Original article

Scand J Work Environ Health. 2011;37(2)99–108. doi:10.5271/sjweh.3138

2nd place, PREMUS [1] best paper competition: implementing return-to-work interventions for workers with low-back pain – a conceptual framework to identify barriers and facilitators

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Fassier J-B, Durand M-J, Loisel P. 2nd place, PREMUS best paper competition: implementing return-to-work interventions for workers with low-back pain – a conceptual framework to identify barriers and facilitators. *Scand J Work Environ Health*. 2011;37(2):99–108. doi:10.5271/sjweh.3138

Objectives Workplace-based return-to-work (RTW) interventions (programs) for workers with low-back pain are more effective than usual healthcare. Nevertheless, the implementation of such interventions usually encounters many barriers within healthcare systems, workplaces, and insurance systems. The aims of this study were, first, to construct a conceptual framework to identify barriers and facilitators before implementing RTW interventions and, second, to validate this conceptual framework empirically.

Methods We conducted a literature review to identify barriers and facilitators described in three domains: (i) diffusion of innovations; (ii) implementation of healthcare programs; and (iii) implementation of low-back pain clinical guidelines. A selection process was used to identify core dimensions. To validate this framework, we conducted a multiple case study with embedded levels of analysis in two regions of France. Data were collected through semi-structured interviews and focus groups with key participants.

Results An initial framework was constructed with eight dimensions to be studied before implementation. This framework was eclectic, with different theoretical backgrounds. After the validation phase, some dimensions were modified, resulting in a revised conceptual framework that was theoretically and empirically grounded.

Conclusions This conceptual framework is an important contribution to the field of implementation science. It can be used in various settings to identify barriers and facilitators prior to implementing RTW interventions. In line with recommendations on knowledge transfer, this will enable evidence-based implementation strategies to be drawn up, improving intervention uptake and thus facilitating occupational disability prevention in low-back pain.

Key terms diffusion of innovation; disability; health services research; program evaluation; sickness absence; vocational rehabilitation.

Low-back pain is a common disabling condition that imposes a heavy burden on individuals, workplaces, and insurance systems (1–3). Return-to-work (RTW) programs for workers with low-back pain were first developed at the end of the 1990s in Sweden (4) and Canada (5, 6). They represented a major innovation in rehabilitation with respect to their goal (RTW as the main outcome of interest) and the integration of the workplace itself as part of the treatment. For example, the Sherbrooke model, developed in Quebec in 1994 (6), is still considered as a "gold standard" intervention in low-back pain disability prevention. This evidence-based model has proved effective (7) and cost-efficient (8), with high internal (9–11) and good external validity (12). The effectiveness of the principles of the Sherbrooke model in treating chronic low-back pain have also been demonstrated (13). Two systematic reviews concluded that workplace-based interventions are more effective than usual healthcare or clinical interventions for reducing sick leave among workers

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with musculoskeletal disorders (11, 14). The European guidelines for prevention in low-back pain recommend temporary work and ergonomic workplace adaptations to ease RTW in case of low-back pain (15).

Although effective interventions have been developed, uptake of research findings by clinicians and healthcare organizations is low (16), a discrepancy known as the "knowledge-to-action gap" (17, 18) and also described in innovation diffusion (19, 20) and healthcare program implementation (21, 22). It is currently recommended to perform a context analysis prior to implementing a complex or innovative intervention, in order to identify barriers and facilitators (23, 24). However, there is currently no indication as to methods for identifying barriers and facilitators (24).

Our study had two objectives: (i) to construct a conceptual framework for the identification of barriers and facilitators before implementing RTW interventions, and (ii) to validate this conceptual framework empirically. For the purposes of the study, the Sherbrooke model was chosen as the "gold standard" RTW intervention for which feasibility was to be assessed (ie, identification of barriers and facilitators ahead of implementation). The French healthcare system was chosen as the potential context of adoption because of the current priority officially given to developing occupational rehabilitation solutions for workers with low-back pain.

