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The SDM 3 Circle Model: A Literature Synthesis and Adaptation for Shared Decision-Making in the Hospital¹

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Abstract

Patient engagement through shared decision-making (SDM) is increasingly seen as a key component for patient safety, patient satisfaction, and quality of care. Current SDM models do not adequately account for medical and environmental contexts, which may influence medical decisions in the hospital. We identified leading SDM models and reviews to inductively construct a novel SDM model appropriate for the inpatient setting. A team of medicine and pediatric hospitalists reviewed the literature to integrate core SDM concepts and processes and iteratively constructed a synthesized draft model. We then solicited broad SDM expert feedback on the draft model for validation and further refinement. The SDM 3 Circle Model identifies 3 core categories of variables that dynamically interact within an “environmental frame.” The resulting Venn diagram includes overlapping circles for 1)patient/family, 2)provider/team, and 3)medical context. The environmental frame includes all external, contextual factors that may influence any of the 3 circles. Existing multistep SDM process models were then re-articulated and contextualized to illustrate how a shared decision might be made. The SDM 3 Circle Model accounts for important environmental and contextual characteristics that vary across settings. The visual emphasis generated by each “circle” and by the environmental frame direct attention to often overlooked interactive forces and has the potential to more precisely define, promote, and improve SDM. This model provides a framework to develop interventions to improve quality and patient safety through SDM and patient engagement for hospitalists.

Keywords

Shared decision-making; medical decision-making; patient engagement; patient-centered care; physician-patient communication

Introduction

Evolving models of medical care emphasize the importance of shared decision-making (SDM) on practical and ethical grounds.¹⁻³ SDM is a cognitive, emotional, and relational process where provider and patient collaborate in a decision after discussing the options, evidence, and potential benefits and harms, while considering the patient’s values, preferences, and circumstances.⁴ Categories of decisions include information gathering, pharmacotherapy, therapeutic procedures, consultations and referrals, counseling and precautions (e.g., behavior modification, goals of care, end-of-life care), and care transitions (e.g., transfer or discharge to home).⁵ Decisions span the continuum of urgency and may be anticipatory or reactive.⁶ The patient’s environment^{7,8} and the provider-patient relationship⁹ have been explicitly incorporated into the ideal SDM process.

SDM has been conceptually and empirically linked with evidence-based practice,¹ although the relationship between SDM and clinical outcomes is less clear.^{10,11} SDM is desired by patients¹² and may bolster patient satisfaction, trust, and adherence.^{13,14} Limited evidence

suggests SDM could reduce inappropriate treatments and testing,¹⁵ decrease adverse events,¹⁶ and promote greater patient safety,^{17–19} but more well-designed studies are needed.

Provider, patient, and contextual factors influence the extent to which SDM occurs. Providers commonly cite time constraints and perceived lack of applicability to certain clinical scenarios or settings,¹⁹ Providers may also lack training and competency in SDM skills.² Patients may be reluctant to disagree with their provider or fear being mislabeled as “difficult.”²⁰ When faced with high stakes or emotionally-charged decisions, patients’ surrogates may prefer to have the provider serve as the sole decision-maker.²¹ Contextually, there may be limited evidence, high clinical stake, or a number of equally beneficial (or harmful) options.^{22,23}

Current SDM models guide clinicians in determining when and how to engage in SDM, yet models vary widely. For example, Elwyn’s model emphasizes the ethical imperative for SDM and outlines 3 SDM steps: introduce choice, describe options, and help patients explore preferences and make decisions.³ Using a multi-modal review and clinician-driven feedback, Legaré’s “IP-SDM” model illustrates the roles of the interprofessional team and emphasizes the influence of environmental factors on decision-making.²⁴ Recent systematic reviews of SDM models have attempted to identify common elements, language, and processes.^{2,25,26}

While published SDM models demonstrate varying emphases – e.g., evidence-based medicine,² provider-patient relationships,⁹ interprofessional practices and environmental influences,²⁴ or patient contextual factors^{7,8} – none specifically addresses hospitalization and the issues that impact decisions as a patients’ clinical condition and care needs change. Studies of SDM in hospitalized patients have relied on either general theoretical frameworks for patient engagement, or on conceptual models developed specifically for outpatient care.^{16,27,28} While the key tenets of SDM are relevant across clinical settings, hospitalization introduces a number of unique and highly relevant factors that may influence all aspects of the SDM process. Table 1 provides several examples from the authors of how inpatient and outpatient SDM may differ.

