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The key components of shared decision making: A systematic review of models

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ABSTRACT

OBJECTIVES: To 1) provide an up-to-date overview of shared decision making (SDM) models, 2) give insight in the prominence of components present in SDM-models, 3) describe who is identified as responsible within the components (patient, healthcare professional, both, none), 4) show the occurrence of SDM-components over time, and 5) present an SDM-map to easily identify key SDM-components per healthcare setting.

DESIGN: Systematic review

ELIGIBILITY CRITERIA: Peer-reviewed articles in English presenting a new or adapted model of SDM

INFORMATION SOURCES: PubMed, Embase, and Cochrane were systematically searched for articles published from inception up to and including May 31, 2018.

RESULTS: 31 articles were included, each describing a unique SDM-model. 10 models were generic, the others were specific to a healthcare setting. 12 models were based on empirical data, 19 primarily on analytical thinking. 53 different elements were identified and clustered into 24 components. *Mention treatment options* was the most prominent component across models. Other components present in more than half of SDM-models were: *Make the decision (68%)*, *Patient preferences (61%)*, *Tailor information (61%)*, *Create choice awareness (55%)*, and *Deliberate (55%).* The healthcare professional was often identified as the only actor responsible for the occurrence of SDM. 9/24 components were less present over time, others remained present in a stable proportion of models or did not show a consistent pattern. *Create choice awareness* stood out, having become present in a markedly increasing proportion of models over time.

CONCLUSIONS: This review provides an up-to-date overview of SDM-models, showing that a unified view on what SDM is, is still lacking. This may not be problematic per se. Clarity about what SDM constitutes is essential though for implementation, assessment, and research purposes. A map for clinicians and researchers is offered to identify key SDM-components.

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STRENGTHS AND LIMITATIONS OF THIS STUDY:

- We systematically searched three main databases, the selection of all articles and extraction of all the data was done in duplicate, and decisions made in consensus
- A potential limitation of the review is that articles that did not provide evidence of presenting an SDM model in the title or abstract were excluded, resulting in the possible omission of models.\

- Our extraction of the SDM models may at times be too inclusive or too strict as it was sometimes difficult to distinguish what may be seen as 'contextual factors' and what as integral to the SDM process from the description of the models

1. INTRODUCTION

Shared decision making (SDM) between patients and healthcare professionals is gradually becoming the norm across Western societies as the model for making patient-centred healthcare decisions[1 2] and achieving value-based care.[3 4] SDM is based on the thought that healthcare professionals are the experts on the medical evidence and patients are the experts on what matters most to them.[3] Systematic reviews of published SDM-models date back to 2006 and 2007.[5 6] Makoul and Clayman concluded that there is no unified SDM-model, and proposed a set of essential elements to form an integrative model of SDM.[5] From their perspective, elements can be initiated either by patients or healthcare professionals, and they purposively abstained from identifying actors in their model so as not to place sole responsibility on either. Soon after, a second systematic review concluded that the focus of SDM-models is placed on information exchange and on the involvement of both patient and healthcare professional in making the decision.[6] Since then, SDM has gained attention exponentially, with new SDM-models emerging, and with what SDM specifically entails remaining under debate.[3 7 8] Moreover, in a systematic review of measures to assess SDM we noted that developers of SDM measures often only vaguely define the SDM construct or do not define it at all.[9] Meanwhile, there are calls to extend the conceptualization of SDM, such as by focusing on the person facing the decision rather than on a consultation,[10] or by shifting the focus of SDM to relationship-centred care[11] or to humanistic communication.[12]

Clarity about what SDM constitutes in a specific situation is essential for training, policy, implementation, and research purposes. This systematic review aims to 1) provide an up-to-date overview of SDM-models, 2) give insight in the prominence of components present in SDM-models, 3) describe who is identified as responsible within the components (i.e., patient, healthcare professional, both or none), 4) show the occurrence of SDM-components over time, and 5) present an SDM-map to easily identify key SDM-components per healthcare setting.

2. METHODS

In the following we use the term *model* for both models and definitions, for sake of readability. These terms may have a slightly different meaning but are often used interchangeably. No ethical approval was required. We registered this systematic review at PROSPERO: CRD42015019740, available from: https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=19740.

2.1 Search strategy

Three electronic databases (PubMed, Embase, and Cochrane) were systematically searched for articles published from inception up to and including May 31, 2018. The search terms “shared

decision" and related terms such as "shared medical decision", "shared treatment decision" and "shared clinical decision", and their plural forms, as well as the broadly used abbreviation SDM were used to search in title and keywords. The search was restricted to peer-reviewed scientific articles; to publications in English for pragmatic reasons; and to publications about humans. See Appendix A for our complete search strategy.

2.2 Eligibility criteria

During the screening of titles and abstracts we determined whether the term *model* or *definition* was used, and if not, whether it could be expected that the authors would provide a new or adapted SDM-model. Full-text articles were excluded if they were not peer-reviewed or not written in English. Full-text articles were included if the authors explicitly described a new model of the SDM-process between a patient and one or more healthcare professionals, or if the authors had adapted an existing model based on own insights or research outcomes, and if the model was described comprehensibly, i.e., in enough detail to explain the process. We therefore excluded articles in which the authors only referred to a model described elsewhere, only mentioned the concept of SDM, or explained it briefly only.

2.3 Selection process

Three researchers (AP, HB-R, FG) independently reviewed titles and abstracts of the first 100 records and discussed inconsistencies until consensus was obtained. Then, in pairs, the researchers independently screened titles and abstracts of all articles retrieved. In case of disagreement, consensus on which articles to screen full-text was reached by discussion. If necessary, the third researcher was consulted to make the final decision. Next, two researchers (AP, HB-R) independently screened full-text articles for inclusion. Again, in case of disagreement, consensus was reached on inclusion or exclusion by discussion and if necessary, the third researcher (FG) was consulted.

2.4 Data extraction

We extracted the description of each SDM-model (i.e., the verbatim text describing the model) as well as the following general characteristics: first author, year of publication, name of the model (if applicable), healthcare setting, and development process (i.e., informed by existing literature or by data collected with the purpose to inform the model; for the latter, we extracted methods and respondents). Using a standardized extraction form, one researcher (AP or HB-R) extracted the data, the other researcher verified it, and inconsistencies were discussed until consensus was reached.

2.5 Data analysis

We separated each SDM-model description into text fragments, i.e., the smallest piece of text conveying a single constituent of the model, often delineated by conjunctions or punctuation. We then first classified all text fragments using elements, starting out with the list of 32 elements that Makoul and Clayman reported.[5] We refined or split elements, or added new elements if necessary. Elements may describe specific behaviours (e.g., *List options*) but need not (e.g., *Patient values*). Second, we determined the actor for each classified text fragment. An actor was defined as the person identified to be responsible for the occurrence of the behaviour or result described in the text fragment (i.e., no actor identified, patient and healthcare professional, only patient, or only healthcare professional). To illustrate, for *Patient values* it may be stated in the text fragment that healthcare professionals need to ask about patients' values, or that patients need to express their values. In the first case, the actor would be the healthcare professional; in the second, the patient. Note that the actor identified for the same element that is present in different SDM-models may differ between models, depending on the actor identified by the authors of the respective models. Third, we clustered elements representing a shared theme into overarching components taking into account the underlying text fragments, and formulated a name for each component, e.g., *Provide neutral information*, *Advocate patient views.* Clustering of elements into components was based on the content of the elements and regardless of actor. For the ensuing components, we now again determined the actor(s), based on the actors identified for the constituting elements. For each analysis step, one researcher (HB-R or AP) performed the analysis, the other verified it, and inconsistencies were discussed until consensus was reached. To depict a possible trend in the occurrence of components in SDM-models over time, we grouped the SDM-models by publication date into three different time periods, each containing approximately the same number of models. We calculated in how many of the models during a particular time period each component was present, as a percentage.

2.6 Patient and public involvement

This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to interpret the results. Patients were not invited to contribute to the writing or editing of this document.

3. RESULTS

The search yielded 2710 initial records and 31 articles were included in this review, from 26 different first authors, each describing a unique model (Figure 1). The articles were published from 1997 up to and including May 2018. See appendix B for the model descriptions.

3.1 General characteristics of the models

3.1.1. Healthcare settings

One-third (10/31) of the SDM-models were generic (i.e., specified as such or no healthcare setting specified).[5 13-21] The other 21 SDM-models had been developed for a particular healthcare setting or patient group, namely primary care,[22-24] general practice,[25 26] mental healthcare,[27 28] paediatrics,[29 30] emergency care,[31 32] serious illness,[33 34] oncology care,[35] chronic care,[36] nursing care,[37] the inpatient setting,[38] diabetes,[39] youth psychotherapy,[40] lung cancer screening,[41] or frail older patients with multiple morbidities.[42]

3.1.2. Decision types

Ten models were focused more or less explicitly on treatment decision making,[14 17 25 27 30 33 35 36 39 40] one on screening,[41] one on test and treatment decision making,[34] and one on decisions regarding diagnostic testing, treatment, or follow-up.[19] For the other 18 models, the authors did not explicitly state the type of decision.[5 13 15 16 18 20-24 26 28 29 31 32 37 38 42]

3.1.3. Development processes

Two-thirds of the models (20/31) were based on analytical thinking of the authors (i.e., no data were collected in patients and/or healthcare professionals with the purpose to inform the model); empirical data collected for other purposes may have informed these models.[5 14 15 17 19 21 22 25 29-38 40 41] The authors of these 20 models have explicitly referred to earlier models as a starting point, or to the literature more generally. The other models (11/31) were developed based on empirical data gathered with the purpose to inform the model.[13 16 18 20 23 24 26-28 39 42] These empirical data were collected in individual and/or focus group interviews with patients (4/11),[13 27 28 39] healthcare professionals (1/11),[26] patients and healthcare professionals (1/11),[16] or with patient representatives, healthcare professionals, managers, and others from unnamed professions (1/11).[24] Between four and 54 patients and between six and 49 healthcare professionals participated in the individual or focus group interviews (not all patient numbers reported for one qualitative study). Further, data were collected in a Delphi study with patients, healthcare professionals and academics (1/11);[42] in research work groups with patients and healthcare professionals (1/11),[18] in a consensus study involving healthcare professionals, an anthropologist and a community health specialist (1/11),[23] and in a three-round consultation of academics, patients and healthcare professionals (1/11).[20]

3.2 Components within the models

We identified 53 different elements in the descriptions of the SDM-models and clustered these in 24 overarching components (Table 1). Figure 2 visualizes the components; the surface of a particular circle indicates in how many of the 31 SDM-models the component was mentioned. *Mention treatment options* was the component most frequently present in any of the SDM-models; it was included in 28/31 models (90%). Other components present in more than half of the models were: *Make the decision* (68%), *Patient preferences* (61%), *Tailor information* (61%), *Create choice awareness* (55%), and *Deliberate* (55%). The component *Reach mutual agreement* was present in 42% of the models and for a majority (8/13, 62%) of them the patient and the healthcare professional had to agree on the final decision. Components identified in 10% of the models at most were: *Healthcare professional expertise* (6%) and *Patient expertise* (6%).

3.3 Actors

3.3.1 Within models

Twenty-eight of the 31 models identified one or more actors, in two models actors were not mentioned at all,[15 20] and the authors of one model stated that they purposively did not define actors.[5] In 14/28 models both patient and healthcare professional were identified as actors;[13 16-19 25 27 30 33 34 36 37 39 42] in two of these, patient's role was implicit.[30 42] Three models identified a patient and several healthcare professionals as actors,[23 24 41] and two models identified the patient under the age of 18, the parent, and the healthcare professional as actors.[29 40] Nine models identified solely the healthcare professional as actor.[14 21 22 26 28 31 32 35 38]

3.3.2 Within components

The colour of the line around the components in Figure 2 shows how often a particular actor or actors were mentioned for the elements constituting that component. The healthcare professional was often identified as the sole actor within components. In other cases, either the patient, both the patient and healthcare professional, or no actor was identified for elements constituting a component. The following actor or actors were identified *in more than half* of the models in which these components were present: the healthcare professional in *Support DM process* (89%), *Offer time* (80%), *Prepare* (75%), *Learn about the patient* (73%), *Healthcare professional preferences* (67%), *Provide neutral information* (67%), *Advocate patient views* (67%), *Provide recommendation* (63%), *Mention treatment options* (61%), and *Create choice awareness* (59%); both healthcare professional and patient in *Reach mutual agreement* (54%); no actor in *Healthcare professional expertise* (100%).

3.4 Time trends

Four models of SDM were published up to 2001.[16 17 26 33] No new models were published between 2001 and 2006, and then another four models in 2006.[5 15 25 36] From then on, numbers increased rapidly from 2014 onwards, and half of the models were published since then. Figure 3 shows how often components appeared in models by time period: until 2011 (N=11 models), 2011 until 2016 (N=9 models), 2016 up to and including May 2018 (N=11 models)**.** There is some variation in which components were present in SDM-models over time. *Mention treatment options* and *Make the decision* were present in more than half of the SDM-models in any time period, while *Prepare*, *Patient expertise*, and *Healthcare professional expertise* were present in relatively few models only in any time period. *Deliberate* and *Determine next step* were present in a constant proportion of models over time. *Create choice awareness* was present in markedly more models from 2011 onwards than before. The presence of several components in models showed a decrease over time, either a marked decrease, i.e., *Determine roles in decision making process* after 2010 and *Patient questions* and *Provide recommendation* after 2015, or a slow but steady decrease, i.e., *Foster partnership, Advocate patient views, Provide information, Provide neutral information*, *Patient preferences*, and *Healthcare professional preferences*. The extent to which the other components were present in models fluctuates more or less over time, without a clear pattern.

3.5 Shared decision making map

We present a map to depict which components seem most relevant to SDM, by healthcare setting (Figure 4). On the Y-axis, the components are shown in order of frequency from top to bottom, across SDM-models. On the X-axis, the healthcare settings are shown in order of number of existing SDM-models from left to right. How often a particular component was present in SDM-models *within* a healthcare setting is colour-coded. The SDM map thus helps identify 1) what components make up SDM-models, 2) how often components are present in SDM-models overall, 3) how often components are present in SDM-models within a particular healthcare setting.

4. DISCUSSION

Our review provides an inventory of the 31 SDM-models currently available. Many models defining SDM are of relatively recent date: half of the models included were published in 2014 or later. Similarities between models exist but significant heterogeneity still remains, as others have noted before.[5] This may not be surprising considering the fact that almost half of the models have been developed for screening, diagnostic testing or treatment decisions, and that 21 of the non-generic models have been developed for 14 different healthcare settings.

Over a decade ago, Makoul and Clayman noted the low frequency with which authors defining SDM recognized and cited previous work in the field; they found one-third of articles with a conceptual model failed to cite any other model.[5] Our review shows that all authors at least referred to existing literature about SDM. Especially the SDM-models that Elwyn[14 26] and Charles[17 33] and their colleagues developed have informed a number of other models, and were adapted for specific healthcare settings. These authors therefore have had a significant impact on thinking about what constitutes an SDM-process. They and others have further published adapted versions of their own models. Components specific to these models are therefore prominently present in our SDM-map. Further and remarkably, views of patients and/or healthcare professionals, the ones who enact SDM in clinical practice, were only assessed for eleven of the 31 models. This may have resulted in underrepresentation of components that patients and healthcare professionals consider to be indispensable in current thinking about what constitutes SDM.

As may be expected, the component *Mention treatment options* was present in the vast majority of the models. The transfer of information about treatment options clearly is key to SDM, and patients need this information to be able to participate in SDM. However, conveying treatment information to patients in itself does not safeguard that patients are actually able to participate.[43 44] For the component *Reach mutual agreement,* two ways of framing appeared: mutual agreement about the final decision is a requisite in part of the models, while in others this requirement is not formulated explicitly, or specifically relates to the *process* required to reach a decision rather than to the final decision itself. It may be of minor importance who makes the final call or whether all parties involved fully agree that the option chosen is the best possible option for this patient in this situation, as long as the process is shared.[45] Patient *expertise* and *Healthcare professional expertise* were rarely present in SDM-models. Since the first is often mentioned as the rationale for SDM,[17 46] it may thus not be surprising that it is not part of the definition of SDM. In contrast, patients justify their preference for healthcare professionals to make the final decision based on the healthcare professional' expertise.[43]

Creating choice awareness clearly caught attention in more recent models. Choice awareness has been defined as "acknowledging that the patient's situation is mutable and that there is more than one sensible way to address or change this situation",[47] and been put forward as pivotal in achieving SDM for some time.[2] However, despite the inclusion of this behaviour in models, it is seldom seen in clinical practice.[47-49] Somewhat surprisingly, several components have lost weight over time. This is true, e.g., for *Patient questions*, *Foster partnership*, *Provide information*, and *Provide neutral information*. These can be viewed as general skills relevant to good communication and not specific

to SDM, implying a trend towards defining SDM more specifically. Other components that surprisingly have lost weight include *Advocate patient views* and *Patient preferences*. However, *Deliberate* remains present in a steady number of models. The emphasis may be shifting from the result, i.e., patients who need to communicate their preferences or healthcare professionals who should elicit preferences, to the process of deliberation by which healthcare professionals support patients in becoming clear on their preferences. Both *Provide a recommendation* and *Healthcare professional preferences* are less and less present in SDM-models, suggesting that authors ideally see that healthcare professionals' preferences influence patients as little as possible. One may question if this is ideal from patients' perspective, as many patients consider receiving a treatment recommendation part of SDM.[13 45 50] Importantly, providing a recommendation that integrates informed patient preferences may indeed help patients in deciding what option they would prefer, and perfectly fits with SDM.

