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# BMJ Open

## Health-Related Preferences of Older Patients with Multimorbidity: the protocol for an Evidence Map.

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Complete List of Authors:	<p>GONZALEZ, ANA; Johann Wolfgang Goethe University, Institute of General Practice; Red de Investigación en Servicios de Salud en Enfermedades Crónicas (REDISSEC)</p> <p>Schmucker, Christine; Medical Center, Faculty of Medicine, University of Freiburg, Institute for Evidence in Medicine (for Cochrane Germany Foundation)</p> <p>Blom, Jeanet; Leiden University Medical Center, Department of Public Health and Primary Care</p> <p>van den Akker, Marjan; Johann Wolfgang Goethe University, Institute of General Practice</p> <p>Nguyen, Truci; Johann Wolfgang Goethe University, Institute of General Practice</p> <p>Nothacker, Julia; Medical Center, Faculty of Medicine, University of Freiburg, Institute for Evidence in Medicine (for Cochrane Germany Foundation)</p> <p>Meerpohl, Joerg; Medical Center, Faculty of Medicine, University of Freiburg</p> <p>Röttgwer, Kristian; Federal Joint Committee "Gemeinsamer Bundesausschuss", Patient representative</p> <p>Wegwarth, Odette; Max Planck Institute for Human Development, Center for Adaptive Rationality</p> <p>Hoffmann, Tammy; Bond University, Centre for Research in Evidence-Based Practice (CREBP), Faculty of Health Sciences and Medicine</p> <p>Straus, Sharon; University of Toronto, Department of Medicine</p> <p>Gerlach, Ferdinand; Johann Wolfgang Goethe University, Institute of General Practice</p> <p>Muth, Christiane; Johann Wolfgang Goethe University, Institute of General Practice</p>
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6 2 Health-Related Preferences of Older Patients with Multimorbidity: The protocol for an Evidence Map.  
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8  
9 3 **AUTHORS**  
10

11 4 Ana Isabel González  
12

13  
14 5 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY. Red de  
15

16  
17 6 Investigación en Servicios de Salud en Enfermedades Crónicas (REDISSEC), Madrid, SPAIN.  
18

19  
20 7 Email: [GonzalezGonzalez@allgemeinmedizin.uni-frankfurt.de](mailto:GonzalezGonzalez@allgemeinmedizin.uni-frankfurt.de)  
21

22  
23 8 Corresponding author  
24

25  
26 9  
27  
28 10 Christine Schmucker  
29

30  
31 11 Institute for Evidence in Medicine (for Cochrane Germany Foundation), Medical Center, Faculty of  
32

33  
34 12 Medicine, University of Freiburg, Freiburg, GERMANY.  
35

36  
37 13 Email: [schmucker@ifem.uni-freiburg.de](mailto:schmucker@ifem.uni-freiburg.de)  
38

39  
40 14  
41  
42 15 Jeanet Blom  
43

44  
45 16 Department of Public Health and Primary Care, Leiden University Medical Center, Leiden, THE  
46

47  
48 17 NETHERLANDS.  
49

50  
51 18 Email: [J.W.Blom@lumc.nl](mailto:J.W.Blom@lumc.nl)  
52

53  
54 19  
55  
56 20 Marjan van den Akker  
57

58  
59 21 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.  
60

1  
2  
3 22 Email: [m.vandenAkker@allgemeinmedizin.uni-frankfurt.de](mailto:m.vandenAkker@allgemeinmedizin.uni-frankfurt.de)  
4 23  
5  
6  
7 24  
8  
9

10 25 Truc Sophia Nguyen  
11  
12

13 26 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.  
14  
15

16 27 Email: [Nguyen@allgemeinmedizin.uni-frankfurt.de](mailto:Nguyen@allgemeinmedizin.uni-frankfurt.de)  
17  
18  
19 28

20  
21 29 Julia Nothacker  
22  
23

24 30 Institute for Evidence in Medicine (for Cochrane Germany Foundation), Medical Center, Faculty of  
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27 31 Medicine, University of Freiburg, Freiburg, GERMANY.  
28  
29

30 32 Email: [nothacker@cochrane.de](mailto:nothacker@cochrane.de)  
31  
32  
33

34 34 Joerg J. Meerpohl  
35  
36

37 35 Institute for Evidence in Medicine (for Cochrane Germany Foundation), Medical Center, Faculty of  
38  
39

40 36 Medicine, University of Freiburg, Freiburg, GERMANY.  
41  
42

43 37 Email: [meerpohl@ifem.uni-freiburg.de](mailto:meerpohl@ifem.uni-freiburg.de)  
44  
45  
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47  
48  
49 39 Kristian Röttger  
50  
51

52 40 Patient representative, Federal Joint Committee "Gemeinsamer Bundesausschuss", Berlin. GERMANY.  
53  
54

55 41 Email: [kristianroettger@aol.de](mailto:kristianroettger@aol.de)  
56  
57  
58 42

59  
60 43 Odette Wegwarth

1  
2  
3 44 Center for Adaptive Rationality, Max Planck Institute for Human Development, Berlin, GERMANY.  
4  
5

6 45 Email: [wegwarth@mpib-berlin.mpg.de](mailto:wegwarth@mpib-berlin.mpg.de)  
7  
8

9 46  
10

11  
12 47 Tammy Hoffmann  
13

14  
15 48 Centre for Research in Evidence-Based Practice (CREBP), Faculty of Health Sciences and Medicine,  
16

17 49 Bond University, Gold Coast, Queensland, AUSTRALIA.  
18

19  
20 50 Email: [thoffman@bond.edu.au](mailto:thoffman@bond.edu.au)  
21  
22

23 51  
24

25  
26 52 Sharon E. Straus  
27

28  
29 53 Department of Medicine, University of Toronto, Toronto, CANADA.  
30

31 54 Email: [sharon.straus@utoronto.ca](mailto:sharon.straus@utoronto.ca)  
32  
33

34 55  
35

36  
37 56 Ferdinand M. Gerlach  
38

39  
40 57 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.  
41

42  
43 58 Email: [gerlach@allgemeinmedizin.uni-frankfurt.de](mailto:gerlach@allgemeinmedizin.uni-frankfurt.de)  
44  
45

46 59  
47

48  
49 60 Christiane Muth  
50

51  
52 61 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.  
53

54  
55 62 Email: [muth@allgemeinmedizin.uni-frankfurt.de](mailto:muth@allgemeinmedizin.uni-frankfurt.de)  
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3 64 **ABSTRACT**  
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6 65 **Introduction:**  
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9 66 Interaction of conditions and treatments, complicated care needs and substantial treatment burden  
10  
11 67 make patient-physician encounters involving multimorbid older patients highly complex. To optimally  
12  
13 68 integrate patients' preferences, define and prioritise realistic treatment goals and individualise care,  
14  
15 69 a patient-centred approach is recommended. However, the preferences of multimorbid patients  
16  
17 70 have not been systematically investigated in relation to their health status. The purpose of this  
18  
19 71 evidence map is to explore current research addressing health-related preferences of older patients  
20  
21 72 with multimorbidity (MM), and to identify knowledge clusters and research gaps.  
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26 73 **Methods and analysis:**  
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29 74 To identify relevant research, we will conduct searches in the electronic databases MEDLINE,  
30  
31 75 EMBASE, PsycINFO, PSYINDEX, CINAHL, Social Science Citation Index, Social Science Citation Index  
32  
33 76 Expanded and the Cochrane library from their inception. We will check references of relevant articles  
34  
35 77 and carry out cited reference research (forward citation tracking).  
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39 78 Two independent reviewers will screen titles and abstracts, check full texts for eligibility and extract  
40  
41 79 the data. Any disagreement will be resolved and consensus reached with the help of a third reviewer.  
42  
43 80 We will include both qualitative and quantitative studies, and address preferences from the patients'  
44  
45 81 perspectives in a multimorbid population over the age of 60 years. Data extraction tables will present  
46  
47 82 study and patient characteristics, aim of study, and methods used to identify preferences and  
48  
49 83 outcomes (i.e., type of preferences). We will summarise the data using tables and figures (i.e. bubble  
50  
51 84 plot) to present the research landscape and to describe clusters and gaps.  
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56 85 **Ethics and dissemination:**  
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3 86 Due to the nature of the proposed evidence map, ethics approval will not be required. Results from  
4  
5 87 our research will be disseminated by means of specifically prepared materials for patients, at  
6  
7 88 relevant (inter-)national conferences and via publication in peer-reviewed journals.  
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11 89 **Registration:**  
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14 90 Open Science Framework (OSF): DOI 10.17605/OSF.IO/MCRWQ.  
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For peer review only

