

## Web appendix 2: Methodology of literature analysis on patient preferences

### Literature Search

We used a combined search strategy for qualitative and quantitative studies investigating health care preferences of patients with multimorbidity. The search strategy consisted of three modules (multimorbidity, patient preferences and study design). Within the modules the search terms were combined using the operator "OR", the three modules were combined using the operator "AND".

Table 1 App 2: Search terms and modules

<b>multimorbidity</b>	<b>patient preferences</b>	<b>study design</b>
multimorbid*	„patient* centered“	„focus group“
comorbid*	„patient* satisfaction“	interview
„frail elderly“	„patient* view“	survey
	„patient* perception“	„mixed method*“
	„patient* perspective“	„qualitative study“
	„patient* preference“	„qualitative research“
	expectation*	

Search strategy for Medline and Embase via Ovid (inception to March 2015):

((((((("qualitative study") OR "Qualitative Research"[Mesh]) OR "mixed method\*") OR survey) OR interview) OR "Focus Groups"[Mesh])) AND (((("Comorbidity"[Mesh]) OR multimorbid\*) OR "Frail Elderly"[Mesh])) AND (((((((("Patient Preference"[Mesh]) OR "patient\* perspective") OR "patient\* perception") OR "patient\* view") OR "patient\* satisfaction") OR "patient\* centered") OR expectation\*). The search yielded 650 hits after removal of duplicates.

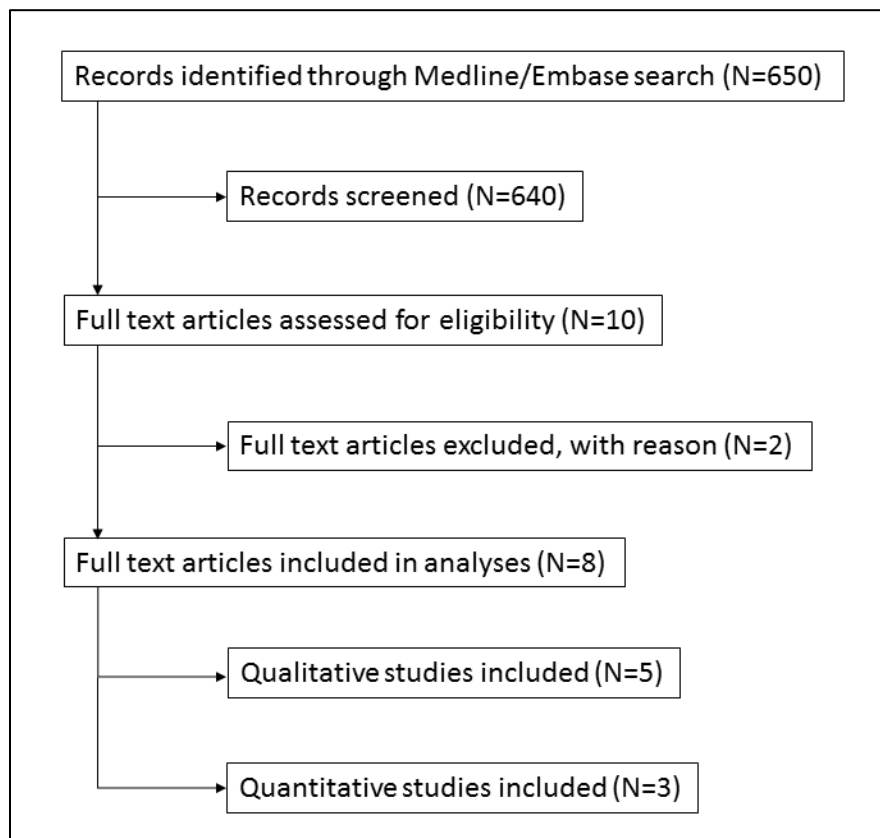
## Inclusion/exclusion criteria

Table 2 App 2: In- and exclusion criteria in the literature analysis

	<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
<b>patients</b>	patients with multimorbidity $\geq 2$ diseases	studies reporting on patients with a specific index disease and comorbidities;
<b>study objective</b>	investigation of patients' healthcare preferences and priorities	effectiveness studies to improve the outcomes of patients with multimorbidity
<b>Study design - qualitative studies</b>	any qualitative study with a transparently documented state-of-the-art methodological approach; systematic reviews of qualitative studies with a transparently documented methodological approach	studies without transparently documented state-of-the-art methodological approach; unsystematic reviews
<b>Study design – quantitative studies</b>	cross-sectional studies, surveys, baseline examination of prospective studies	

After removal of duplicates 650 hits remained to be screened for inclusion into the review.

