

Research Article

Barriers and Facilitators to Research Translation into Health Care Decision Making: A Scoping Review

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Received: April 10, 2017; **Accepted:** May 05, 2017;

Published: May 12, 2017

Abstract

Background: To provide useful insights into the design of strategies to better put into practice health research outcomes in the case of cancer, heart disease and sexually transmitted infections, we designed a study to identify barriers and facilitators to implement clinical or public health guidelines recommendations.

Methods: A literature review protocol was designed and studies were retrieved from the MedLine database for the period 2009-2011. Studies were classified as high, moderate or poor quality according to a specific protocol for each type of study (quantitative, qualitative, review).

Results: A total of 164 barriers or facilitators affecting implementation of evidence were identified from 63 studies, although 36.5% were rated as being of poor methodological quality. Excluding the poor methodological quality studies, we saw that aspects related to patients and health professionals have been studied most (although they are analyzed separately rather than at a relational level), while there is a lack of studies focusing on guidelines.

Conclusions: The identified barriers and facilitators can be used in subsequent qualitative studies to explore in more depth what makes guidelines difficult or easy to implement. More studies have to be conducted focusing on relational aspects, that is, how patients and professionals interact mutually, and how they interact with environment or organization.

Keywords: Translational research; Clinical practice guideline; Implementation barriers

Background

In the assessment of health policies and programs, it is important to identify the reasons for adoption and adherence of evidenced-based interventions and recommendations by health professionals and patients. Clinical practice guidelines (CPG) are a major vehicle translating complex research findings into evidenced-based recommendations. Research on their implementation has consistently shown that modest improvements in health care can be achieved [1]; however few studies provide a clear rationale for selection of the implementation strategy [2]. To understand the impact of either their implementation or potential to spread, attention must be paid primarily to issues related to decision makers and those people potentially required to adopt them [3]. Therefore, factors that underpin the reasons for adherence to or adoption of evidence-based health interventions by both health professionals and patients need to be identified.

Several studies have identified major barriers to clinical or public health guidelines use and implementation [4]. All are related to the guidelines themselves, patients, lack of time, and resources or support to implement recommendations [5]. Moreover, barriers differ by type of guideline, demographic characteristics of health care providers and type of practice setting [6]. Consequently, generalization of the implementation of results to health services different from those in which the research was conducted is very difficult, mainly because there is little knowledge about attitudes and preferences of professionals and patients, or about elements of the health system

which may be influencing such implementation [7].

The goal of our study was to identify barriers and facilitators for implementing clinical or public health recommendations in order to provide useful insights into the design of strategies to better put into practice health research outcomes. For these purposes, three common health problems were selected, two non-communicable diseases (cardiovascular diseases and cancer) and one communicable (sexually transmitted infections), which are representing the major causes of death worldwide [8], and for which preventive and clinical recommendations are widely available.

Explicitly, the objective of this study was to systematically review the evidence reported in the literature about cancer, heart and sexually transmitted diseases on facilitators and barriers to the implementation of research findings in the health care setting, identify which barriers and facilitators are more often studied, and what relationships exist between them, if any.

Methods

Search strategy and inclusion criteria of papers

A literature review protocol was designed and studies to be included were retrieved from the MedLine bibliographic database. Flow diagram of papers selection was reported according to the PRISMA statement [9]. The bibliographic search was conducted for the period 2009 to 2011 and additional papers were identified by searching the reference list of retrieved articles.

The search strategy, based on the explicit criteria and focused on the specific diseases already mentioned, was as follows: [interventions OR recommendations] AND [cardiovascular disease OR cancer OR (STI) OR sexual transmission] AND [health impact OR (clinical practice) OR (CPG) OR (policy makers) OR (health outcome)] AND [disseminat* OR implement* OR decision-making OR stakeholder* OR barrier* OR bedside to practice OR enabler*].

One reviewer screened the search results looking for studies considered eligible based on their title and abstract. We selected articles using quantitative or qualitative analyses that reported on barriers or facilitators to evidence-based research translation into health decision making. Thus, inclusion criteria were: papers published in English, Spanish or French languages, focused on cancer, cardiovascular disease or sexually transmitted infectious diseases, and studying potential barriers and/or facilitators for guideline recommendations implementation.

Study quality assessment

Study features and outcomes were entered in a database specifically designed for the review. Quality criteria for original papers were based on Alberta Heritage Foundation for Medical Research [10]. Compliance of each item was rated as 2, 1 or 0. Quantitative studies were assessed using 14 different items, so the maximum score possible was 28. High quality studies were graded as “++” (score over 21), moderate quality ones as “+” (15 – 21 points) and poor quality were graded as ‘-’ (less than 14 points). In the case of qualitative studies, 10 items were used (maximum score 20). Again, studies were considered as having a high (over 15 points; ‘++’), moderate (11 – 15 points; ‘+’) or poor quality (below 11 points; ‘-’). Finally, systematic reviews were also rated. Quality assessment was performed using SIGN criteria (maximum score 12 points, referred to 6 items), [11] and were also considered as high (over 9; ‘++’), moderate (7 – 9 points; ‘+’) and poor quality (below 7; ‘-’).