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3 92 **Strengths and limitations of this study:**  
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6 93 Strengths are the multinational and multidisciplinary team, which covers the necessary area of  
7  
8  
9 94 expertise and has considerable methodological experience and skills.  
10

11  
12 95 Furthermore, a patient's representative will be involved in designing the study to ensure that from  
13  
14 96 the beginning, patient-relevant questions are defined, and results discussed accordingly.  
15

16  
17 97 The search will also be broad-based, use a sensitive rather than a specific strategy, and cover a wide  
18  
19  
20 98 range of databases, terms and search strategies (i.e. forward citation tracking).  
21

22  
23 99 In addition, selection criteria will be broad (i.e. both qualitative and quantitative studies will be  
24  
25 100 considered) and no restrictions will be placed on setting or language of publication.  
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29 101 The main limitation is poor indexing and the lack of, or non-standardized definition of, a research  
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31 102 topic (e.g., expressed as satisfaction, experience or perspectives).  
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## 104 INTRODUCTION

105 Multimorbidity (MM) is defined as the co-occurrence of two or more chronic or acute diseases and  
106 medical conditions in one person (1). The prevalence of MM increases significantly with age, rising  
107 from about 50% at the age of 60 years to more than 80% at the age of 80, although estimates vary  
108 widely depending on the employed definition of MM (2–6). Interaction of conditions and treatments,  
109 complicated care needs and substantial treatment burden make patient-physician encounters  
110 involving multimorbid older patients highly complex, and the clinical management of these patients  
111 extremely challenging (7).

112 Although interventions to improve relevant outcomes in patients with MM still lack high-quality  
113 evidence (8,9), existing principles (10), clinical practice guidelines (11) and care models (12) all  
114 recommend a patient-centred approach that takes patient preferences into consideration. MM can  
115 be associated with overwhelming management burden, which makes it necessary for physicians and  
116 patients to prioritise treatment plans by considering both the reduction of symptoms and the  
117 patients' quality of life. As every treatment option consists of a specific combination of benefits,  
118 harms and burden, it is important that physicians understand the need to take patients' preferences  
119 and priorities into account in the decision-making process. Tailoring treatments to each individual  
120 patient's needs and preferences is likely to improve adherence to self-management interventions  
121 and medication (13).

122 The GRADE working group define preferences as choices that patients make when "considering the  
123 potential benefits, harms, costs, limitations, and inconveniences of the management options in  
124 relation to one another" (14). Overall, preferences include patients' beliefs, expectations, desires,  
125 perspectives and goals (14). Some preferences, such as the avoidance of pain, are well-established  
126 and stable, and the patient is fully aware of them. Other preferences, however, must be developed  
127 from scratch. This is the case when initial preferences are inadequate to the task of solving the  
128 decision a person is faced with. The elucidation and construction of preferences is a complex process  
129 that several disciplines have investigated from different perspectives (15–18).

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2  
3 130 Healthcare decision-making in MM requires that health problems are prioritised in terms of desired  
4  
5 131 vs. undesired outcomes - a situation that patients often have no experience with. Clinical decision  
6  
7 132 elements may be unfamiliar to them, and the available choices may present a conflict in that one  
8  
9 133 goal can only be achieved by forgoing another (16). Moreover, MM is often characterised by a state  
10  
11 134 of shifting priorities in self-management that can change from day to day (19). Hence, most  
12  
13 135 healthcare-related preferences must be constructed during a process of elicitation that is part of the  
14  
15 136 decision-making process (16).

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19 137 Although several tools have been developed to assess multimorbid patients' preferences (e.g. for  
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21 138 different treatment options or outcomes) in terms of the prioritisation of their health-related goals  
22  
23 139 (20), no structured attempt has yet been made to summarise the current state of research on  
24  
25 140 healthcare-related preferences in this patient population. However, the broad nature of this topic  
26  
27 141 requires that existing evidence is mapped out, i.e. a systematic search of existing knowledge in the  
28  
29 142 field should be conducted to identify gaps and/or future research needs (21). Evidence mapping is an  
30  
31 143 innovative method of synthesising evidence when the research question is too broad to perform a  
32  
33 144 "traditional" systematic review. Both evidence maps (EM) and scoping reviews have recently been  
34  
35 145 recommended by the Agency for Healthcare Research and Quality (AHRQ)'s Evidence-based Practice  
36  
37 146 Center program (22) as a first step towards systematically mapping existing research that can help  
38  
39 147 answer broad-based questions. The two emerging methods differ in the way they present their  
40  
41 148 results: scoping reviews present a narrative description of results, whereas evidence maps use visual  
42  
43 149 formats (e.g. bubble plots) (23).

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48 150 In this article, we report the protocol of an EM to: (i) systematically identify and describe key  
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50 151 characteristics of research on health-related preferences of older patients with MM; (ii) display the  
51  
52 152 existing research landscape in visual formats; (iii) identify evidence clusters to guide subsequent  
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54 153 knowledge synthesis (systematic reviews and meta-analysis); and, (iv) identify evidence gaps to  
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56 154 inform patients, clinicians, researchers, policy-makers and funding agencies, and to help identify  
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58 155 future research priorities. This work will provide us with a thorough overview of research on the  
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3 156 health-related preferences of older patients with MM.  
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6 157 **METHODS AND ANALYSIS**  
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10 158 The aim of EMs is (21) to “collate, describe, and catalogue” knowledge of a broad subject area (24).  
11

12 159 EMs are particularly effective when research questions are wide-ranging because they explore rather  
13

14 160 than summarise evidence. Consequently, EMs do not include meta-analysis, or compare the strength  
15

16 161 of evidence between studies but chart concepts, themes and the amount and type of evidence  
17

18 162 available.  
19  
20

21 163 The present protocol will follow, where applicable, the ‘PRISMA Extension for Scoping Reviews’  
22

23 164 (PRISMA-ScR) checklist (25) (see Additional file 1).  
24  
25

26 165 [About here: link to Additional file 1. Preferred Reporting Items for Systematic reviews and Meta-  
27

28 166 Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist]  
29  
30

31 167 Following the framework originally establish by Arksey and O`Malley (26), refined by Levac et al (27)  
32

33 168 and further developed by the Joanna Brigs Institute (28), six steps will be used to create the EM: 1)  
34

35 169 Identifying a broad clinical question; 2) Identifying relevant studies; 3) Study selection; 4) Charting  
36

37 170 the data; 5) Reporting the results; 6) Consultation.  
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41 171 **Step 1. Identifying a broad clinical question**  
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43 172 A pilot test of an EM for our research question (published elsewhere) was performed as part of a  
44

45 173 collaboration between the Institute of General Practice at Johann Wolfgang Goethe University  
46

47 174 (Frankfurt) and the Institute for Evidence in Medicine (for Cochrane Germany Foundation), Freiburg.  
48

49 175 It showed the feasibility of the mapping approach and areas for improvement, thus helping to refine  
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51 176 the research question and the methods to be used.  
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53 177 We established a multidisciplinary research team of 11 experts – some of whom had more than one  
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55 178 area of expertise - from 5 countries (Australia, Canada, Germany, Spain, The Netherlands). In  
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57 179 addition to a patient representative (1), the professionals represented primary care (2), internal  
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3 180 medicine (1), geriatrics (1), cognitive psychology (1), public health and health services research (2),  
4  
5 181 methodology (3), shared decision-making (1), epidemiology (1), and knowledge translation (1).  
6  
7 182 At the project kick-off meeting in April 2018, all members of the multidisciplinary research team  
8  
9 183 contributed to the definition of the scope of the EM. Based on the results of previous exploratory  
10  
11 184 research, we defined the following question to be addressed by our EM: What specific health-related  
12  
13 185 preferences of older patients with MM are described in current literature?  
14  
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16

