A national survey of organizational transfer practices in chronic disease prevention in Canada

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Abstract

Underuse of best practices in chronic disease prevention (CDP) represents missed opportunities to promote healthy living and prevent chronic disease. Better understanding of how CDP programs, practices and policies (PPPs) are transferred from ‘resource’ organizations that develop them to ‘user’ organizations that implement them is crucial. The objectives of this work were to develop psychometrically sound measures of transfer practices occurring within resource organizations; describe the use of these transfer practices and identify correlates of the transfer process. Cross-sectional data were collected in structured telephone interviews with the person most knowledgeable about PPP transfer in 77 Canadian organizations that develop PPPs. Independent correlates of transfer were identified using multiple linear regression. The transfer practices most commonly used included: identification of barriers to PPP adoption/implementation, tailoring transfer strategies and designing a transfer plan. Skill at planning/implementing transfer, external sources of funding specifically allocated for transfer, type of resource organization, attitude toward process of collaboration and user-centeredness were all positively associated with the transfer process. These factors represent possible targets for interventions to improve transfer of CDP PPPs.

Introduction

As the chronic disease burden increases, prevention is a critical focus for public health [1] and a high priority for health policy [2–4]. The ability of public health systems (i.e. organizations that collectively act on population health) to effectively reduce the chronic disease burden depends in part on the capacity of member organizations to develop effective health promotion and chronic disease prevention (CDP) programs, practices and policies (PPPs) and to ensure that these have widespread uptake [5, 6]. However, many promising PPPs developed through health promotion research fail to have a significant impact because plans or activities to transfer these PPPs across public health organizations are not well-developed [6–8]. Limited CDP resources can be wasted when the full potential of many innovative best practices is not achieved.

Despite a growing literature that views dissemination of public health PPPs as crucial to effective CDP programming, few studies describe the transfer practices within organizations that enable...
Herein, we describe practices within ‘resource’ organizations that develop PPPs, to actively transfer PPPs to ‘user’ organizations that adopt and implement them [9, 10]. This active transfer process contrasts diffusion (i.e. the passive, unplanned spread of innovations [11]), which is largely ineffective in influencing public health practice [12, 13]. It also contrasts knowledge translation (KT) /exchange [14], which focuses on translating research results into intervention. While the KT literature increases understanding on how research-generated knowledge is used to develop PPPs, our focus is downstream. Specifically we ask: ‘Once a PPP is developed within one organization, how is it transferred to other organizations and what organizational factors are associated with this transfer process?’

Efforts to describe organizational transfer practices are challenged on several levels. First, public health organizational research is largely limited to assessing the performance of public health agencies in carrying out health protection functions [15, 16]. Second, the transfer process is usually bundled within a conceptual package including innovation development, transfer, uptake and utilization, which fails to separate the role of resource and user organizations [7, 17]. Third, qualitative work predominates this area. Although qualitative findings provide rich descriptions and locally meaningful information, they often cannot be generalized across jurisdictions. Quantitative data are needed to provide public health decision-makers with standardized questionnaires for systematic measurement to monitor, manage and improve transfer practices. Finally, much of the empirical literature focuses on recipients of transfer efforts (i.e. user organizations or individual practitioners) and on the determinants of the adoption, implementation and institutionalization (i.e. utilization) of the entities being transferred (i.e. research knowledge [18, 19], clinical practice guidelines [20] and policy analyses [21]).

In this paper, we introduce a conceptual framework that describes the process of PPP transfer from the resource organization perspective. We describe the development of quantitative measures of transfer practices and potential correlates of transfer. Lastly, we describe transfer practices in organizations engaged in primary prevention of chronic disease and we identify independent correlates of the transfer process using multivariate analysis.

Conceptual framework

Figure 1 describes our conceptual framework. Resource and user organization(s) are conceptualized as having two-way exchange[22–27] that emphasizes the importance of interaction to develop relevant PPPs; designing transfer plans for successful utilization and developing a linkage system or means to exchange about the PPP [26, 27]. Theoretically, linkage helps developers by allowing users to express needs and expectations [22, 27, 28].