Methods

Objective 1

A literature review was conducted to identify all possible types of barriers and facilitators likely to be encountered in implementing a RTW intervention. The implementation process can be conceptualized from different perspectives, with three corresponding domains to be explored in the literature: (i) diffusion of innovations, (ii) adoption of new evidence, and (iii) healthcare program implementation. Due to the complex nature of the research question and the scattering of evidence, the review could not rely solely on protocol-driven search strategies (25). A pragmatic approach was adopted, primarily searching for systematic reviews in the fields of RTW intervention (14, 26–31), diffusion of innovations (19, 32–34), organizational change (35, 36), and implementation of evidence-based medicine (24, 37–42). A secondary snowball strategy was adopted to identify references of references. Thirdly, the resulting reference list was checked against a manual search of specialized journals (ie, *Journal of Occupational Rehabilitation* and *Implementation Science*).

In order to construct the conceptual framework, we drew up a list of different types of barriers and facilitators for each of the three domains of knowledge. Secondarily, each of the three lists was reduced to a smaller number of core categories by thematic synthesis (43). Finally, the core categories of barriers and facilitators common to all three domains were retained in the conceptual framework. This reduction process provided a conceptual framework that was comprehensive, parsimonious, and logically coherent (44). A pilot test of the conceptual framework was run on three original studies.

Objective 2

To validate the conceptual framework empirically, a feasibility study was conducted to assess barriers and facilitators ahead of implementation of the Sherbrooke model in France. A multiple case-study design with embedded levels of analysis was used in a qualitative perspective (45). Case studies are commonly used in health service research (46), with specific criteria for appraising methodological quality (45–47) that can also be assessed on generic checklists (48, 49).

Two regions of France were chosen on the basis of high prevalence of musculoskeletal disorders. In each region, key participants were identified by theoretical sampling in two steps: purposive then snowball sampling (50). Theoretical sampling was based on the "arena model" that stresses the association of multiple stakeholders with divergent interests (16, 51). Accordingly, key informants were selected among healthcare professionals, workplace agents, and agents from Sécurité Sociale (the French national health insurance scheme), so as to identify possible barriers and facilitators in each category. Recruitment was initiated with three key actors in each region: one director from the Sécurité Sociale agency, one occupational physician from the Labour Inspection Agency, and one professor of occupational health and medicine. Respondent characteristics are described in table 1.

All participants attended a 3-hour interactive session concerning the Sherbrooke model, based upon a structured knowledge transfer and exchange model (52). Data collection used semi-structured interviews (N=22) and focus groups (N=7) conducted by one researcher with the key respondents. Interviews and discussion guides were based on the conceptual framework as previously drawn up and pre-tested. Examples of questions are given in table 2. The data collection settings were rehabilitation centers (2), Sécurité Sociale agencies (2), occupational health services (3) and workplaces (one automobile plant, one home services association and two university hospitals). A researcher took field notes to identify bias linked to personal assumptions. Pro-innovation bias

Table 1. Respondent characteristics per region. Some respondents were involved in both interview and focus groups. [NA=not available.]

Cases	Healthcare system Type (number of professionals)	Insurance system Type (number of professionals)	Workplaces Type (number of professionals)
Region 1			
Interviews	Physical therapist (2); Occupational therapist (1); Occupational physician (3)	NA	Employer (1); ergonomist (2)
Focus groups	NA	Focus group 1: regional prevention department manager (2); regional social department manager (2)	Focus group 1 (home services association): employer (1); manager (1); worker (1)
		Focus group 2: social insurance physician (5)	Focus group 2 (university hospital): occupational physician (2); ergonomist (2)
Region 2			
Interviews	Occupational physician (2); rehabilitation physician (1)	Social worker: 2; social insurance physician (2); regional prevention department manager (1)	Employer: 1; unions (2); ergonomist (1); labor administration (1)
Focus groups	Focus group 1 (occupational health service 1): occupational physician (5)	NA	Focus group (university hospital): employer (1); union (1); occupational physician (4); ergonomist (1); social worker (3); psychologist (1)
	Focus group 2 (occupational health service 2): occupational physician (10)	NA	NA

and preconceived ideas were identified and taken into account during the analysis. Other sources of evidence were used for triangulation purposes. The characteristics of local practices described by the respondents were confirmed by participant observation in one rehabilitation team. Grey literature (annual report and internal regulations of social insurance physicians) confirmed occupational disability prevention practices.