This study reviews leading SDM models to construct a more environmentally and contextually sensitive model appropriate for the hospital setting. While developed with hospital medicine in mind, a synthesized model that attends to environmental and systems context, provider/team factors, patient factors, and disease/medical variables is highly relevant in any setting where SDM occurs.

Methods

We constructed a model appropriate for SDM across the care continuum through the following 3-part, iterative group process: 1) a comprehensive literature review of existing SDM models, 2) synthesis and inductive development of a new draft model, and 3) modification of the new model using feedback from SDM experts.

Narrative literature review

We performed a structured, comprehensive literature review²⁹ to compare and contrast existing SDM models and frameworks. Leading models and key concepts were first identified using 2 systematic reviews^{25,26} and a comprehensive review.² In order to extend the search to 2016 and include any overlooked articles, a PubMed search was performed using the terms “shared decision-making” or “medical decision-making” AND “model” or “theory” or “framework” for English-language articles from inception to 2016. The search was repeated using Google Scholar to verify results and obtain the number of citations per article as a proxy for impact and saturation. In order to minimize possible search error or selection bias, reference lists in high impact publications were hand searched to identify additional articles. All abstracts were manually reviewed by 2 independent authors for relevance and later inclusion in our group iterative process. *A priori* inclusion criteria were limited to provider-patient SDM (i.e. not clinical reasoning or making decisions in general) and complete descriptions of a conceptual model or framework. Additional publications suggested by experts (e.g., perspective pieces or terminology summaries) were also reviewed.

Model development and expert review

An electronic SDM reference library and annotated bibliography of the selected articles (Table 2) was created to guide the synthesis of SDM models and highlight needed revisions for hospital medicine. In a process similar to Legaré,²⁴ a group of 8 pediatric and adult medicine hospitalists, a palliative care physician, a cognitive psychologist, a biostatistician, and 3 medical trainees reviewed the selected SDM publications and models³⁰ and independently created their own adapted inpatient SDM models. Through an iterative, consensus-building group process, each model was discussed to select key elements or features to be integrated into a synthesized model. This model was guided by principles of social ecological theory, which emphasizes the role of the individual as influenced by and interactive with systems and the environment.³¹

The draft model and a standardized set of questions (Appendix A) were then emailed to all first and last authors of the reviewed studies (Table 2). Expert responses were compiled, coded, and analyzed independently by 3 co-authors. Inductive coding techniques and a constant comparative approach were used to code the qualitative data.³² Preliminary findings were shared among the 3 reviewers and discussed until consensus was reached on emerging themes and implications for the new SDM model and multistep SDM pathway. A master list of suggested revisions was shared with the larger authorship team and the model was refined accordingly.

Results

Two previously published systematic reviews^{25,26} identified 494 articles, 161 conceptual definitions of SDM, and over 30 separate key concepts. The additional PubMed search garnered 1,957 publications (with many overlapping from the systematic reviews). A manual search of the systematic reviews and PubMed abstracts identified 16 unique and complete decision-making models for further review. Hand searches of their citations yielded an

additional 6 models for a total of 22 models.^{3,4,13,23,33–51} The majority of excluded articles described specific decision aids and small clinical studies, focused on only one step of the decision-making process, or were not otherwise relevant. The first (SR) and senior authors (JS) reviewed the 22 models for SDM relevance, generalizability, and content saturation yielding a final sample of 9 SDM models. A subsequent Google Scholar search did not identify any new SDM models but 2 SDM theory papers^{52,1} and 2 commentaries^{53,54} were selected based on influence (i.e. number of citations), expert recommendation or coverage of a novel aspect of SDM. A total of 15 studies (9 SDM models + 6 reviews; See Table 2) were used by our development team to create a synthesized SDM model. A tenth SDM model⁵⁵ and 3 additional descriptive and normative studies^{8,56,57} were later added based on expert feedback and incorporated into our final SDM 3 Circle Model.

Expert Feedback

Twenty-one out of 27 (78%) SDM expert authors responded to our email request for feedback. The majority (62%) agreed with the basic elements of the model, including the environmental frame and the 3 domains. Some respondents viewed SDM as strictly a process between patient and provider independent of the disease, leading to refinement of the medical context category. Several experts emphasized the importance of SDM “set-up,” which includes the elicitation of patient preferences in how decisions are made and the extent of patient and/or surrogate involvement.