The nine transfer practices originally conceptualized as comprising the transfer process draw on several models of planned change (Table I) which describe actions undertaken by change agents to alter the structure and/or functioning of user systems (usually termed ‘clients’), thereby addressing perceived needs or problems.

The utilization literature also informed our conceptualization of transfer practices (Fig. 1) by describing potential determinants of PPP adoption and implementation by user organizations (Table II) including users’ perceptions of the attributes of the PPP, characteristics of user organizations, relationships between resource and user organizations and strategies used to transfer PPPs. These factors need to be addressed by resource organizations as they proceed through the transfer process. Although depicted in an ordered sequence, transfer practices are not necessarily temporally sequential [28].

Seven constructs drawn from Havelock’s synthesis of the dissemination and utilization literatures (1971) and Huberman’s ‘dissemination effort model’ (1987) are depicted as potential correlates of transfer. These constructs are hypothesized to promote transfer efforts and include (i) user-centeredness of transfer efforts (i.e. the extent to which resource organizations take users’ needs into account); (ii) resource organization structure (i.e. age, size and type); (iii) openness or orientation toward transfer (i.e. readiness to be influenced by
user feedback and new knowledge; skill renewal; (iv) organizational capacity (i.e. skills and resources) to undertake transfer; (v) incentives or rewards (dollars, recognition by colleagues, knowledge, self-esteem, satisfaction in creating something that works, feedback from satisfied clients and feeling of job well done) for investment in transfer activities; (vi) organizational flexibility to adjust transfer efforts and (vii) commitment to transfer (i.e. number and diversity of staff who gain access to the user; persistence of leadership for transfer).

**Methods**

Questionnaire development involved developing items *de novo* [except for three items adapted from unpublished measures of organizational practices/activities for heart health promotion (Canadian Heart Health Initiative-Ontario Project 1996, Heart Health Nova Scotia 1996)], drawing from the literatures on: knowledge transfer, utilization and dissemination, [11, 17, 22, 25, 28, 50–52] planned social or organizational change [30, 31] and educational intervention research [32]. Face and content validity of all items was tested with four researchers recognized nationally for their work in relevant domains. The first version of the questionnaire was pre-tested with public health researchers and practitioners working in HIV/AIDS and injury prevention and preventive dentistry. Finally, we pilot-tested a revised version in 11 organizations that delivered prevention activities unrelated to CVD.
<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Phases of planned change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lewin [29]</strong></td>
<td>Unfreezing</td>
</tr>
<tr>
<td><strong>Lippitt et al. [30]</strong></td>
<td>Development of need for change</td>
</tr>
<tr>
<td></td>
<td>Establishment of change relationship</td>
</tr>
<tr>
<td></td>
<td>Diagnosis of client system’s problem</td>
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<td></td>
<td>Examination of alternative routes and goals</td>
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<tr>
<td></td>
<td>Establishment of goals and intentions of action</td>
</tr>
<tr>
<td></td>
<td>Transformation of intentions into actual change efforts</td>
</tr>
<tr>
<td></td>
<td>Generalization &amp; stabilization of change</td>
</tr>
<tr>
<td></td>
<td>Achieving a terminal relationship</td>
</tr>
<tr>
<td><strong>Rich &amp; Zaltman [31]</strong></td>
<td>Change team development</td>
</tr>
<tr>
<td></td>
<td>Client identification</td>
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<tr>
<td></td>
<td>Problem definition</td>
</tr>
<tr>
<td></td>
<td>Innovation (change program) design</td>
</tr>
<tr>
<td></td>
<td>Specification of objectives</td>
</tr>
<tr>
<td></td>
<td>Selection of general strategies or approaches</td>
</tr>
<tr>
<td></td>
<td>Selection of Tactics (specific activities)</td>
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<td></td>
<td>Implementation (of activities)</td>
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<tr>
<td></td>
<td>Evaluation</td>
</tr>
<tr>
<td><strong>Bartholomew et al. [32]</strong></td>
<td>Identification of potential users of the health promotion program</td>
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<tr>
<td></td>
<td>Develop a linkage system</td>
</tr>
<tr>
<td></td>
<td>Set performance objectives for program use</td>
</tr>
<tr>
<td></td>
<td>Identification of barriers to adoption, implementation</td>
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<tr>
<td></td>
<td>Select methods &amp; strategies</td>
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<tr>
<td></td>
<td>Design diffusion plan</td>
</tr>
<tr>
<td></td>
<td>Evaluation</td>
</tr>
<tr>
<td><strong>Caburnay et al. [8]</strong></td>
<td>Establish evidence for program effectiveness</td>
</tr>
<tr>
<td></td>
<td>Identify organizations to adopt program</td>
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<tr>
<td></td>
<td>Assess unique needs/characteristics of these organizations</td>
</tr>
<tr>
<td></td>
<td>Adapt the program to meet these needs</td>
</tr>
<tr>
<td></td>
<td>Develop program implementation and training materials to facilitate adoption</td>
</tr>
<tr>
<td></td>
<td>Provide a plan for continuous program improve-ment and evaluation</td>
</tr>
</tbody>
</table>
Table II. Summary of factors that may influence the adoption or implementation of PPPs by user organizations and may need to be considered in resource organization transfer practices