Data extraction and synthesis

Data extraction was performed by six reviewers. We performed evidence tables retrieving for each paper data about: study design, target population, intervention studied, disease, implementation agent, guideline/recommendation, dissemination channel, results of the study, methodological quality according to the above mentioned criteria, and barrier or facilitator studied.

Barriers and facilitators identified were listed according to what was found in the literature and then grouped into categories and subcategories by means of a consensus meeting with almost all members of the research team (n=6) using a Nominal Group Technique [12]. All of them were afterwards related to the methodological quality of the papers where they were studied.

Barriers and facilitators are rarely studied alone. Indeed, studies largely include more than one subcategory in their analyses for which we found of interest to show the existing relationships between different subcategories of barriers or facilitators. In this case, we selected studies that focused on more than one subcategory and by means of a symmetric matrix we could relate barriers/facilitators as they appear in these studies. Specific software packages for the analysis of social network data and network visualization (UCINET 6.0 and Net Draw software) were used. All analyses were done for

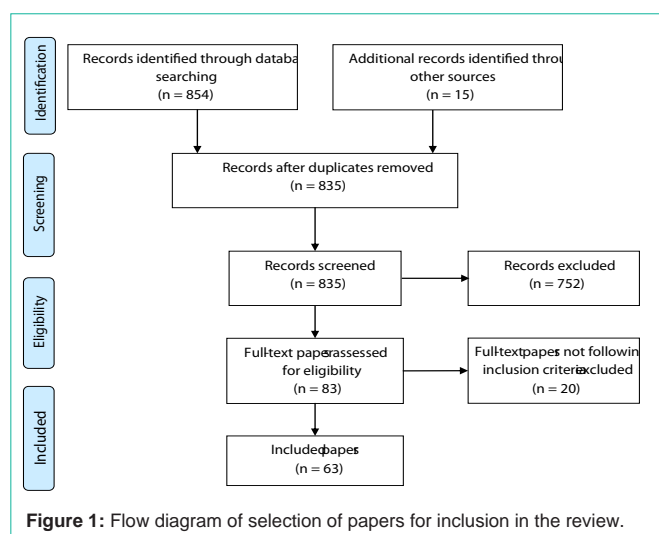


Figure 1: Flow diagram of selection of papers for inclusion in the review.

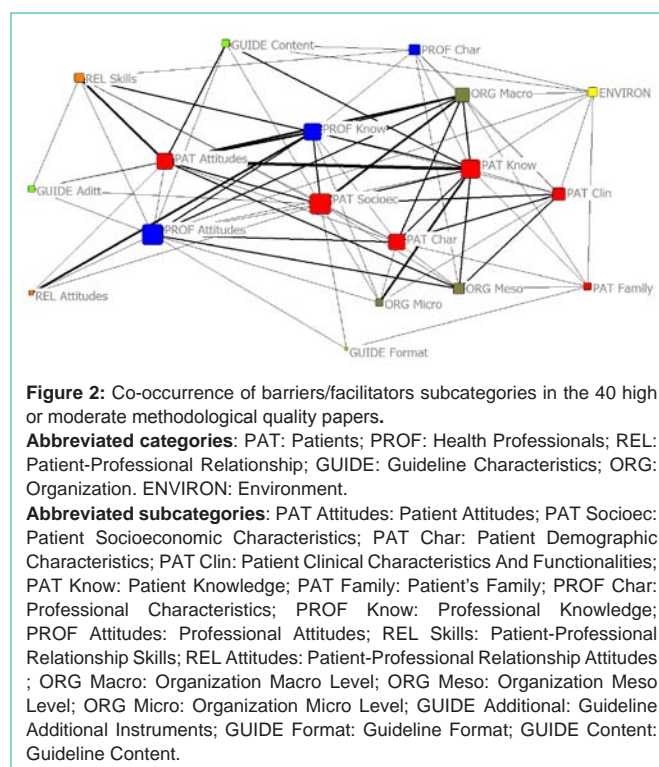


Figure 2: Co-occurrence of barriers/facilitators subcategories in the 40 high or moderate methodological quality papers.

Abbreviated categories: PAT: Patients; PROF: Health Professionals; REL: Patient-Professional Relationship; GUIDE: Guideline Characteristics; ORG: Organization. ENVIRON: Environment.

