medical Journal of Australia*, 1996. **164**(12): p. 17.