

## ARTICLE

# Implementing decision aids in clinical practice: A work in (slow) progress

Roger Luckmann MD MPH<sup>a</sup>, Mary E. Cooley PhD RN FAAN<sup>b</sup> and Ruth M. Tappen EdD RN FAAN<sup>c</sup>

a Geriatrician, Department of Family Medicine and Community Health, University of Massachusetts Medical School, Worcester, MA, USA

b Nurse Scientist, Dana-Farber Cancer Institute College of Nursing and Health Sciences, Boston, MA, USA

c Christine E. Lynn Eminent Scholar and Professor, Christine E. Lynn College of Nursing, Florida Atlantic University, Boca Raton, FL, USA

## Abstract

**Aims and Objectives:** While availability of and access to decision aids (DA) addressing many clinical issues has improved greatly in recent years, several significant barriers to adoption and use need to be addressed and overcome before effective DA implementation becomes widespread.

**Methods:** Interviews with scholars familiar with DA implementation and a literature review.

**Results:** We have identified and described 22 barriers: 9 workflow barriers, 2 key limitations in resources, 3 concerns about DA quality and availability, 7 provider/patient barriers and uncertainty about the characteristics of effective DAs.

**Discussion:** Workflow barriers may be among the most challenging to overcome. Effectively addressing them may require significant investment of resources, complex re-engineering of workflow, reconfiguration of clinical facilities, and introduction of new computer hardware. We classify and review the strengths and weaknesses of workflow and physical locations of DA use and of DA formats. We also propose a classification of the dimensions of clinical decisions that may have implications for DA content and design.

**Conclusion:** We conclude that more rapid progress in DA implementation may depend on new opportunities to increase the time allocated to clinical encounters expected to come from the adoption of value-based reimbursement and on research focused on workflow challenges and DA formats.

## Keywords

Barriers, classification, decision aids, facilitators, implementation, information technology, patient navigators, person-centered healthcare, rate of progress, service reconfiguration

## Correspondence address

Dr. Roger Luckman, Department of Family Medicine and Community Health, University of Massachusetts Medical School, 55 Lake Ave. North, Worcester, MA 01760, USA. E-mail: luckmanr@ummhc.org

Accepted for publication: 20 July 2018

## Introduction

Decision aids (DA) are print, electronic and video tools that elucidate and compare the benefits and harms of healthcare interventions. They can help patients choose treatment and preventive care options consistent with their personal values and preferences. DAs may be most effective when they are linked to a shared decision-making (SDM) process that involves a patient and a healthcare provider who can address patients' questions and facilitate application of patients' values to the decision. Studies of DAs have shown that, compared to usual care, they can increase patients' knowledge, accuracy of risk perceptions, engagement in decision-making, likelihood of making a decision and congruency between informed values and

care. DAs can also decrease decisional conflict related to feeling uninformed and indecision about personal values [1].

Decisions vary in important dimensions as shown in Table 1. Decisions with a few simple options and minimal harms (e.g., statins to prevent heart disease), may be dealt with during a clinical encounter with the use of a short DA. To support difficult, complex decisions (e.g., cancer treatment) more detailed, longer DAs may be needed and they may require more time and support to review.

There is growing support among providers, payers and healthcare system leaders for engaging patients in DA supported SDM when diagnostic or treatment options involve trade-offs in benefits and harms sensitive to patients' values and preferences. The USA Affordable Care Act required the establishment of a "program to

provide for the phased-in development, implementation, and evaluation of SDM using patient DAs to meet the objective of improving the understanding of patients of their medical treatment options” [2]. The Center for Medicare and Medicaid (CMS) of the USA requires patients eligible for lung cancer screening to engage in SDM supported by a DA and is proposing to offer incentives to Accountable Care Organizations (ACO) implementing SDM and DAs for 6 common preference-sensitive conditions [3,4]. Other drivers of DA adoption include the ethical imperative to inform patients about the harms and benefits of healthcare interventions and the evidence that DA supported SDM has led to a reduction in healthcare costs due to patients declining a few preference-sensitive services including major elective invasive surgery and prostate-specific antigen screening [1,5].