## 17 186 **Step 2. Identifying relevant studies**

18  
19  
20 187 In order to identify relevant published studies, we will conduct a literature search in the following  
21  
22 188 electronic databases: MEDLINE (1946 to 2018) via Wolters Kluwer's search interface Ovid (indexed  
23  
24 189 and non-indexed databases), CINHAL (1981 to 2018), PsycINFO (1800s to 2018) and PSYINDEX via  
25  
26 190 EBSCOhost, Science Citation Index Expanded (1945 to 2018), and Social Science Citation index (1956  
27  
28 191 to 2018) via Clarivate Analytics' Web of Science, and EMBASE (1988 to 2018) via Ovid and Cochrane  
29  
30 192 Database (CENTRAL, TRIALS). We will check references of relevant articles and perform cited  
31  
32 193 reference research (forward citation tracking) based on the 10 most relevant studies found in our  
33  
34 194 initial search (e.g., if keywords provided by the author contained the terms "multimorbidity" and  
35  
36 195 "patient preferences" and/ or described a specific method for eliciting patients' preferences, such as  
37  
38 196 conjoint analysis). Authors of conference proceedings with no published results in academic journals  
39  
40 197 will be contacted and asked for any unpublished results. Secondary research (i.e., systematic reviews,  
41  
42 198 synthesis of qualitative studies, scoping reviews) studies on related topics will be reviewed and  
43  
44 199 references will be checked for possible inclusion in the EM. We will also search for ongoing trials in  
45  
46 200 clinicaltrials.gov and the WHO register.  
47  
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51  
52 201 We will follow PRESS Peer Review of Electronic Search Strategies recommendations and develop the  
53  
54 202 final search strategy in collaboration with an expert medical sciences librarian (29).  
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57 203 The full electronic search strategy for the MEDLINE database is provided in Additional file 2.  
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60 204 [About here: link to Additional file 2. Search strategy used for MEDLINE database]

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3 205 Based on the results of pilot testing, we agreed with all collaborative partners upon the following  
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5 206 eligibility criteria for the EM during the kick-off meeting in April 2018 (see Table 1):  
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8 207 [About here: Table 1. Inclusion & exclusion criteria]  
9  
10

#### 11 208 *Participants/population*

12  
13 209 Older patients (mean and/or median age  $\geq 60$  years) with MM (two or more simultaneous acute or  
14  
15 210 chronic conditions (1)) of any type will be considered.  
16  
17

#### 18 211 *Outcomes*

19  
20 212 Our phenomena of interest (outcomes) will be (i) health-related preferences relating to the  
21  
22 213 organisation of health-care; (ii) preferences for specific information, communication, or involvement  
23  
24 214 in a shared decision-making process; (iii) preferences relating to desired, undesired and competing  
25  
26 215 outcomes (in terms of safety and effectiveness); (iv) prioritisation of health problems or conditions;  
27  
28 216 (v) screening or diagnostic procedure preferences; and (vi) treatment preferences. The classification  
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30 217 of the outcomes will be discussed and consecutively adapted, depending on the literature findings.  
31  
32 218 This classification will further allow content analysis and the establishment of research clusters and  
33  
34 219 gaps.  
35  
36  
37

#### 38 220 *Study setting*

39  
40 221 We will not apply any restrictions to geographical location of the study or language of publication,  
41  
42 222 and we will include studies conducted in any setting, i.e. any health care context in any country  
43  
44 223 (including low and middle-income countries).  
45  
46

#### 47 224 *Study design*

48  
49 225 We will include qualitative and quantitative studies that address the phenomena of interest defined  
50  
51 226 above from the patients' perspectives.  
52  
53 227 We will exclude case reports, narrative reviews and editorials, and articles without details on  
54  
55 228 methodology. We will exclude interventional studies testing interventions of limited availability or  
56  
57 229 whose legal status is unclear (e.g. euthanasia). Studies addressing only the preferences of caregivers,  
58  
59 230 family, or medical and/or other professionals, will not be considered.  
60

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2  
3 231 **Step 3. Study selection**  
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5  
6 232 Bibliographic details of all identified references will first be uploaded to Endnote© and then  
7  
8 233 converted into COVIDENCE©, which will automatically detect duplicate documents. Two reviewers  
9  
10 234 (AIG, JN or KW) will independently screen titles and abstracts and will independently check full texts  
11  
12 235 of the included articles for eligibility. Any disagreement will be resolved and consensus reached with  
13  
14 236 the help of a third reviewer (CS). Before screening, a stepwise calibration exercise will be performed  
15  
16 237 on a sample of 50 studies, with the aim of achieving 80% agreement between the two reviewers.  
17  
18 238 Inclusion and exclusion criteria will be reviewed and refined as necessary during the calibration  
19  
20 239 period.  
21  
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23  
24 240 **Step 4. Charting the data**  
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26  
27 241 Data extraction tables will be created using Excel and will include, when available: study  
28  
29 242 characteristics such as research type and setting (health care context, country of origin, study  
30  
31 243 period); patient characteristics (sample size, age, sex, definition of MM); aim of study; characteristics  
32  
33 244 of the preferences, such as methods used to elucidate patients' preferences, framing and definition  
34  
35 245 of preferences (e.g., treatment preferences, diagnostic preferences, desired, undesired and  
36  
37 246 competing outcome preferences - as guided by the above description of the phenomena of interest)  
38  
39 247 and results (see Table 2).  
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44 248 [About here: Table 2. Data extraction framework]  
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46  
47 249 Following a calibration exercise on five full texts, two reviewers (AIG, JN or CS) will independently  
48  
49 250 extract the data. To check the adequacy of the extracted information, the data extraction file will be  
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51 251 shared with other authors (CM, JB, MvA, TH and SS), and changes performed where necessary.  
52

53 252 **Step 5. Reporting the results**  
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56 253 We will summarise the data using tables and figures (i.e. bubble plot) to present the evidence  
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58 254 landscape and to elucidate clusters and gaps. For each year, we will identify the number of primary  
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60 255 and secondary research studies, as well as conferences and doctoral theses, which describe patients'

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3 256 preferences. We will describe the identified studies in terms of characteristics such as location,  
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5 257 setting and study design (i.e. observational - qualitative, quantitative or mixed-methods – or  
6  
7 258 interventional studies), sub-population according to age or MM pattern / severity if possible, and  
8  
9 259 study objectives aggregated according to research topic (i.e. type of preference) (Table 2).  
10  
11  
12 260 Clustering of research topics will be performed by applying content analysis (30,31) and based on  
13  
14 261 coding by two independent reviewers (AIG, JN or CS). The results will be entered into the data  
15  
16 262 extraction file, which will then be reviewed by the other researchers (CM, JB, MvA, TH and SS).  
17  
18 263 Categories for the analysis of the obtained data will be modified accordingly, along with the  
19  
20 264 development of the EM, and agreed upon after consultation with the research team.  
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#### 24 265 **Step 6. Consultation**

26 266 The development of the EM will follow an iterative process and all members of the research team  
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28 267 will be consulted during all steps of the project, including the identification of relevant literature,  
29  
30 268 study selection and data extraction. In November 2018, we held a workshop to present the results of  
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32 269 the preliminary search strategy and exploratory investigation, and to obtain feedback before  
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34 270 conducting further searches and other activities. We discussed interim results, refined the  
35  
36 271 methodology and agreed on the best formats for reporting our findings. Cluster definitions of the  
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38 272 identified research topics were discussed and agreed upon by all authors. All necessary changes were  
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40 273 established before continuing with the development of the EM.  
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#### 46 274 **Patient and public involvement**

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48 275 A patient representative from the Federal Joint Committee “Gemeinsamer Bundesausschuss“  
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50 276 participated actively in all the six steps followed to create the EM.  
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#### 54 277 **ETHICS AND DISSEMINATION**

55  
56 278 Due to the nature of the proposed evidence map, ethics approval will not be required. We will prepare  
57  
58 279 presentations to disseminate the study findings to healthcare providers and patients, and at relevant  
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3 280 national and international conferences, and we aim to publish the results of the study in peer-reviewed  
4  
5 281 journals. We will provide recommendations for primary research that are based on the identified  
6  
7 282 knowledge gaps, and recommendations for secondary research that are based on knowledge clusters.  
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10 283 **FULL REFERENCES**  
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8 381 **AUTHORS' CONTRIBUTIONS**  
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10 382 AIG wrote the initial draft of the protocol. CM is the guarantor of the review. CS and JM provided  
11  
12 383 methodological guidance and revisions of the manuscript. CS and JN assisted in the identification of  
13  
14 384 databases and reviewed the search strategy. JB, MvA, TN, JN, OW, KR, TH, FG and SS are co-  
15  
16 385 supervisors of this project, provided advice at all stages of the development of the protocol, and  
17  
18 386 contributed to the revision of the manuscript. All authors read and approved the final manuscript.  
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23 387 **FUNDING STATEMENT**  
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25  
26 388 This work was supported by the German Federal Ministry of Education and Research, grant number  
27  
28 389 01GL1729. The funder had no role in developing the protocol for this review.  
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31 390 **COMPETING INTERESTS STATEMENT**  
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35 391 None declared  
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37 392 **WORD COUNT**  
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40 393 2,209 words  
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394 **Table 1. Inclusion & exclusion criteria**