Abbreviated subcategories: PAT Attitudes: Patient Attitudes; PAT Socioec: Patient Socioeconomic Characteristics; PAT Char: Patient Demographic Characteristics; PAT Clin: Patient Clinical Characteristics And Functionalities; PAT Know: Patient Knowledge; PAT Family: Patient's Family; PROF Char: Professional Characteristics; PROF Know: Professional Knowledge; PROF Attitudes: Professional Attitudes; REL Skills: Patient-Professional Relationship Skills; REL Attitudes: Patient-Professional Relationship Attitudes ; ORG Macro: Organization Macro Level; ORG Meso: Organization Meso Level; ORG Micro: Organization Micro Level; GUIDE Additional: Guideline Additional Instruments; GUIDE Format: Guideline Format; GUIDE Content: Guideline Content.

all the studies identified, but also stratified by their methodological quality. The resulting networks show which barriers and facilitators are studied together. Figures show squares (barrier/facilitator subcategory) linked by lines. Square size indicates the number of documents where each group of barriers/facilitators has been studied, and line thickness the number of papers where the two linked barrier/facilitator groups have been studied together.

Results

Search results yielded 835 papers (Figure 1), 752 of which were excluded after reviewing the abstract for being duplicates or for not addressing barriers/facilitators for the implementation of guideline recommendations. Then, after checking full-text papers for

Table 1: Number of selected studies according to type of study and its quality.

	High quality (++)	Moderate quality (+)	Poor quality (-)	Total
Quantitative studies	7 ^[13-19]	13 ^[31-43]	2 ^[53,54]	22
Qualitative studies	10 ^[20-29]	8 ^[44-51]	14 ^[55-68]	32
Reviews	1 ^[30]	1 ^[52]	7 ^[69-75]	9
Total	18	22	23	63

Table 2: Categories and subcategories for barriers and/or facilitators.

Category	Subcategory (number of barriers/facilitators)
Patients	• Demographic characteristics (n=2)
	• Socioeconomic characteristics (n=2)
	• Clinical characteristics and functionalities (n=8)
	• Knowledge (n=8)
	• Family (n=2)
	• Attitudes, beliefs and preferences (n=18)
Health professionals	• Professional characteristics (n=2)
	• Knowledge or skills (n=12)
	• Attitudes, beliefs and preferences (n=12)
Patient-professional relationship	• Skills (n=5)
	• Attitudes (n=14)
Guideline characteristics	• Format (n=6)
	• Content (n=14)
	• Additional instruments (n=11)
	• <i>Micro</i> level: clinical management (n=14)
Organization	• <i>Meso</i> level: small structure management (n=16)
	• <i>Macro</i> level: policies (n=13)
	• Environment (n=5)

coherency between content and our stated aim, a further 20 papers were excluded. Thus, 63 documents were finally selected for critical appraisal and classified according to their methodological quality. There is a remarkable heterogeneity between studies, being 50% of them qualitative yet nearly half of all qualitative studies were ranked as poor quality (Table 1).

Critical appraisal of the selected studies allowed for the identification of a large number of possible barriers or facilitators (n=164) to evidence implementation. By means of a modified Nominal Group Technique, they were classified into 6 different categories and 17 subcategories as displayed in Table 2. We found that attitudes, beliefs and preferences were barriers or facilitators both in patients and health professionals, although amongst patients we found aspects such as risk perception, adherence to medication or inability to change habits, while amongst health professionals other aspects were studied, e.g. skepticism, clinical inertia or lack of agreement with clinical recommendations. Similarly, although knowledge barriers were found in patients as well as in professionals, in one case they were more related to patient awareness of clinical situation and treatment options while for professionals were more related to expertise or strategies for keeping up to date. Regarding patient-professional relationship skills, linguistic problems or incorrect interpretation of recommendations were found as barriers for guideline implementation. Finally, it is worth mentioning some enablers related to additional instruments to the guideline, especially those studied in high quality papers such as: use of clinical decision support systems, online availability of the guideline or telephone counseling.

After constructing the barriers/facilitators group relations matrix

stratifying by papers methodological quality, and restricting our attention to those of high or moderate methodological quality (Figure 2), we saw that aspects related to patients and health professionals, as well as those related to health policies (organization at macro level), have been studied most (biggest square sizes), while there is a lack of studies focusing on environment, guidelines and management at clinical level.

In addition, since line thickness shows number of documents where the two linked aspects have been studied together, it can be inferred from Figure 2 that patient attitudes have often been studied with patient and health professional knowledge. On the other hand, there are few good quality papers studying patient-professional relationships together with guideline characteristics. Thus, researchers are interested in studying barriers/facilitators related to professionals and patients, but they are not paying attention to the relationship between them. Indeed, professional- and patient-related aspects are analyzed separately rather than at a relational level (e.g. shared decision-making).