In response to these and other drivers of DA implementation, hundreds of DAs have been developed, evaluated according to respected standards [6] and made available to providers. Healthwise™ produces DAs that can be integrated with electronic health records (EHR) [7] and Washington State has developed a DA certification process [8]. In *Shared Decision Making in Health Care*, Simmins *et al.* and Andrews *et al.* describe and evaluate several DA distribution strategies: (1) provider ordering DAs through an EHR for patients to review at home or in clinic before or after a visit, (2) patient ordering DAs before visits, (3) making DAs available in exam rooms and (4) a walk-in DA library [9,10]. While these reports document effective distribution of DAs through a variety of channels, they do not provide detailed information about use and impact on decisions and are thus of limited value in assessing implementation effectiveness and barriers.

Studies of DA implementation that address actual DA use have shown mixed results. In a review of DA implementation studies published from 2000-2011, Elwyn *et al.* concluded that 8 of 18 implementation efforts resulted in “insight” only, 10 in some level of acceptance or change and none in adoption and maintenance of the DA [11]. Group Health staff distributed 12 DAs related to treatment of common, high cost conditions for which surgery was an option and reported patient utilization of the DAs, patient knowledge and reduction in surgeries and after introduction of the DAs [12]. They document reductions in the percentage of patients choosing joint replacements when DAs were used. The Foundation for Informed Medical Decision Making (FIMDM) sponsored implementation projects in 8 primary care settings [13]. FIMDM provided support in engagement and training of staff and providers and in patient selection, as well as access to more than 50 DAs, recommendations for their use, means for measuring SDM effectiveness and feedback. After describing 3 main barriers to implementation (limited time, inadequate training of providers, EHRs not providing desired support) authors of a qualitative study of staff experiences concluded that “widespread implementation will not be easy” [13]. Belkora *et al.* report on a program in which college students are recruited to coach patients before scheduled decision-making visits. The coaches provided relevant DAs to 5,153 patients from 2006-2012 [14]. Given that limited evidence on DA adoption suggests that few providers and healthcare systems are regularly

using them, we believe barriers to implementation (and means to overcome them) warrant further investigation [11]. We therefore sought to investigate these factors in the current study.

Table 1 Dimensions of Decisions and Implications for Decision Aids and Shared Decision-Making

Dimensions	Implications
Magnitude of benefit/s and harm/s	<ul style="list-style-type: none"> <li>• Decisions may be less difficult when benefit is significant and harm is not or harm is significant and benefit is not.</li> <li>• Decisions may be more difficult when the magnitudes of benefit and harm are similar</li> </ul>
Immediacy of benefit/s and harm/s	<ul style="list-style-type: none"> <li>• When benefit is immediate and harm distant, the decision may be less difficult.</li> <li>• When harm is immediate and benefit is distant, the decision may be more difficult.</li> </ul>
Probability of benefit/s and harm/s	<ul style="list-style-type: none"> <li>• When benefit is highly probable and harm unlikely, or harm highly probable and benefit unlikely the decision may be less difficult.</li> <li>• When harm and benefit are equally probable, the decision may be more difficult.</li> </ul>
Uncertainty about benefit/s or harm/s	<ul style="list-style-type: none"> <li>• Greater uncertainty makes decisions more difficult.</li> </ul>
Number of Options	<ul style="list-style-type: none"> <li>• The greater the number of options the more complex and difficult the decision</li> </ul>

## Methods

Elwyn *et al.* identified 5 barriers to DA implementation: competing demands and limited time in practices, limited financial and workforce resources, limited interest in and acceptance of DAs by clinical staff, difficulty integrating DA use into workflows and language barriers [11]. We sought to confirm the continued relevance of these barriers and to identify other barriers to DA implementation by reviewing the recent literature and conducting interviews of scholars in the U.S and Europe with firsthand knowledge of and experience with DA implementation. We identified scholars through their publications and by requesting scholars to name others with experience in DA implementation. We completed 13 structured interviews and employed qualitative research methods to summarize the barriers to DA implementation. Interviewees were asked to describe their experience in DA implementation and to identify implementation barriers and facilitators and best practices for integrating DAs into clinical practice.