Several respondents identified time constraints (N=2), acuity of disease (N=3), and presence of multiple teams (N=6) to be the significant factors distinguishing inpatient from outpatient SDM. For some experts, “team” referred to the interprofessional care team while others referred to it as the collaboration among attending physicians and trainees. Experts noted that while the intensity and frequency of inpatient interactions could promote SDM, higher patient acuity and the urgency of decisions could negatively influence SDM and/or the patient’s ability to participate. Similarly, the presence of other team members may either impede or promote SDM by either contributing to miscommunication or bringing well-trained SDM experts to the bedside. Financial impact on patients and resource constraints were also noted as relevant. All of these elements have been incorporated into the final SDM 3 Circle Model and multistep SDM Pathway (Figure 1).

The SDM 3 Circle Model

The SDM 3 Circle Model comprises 3 categories of SDM barriers and facilitators that intersect within the environmental frame of an inpatient ward or other setting: 1) Provider/Team, 2) Patient/Family, and 3) Medical Context. A Venn diagram visually represents the conceptual overlaps and distinctions among these categories that are all affected by the environment in which they occur (Figure 1).

The patient/family circle mirrors prior SDM models that address the role of patient preferences in making decisions,^{3,4,12} with the explicit addition of the roles of families and surrogates as either decision makers or influencers. This circle includes personal characteristics, such as cognitions (e.g., beliefs, attitudes), emotions (e.g., anxiety, hope), behaviors (e.g., adherence, assertiveness), illness history (i.e. subjective experience and

understanding of one's own medical history), and related social features (e.g., culture, education, literacy, social supports).

Patient factors are not static over time or context. They occur within an environmental setting and are likely to be influenced by concurrent provider and medical variables (the second and third circles). Disease exacerbation leading to hospitalization or transfer to a subacute facility could dramatically shift the calculus a patient uses to determine preferences or activate dormant family dynamics. Strong provider-patient rapport (the overlap of patient and provider factors) may influence the development of trust and subsequent decisions.⁹ The type of disease or symptom presentation (circle 3 - medical context) may further influence patient factors due to stigma, perceived vulnerability, or assumed prognosis.

The provider/team circle includes both individual and team-based factors falling into similar categories as the patient/family domain such as cognitions, behavior, and social features; however, these factors include both personal (e.g., the provider's personal history, values and beliefs) and professional (e.g., past medical training, decision-making style, past experiences treating a disease) characteristics. Decisions may involve an interprofessional team representing a broad range of personalities and professional values. Decisions and decision-making processes may change over time as team composition changes, as level of provider expertise varies, or as environmental, patient, or disease/illness factors influence providers and teams.

Medical context includes factors related to the disease and the potential ways to evaluate or manage it. Examples of disease factors include acuity, symptoms, course, and prognosis. Most obviously, disease factors will influence the content of risk-benefit discussions but may also affect the SDM process through disease stigma or cultural assumptions about etiology. Disease evaluation factors include the psychometrics of a diagnostic screen, invasive and non-invasive testing, or a range of different preventive or therapeutic interventions. Treatment variables include the available options, costs, and risk of complications. Medical context variables evolve as evidence-based medicine and biomedical knowledge increase and new treatment options emerge.

Each of the 3 circles operates within the same environmental frame, such as an inpatient medicine ward, which itself operates within a hospital and the broader health care system. This frame exerts overt and subtle influences on providers, patients, and even the medical context. Features of the environmental frame include culture (e.g. values, preferences, social norms), university vs. community setting, incentives, formularies, quality improvement campaigns, regulations, and technology use.

The dynamic interactivity of the environmental frame and the 3 circles inform the process of SDM and highlight key differences that may occur between care settings. Certain features may predominate in different situations, but all will influence and be influenced by features of other circles during the course of SDM.