Discussion

Our review identified 164 possible barriers or facilitators affecting implementation of health recommendations about cancer, heart and sexually transmitted diseases, through an analysis of 63 studies, although 36.5% (23 out of 63) were rated as being of poor methodological quality. Taking into account only the high and moderate methodological quality studies we saw that aspects related to patients and health professionals, as well as those related to health policies, have been studied most, while there is a lack of studies focusing on guidelines. It is somehow surprising that so little has been studied on guidelines since one would think that format, dissemination or clinical decision tools for implementing them are essential elements for guideline implementation. Given that we are dealing with knowledge translation, it is certainly unexpected that so little is reported about barriers or facilitators related to the designed tool for knowledge translation, that is, guidelines. Although considerable effort has been devoted to developing high quality guidelines, there is scarce evidence regarding how development criteria may affect their implementation. It seems, therefore, that guidelines themselves have not been sufficiently studied as a potential barrier or facilitator. So, the results of our study may be biased because of researcher choice of study object in the original papers.

The fact that aspects related to patients and professionals are the most studied is probably because of data availability. The ease with which data may be obtained determines the object on which research is conducted, and even the methodology used. Thus, studies analyzing patient factors are mainly quantitative because they are, statistically speaking, a big and captive sample. Eg, patients admitted to hospital can be approached by a questionnaire at different points in time. In addition, they are not qualitatively interviewed with open questions because it is generally believed that they cannot offer an expert opinion. On the other hand, professional barriers/facilitators are mostly studied by qualitative methodology because in this case it is more difficult to obtain a statistically representative sample and besides that, they are considered experts and, therefore, studies using exploratory and open interviews are common.

Our study shows what has been studied in three major health

conditions, and therefore what is known from the evidence-based point of view in these cases. However, this evidence may or may not be consistent with that which may be found in different health care settings or different countries. In addition, this evidence reveals barriers and facilitators but it does not offer an explanation of why they are so or which ones are the most important, in what settings and with what stakeholders (physicians, nurses, patients, managers and so on). Moreover, in some cases a given item has been identified as a barrier in one study and as a facilitator in another, or one may even be on the causal path of the other. In depth high quality qualitative studies are needed in this regard.

Therefore, a limitation of this study is that we only considered heart, cancer and sexually transmitted diseases and a publication period of just three years. However, firstly, searching had to be limited as otherwise it would have been impossible to review all literature; secondly, we included reviews in our search, so we probably captured previous original papers through the reviews; and thirdly, these diseases were carefully selected to include a diverse range of clinical conditions and because they are diseases where clinical and public health evidence-based recommendations have been widely published. We feel confident that adding conditions or extending the publication period of our literature search would have not revealed new categories or subcategories of barriers or facilitators. As a matter of fact, other literature reviews came up with similar categories when studying specific clinical conditions or specialties like spinal cord injury, [76] ICU, [77] or physiotherapy, [78] or when focusing on particular stakeholders like policy makers [79].

A strength of our study, besides its broader spectrum, is that we aimed at not only identifying as much as possible barriers and facilitators (studied through any design, quantitatively or qualitatively), but also looking at which ones were studied most and looking for relationships between them. We are aware that this is not a typical objective for a systematic review. However, it is acceptable for a scoping review [80]. Thus, to fulfill our aim we had to adapt the already known methodology and somehow innovate with it. To do so, we had to apply different methodological quality instruments depending on the study design in order to dismiss poor quality papers for the relationship analysis. Then, to analyze it we made use of a technique which is usually employed for social network data. As far as we know, this type of analysis has never been applied to a literature review.

Finally, more investment is needed for implementation research since funding agencies allocate important resources for research into new methods for diagnostics, therapy or prevention and for studying mechanisms of disease but very little funding to how the implementation of these research findings could take place. Not surprisingly, there is little funding allocation to implementation itself, for instance, to research on how to modify patient and health professional attitudes if they have been identified as a barrier for an evidence-based recommendation.

Conclusions

Our review identified numerous barriers and facilitators for implementing evidence-based health recommendations than could be classified into six groups or categories concerning: patients, health professionals, patient-professional relationship, organizational

aspects, guideline characteristics, and environmental factors.

Regarding those studied in good methodological quality papers, we showed that barriers or facilitators related to actors (health professionals and patients) are studied more than those concerning guidelines or organizations. Furthermore, professional and patient aspects are analyzed separately rather than at a relational level. Therefore, since knowledge translation is primarily relational, more studies have to be conducted focusing on relational aspects, that is, how patients and health professionals interact mutually and how they interact with the environment or with organizations.