Table 2 Barriers to Decision Aid Implementation

Barriers	Consequences	Actions to Address Barrier and Consequence
<b>Decision aid quality and availability issues</b>		
Variable quality of available DAs in terms of accuracy, bias, adherence to standards, certification by credible authorities.	<ul style="list-style-type: none"> <li>Substantial time required to review and collect DAs to create a library</li> <li>Use of low quality DAs</li> <li>May discourage patients/providers from use of DAs</li> </ul>	Development of high quality DA libraries that are certified and updated
Limited number of topics covered by available high quality DAs	<ul style="list-style-type: none"> <li>Missed opportunities for DA use and SDM</li> </ul>	Development of comprehensive DA libraries
Limited availability of DAs in different languages and for patients with limited health and general literacy	<ul style="list-style-type: none"> <li>Missed opportunities for DA use and SDM</li> <li>Suboptimal DA and SDM experience</li> </ul>	<ul style="list-style-type: none"> <li>Development of DA libraries that include DAs in multiple languages and accessible to patients with limited literacy</li> <li>Research on DA design for patients with limited literacy</li> </ul>
<b>Uncertainties about characteristics of effective DAs</b>		
Uncertainties about optimal media, format and for: <ul style="list-style-type: none"> <li>Different types of decisions</li> <li>Different patient audiences Different contexts (independent use, with provider).</li> </ul>	Suboptimal, ineffective DA and SDM experience	Research on DA media, format and content
<b>Barriers to provider/patient adoption</b>		
Providers' belief they are already doing SDM	Limited interest in DA use, SDM training	Provider education and incentives
Patient and provider lack of familiarity with SDM and DAs	Need for training and education about DAs and SDM	Patient and provider education
Patients' limited interest and limited time	Suboptimal engagement in DA use and SDM	Patient education and incentives
Provider resistance to increasing patient involvement in decisions	Inadequate provider support for implementing DA and SDM programs	Provider education and incentives
<b>Decision aid quality and availability issues</b>		
Variable quality of available DAs in terms of accuracy, bias, adherence to standards, certification by credible authorities.	<ul style="list-style-type: none"> <li>Substantial time required to review and collect DAs to create a library</li> <li>Use of low quality DAs</li> <li>May discourage patients/providers from use of DAs</li> </ul>	Development of high quality DA libraries that are certified and updated
Limited number of topics covered by available high quality DAs	<ul style="list-style-type: none"> <li>Missed opportunities for DA use and SDM</li> </ul>	Development of comprehensive DA libraries

Limited availability of DAs in different languages and for patients with limited health and general literacy	<ul style="list-style-type: none"> <li>• Missed opportunities for DA use and SDM</li> <li>• Suboptimal DA and SDM experience</li> </ul>	<ul style="list-style-type: none"> <li>• Development of DA libraries that include DAs in multiple languages and accessible to patients with limited literacy</li> <li>• Research on DA design for patients with limited literacy</li> </ul>
<b>Uncertainties about characteristics of effective DAs</b>		
Uncertainties about optimal media, format and for: <ul style="list-style-type: none"> <li>• Different types of decisions</li> <li>• Different patient audiences Different contexts (independent use, with provider).</li> </ul>	Suboptimal, ineffective DA and SDM experience	Research on DA media, format and content
<b>Barriers to provider/patient adoption</b>		
Providers' belief they are already doing SDM	Limited interest in DA use, SDM training	Provider education and incentives
Patient and provider lack of familiarity with SDM and DAs	Need for training and education about DAs and SDM	Patient and provider education
Patients' limited interest and limited time	Suboptimal engagement in DA use and SDM	Patient education and incentives
Provider resistance to increasing patient involvement in decisions	Inadequate provider support for implementing DA and SDM programs	Provider education and incentives
Provider belief that patients are not interested in DAs and/or engaging in SDM	Limited provider buy in to DA implementation	Provider education
Provider perception that adequate time is not available for SDM and use of DAs in encounters	Resistance of DA and SDM implementation	<ul style="list-style-type: none"> <li>• Develop and promote models of highly efficient use of DAs and SDM</li> <li>• Tailor encounter time to patients' needs</li> </ul>
Limited provider motivation	Resistance of DA and SDM implementation	Provider education and incentives

Table 3 Strengths and Weaknesses of Workflow and Physical Locations of Use of Decision Aids