Our results further show that the calls that were recently made to extend the conceptualization of SDM e.g., by focusing on the person facing the decision rather than on a consultation,[10] or by explicitly including time outside of consultations[45] would indeed add new aspects to the conceptualizations of SDM so far.

It is noteworthy that in one-third of the models overall, and in almost half of the models published since 2016, only the healthcare professional is identified as the actor in SDM, that is, is seen as responsible for the occurrence of an SDM-process. This does not align with the formal acknowledgement of patients' role in making SDM happen in 2011, in the Salzburg statement on SDM.[51] It bears the question whether it is justified to put the onus of achieving SDM on healthcare professionals only, and how patients can truly participate in an SDM-process if they are not recognized as active participants. Especially since patients formulate their own responsibilities in SDM, in qualitative studies asking about SDM.[13 18 45] Authors of SDM-models should therefore carefully consider patients' role in SDM. Also, we recommend that authors who develop an SDM model clarify each actor's role. Doing so, will help elucidate whose behaviour(s) should be targeted when aiming to improve SDM-levels, or measured when aiming to evaluate SDM-levels. This will facilitate the development of appropriate interventions and of valid measurement instruments.

This study provides a systematic overview of SDM-models published so far. A potential limitation of the review is that we excluded articles based on title/abstract screening that did not provide evidence of presenting an SDM-model. We may therefore have missed models. Further, for some models it was difficult to distinguish what may be seen as context and what as integral to the SDM-

process. Also, it was sometimes difficult to determine from the description what the authors considered to be essential to the SDM-process and what was e.g., an example of possible behaviour in the context of SDM.

The existence of SDM-models that vary in emphasis does not seem problematic to us per se. What an SDM-process exactly entails may differ by healthcare setting, and it may thus be helpful to have different models and choose the one that fits one's purposes best. Striving for one unified model may even be unrealistic and counterproductive. Also, existing models may be adapted or extended if this proves useful. However, striving for consensus on the core of what SDM is, is desirable to align research, training, and implementation efforts. The pursuit of consensus begs the question as to whom should ideally be involved in deciding on the essence of SDM. Until consensus is reached, we call authors to report the model they use, whichever it is. Being explicit about the SDM-model used is necessary to develop SDM measures, understand results on the occurrence of SDM and its effects, to develop and implement interventions, and for training and policy purposes. When developing an intervention, it is also important to report whether the intervention targets one or more components of the SDM-process. For healthcare professionals who aim to share decisions with their patients, it is good to realise that there is no consensus in the field, only that certain components are more key to SDM than others. Our SDM-map can be used to easily identify the most relevant components when enacting SDM in clinical practice.

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AUTHOR CONTRIBUTIONS

AP, AS and HB-R designed the study. AP, FG and HB-R performed title and abstract screening. AP and HB-R performed full-text screening, conducted the data extraction, and wrote the first draft of the manuscript. All authors were involved in interpreting the results. All authors have read the manuscript, made improvements of the content and wording, and have agreed to the final version. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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COMPETING INTERESTS STATEMENT

All authors have completed the *Unified Competing Interest form* (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

DATA SHARING STATEMENT

We will share our data upon request.

LICENCE STATEMENT

FIGURE LEGENDS

Figure 1. Flow diagram of article selection process

Figure 2. Components of SDM models, and actors identified within components

Figure 3. Appearance of components in SDM models over time

Figure 4. Map of SDM-components by healthcare setting and frequency of occurrence

Table 1. Components, their constituting elements, and how often they are part of SDM models.

Components	Elements	Frequency
advocate patient views	patient advocacy patients' opinion is important	9 (29%)
create choice awareness	equipoise make need for decision explicit	17 (55%)
deliberate	deliberation~ negotiation~	17 (55%)
determine roles in decision making process	all parties have a legitimate interest in the decision* formulation of equality of partners involves at least two people* patient's decisional role preference^ process determination or evaluation	13 (42%)
determine next step	arrange follow-up* implementation	14 (45%)
foster partnership	mutual respect* partnership*	10 (32%)
gather support and information	patient accesses information support with decision	6 (19%)
healthcare professional expertise	doctor knowledge~	2 (6%)
healthcare professional preferences	healthcare professional preferences healthcare professional values	6 (19%)
learn about the patient	check/clarify understanding healthcare professional^ learn about the patient	15 (48%)
make the decision	document (discussion about) decision make or explicitly defer decision* patient retains ultimate authority over decision revisiting decision	21 (68%)
mention treatment options	benefits/risks (pros/cons)* feasibility of option(s) list options^ present evidence*	28 (90%)
offer time	offer time	5 (16%)
patient expertise	patient expertise	2 (6%)
patient preferences	patient concerns patient goals of care patient preferences~ patient values~	19 (61%)
patient questions	patient questions	5 (16%)
prepare	prepare (prior to consultation)	4 (13%)
provide information	information exchange* medical information	12 (39%)

	patient information	
provide neutral information	unbiased information*	6 (19%)
provide recommendation	doctor recommendation~	8 (26%)
reach mutual agreement	mutual agreement*	13 (42%)
set agenda	decide on agenda for the consultation define/explain problem*	7 (23%)
support decision making process	assess what patient needs to make decision doctor guidance in decision making process identify and address emotions	9 (29%)
tailor information	ascertain preferred (format for) information* check/clarify understanding patient^ flexibility/individualized approach* use clear language	19 (61%)

* original element from review Makoul&Clayman

~ split element from review Makoul&Clayman; the original element contained two different constituents

^ refined element from review Makoul&Clayman; we added the appropriate verb or relevant actor

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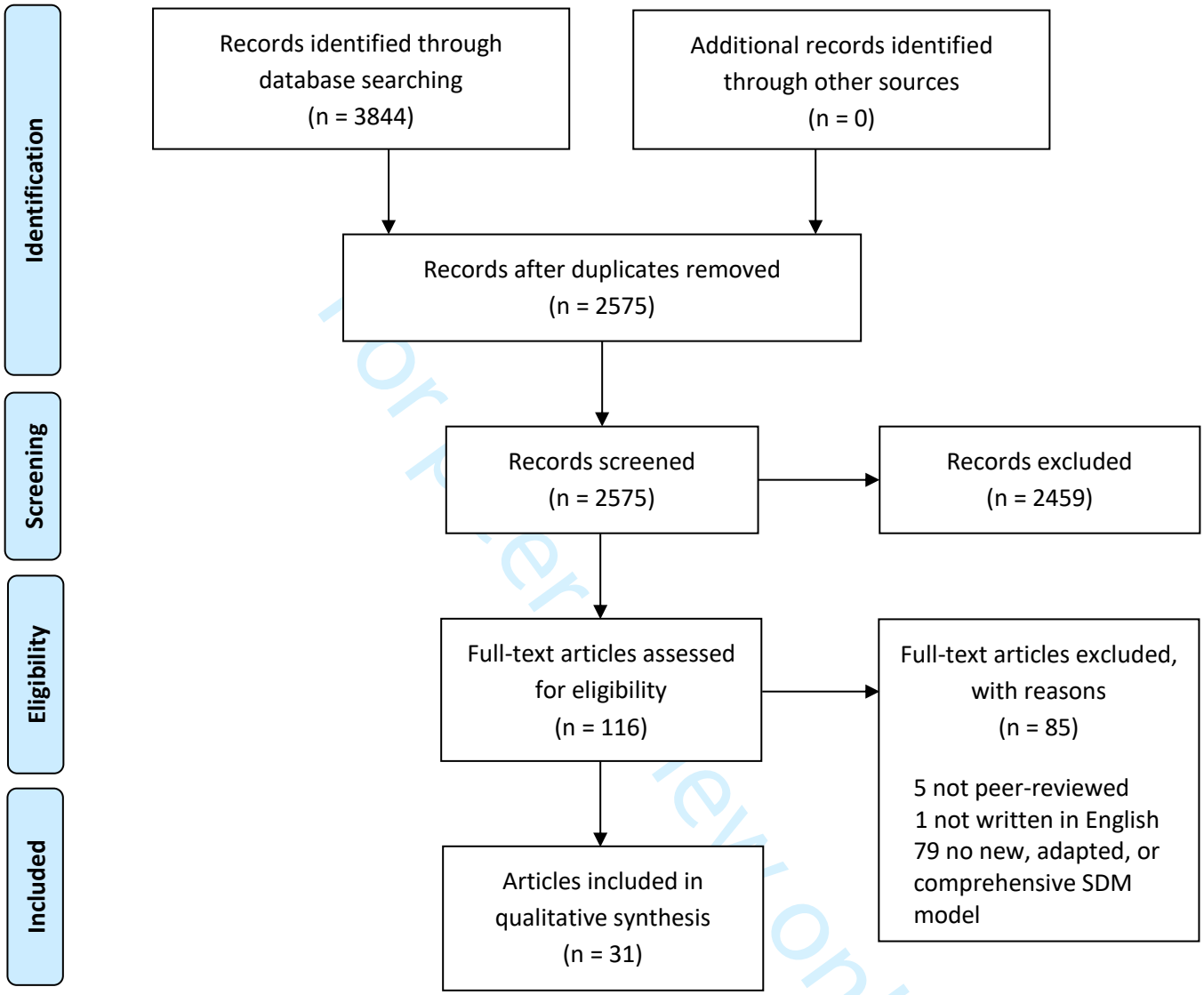

Figure 2. Components of SDM models, and actors identified within components

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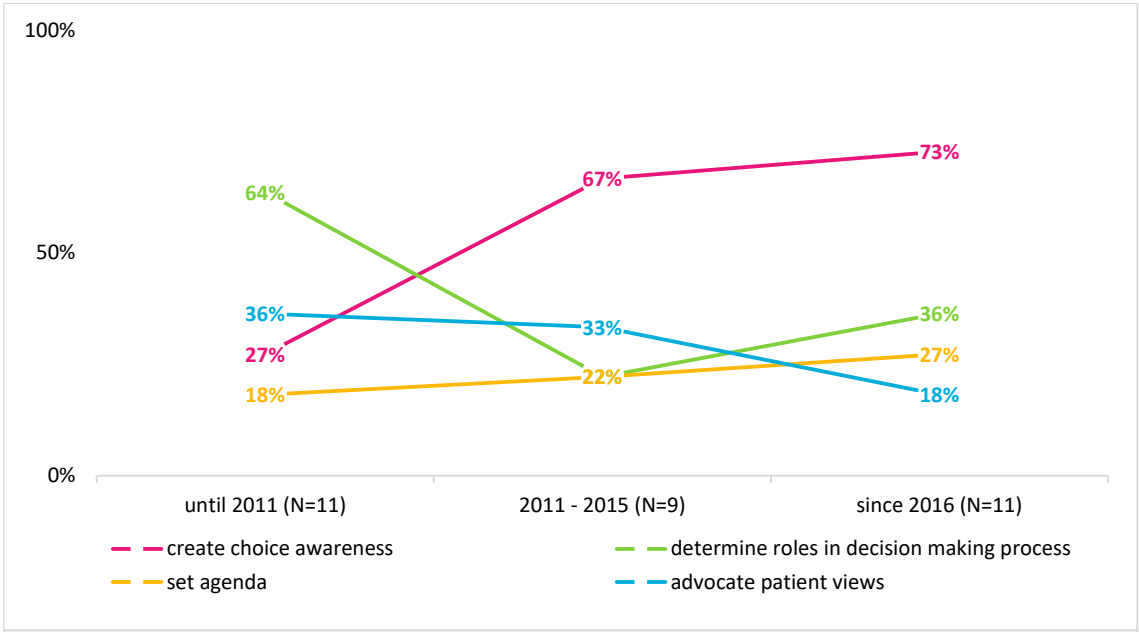
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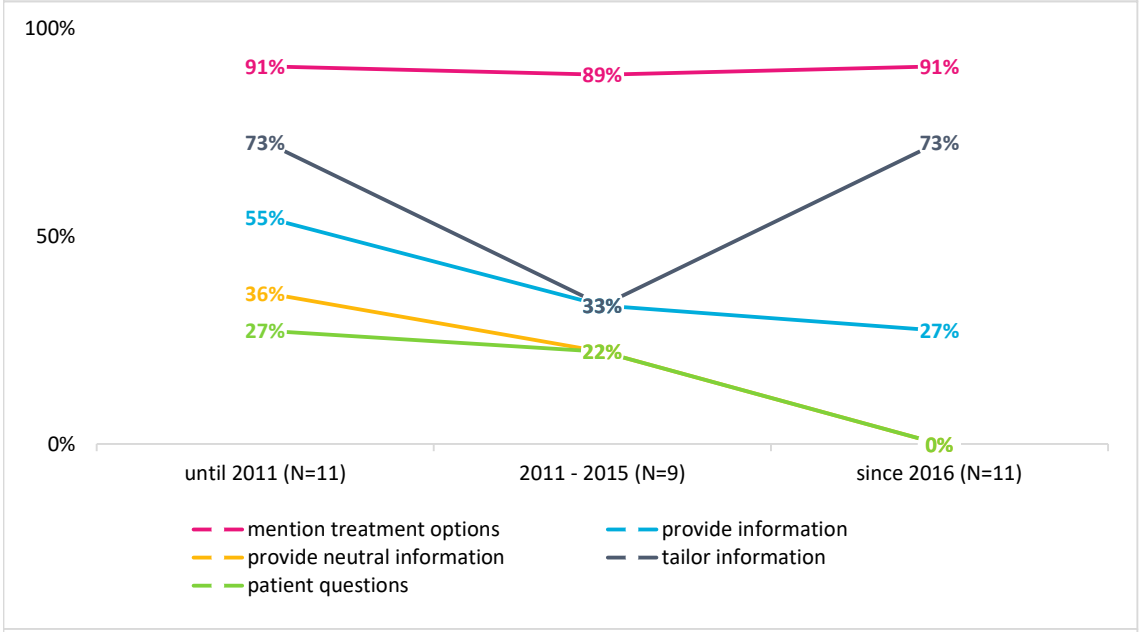
until 2011 (N=11)
2011 - 2015 (N=9)
since 2016 (N=11)
create choice awareness
determine roles in decision making process
set agenda
advocate patient views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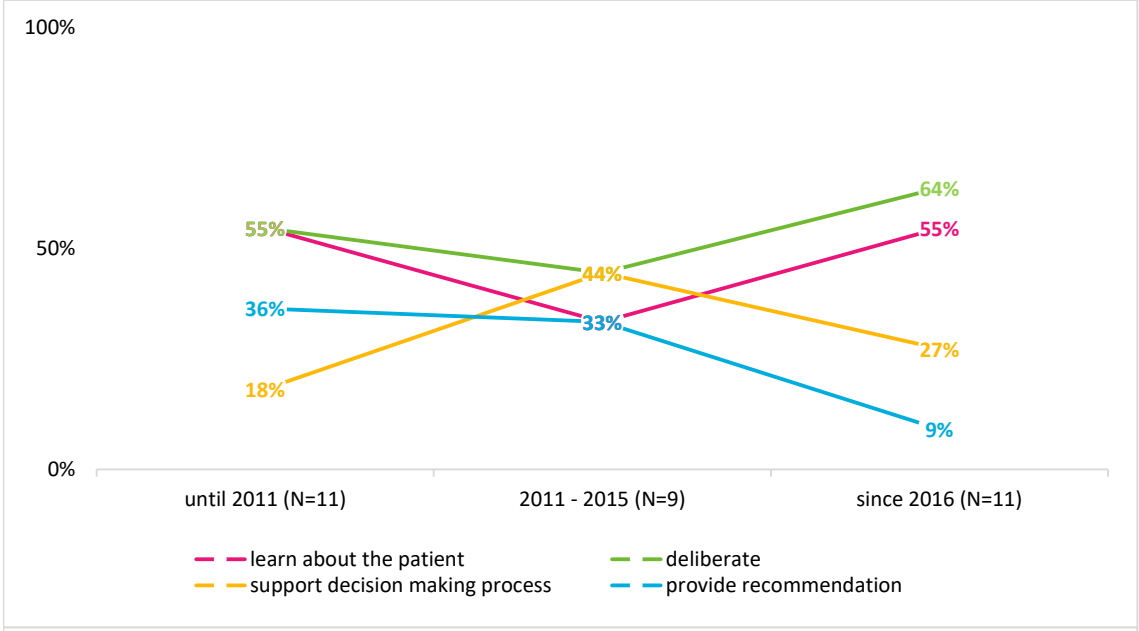
mention treatment options
provide information
provide neutral information
tailor information
patient questions