The identified barriers or facilitators will be used in subsequent qualitative studies to explore in more depth what makes clinical or public health guidelines difficult or easy to implement. These studies will involve health professionals, clinical and non-clinical, as well as patients, either hospital or primary care users including healthy occasional users. Improving insight into implementation enablers can help in designing dissemination strategies for health guidelines.

Acknowledgments

The research for this paper was financially supported by the Instituto de Salud Carlos III from the Spanish Ministry of Economy and Competitiveness, grant no. PI11-01902.

References

1. Davies P, Walker AE, Grimshaw JM. A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implementation Science*. 2010; 5: 14.
2. Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess*. 2004; 8: 1-72.
3. Glasgow RE. Critical measure issues in translational research. *Res Social Work Pract*. 2009; 19: 560-568.
4. Francke AL, Smit MC, de Veer AJ, Mistiaen P. Factors influencing the implementation of clinical guidelines for health care professionals: a systematic meta-review. *BMC Medical Informatics and Decision Making*. 2008; 8: 38.
5. Kotzeva A, Guilmamón I, Gracia J, Díazdel Campo P, Gich I, Calderón E, et al. Use of clinical practice guidelines and factors related to their uptake: a survey of health professionals in Spain. *Journal of Evaluation in Clinical Practice*. 2014; 20: 216-224.
6. Taba P, Rosenthal M, Habicht J, Tarién H, Mathiesen M, Hill S, et al. Barriers and facilitators to the implementation of clinical practice guidelines: A cross-sectional survey among physicians in Estonia. *BMC Health Services Research*. 2012; 12: 455.
7. Eccles M, Grimshaw J, Walker A, Johnston M, Pitts N. Changing the behavior of healthcare professionals: the use of theory in promoting the uptake of research findings. *J Clin Epidemiol*. 2005; 58: 107-112.
8. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med*. 2006; 3: e442.
9. Moher D, Liberati A, Tetzlaff J, Altman DG; The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med*. 2009; 151: 264-269.
10. Kmet L M, Lee R C, Cook L S. Standard quality assessment criteria for evaluating primary research papers from a variety of fields. Edmonton: Alberta Heritage Foundation for Medical Research (AHFMR). HTA Initiative #13. 2004.
11. Scottish Intercollegiate Guidelines Network (SIGN). SIGN 50: a guideline