<table>
<thead>
<tr>
<th>Factor</th>
<th>Summary of Findings</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users’ perception of the PPP</td>
<td>Attributes identified as having a positive impact on successful utilization include: (i) compatibility with the activities, objectives and values of the user organization; (ii) relative advantage over current practice; (iii) simplicity of the PPP or ease of understanding the PPP and its implementation; (iv) observability or degree to which results or impacts of a PPP are observable to others; (v) trialability or opportunity to experiment with the PPP on a limited basis; (vi) flexibility or degree to which a PPP can be sub-divided and offered as separate components or can be adapted for use in a wide variety of situations and still be effective.</td>
<td>[33]</td>
</tr>
<tr>
<td>Characteristics of user organizations</td>
<td>Degree of formalization of tasks (i.e. the degree to which a user organization emphasizes following rules and procedures)</td>
<td>[34, 35]</td>
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<td></td>
<td>Existence of a department/unit/team that specializes in the field of the PPP</td>
<td>[36, 37]</td>
</tr>
<tr>
<td></td>
<td>Organizational climate</td>
<td>[9, 25, 37]</td>
</tr>
<tr>
<td></td>
<td>Types of clients served</td>
<td>[37–41]</td>
</tr>
<tr>
<td></td>
<td>Organizational capacity to deliver the PPP (human and financial resources, intervention skills), motivation, physical facilities</td>
<td>[42]</td>
</tr>
<tr>
<td></td>
<td>Centralization or dispersion of power</td>
<td>[43]</td>
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<td></td>
<td>Visible support of the PPP among leaders</td>
<td>[44]</td>
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<tr>
<td></td>
<td>Presence of a champion who supports and promotes the PPP</td>
<td>[37,39,44]</td>
</tr>
<tr>
<td></td>
<td>Experience with PPPs similar or related to the one in question</td>
<td>[45]</td>
</tr>
<tr>
<td></td>
<td>Existence of a department/unit/team that specializes in the field of the PPP</td>
<td>[36,37]</td>
</tr>
<tr>
<td>Relationship between resource and user organization(s)</td>
<td>Existence of linkages between resource and user organizations contributes to effective PPP transfer and uptake</td>
<td>[26,27]</td>
</tr>
<tr>
<td></td>
<td>Linkage system established at the beginning of PPP planning aids developers at every stage of the transfer process and provides the user system with a means of expressing needs, expectations and limitations of the PPP being developed</td>
<td>[22,27,28,32]</td>
</tr>
<tr>
<td></td>
<td>Several ways in which a linkage system can be organized, with varying degrees of formality</td>
<td>[32]</td>
</tr>
<tr>
<td>Method or strategy used to transfer PPP</td>
<td>Strategies used by resource organizations to transfer PPPs are critical to adoption/implementation by users</td>
<td>[7]</td>
</tr>
<tr>
<td></td>
<td>Transfer efforts by innovators represent a good predictor of use of research in several social science disciplines (OR = 3.7, P &lt; 0.01).</td>
<td>[46]</td>
</tr>
<tr>
<td></td>
<td>Wide range of transfer strategies highlighted in the literature includes: workshops and training programs emphasizing experiential learning and supervised practice; print communication with a high degree of specificity and operational description; communication through new information technologies; use of external consultants or knowledge brokers; early involvement of influential users in the planning and development of the PPP; technical assistance and developmental support to assure users have capacity to adopt and implement PPPs. No strong evidence to recommend any one-transfer strategy as effective, tailoring of different strategies to different demographic, structural and cultural features of users was supported. The value of personal contact has been reported as well as the importance of being proactive, using different techniques and channels simultaneously to promote 'purposeful redundancy', ensuring quality of execution (e.g. fidelity to plan, smoothness of execution).</td>
<td>[7]</td>
</tr>
</tbody>
</table>
diabetes, chronic respiratory diseases or cancer. Two francophone translators translated the questionnaire from English into French. Equivalence between versions was verified according to recommendations for health measures cross-cultural adaptation [53].