All interviews and discussions were audio-taped, transcribed, and collected in a single database. Mean interview time was 59 minutes (range: 22–180 minutes). Qualitative content analysis of the transcriptions used Atlas.ti software, version 5.2 (ATLAS.ti Scientific Software Development GmbH, Berlin Germany), with intra-case followed by comparative inter-case analysis (53). One coder performed the primary analysis and a second coded selected material to ensure multiple coder reliability. Disagreements were resolved by discussion.

The initial conceptual framework categories were used as a coding tree and modified during analysis as required by the data. Embedded analyses were conducted to distinguish barriers and facilitators at individual, organizational, and regulatory levels. There were no major findings during the later stages of the coding process, probably indicating data saturation. A preliminary version of the research report was sent to the respondents whose comments (4) were appended to the final report.

The Research Ethics Committee of Charles LeMoyne Hospital, Longueuil, Quebec, approved the research protocol.

Table 2. Examples of questions from the interview guide

Does the Sherbrooke model appear different from your usual practice? What seems different to you?
Do you think this model is difficult to understand/use? What do you think is difficult to understand/use?
Do you think this model could help you in your usual practice? What do you think is helpful?
What do you think are the main advantages/benefits/interests (limitations/risks) of this model?
If this model were to be implemented in France, what barriers/difficulties (facilitators/opportunities) would you expect, according to your own experience? Can you give examples from your own experience?
Overall, what would you say about the feasibility of this model in France?

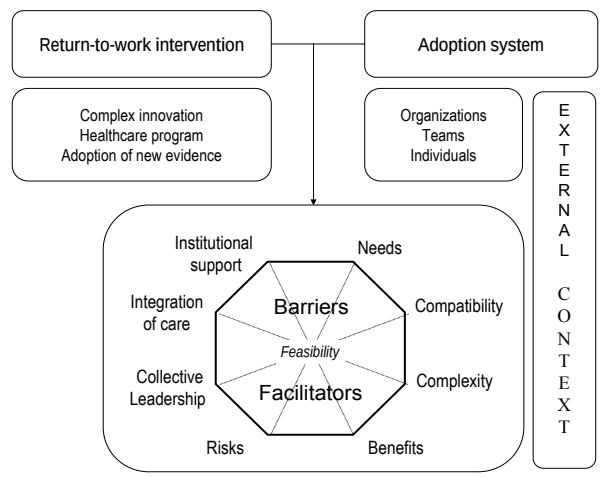

Figure 1. Initial conceptual framework to identify barriers and facilitators

Results

Initial conceptual framework

The initial conceptual framework based on the literature review is shown in figure 1. It comprises three parts: (i) the RTW intervention to be implemented, (ii) the adoption system (with three levels of adopters: individuals, teams, and organizations), and (iii) the eight categories of barriers and facilitators under scrutiny for the intervention feasibility assessment. The definition and theoretical background of the barriers and facilitators are detailed in table 3. The nature of the initial conceptual framework was eclectic or so-called "mosaic" since the categories of barriers and facilitators came from different theoretical and/or disciplinary backgrounds (54). This allowed barriers and facilitators to be identified at the different levels described in the literature (individuals, teams, organizations, and the wider context) (42, 54–56).

Revised conceptual framework

Some categories of the initial conceptual framework failed to operate as intended during data collection. Some questions received no answer from the respondents as they did not fit with their experience. Conversely, other questions received too many answers, referring to different concepts. Similar observations were made during data analysis. After a return to the literature, changes were made to the initial categories that were not grounded in the data. These changes are detailed and justified in table 4 and finally resulted in the revised conceptual framework described in figure 2 and detailed in table 5.

Table 3. Definition, background and interpretation of the categories of barriers and facilitators included in the initial conceptual framework.