100%
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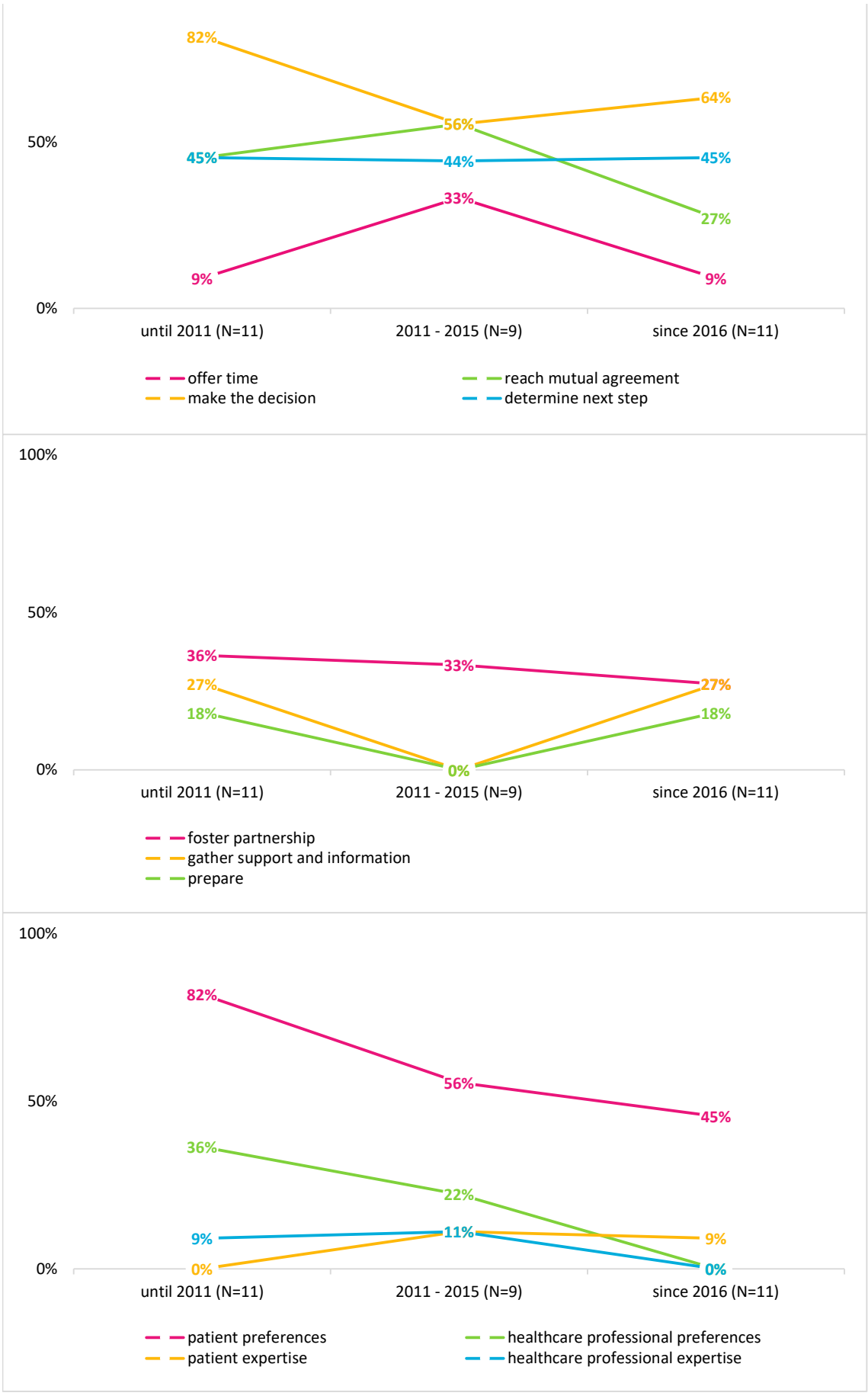
until 2011 (N=11)
2011 - 2015 (N=9)
since 2016 (N=11)
learn about the patient
deliberate
support decision making process
provide recommendation


100%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44%
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27%
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until 2011 (N=11)
2011 - 2015 (N=9)
since 2016 (N=11)
offer time
make the decision
reach mutual agreement
determine next step
100%
50%
36%
33%
27%
27%
18%
18%
0%
0%
until 2011 (N=11)
2011 - 2015 (N=9)
since 2016 (N=11)
foster partnership
gather support and information
prepare
100%
50%
82%
56%
45%
36%
22%
9%
11%
9%
0%
0%
0%
until 2011 (N=11)
2011 - 2015 (N=9)
since 2016 (N=11)
patient preferences
patient expertise
healthcare professional preferences
healthcare professional expertise

Figure 4. Map of SDM-components by healthcare setting and frequency of occurrence

509x447mm (600 x 600 DPI)

Appendix A: Search strategy

PubMed

(shared decision[ti] OR shared decision[ot] OR shared decisions[ti] OR shared decisions[ot] OR shared decisionmaking[ti] OR shared decisionmaking[ot] OR SDM[ti] OR SDM[ot] OR Shared medical decision[ti] OR Shared medical decision[ot] OR Shared treatment decision[ti] OR Shared treatment decision[ot] OR Shared medical decisions[ti] OR Shared medical decisions[ot] OR Shared treatment decisions[ti] OR Shared treatment decisions[ot] OR Shared clinical decision[ti] OR Shared clinical decision[ot] OR Shared clinical decisions[ti] OR Shared clinical decisions[ot])
NOT
("addresses"[Publication Type] OR "biography"[Publication Type] OR "comment"[Publication Type] OR "directory"[Publication Type] OR "editorial"[Publication Type] OR "festschrift"[Publication Type] OR "interview"[Publication Type] OR "lectures"[Publication Type] OR "legal cases"[Publication Type] OR "legislation"[Publication Type] OR "letter"[Publication Type] OR "news"[Publication Type] OR "newspaper article"[Publication Type] OR "patient education handout"[Publication Type] OR "popular works"[Publication Type] OR "congresses"[Publication Type] OR "practice guideline"[Publication Type]) NOT ("animals"[MeSH Terms] NOT "humans"[MeSH Terms])
AND
english[la]

Embase

(shared decision*.ti OR SDM.ti OR Shared medical decision*.ti OR Shared treatment decision*.ti OR Shared clinical decision*.ti OR ((shar*) ADJ5 (decis*)).ti)
NOT
("editorial"/ OR "letter"/ OR conference abstract.pt OR conference review.pt) NOT (exp "Animals"/ NOT exp "humans"/)
AND
english.la

Cochrane

shared decision" OR "shared decisions" OR "shared decisionmaking" OR "SDM" OR "Shared medical decision" OR "Shared treatment decision" OR "Shared medical decisions" OR "Shared treatment decisions" OR "Shared clinical decision" OR "Shared clinical decisions" OR (share* AND decis*): ti

Appendix B. Shared decision making (SDM) models (N=31) in order of publication year and first author

First author, publication year	SDM model
Charles, 1997[33]	Four minimum or necessary criteria for classifying a physician-patient decision making interaction as SDM (i.e., necessary but not always sufficient). SDM involves that: **1. At least the physician and the patient are involved** (Often more than two participants are involved, such as a relative, a friend or another physician); **2. Both parties share information** (The physician should: a) Establish a conducive atmosphere so that the patient feels that her views about various treatment options are valued and needed, b) Elicit patient preferences, c) Transfer technical information on treatment options, risks and their probable benefits in an as unbiased, clear and simple a way as is possible, d) Help the patient to conceptualize the weighing process of risks versus benefits, and ask patients questions in order to ensure that patients' preferences are based on facts, e) Share his treatment recommendation and/or affirm the patient's treatment preference; The patient should be willing to take responsibility for disclosing preferences, asking questions, weighing and evaluating treatment alternatives, and formulating a treatment preference); **3. Both parties take steps to build a consensus about the preferred treatment;** **4. An agreement is reached on the treatment to implement.**
Charles, 1999[17]	The SDM model has three analytical stages (These may occur together or in an iterative process): **1. Information exchange** (Information exchange is two-way, from physician to patient and from patient to physician. The physician must inform the patient of all information that is relevant to making the decision (information about available treatment options, the benefits and risks of each and potential effects on the patient's psychological and social well-being); The patient needs to provide information on issues raised (Values, preferences, lifestyle, beliefs and knowledge about illness and its treatment) to ensure that both the physician and patient evaluate the information of the physician within the context of the patient's specific situation and needs); **2. Deliberation about treatment options (i.e., the process of expressing and discussing treatment preferences)** (The deliberation has an interactional nature, and both physician and patient are assumed to have a legitimate investment in the treatment decision (The patient because her health is at stake and the physician out of concern for the patient's welfare). The physician and patient (plus potential others) need (both) to be willing to engage in the decision making process by expressing treatment preferences. The interaction process to be used to reach an agreement may be explicitly discussed at the outset of the encounter or may evolve implicitly as the interaction unfolds); **3. Deciding on the treatment to implement** (Both parties, through the deliberation process, work towards reaching an agreement and both parties have an investment in the ultimate decision made).

Towle, 1999[16]	**Competencies (knowledge, skills, abilities) for physicians for informed SDM include:** 1. Develop a partnership with the patient; 2. Establish or review the patient's preferences for information; 3. Establish or review the patient's preferences for role in decision making and the existence and nature of any uncertainty about the course of action to take; 4. Ascertain and respond to patient's ideas, concerns, and expectations; 5. Identify choices and evaluate the research evidence in relation to the individual patient; 6. Present (or direct patient to) evidence; Help patient to reflect on and assess the impact of alternative decisions with regard to the patient's values and lifestyle; 7. Make or negotiate a decision in partnership with the patient and resolve conflict; 8. Agree an action plan and complete arrangements for follow up. **Preliminary list of competencies for patients for informed SDM include:** 1. Define (for oneself) the preferred doctor patient relationship; 2. Find a physician and establish, develop, and adapt a partnership; 3. Articulate (for oneself) health problems, feelings, beliefs, and expectations in an objective and systematic manner; 4. Communicate with the physician in order to understand and share relevant information clearly and at the appropriate time in the medical interview; 5. Access information; 6. Evaluate information; 7. Negotiate decisions, give feedback, resolve conflict, agree on an action plan.
Elwyn, 2000[26]	Sequence of skills (competences) to involve patients in healthcare decisions: **1. Implicit or explicit involvement of patients in the decision making process** (Patients should fully understand that there is an opportunity to take part in a decision and that they are expected to take an active role); **2. Explore ideas, fears, and expectations of the problem and possible treatments;** **3. Portrayal of equipoise and options** (List options that are reasonably available, including, where relevant, the option of taking no action, and portraying options in an open, non-directive manner); **4. Identify preferred data format and provide tailor-made information;** **5. Checking process: Understanding of information and reactions** (Explore patients' ideas, fears, and expectations of possible options); **6. Checking process: Acceptance of process and decision making role preference** (Involving the patient to the extent they desire to be involved. Role preference should be ascertained after options have been described); **7. Make, discuss or defer decisions** (Ability to make transition from 'describing and checking' to achieving a decision, even if result is to postpone the process); **8. Arrange follow-up** (Offer opportunity to reconsider issues on another occasion, even if a firm decision has been made).
Makoul, 2006[4]	**Essential elements of SDM comprise:** 1. Define and/or explain the problem; 2. Present options; 3. Discuss pros/cons (benefits/risks/costs); 4. Patient values/preferences;

	5. Discuss patient ability/self-efficacy (i.e., to follow through with a plan); 6. Doctor knowledge/recommendations; 7. Check/clarify understanding; 8. Make or explicitly defer decision; 9. Arrange follow-up.
Montori, 2006[36]	Phases of shared treatment decision making as they apply to chronic care decisions: **1. Establishing an ongoing partnership** (Relationship is between 'patient team' (patient, members of patient's network, patients with same condition) and 'healthcare team' (healthcare professionals, educators, personal trainers), partnership takes place in the healthcare space and the patient's space); **2. Information exchange** (Clinician shares 'technical' information about available choices and their potential outcomes; Patient shares technical information they obtained from other sources and information about personal and social context; Patient and clinician both share their values and preferences); **3. Deliberating on options** (Process of considering the pros and cons for each one of the relevant choices, and clinicians and patients working together to identify the best strategy); **4. Deciding and acting on the decision** (Patients and the healthcare team work on strategies to implement and support the decision in the patient's own space; Clinician should be willing to revisit the decision).
Murray, 2006[25]	**Doctor and patient:** **1. Decide on an agenda for a consultation** (Exchange information (concerns, preferences and reasons for prioritizing), deliberate (listen to and respect the others' perspective), negotiate/decide on agenda for this consultation); **2. Decide on a treatment plan** (Doctor provides information about natural history of disease, and technical and medical information about treatment options, including pros and cons; If patient has accessed health information then agreement should be reached on the information to be used in the decision making process; Patient provides information on treatment preferences; Doctor provides information on preferences; Doctor and patient negotiate an agreed management plan, including opportunity for a change in decision if circumstances alter).
Simon, 2006[15]	**Steps in SDM process:** 1. Disclosure that a decision needs to be made; 2. Formulation of equality of partners; 3. Equipoise statement; 4. Informing on the options' benefits and risks; 5. Investigation of patient's understanding and expectations; 6. Identification of preferences; 7. Negotiation; 8. Shared decision; 9. Arrangement of follow-up.
Peek, 2008[39]	SDM consists of three conceptual domains: **1. Information-sharing** (Physicians explain/give information, listen, answer questions, and use layman's terms; Patients tell 'their story', report symptoms/answer questions, ask questions, and 'have a say');

	2. Physician recommendations (A single option is offered or multiple options are offered with single medical doctor recommendation); **3. Decision making** (Patients follow the recommendation regardless (in case of single option offered), make their own choice (in case of multiple options offered with single medical doctor recommendation), agree/disagree in the office, or decide to adhere/non-adhere once at home).
Lown, 2009[18]	Six categories of patient and physician themes and corresponding attitudes and behaviours that enhance SDM: **1. Patient and physician act in relational ways** (Patient and physician each seek a personal connection, and demonstrate trust and consideration and/or empathy; Physician uses non-verbal behaviour to connect with the patient, and takes time during the encounter and afterwards); **2. Patient feelings, preferences and information about self** (Patient is aware of and expresses feelings, recognizes and expresses personal priorities and preferences about participation and care, considers significant others' needs when making choices, describes symptoms and their personal significance, and answers questions honestly; Physician listens and explores patient's personal information, feelings, needs and preferences, and conveys respect for those); **3. Patient and physician discuss information and options** (Patient and physician each are willing to listen and be open to ideas from the other; Patient asks questions, shares understanding of information, and explains thinking process; Physician provides medical information, elicits questions, and adjusts information-giving to the patient's needs and preferences, presents options, including risks and benefits, based on recent literature, is honest about limits of physician's knowledge and scientific information, and presents opinion); **4. Patient and physician seek information, support and advice** (Patient gathers support from significant others, and gathers information from sources other than this physician; Physician demonstrates willingness to seek and/or seeks additional information and encourages the patient to do the same, acknowledges/seeks and respects the expertise of other professionals, and seeks personal support); **5. Patient and physician share control/negotiate a decision** (Patient and physician accept risk or uncertainty; Patient advocates for self within the relationship, and negotiates / agrees to disagree; Physician validates patient self-advocacy, integrates patient's feelings and preferences into a mutual decision, and includes significant others in discussion); **6. Patient and physician act on behalf of the patient** (Patient takes responsibility for acting on agreed upon plans; Physician advocates for the patient).
Karkazis, 2010[30]	**Six-step model for the SDM process:** 1. Set the stage and develop an appropriate team (Well before the clinical consultation consider the range of expertise needed, how to frame the decisions to parents, and how to enhance parents' understanding of the decision); 2. Establish (parents') preferences for information and discuss the role of all parties in making a decision; 3. Identify and address (parents') emotions that might interfere with (parents') effective participation in the decision making process; 4. Define (parents') concerns about the (child's) diagnosis and explore how (parents') weigh values in order to outline treatment options in a way that addresses (parents') concerns (Clinicians must acknowledge to the parents that

clinicians' values are not more “right” than theirs, and help parents consider their own assumptions and biases);
5. Identify options and present evidence (Identify and present all options objectively, including no surgery, the possible consequences of each option in a realistic way, how likely the consequences are, and type and quality of the evidence underlying options), provide a recommendation based on what evidence or other argument, explore (parents') ideas and assumptions, and correct misperceptions relating to the options;
6. Share responsibility for making a decision, which need not be shared (The values of the parents (and child when appropriate) should guide the decision making process).