Respondents provided responses to several items referring to a specific CDP PPP that their organization had transferred most recently within the last 3 years. This ‘reference PPP’ was to have been completely new, newly adapted from an existing program, practice, campaign or activity or part of a larger new or newly adapted program; focused on primary prevention; developed with the intent to transfer to organizations targeting populations and completely transferred or had reached a sufficiently advanced stage in the transfer process to allow respondents to fully reflect on the experience. The most recently transferred PPP was used in an attempt to minimize potential recall bias and increase measurement accuracy.

The final questionnaire comprised 237 items covering organizational characteristics (7 items); transfer practices (72 items); description of the ‘reference PPP’ (42 items); factors affecting transfer practices (109 items) and respondent characteristics (7 items). Response choices included yes/no, numeric options and five-point Likert scales, with extent of agreement response formats ranging from ‘1’ (very low/strongly disagree) to ‘5’ (very high/strongly agree).

To identify organizations for inclusion in the survey, we undertook a census of all regional, provincial and national organizations across Canada with mandates for the primary prevention of diabetes, cancer, CVD and chronic respiratory illness and/or promotion of healthy eating, non-smoking and/or physical activity. Specifically, federal and provincial government departments, regional health authorities, public health units, non-governmental organizations (NGOs) and their provincial/regional divisions, para-governmental health agencies, resource centers, professional organizations and ‘GROUPED organizations’, such as coalitions, alliances and partnerships, were identified through an exhaustive Internet search and consultations with key contacts across Canada. All organizations identified were invited to participate. Screening interviews were conducted with senior managers to confirm eligibility, solicit participation and obtain contact information for potential respondents. Eligible organizations were mandated to undertake primary prevention of chronic disease; were involved in developing CDP PPPs and had transferred ≥1 PPP to other organizations in the past 3 years. The term ‘organization’ refers to an entire organization if the organization as a whole conducted CDP activities or to a specific department, unit or branch within an organization if only certain divisions undertook CDP activities.

Data were collected from October 2004 to April 2005 in telephone interviews (mean length 68 ± 22 minutes) conducted in English or French by nine trained interviewers. Respondents (one/organization) were identified by senior managers as the employee(s) most knowledgeable about CDP PPP transfer and included senior/middle managers, service providers and professional staff. Questionnaires were emailed to respondents prior to interviews to allow preparation and consultation with colleagues.