- developer's handbook. ISBN 978 1 905813 25 4. Edinburgh: Scottish Intercollegiate Guidelines Network. 2008.
12. Potter M, Gordon S, Hamer P. The nominal group technique: a useful consensus methodology in physiotherapy research. *New Zealand Journal of Physiotherapy*. 2004; 32: 126-130.
 13. Goud R, De Keizer NF, Ter Riet G, Wyatt JC, Hasman A, Hellemans IM, et al. Effect of guideline based computerised decision support on decision making of multidisciplinary teams: cluster randomised trial in cardiac rehabilitation. *British Medical Journal*. 2009; 338: b1440.
 14. Han PKJ, Klabunde CN, Breen N, Yuan G, Grauman A, Davis WW, et al. Multiple clinical practice guidelines for breast and cervical cancer screening: perceptions of US primary care physicians. *Medical Care*. 2011; 49: 139-148.
 15. Jones RM, Vernon SW, Woolf SH. Is discussion of colorectal cancer screening options associated with heightened patient confusion? *Cancer Epidemiol Biomarkers Prev*. 2010; 19: 2821-2825.
 16. Zikmund-Fisher BJ, Couper MP, Singer E, Ubel PA, Ziniel S, Fowler FJ, et al. Deficits and variations in patients' experience with making 9 common medical decisions: the DECISIONS survey. *Medical Decision Making*. 2010; 30: 85S-95S.
 17. Richardson CR, Buis LR, Janney AW, Goodrich DE, Sen A, Hess ML, et al. An Online Community Improves Adherence in an Internet-Mediated Walking Program. Part 1: Results of a Randomized Controlled Trial. *Journal of Medical Internet Research*. 2010; 12: e71.
 18. Borgonjen RJ, Van Everdingen JJ, Bik CM, Tuut MK, Spuls PI, Van De Kerkhof PC. Prospective comparison of three guideline development methods for treatment of actinic keratosis. *BMJ Qual Saf*. 2011; 20: 832-841.
 19. Hegenscheid K, Hoffmann W, Fochler S, Domin M, Weiss S, Hartmann B, et al. Telephone counseling and attendance in a national mammography-screening program a randomized controlled trial. *AMEPRE*. 2011; 41: 421-427.
 20. Vadaparampil ST, Kahn JA, Salmon D, Lee J-H, Quinn GP, Roetzheim R, et al. Missed clinical opportunities: Provider recommendations for HPV vaccination for 11-12 year old girls are limited. *Vaccine*. 2011; 29: 8634-8641.
 21. Chapman NH, Lazar SP, Fry M, Lassere MN, Chong BH. Clinicians adopting evidence based guidelines: a case study with thromboprophylaxis. *BMC Health Services Research*. 2011; 11: 240.
 22. Meurer WJ, Majersik JJ, Frederiksen SM, Kade AM, Sandretto AM, Scott PA. Provider perceptions of barriers to the emergency use of tPA for Acute Ischemic Stroke: A qualitative study. *BMC Emergency Medicine*. 2011; 11: 5.
 23. Adams OP, Carter AO. Knowledge, attitudes, practices, and barriers reported by patients receiving diabetes and hypertension primary health care in Barbados: a focus group study. *BMC Family Practice*. 2011; 12: 135.
 24. Blickem C, Bower P, Protheroe J, Kennedy A, Vassilev I, Sanders C, et al. The role of information in supporting self-care in vascular conditions: a conceptual and empirical review. *Health Soc Care Community*. 2011; 19: 449-459.
 25. Garavalia L, Garavalia B, Spertus JA DC. Medication Discussion Questions (MedDQ): developing a guide to facilitate patient-clinician communication about heart medications. *J Cardio vasc Nurs*. 2011; 26: E12-E19.
 26. Salbach NM, Veinot P, Jaglal SB, Bayley M RD. From continuing education to personal digital assistants: what do physical therapists need to support evidence-based practice in stroke management? *J Eval Clin Pract*. 2011; 17: 786-793.
 27. Shepherd HL, Butow PN TM. Factors which motivate cancer doctors to involve their patients in reaching treatment decisions. *Patient Educ Couns*. 2011; 84: 229-235.
 28. Hill KM, Lalor EE. How useful is an online tool to facilitate guideline implementation? Feasibility study of using eGLIA by stroke clinicians in Australia. *Quality Safety in Health Care*. 2009; 18: 157-159.
 29. Tierney S, Mamas M, Skelton D, Woods S, Rutter MK, Gibson M, et al. What can we learn from patients with heart failure about exercise adherence? A systematic review of qualitative papers. *Health Psychology*. 2011; 30: 401-410.