Application of the SDM 3 Circle Model

As shown in Figure 1, the multistep SDM pathway begins with information gathering and processing where the provider solicits medical history as well as patient preferences for decision-making. This “processing” of patient decision-making preferences is less commonly described. The next steps, sharing information and decision discussion, include patient education about the medical issue and available treatments. Discussions may involve the pros/cons of each option, alternative diagnostic or management strategies, and how these decisions fit with a patient’s preferences, abilities (e.g., health literacy)⁵⁸ and resources, or what has been called “contextualizing care.”^{7,8} Framing and other provider behaviors, including the use of decision aids and decision guides,¹⁵ may influence these conversations. Finally, after gathering, sharing, and discussing information (as influenced by the environment and 3 circles), a medical decision is made and patient understanding is verified. Detailed examples of how this model might be applied are illustrated with case scenarios in Appendix B.

While the SDM process is similar across clinical settings, its operationalization varies in important ways for hospital decision-making. In some situations, patients may defer all decisions to their providers or decisions may be considered with multiple providers concurrently. In the hospital SDM may not be possible such as in emergency surgery for an obtunded patient or patient and surrogate are not available or able to participate in the decision. Therefore, providers may bypass the steps of information sharing and discussion of the decision (big arrow in Figure 1 and Appendix B), proceeding directly to decision-making.

Discussion

The SDM 3 Circle Model provides a concise, ecologically valid, contextually sensitive representation of SDM that synthesizes and extends beyond recent SDM models.^{3,7,40} Each circle represents the forces that influence SDM across settings. While the multistep SDM pathway occurs similarly in outpatient and inpatient settings, how each step is operationalized and how each “circle” exerts its influence may differ and warrants further consideration throughout the SDM process. For example, hospitalized patients may have greater stress and anxiety, have more family involvement, be more motivated to adhere to treatment, and may be under greater financial and social pressures. Unlike outpatient primary care, patients are less likely to have an existing relationship with their inpatient providers, potentially compromising patient confidence in the provider, and necessitating expeditious trust building.

The SDM 3 Circle Model captures “setting” in both the broader environmental frame and within the provider/team category of variables. The frame also captures health system and broader community variables that may influence the practicality of some medical decisions. Within this essential frame, all 3 categories of patient, provider, and medical context are included as part of the SDM process. A better understanding of their interplay may be of great value for clinicians, researchers, administrators, and policy makers who wish to further study and promote SDM. Both the SDM 3 Circle Model and its accompanying pathway

(Figure 1) highlight opportunities for intervention and research, and may drive quality improvement initiatives to improve clinical outcomes.

Limitations

We did not perform a new systematic review, potentially omitting lesser known publications. We mitigated this risk by using recent systematic reviews, searching multiple databases, hand searching citation lists, and making inquiries to SDM experts. Our selection of models used as a foundation for the synthesized model was based on consensus, which included an element of subjective, clinical judgment. Our SDM expert sample was small and limited to authors of the papers we reviewed, potentially restricting the range of viewpoints received. Lastly, the SDM 3 Circle Model highlights key concept areas rather than all possible factors that influence SDM.

Conclusion

We present a peer-reviewed, literature-based SDM model capable of accounting for the unique circumstances and challenges of SDM in the hospital. The SDM 3 Circle Model identifies the primary categories of variables thought to influence SDM, places them in a shared environmental frame, and visually represents their interactive nature. A multistep representation of the SDM process further illustrates how the unique features and challenges of hospitalization might exert influence at various points as patients and providers reach a shared decision. As the interrelationships of patient, provider/team, medical context and the environmental frame in which they occur are better understood, more effective and targeted interventions to promote SDM can be developed and evaluated.

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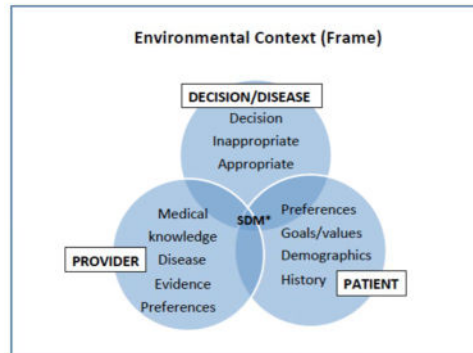
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Appendix A. Email template to SDM experts with initial SDM model and stimulus questions

Shared Decision-Making in the Inpatient Setting – A Conceptual Model



I am writing to you based on your expertise in patient safety and patient communication to get your input on an SDM model. We have greatly benefited from your work in this area and have noticed that most of the SDM models focus on outpatient medicine. We have synthesized the best of those models into the attached, two-part figure that we believe can work for either outpatient or inpatient medicine and plan to publish. We would greatly appreciate it if you could look at this figure and give us your impressions. We have added a few prompts below but any comments or impressions are welcome. To date, our patients and providers have been extremely positive about our work and we hope to share our materials with others very soon.