Figure 1 App 2: Flow Chart of literature selection



## Characteristics of included studies

Table 3 App 2: Study characteristics of included studies – Qualitative studies

1 <sup>st</sup> author, year, country	Objective	Inclusion criteria	Exclusion criteria	Participants	Methodology	Quality criteria*
Robben et al., 2011 Netherlands	Investigation of preferences for receiving information among frail elderly (and their informal care givers).	'frail elderly' over 65, defined as: more than 1 of: cognitive impairment; physical handicap; psychosocial problems; multimorbidity; polypharmacy; social isolation. (Dutch College of General Practitioners)	unable to speak (Dutch); severe hearing loss; life expectancy < 6 months; severe cognitive deficits.	f: 9 m: 2	semi-structured interviews; grounded theory	10/11
van Kempen et al., 2011 Netherlands  <i>same study as Robben et al. 2011</i>	Investigation of the needs and preferences of frail older people concerning home visits of family physicians.	'frail elderly' over 65, defined as: more than 1 of: cognitive impairment; physical handicap; psychosocial problems; multimorbidity; polypharmacy; social isolation. (Dutch College of General Practitioners)	unable to speak (Dutch); severe hearing loss; life expectancy < 6 months; severe cognitive deficits.	f: 9 m: 2	semi-structured interviews; grounded theory	10/11

<b>1<sup>st</sup> author, year, country</b>	<b>Objective</b>	<b>Inclusion criteria</b>	<b>Exclusion criteria</b>	<b>Participants</b>	<b>Methodology</b>	<b>Quality criteria*</b>
Ekdahl et al., 2010 Sweden	Investigation of patients' preferences for shared decision making when admitted to hospital for an acute illness.	'frail elderly' as defined by the Swedish National Centre of Epidemiology 2001: > 75 years, > 3 hospital stays within the last 12 months, > 3 ICD-10 diagnoses	unable to speak (Swedish), substantial dementia	f: 10 m: 5	semi-structured interviews; content analysis according to Graneheim and Lundman with manifest and latent focus.	11/11
Fried et al., 2008 USA	Investigating multimorbid patients views on and knowledge about drug effects and interactions.	≥ 65 years ≥ 5 drugs 16 further criteria characterizing multimorbidity.	unable to speak (English); severe hearing loss; severe cognitive deficits.	f: 44 m: 22	13 focus groups; grounded theory	10/11
Bayliss et al., 2008 USA	Explore processes of care desired by elderly patients who have multimorbidities.	≥ 65 years at least: diabetes, depression, osteoarthritis; stratified random sample from survey respondent population; members of one HMO	n.g.	f: 13 m: 13	face-to-face, semi-structured interviews, content analysis	9/11
Noel et al., 2005 USA	To explore the collaborative care needs and preferences in primary care patients with multiple chronic illnesses.	Veterans Health Administration, primary care clinics (found by purposive sampling): ≥ diagnoses	severe cognitive impairment; uncontrolled psychiatric illness	f: 12 m: 48	focus groups, content analysis	8/11

1 <sup>st</sup> author, year, country	Objective	Inclusion criteria	Exclusion criteria	Participants	Methodology	Quality criteria*
Jerant et al., 2005	(1) to elicit perceived barriers to active self-management; and (2) to elicit perceived barriers to accessing self-management support services and resources.	convenience sample from university: (1) diagnosis of one or more of the study chronic illnesses (arthritis, asthma, COPD, CHF, depression, and DM); (2) aged 40 or older; (3) able to read at 7th grade level and speak English; (4) residing in a private home; and (5) interest in discussing chronic illness self-management. (85% had ≥ 2 chronic illnesses)	n.g.	f: 37 m:17	focus groups content analysis	10/11
f: female; m: male; n.g.: not given *criteria derived from Giacomini and Cook 2000						