 30. Grace SL, Chessex C, Arthur H, Chan S, Cyr C, Dafoe W, et al. Systematizing Inpatient Referral to Cardiac Rehabilitation 2010: Canadian association of cardiac rehabilitation and Canadian cardiovascular society joint position paper. *Can J Cardiol*. 2011; 31: 192-199.
 31. Kumar Amit, Fonarow Gregg C, Eagle Kim A, Hirsch Allan T, Califf Robert M, Alberts MJ, et al. Investigators on behalf of the R. Regional and Practice Variation in Adherence to Guideline Recommendations for Secondary and Primary Prevention Among Outpatients With Atherothrombosis or Risk Factors in the United States. *Crit Pathways in Cardiol*. 2009; 8: 104-111.
 32. Huynh LT, Chew DPB, Sladek RM, Phillips PA, Brieger DB, Zeitz CJ. Unperceived treatment gaps in acute coronary syndromes. *International Journal of Clinical Practice*. 2009; 63: 1456-1464.
 33. Luker J, Grimmer-Somers K. Factors influencing acute stroke guideline compliance: a peek inside the "black box" for allied health staff. *Journal of Evaluation in Clinical Practice*. 2009; 15: 383-389.
 34. Yabroff KR, Saraiya M, Meissner HI, Haggstrom DA, Wideroff L, Yuan G, et al. Specialty differences in primary care physician reports of papanicolaou test screening practices: a national survey, 2006 to 2007. *Annals of Internal Medicine*. 2009; 151: 602-611.
 35. Tamblyn R, Abrahamowicz M, Dauphinee D, Wenghofer E, Jacques A, Klass D, et al. Influence of physicians' management and communication ability on patients' persistence with antihypertensive medication. *Archives of Internal Medicine*. 2010; 170: 1064-1072.
 36. Nirenberg A, Reame NK, Cato KD, Larson EL. Oncology nurses' use of National Comprehensive Cancer Network clinical practice guidelines for chemotherapy-induced and febrile neutropenia. *Oncology Nursing Forum*. 2010; 37: 765-773.
 37. Berben L, Bogert L, Leventhal ME, Fridlund B, Jaarsma T, Norekvål TM, et al. Which interventions are used by health care professionals to enhance medication adherence in cardiovascular patients? A survey of current clinical practice. *European Journal of Cardiovascular Nursing*. 2011; 10: 14-21.
 38. McCormack L, Treiman K, Bann C, Williams-Piehot P, Driscoll D, Poehlman J, et al. Translating medical evidence to promote informed health care decisions. *Health Services Research*. 2011; 46: 1200-1223.
 39. Plon SE, Cooper HP, Parks B, Dhar SU, Kelly PA, Weinberg AD, et al. Genetic testing and cancer risk management recommendations by physicians for at-risk relatives. *Genetics in Medicine*. 2011; 13: 148-154.
 40. Naveh P, Leshem R, Dror YF, Musgrave CF. Pain severity, satisfaction with pain management, and patient-related barriers to pain management in patients with cancer in Israel. *Oncology Nursing Forum*. 2011; 38: E305-E313.
 41. Polyzos NP, Mauri D, Ioannidis JPA. Guidelines on Chemotherapy in Advanced Stage Gynecological Malignancies: An Evaluation of 224 Professional Societies and Organizations. *PLoS ONE*. 2011; 6: 8.
 42. Lafata JE, Cooper GS, Divine G, Flocke SA, Oja-Tebbe N, Stange KC, et al. Patient-physician colorectal cancer screening discussions: Delivery of the 5A's in practice. *American Journal of Preventive Medicine*. 2011; 41: 480-486.
 43. Goossens E, Norekvål TM, Faerch J, Hody L, Olsen SS, Darmer MR, et al. Sexual counselling of cardiac patients in Europe: culture matters. *International Journal of Clinical Practice*. 2011; 65: 1092-1099.
 44. Fiscella K, Ransom S, Jean-Pierre P, Cella D, Stein K, Bauer JE, et al. Patient-reported outcome measures suitable to assessment of patient navigation. *Cancer*. 2011; 117: 3601-3615.
 45. Bosworth HB, Granger BB, Mendys P, Brindis R, Burkholder R, Czajkowski SM, et al. Medication adherence: a call for action. *American Heart Journal*. 2011; 162: 412-424.
 46. Soheilipour S, Scambler S, Dickinson C, Dunne SM, Burke M, Jabbarifar SE, et al. Summary of: Antibiotic prophylaxis in dentistry: part II. A qualitative study of patient perspectives and understanding of the NICE guideline. *British Dental Journal*. 2011; 211: E2.