References (alphabetical)	Category of barrier / facilitator	Definition	Interpretation
Cabana et al, 1999 (70); Fixsen et al, 2005 (32); Greenhalgh et al, 2004 (34); Kegler et al, 2008 (69); Rogers, 1995 (19); Saillour-Glénison et al, 2003 (71); Shojania & Grimshaw, 2005 (41)	Needs	The gap observed by the intended adopters between the reality and a desired state	The more a situation is perceived as intolerable, the more a potential intervention is likely to be implemented successfully
Buchanan et al, 2005 (35); Cabana et al, 1999 (70); Dopson et al, 2005 (37); Fixsen et al, 2005 (32); Ginsburg & Tregunno, 2005 (73); Greenhalgh et al, 2004 (34); MacEachen et al, 2006 (27); Patwardhan & Patwardhan, 2008 (72); Rogers, 1995 (19); Saillour-Glénison et al, 2003 (71); Shaw et al, 2008 (31); Shojania & Grimshaw, 2005 (41)	Compatibility	The extent to which the intervention is compatible with the values, norms and perceived needs of intended adopters	The more an intervention is compatible with the values, norms and needs of the adopters, the more easily it will be adopted and implemented
Cabana et al, 1999 (70); Francke et al, 2008 (74); Greenhalgh et al, 2004 (34); Rogers, 1995 (19); Saillour-Glénison et al, 2003 (71); Shaw et al, 2007 (24)	Complexity	The extent to which the intervention is perceived by the intended adopters as complex to understand and use	The more an intervention is perceived by the adopters as simple to understand and to use, the more easily it will be adopted and implemented
Buchanan et al, 2005 (35); Cabana et al, 1999 (70); Denis et al, 2002 (75); Fixsen et al, 2005 (32); Gold & Taylor, 2007 (76); Greenhalgh et al, 2004 (34); Rogers, 1995 (19); Saillour-Glénison et al, 2003 (71)	Benefits	The advantages of the intervention as perceived by the intended adopters (cost savings, time savings, gain of legitimacy, etc.)	The more an intervention has clear advantages perceived by the adopters, the more easily it will be adopted and implemented
Buchanan et al, 2005 (35); Denis et al, 2002 (75); Dopson et al, 2005 (37); Fixsen et al, 2005 (32); Gold & Taylor, 2007 (76); Greenhalgh et al, 2004 (34); MacEachen et al, 2006 (27); Rogers, 1995 (19); Saillour-Glénison et al, 2003 (71); Shaw et al, 2008 (31); Shojania & Grimshaw, 2005 (41)	Risks	The risks of the intervention as perceived by the intended adopters (additional costs, workload, etc.)	The more an intervention involves clear risks perceived by the adopters, the harder it will be to adopt and implement
Cabana et al, 1999 (70); Denis et al, 2001 (77)	Collective leadership	A team assembling a variety of skills, expertise and sources of influence and legitimacy able to facilitate the implementation of the intervention	The more a collective leadership is present and effective to support the intervention, the more easily the intervention will be adopted and implemented
Ahgren & Axelsson, 2005 (58); Nasmith et al, 2004 (78)	Integration of care	The cooperation of intended adopters and organizations in achieving the common goal aimed at by the intervention	The more cooperation is present between adopters and organisations to operate the intervention, the more easily it will be adopted and implemented
Buchanan et al, 2005 (35); Cabana et al, 1999 (70); Fixsen et al, 2005 (32); Greenhalgh et al, 2004 (34); MacEachen et al, 2006 (27); Rogers, 1995 (19); Saillour-Glénison et al, 2003 (71); Shaw et al, 2008 (31);	Institutional support	Provision of resources by the institution to support the implementation of the intervention (financial and human resources, time, social capital, etc.)	The more an intervention is supported by the institutions / authorities, the more easily it will be adopted and implemented

Table 4. Changes in categories of the initial conceptual framework and reasons for modification