Inclusion criteria	Exclusion criteria
<p>⇒ Qualitative and quantitative studies addressing health-related preferences (priorities, goal-oriented, goal attainment, shared decision-making, patient-centred, patient-oriented, "satisfaction") from the patient's perspective</p> <p>⇒ Age: average age of 60 or older, geriatric patients, elderly patients</p> <p>⇒ Polypharmacy: with or without polypharmacy</p> <p>⇒ Multimorbidity: Comorbidity, multiple chronic conditions</p> <p>⇒ No restrictions: We will not apply any restrictions with respect to geographical location, health care context, country, and language</p>	<p>⇒ Case reports,</p> <p>⇒ Narrative reviews</p> <p>⇒ Editorials</p> <p>⇒ Articles providing no details on methodology</p> <p>⇒ Interventional studies of limited availability, or whose legal status is unclear (e.g. euthanasia)</p> <p>⇒ Studies addressing only preferences of caregivers and medical professionals</p>

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397 **Table 2. Data extraction framework**

Bibliometrics	Description	Coding
First Author, year of publication		
Study characteristics	Publication type	Research article, conference, thesis, study protocol
	Study type	Primary or secondary research
	Language	e.g. English
	Geographical location	Country, region, city
	Study setting	Hospital, general practice, nursing home, other
	Study method	Observational (i.e. qualitative, quantitative, mixed methods) or interventional study
Patient characteristics	Definition of MM	(authors' description)
	Number of patients	Study sample
	Age	(years)
	Sex	(% females)
Methods of data collection	Type of data collection	Interview, semi-structured interview, survey, focus group, questionnaire (authors' description)
	Method of eliciting patients' preferences (PtP)	Tool definition (authors' description)
Outcome	Definition of (PtP) and priorities	(authors' definition)

	Type of PtP assessed	(reviewers' definition)
Study aim		(authors' description)
Results / Conclusions		(authors' description)

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399 PtP: patients' preferences

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For peer review only

## Additional file 1.

**Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	Page 1, line 2
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 4, lines 65-89
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Page 6, lines 105-150
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 7, lines 151-157
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Page 5, line 91
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Pages 9-10, lines 187-223
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Page 9, lines 187-197
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Page 10, line 226



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Pages 10-11, lines 229-235
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Page 11, lines 237-246
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 11, lines 237-246
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Click here to enter text.
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Pages 11-12, lines 248-261
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Click here to enter text.
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Click here to enter text.
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Click here to enter text.
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Click here to enter text.
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Click here to enter text.
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review	Click here to enter text.

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		questions and objectives, and consider the relevance to key groups.	
Limitations	20	Discuss the limitations of the scoping review process.	Click here to enter text.
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Click here to enter text.
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Page 16, lines 377-378

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* ;169:467–473. doi: 10.7326/M18-0850

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4 **1 Additional file 2. Search strategy used for MEDLINE database (search interface: Ovid; Host:**  
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7 **2 Wolters Kluwer)**  
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11 **3 MEDLINE 1946 to the third week of April, 2018,**  
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13  
14 **4 MEDLINE Daily Update April 26, 2018,**  
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16  
17 **5 MEDLINE In-Process & Other Non-Indexed Citations April 26, 2018,**  
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19  
20 **6 MEDLINE Epub Ahead of Print April 26, 2018**  
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23  
24 **7 Search date (yyyy-mm-dd): 2018-04-27**  
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#	Searches	Results	Annotations
1	exp aged/	2800655	#1 to #8:
2	Geriatrics/	28648	Aspect Aged
3	(old*3 adj2 (adult*2 or people or person* or patient* or age*2 or man or men or wom#n or client* or residen*)).ti,ab,kf.	551680	
4	(elder* or geriat* or geronto* or frail* or senior? or agedly).ti,ab,kf.	314577	
5	(high*3 age*2 or late* life* or late* live*).ti,ab,kf.	21918	

6	((liv* or life*) adj2 long*3 adj2 (adult* or people or person* or patient* or man or men or wom?n or client* or residen*)).ti,ab,kf.	2540	
7	advanced in years.ti,ab,kf. or betagt*.ot.	162	
8	or/1-7	3248520	
9	comorbidity/	92917	#9 to #21:
10	Multiple Chronic Conditions/	178	Aspect Multi-morbidity
11	exp chronic disease/ and (multi or multiple or concurren* or complex*).ti,ab,kf.	20443	
12	(comorbid* or co-morbid*).ti,ab,kf,ot. or (komorbid* or ko-morbid*).ot.	140228	
13	(multimorbid* or multi*-morbid*).ti,ab,kf,ot.	4057	
14	(polymorbid* or poly morbid*).ti,ab,kf,ot.	292	
15	multidisease*.ti,ab,kf.	39	
16	((multi or multiple) adj2 (ill or illness* or condition* or disorder* or syndrom* or disease*)).ti,ab,kf.	30204	

17	(complex* adj2 (patient* or disease* or ill or illness* or condition* or disorder*)).ti,ab,kf.	42426	
18	(concurrent* adj2 (disease* or ill or illness* or condition* or disorder*)).ti,ab,kf.	4305	
19	(multimedication* or multi*-medication* or polymedication* or poly-medication* or polypharmacy* or poly-pharmacy*).ti,ab,kf.	8133	
20	Polypharmacy/	3790	
21	or/9-20	297020	
22	8 and 21	110795	Aged AND Multi-morbidity
23	exp patient centered care/	16400	#23 to #49:
24	exp patient satisfaction/	78556	Aspect patient-
25	decision making/	83248	centered care
26	choice behaviour/	28960	
27	Health Priorities/	10119	
28	((patient? or client? or person*2) adj2 prefer*).ti,ab,kf.	18606	

29	((patient? or client? or person*2) adj2 priorit*).ti,ab,kf.	2490
30	(treatment adj2 (goal? or preference? or priorit*).ti,ab,kf.	11750
31	goal attainment.ti,ab,kf.	1550
32	(goal oriented* or goaloriented*).ti,ab,kf.	1425
33	goals/	14804
34	(patient cent* adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	9128
35	(person cent* adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	2349
36	(client cent* adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	556
37	(patient oriented adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	375
38	(person oriented adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	114

1 2 3 4 5 6 7 8 9	39	(client oriented adj2 (care or approach* or therap* or treatment or medic*)).ti,ab,kf.	19
10 11 12 13 14 15	40	(patient cent?redness or client cent?redness or person cent?redness).ti,ab,kf.	1408
16 17 18 19	41	(patientcent* or clientcent* or personcent*).ti,ab,kf.	24
20 21 22 23 24 25	42	(patientoriented* or clientoriented* or personoriented*).ti,ab,kf.	4
26 27 28 29 30 31 32 33 34 35	43	(patient*orientier* or klient*orientier* or patient*zentrier* or klient*zentrier* or person*orientier* or person*zentrier*).ot.	179
36 37 38 39 40 41 42	44	((patient* or klient* or person*) adj (zentrier* or orientier*)).ot.	24
43 44 45 46 47 48 49 50 51	45	((goal* or priorit* or target* or value* or preference*) adj2 (patient* or individual* or person* or client*)).ti,ab,kf.	63093
52 53 54 55 56 57 58	46	((goal* or priorit* or target* or preference*) adj2 treatment*).ti,ab,kf.	32182
59 60	47	((patient* or client* or person*) adj2 choice*).ti,ab,kf.	9970

1	48	shared decision making.ti,ab,kf.	5495	
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3	49	or/23-48	326625	
4				
5	50	22 and 49	4208	Aged AND Multi-
6				morbidity AND patient-
7				centered care
8				
9	51	protocol.ti.	35122	Textword protocol in
10				title
11				
12	52	21 and 49 and 51	89	Multi-morbidity AND
13				patient-centered care
14				AND protocol in title
15				
16	53	50 or 52	4259	(Aged AND Multi-
17				morbidity AND patient-
18				centred care)
19				OR
20				(Multi-morbidity AND
21				patient-centred care
22				AND protocol in title)
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24	54	exp animals/ not humans/	4450254	Exclusion of animals
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57	(case? adj3 report).ti.	302363	
58	editorial.pt.	456208	
59	editorial.ti.	34313	
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9 / = Medical Subject Heading (MeSH)

10 Exp = exploded Mesh term

11 \* = truncation, any number of characters

12 \*2, \*3 = truncation: from 0 to 2, 0 to 3 characters

13 ? = 0 or 1 character

14 # = 1 character

15 .ti,ab,kf. = title, abstract, keyword heading word

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3 16 .ti. = title  
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6 17 .ot. = original title  
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10 18 .mp. = title, abstract, original title, name of substance word, subject heading word, keyword  
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13 19 heading word, protocol supplementary concept word, rare disease supplementary concept  
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16 20 word, unique identifier  
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19 21 .pt. = publication type  
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22 22  $adj_n$  = Search terms within  $n$  words in any order  
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# BMJ Open