Légaré, 2011[23] Assumes that at least two healthcare professionals from different professions collaborate to achieve SDM with the patient, either concurrently or sequentially. Six-step interprofessional SDM model at the individual (micro) level:
1. Patient with a health condition and Equipoise (Patient presents a health problem that requires a decision; Professionals share their knowledge and understanding of the options with the patient while recognizing equipoise (i.e., more than one option exists, including the option to maintain the status quo) and the need for a decision));
2. Exchange of information (The health professional(s) and the patient share information about the potential benefits and harms of the options);
3. Clarification of values/preferences (Values clarification by all actors involved in the decision making process; Values of all actors may influence the decision; All actors should understand the values that are at play);
4. Feasibility of the options (The interprofessional team, including the patient, analyses the feasibility of the options before determining individual preferences);
5. Preferred choice/Actual decision (The patient identifies his preferred option with help from others. Ideally the final decision is agreed upon by all, and the healthcare professional must at least endorse the decision);
6. Implementation and health outcomes (Supporting the patient so that the option chosen has a favourable impact on the health outcomes that he values most. The extent to which the option is implemented as planned and health outcomes must be evaluated to further inform the decision making process).

Légaré, 2011[24] For the SDM process to be interprofessional, at least two healthcare providers from different professions must collaborate with the patient either concurrently or sequentially. SDM is an iterative six-step process:
1. Decision to be made (A health professional makes explicit that a choice needs to be made and identifies more than 1 option);
2. Information exchange (The health professional(s) and the patient share information about potential harms and benefits, including evidence-based information and information on the affective and emotional aspects of the decision);
3. Clarification of values/preferences (Values clarification by all actors involved in the decision making process; Values of all actors may influence the decision; All actors should understand the values that are at play);
4. Feasibility of the options (The interprofessional team, including the patient, analyses the feasibility of the options before determining individual preferences);

	5. Preferred choice/Actual decision (The patient identifies his preferred option with help from others. Ideally the final decision is agreed upon by all, and the healthcare professional must at least endorse the decision); **6. Implementation and outcomes** (The patient should be supported so that the option chosen has a favourable impact on the outcomes that the patient values most; The extent to which the option is implemented as planned and outcomes must be evaluated to further inform the decision making process).
Elwyn, 2012[14]	Three key steps of SDM for clinical practice: **1. Choice talk** (Making sure that patients are aware that a choice exists and know that reasonable options are available, this may be initiated by either patient or clinician); **2. Option talk** (Providing more detailed information about treatment options); **3. Decision talk** (Supporting the work of considering preferences and deciding what is best). The clinician supports deliberation throughout the process. Deliberation defined as: A process where patients become aware of choice, understand their options, and have time and support to consider 'what matters most to them'.
Eliacin, 2014[27]	**SDM is a process with three key components:** 1. Information sharing between patient and provider; 2. General discussion about treatment options; 3. Final decision that is mutually agreed upon by provider and the patient. The patient-provider relationship is an essential foundation for shared decision making and facilitates the implementation of the three components of shared decision making.
Kane, 2014[35]	Six-step process model of SDM: **1) Invite the patient to participate** (Let patient know that he/she has options and that patient's goals and concerns are a key part of decision making process); **2) Present available treatment options;** **3) Provide balanced information on benefits and risks** (Ensure patients correctly understand information); **4) Assist patients in evaluating options based on their goals, make sure to understand patients' preferences;** **5) Facilitate deliberation and decision making** (Let patients know they have time for considering treatment choices, and ask what else they need to feel comfortable making decisions); **6) Implement SDM** (Identify and present next steps, assess patient understanding, and discuss any possible challenges with implementation).
Shay, 2014[13]	Patients' conceptual definition of SDM includes two key phases of SDM: Phase 1: An interactive exchange, Phase 2: Making the decision. Phase 1 includes four interdependent components: **1. Mutual exchange of information** (Patient shares concerns or problems; Physician shares relevant medical information and treatment options); **2. Open-mindedness and respect for one another** (Physicians bring in medical expertise, patients bring in their unique knowledge about their body and symptoms; Physician and patient should both listen and be open-minded about what the other says. Physicians should: a) Make time to talk with a patient on a more personal level and b) Respect the expertise of the patient, solicit patients'

	thoughts and concerns, and take time to answer questions before forming a recommendation); **3. Patient self-advocacy** (Patients are responsible to advocate for themselves throughout the SDM process (Ask questions, guide the conversation if needed, share opinions, and speak up if needed)); **4. Physician should provide a personalized recommendation and explain the reasoning for the recommendation in general and for the individual patient.** In Phase 2 a decision is made that is in the best interest of the patient. *About half of the patients:* Decision making is mutual between the patient and physician. *The other half of patients:* Ultimately the patient always decides. The patient has to take final responsibility, even if patient and physician shared in the communication process leading to the decision.
Volk, 2014[22]	Six steps process for achieving SDM: **1. Describe the need for a decision** (Describe health issue or decision, communicate uncertainty, and emphasize need for a decision); **2. Review the options** (Discuss the options, provide balanced explanation of pros and cons of each option, provide probabilities, and assess patient's comprehension); **3. Explore patient's values** (Discuss patient's views of the options, and explore patient's values); **4. Determine patient's preferred role in making the decision;** **5. Negotiate a course of action** (Assess patient's readiness to make a decision, elicit patient's initial preferences for the options, provide a recommendation if the patient prefers this, and negotiate a mutually agreed upon course of action); **6. Make plans for follow-up** (Help undecided patients to access additional support to make the decision, make plan to review the decision or deferment, and document in the medical record the discussion, the use of decision aid (if applicable) and the decision). **Four behaviours are important throughout the SDM process:** 1) Encourage patient questions, 2) Provide guidance in decision making process, 3) Tailor information to patient, 4) Establish a partnership with patient.
Gillick, 2015[34]	**Re-engineered SDM (goal-centric):** 1. Physician clarifies the patient's underlying health status (Make sure the patient understands the diagnosis, prognosis, and likely trajectory of disease in the context of their other medical problems); 2. Physician initiates conversation about goals of care, asks patient to prioritise their goals of care (Patients should think about what is most important personally, given some understanding of their medical condition and how that condition is likely to evolve over time); 3. Physician formulates the prioritised goals in terms of the three major medical goals of care (life-prolongation, maintenance of function, maximising comfort) in ways acceptable to patient; 4. Physician translates goals of care in a specific treatment based on the physician's knowledge of the consequences of the various treatments; 5. Patient retains the ultimate authority to accept or reject the proposed treatment.

Stiggelbout, 2015[19]	**The following steps are distinguished:** 1. The professional informs the patient that a decision is to be made and that the patient's opinion is important; 2. The professional explains the options and the pros and cons of each relevant option; 3. The professional and patient discuss the patient's preferences; The professional supports the patient in deliberation; 4. The professional and patient discuss patient's decisional role preference, make or defer the decision, and discuss possible follow-up.
Grim, 2016[28]	A model for SDM in mental health services, with five steps: **1. Preparation** (Before the meeting: Develop agenda (Inform the patient about the purpose and estimated duration of the meeting prior to the meeting), and provide user with decision support); **2. Choice talk** (Step back, offer choice, justify choice (i.e., preferences matter), check reaction, defer closure. Physician provides guidance to the patient in this step); **3. Option talk** (Check knowledge (Patient should be open to have his/her knowledge corrected), list options, describe options, harms and benefits in language devoid of medical jargon, explore patient's preferences (Provider should support patient in considering the pros and cons and to assess implications of the options), and summarize); **4. Decision talk** (Focus on preferences, elicit preferences, offer time to considerate the options, move to a decision, offer to make a recommendation if patient so wishes, and offer review of what has been discussed); **5. Follow up** (Make further contact with provider possible after decision has been made, plan return visit for review and follow-up, make it possible for patient to follow one's progress, to know how long a decision will remain in effect, and to review or revisit a decision). Decision support is important during all steps of the decision process.
Langer, 2016[40]	The sample SDM model consists of six steps: **1. Discuss preferred roles in treatment planning;** **2. Specify decisions to be made;** **3. Present the available options for each decision** (The top few choices for each decision should be presented); **4. Determine pros and cons of each option** (Elicitation of the pros and cons from each decision maker's perspective); **5. Design preliminary treatment plan** (The clinician and family discuss the pros and cons of each option and formulate an initial treatment plan); **6. Implement progress monitoring** (Continually evaluate the effectiveness of the treatment plan through targeted assessment measures so that adjustments can be made).
van de Pol, 2016[42]	SDM is seen as a dynamic process. The model consists of the following six steps: **1. Preparation** (History, review of previous discussion or documentation regarding treatment in general or on specific issues and problem analysis (Functional assessment of all current problems)); **2. Goal talk** (Explain that disease has occurred and that choices need to be made, explain that every patient has own preferences and priorities, identify

	proxy decision maker if appropriate, identify patient values and goals of care, and elicit goals of care); **3. Choice talk** (Summarise the preceding steps and verify your recapitulation, explain that there are several treatment possibilities and offer choice, always including option of no treatment, invite patient/proxy to formulate treatment aim and support the patient, convey that only the patient can be the expert on treatment aims, priorities and preferences, and check if the patient/proxy has understood everything; **4. Option talk** (List personalised treatment options, discuss risks, benefits and side effects of every treatment option, check which risks and side effects the patient is willing to take, and observe how the patient reacts; **5. Decision talk** (Inquire if the patient/proxy is ready to make a decision, and if not, go back to the preceding steps, focus on the preferences of the patient and make a decision with the patient/proxy. If the patient wants the doctor to decide, discuss this explicitly, and connect to the identified patient values, goals of care and treatment aims); **6. Evaluation talk** (Discuss the decision making process. If not everybody is satisfied with the decision making process, enquire about the dissatisfaction and go back to a preceding step. Prepare a treatment plan based on the decision).
Dobler, 2017[41]	**SDM lung cancer screening counselling entails:** 1. Clinician and patient work together to determine whether lung cancer screening makes intellectual, emotional, and practical sense given the patient's overall personal and medical situation, as well as their informed preferences and values; 2. A conversation aid is used to support communication about the relative benefits and harms of screening or not, using tailored estimates of risk and state-of-the-art information design.
Elwyn, 2017[20]	The SDM process is a fluid transition between three different kinds of talk: **1. Team talk** (Work together, describe choices, offer support, and ask about goals); **2. Option talk** (Discuss alternatives, using risk communication principles); **3. Decision talk** (Get to informed preferences, and make preference-based decisions).
Park, 2017[29]	SDM in paediatrics consists of four attributes: **1. The active participation of parents, children, and health professionals;** **2. Collaborative partnership, i.e., mutuality and equality between parents, children and health professionals** (Important components of partnership are open-mindedness, mutual respect, and trust); **3. Reaching a compromise, i.e., reaching an outcome via mutual agreement** (Health professionals define and explain, and present the available options and their advantages and disadvantages; Parents, children, and health professionals establish the outcomes important to the patient and determine patient's preferences, and reach a decision); **4. Common goal for child's health** (Seeking a common goal or shared purpose).
Probst, 2017[32]	The clinician should initiate the SDM conversation according to four general steps: **1. Acknowledge That a Clinical Decision Needs to Be Made** (The clinician should make it clear what he or she is going to discuss and why. A clear statement

	should be made indicating that a decision with various options needs to be discussed); **2. Share Information in Regard to Management Options and the Potential Harms, Benefits, and Outcomes of Each** (Information should be provided in a stepwise fashion at a pace the patient can understand. Information should be expressed free of medical jargon); **3. Explore Patient Values, Preferences, and Circumstances** (Ask about and discuss what matters to the patient and what social factors may be at play); **4. Decide Together on the Best Option for the Patient, Given His or Her Values, Preferences, and Circumstances (**The conversation should result in a mutual decision. It is the clinician's responsibility to understand the patient's preferences and values and help him or her make a decision most consistent with these. The clinician should not unduly sway the patient).
Rennke, 2017[38]	The multistep SDM pathway consists of the following four steps: **1. Information gathering** (The provider solicits medical history and patient preferences for decision making); **2. Information sharing** (Patient education about the medical issue and available treatments); **3. Decision discussion** (This involves the pros/cons of each option, alternative diagnostic or management strategies, and how these decisions fit with a patient's preferences, abilities and resources, or what has been called 'contextualizing care'); **4. Make (shared) decision, Check understanding.**
Rusiecki, 2017[21]	**A circular SDM model in which the order of the steps is fluid:** 1. Identify the issue; 2. Equipoise; 3. List options with pros/cons; 4. Explore patient's values and concerns; 5. Check patient's understanding; 6. Negotiate a decision; 7. Review treatment/follow-up plan.
Probst, 2018[31]	**The SDM process occurs in a conversation and should include the following three steps:** 1. Acknowledge that clinical decision needs to be made with the patient; 2. Engage in conversation with the patient to share information about the current clinical scenario as well as options for future care, while exploring the patient's values, preferences, and circumstances. Every effort must be made to speak in clear language and avoid medical jargon to maximize patient understanding. This step typically happens in a dynamic, circular fashion; 3. Reach an agreement regarding the best plan of action on the basis of the patient's informed preferences.
Truglio-Londrigan, 2018[37]	SDM is a comprehensive ongoing process and entails three categories: **1. Communication and Relationship building** *Relationship Building - Trust and Respect* - The patient identifies a need or question. Individuals enter into a relationship where there is collaboration and sharing of power, and they must work towards building a trusting and respectful relationship. *Information Exchange – Communication* - Communication is both interpersonal and intrapersonal. The interpersonal communication is the mutual

exchange of information and involves active listening. Intrapersonal communication entails: a) Mutual reflection i.e., the provider and patient reflect together via communication, exchanging thoughts about decisions, and patient's perspective, and b) Individual reflection, which takes place autonomously within the individual provider or patient;

2. Working toward shared decision making

(Assessment - The provider must come to know the patient, the patient's family and home/community, and patient's specific preferences. *Teaching-learning* - Providers teach and provide patients with the necessary information on diagnosis, treatment, and strength of the evidence, in optimal format for patients to learn and understand the information. *Balance* - Provider should use equipoise if >1 best practices are available. Finding balance requires deliberation and negotiation leading to consensus about the decision. *Decision* - Consensus about the decision;

3. Action for SDM

Takes action - The patient takes action to see the decision through, which may prompt a re-evaluation of the decision together with the provider. *No action* - The patient takes no action and may then choose to return to the provider to re-evaluate the decision or not to return.

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	N/A
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	2, 4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix A
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	N/A
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	N/A
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	N/A
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Appendix B
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	N/A
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	N/A
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	9-12
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	11-12
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	14

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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The key components of shared decision making: A systematic review of models

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The key components of shared decision making: A systematic review of models

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ABSTRACT

OBJECTIVES: To 1) provide an up-to-date overview of shared decision making (SDM)-models, 2) give insight in the prominence of components present in SDM-models, 3) describe who is identified as responsible within the components (patient, healthcare professional, both, none), 4) show the occurrence of SDM-components over time, and 5) present an SDM-map to identify key SDM-components per healthcare setting.

DESIGN: Systematic review.

ELIGIBILITY CRITERIA: Peer-reviewed articles in English presenting a new or adapted model of SDM.

INFORMATION SOURCES: Academic Search Premier, Cochrane, Embase, Emcare, PsycINFO, PubMed, and Web of Science were systematically searched for articles published up to and including September 2, 2019.

RESULTS: Forty articles were included, each describing a unique SDM-model. Twelve models were generic, the others were specific to a healthcare setting. Fourteen were based on empirical data, 26 primarily on analytical thinking. Fifty-three different elements were identified and clustered into 24 components. Overall*, Describe treatment options* was the most prominent component across models. Components present in >50% of models were: *Make the decision (75%)*, *Patient preferences (65%)*, *Tailor information (65%)*, *Deliberate (58%), Create choice awareness (55%)*, and *Learn about the patient* (53%). In the majority of the models (27/40), both healthcare professional and patient were identified as actors. Over time, *Describe treatment options* and *Make the decision* are the two components which are present in most models in any time period. *Create choice awareness* stood out for being present in a markedly larger proportion of models over time.