Thirteen variables measured transfer practices and 23 measured the seven types of potential correlates (Table III). A detailed description of these variables is provided on-line (Supplementary data available at Health Education Research online).

Data analysis

Several principal components analyses (PCA) with varimax rotation were used to extract factors with eigenvalues >1 from among subsets of items intended to measure individual transfer practices or potential correlates. The number of factors retained was based on Cattell’s Scree Test as well as accounting for ≥50% of the variance in the variables measured [54]. Observations to item ratios ranged from 6 to 25. Items with factor loadings ≥0.55 were retained to construct unit-weighted scales with stipulation that an item could not be retained in more than one factor, that each factor contained a minimum of three items and that items loading on a given factor shared the same
conceptual meaning [55]. Items rejected based on these criteria were treated as single-item measures \((n = 2)\) or dropped \((n = 5)\) if they did not represent a key concept in the conceptual framework. Fifty-six of 237 items entered into several PCAs yielded 12 multi-item scales and 2 single-item measures. Supplementary data available at Health Education Research online describes the psychometric properties of all scales.

Internal consistency was measured by Cronbach’s alpha and mean inter-item correlations [56]. The range and distribution of individual inter-item correlations were examined to confirm unidimensionality [56]. Interpretive labels were assigned to each scale. Factor-based scores for each scale were computed only when organizations had data for \(\geq 50\%\) of items in the scale. Items in the scale were summed, then divided by the number of items completed to maintain the score in the original response range.

PCA-based scale construction was not appropriate when items measuring a transfer practice/potential correlate did not share response categories, did not represent one underlying construct or had dichotomous response sets. For four transfer practice and two correlate variables measured in several yes/no items, positive responses were summed, the cumulative frequency was quintiled and then

<table>
<thead>
<tr>
<th>Construct</th>
<th>Variable name(s)</th>
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</table>
| Transfer process | Transfer practices:  
- Identification of need for PPP  
- Development of a linkage system  
- Collaboration with user organization(s) during development of PPP\(^a\)  
- Collaboration with user organization(s) during transfer of PPP\(^a\)  
- Collaboration with user organization(s) during evaluation of transfer process\(^a\)  
- Identification of barriers to PPP adoption and implementation by the user organization\(^a\)  
- Identification of facilitators to PPP adoption and implementation by the user organization\(^a\)  
- Selection of strategies to overcome barriers or promote facilitators\(^a\)  
- Tailoring transfer strategies to improve the potential for success\(^a\)  
- Design of a transfer plan  
- Enhancement of user capacity to adopt and implement PPP  
- Fidelity to transfer plan  
- Evaluation of transfer process |
| Type of potential correlate | Structure of resource organization  
- Age of organization; Type of organization; Size of organization (number of paid full time equivalents at the organization or CDP division level, number of volunteers); Geographic level served, National region location/jurisdiction  
- Openness/orientation toward transfer  
- Attitude toward process of collaboration; Attitude toward linkage, Organizational support for professional development in transfer; Frequency of professional development in transfer  
- Organizational capacity  
- Skill at planning/implementing transfer; Skill at evaluating transfer; Skill at collaborating with user organizations; Adequacy of resources for transfer; External sources of funding specifically allocated for transfer  
- User-centeredness of transfer efforts  
- User-centeredness  
- Incentives to transfer  
- Transfer incentive in the form of job satisfaction; Transfer incentive in the form of professional recognition; Transfer incentive in the form of access to funding  
- Organizational flexibility |  
- User type diversity  
- Organizational commitment to transfer  
- Designated person in charge of transfer; Championing of transfer; Transfer considered part of PPP developers’ job |

\(^a\)Collaboration with user, Identification of barriers/facilitators, Selection of strategies originally conceptualized as single practices. 13 practices emerged from 9 following PCA.
rankings were re-coded to create scores ranging between 1 and 5.