Location of Use of Decision Aids	Types of DAs and Media That Can be Used and Options for SDM	Strengths	Weaknesses
Home Before Visit	<ul style="list-style-type: none"> <li>• All types of DAs</li> <li>• Any type of media available in home</li> <li>• Live SDM <i>via</i> telephone or audio/video connection only</li> </ul>	<ul style="list-style-type: none"> <li>• Less time pressure than in other settings.</li> <li>• May be less threatening venue.</li> <li>• Possible participation by family members.</li> <li>• May be repeated, stopped, and restarted at will. More time to consider options before making a decision.</li> </ul>	<ul style="list-style-type: none"> <li>• Time between home DA us and SDM with provider is increased so recall of information, questions, concerns, <i>etc.</i> may be limited if patient did not keep a record</li> <li>• Provider must arrange for DA delivery in the appropriate format.</li> <li>• Patient may need assistance to access audio/video DAs on appropriate devices.</li> </ul>

Waiting Room Before Encounter	<ul style="list-style-type: none"> <li>All types of DAs</li> <li>Media: Print, smartphone, tablet computer, DVD/CD player</li> <li>No SDM while using DA</li> </ul>	<ul style="list-style-type: none"> <li>Little time lag between DA use and SDM with provider supports better recall of information, concerns, <i>etc.</i></li> <li>Device and help with use provided in real time by practice staff.</li> </ul>	<ul style="list-style-type: none"> <li>Many competing demands for patient time in waiting are pre-visit (e.g. history updates, symptom checklists)</li> <li>Uncertainty about time available may make it difficult to assure DA use is complete before rooming.</li> <li>Previsit anxiety may interfere with comprehension of DA information</li> <li>Challenge of distributing and collecting loaned devices</li> </ul>
Dedicated Space or Exam Room Before Encounter	<ul style="list-style-type: none"> <li>All types of DAs</li> <li>Media: Desktop PC, Large screen video, Print, smartphone, tablet computer, DVD/CD player</li> <li>No SDM while using DA</li> </ul>	<ul style="list-style-type: none"> <li>Same as for waiting room</li> <li>Use of permanently installed devices would obviate need to track loaned devices</li> <li>More privacy, less distraction than in waiting room</li> </ul>	<ul style="list-style-type: none"> <li>Same as for waiting room.</li> <li>Cost of creating and maintaining dedicated space.</li> </ul>
Exam Room During Encounter	<ul style="list-style-type: none"> <li>All types of DAs</li> <li>Media: Desktop PC, Large screen video, Print, smartphone, tablet computer, DVD/CD player</li> </ul>	<ul style="list-style-type: none"> <li>Same as exam room before encounter</li> <li>A provider may interact with the patients during the use of DA</li> <li>SDM and DA use may be integrated</li> </ul>	<ul style="list-style-type: none"> <li>Patient may be pressured to use DA at a pace faster than optimal</li> <li>Pressures on provider time may limit DA use</li> </ul>

## Results

### DA Implementation Barriers

#### Workflow Barriers

Our informants identified overcoming barriers to integrating DAs into clinical workflow as particularly important. As shown in Table 2, workflow barriers have serious consequences and may require significant investment in resources, complex re-engineering of workflows, reconfiguration of clinical facilities and new computer hardware. DAs designed for use in an exam room during an encounter may require little workflow re-design or resources to implement and thus may be most likely to be adopted while the 10-20-minute visit remains common in primary care. Table 3 shows the characteristics, strengths and weaknesses of workflow locations and related physical locations for DA use. The table focuses on facilitating the use of DAs immediately before or during a provider encounters, but DAs may also be used by patients at home before or after an SDM. All the workflow/physical location options have both strengths and weaknesses.

Several studies of the implementation of a single DA designed for use during a typical primary care encounter, have showed that the DAs substantially increase the number of patients who are engaged in SDM [15]. Systems that make DAs available to providers in exam rooms may be logistically easier to implement than systems that provide relevant DAs to patients at home or in the clinic before an encounter, but providers will likely need more training in DA-supported SDM and more incentives to use DAs before DAs become widely used in examination rooms. DA use may also require more provider time with patients than is currently available in many primary care practices. Some studies suggest that the increase in time

may be small, increasing the median duration of an encounter by only 2.6 minutes [1]. Nevertheless, a study of the implementation of 16 DAs not explicitly targeted for use in an encounter identified limited encounter time as a key workflow barrier and identified the potential of systems facilitating distribution of DAs to eligible patients to increase DA utilization [16].