Questions:

Do the 3 primary circles accurately capture the primary domains for SDM consideration? If not, what is missing?

Does the larger environmental context “frame” help? Our intent was to capture the environmental factors that might be different in an inpatient vs. outpatient setting.

At present, the SDM process pathway is essentially the same as outpatient medicine. What changes would you make to better represent the SDM process for inpatient medicine? (For example, we considered including the influence of other team members, location, and conversations with outpatient doctors, or the influence of acuity or co-morbidities.) Any suggestions?

Please add any general comments including those about uniqueness, clarity, visual appeal, etc.

Appendix B. Clinical application of the SDM Conceptual Model and Multistep Shared Decision-Making (SDM) Pathway

Case An 89-year-old woman with osteoporosis and Alzheimer’s dementia is hospitalized after a mechanical fall at home resulting in several rib fractures. Her hospitalization has been complicated by pain and delirium.

Decision Type – Disposition/Care Transition: Discharge home or discharge to a skilled nursing facility

Environmental Framework – Rural community hospital with limited choices for skilled nursing facilities in the area. Traditional physician-centric decision models are typically followed. There is pressure for quick discharge.

Patient/Family – Patient has consistently expressed a wish to return home but has been delirious in the hospital. This is her second hospitalization for falls. The patient’s spouse died several years ago in a long-term care facility. The patient and her family had a negative experience and believe that the facility will not provide enough supervision and attention to her.

Provider/Team – The hospitalist is concerned that the patient’s delirium may not improve quickly in the skilled nursing facility but home would not provide regular physical therapy, occupational therapy or nursing care. The team, including the hospitalist, bedside nurse, physical therapist, occupational therapist and case manager recently discharged another patient home in the past week who was discharged home and was readmitted less than 48 hours later with a hip fracture after a fall.

Medical context –The patient is medically stable for discharge. The closest nursing facility is 65 miles from the patient’s home but the patient would receive at least one hour of physical therapy every day. The patient’s niece and primary caregiver do not have a car and would have to travel by bus to visit the patient. If the patient is discharged home she would receive home physical therapy twice a week.

Case 2

A 13-month-old fully immunized girl with a history of febrile seizures is admitted with fevers and lethargy. She is diagnosed with *Streptococcus pneumoniae* meningitis and the inpatient team’s recommendation is a minimum 10-day course of parenteral antibiotic treatment.

Decision Type – Treatment: Placing an intravenous (IV) access for prolonged parenteral therapy and includes the options of long term access with antibiotics at home versus short term access while remaining in the hospital for the duration of therapy

Environmental Framework – Admitted to a children’s hospital with resources and availability of several types of procedures for short term and long term IV access. Availability of resources such as home care and home pharmacy may factor into whether or not it could be an option for the family to administer the antibiotic therapy at home.

Patient/Family – There is no history or experience with procedures and inpatient hospitalization. There is support at home and the ability of family to care for the child.

Provider/Team – The hospitalist’s bias includes a personal preference for long term access.

Medical Context – The decision is based on evidence-based guidelines and there is one option that the hospitalist is recommending. An oral course of antibiotic or shorter duration of treatment should not be posed as an option to the family since this practice departs from the standard of care. However, the *route* by which she receives the intravenous (IV) antibiotic could be a discussion that engages the family’s preferences and values. Although peripheral IVs are less invasive, she would require multiple IVs through the course of treatment since most IVs last for only 2–3 days. Because of her young age and smaller veins, IV access may become more challenging as she continues therapy and she may require several attempts before IV access is secured. However, placement of a PICC line carries the risks associated with a central line such as bloodstream infection and blood clots. Another consideration with this particular age group is that she would likely need to undergo moderate sedation for placement of the PICC line, which carries its own inherent risks. If she does undergo PICC line placement however, the family may also have the option of administering the antibiotic therapy at home.



SDM Pathway Step and Application (see Figure 1)	Case 1	Case 2
Information gathering	Where would you like to go after hospital discharge? What kind of support services are needed if you were to go home? What experience have you had with nursing facilities?	How has she been tolerating peripheral access this hospitalization? Who is available to place central lines here? What antibiotic is recommended? What is the duration of therapy?
Information sharing	During your hospital stay these events happened...	Bacterial meningitis is...