We created a ‘TRANSFER’ summary score as the sum of the 13 transfer practice scores (i.e. eight scores with 5-point Likert scales; four with 5-point scales from quintiled frequency distributions of summed positive responses to yes/no items and one with a dichotomous scale). TRANSFER scores ranged between 30 and 61 (mean (SD) = 44(8) and median = 44).

Descriptive data checks included examination of frequency distributions for categorical variables, means for transfer practice scales/scores or medians for skewed count variables. Organizations were labeled ‘heavily engaged’ in a transfer practice if the score = 4 or 5 on a 5-point Likert scale or the quintiled ranking of the cumulative frequency or was a positive response on a dichotomous scale.

Independent correlates of TRANSFER were identified using multiple linear regression. Potential correlates significant at $P < 0.20$ univariately were entered into multivariate models, and variables significant at $P < 0.05$ were retained. Split-sample cross-validation was used to verify the performance of this final model in an ‘independent sample’ [57]. Strength of clustering by province was measured by the intra-class correlation coefficient (ICC). A Generalized Estimating Equation (GEE) procedure with an exchangeable covariance structure was used to fit the regression equation taking clustering into account.

Data analyses were conducted using SAS software, version 8.2 (SAS Institute, Inc., Cary, NC, USA) and SPSS software release 11 (SPSS Inc., Chicago, IL, USA). This study was approved by the McGill University Faculty of Medicine Institutional Review Board.

**Results**

Eighty-one of 92 eligible resource organizations (88%) accepted to participate; data were collected in 77 of 81 organizations. Numbers of interviews per province ranged from 1 to 17 (mean = 10 and median = 7). One-third of resource organizations were formally mandated regional public health organizations; one-third were NGOs and 11% were GROUPED organizations. The median age of organizations was 20 years. The median number of full-time equivalent staff was 12.5. Over, half (52%) of organizations targeted a province. Twenty percent referred to training/professional development programs/activities as their ‘reference PPP’, 20% referred to resource/practice toolkits and 13% referred to community-based programs. PPPs less frequently referenced included approaches/frameworks (7% of organizations), strategies (4%) and policies (3%).

**Frequency of transfer practices comprising the transfer process**

Transfer practices most heavily engaged in included identifying barriers to PPP adoption/implementation, tailoring transfer strategies and designing transfer plans (Table IV).

Those least heavily engaged in included fidelity to transfer plan, selecting strategies to overcome barriers/promote facilitators, evaluating transfer process, developing linkage systems and enhancing user capacity.

Five organizations did not heavily engage in any transfer practice and none were heavily engaged in all 13. Fifty-seven percent reported ‘heavy engagement’ in <5 transfer practices. There was no systematic pattern in types of practices heavily engaged in.

There were few differences by type of organization in transfer practices heavily engaged in, although formally-mandated regional-level public health organizations were more heavily engaged than NGOs or GROUPED organizations in evaluating transfer, enhancing user capacity and collaborating with user organizations during transfer. Additionally, GROUPED organizations were least engaged in collaborating during evaluation and in identifying barriers.

**Correlates of transfer process**

Eleven of 23 potential correlates of transfer were entered into multivariate analyses (Supplementary data available at *Health Education Research* online). Five variables were positively associated with transfer (Table V) and explained 40% of the
variation in TRANSFER ($F$ value 7.56, $P < 0.0001$). The cross-validation results indicated no overfitting ($R^2 = 0.35$ and 0.33 for the estimation and cross-validation samples respectively). Although the ICC = 0.06 indicated no clustering, regression coefficients and model-based standard errors presented are those derived using GEE.