## Health-Related Preferences of Older Patients with Multimorbidity: the protocol for an Evidence Map.

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6 2 Health-Related Preferences of Older Patients with Multimorbidity: The protocol for an Evidence Map.  
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9 3 **AUTHORS**  
10

11 4 Ana Isabel González  
12

13  
14 5 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY. Red de  
15

16  
17 6 Investigación en Servicios de Salud en Enfermedades Crónicas (REDISSEC), Madrid, SPAIN.  
18

19  
20 7 Email: [GonzalezGonzalez@allgemeinmedizin.uni-frankfurt.de](mailto:GonzalezGonzalez@allgemeinmedizin.uni-frankfurt.de)  
21

22  
23 8 Corresponding author  
24

25  
26 9  
27  
28 10 Christine Schmucker  
29

30  
31 11 Institute for Evidence in Medicine (for Cochrane Germany Foundation), Medical Center, Faculty of  
32

33  
34 12 Medicine, University of Freiburg, Freiburg, GERMANY.  
35

36  
37 13 Email: [schmucker@ifem.uni-freiburg.de](mailto:schmucker@ifem.uni-freiburg.de)  
38

39  
40 14  
41  
42 15 Jeanet Blom  
43

44  
45 16 Department of Public Health and Primary Care, Leiden University Medical Center, Leiden, THE  
46

47  
48 17 NETHERLANDS.  
49

50  
51 18 Email: [J.W.Blom@lumc.nl](mailto:J.W.Blom@lumc.nl)  
52

53  
54 19  
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56  
57 20 Marjan van den Akker  
58

59  
60 21 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.

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22 Email: [m.vandenAkker@allgemeinmedizin.uni-frankfurt.de](mailto:m.vandenAkker@allgemeinmedizin.uni-frankfurt.de)

23

24

25 Truc Sophia Nguyen

26 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.

27 Email: [Nguyen@allgemeinmedizin.uni-frankfurt.de](mailto:Nguyen@allgemeinmedizin.uni-frankfurt.de)

28

29 Julia Nothacker

30 Institute for Evidence in Medicine (for Cochrane Germany Foundation), Medical Center, Faculty of

31 Medicine, University of Freiburg, Freiburg, GERMANY.

32 Email: [nothacker@cochrane.de](mailto:nothacker@cochrane.de)

33

34 Joerg J. Meerpohl

35 Institute for Evidence in Medicine (for Cochrane Germany Foundation), Medical Center, Faculty of

36 Medicine, University of Freiburg, Freiburg, GERMANY.

37 Email: [meerpohl@ifem.uni-freiburg.de](mailto:meerpohl@ifem.uni-freiburg.de)

38

39 Kristian Röttger

40 Patient representative, Federal Joint Committee "Gemeinsamer Bundesausschuss", Berlin. GERMANY.

41 Email: [kristianroettger@aol.de](mailto:kristianroettger@aol.de)

42

43 Odette Wegwarth

1  
2  
3 44 Center for Adaptive Rationality, Max Planck Institute for Human Development, Berlin, GERMANY.  
4  
5

6 45 Email: [wegwarth@mpib-berlin.mpg.de](mailto:wegwarth@mpib-berlin.mpg.de)  
7  
8

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11 47 Tammy Hoffmann  
12  
13

14 48 Centre for Research in Evidence-Based Practice (CREBP), Faculty of Health Sciences and Medicine,  
15  
16

17 49 Bond University, Gold Coast, Queensland, AUSTRALIA.  
18  
19

20 50 Email: [thoffman@bond.edu.au](mailto:thoffman@bond.edu.au)  
21  
22

23 51  
24

25 52 Sharon E. Straus  
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27

28 53 Department of Medicine, University of Toronto, Toronto, CANADA.  
29  
30

31 54 Email: [sharon.straus@utoronto.ca](mailto:sharon.straus@utoronto.ca)  
32  
33

34 55  
35

36 56 Ferdinand M. Gerlach  
37  
38

39 57 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.  
40  
41

42 58 Email: [gerlach@allgemeinmedizin.uni-frankfurt.de](mailto:gerlach@allgemeinmedizin.uni-frankfurt.de)  
43  
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45 59  
46  
47

48 60 Christiane Muth  
49  
50

51 61 Institute of General Practice, Johann Wolfgang Goethe University, Frankfurt / Main, GERMANY.  
52  
53

54 62 Email: [muth@allgemeinmedizin.uni-frankfurt.de](mailto:muth@allgemeinmedizin.uni-frankfurt.de)  
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**64 ABSTRACT****65 Introduction:**

66 Interaction of conditions and treatments, complicated care needs and substantial treatment burden  
67 make patient-physician encounters involving multimorbid older patients highly complex. To optimally  
68 integrate patients' preferences, define and prioritise realistic treatment goals and individualise care,  
69 a patient-centred approach is recommended. However, the preferences of older patients, who are  
70 especially vulnerable and frequently multimorbid, have not been systematically investigated with  
71 regard to their health status. The purpose of this evidence map is to explore current research  
72 addressing health-related preferences of older patients with multimorbidity, and to identify  
73 knowledge clusters and research gaps.

**74 Methods and analysis:**

75 To identify relevant research, we will conduct searches in the electronic databases MEDLINE,  
76 EMBASE, PsycINFO, PSYINDEX, CINAHL, Social Science Citation Index, Social Science Citation Index  
77 Expanded and the Cochrane library from their inception. We will check reference lists of relevant  
78 articles and carry out cited reference research (forward citation tracking). Two independent  
79 reviewers will screen titles and abstracts, check full texts for eligibility and extract the data. Any  
80 disagreement will be resolved and consensus reached with the help of a third reviewer. We will  
81 include both qualitative and quantitative studies, and address preferences from the patients'  
82 perspectives in a multimorbid population over the age of 60 years. There will be no restrictions on  
83 the publication language. Data extraction tables will present study and patient characteristics, aim of  
84 study, and methods used to identify preferences and outcomes (i.e., type of preferences). We will  
85 summarise the data using tables and figures (i.e. bubble-plot) to present the research landscape and  
86 to describe clusters and gaps.

**87 Ethics and dissemination:**



1  
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3 88 Due to the nature of the proposed evidence map, ethics approval will not be required. Results from  
4  
5 89 our research will be disseminated by means of specifically prepared materials for patients, at  
6  
7 90 relevant (inter-)national conferences and via publication in peer-reviewed journals.  
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11 91 **Registration:**  
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14 92 Open Science Framework (OSF): DOI 10.17605/OSF.IO/MCRWQ.  
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For peer review only

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3 94 **Strengths and limitations of this study:**  
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6 95 Strengths of the study include, first, the considerable expertise, methodological experience and skills  
7  
8 96 that result from having a multinational and multidisciplinary study team that also includes a patient's  
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10  
11 97 representative.  
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13

14 98 Second, the search will also be broad-based, use a sensitive rather than a specific strategy, and cover  
15  
16 99 a wide range of databases, terms and search strategies (e.g. forward citation tracking).  
17  
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19  
20 100 Third, selection criteria will be broad (i.e. both qualitative and quantitative studies will be  
21  
22 101 considered) and no restrictions will be placed on setting or language of publication.  
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25  
26 102 The main study limitation is poor indexing of articles and the lack of, or non-standardized definition  
27  
28 103 of, 'patient preferences' (e.g., expressed as satisfaction, experience or perspectives).  
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31 104 The planned evidence map is expected to help researchers identify clusters and gaps in evidence on  
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33 105 preferences of older patients with multimorbidity.  
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## 107 INTRODUCTION

108 Multimorbidity is defined as the co-occurrence of two or more or acute diseases and medical  
109 conditions in one person (1). The prevalence of multimorbidity increases significantly with age, rising  
110 from about 50% at the age of 60 years to more than 80% at the age of 80, although estimates vary  
111 widely depending on the employed definition of multimorbidity (2–7). Interaction of conditions and  
112 treatments, complicated care needs and substantial treatment burden make patient-physician  
113 encounters involving multimorbid older patients highly complex, and the clinical management of  
114 these patients extremely challenging (8–10).