Involving patient navigators and nurses in DA supported SDM could be more cost-effective than using physicians or midlevel providers. Research is needed comparing the feasibility and effectiveness of DA use in all workflow/physical locations and comparing outcomes for SDM facilitated by staff other than physicians. As encounter-based reimbursement is replaced by value-based payment that allows for longer encounters and virtual encounters, time may become a less important barrier.

#### Decision Aid Formats

DAs are produced by researchers, non-profit institutions as well as for-profit enterprises in many different media and formats, but often not in multiple languages or with special editions focused on patients with limited general or health literacy. The limited availability of high quality, regularly updated DAs in optimal formats for use within the clinical workflow is another significant barrier to implementation. While there is agreement among DA advocates on criteria for assessing the quality of DAs [6], even those that meet quality standards may not be regularly revised to reflect changes in relevant evidence.

The strengths and weaknesses of DA formats are shown in Table 4. Patient preferences and literacy, decision complexity and availability of display devices required for some DAs in the proposed delivery location/s, all may determine the optimal format for a specific use. However, little research on the comparative effectiveness of different formats is available to guide the format selection.

Table 4 Strengths and Weaknesses of Decision Aid Formats

Types of Decision Aids	Media	Description	Strengths	Weaknesses
Noninteractive text and graphics	Paper, tablet computer, smart phone, personal computer	Static information presented in linear sequence.	Familiar to all readers, simplicity.	Limited communication to poor readers and nonreaders. Unresponsive to individual need.
Interactive text and graphics	Paper, tablet computer, smart phone, personal computer	Patient makes choices about content to view and/or is directed to relevant content based on responses.	Readers may more easily find or be directed to information most relevant and of interest to them at the level of detail they desire	Limited communication to poor readers and nonreaders.
Script delivered live with opportunities for clarification and questions	In person, telephone, audio/video link (e.g. via Skype)	Interaction with person delivering script allows for tailoring. Could be supported with graphics. Similar to having a provider review text/graphics with a patient	Reading not required. Tailoring possible through live interaction between patient and provider. Opportunity for questions.	Variability in provider delivery skills and knowledge.
Noninteractive video with opportunities to skip, repeat sections	Video player, tablet computer, smart phone, personal computer	Range: Static PowerPoint slides with audio to full featured video with recording of live action and complex animation	May not require reading for comprehension. Combination of visual and audio may be more engaging. Can include vignettes involving patients and providers, patients telling their stories, animated graphics.	High cost of production. May take more time to convey key points if vignettes and stories are used.
Interactive video	Video player, tablet computer, smart phone, personal computer	May require viewers to respond to questions that tailor the pathway through the video. Responses by voice, keyboard or touch screen	Similar to non-interactive video with added opportunity for engagement and forced tailoring	Similar to non-interactive video with additional skills and/or learning required to meet requirements for interaction.

Those implementing DAs may be discouraged by poor outcomes of DA use that may occur when a suboptimal format is used for a specific population and workflow.

### Patient and Provider Barriers

Table 2 shows several additional barriers related to provider knowledge, attitudes and beliefs. Limited provider training and motivation and provider concerns about quality control, have been well documented [13,17-19]. Research also has shown that provider buy-in is critical to successful DA implementation [20]. Some practitioners worry that DAs may erode their authority or excessively elevate the patient’s status in the decision-making process, leading to decisions that could compromise practitioners’ or the public’s best interests [21]. Uncertainty about the relative added value of DA implementation may sideline a DA project in favor of interventions with better defined clinical outcomes [11]. In their systematic review of barriers to and facilitators of SDM implementation in 38 studies, Légaré *et al.* identified and defined 34 barriers associated with provider knowledge, attitudes and behaviors [22]. The most commonly cited barriers involved provider perception of time constraints and of patients’ lack of interest in engaging in SDM, such as the patient/provider barriers to DA implementation that we

identified.

### Other barriers

Other barriers to implementation are related to limited patient experience with DAs. Patients may require some background orientation to their role in decision-making and to the advantages of learning about the harms and benefits of tests and treatments before they can appreciate the relevance of DAs and engage in SDM. Patients may also need help in defining their healthcare goals, values and preferences and gauging their influence on decisions.