Initial category	Modification	Reason for modification
Compatibility	Category split into four different categories in the revised conceptual framework	"Compatibility" appeared during data collection / analysis to be a very generic category, with a large quantity of heterogeneous material (verbatims). After returning to the literature, we decided to split this category into four categories that were more specific and usable to identify barrier and facilitators. These four categories included in the revised conceptual framework are: (i) values; (ii) professional practices; (iii) organizational practices; and (iv) legislation.
Collective leadership	Category deleted	The concept of "collective leadership" appeared during data collection/ analysis to be very analytic and hard for key informants to understand. Consequently, this category was hardly represented in the data collected. After returning to the literature, we decided to delete this category despite the role attributed to leadership in the literature. Elements of this choice are set out in the Discussion section.
Integration of care	Category deleted	The "integration of care" category was deleted for the same reasons as those of "collective leadership". Elements of this choice are set out in the Discussion section.
Institutional support	Category re-labeled in the revised conceptual framework but with the same definition	The "institutional support" category was re-labeled (with the same definition and content) as "resources" in the revised conceptual framework, since this label was more frequently used by and understandable for the respondents.

Barriers and facilitators identified

No major differences were identified between region 1 and region 2 on intra- and inter-case analysis, the results of which are available in the full research report (57). Examples of some of the barriers and facilitators identified are given in table 6. Although it is not the purpose of this article to give a complete picture of the feasibility of the Sherbrooke model in France, these results demonstrate the ability of the conceptual framework to identify and sort a wide range of barriers and facilitators at different levels.

Discussion

Altered categories in conceptual frameworks

Four categories of the initial conceptual framework were modified following data collection and analysis. One was merely re-labeled; one was split into more specific categories; and two were deleted (table 4).

The concept of "integration of care" was not retained in the revised conceptual framework due do its high level of abstraction, which proved difficult for respondents to understand. Further exploration of the literature showed that this concept was used to assess the integration of healthcare pathways that were already implemented (58–61); it therefore appeared that this concept was not appropriate for the pre-implementation phase.

The concept of "collective leadership" also proved difficult for respondents to understand and document. A return to the literature revealed that there were problems in conceptualizing the notion of opinion leaders as such, and thus in assessing aspects related to opinion leaders (62). It has been argued that the use of opinion leaders as a planned strategy is hypothetical, due to methodological issues and lack of knowledge (62, 63). For these reasons, the concept of opinion leadership was not retained in the revised conceptual framework. The concept might have been clarified by using the data to explore respondents' representations; but the data about opinion leadership was so scarce that no such analysis could be performed.

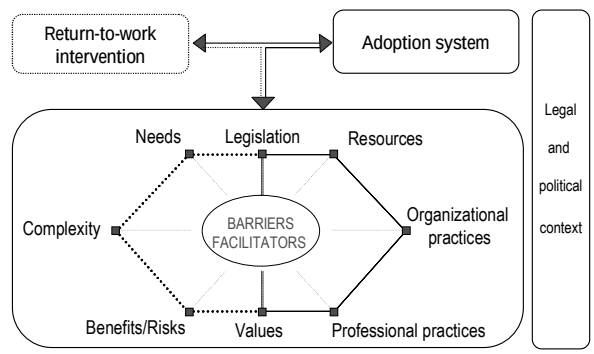

Figure 2. Revised conceptual framework to identify barriers and facilitators.

Table 5. Definition, background and interpretation of the categories of barriers and facilitators included in the revised conceptual framework. [RTW=return to work]