115 Although interventions to improve relevant outcomes in older patients with multimorbidity still lack  
116 high-quality evidence (11,12), existing principles (13), clinical practice guidelines (14),  
117 recommendations for research (9) and care models (15) all recommend a patient-centred approach  
118 that takes patient preferences into consideration. Multimorbidity can be associated with  
119 overwhelming management burden, which makes it necessary for physicians and patients to  
120 prioritise treatment plans by considering both the reduction of symptoms and the patients' quality of  
121 life (16,17). As every treatment option consists of a specific combination of benefits, harms and  
122 burden, it is important that physicians understand the need to take older patients' preferences and  
123 priorities into account in the decision-making process. Tailoring treatments to each individual older  
124 patient's needs and preferences is likely to improve adherence to self-management interventions  
125 and medication (18).

126 The GRADE working group define preferences as choices that patients make when "considering the  
127 potential benefits, harms, costs, limitations, and inconveniences of the management options in  
128 relation to one another" (19). Overall, preferences include patients' beliefs, expectations, desires,  
129 perspectives and goals (19). Certain preferences, such as the avoidance of pain, are stable and well  
130 articulated by patients,. However, most preferences relating to the medical decision-making process  
131 have to be broken down into their individual components, as the patient is often not familiar with  
132 them. For example, the potential benefits and harms of a new drug treatment have to be taken into

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3 133 consideration and weighed against each other and across diseases, especially in in older patients  
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5 134 with multimorbidity. The elucidation and construction of preferences is a complex process that  
6  
7 135 several disciplines have investigated from different perspectives (20–23).  
8  
9  
10 136 Healthcare decision-making in multimorbidity requires that health problems are prioritised in terms  
11  
12 137 of desired vs. undesired outcomes - a situation that patients often have no experience with (24).  
13  
14 138 Clinical decision elements may be unfamiliar to them, and the available choices may present a  
15  
16 139 conflict in that one goal can only be achieved by forgoing another (21). Moreover, multimorbidity is  
17  
18 140 often characterised by a state of shifting priorities in self-management that can change from day to  
19  
20 141 day (25). Hence, most healthcare-related preferences must be constructed during a process of  
21  
22 142 elicitation that is part of the decision-making process (21).  
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26 143 Although several tools have been developed to assess multimorbid patients' preferences (e.g. for  
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28 144 different treatment options or outcomes) in terms of the prioritisation of their health-related goals  
29  
30 145 (26), no structured attempt has yet been made to summarise the current state of research on  
31  
32 146 healthcare-related preferences in this patient population. However, the broad nature of this topic  
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34 147 requires that existing evidence is mapped out, i.e. a systematic search of existing knowledge in the  
35  
36 148 field should be conducted to identify gaps and/or future research needs (27).  
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40 149 In this article, we report the protocol of an evidence map to: (i) systematically identify and describe  
41  
42 150 key characteristics of research on health-related preferences of older patients with multimorbidity;  
43  
44 151 (ii) display the existing research landscape in visual formats; (iii) identify evidence clusters to guide  
45  
46 152 subsequent knowledge synthesis (systematic reviews and meta-analysis); and, (iv) identify evidence  
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48 153 gaps to inform patients, clinicians, researchers, policy-makers and funding agencies, and to help  
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50 154 identify future research priorities. This work will provide us with a thorough overview of research on  
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52 155 the health-related preferences of older patients with multimorbidity.  
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## 57 **METHODS AND ANALYSIS**

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3 157 Evidence mapping is an innovative method of synthesising evidence that is particularly useful when  
4  
5 158 the research question is too broad to permit a “traditional” systematic review to be performed.  
6  
7 159 Evidence maps have recently been recommended by the Agency for Healthcare Research and Quality  
8  
9 160 (AHRQ)’s Evidence-based Practice Center program (28) as a first step towards systematically mapping  
10  
11 161 existing research (clusters and gaps in evidence) that can help answer broad-based questions. They  
12  
13 162 usually use visual formats (e.g. bubble plots) to analyse and present results (29).  
14  
15 163 The aim of evidence maps is (27) to “collate, describe, and catalogue” knowledge of a broad subject  
16  
17 164 area (30). Evidence maps are particularly effective when research questions are wide-ranging  
18  
19 165 because they explore rather than summarise evidence. Consequently, evidence maps do not include  
20  
21 166 meta-analysis or compare the strength of evidence between studies but chart concepts, themes and  
22  
23 167 the amount and type of evidence available.  
24  
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28 168 The present protocol will follow, where applicable, the ‘PRISMA Extension for Scoping Reviews’  
29  
30 169 (PRISMA-ScR) checklist (31) (see Additional file 1).  
31  
32

33 170 [About here: link to Additional file 1. Preferred Reporting Items for Systematic reviews and Meta-  
34  
35 171 Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist]  
36  
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38 172 Following the framework originally establish by Arksey and O`Malley (32), refined by Levac et al (33)  
39  
40 173 and further developed by the Joanna Briggs Institute (34), six steps will be used to create the  
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42 174 evidence map: 1) Identifying a broad clinical question; 2) Identifying relevant studies; 3) Study  
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44 175 selection; 4) Charting the data; 5) Reporting the results; 6) Consultation.  
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#### 48 176 **Step 1. Identifying a broad clinical question**

49

50 177 A pilot test of an evidence map for our research question (published elsewhere) was performed as  
51  
52 178 part of a collaboration between the Institute of General Practice at Johann Wolfgang Goethe  
53  
54 179 University (Frankfurt) and the Institute for Evidence in Medicine (for Cochrane Germany Foundation),  
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56 180 Freiburg. It showed the feasibility of the mapping approach and areas for improvement, thus helping  
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58 181 to refine the research question and the methods to be used.  
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3 182 We established a multidisciplinary research team of 11 experts – some of whom had more than one  
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5 183 area of expertise - from 5 countries (Australia, Canada, Germany, Spain, The Netherlands). In  
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7 184 addition to a patient representative (1), the professionals represented primary care (2), internal  
8  
9 185 medicine (1), geriatrics (1), cognitive psychology (1), public health and health services research (2),  
10  
11 186 methodology (3), shared decision-making (1), epidemiology (1), and knowledge translation (1).  
12  
13

14 187 At the project kick-off meeting in April 2018, all members of the multidisciplinary research team  
15  
16 188 contributed to the definition of the scope of the evidence map. Based on the results of previous  
17  
18 189 exploratory research, we defined the following question to be addressed by our evidence map: What  
19  
20 190 specific health-related preferences of older patients with multimorbidity are described in the  
21  
22 191 available literature?  
23  
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## 26 192 **Step 2. Identifying relevant studies**

27  
28  
29 193 In order to identify relevant published studies, we will conduct a literature search in the following  
30  
31 194 electronic databases: MEDLINE (1946 to 2018) via Wolters Kluwer's search interface Ovid (indexed  
32  
33 195 and non-indexed databases), CINAHL (1981 to 2018), PsycINFO (1800s to 2018) and PSYINDEX via  
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35 196 EBSCOhost, Science Citation Index Expanded (1945 to 2018), and Social Science Citation index (1956  
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37 197 to 2018) via Clarivate Analytics' Web of Science, and EMBASE (1988 to 2018) via Ovid, and Cochrane  
38  
39 198 Database (CENTRAL, TRIALS). We will check the reference lists of included articles (backward citation  
40  
41 199 tracking) and carry out forward citation tracking using the Web of Science Core Collection and Google  
42  
43 200 Scholar. Additionally, we will search for related articles in Pubmed. Authors of conference  
44  
45 201 proceedings that have not published a full set of results will be contacted. Secondary research (i.e.,  
46  
47 202 systematic reviews, synthesis of qualitative studies, scoping reviews) studies on related topics will be  
48  
49 203 reviewed and references will be checked for possible inclusion in the evidence map. We will also  
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51 204 search for ongoing trials in clinicaltrials.gov and the WHO register.  
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56 205 We followed the recommendations of PRESS Peer Review of Electronic Search Strategies and  
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58 206 developed the final search strategy in collaboration with an expert medical sciences librarian (35).  
59  
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3 207 The full electronic search strategy for the MEDLINE database is provided in Additional file 2.  
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6 208 [About here: link to Additional file 2. Search strategy used for MEDLINE database]  
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9 209 Based on the results of pilot testing, we agreed with all collaborative partners upon the following  
10

11 210 eligibility criteria for the evidence map during the kick-off meeting in April 2018 (see Table 1):  
12  
13

14 211 [About here: Table 1. Inclusion & exclusion criteria]  
15  
16

#### 17 212 *Participants/population*

18  
19 213 Older patients (mean and/or median age  $\geq 60$  years) with multimorbidity (two or more simultaneous  
20