Table 4 App 2: Study characteristics of included studies – quantitative studies

1 <sup>st</sup> author, year, country	Objective	Inclusion criteria	Exclusion criteria	Participants	Methodology	Quality criteria*
<b>Quantitative studies</b>						
Killiari et al., 2014 Cyprus	Investigation of prevalence of multimorbidity in Cyprus and patients' satisfaction with health care.	Patients with $\geq 2$ diagnoses, 18-88 years, representative household sample, excluding institutional residents and group housings.	n.g.	f: 264 m: 201	cross-sectional study, personal interviews	3/6
Fung et al., 2008 USA	Investigate relationship between multimorbidity and patient's rating of communication.	Random sample of households from 12 communities with > 200.000 inhabitants drawn from the CTS Household Surveys national sample.	n.g.	f: 8204 m: 7505	cross-sectional study, telephone interviews	4/6
Noel et al., 2007 USA	Comparison of need for self-management-education between patients with multimorbidity and patients with single diseases.	Patients from a 'Veterans Affairs Medical Center' with at least 1 contact over the last 13 months. Either multimorbid patients ( $\geq 3$ diagnoses) or patients with just one chronic disease	n.g.	patients with multimorbidity: n = 227 patients with single disease: n=195	cross-sectional study	5/6
f: female; m: male; n.g.: not given *criteria: participant selection; responder/ non-responder; clearly focused endpoint definition; validated questionnaires; measurement if confounding variables; documentation of missing values						

## Excluded studies with reasons

Table 5 App 2: Excluded studies

Study	Reason for exclusion
Junius-Walker et al.: Impact of a priority-setting consultation on doctor-patient agreement after a geriatric assessment: cluster randomised controlled trial in German general practices. Qual Prim Care. 2012;20(5):321-34.	Interventional study
Wrede J et al.: Complex health care decisions with older patients in general practice: patient-centeredness and prioritization in consultations following a geriatric assessment. Patient Educ Couns. 2013 Jan;90(1):54-60  <i>same study as Junius-Walker et al.</i>	Interventional study
Löffler C et al.: Optimizing polypharmacy among elderly hospital patients with chronic diseases--study protocol of the cluster randomized controlled POLITE-RCT trial. Implement Sci. 2014 Oct 6;9:151.	Study protocol

## References

- Ekdahl AW, Andersson L, Friedrichsen M. "They do what they think is the best for me." Frail elderly patients' preferences for participation in their care during hospitalization. *Patient Educ Couns*. 2010;80(2):233–40.
- Robben S, van Kempen J, Heinen M, Zuidema S, Olde Rikkert M, Schers H, u. a. Preferences for receiving information among frail older adults and their informal caregivers: a qualitative study. *Fam Pract*. 2012;29(6):742–7.
- van Kempen JAL, Robben SHM, Zuidema SU, Olde Rikkert MGM, Melis RJF, Schers HJ. Home visits for frail older people: a qualitative study on the needs and preferences of frail older people and their informal caregivers. *Br J Gen Pract J R Coll Gen Pract*. 2012;62(601):e554-60.
- Fried TR, McGraw S, Agostini JV, Tinetti ME. Views of older persons with multiple morbidities on competing outcomes and clinical decision-making. *J Am Geriatr Soc*. 2008;56(10):1839–44.
- Noël PH, Frueh BC, Larme AC, Pugh JA. Collaborative care needs and preferences of primary care patients with multimorbidity. *Health Expect Int J Public Particip Health Care Health Policy*. 2005;8(1):54–63.
- Bayliss EA, Edwards AE, Steiner JF, Main DS. Processes of care desired by elderly patients with multimorbidities. *Fam Pract*. 2008;25(4):287–93.
- Jerant AF, von Friederichs-Fitzwater MM, Moore M. Patients' perceived barriers to active self-management of chronic conditions. *Patient Educ Couns*. 2005;57(3):300–7.
- Kiliari N, Theodosopoulou E, Papanastasiou E. Multimorbidity and unmet citizens' needs and expectations urge for reforms in the health system of Cyprus: a questionnaire survey. *JRSM Open*. 2014;5(1):2042533313515860.
- Fung CH, Setodji CM, Kung F-Y, Keesey J, Asch SM, Adams J, u. a. The relationship between multimorbidity and patients' ratings of communication. *J Gen Intern Med*. 2008;23(6):788–93.
- Noel PH, Parchman ML, Williams JWJ, Cornell JE, Shuko L, Zeber JE, u. a. The challenges of multimorbidity from the patient perspective. *J Gen Intern Med*. 2007;22 Suppl 3:419–24.
- Giacomini MK, Cook DJ. Users' guides to the medical literature: XXIII. Qualitative research in health care A. Are the results of the study valid? Evidence-Based Medicine Working Group. *JAMA*. 19. Juli 2000;284(3):357–62.