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SDM Pathway Step and Application (see Figure 1)	Case 1	Case 2
	There are the options available after you leave the hospital... We anticipate that... when you leave the hospital.	Based on current evidence-based guidelines antibiotic therapy is... These are the options for how your daughter may receive the antibiotic therapy...
Decision discussion	As we discuss your recovery what is important to you in terms of care? Let's compare what your recovery would be like at home versus a nursing facility.	The benefits of using a PICC line include ... and the risks include... If she receives a PICC line and does therapy at home ...if she stays in the hospital... What do you think would work best for her? Tell me more about that.
SDM	The decision is to go home. Tell me what factored into our decision for her to go home and what we discussed may happen at home.	We have made the decision to go ahead and place a PICC line and receive antibiotics at home. Based on what we discussed tell me what will happen when you arrive at home.
Implementation	Home nursing services and physical therapy has been set up. Additionally the team has recommended home occupational therapy.	The PICC has been placed. Our team wants to help with the transition home and have arranged for bloodwork to be drawn in one week at the Pediatrician's clinic. What questions do you have?
Outcomes	A visiting nurse will follow up on pain and functional status during the home visits. The nurse will continue to communicate with the patient, caregivers, hospital providers and the primary care team on medication adherence and falls prevention.	Following discharge the pediatric nurse will call the family twice a week to answer any questions and ask about treatment response, side effects and follow up care.

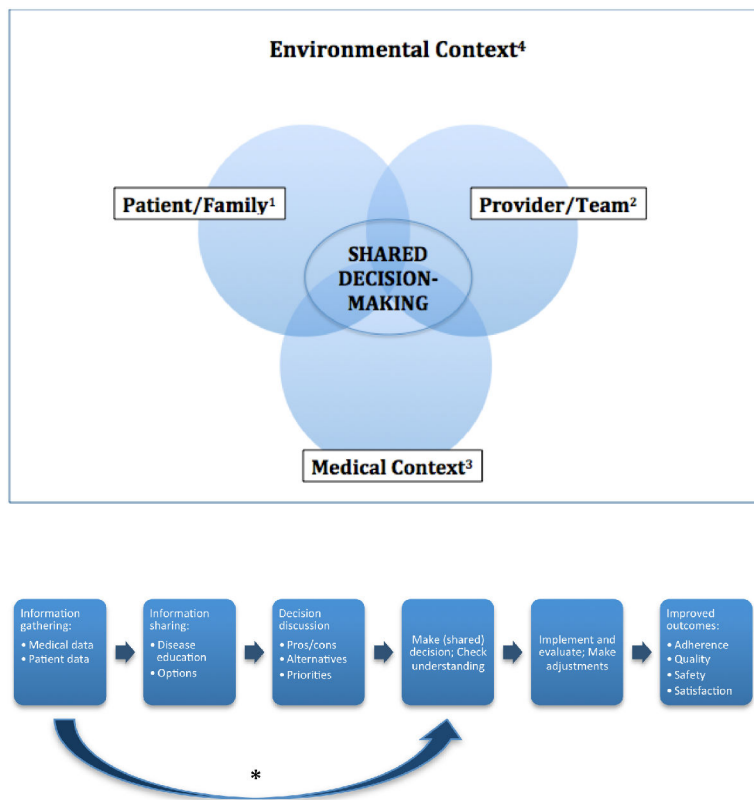


Figure 1. SDM 3-Circle Conceptual Model and Multistep Shared Decision-Making (SDM) Pathway

¹Patient/Family: A patient’s ability to engage in SDM reflects one’s health (e.g., functional and cognitive status) and life circumstances (e.g., socio-economic status; presence of a family member to serve as a surrogate).

²Provider/Team: SDM engagement is influenced by characteristics of an inpatient team (e.g., attending physician, trainees, nurse, social workers, case managers, dietitians, therapists) and characteristics of the healthcare providers it comprises (e.g., fatigued vs. well-rested; variable familiarity with SDM guidelines).

³Medical Context: Some decisions require a patient to provide informed consent (e.g., invasive hospital tests and procedures; blood product transfusions); others require a patient to play a fundamental role (e.g., adhere to prescription or course of rehabilitation).