CONCLUSIONS: This review provides an up-to-date overview of SDM-models, showing that SDM-models quite consistently share some components but that a unified view on what SDM is, is still lacking. Clarity about what SDM constitutes is essential though for implementation, assessment, and research purposes. A map is offered to identify key SDM-components.

TRIAL REGISTRATION: PROSPERO registration CRD42015019740

STRENGTHS AND LIMITATIONS OF THIS STUDY:

- Seven major databases were systematically searched
- Selection of all articles and extraction of all the data was done in duplicate and in consensus
- Articles that did not provide evidence of presenting a shared decision making (SDM)-model in the title or abstract may have falsely been excluded

- It was sometimes difficult to distinguish what authors of SDM-models saw as contextual versus integral to the SDM-process
- Extraction of the SDM-models therefore may have been too inclusive or too strict

1. INTRODUCTION

Shared decision making (SDM) between patients and healthcare professionals is gradually becoming the norm across Western societies as the model for making patient-centred healthcare decisions[1 2] and achieving value-based care.[3 4] SDM is based on the thought that healthcare professionals are the experts on the medical evidence and patients are the experts on what matters most to them.[3] Systematic reviews of published SDM-models date back to 2006 and 2007.[5 6] Makoul and Clayman concluded that there is no unified SDM-model, and proposed a set of essential elements to form an integrative model of SDM (e.g., *Define and/or explain the problem*, *Discuss pros/cons, Patient values/preferences*, *Make or explicitly defer decision*).[5] From their perspective, elements can be initiated either by patients or healthcare professionals, and they purposively abstained from identifying actors in their model so as not to place sole responsibility on either. Soon after, a second systematic review concluded that the focus of SDM-models is placed on information exchange and on the involvement of both patient and healthcare professional in making the decision.[6] Since then, SDM has gained attention exponentially, with new SDM-models emerging, and with what SDM specifically entails remaining under debate.[3 7 8] Moreover, in a systematic review of measures to assess SDM we noted that developers of SDM measures often only vaguely define the SDM construct or do not define it at all.[9] Meanwhile, there are calls to extend the conceptualization of SDM, such as by focusing on the person facing the decision rather than on a consultation,[10] or by shifting the focus of SDM to relationship-centred care[11] or to humanistic communication.[12]

Clarity about what SDM constitutes in a specific situation is essential for training, implementation, policy, and research purposes. This systematic review aims to 1) provide an up-to-date overview of SDM-models, 2) give insight in the prominence of components present in SDM-models, 3) describe who is identified as responsible within the components (i.e., patient, healthcare professional, both or none), 4) show the occurrence of SDM-components over time, and 5) present an SDM-map to easily identify key SDM-components per healthcare setting.

2. METHODS

In the following we use the term *model* for both models and definitions, for sake of readability. These terms may have a slightly different meaning but are often used interchangeably. No ethical approval was required. We registered this systematic review at PROSPERO: CRD42015019740.

2.1 Search strategy

Seven electronic databases (Academic Search Premier, Cochrane, Embase, Emcare, PsycINFO PubMed, and Web of Science) were systematically searched for articles published from inception up to and including September 2, 2019. The search terms “shared decision” and related terms such as “shared medical decision”, “shared treatment decision” and “shared clinical decision”, and their plural forms, as well as the broadly used abbreviation SDM were used to search in title and keywords. The search was restricted to peer-reviewed scientific articles; to publications in English for pragmatic reasons; and to publications about humans. See Appendix A for our complete search strategy.

2.2 Eligibility criteria

During the screening of titles and abstracts we determined whether the term *model* or *definition* was used, and if not, whether it could be expected that the authors would provide a new or adapted SDM-model. Full-text articles were excluded if they were not externally peer-reviewed or not written in English. Full-text articles were included if the authors explicitly described a new model of the SDM-process between a patient and one or more healthcare professionals, or if the authors had adapted an existing model based on own insights or research outcomes, and if the model was described comprehensibly, i.e., in enough detail to explain the process. We therefore excluded articles in which the authors only referred to a model described elsewhere, only mentioned the concept of SDM, or explained it briefly only. Also, the focus was on models that assumed a competent patient, i.e., a patient that was able to participate in the decision making process.

2.3 Selection process

Three researchers (AP, HB-R, FG) independently reviewed titles and abstracts of the first 100 records and discussed inconsistencies until consensus was obtained. Then, in pairs, the researchers independently screened titles and abstracts of all articles retrieved. In case of disagreement, consensus on which articles to screen full-text was reached by discussion. If necessary, the third researcher was consulted to make the final decision. Next, two researchers (AP, HB-R) independently screened full-text articles for inclusion. Again, in case of disagreement, consensus was reached on inclusion or exclusion by discussion and if necessary, the third researcher (FG) was consulted.

2.4 Data extraction

We extracted the description of each SDM-model (i.e., the verbatim text describing the model) as well as the following general characteristics: first author, year of publication, name of the model (if

applicable), healthcare setting, and development process (i.e., informed by existing literature or by data collected with the purpose to inform the model; for the latter, we extracted methods and respondents). Using a standardized extraction form, one researcher (AP or HB-R) extracted the data, the other researcher verified it, and inconsistencies were discussed until consensus was reached.

2.5 Data analysis

We separated each SDM-model description into text fragments, i.e., the smallest piece of text conveying a single constituent of the model, often delineated by conjunctions or punctuation. We then first classified all text fragments using elements, starting out with the list of 32 elements that Makoul and Clayman reported.[5] We refined or split elements, or added new elements if necessary. Elements may describe specific behaviours (e.g., *List options*) but need not (e.g., *Patient values*). Second, we determined the actor for each classified text fragment. An actor was defined as the person identified to be responsible for the occurrence of the behaviour or result described in the text fragment (i.e., no actor identified, patient and healthcare professional, only patient, or only healthcare professional). To illustrate, for *Patient values* it may be stated in the text fragment that healthcare professionals need to ask about patients' values, or that patients need to express their values. In the first case, the actor would be the healthcare professional; in the second, the patient. Note that the actor identified for the same element that is present in different SDM-models may differ between models, depending on the actor identified by the authors of the respective models. Third, we clustered elements representing a shared theme into overarching components taking into account the underlying text fragments, and formulated a name for each component, e.g., *Provide neutral information*, *Advocate patient views.* Clustering of elements into components was based on the content of the elements and regardless of actor. For the ensuing components, we now again determined the actor(s), based on the actors identified for the constituting elements. For each analysis step, one researcher (HB-R or AP) performed the analysis, the other verified it, and inconsistencies were discussed until consensus was reached. To depict a possible trend in the occurrence of components in SDM-models over time, we grouped the SDM-models by publication date into four different time periods (i.e., until 2010, 2010-2014, 2015-2017, since 2018), each containing approximately the same number of models. We calculated in how many of the models during a particular time period each component was present, as a percentage.

2.6 Patient and public involvement

This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to interpret the results. Patients were not invited to contribute to the writing or editing of this document.

3. RESULTS

The search yielded 4164 unique records. Forty articles were included in this review, from 34 different first authors, each describing a unique model (Figure 1). The articles were published from 1997 up to and including September 2, 2019. See appendix B for the model descriptions.

3.1 General characteristics of the models

3.1.1. Healthcare settings

Twelve SDM-models were generic (i.e., specified as such or no healthcare setting specified).[5 13-23] The other 28 SDM-models had been developed for a particular healthcare setting or patient group, namely primary care,[24-29] screening,[30 31] the inpatient setting,[32] paediatrics,[33-35] mental healthcare,[36-38] emergency care,[39 40] oncology care,[41 42] chronic care,[43 44] nursing care,[45] physical therapy,[46] older patients,[47 48] serious illness,[49 50] or diabetes.[51]

3.1.2. Decision types

Thirteen models were focused more or less explicitly on treatment decision making,[14 17 28 34 36 38 41-43 46 48 49 51] two on screening,[30 31] one on test and treatment decision making,[50] one on disease prioritization and treatment, [44] one on goals and actions, [27] and one on decisions regarding diagnostic testing, treatment, or follow-up.[19] For the other 21 models, the authors did not explicitly state the type of decision.[5 13 15 16 18 20-26 29 32 33 35 37 39 40 45 47]

3.1.3. Development processes

All authors referred to the broader SDM literature including SDM-models, although existing SDM-models may not have explicitly formed the origin of their own model. Twenty-one SDM-models were explicitly based on one or more of the SDM-models included in this review.[5 15 17 18 20 22 23 25-29 31 32 38 39 43 45-47 51] Appendix B shows that especially the models of Charles,[17 49] Towle,[16] Elwyn,[14 29] and Makoul[5] informed other SDM-models. Two-thirds of the models (26/40) were further or solely based on analytical thinking of the authors (i.e., no data were collected in patients and/or healthcare professionals with the purpose to inform the model); of note, empirical data collected for other purposes may have informed these models.[5 14 15 17 19 21 22 24 28 30-35 38-41 43-46 48-50] The development of the other models (14/40) was informed by empirical data gathered with the purpose to inform the model.[13 16 18 20 23 25-27 29 36 37 42 47 51] These empirical data were collected in individual and/or focus group interviews with patients (4/14),[13 36 37 51] healthcare professionals (1/14),[29] patients and healthcare professionals (1/14),[16] patients, members of the general population, healthcare professionals, and researchers (1/14),[42] or in patient representatives, healthcare professionals, managers, and others

from unnamed professions (1/14).[26] Between four and 54 patients and between six and 49 healthcare professionals participated in the individual or focus group interviews (not all patient numbers reported for one qualitative study). Further, data were collected in a Delphi study with patients, healthcare professionals and academics (1/14);[47] in research work groups with patients and healthcare professionals (1/14),[18] in a consensus study involving healthcare professionals, an anthropologist and a community health specialist (1/14),[25] and in a three-round consultation of academics, patients and healthcare professionals (1/14).[20] Finally, 76 consultations (one consultation of 26 pre-dialysis patients and two consultations of 25 breast cancer patients) were audiotaped and analysed (1/14),[23] and eight consultations were audiotaped and analysed, and patients, healthcare professionals and experts were interviewed (1/14).[27]

3.2 Components within the models

We identified 53 different elements in the descriptions of the SDM-models and clustered these in 24 overarching components (Table 1). Figure 2 visualizes the components; the surface of a particular circle indicates in how many of the 40 SDM-models the component was mentioned. *Describe treatment options* was the component most frequently present in any of the SDM-models; it was included in 35/40 models (88%). Other components present in more than half of the models were: *Make the decision* (75%), *Patient preferences* (68%), *Tailor information* (65%), *Deliberate* (58%), *Create choice awareness* (55%), and *Learn about the patient* (55%). The component *Reach mutual agreement* was present in 35% of the models. For a majority (9/14, 64%) of these models the patient and the healthcare professional had to agree on the final decision, but not in all. Components identified in 10% of the models at most were: *Healthcare professional expertise* (10%) and *Patient expertise* (8%).

3.3 Actors

3.3.1 Within models

Thirty-seven of the 40 models identified one or more actors, in two models actors were not mentioned at all,[15 20] and the authors of one model stated that they purposively did not define actors.[5] In 21/37 models both patient and healthcare professional were identified as actors;[13 16-19 22 27 28 31 34 36 42-51] in four of these, patients' role was implicit,[27 31 34 47] and in one both patients' and healthcare professionals' role were implicit. [22] Three models identified the patient and several healthcare professionals as actors,[25 26 30], three models identified the underaged patient , the parent, and the healthcare professional as actors.[33 35 38] Ten models identified solely the healthcare professional as actor.[14 21 23 24 29 32 37 39-41]

3.3.2 Within components

The colour of the line around the components in Figure 2 shows how often a particular actor or actors were mentioned for the elements constituting that component. The healthcare professional was often identified as the sole actor within components. In other cases, either the patient, both the patient and the healthcare professional, or no actor was identified for elements constituting a component. The following actor or actors were identified *in more than half* of the models in which these components were present: the healthcare professional in *Support decision making process* (92%), *Advocate patient views* (69%), *Prepare* (67%), *Learn about the patient* (64%), *Describe treatment options* (63%), *Offer time* (63%), *Provide neutral information* (63%), *Provide recommendation* (60%), *Healthcare professional preferences* (57%), *Create choice awareness* (55%), and *Tailor information* (54%); both healthcare professional and patient in *Reach mutual agreement* (57%); no actor in *Healthcare professional expertise* (100%), *Patient expertise* (67%) and *Gather support and information (56%)*.

3.4 Time trends

Four models of SDM were published up to 2001.[16 17 29 49] No new models were published between 2001 and 2006, and then another four models in 2006.[5 15 28 43] From then on, numbers increased rapidly from 2015 onwards, and half of the models were published since then. Figure 3 shows how often components appeared in models by time period: until 2010 (N=10 models), 2010 until 2015 (N=9 models), 2015 until 2018 (N=11 models), 2018 up to and including September 2 2019 (N=10 models)**.** There is some variation in which components were present in SDM-models over time. *Describe treatment options* and *Make the decision* were present in more than half of the SDM-models in any time period, while *Patient expertise*, *Healthcare professional expertise*, and *Prepare* were present in relatively few models only in any time period, although the latter shows a steady increase over time. *Create choice awareness* was present in markedly more models from 2010 onwards than before. The presence of several components in models showed a more or less marked decrease over time, including *Healthcare professional preferences* since 2010, *Support decision making process*, *Provide recommendation*, and *Reach mutual agreement* since 2015, and *Determine roles in decision making process* since 2018. The extent to which the other components were present in models fluctuates over time, without a clear pattern. The most prominent components in the most recent models in order of occurrence include *Describe treatment options*, *Make the decision, Tailor information*, *Deliberate*, *Learn about the patient*, and *Determine next step*.

3.5 Shared decision making map

We present a map to depict which components seem most relevant to SDM, by healthcare setting (Figure 4). On the Y-axis, the components are shown in order of frequency from top to bottom, across SDM-models. On the X-axis, the healthcare settings are shown in order of number of existing SDM-models from left to right. How often a particular component was present in SDM-models *within* a healthcare setting is colour-coded. The SDM-map thus helps identify 1) what components make up SDM-models, 2) how often components are present in SDM-models overall, 3) how often components are present in SDM-models within a particular healthcare setting. The SDM-map shows some components to be part of SDM-models in almost any healthcare setting (e.g., *Describe treatment options*, *Make the decision*, *Patient preferences*), and how the inclusion of other components differs between settings (e.g., *Create choice awareness*, *Provide recommendation*, *Offer time*). The SDM-map may help users to critically reflect on the rightful presence or absence of components in particular healthcare settings.

4. DISCUSSION

Our review provides an inventory of the 40 SDM-models currently available. Many models defining SDM are of relatively recent date: half of the models included were published in 2015 or later. Similarities between models exist but significant heterogeneity still remains, as others have noted before.[5] This may not be surprising considering the fact that almost half of the models have been developed for a variety of decisions relating to screening, diagnostic testing or treatment decisions, and that 28 of the non-generic models have been developed for 13 different healthcare settings.

Over a decade ago, Makoul and Clayman noted the low frequency with which authors defining SDM recognized and cited previous work in the field; they found one-third of articles with a conceptual model failed to cite any other model.[5] Our review shows that authors at least referred to existing literature about SDM, also when they did not base their own model on an earlier SDM-model. Especially the relatively older models that Charles,[17 49] Towle,[16] Elwyn,[14 29] and Makoul[5] and their colleagues developed have each informed at least six other SDM-models. These authors therefore have had a significant impact on thinking about what constitutes an SDM-process. They and others have further published adapted versions of their own models. Components specific to these models are therefore prominently present in our SDM-map. Further and remarkably, views of patients and/or healthcare professionals, the ones who enact SDM in clinical practice, were only assessed to inform fourteen of the 40 models. This may have resulted in underrepresentation of components that patients and healthcare professionals consider to be indispensable in current thinking about what constitutes SDM.