47. Krishnan A, Yadav K, Kaur M, Kumar R. Epidemiology to public health intervention for preventing cardiovascular diseases: The role of translational research. *The Indian Journal of Medical Research*. 2010; 132: 643–650.
48. Bennett MI, Flemming K, Closs SJ. Education in cancer pain management. *Curr Opin Support Palliat Care*. 2011; 5: 20–24.
49. Silwer L, Wahlström R, Lundborg CS. Views on primary prevention of cardiovascular disease - an interview study with Swedish GPs. *BMC Family Practice*. 2010; 11: 44.
50. Owen-Smith A, Coast J, Donovan J. The usefulness of NICE guidance in practice: different perspectives of managers, clinicians, and patients. *International Journal of Technology Assessment in Health Care*. 2010; 26: 317–322.
51. McCluskey A, Middleton S. Delivering an evidence-based outdoor journey intervention to people with stroke: Barriers and enablers experienced by community rehabilitation teams. *BMC Health Services Research*. 2010; 10: 18.
52. Allen JD, Berry DL. Multi-media support for informed/shared decision-making before and after a cancer diagnosis. *Seminars in Oncology Nursing*. 2011; 27: 192–202.
53. Wexler R, Elton T, Taylor CA, Pleister A, Feldman D. Physician reported perception in the treatment of high blood pressure does not correspond to practice. *BMC Family Practice*. 2009; 10: 23.
54. Hack TF, Carlson L, Butler L, Degner LF, Jakulj F, Pickles T, et al. Facilitating the implementation of empirically valid interventions in psychosocial oncology and supportive care. *Support Care Cancer*. 2011; 19: 1097–1105.
55. Pollack LA, Hawkins NA, Peaker BL, Buchanan N, Risendal BC. Dissemination and translation: a frontier for cancer survivorship research. *Cancer Epidemiol Biomarkers Prev*. 2011; 20: 2093–2098.
56. Edward Stefanek M. Uninformed compliance or informed choice? A needed shift in our approach to cancer screening. *Journal of the National Cancer Institute*. 2011; 103: 1821–1826.
57. Banham D, Lynch J KJ. An equity-effectiveness framework linking health programs and healthy life expectancy. *Aust J Prim Health*. 2011; 17: 309–319.
58. Mahle WT, Martin GR, Beekman RH, Morrow WR, Rosenthal GL, Snyder CS, et al. Endorsement of Health and Human Services recommendation for pulse oximetry screening for critical congenital heart disease. *Pediatrics*. 2012; 129: 190–192.
59. Handler J, Lackland DT. Translation of hypertension treatment guidelines into practice: a review of implementation. *Journal of the American Society of Hypertension*. 2011; 5: 197–207.
60. Abulkhair O, Saghir N, Sedky L, Saadedin A, Elzahwary H, Siddiqui N, et al. Modification and implementation of NCCN guidelines on prostate cancer in the Middle East and North Africa region. *Journal of the National Comprehensive Cancer Network*. 2010; 8: S26–S28.
61. Ogilvie D, Cummins S, Petticrew M, White M, Jones A, Wheeler K. Assessing the evaluability of complex public health interventions: five questions for researchers, funders, and policymakers. *The Milbank Quarterly*. 2011; 89: 206–225.
62. Fletcher BJ, Himmelfarb CD, Lira MT, Meininger JC, Pradhan SR, Sikkema J. Global cardiovascular disease prevention: a call to action for nursing: multilevel policies. *European Journal of Cardiovascular Nursing*. 2011; 10: S15–S21.
63. Van der Goes MC, Jacobs JW, Boers M, Andrews T, Blom-Bakkens MA, Buttgerit F, et al. Patient and rheumatologist perspectives on glucocorticoids: an exercise to improve the implementation of the European League Against Rheumatism (EULAR) recommendations on the management of systemic glucocorticoid therapy in rheumatic diseases. *Ann Rheum Dis*. 2010; 69: 1015–1021.
64. Goud R, Hasman A, Strijbis A-M, Peek N. A parallel guideline development and formalization strategy to improve the quality of clinical practice guidelines. *International Journal of Medical Informatics*. 2009; 78: 513–520.
65. Gandara E, Moniz TT, Dolan M Lou, Melia C, Dudley J, Smith A, et al. Improving adherence to treatment guidelines: a blueprint. *Critical Pathways in Cardiology*. 2009; 8: 139–145.
66. Davoren SL. Legal interventions to reduce alcohol-related cancers. *Public Health*. 2011; 125: 882–888.
67. Ferguson TS, Tulloch-Reid MK, Cunningham-Myrie CA, Davidson-Sadler T, Copeland S, Lewis-Fuller E, et al. Chronic disease in the Caribbean: Strategies to respond to the public health challenge in the region. *West Indian Medical Journal*. 2011; 60: 397–411.
68. Gifford W, Davies B, Tourangeau A, Lefebvre N. Developing team leadership to facilitate guideline utilization: planning and evaluating a 3-month intervention strategy. *Journal of Nursing Management*. 2011; 19: 121–132.
69. Fairchild Alysa. Under-treatment of cancer pain. *Curr Opin Support Palliat Care*. 2010; 4: 11–15.
70. Manuel DG. The effectiveness of national guidelines for preventing cardiovascular disease: integrating effectiveness concepts and evaluating guidelines' use in the real world. *Current Opinion in Lipidology*. 2010; 21: 359–365.
71. Senore C, Malila N, Minozzi S, Armaroli P. How to enhance physician and public acceptance and utilisation of colon cancer screening recommendations. *Best Pract Res Clin Gastroenterol*. 2010; 24: 509–520.
72. Stamatakis KA, McBride TD, Brownson RC. Communicating prevention messages to policy makers: the role of stories in promoting physical activity. *Journal of Physical Activity Health*. 2010: S99–S107.
73. Gagliardi AR, Dobrow MJ, Wright FC. How can we improve cancer care? A review of interprofessional collaboration models and their use in clinical management. *Surgical oncology*. 2011; 20: 146–154.
74. Mitchell J, Jatoi A. Parenteral nutrition in patients with advanced cancer: merging perspectives from the patient and healthcare provider. *Seminars in Oncology*. 2011; 38: 439–442.
75. Cohen SM, Kataoka-Yahiro M. Themes in the literature related to cardiovascular disease risk reduction. *The Journal of Cardiovascular Nursing*. 2009; 24: 268–276.
76. Noonan VK, Wolfe DL, Thorogood NP, Park SE, Hsieh JT, Eng JJ, SCIRE Research Team. Knowledge translation and implementation in spinal cord injury: a systematic review. *Spinal Cord*. 2014; 52: 578–587.
77. Lane D, Ferri M, Lemaire J, McLaughlin K, Stelfox HT. A systematic review of evidence-informed practices for patient care rounds in the ICU. *Crit Care Med*. 2013; 41: 2015–2029.
78. Scurlock-Evans L, Upton P, Upton D. Evidence-based practice in physiotherapy: a systematic review of barriers, enablers and interventions. *Physiotherapy*. 2014; 100: 208–219.
79. Oliver K, Innvar S, Lorenc T, Woodman J, Thomas J. A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Services Research*. 2014; 14: 2.
80. Tricco AC, Lillie E, Zarin W, et al. A scoping review on the conduct and reporting of scoping reviews. *BMC Medical Research Methodology*. 2016; 16: 15.