21 214 acute or chronic conditions (1)) of any type will be considered.  
22  
23

#### 24 215 *Outcomes*

25  
26 216 Our phenomena of interest (outcomes) will be (i) preferences related to the organisation of  
27

28 217 healthcare; (ii) preferences for specific information, communication, or involvement in a shared  
29

30 218 decision-making process; (iii) preferences relating to desired, undesired and competing outcomes (in  
31

32 219 terms of safety and effectiveness); (iv) prioritisation of health problems or conditions; (v) screening  
33  
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35 220 or diagnostic procedure preferences; and (vi) treatment preferences. The classification of the  
36

37 221 outcomes will be discussed and consecutively adapted, depending on the literature findings. This  
38

39 222 classification will further allow content analysis and the establishment of research clusters and gaps.  
40  
41

#### 42 223 *Study setting*

43  
44 224 We will not apply any restriction to the geographical location of the study or the language of  
45

46 225 publication, and we will include studies conducted in any setting, i.e. any health care context in any  
47

48 226 country (including low and middle-income countries).  
49  
50

#### 51 227 *Study design*

52  
53 228 We will include qualitative and quantitative studies that address the phenomena of interest defined  
54

55 229 above from the patients' perspectives.  
56

57 230 We will exclude case reports, narrative reviews and editorials. We will leave out studies investigating  
58

59 231 preferences for or against interventions of limited availability or whose legal status is unclear (e.g.  
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3 232 euthanasia, which is neither legal nor available in most Western countries). Studies addressing only  
4  
5 233 the preferences of caregivers, family, or medical and/or other professionals, will not be considered.  
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7

### 8 234 **Step 3. Study selection**

9  
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11 235 Bibliographic details of all identified references will first be uploaded to Endnote© and then  
12  
13 236 converted into COVIDENCE©, which will automatically detect duplicate documents. Two reviewers  
14  
15 237 (AIG, JN or KW) will independently screen titles and abstracts and will independently check full texts  
16  
17 238 of the included articles for eligibility. Any disagreement will be resolved and consensus reached with  
18  
19 239 the help of a third reviewer (CS). Before screening, a stepwise calibration exercise will be performed  
20  
21 240 on a sample of 50 studies, with the aim of achieving 80% agreement between the two reviewers. In  
22  
23 241 case 80% agreement is not reached, our inclusion and exclusion criteria will be refined to reach this  
24  
25 242 cut-off (e.g. defined more stringently). Refined criteria will be calibrated on a new sample of 50  
26  
27 243 studies and repeated until this threshold is reached. We will report any changes to the inclusion and  
28  
29 244 exclusion criteria that result from the calibration exercise as deviations from the published protocol.  
30  
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32

### 33 245 **Step 4. Charting the data**

34  
35  
36 246 Data extraction tables will be created using Excel and will include, when available: study  
37  
38 247 characteristics such as research type (study design / methodology) and setting (health care context,  
39  
40 248 country of origin, study period); patient characteristics (sample size, age, sex, definition of  
41  
42 249 multimorbidity); aim of study; characteristics of the preferences, such as methods used to elucidate  
43  
44 250 patients' preferences, framing and definition of preferences (e.g., treatment preferences, diagnostic  
45  
46 251 preferences, desired, undesired and competing outcome preferences - as guided by the above  
47  
48 252 description of the phenomena of interest) and results (see Table 2).  
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52  
53 253 [About here: Table 2. Data extraction framework]

54  
55  
56 254 Following a calibration exercise on five full texts, two reviewers (AIG, JN or CS) will independently  
57  
58 255 extract the data. To check the adequacy of the extracted information, the data extraction file will be  
59  
60 256 shared with other authors (CM, JB, MvA, TH and SS), and changes performed where necessary.



## 257 **Step 5. Reporting the results**

258 We will summarise the data using tables and figures (i.e. bubble plot) to present the evidence  
259 landscape and to elucidate clusters and gaps. For each year, we will identify the number of primary  
260 and secondary research studies, as well as conferences and doctoral theses, which describe patients'  
261 preferences. We will describe the identified studies in terms of characteristics such as location,  
262 setting and study design (i.e. observational - qualitative, quantitative or mixed-methods – or  
263 interventional studies), sub-population according to age or multimorbidity pattern / severity if  
264 possible, and study objectives aggregated according to research topic (i.e. type of preference) (Table  
265 2).

266 Clustering of research topics will be performed by applying content analysis (36,37) to summarise the  
267 types of preference described in the study. Based on coding by two independent reviewers (AIG, JN  
268 or CS), overarching themes will be identified and aggregated. For this purpose, the results will be  
269 entered into the data extraction file, which will then be reviewed by the other researchers (CM, JB,  
270 MvA, TH and SS). Categories for the analysis of the obtained data will be modified accordingly, along  
271 with the development of the evidence map, and agreed upon after consultation with the research  
272 team.

## 273 **Step 6. Consultation**

274 The development of the evidence map will follow an iterative process and all members of the  
275 research team will be consulted during all steps of the project, including the identification of relevant  
276 literature, study selection and data extraction. In November 2018, we held a workshop to present  
277 the results of the preliminary search strategy and exploratory investigation, and to obtain feedback  
278 before conducting further searches and other activities. We discussed interim results, refined the  
279 methodology and agreed on the best formats for reporting our findings. Cluster definitions of the  
280 identified research topics were discussed and agreed upon by all authors. All necessary changes were  
281 established before continuing with the development of the evidence map.

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3 282 The present study started on February 1<sup>st</sup> 2018 and is scheduled to end on October 31<sup>st</sup> 2019.  
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5

6 283 **Patient and public involvement**  
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8  
9 284 A patient representative (KR) from the Federal Joint Committee “Gemeinsamer Bundesausschuss (G-  
10  
11 285 BA)” will actively participate in all six steps required to create the evidence map. As a result of his  
12  
13 286 work on the G-BA board of patients’ representatives, KR has considerable expertise in evidence-  
14  
15 287 based medicine in a health care context, and an understanding of the pivotal role of patients’  
16  
17  
18 288 preferences in the provision of effective health care. The G-BA constitutes the highest decision-  
19  
20 289 making body for the joint self-administration of stakeholders in the German health service, and the  
21  
22 290 statutory health insurance service catalogue for over 70 million insured individuals is based on its  
23  
24 291 guidelines.”  
25  
26

27 292 **ETHICS AND DISSEMINATION**  
28

29  
30 293 Due to the nature of the proposed evidence map, ethics approval will not be required. We will prepare  
31  
32 294 presentations to disseminate the study findings to healthcare providers and patients, and at relevant  
33  
34 295 national and international conferences, and we aim to publish the results of the study in peer-reviewed  
35  
36 296 journals. We will provide recommendations for primary research that are based on the identified  
37  
38 297 knowledge gaps, and recommendations for secondary research that are based on knowledge clusters.  
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42 298 **FULL REFERENCES**  
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### 393 **AUTHORS' CONTRIBUTIONS**

394 AIG wrote the initial draft of the protocol. CM is the guarantor of the review. CS and JM provided  
395 methodological guidance and revisions of the manuscript. CS and JN assisted in the identification of  
396 databases and reviewed the search strategy. JB, MvA, TN, JN, OW, KR, TH, FG and SS are co-  
397 supervisors of this project, provided advice at all stages of the development of the protocol, and  
398 contributed to the revision of the manuscript. All authors read and approved the final manuscript.

### 399 **FUNDING STATEMENT**

400 This work was supported by the German Federal Ministry of Education and Research, grant number  
401 01GL1729. The funder had no role in developing the protocol for this review.