⁴Environment: A clinical service (e.g., medicine or pediatrics, emergency department, hospital floor or intensive care unit) operates within a hospital (e.g., university-based/ community-based) located in a community (e.g., transportation options) and health system (with varying incentives and priorities). Features of each level can influence the SDM encounter through their bearing on the three domains.

* Certain situations may warrant bypassing or limiting the steps of information sharing and decision discussion such as time-sensitive emergencies (e.g. emergency surgery) or if the patient and/or surrogate are uninterested or unable to participate in SDM

Table 1

Examples of differences between inpatient and outpatient shared decision-making

Outpatient Setting	Inpatient Setting
<p>Timing / Temporality of Decisions</p> <ul style="list-style-type: none"> • Single office visit/encounter <i>or</i> multiple discrete visits • Time limited to appointment slot with some decisions made over multiple visits • Healthcare staff interface within appointment window 	<p>Timing / Temporality of Decision</p> <ul style="list-style-type: none"> • Series of encounters over the course of hospitalization • Time variability per daily encounter(s) • Members of healthcare staff and team interface at variable times during the day • Different healthcare staff interface at different periods
<p>Decision-making Environment</p> <ul style="list-style-type: none"> • Time to ponder decisions away from the clinical environment after the brief and discrete clinical encounter • Ability to access second opinions out of healthcare team's institution (including family, PCP, specialists) • Quick return to patient's natural environment • Inpatient hospital resources not as readily available (imaging, tests, procedures, hospital consultants) • Generally, less time pressure to make decision 	<p>Decision-making Environment</p> <ul style="list-style-type: none"> • Continued frequent conversations about clinical decision • Quick access to variable specialists and members of the same institution's healthcare team (including nurses, social workers) • Patient in foreign environment for undefined time • Closely monitored patient environment with hospital resources readily available (imaging, tests, procedures, consultants) • Constant reminders of medical decision(s) needed for patient
<p>Disease Acuity</p> <ul style="list-style-type: none"> • Decisions for elective or urgent matters 	<p>Disease Acuity</p> <ul style="list-style-type: none"> • Decisions for elective, urgent, or emergent matters
<p>Relationships between decision makers</p> <ul style="list-style-type: none"> • Longer-term relationships with medical home providers • Single encounter relationships for urgent care or overflow visits • Single trainee working with provider per patient 	<p>Relationships between decision makers</p> <ul style="list-style-type: none"> • Variable time relationships with shift-work providers (days, nights, weekends) • Inter-professional provider engagement • In academic institutions, tendency for larger teams, including multiple trainees per team and potentially multiple teams per patient
<p>Common Issues</p> <ul style="list-style-type: none"> • Limited time per encounter • Difficulties with follow-up appointments • Difficulties with timeliness (e.g., of tests, consults, procedures, etc.) • Difficulties with care coordination (PCP, specialists) • Decision stakeholders may not be present at the discrete visit • Recall bias when there are lengthy intervals between encounters • Care discontinuity - different providers as part of practice group or team 	<p>Common Issues</p> <ul style="list-style-type: none"> • Limited time per patient during rounds • Confusion regarding provider roles • Unpredictability of provider/personnel visits throughout the day • Confusion stemming from conflicting opinions of different teams • Multiple teams involved in patient care activities • Care discontinuity – resulting from shift-work and changes in medical team