References (alphabetical)	Category of barrier / facilitator	Definition	Interpretation
Unchanged/Table 2	Needs	Unchanged/Table 2	Unchanged/Table 2
Unchanged/Table 2	Complexity	Unchanged/Table 2	Unchanged/Table 2
Unchanged/Table 2	Benefits	Unchanged/Table 2	Unchanged/Table 2
Unchanged/Table 2	Risks	Unchanged/Table 2	Unchanged/Table 2
Buchanan et al, 2005 (35); Dopson et al, 2005 (37); Fixsen et al, 2005 (32); Francke et al, 2008 (74); Greenhalgh et al, 2004 (34); MacEachen et al, 2006 (27); Rogers, 1995 (19); Shaw et al, 2008 (31); Shojania & Grimshaw, 2005 (41)	Values	Ideal and cognitive references of the adopters related to the worker's rehabilitation and his/her RTW issue	The more the intervention is aligned with the ideal and cognitive references of the adopters, the more easily it will be adopted and implemented
Buchanan et al, 2005 (35); Dopson et al, 2005 (37); Fixsen et al, 2005 (32); Francke et al, 2008 (74); MacEachen et al, 2006 (27); Greenhalgh et al, 2004 (34); Rogers, 1995 (19); Shaw et al, 2008 (31)	Professional practices	Individual professional behavior of the adopters related to the worker's rehabilitation and his/her RTW issue	The more an individual professional behavior is aligned with the components of the intervention, the more easily it will be adopted and implemented
Buchanan et al, 2005 (35); Dopson et al, 2005 (37); Fixsen et al, 2005 (32); Francke et al, 2008 (74); MacEachen et al, 2006 (27); Greenhalgh et al, 2004 (34); Rogers, 1995 (19); Shaw et al, 2008 (31)	Organizational practices	Organizational culture and routines in the adoption system related to the worker's rehabilitation and his/her RTW issue	The more the organizational culture and routines are aligned with the components of the intervention, the more easily it will be adopted and implemented
Unchanged/Table 2 ("Institutional support")	Resources	Unchanged/Table 2 ("Institutional support")	Unchanged/Table 2 ("Institutional support")
Buchanan et al, 2005 (35); Dopson et al, 2005 (37); Fixsen et al, 2005 (32); Francke et al, 2008 (74); Greenhalgh et al, 2004 (34); MacEachen et al, 2006 (27); Rogers, 1995 (19); Shaw et al, 2008 (31)	Legislation	Policy, rules and regulations in the adoption system that are related to the worker's rehabilitation and his/her RTW issue	The more the policy, rules and regulations are aligned with the components of the intervention, the more easily it will be adopted and implemented

Characteristics of the revised conceptual framework

The eight categories of the revised conceptual framework give an initial picture of the kinds of barriers and facilitators that may be encountered in implementing an RTW intervention. Although different kinds and levels of barriers and facilitators may influence each other (42), no causal links are represented here. This conceptual framework should be considered descriptive (45, 64): it is not intended to have an explanatory or predictive value, although this would be a desirable goal for future research.

Nonetheless, the revised conceptual framework represents a substantial progress and meets a current gap in the literature. Its eclectic background makes it theoretically grounded and able to encompass a wide range of theories and concepts in the implementation literature. Its operational value was tested successfully, so that it can also be considered empirically grounded.

To our knowledge, it is the first tool that can be used to uncover a wide spectrum of possible barriers and facilitators from a pragmatic point of view before implementing an RTW intervention at local/regional level.

Strengths and limitations of the study

Several study limitations must be mentioned. The number of cases under study was limited, and this choice was made primarily for logistic reasons. Although the generalizability of the results (discussed below) might have been increased by including more cases, it is usual in multiple case-study designs to start with a limited number of cases and add new ones in a second step according to initial results (45, 50). The search strategy did not use a regular keyword search, so that other concepts that might have been uncovered may have been missed. Workplace sampling resulted in an over-representation of the health- and social-care sectors, due to the availability of respondents therein. Nonetheless, the input from two occupational health services (15 occupational physicians) involved in a wide range of economic activities probably compensated for this limitation. Another limitation concerns the unsolved issue of identifying opinion leaders as potential facilitators; however, it is possible that the diversity of the stakeholders influencing this arena (16) makes it difficult for one specific actor to take on an important leadership role, especially at the implementation stage.

The qualitative methods used in the project are believed to be a strength of the study. The case-study design enabled a complex notion to be studied in its real-life context. The data collection methods enabled respondents' experience to be harvested and triangulated with other sources. The embedded levels of analysis by thematic content analysis identified barriers and facilitators at the different levels. Other study strengths concern the measures taken to meet the criteria of methodological quality in case-study research (46–48). The results of this study are therefore believed to have good construct validity, reliability, and external validity as specifically defined in case-study research (45, 46). The concept of external validity (or generalizability) refers here to the ability of the revised conceptual framework to be used in other settings (ie, outside France) to evaluate the feasibility of other RTW interventions (other than the Sherbrooke model): a quality known as *analytical generalization,* driven from data to theory (64–66). The external validity of the barriers and facilitators identified in the study is limited to the French healthcare system, even though some similarities to barriers and facilitators described in other settings were observed (16, 67).