### Discussion

In a systematic review of the implementation of patient decision support Elwyn *et al.* conclude that barriers to SDM and DAs are “under-investigated and under-specified”, especially regarding the “nature of professional and organizational resistance” to SDM and DA use [11]. The current paper, inspired and informed by the input of SDM and DA scholars, is an attempt to better specify barriers to DA implementation and to classify strengths and weaknesses of approaches to DA implementation and DA

formats that may be useful in the design of future studies. Most of the barriers we have addressed were acknowledged by the scholars we interviewed in one form or another. Their insights provided the foundation for the key points we make in this paper. While all were enthusiastic about the future of DAs and SDM, none identified any shortcuts to increasing DA implementation and use in SDM. However, there has been significant progress in getting DAs into the hands of providers in some healthcare systems.

## Conclusion

Embedding DAs into popular EHRs is dramatically improving access to DAs at the point of care. These are encouraging developments even if we do not know how and how much the DAs are being used. However, before we can expect to see DAs routinely used in effective SDM discussions, we will also need: (1) progress in the adoption of value-based reimbursement for care that allows providers to reallocate their patient care time and that creates incentives for limiting care to measures that are preferred by patients and (2) research that identifies the most effective workflow locations for DA use and that elucidates the optimal DA formats for different decisions.

## Acknowledgements and Conflicts of Interest

The authors gratefully acknowledge the following scholars for taking the time to participate in interviews and for suggestions in revising drafts of the manuscript to ensure we were accurately and comprehensively addressing the issues involved in DA implementation: Michael Barry, Jeff Belkora, Donna Berry, Jacques Cornuz, Glen Elwyn, Dominick Frosch, Pat Hollen, Del Konopka, Annie Lieberman, Karen Sepucha, Jamie Studts, Richard Thompson and Richard Wexler. We received funding from the Patient Centered Outcomes Research Institute, EAIN Dissemination Award, Engaging Stakeholders in Decision Aid Implementation. We declare no conflicts of interest.

## References

[1] Stacey, D., Légaré, F., Lewis, K., Barry, M.J., Bennett, C.L., Eden, K.B., Holmes-Rovner, M., Llewellyn-Thomas, H., Lyddiatt, A., Thomson, R. & Trevena, L. (2017). Decision aids for people facing health treatment or screening decisions. *Cochrane Database of Systematic Reviews* 4: CD001431.

[2] U.S. Federal Government. 2010. Affordable Care Act. Available at: <https://www.healthcare.gov/where-can-i-read-the-affordable-care-act/>. Accessed on April 8, 2017.

[3] Center for Medicare and Medicaid Services. (2015). Decision memo for screening for lung cancer with low dose computed tomography (LDCT) (CAG-00439N).

Available at: <https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=274>. Accessed on April 8, 2017.

[4] Center for Medicare and Medicaid Services. (2016). Beneficiary Engagement and Incentives: Shared Decision Making (SDM) Model. Available at: <https://innovation.cms.gov/initiatives/Beneficiary-Engagement-SDM/>. Accessed on: April 8, 2017.

[5] Wennberg, J.E., Brownle, S., Fisher, E.S., Skinner, J.S. & Weinstein, J.N. (2008). Improving quality and curbing health care spending: opportunities for the Congress and the Obama Administration. Dartmouth Atlas White Paper. Available at: [www.dartmouthatlas.org/downloads/reports/agenda\\_for\\_change.pdf](http://www.dartmouthatlas.org/downloads/reports/agenda_for_change.pdf).

[6] Volk, R., Llewellyn-Thomas, H., Stacey, D. & Elwyn, G. (2013). Ten years of the International Patient Decision Aid Standards Collaboration: evolution of the core dimensions for assessing the quality of patient decision aids. *BMC Medical Informatics and Decision Making* 13 (Supplement 2) S1.

[7] Healthwise™. Deliver patient specific health information within your workflow. Available at: <https://www.healthwise.org/providersolutions/pointofcare.aspxHealthDialog>. Accessed on April 8, 2017.