**Table IV. Proportion of resource organizations heavily engaged in specific transfer practices by type of organization**

<table>
<thead>
<tr>
<th>Transfer practice</th>
<th>Type of organization</th>
<th>Total%</th>
<th>Public health %</th>
<th>NGO%</th>
<th>Grouped%</th>
<th>Other %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of the need for PPP</td>
<td></td>
<td>68</td>
<td>67</td>
<td>69</td>
<td>67</td>
<td>71</td>
</tr>
<tr>
<td>Development of a linkage system</td>
<td></td>
<td>39</td>
<td>42</td>
<td>35</td>
<td>33</td>
<td>47</td>
</tr>
<tr>
<td>Collaboration during development</td>
<td></td>
<td>51</td>
<td>46</td>
<td>46</td>
<td>55</td>
<td>62</td>
</tr>
<tr>
<td>Collaboration during transfer</td>
<td></td>
<td>57</td>
<td>71</td>
<td>42</td>
<td>33</td>
<td>75</td>
</tr>
<tr>
<td>Collaboration during evaluation</td>
<td></td>
<td>42</td>
<td>54</td>
<td>36</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>Identification of barriers to PPP adoption/implementation</td>
<td></td>
<td>83</td>
<td>87</td>
<td>81</td>
<td>67</td>
<td>88</td>
</tr>
<tr>
<td>Identification of facilitators to PPP adoption/implementation</td>
<td></td>
<td>70</td>
<td>71</td>
<td>61</td>
<td>78</td>
<td>76</td>
</tr>
<tr>
<td>Selection of strategies to overcome barriers/promote facilitators</td>
<td></td>
<td>34</td>
<td>25</td>
<td>31</td>
<td>33</td>
<td>53</td>
</tr>
<tr>
<td>Tailoring of transfer strategies</td>
<td></td>
<td>76</td>
<td>75</td>
<td>73</td>
<td>78</td>
<td>82</td>
</tr>
<tr>
<td>Design of transfer plan</td>
<td></td>
<td>75</td>
<td>79</td>
<td>65</td>
<td>67</td>
<td>88</td>
</tr>
<tr>
<td>Enhancement of user capacity</td>
<td></td>
<td>39</td>
<td>50</td>
<td>19</td>
<td>11</td>
<td>71</td>
</tr>
<tr>
<td>Fidelity to transfer plan</td>
<td></td>
<td>28</td>
<td>37</td>
<td>23</td>
<td>33</td>
<td>18</td>
</tr>
<tr>
<td>Evaluation of transfer process</td>
<td></td>
<td>35</td>
<td>46</td>
<td>19</td>
<td>11</td>
<td>59</td>
</tr>
</tbody>
</table>

*a'Heavily engaged' denotes transfer practice score = ‘4’ or ‘5’ on a 5-point Likert scale or quintiled ranking of cumulative frequency or positive response on a transfer variable.

*bScored on a 5-point Likert scale: 1 = never involved and 5 = extensively involved.

*cArithmetic sum, quintiled and re-coded from 0-4 to 1-5.

*dScored on a 5-point Likert scale: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree and 5 = strongly agree.

*eScored on a 5-point Likert scale: 1 = not at all and 5 = completely.

*fOriginally this variable was dichotomous (scored 0/1), while all other transfer practices were scored 1-5. In the summative score that was created to serve as the dependent variable, this dichotomous variable did not provide adequate weight respective of other practices therefore a linear transformation was performed to re-code it from 0/1 to 2/4.5.

Discussion

This is the first study to describe transfer practices and to identify correlates of transfer in CDP resource organizations. At least one-quarter of resource organizations heavily engaged in each of the 13 transfer practices, suggesting that these practices were relevant. However, organizations differed substantially in number and type of transfer practices engaged in, which may reflect that there are no ‘evidence-based’ guidelines on optimal transfer practices. Practices engaged in may represent those that seem easiest or most feasible given resources available. For example, many organizations engaged in identifying barriers to user PPP adoption/implementation. However, enhancing user
capacity was not heavily practiced, possibly because resource organizations do not view user capacity as their responsibility. Alternatively, engaging in activities to increase user capacity may require time or resources that are unavailable.