Future research

Further feasibility studies should be conducted to document the construct validity and applicability of the revised conceptual framework in other contexts. In view of the theoretical background of this framework, we believe it to be also applicable to healthcare programs other than RTW interventions, but this assumption should be confirmed by further studies.

The next step in the implementation process would be the choice of different implementation strategies/activities specifically tailored to the barriers and facilitators identified. However, the literature on methods of doing so is poor. A recent Cochrane review about the effectiveness of tailored interventions to overcome identified barriers to change pointed out that 20 of the 26 studies included made no reference to any theoretical underpinning in developing interventions (68). This shortcoming should be a matter of particular concern in future research. Finally, the effectiveness and cost-effectiveness of tailored interventions should be evaluated, to determine their relevance in the context of limited resources.

This revised conceptual framework elaborated and tested provides innovative and usable knowledge in the field of implementation science and practice. It is likely to open new perspectives of applied research in occupational disability prevention, with the development of feasibility studies and assessment of implementation strategies. Finally, it is likely that better implementation of effective RTW interventions will lead to better functional and occupational outcomes for workers with low-back pain.

Table 6. Example of barriers and facilitators identified during the feasibility study of the Sherbrooke model in France. [RTW=return to work; GP=general practioner.]

Examples	Verbatims from the respondents
Barriers	
Individual level	
Perceived risks	"The worker can feel the pressure for RTW, whatever the cost."
Conflicting values	"For GPs who don't have a social streak, it's no use."
Conflicting professional practice	"Physiotherapists are afraid to mobilize their patients because of pain."
Organizational level	
Perceived risks	"Who is accountable if the worker is injured in the workplace during rehabilitation?"
Lack of resources	"Who will pay for the ergonomist? And for the adaptations?"
Conflicting organizational practices	"Our rehabilitation services are very, very far from the workplace here…"
Specific barriers in the workplace	"Work conditions are the hostage of social demands by the workers."
Legal and political level	Legal barriers to rehabilitation in the workplace during sick-leave
	Professional confidentiality as a barrier to shared information
Facilitators	
Individual level	
Perceived needs	"It is so good to know that such solutions exist when we are sometimes desperate in front of our cases."
Concordant values	"I feel right in my professional role within this model"
Concordant professional practice	"Reassure and reactivate, well, that's what I do!"
Organizational level	
Concordant values	"Early RTW is one of the commitments of our rehabilitation network."
Concordant organizational practice	"We are used to working in close collaboration with the occupational physician to organize workplace accommodation for injured workers."
Specific facilitators in the workplace	"We don't fight between different union representatives here."
Legal and political level	Legal possibility of graded RTW
	Legal legitimacy of the Workers Compensation Board
	Legal possibility of inter-organizational collaboration through healthcare networks

Acknowledgements

The authors are grateful to the following individuals for their valuable help in coordinating the study and collecting the data: Ms QN Hong, Research Assistant at CAPRIT, Université de Sherbrooke, Quebec, Canada, J-F Caillard, Professor and Head of Division of Occupational Health and Medicine at the University of

Rouen, France, and Y Roquelaure, Professor and Head of Division of Occupational Health and Medicine at the University of Angers, France.

At the time of the study, J-B Fassier was supported as a PhD student by grants from *Chaire en Réadaptation au Travail* Jacques-Armand Bombardier and Pratt & Whitney Canada, and from the Charles LeMoyne Hospital Research Centre, Longueuil, Quebec, Canada.

Part of this work was supported by a grant received from the French occupational risk department of the national health insurance *Caisse Nationale d'Assurance Maladie des Travailleurs Salariés, Direction des risques professionnels* (CNAMTS).

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Received for publication: 6 September 2010