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3 402 **COMPETING INTERESTS STATEMENT**  
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6 403 None declared  
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9 404 **WORD COUNT**  
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12 405 2,209 words  
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For peer review only

406 **Table 1. Inclusion & exclusion criteria**

Inclusion criteria	Exclusion criteria
<p>⇒ Qualitative and quantitative studies addressing health-related preferences (priorities, goal-oriented, goal attainment, shared decision-making, patient-centred, patient-oriented, "satisfaction") from the patient's perspective</p> <p>⇒ Age: average age of 60 or older, geriatric patients, elderly patients</p> <p>⇒ Polypharmacy: with or without polypharmacy</p> <p>⇒ Multimorbidity: Comorbidity, multiple chronic conditions</p> <p>⇒ No restrictions: We will not apply any restrictions to the geographical location, health care context, country, and publication language of the study</p>	<p>⇒ Case reports,</p> <p>⇒ Narrative reviews</p> <p>⇒ Editorials</p> <p>⇒ Studies investigating preferences for or against interventions that are not generally available or only legal in limited contexts (e.g. euthanasia)</p> <p>⇒ Studies addressing only preferences of caregivers and healthcare professionals</p>

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409 **Table 2. Data extraction framework**

<b>Bibliometrics</b>	<b>Description</b>	<b>Coding</b>
First Author, year of publication		
Study characteristics	Publication type	Research article, conference, thesis, study protocol
	Study type	Primary or secondary research
	Language	e.g. English
	Geographical location	Country, region, city
	Study setting	Hospital, general practice, nursing home, other
	Study method	Observational (i.e. qualitative, quantitative, mixed methods) or interventional study
Patient characteristics	Definition of multimorbidity	(authors' description)
	Number of patients	Study sample
	Age	(years)
	Sex	(% females)
Methods of data collection	Type of data collection	Interview, semi-structured interview, survey, focus group, questionnaire (authors' description)
	Method of eliciting patients' preferences (PtP)	Tool definition (authors' description)
Outcome	Definition of (PtP) and priorities	(authors' definition)

	Type of PtP assessed	(reviewers' definition)
Study aim		(authors' description)
Results / Conclusions		(authors' description)

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411 PtP: patients' preferences

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## Additional file 1.

**Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	Page 1, line 2
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 4, lines 65-90
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Pages 7-8, lines 108-155
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 8, lines 149-155
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Page 5, line 92
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Pages 11, lines 211-233
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Page 10, lines 193-206
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Page 11, line 207; additional file 2

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Pages 12, lines 235-244
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Page 12, lines 246-256
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 12, lines 246-252; table 2
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Click here to enter text.
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 13, lines 258-272
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Click here to enter text.
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Click here to enter text.
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Click here to enter text.
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Click here to enter text.
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Click here to enter text.
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review	Click here to enter text.

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		questions and objectives, and consider the relevance to key groups.	
Limitations	20	Discuss the limitations of the scoping review process.	Click here to enter text.
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Click here to enter text.
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Page 18, lines 400-401

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* ;169:467–473. doi: 10.7326/M18-0850

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4 **1 Additional file 2. Search strategy used for MEDLINE database (search interface: Ovid; Host:**  
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7 **2 Wolters Kluwer)**  
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11 **3 MEDLINE 1946 to the third week of April, 2018,**  
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14 **4 MEDLINE Daily Update April 26, 2018,**  
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16  
17 **5 MEDLINE In-Process & Other Non-Indexed Citations April 26, 2018,**  
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20 **6 MEDLINE Epub Ahead of Print April 26, 2018**  
21  
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23  
24 **7 Search date (yyyy-mm-dd): 2018-04-27**  
25

#	Searches	Results	Annotations
1	exp aged/	2800655	#1 to #8:
2	Geriatrics/	28648	Aspect Aged
3	(old*3 adj2 (adult*2 or people or person* or patient* or age*2 or man or men or wom#n or client* or residen*)).ti,ab,kf.	551680	
4	(elder* or geriat* or geronto* or frail* or senior? or agedly).ti,ab,kf.	314577	
5	(high*3 age*2 or late* life* or late* live*).ti,ab,kf.	21918	

6	((liv* or life*) adj2 long*3 adj2 (adult* or people or person* or patient* or man or men or wom?n or client* or residen*)).ti,ab,kf.	2540	
7	advanced in years.ti,ab,kf. or betagt*.ot.	162	
8	or/1-7	3248520	
9	comorbidity/	92917	#9 to #21:
10	Multiple Chronic Conditions/	178	Aspect Multi-morbidity
11	exp chronic disease/ and (multi or multiple or concurren* or complex*).ti,ab,kf.	20443	
12	(comorbid* or co-morbid*).ti,ab,kf,ot. or (komorbid* or ko-morbid*).ot.	140228	
13	(multimorbid* or multi*-morbid*).ti,ab,kf,ot.	4057	
14	(polymorbid* or poly morbid*).ti,ab,kf,ot.	292	
15	multidisease*.ti,ab,kf.	39	
16	((multi or multiple) adj2 (ill or illness* or condition* or disorder* or syndrom* or disease*)).ti,ab,kf.	30204	

17	(complex* adj2 (patient* or disease* or ill or illness* or condition* or disorder*)).ti,ab,kf.	42426	
18	(concurrent* adj2 (disease* or ill or illness* or condition* or disorder*)).ti,ab,kf.	4305	
19	(multimedication* or multi*-medication* or polymedication* or poly-medication* or polypharmacy* or poly-pharmacy*).ti,ab,kf.	8133	
20	Polypharmacy/	3790	
21	or/9-20	297020	
22	8 and 21	110795	Aged AND Multi-morbidity
23	exp patient centered care/	16400	#23 to #49:
24	exp patient satisfaction/	78556	Aspect patient-
25	decision making/	83248	centered care
26	choice behaviour/	28960	
27	Health Priorities/	10119	
28	((patient? or client? or person*2) adj2 prefer*).ti,ab,kf.	18606	



29	((patient? or client? or person*2) adj2 priorit*).ti,ab,kf.	2490
30	(treatment adj2 (goal? or preference? or priorit*).ti,ab,kf.	11750
31	goal attainment.ti,ab,kf.	1550
32	(goal oriented* or goaloriented*).ti,ab,kf.	1425
33	goals/	14804
34	(patient cent* adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	9128
35	(person cent* adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	2349
36	(client cent* adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	556
37	(patient oriented adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	375
38	(person oriented adj2 (care or approach* or therap* or treatment or medic*).ti,ab,kf.	114

1 2 3 4 5 6 7 8 9	39	(client oriented adj2 (care or approach* or therap* or treatment or medic*)).ti,ab,kf.	19
10 11 12 13 14 15	40	(patient cent?redness or client cent?redness or person cent?redness).ti,ab,kf.	1408
16 17 18 19	41	(patientcent* or clientcent* or personcent*).ti,ab,kf.	24
20 21 22 23 24 25	42	(patientoriented* or clientoriented* or personoriented*).ti,ab,kf.	4
26 27 28 29 30 31 32 33 34 35	43	(patient*orientier* or klient*orientier* or patient*zentrier* or klient*zentrier* or person*orientier* or person*zentrier*).ot.	179
36 37 38 39 40 41 42	44	((patient* or klient* or person*) adj (zentrier* or orientier*)).ot.	24
43 44 45 46 47 48 49 50 51	45	((goal* or priorit* or target* or value* or preference*) adj2 (patient* or individual* or person* or client*)).ti,ab,kf.	63093
52 53 54 55 56 57 58	46	((goal* or priorit* or target* or preference*) adj2 treatment*).ti,ab,kf.	32182
59 60	47	((patient* or client* or person*) adj2 choice*).ti,ab,kf.	9970

1	48	shared decision making.ti,ab,kf.	5495	
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3	49	or/23-48	326625	
4				
5	50	22 and 49	4208	Aged AND Multi-
6				morbidity AND patient-
7				centered care
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9	51	protocol.ti.	35122	Textword protocol in
10				title
11				
12	52	21 and 49 and 51	89	Multi-morbidity AND
13				patient-centered care
14				AND protocol in title
15				
16	53	50 or 52	4259	(Aged AND Multi-
17				morbidity AND patient-
18				centred care)
19				OR
20				(Multi-morbidity AND
21				patient-centred care
22				AND protocol in title)
23				
24	54	exp animals/ not humans/	4450254	Exclusion of animals
25				
26				
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55	53 not 54	4258	
56	case reports.pt.	1875801	Exclusion of editorials
57	(case? adj3 report).ti.	302363	and case reports
58	editorial.pt.	456208	
59	editorial.ti.	34313	
60	or/56-59	2443711	
61	55 not 60	4111	
62	remove duplicates from 61	4080	Exclusion of duplicates.  <b>Final result</b>

8

9 / = Medical Subject Heading (MeSH)

10 Exp = exploded Mesh term

11 \* = truncation, any number of characters

12 \*2, \*3 = truncation: from 0 to 2, 0 to 3 characters

13 ? = 0 or 1 character

14 # = 1 character

15 .ti,ab,kf. = title, abstract, keyword heading word

1  
2  
3 16 .ti. = title  
4  
5

6 17 .ot. = original title  
7  
8

9 18 .mp. = title, abstract, original title, name of substance word, subject heading word, keyword  
10  
11

12 19 heading word, protocol supplementary concept word, rare disease supplementary concept  
13  
14

15 20 word, unique identifier  
16  
17

18 21 .pt. = publication type  
19  
20

21 22  $adj_n$  = Search terms within  $n$  words in any order  
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24 23  
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