As may be expected, the component *Describe treatment options* was present in the vast majority of models. The transfer of information about treatment options is clearly key to SDM, and patients need this information to be able to participate in SDM. However, conveying treatment information to patients in itself does not safeguard that patients are actually able to participate.[52 53] For the component *Reach mutual agreement,* two ways of framing appeared: mutual agreement about the final decision is a requisite in part of the models, while in others this requirement is not formulated explicitly, or specifically relates to the *process* required to reach a decision rather than to the final decision itself. It may be of minor importance who makes the final call or whether all parties involved fully agree that the option chosen is the best possible option for this patient in this situation, as long as the process is shared.[42] *Patient expertise* and *Healthcare professional expertise* were rarely present in SDM-models. Since the first is often mentioned as the rationale for SDM,[17 54] it may not be surprising that it is not part of the definition of SDM. The authors' focus may be more on *how* to uncover this expertise (e.g., *Learn about the patient*) when describing the SDM process than the expertise itself.

Creating choice awareness clearly caught attention since 2010. Choice awareness has been defined as "acknowledging that the patient's situation is mutable and that there is more than one sensible way to address or change this situation",[55] and been put forward as pivotal in achieving SDM for some time.[2] However, despite the inclusion of this behaviour in models, it is seldom seen in clinical practice.[55-57] Both *Provide a recommendation* and *Healthcare professional preferences* are less and less present in SDM-models, suggesting that authors ideally see that healthcare professionals' preferences influence patients as little as possible. One may question if this is ideal from patients' perspective, as many patients consider receiving a treatment recommendation part of SDM.[13 42 58] Importantly, providing a recommendation that integrates informed patient preferences may indeed help patients in deciding what option they would prefer, and perfectly fits with SDM. Our results further show that the calls that were recently made to extend the conceptualization of SDM e.g., by focusing on the person facing the decision rather than on a consultation,[10] or by explicitly including time outside of consultations[42] would indeed add new aspects to the conceptualizations of SDM so far. *Offer time* and *Gather support and information* e.g., are part of relatively few models and typically convey attention to time outside of consultations and to the involvement of other stakeholders in the process, such as informal caregivers.[18 42] Future SDM-models may use a triadic approach towards SDM, in which the role of the caregiver is explicit.[59]

It is noteworthy that in one-fourth of the models overall, only the healthcare professional is identified as the actor in SDM, that is, is seen as responsible for the occurrence of an SDM-process. This does not align with the formal acknowledgement in 2011 of patients' role in making SDM happen in the Salzburg statement on SDM.[60] It bears the question whether it is justified to put the onus of achieving SDM on healthcare professionals only, and how patients can truly participate in an SDM-process if they are not recognized as active participants. It is especially important to acknowledge patients' role in SDM-models since patients formulate their own responsibilities in SDM, in qualitative studies asking about SDM.[13 18 42] Authors of SDM-models should therefore carefully consider patients' role in SDM. Also, we recommend that authors who develop an SDM-model clarify each actor's role. Doing so will help elucidate whose behaviour(s) should be targeted when aiming to improve SDM-levels, or measured when aiming to evaluate SDM-levels. This will facilitate the development of appropriate interventions and of valid measurement instruments. Also, authors of future SDM-models may want to involve patients and healthcare professionals in the development process of their models, to ensure that these reflect the views of those who enact SDM in practice.

This study provides a systematic overview of SDM-models published so far. A first potential limitation of the review is that we excluded articles based on title/abstract screening that did not provide evidence of presenting an SDM-model. We may therefore have missed models. Second, the first criterion in the assessment of full-text articles was if they had gone through external peer-review. This criterion was difficult to apply at times, as information was lacking in this respect. We therefore chose an inclusive strategy and may have included articles that have not gone through external peer-review. Third, for some models it was difficult to distinguish what the authors saw as context and what as integral to the SDM-process. Also, it was sometimes difficult to determine from the description what the authors considered to be essential to the SDM-process and what was e.g., an example of possible behaviour in the context of SDM.

The existence of SDM-models that vary in emphasis does not seem problematic to us per se. What an SDM-process exactly entails may differ by healthcare setting, and it may thus be helpful to have different models and choose the one that fits one's purposes best. Striving for one unified model may even be unrealistic and counterproductive. Also, existing models may be adapted or extended if this proves useful. However, striving for consensus on the core of what SDM is, is desirable to align research, training, and implementation efforts. The pursuit of consensus begs the question as to whom should ideally be involved in deciding on the essence of SDM. Until consensus is reached, we call authors to report the model they use, whichever it is. Being explicit about the SDM-model used is

necessary to develop SDM measures, understand results on the occurrence of SDM and its effects, to develop and implement interventions, and for training and policy purposes. When developing an intervention, it is also important to report whether the intervention targets one or more components of the SDM-process. For healthcare professionals who aim to share decisions with their patients, it is good to realise that there is no consensus in the field, only that certain components are more key to SDM than others. Our SDM-map is a practical visual tool to easily identify the most relevant components when enacting SDM in clinical practice, what components may be of more or less relevance to a particular healthcare setting, and provides a basis for what should be included in training and decision support interventions.

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AUTHOR CONTRIBUTIONS

AP, AS and HB-R designed the study. AP, FG and HB-R performed title and abstract screening. AP and HB-R performed full-text screening, conducted the data extraction, and wrote the first draft of the manuscript. All authors were involved in interpreting the results. All authors have read the manuscript, made improvements of the content and wording, and have agreed to the final version. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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COMPETING INTERESTS STATEMENT

All authors have completed the *Unified Competing Interest form* (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no

financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

DATA SHARING STATEMENT

We will share our data upon request. Please email dr. A.H. Pieterse (pieterse@lumc.nl).

LICENCE STATEMENT

FIGURE LEGENDS

Figure 1. Flow diagram of article selection process

Figure 2. Components of shared decision making models, and actors identified within components

Figure 3. Appearance of components in shared decision making models over time

Figure 4. Map of shared decision making components by healthcare setting and frequency of occurrence

Table 1. Components, their constituting elements, and how often they are part of the 40 shared decision making models.

Components	Elements	Frequency
advocate patient views	patient advocacy patient opinion is important	12 (30%)
create choice awareness	equipoise make need for decision explicit	22 (55%)
deliberate	deliberation~ negotiation~	23 (58%)
describe treatment options	benefits/risks (pros/cons)* feasibility of option(s) list options^ present evidence*	35 (88%)
determine roles in decision making process	all parties have a legitimate interest in the decision* formulation of equality of partners involves at least two people* patient's decisional role preference^ process determination or evaluation	14 (35%)
determine next step	arrange follow-up* implementation	19 (48%)
foster partnership	mutual respect* partnership*	12 (30%)
gather support and information	patient accesses information support with decision	8 (20%)
healthcare professional expertise	doctor knowledge~	4 (10%)
healthcare professional preferences	healthcare professional preferences healthcare professional values	7 (18%)
learn about the patient	check/clarify understanding healthcare professional^ learn about the patient	21 (53%)
make the decision	document (discussion about) decision make or explicitly defer decision* patient retains ultimate authority over decision revisiting decision	30 (75%)
offer time	offer time	8 (20%)
patient expertise	patient expertise	3 (8%)
patient preferences	patient concerns patient goals of care patient preferences~ patient values~	26 (65%)
patient questions	patient questions	8 (20%)
prepare	prepare (prior to consultation)	6 (15%)
provide information	information exchange*	17 (43%)

	medical information patient information	
provide neutral information	unbiased information*	8 (20%)
provide recommendation	doctor recommendation~	10 (25%)
reach mutual agreement	mutual agreement*	14 (35%)
set agenda	decide on agenda for the consultation define/explain problem*	9 (23%)
support decision making process	assess what patient needs to make decision doctor guidance in decision making process identify and address emotions	11 (28%)
tailor information	ascertain preferred (format for) information* check/clarify understanding patient^ flexibility/individualized approach* use clear language	26 (65%)

* original element from review Makoul & Clayman[5]

~ split element from review Makoul & Clayman[5]; the original element contained two different constituents

^ refined element from review Makoul & Clayman[5]; we added the appropriate verb or relevant actor

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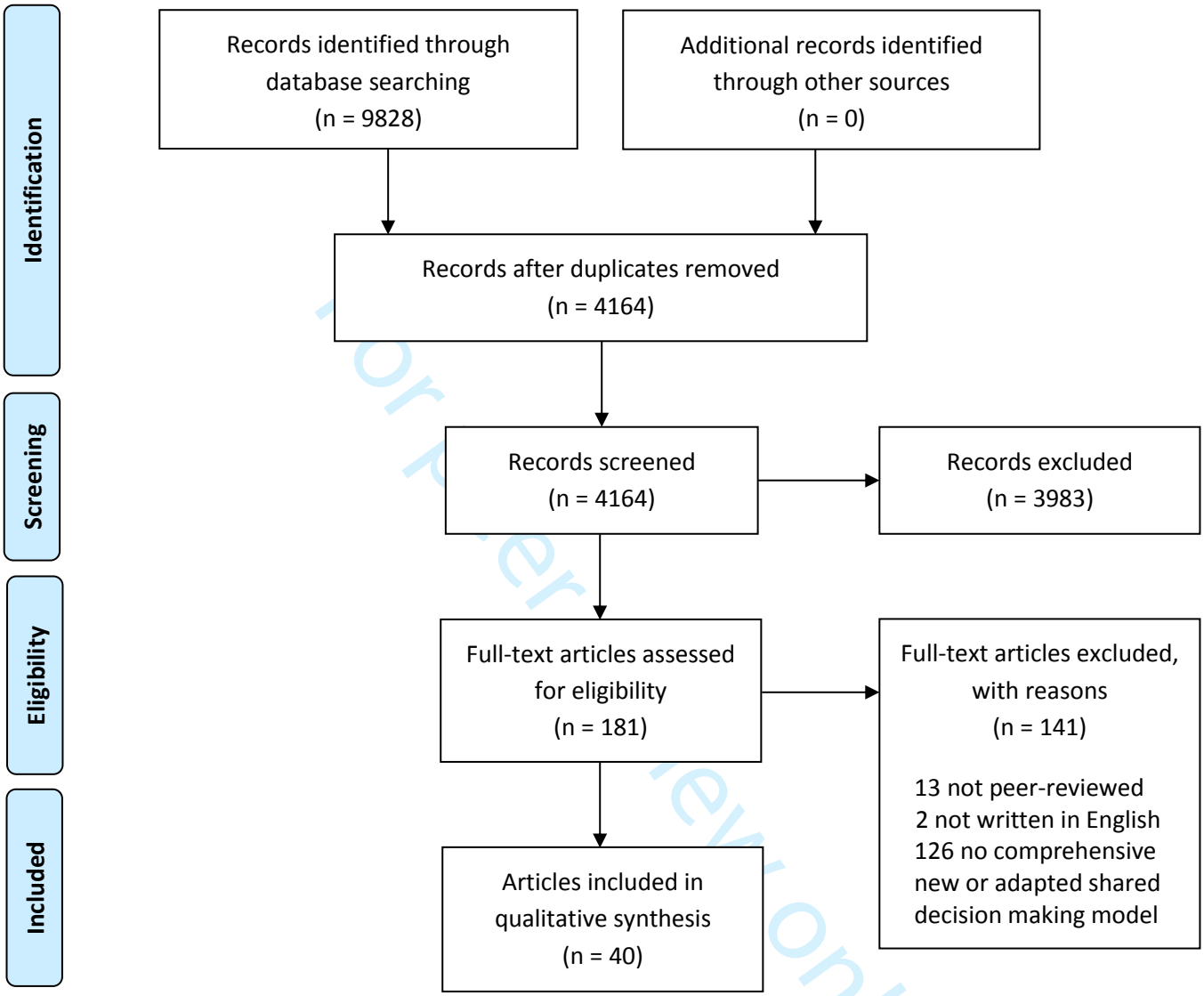
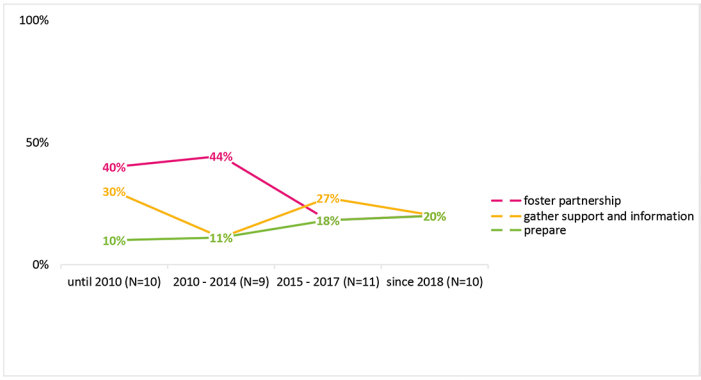


Figure 1. Flow diagram of article selection process

Figure 2. Components of SDM-models, and actors identified within components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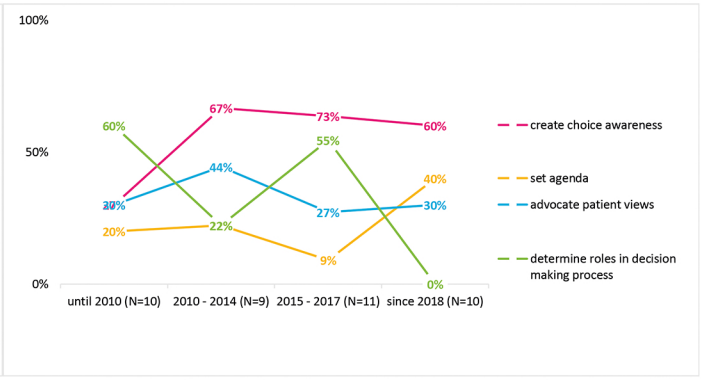
foster partnership
gather support and information
prepare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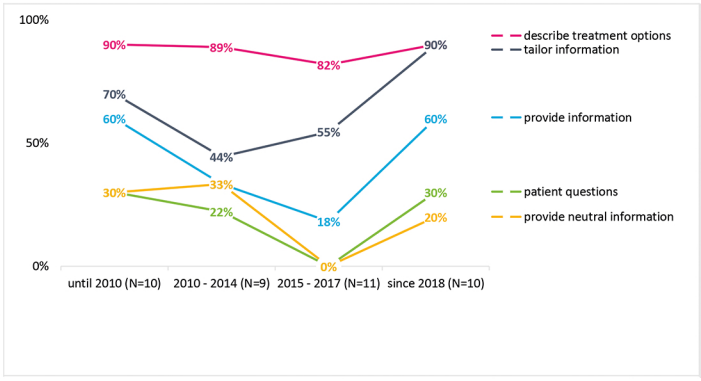
create choice awareness
set agenda
advocate patient views
determine roles in decision making process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describe treatment options
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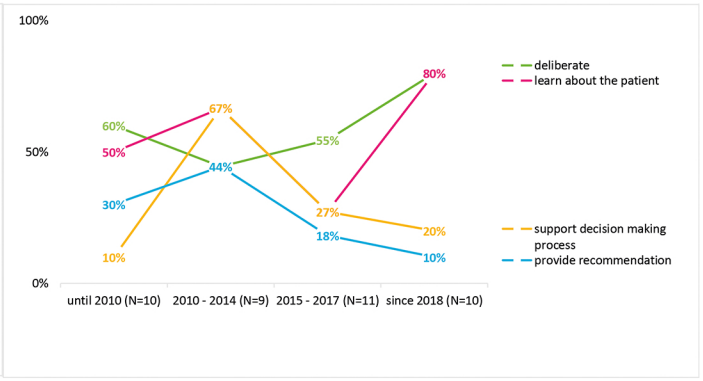
provide information
patient questions
provide neutral information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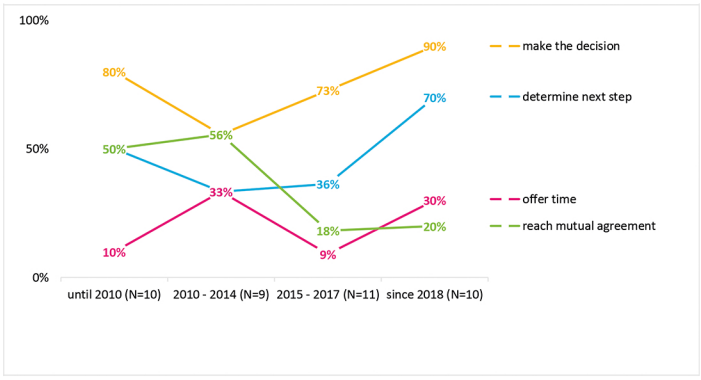
deliberate
learn about the patient
support decision making process
provide recommendation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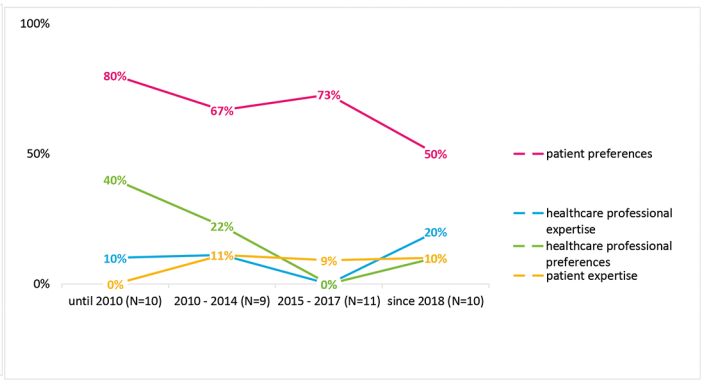
make the decision
determine next step
offer time
reach mutual agreement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patient preferences
healthcare professional expertise
healthcare professional preferences
patient expertise