Table 2

Annotated list of selected SDM studies and models/frameworks

Author(s) and Citation	Description
Braddock CH, Edwards KA, Hasenberg NM, Laidley TL, Levinson W. 1999⁵⁷	Using a cross-sectional descriptive evaluation of audiotaped office visits of primary care and surgeon office visits. Informed (shared) decision-making was found to be incomplete. Conclusion: More needs to be done to encourage SDM.
Braddock III CH, Fihn SD, Levinson W. et al. 1997⁵⁶	Cross-sectional descriptive evaluation of informed decision-making based on audiotaped primary care office encounters. Authors used six criteria to score informed decision-making and found that a discussion of risks and benefits and patient understanding was infrequent.
Charles C, Gafni A, Whelan T. 1997⁵¹ Charles C, Gafni A, Whelan T. 1999⁴	Landmark studies that described a framework for shared decision-making based on a physician-patient partnership in the decision-making process. The process included sharing of information including treatment preferences and agreement on a decision.
Elwyn G, Frosch D, Thomson R, et al. 2012³	Authors describe an SDM model for treatment decision in primary care. The model focuses on patient's active involvement in the process, exploration of expectations and options, teach back and follow up. Three key steps include choice talk, option talk and decision talk.
Elwyn G, Lloyd A, May C, et al. 2014³⁷	Authors describe the collaborative deliberation model of decision-making based on five communicative efforts of constructive interpersonal engagement, recognition of alternative actions, comparative learning, preference construction and elicitation and preference integration. The model could apply to different types of communication in health care including motivational interviewing, SDM, goal setting and action planning.
Epstein RM, Gramling RE. 2013⁵³	Review of the SDM in the context of complex and uncertain situations and the role of preference, relationship and the concept of shared attentional focus. Authors also include the role of information technology, health care teams and health systems in decision-making.
Hoffmann TC, Montori VM, Del Mar C. 2014¹	Authors highlight the interconnection between evidence-based medicine (EBM) and SDM - each is necessary in combination to improve patient care. Calls for SDM and EBM to be included in practice guidelines and future research.
Holzmueller CG, Wu AW, Pronovost P.J. 2012³⁶	Framework for physicians to determine patient involvement in decision-making and includes patient-related factors. The framework further delineates situations when patients should decide and when physicians should decide.
Kon, AA. 2010⁵⁴	Commentary describes SDM as a continuum with one end being patient driven and the opposite physician driven with a middle being both as equal partners. Different decisions and situations call for varying degrees of patient and physician input in the process.
Légaré F, Stacey D, Pouliot S, et al. 2011⁴⁰ Légaré F., Stacey D, Gagnon S. 2011⁶⁰	The model describes an interprofessional approach to SDM. Each professional works either in collaboration with other providers or sequentially with the patient. The model includes the role of environment in SDM and includes clarification of values and feasibility of options.
Makoul G, Clayman ML. 2006²⁵	Literature review of SDM models and propose a model based on 9 essential elements. The elements include: define/explain problem, present options, discuss pros/cons, patient preferences/values, patient ability, physician recommendations, checking for understandings, make/defer decision and arrange follow up. Authors also include ideal elements and general qualities that promote SDM.
Moumjid N, Gafni A, Bremond A, et al. 2007²⁶	Explores if there is a clear definition of SDM, whether authors provide a definition of SDM when they use the term, and whether they are consistent in doing so.
Muëller-Engelmann M, Keller H, Donner-Banzhoff N, Krones T. 2011⁴⁵	This paper investigates current social norms regarding the appropriateness of SDM in different situations. The authors find that SDM is considered most important in severe illness and chronic condition. SDM was also indicated as necessary when there is more than one therapeutic option without one being clearly superior.
Rapley T. 2008⁵⁵	Describes a framework for how to conceptualize decision-making as an evolving series of encounters over time interfacing with several different individuals, knowledge acquisitions and technologies.
Stacey D, Légaré F, Pouliot S, et al. 2010⁵²	Comprehensive theory analysis of SDM conceptual models to determine how relevant they are to interprofessional collaboration in clinical practice. They concluded that most SDM models did not utilize an interprofessional approach. This highlights the need for a model that is more inclusive of other health professionals.
Torke AM, Petronio S, Sachs GA, et al. 2012³⁴	This article uses literature from medicine, communication studies, and medical ethics to build a conceptual model of the role of communication in decision-making. Information processing and relationship building were found to be two major elements of interpersonal communication.

Author(s) and Citation	Description
Towle A, Godolphin W. 1999 ⁵⁹	Model is developed from proposed physician and patient competencies for learning and teaching SDM. The competencies include developing a physician-patient partnership, explicit discussion around patient preference and readiness, role of the patient in the decision-making process, developing an action plan and resolving conflict.
Weiner SJ, Schwartz A, Sharma G, et al. 2013 ⁸	Observational study using a protocol of medical chart audits and audiotaped provider encounters at internal medicine clinics at 2 VA hospitals to evaluate for contextualizing care (also called patient-centered decision-making); providers were scored on their ability to incorporate contextual factors such as barriers to treatment into care planning. The developed protocol could be used to assess physician performance around contextualized decision-making.
Whitney SN. 2003 ²³	This article proposes a model of medical decisions based on importance and clarity. It also identifies 3 types of decisions that are less well suited to a collaborative decision: major decisions with low certainty, minor decisions that have high certainty, and major decisions that have high certainty when patients and physicians disagree.

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