[8] Washington State Health Care Authority. (2016). Health Care Authority certifies first patient decision aids. Available at: <https://www.hca.wa.gov/about-hca/health-care-authority-certifies-first-patient-decision-aids>. Accessed on: April 8, 2017.

[9] Simmins, L., Leavitt, L., Sepuch, K. (2016). Case Study: Letting patients decide - A novel distribution strategy in primary care, Massachusetts General Hospital. In: Shared Decision Making in Health Care. Elwyn, G., Edwards, A. & Thomson, R. (Eds.), pp. 210-214. Oxford: Oxford University Press.

[10] Andrews, A.O., Kearing, S.A. & Vidal, D.C. (2016). Case Study: Changing culture and delivery to achieve shared decision making at Dartmouth-Hitchcock Medical Center, New Hampshire. In: Shared Decision Making in Health Care. Elwyn, G., Edwards, A., Thomson, R. (Eds.), pp. 204-209. Oxford: Oxford University Press.

[11] Elwyn, G., Scholl, I., Tietbohl, C., Mann, M., Edwards, A.G., Clay, C., Légaré, F., van der Weijden, T., Lewis, C.L., Wexler, R.M. & Frosch, D.L. (2013). "Many miles to go...": a systematic review of the implementation of patient decision support interventions into routine clinical practice. *BMC Medical Informatics and Decision Making* 13 (Supplement 2) S14.

[12] Aterburn, D., Westbrook, E.O. & Hsu, C. (2016). Case Study: The shared decision making story at Group Health. In: Shared Decision Making in Health Care. Elwyn, G., Edwards, A. & Thomson, R. (Eds.), pp. 190-196. Oxford: Oxford University Press.

[13] Friedberg, M.W., Van Busum, K., Wexler, R., Bowen, M. & Schneider, E.C. (2013). A demonstration of shared decision making in primary care highlights barriers to adoption and potential remedies. *Health Affairs* 32, 268-275.

[14] Belkora, J., Volz, S., Loth, M., Teng, A., Zarin-Pass, M., Moore, D. & Esserman, L. (2015). Coaching patients in

the use of decision and communication aids: RE-AIM evaluation of a patient support program. *BMC Health Services Research* 15, 209.

[15] Zeballos-Palacios, C., LeBlanc, A., Hess, E.P., Tilburt, J., Wyatt, K., Boehmer, K., Breslin, M., Branda, M. & Montori, V.M. (2016). Case study: interventions to create better conversations at the Mayo Clinic. In: *Shared Decision Making in Health Care*. Elwyn, G., Edwards, A. & Thomson, R. (Eds), pp. 222-227. Oxford: Oxford University Press.

[16] Lin, G.A., Halley, M., Rendle, K.A.S., Tietbohl, C., May, S.G., Trujillo, L. & Frosch, D.L. (2013). An effort to spread decision aids in five California primary care practices yielded low distribution. *Health Affairs* 32, 311-320.

[17] Gravel, K., Légaré, F. & Graham, I.D. (2006). Barriers and facilitators to implementing shared decision-making in clinical practice: a systematic review of health professionals' perceptions. *Implementation Science* 1, 16.

[18] O'Donnell, S., Cranney, A., Jacobsen, M.J., Graham, I.D., O'Connor, A.M. & Tugwell, P. (2006). Understanding and overcoming the barriers of implementing patient decision aids in clinical practice. *Journal of Evaluation in Clinical Practice* 12, 174-181.

[19] Elwyn, G., Laitner, S., Coulter, A., Walker, E., Watson, P. & Thomson, R. (2010). Implementing shared decision making in the NHS. *British Medical Journal* 341, c5146.

[20] Uy, V., May, S.G., Tietbohl, C. & Frosch, D.L. (2014). Barriers and facilitators to routine distribution of patient decision support interventions: a preliminary study in community-based primary care settings. *Health Expectations* 17, 353-364.

[21] Watson, D.B., Thomson, R.G. & Murtagh, M.J. (2008). Professional centered shared decision making: patient decision aids in practice in primary care. *BMC Health Services Research* 8, 5.

[22] Légaré, F., Ratte, S., Gravel, K. & Graham, I.D. (2008). Barriers and facilitators to implementing shared decision-making in clinical practice: update of a systematic review of health professionals' perceptions. *Patient Education and Counseling* 73, 526-535.