Figure 4. Map of SDM-components by healthcare setting and frequency of occurrence

Appendix A: Search strategy

PubMed

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AND english[la]

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Web of Science

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[excluding] DOCUMENT TYPES: (BOOK REVIEW OR NEWS ITEM OR MEETING ABSTRACT OR EDITORIAL MATERIAL)

PsycINFO

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Limiters: Journal Articles (549) / Dissertations (50)

Academic Search Premier

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Limiters: Article

Appendix B. Shared decision making (SDM)-models (N=40) in order of publication year and first author

First author, publication year	SDM-model
Charles, 1997[49] *Explicitly informed the following models:* [5 17 18 22 24-26 28 32 38 45 51]	Four minimum or necessary criteria for classifying a physician-patient decision making interaction as SDM (i.e., necessary but not always sufficient). SDM involves that: **1. At least the physician and the patient are involved** (Often more than two participants are involved, such as a relative, a friend or another physician); **2. Both parties share information** (The physician should: a) Establish a conducive atmosphere so that the patient feels that her views about various treatment options are valued and needed, b) Elicit patient preferences, c) Transfer technical information on treatment options, risks and their probable benefits in an as unbiased, clear and simple a way as is possible, d) Help the patient to conceptualize the weighing process of risks versus benefits, and ask patients questions in order to ensure that patients' preferences are based on facts, e) Share his treatment recommendation and/or affirm the patient's treatment preference; The patient should be willing to take responsibility for disclosing preferences, asking questions, weighing and evaluating treatment alternatives, and formulating a treatment preference); **3. Both parties take steps to build a consensus about the preferred treatment;** **4. An agreement is reached on the treatment to implement.**
Charles, 1999[17] *Explicitly informed the following models:* [5 22 24-26 28 32 38 43 45 51]	The SDM model has three analytical stages (These may occur together or in an iterative process): **1. Information exchange** (Information exchange is two-way, from physician to patient and from patient to physician. The physician must inform the patient of all information that is relevant to making the decision (information about available treatment options, the benefits and risks of each and potential effects on the patient's psychological and social well-being); The patient needs to provide information on issues raised (Values, preferences, lifestyle, beliefs and knowledge about illness and its treatment) to ensure that both the physician and patient evaluate the information of the physician within the context of the patient's specific situation and needs); **2. Deliberation about treatment options (i.e., the process of expressing and discussing treatment preferences)** (The deliberation has an interactional nature, and both physician and patient are assumed to have a legitimate investment in the treatment decision (The patient because her health is at stake and the physician out of concern for the patient's welfare). The physician and patient (plus potential others) need (both) to be willing to engage in the decision making process by expressing treatment preferences. The interaction process to be used to reach an agreement may be explicitly discussed at the outset of the encounter or may evolve implicitly as the interaction unfolds); **3. Deciding on the treatment to implement** (Both parties, through the deliberation process, work towards reaching an agreement and both parties have an investment in the ultimate decision made).
Towle, 1999[16]	**Competencies (knowledge, skills, abilities) for physicians for informed SDM include:**

Explicitly informed the following models: [5 22 24-26 29 32 38]	1. Develop a partnership with the patient; 2. Establish or review the patient's preferences for information; 3. Establish or review the patient's preferences for role in decision making and the existence and nature of any uncertainty about the course of action to take; 4. Ascertain and respond to patient's ideas, concerns, and expectations; 5. Identify choices and evaluate the research evidence in relation to the individual patient; 6. Present (or direct patient to) evidence; Help patient to reflect on and assess the impact of alternative decisions with regard to the patient's values and lifestyle; 7. Make or negotiate a decision in partnership with the patient and resolve conflict; 8. Agree an action plan and complete arrangements for follow up. **Preliminary list of competencies for patients for informed SDM include:** 1. Define (for oneself) the preferred doctor patient relationship; 2. Find a physician and establish, develop, and adapt a partnership; 3. Articulate (for oneself) health problems, feelings, beliefs, and expectations in an objective and systematic manner; 4. Communicate with the physician in order to understand and share relevant information clearly and at the appropriate time in the medical interview; 5. Access information; 6. Evaluate information; 7. Negotiate decisions, give feedback, resolve conflict, agree on an action plan.
Elwyn, 2000[29] *Explicitly informed the following models:* [5 15 22 25 26 38]	Sequence of skills (competences) to involve patients in healthcare decisions: **1. Implicit or explicit involvement of patients in the decision making process** (Patients should fully understand that there is an opportunity to take part in a decision and that they are expected to take an active role); **2. Explore ideas, fears, and expectations of the problem and possible treatments;** **3. Portrayal of equipoise and options** (List options that are reasonably available, including, where relevant, the option of taking no action, and portraying options in an open, non-directive manner); **4. Identify preferred data format and provide tailor-made information;** **5. Checking process: Understanding of information and reactions** (Explore patients' ideas, fears, and expectations of possible options); **6. Checking process: Acceptance of process and decision making role preference** (Involving the patient to the extent they desire to be involved. Role preference should be ascertained after options have been described); **7. Make, discuss or defer decisions** (Ability to make transition from 'describing and checking' to achieving a decision, even if result is to postpone the process); **8. Arrange follow-up** (Offer opportunity to reconsider issues on another occasion, even if a firm decision has been made).
Makoul, 2006[5] *Explicitly informed the following models:* [15 24-26 32 38]	**Essential elements of SDM comprise:** 1. Define and/or explain the problem; 2. Present options; 3. Discuss pros/cons (benefits/risks/costs); 4. Patient values/preferences; 5. Discuss patient ability/self-efficacy (i.e., to follow through with a plan); 6. Doctor knowledge/recommendations; 7. Check/clarify understanding;

	8. Make or explicitly defer decision; 9. Arrange follow-up.
Montori, 2006[43] *Explicitly informed the following models:* [25 26 45 51]	Phases of shared treatment decision making as they apply to chronic care decisions: **1. Establishing an ongoing partnership** (Relationship is between 'patient team' (patient, members of patient's network, patients with same condition) and 'healthcare team' (healthcare professionals, educators, personal trainers), partnership takes place in the healthcare space and the patient's space); **2. Information exchange** (Clinician shares 'technical' information about available choices and their potential outcomes; Patient shares technical information they obtained from other sources and information about personal and social context; Patient and clinician both share their values and preferences); **3. Deliberating on options** (Process of considering the pros and cons for each one of the relevant choices, and clinicians and patients working together to identify the best strategy); **4. Deciding and acting on the decision** (Patients and the healthcare team work on strategies to implement and support the decision in the patient's own space; Clinician should be willing to revisit the decision).
Murray, 2006[28] *Explicitly informed the following models:* [22 25 26]	**Doctor and patient:** **1. Decide on an agenda for a consultation** (Exchange information (concerns, preferences and reasons for prioritizing), deliberate (listen to and respect the others' perspective), negotiate/decide on agenda for this consultation); **2. Decide on a treatment plan** (Doctor provides information about natural history of disease, and technical and medical information about treatment options, including pros and cons; If patient has accessed health information then agreement should be reached on the information to be used in the decision making process; Patient provides information on treatment preferences; Doctor provides information on preferences; Doctor and patient negotiate an agreed management plan, including opportunity for a change in decision if circumstances alter).
Simon, 2006[15]	**Steps in SDM process:** 1. Disclosure that a decision needs to be made; 2. Formulation of equality of partners; 3. Equipoise statement; 4. Informing on the options' benefits and risks; 5. Investigation of patient's understanding and expectations; 6. Identification of preferences; 7. Negotiation; 8. Shared decision; 9. Arrangement of follow-up.
Peek, 2008[51] *Explicitly informed the following model:* [45]	SDM consists of three conceptual domains: **1. Information-sharing** (Physicians explain/give information, listen, answer questions, and use layman's terms; Patients tell 'their story', report symptoms/answer questions, ask questions, and 'have a say'); **2. Physician recommendations** (A single option is offered or multiple options are offered with single medical doctor recommendation); **3. Decision making** (Patients follow the recommendation regardless (in case of single option offered), make their own choice (in case of multiple options

	offered with single medical doctor recommendation), agree/disagree in the office, or decide to adhere/non-adhere once at home).
Lown, 2009[18]	Six categories of patient and physician themes and corresponding attitudes and behaviours that enhance SDM:
Explicitly informed the following model: [45]	**1. Patient and physician act in relational ways** (Patient and physician each seek a personal connection, and demonstrate trust and consideration and/or empathy; Physician uses non-verbal behaviour to connect with the patient, and takes time during the encounter and afterwards); **2. Patient feelings, preferences and information about self** (Patient is aware of and expresses feelings, recognizes and expresses personal priorities and preferences about participation and care, considers significant others' needs when making choices, describes symptoms and their personal significance, and answers questions honestly; Physician listens and explores patient's personal information, feelings, needs and preferences, and conveys respect for those); **3. Patient and physician discuss information and options** (Patient and physician each are willing to listen and be open to ideas from the other; Patient asks questions, shares understanding of information, and explains thinking process; Physician provides medical information, elicits questions, and adjusts information-giving to the patient's needs and preferences, presents options, including risks and benefits, based on recent literature, is honest about limits of physician's knowledge and scientific information, and presents opinion); **4. Patient and physician seek information, support and advice** (Patient gathers support from significant others, and gathers information from sources other than this physician; Physician demonstrates willingness to seek and/or seeks additional information and encourages the patient to do the same, acknowledges/seeks and respects the expertise of other professionals, and seeks personal support); **5. Patient and physician share control/negotiate a decision** (Patient and physician accept risk or uncertainty; Patient advocates for self within the relationship, and negotiates ⁄ agrees to disagree; Physician validates patient self-advocacy, integrates patient's feelings and preferences into a mutual decision, and includes significant others in discussion); **6. Patient and physician act on behalf of the patient** (Patient takes responsibility for acting on agreed upon plans; Physician advocates for the patient).
Karkazis, 2010[34]	**Six-step model for the SDM process:** 1. Set the stage and develop an appropriate team (Well before the clinical consultation consider the range of expertise needed, how to frame the decisions to parents, and how to enhance parents' understanding of the decision); 2. Establish (parents') preferences for information and discuss the role of all parties in making a decision; 3. Identify and address (parents') emotions that might interfere with (parents') effective participation in the decision making process; 4. Define (parents') concerns about the (child's) diagnosis and explore how (parents') weigh values in order to outline treatment options in a way that addresses (parents') concerns (Clinicians must acknowledge to the parents that clinicians' values are not more “right” than theirs, and help parents consider their own assumptions and biases); 5. Identify options and present evidence (Identify and present all options objectively, including no surgery, the possible consequences of each option in a

	realistic way, how likely the consequences are, and type and quality of the evidence underlying options), provide a recommendation based on what evidence or other argument, explore (parents') ideas and assumptions, and correct misperceptions relating to the options; 6. Share responsibility for making a decision, which need not be shared (The values of the parents (and child when appropriate) should guide the decision making process).
Légaré, 2011[25] *Explicitly informed the following models:* [26 32]	Assumes that at least two healthcare professionals from different professions collaborate to achieve SDM with the patient, either concurrently or sequentially. Six-step interprofessional SDM model at the individual (micro) level: **1. Patient with a health condition and Equipoise** (Patient presents a health problem that requires a decision; Professionals share their knowledge and understanding of the options with the patient while recognizing equipoise (i.e., more than one option exists, including the option to maintain the status quo) and the need for a decision)); **2. Exchange of information** (The health professional(s) and the patient share information about the potential benefits and harms of the options); **3. Clarification of values/preferences** (Values clarification by all actors involved in the decision making process; Values of all actors may influence the decision; All actors should understand the values that are at play); **4. Feasibility of the options** (The interprofessional team, including the patient, analyses the feasibility of the options before determining individual preferences); **5. Preferred choice/Actual decision** (The patient identifies his preferred option with help from others. Ideally the final decision is agreed upon by all, and the healthcare professional must at least endorse the decision); **6. Implementation and health outcomes** (Supporting the patient so that the option chosen has a favourable impact on the health outcomes that he values most. The extent to which the option is implemented as planned and health outcomes must be evaluated to further inform the decision making process).
Légaré, 2011[26] *Explicitly informed the following model:* [32]	For the SDM process to be interprofessional, at least two healthcare providers from different professions must collaborate with the patient either concurrently or sequentially. SDM is an iterative six-step process: **1. Decision to be made** (A health professional makes explicit that a choice needs to be made and identifies more than 1 option); **2. Information exchange** (The health professional(s) and the patient share information about potential harms and benefits, including evidence-based information and information on the affective and emotional aspects of the decision); **3. Clarification of values/preferences** (Values clarification by all actors involved in the decision making process; Values of all actors may influence the decision; All actors should understand the values that are at play); **4. Feasibility of the options** (The interprofessional team, including the patient, analyses the feasibility of the options before determining individual preferences); **5. Preferred choice/Actual decision** (The patient identifies his preferred option with help from others. Ideally the final decision is agreed upon by all, and the healthcare professional must at least endorse the decision);

	6. Implementation and outcomes (The patient should be supported so that the option chosen has a favourable impact on the outcomes that the patient values most; The extent to which the option is implemented as planned and outcomes must be evaluated to further inform the decision making process).
Elwyn, 2012[14] *Explicitly informed the following models:* [20 22 23 27 32 37 39 47]	Three key steps of SDM for clinical practice: **1. Choice talk** (Step back, making sure that patients are aware that a choice exists and know that reasonable options are available, this may be initiated by either patient or clinician, justify choice, i.e., preferences matter, check reaction and defer closure.); **2. Option talk** (Check knowledge, list options, providing more detailed information about treatment options including harms and benefits, explore preferences, provide patient decision support, and summarize); **3. Decision talk** (Focus on preferences, elicit preferences, supporting the work of considering preferences and deciding what is best, move to a decision, and offer review). The clinician supports deliberation throughout the process. Deliberation defined as: A process where patients become aware of choice, understand their options, and have time and support to consider 'what matters most to them'.
Elwyn, 2013[22]	Three-talk model of SDM: **1. Justify:** Explain the need to deliberate about a decision, create a partnership to support the work – 'team talk'; **2. Inform:** Two-way exchange of high-quality information and opinions – 'options talk'; **3. Elicit:** Listen to patient's preferences about treatment and outcome goals, concerns, and priorities; **4. Integrate:** 'diagnose preferences', make recommendations, seek patient's views, and make or defer decisions – 'decision talk'.
Eliacin, 2014[36]	**SDM is a process with three key components:** 1. Information sharing between patient and provider; 2. General discussion about treatment options; 3. Final decision that is mutually agreed upon by provider and the patient. The patient-provider relationship is an essential foundation for shared decision making and facilitates the implementation of the three components of shared decision making.
Kane, 2014[41]	Six-step process model of SDM: **1) Invite the patient to participate** (Let patient know that he/she has options and that patient's goals and concerns are a key part of decision making process); **2) Present available treatment options;** **3) Provide balanced information on benefits and risks** (Ensure patients correctly understand information); **4) Assist patients in evaluating options based on their goals, make sure to understand patients' preferences;** **5) Facilitate deliberation and decision making** (Let patients know they have time for considering treatment choices, and ask what else they need to feel comfortable making decisions); **6) Implement SDM** (Identify and present next steps, assess patient understanding, and discuss any possible challenges with implementation).

Shay, 2014[13] *Explicitly informed the following model:* [45]	Patients' conceptual definition of SDM includes two key phases of SDM: Phase 1: An interactive exchange, Phase 2: Making the decision. Phase 1 includes four interdependent components: **1. Mutual exchange of information** (Patient shares concerns or problems; Physician shares relevant medical information and treatment options); **2. Open-mindedness and respect for one another** (Physicians bring in medical expertise, patients bring in their unique knowledge about their body and symptoms; Physician and patient should both listen and be open-minded about what the other says. Physicians should: a) Make time to talk with a patient on a more personal level and b) Respect the expertise of the patient, solicit patients' thoughts and concerns, and take time to answer questions before forming a recommendation); **3. Patient self-advocacy** (Patients are responsible to advocate for themselves throughout the SDM process (Ask questions, guide the conversation if needed, share opinions, and speak up if needed)); **4. Physician should provide a personalized recommendation and explain the reasoning for the recommendation in general and for the individual patient.** In Phase 2 a decision is made that is in the best interest of the patient. *About half of the patients:* Decision making is mutual between the patient and physician. *The other half of patients:* Ultimately the patient always decides. The patient has to take final responsibility, even if patient and physician shared in the communication process leading to the decision.
Volk, 2014[24] *Explicitly informed the following model:* [46]	Six steps process for achieving SDM: **1. Describe the need for a decision** (Describe health issue or decision, communicate uncertainty, and emphasize need for a decision); **2. Review the options** (Discuss the options, provide balanced explanation of pros and cons of each option, provide probabilities, and assess patient's comprehension); **3. Explore patient's values** (Discuss patient's views of the options, and explore patient's values); **4. Determine patient's preferred role in making the decision;** **5. Negotiate a course of action** (Assess patient's readiness to make a decision, elicit patient's initial preferences for the options, provide a recommendation if the patient prefers this, and negotiate a mutually agreed upon course of action); **6. Make plans for follow-up** (Help undecided patients to access additional support to make the decision, make plan to review the decision or deferment, and document in the medical record the discussion, the use of decision aid (if applicable) and the decision). **Four behaviours are important throughout the SDM process:** 1) Encourage patient questions, 2) Provide guidance in decision making process, 3) Tailor information to patient, 4) Establish a partnership with patient.
Gillick, 2015[50]	**Re-engineered SDM (goal-centric):** 1. Physician clarifies the patient's underlying health status (Make sure the patient understands the diagnosis, prognosis, and likely trajectory of disease in the context of their other medical problems); 2. Physician initiates conversation about goals of care, asks patient to prioritise their goals of care (Patients should think about what is most important

	personally, given some understanding of their medical condition and how that condition is likely to evolve over time); 3. Physician formulates the prioritised goals in terms of the three major medical goals of care (life-prolongation, maintenance of function, maximising comfort) in ways acceptable to patient; 4. Physician translates goals of care in a specific treatment based on the physician's knowledge of the consequences of the various treatments; 5. Patient retains the ultimate authority to accept or reject the proposed treatment.
Stiggelbout, 2015[19] *Explicitly informed the following model:* [31]	**The following steps are distinguished:** 1. The professional informs the patient that a decision is to be made and that the patient's opinion is important; 2. The professional explains the options and the pros and cons of each relevant option; 3. The professional and patient discuss the patient's preferences; The professional supports the patient in deliberation; 4. The professional and patient discuss patient's decisional role preference, make or defer the decision, and discuss possible follow-up.
Grim, 2016[37]	A model for SDM in mental health services, with five steps: **1. Preparation** (Before the meeting: Develop agenda (Inform the patient about the purpose and estimated duration of the meeting prior to the meeting), and provide user with decision support); **2. Choice talk** (Step back, offer choice, justify choice (i.e., preferences matter), check reaction, defer closure. Physician provides guidance to the patient in this step); **3. Option talk** (Check knowledge (Patient should be open to have his/her knowledge corrected), list options, describe options, harms and benefits in language devoid of medical jargon, explore patient's preferences (Provider should support patient in considering the pros and cons and to assess implications of the options), and summarize); **4. Decision talk** (Focus on preferences, elicit preferences, offer time to considerate the options, move to a decision, offer to make a recommendation if patient so wishes, and offer review of what has been discussed); **5. Follow up** (Make further contact with provider possible after decision has been made, plan return visit for review and follow-up, make it possible for patient to follow one's progress, to know how long a decision will remain in effect, and to review or revisit a decision). Decision support is important during all steps of the decision process.
Jansen, 2016[48]	Steps for shared decision making process about deprescribing in older people: **1. Creating awareness that options exist:** Clinician and patient acknowledge that a decision can be made about continuation or discontinuation of medicines, and that this requires input from both clinician and patient; **2. Discussing the options and their benefits and harms:** Ensuring that the patient knows what options are available (including the option to continue medicines) and understands the process of deprescribing, the expected benefits and harms of each option, and how likely they are to occur; **3. Exploring patient preferences for the different options:** Help patients identify their preferences, goals, and priorities regarding deprescribing;

	4. Making the decision: Integrating the patient's preferences and priorities with information on benefits and harms. Decisions may be made by the patient, made collaboratively, or deferred to the clinician.
Langer, 2016[38]	The sample SDM model consists of six steps: **1. Discuss preferred roles in treatment planning;** **2. Specify decisions to be made;** **3. Present the available options for each decision** (The top few choices for each decision should be presented); **4. Determine pros and cons of each option** (Elicitation of the pros and cons from each decision maker's perspective); **5. Design preliminary treatment plan** (The clinician and family discuss the pros and cons of each option and formulate an initial treatment plan); **6. Implement progress monitoring** (Continually evaluate the effectiveness of the treatment plan through targeted assessment measures so that adjustments can be made).
Van de Pol, 2016[47]	SDM is seen as a dynamic process. The model consists of the following six steps: **1. Preparation** (History, review of previous discussion or documentation regarding treatment in general or on specific issues and problem analysis (Functional assessment of all current problems)); **2. Goal talk** (Explain that disease has occurred and that choices need to be made, explain that every patient has own preferences and priorities, identify proxy decision maker if appropriate, identify patient values and goals of care, and elicit goals of care); **3. Choice talk** (Summarise the preceding steps and verify your recapitulation, explain that there are several treatment possibilities and offer choice, always including option of no treatment, invite patient/proxy to formulate treatment aim and support the patient, convey that only the patient can be the expert on treatment aims, priorities and preferences, and check if the patient/proxy has understood everything; **4. Option talk** (List personalised treatment options, discuss risks, benefits and side effects of every treatment option, check which risks and side effects the patient is willing to take, and observe how the patient reacts; **5. Decision talk** (Inquire if the patient/proxy is ready to make a decision, and if not, go back to the preceding steps, focus on the preferences of the patient and make a decision with the patient/proxy. If the patient wants the doctor to decide, discuss this explicitly, and connect to the identified patient values, goals of care and treatment aims); **6. Evaluation talk** (Discuss the decision making process. If not everybody is satisfied with the decision making process, enquire about the dissatisfaction and go back to a preceding step. Prepare a treatment plan based on the decision).
Dobler, 2017[30]	**SDM lung cancer screening counselling entails:** 1. Clinician and patient work together to determine whether lung cancer screening makes intellectual, emotional, and practical sense given the patient's overall personal and medical situation, as well as their informed preferences and values; 2. A conversation aid is used to support communication about the relative benefits and harms of screening or not, using tailored estimates of risk and state-of-the-art information design.

Elwyn, 2017[20]	The SDM process is a fluid transition between three different kinds of talk: **1. Team talk** (Work together, describe choices, offer support, and ask about goals); **2. Option talk** (Discuss alternatives, using risk communication principles); **3. Decision talk** (Get to informed preferences, and make preference-based decisions).
Park, 2017[33]	SDM in paediatrics consists of four attributes: **1. The active participation of parents, children, and health professionals;** **2. Collaborative partnership, i.e., mutuality and equality between parents, children and health professionals** (Important components of partnership are open-mindedness, mutual respect, and trust); **3. Reaching a compromise, i.e., reaching an outcome via mutual agreement** (Health professionals define and explain, and present the available options and their advantages and disadvantages; Parents, children, and health professionals establish the outcomes important to the patient and determine patient's preferences, and reach a decision); **4. Common goal for child's health** (Seeking a common goal or shared purpose).
Probst, 2017[40] *Explicitly informed the following model: [39]*	The clinician should initiate the SDM conversation according to four general steps: **1. Acknowledge That a Clinical Decision Needs to Be Made** (The clinician should make it clear what he or she is going to discuss and why. A clear statement should be made indicating that a decision with various options needs to be discussed); **2. Share Information in Regard to Management Options and the Potential Harms, Benefits, and Outcomes of Each** (Information should be provided in a stepwise fashion at a pace the patient can understand. Information should be expressed free of medical jargon); **3. Explore Patient Values, Preferences, and Circumstances** (Ask about and discuss what matters to the patient and what social factors may be at play); **4. Decide Together on the Best Option for the Patient, Given His or Her Values, Preferences, and Circumstances (**The conversation should result in a mutual decision. It is the clinician's responsibility to understand the patient's preferences and values and help him or her make a decision most consistent with these. The clinician should not unduly sway the patient).
Rennke, 2017[32]	The multistep SDM pathway consists of the following four steps: **1. Information gathering** (The provider solicits medical history and patient preferences for decision making); **2. Information sharing** (Patient education about the medical issue and available treatments); **3. Decision discussion** (This involves the pros/cons of each option, alternative diagnostic or management strategies, and how these decisions fit with a patient's preferences, abilities and resources, or what has been called 'contextualizing care'); **4. Make (shared) decision, Check understanding.**
Lenzen, 2018[27]	Practical framework for shared decision making about goals and actions: **1. Preparation:** Informing the patient about the aim of the consultation; Inviting the patient to ask questions or raise points for discussion;

	2. Goal setting: Exploring the patient's current and desired situations; Giving information tailored to the patient; Supporting the patient in formulating feasible goals; **3. Action planning:** Making sure the patient knows that he/she has a choice (Choice talk); Discussing possible options for actions with the patient (Option talk); Deciding on actions together with the patient (Decision talk); **4. Evaluation:** Continuously reflecting on the patient's progress, and adjusting goals and actions.
Moore, 2018[46]	SDM is an iterative three-stage process: **1. Prepare for collaboration:** Clinicians communicate that decisions need to be made, options exist, and patient participation can help determine a plan to meet the patient's needs; invite the patient to participate; negotiate priorities; **2. Exchange information about options, inclusive of patients' values and preferences:** Clinicians identify patient knowledge, concerns and values; Clinicians and patients exchange information about goals and treatment options, with benefits and risks; Clinicians and patients clarify and correct perceptions about options, resources, values, and preferences; Clinicians and patients check for a good match between patient priorities and available options; Clinicians and patients deliberate, and reach a decision or plan or defer the decision; Value the expertise of the patient and the clinician; **3. Affirm and implement the decision or plan:** Clinicians and patients summarize the plan to confirm mutual understanding, congruence with patient priorities and goals, and the patient's understanding of the condition and its consequence; Clinicians and patients discuss strategies for promoting adherence, assessing success, and modify the plan as needed; Clinicians document the decision-making process, the plan, and expected outcomes.
Probst, 2018[39]	**The SDM process occurs in a conversation and should include the following three steps:** 1. Acknowledge that clinical decision needs to be made with the patient; 2. Engage in conversation with the patient to share information about the current clinical scenario as well as options for future care, while exploring the patient's values, preferences, and circumstances. Every effort must be made to speak in clear language and avoid medical jargon to maximize patient understanding. This step typically happens in a dynamic, circular fashion; 3. Reach an agreement regarding the best plan of action on the basis of the patient's informed preferences.
Rusiecki, 2018[21]	**A circular SDM model in which the order of the steps is fluid:** 1. Identify the issue; 2. Equipoise; 3. List options with pros/cons; 4. Explore patient's values and concerns; 5. Check patient's understanding; 6. Negotiate a decision; 7. Review treatment/follow-up plan.
Saidinejad, 2018[35]	**Principles of shared decision making with patient and caregivers:** 1. A mutually respectful patient-provider relationship;

	2. Minimizing communication barriers (language, cultural, social, etc.); 3. Allowing patient to express understanding of the medical problem being treated, available options, and management plan in a meaningful fashion; 4. A transparent and honest discussion of treatment options, as well as risks and benefits; 5. Patients are assisted in understanding the feasibility of each option; 6. Allowing time for the patient/caregiver/family to deliberate and discuss option; 7. Review with patients the choice they opted for, the next steps, and expectation for outcome; 8. Provide strict return precautions.
Truglio-Londrigan, 2018[45]	SDM is a comprehensive ongoing process and entails three categories: **1. Communication and Relationship building** *Relationship Building - Trust and Respect* - The patient identifies a need or question. Individuals enter into a relationship where there is collaboration and sharing of power, and they must work towards building a trusting and respectful relationship. *Information Exchange – Communication* - Communication is both interpersonal and intrapersonal. The interpersonal communication is the mutual exchange of information and involves active listening. Intrapersonal communication entails: a) Mutual reflection i.e., the provider and patient reflect together via communication, exchanging thoughts about decisions, and patient's perspective, and b) Individual reflection, which takes place autonomously within the individual provider or patient; **2. Working toward shared decision making** *(Assessment* - The provider must come to know the patient, the patient's family and home/community, and patient's specific preferences. *Teaching-learning* - Providers teach and provide patients with the necessary information on diagnosis, treatment, and strength of the evidence, in optimal format for patients to learn and understand the information. *Balance* - Provider should use equipoise if >1 best practices are available. Finding balance requires deliberation and negotiation leading to consensus about the decision. *Decision* - Consensus about the decision; **3. Action for SDM** *Takes action* - The patient takes action to see the decision through, which may prompt a re-evaluation of the decision together with the provider. *No action* - The patient takes no action and may then choose to return to the provider to re-evaluate the decision or not to return.
Bomhof-Roordink, 2019[42]	**SDM in oncology whereby oncologist and patient behaviors unfold over time, during as well as outside consultations.** 1. Oncologist determines possible treatment options for patients **before or during consultations**; 2. Oncologist expresses importance of patient's opinion; 3a. Oncologist provides information about the disease, and presents the treatment options including pros and cons and their associated probabilities. Oncologist explains treatment outcomes into some detail at least. Oncologist is open and honest, and his/her information is accurate, clear, and complete. Oncologist determines patient's level of understanding and clarifies any issues if necessary; 3b. Patient asks questions when things are not clear;

	4a. Oncologist learns about the patient; 4b. Patient expresses thoughts and feelings openly; 5a. Oncologist supports deliberation throughout the decision process, using the knowledge he/she gained about the patient; 5b. Patient thinks about what is important for him/her and considers and weighs the options; 6. **Outside consultations:** Patient considers treatment options; Patient consults others; Patient accesses information; 7a. Oncologist asks about preferences; 7b. Patient expresses preferences about the treatment options, after oncologist has asked for it or at own initiative; 7c. Oncologist provides a treatment recommendation, and his/her expertise lends him/her the authority to do so; 8. Oncologist and/or patient make treatment decision.
Chor, 2019[31]	A five-step framework: 1. Identify that a decision needs to be made and acknowledge the equipoise around this decision; 2. Explain medical options including the components of the pelvic examination, and the potential medical and psychosocial benefits and harms of the options; Provide patients the opportunity to ask questions; 3. Elicit values, preferences, and experiences and engage in how these may inform the decision; 4. Jointly arrive at a decision or agree to defer the decision; 5. Educate regarding pelvic health and warning signs, and ensure that the patient feels welcome for future follow-up.
Joseph-Williams, 2019[23]	'Implement-SDM' : **1. Preparation phase;** **2. Choice introduction;** **3. Increasingly tailored option presentation:** Clinician uses emerging knowledge about the patient's clinical history and preferences to continually tailor the discussion to that individual patient; presentation is responsive and tailored to the needs of individual patients and to contextual factors; **4. Planning discussion:** Emphasis may be on consolidating preferences and making decisions, or on summarising preferences and encouraging an ongoing reflective and iterative process until decision can be made. **From Choice introduction through Planning discussion: Clinician, patient and family preferences evolving from prior to informed; Preference checking and elicitation; Decision, emotional, and practical support.** **Multi-stage and distributed (across time and multiple persons) decisions.**
Ng, 2019[44]	Dual-layer process of shared decision making: **Layer 1: Disease prioritisation:** **1. Primary care providers (PCPs) provide information on:** Status of patient's medical conditions; Clinical outcomes of each disease (if uncontrolled); **2. Patients provide information about:** Their understanding of each disease and its impact; The disease that they are most concerned about or affects them most;

3. The PCP and patient discuss, negotiate and agree on: The disease(s) to focus on for this consultation; When to revisit the other diseases.

Layer 2: Treatment prioritisation

4. PCPs provide information on: Treatment options available; Pros and cons of each treatment option;

5. Patients provide information on: Their understanding of each treatment option and its attributes; The treatment attributes that they value most or are concerned of;

6. The PCP and patient discuss, negotiate and agree on: The treatment option; When to revisit the decision if undecided;

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	N/A
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	2, 4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix A
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5, 6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	N/A
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	N/A
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	N/A
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Appendix B
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	N/A
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	N/A
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10-13
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	12
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12-13
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	13

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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