Diversity in transfer practices heavily engaged in could also reflect that not all practices are needed in every situation. For example, the finding that development of a linkage system was infrequently practiced does not necessarily reflect poor transfer effort. Long-standing collaborative relationships between resource and target user organizations may mitigate the need for developing linkage systems [22].

Although most organizations were heavily engaged in designing transfer plans, few reported fidelity to transfer plan (i.e. 78% reported minor/major modifications to transfer plans or reported no plan). While lack of fidelity may reflect poor planning, it may also represent needed adjustments to the original plan based on new information.

Rigorous evaluation of transfer efforts is key to developing an evidence-base for best practices in transfer of CDP PPPs. However, only half of formally mandated regional-level public health organizations, 19% of NGOs and 11% of GROUPED organizations reported heavy engagement in evaluating transfer efforts, suggesting that training and funding for evaluation may be needed.

Formally mandated regional-level public health organizations reported average TRANSFER scores 3.3 points higher than NGO/grouped organizations. If these differences reflect greater success in transferring PPPs, then the transfer correlates identified herein may represent useful targets for interventions to improve transfer. Training programs that improve skills to plan and undertake transfer may be warranted. Increasing funding from external sources to support comprehensive transfer may be warranted since linkage with users [58], tailoring PPPs to multiple users with sometimes competing needs [58] and enhancing user capacity to facilitate PPP adoption and implementation [59] can require significant resources. External funding may provide the necessary ‘slack’ that in-house operating budgets cannot. However, the application process for funding may disadvantage some organizations, particularly those with fewer professional staff and lower levels of administrative capacity. Incorporating sufficient dedicated funds for comprehensive transfer is an important part of resource organizational capacity. Finally, shifts in organizational attitudes toward the process of collaboration and user-
centeredness necessitate internal mechanisms and structures that promote and ingrain two-way exchanges [7, 60] and address territorial issues and lack of trust that can exist between the diverse set of disciplines that comprise the public health system and its stakeholders [61]. Such shifts in attitude also require funding formulas supportive of collaborative approaches between resource and user entities [58] (i.e. longer terms of funding can provide the stability to make these collaborations worth the effort to establish and maintain).

Limitations
Data were collected from a single respondent within each organization, albeit an individual carefully selected as most knowledgeable about transfer. Data provided by a single person may not reliably reflect the inherent complexity of organizations. Ideally, organizational-level constructs should be assessed using objective measures, but key informant-report is the most common method of data collection in organizational research. While face and content validity and internal reliability of our measures was assessed, inter-rater reliability could not be studied due to the small number of organizations with two individuals knowledgeable about transfer \((n = 17)\) and the fact that 64% of respondent pairs did not cite the same ‘reference PPP’. Criterion-related validity could not be examined because there are no ‘gold standard’ measures of the indicators of interest. Longitudinal data are needed to investigate if the associations observed in this study might be causal. Finally, generalizability of results beyond Canada may be limited.

Conclusions
Underutilization of best practices in CDP represents missed opportunities to promote healthy living and prevent chronic disease. Better understanding of the transfer process for CDP PPP by resource organizations is critical for public health policy. Based on a conceptual model of transfer and using data from the first national survey of transfer practices in a public health system, we (i) developed psychometrically sound measures of transfer practices; (ii) described the frequency of engagement/levels of endorsement in these practices and (iii) identified correlates of the transfer process undertaken by resource organizations engaged in primary CDP. This work complements the existing utilization literature, which focuses on user organizations by providing a more upstream, resource organization perspective. In addition, it extends the KT literature by developing a more highly articulated understanding of the process through which organizations that develop innovations (whether or not research-derived) may work to promote that these are adopted and applied.

Although we cannot comment on the effectiveness of the transfer practices investigated, there appears to be room for improvement in the comprehensiveness of transfer. Educational, funding and infrastructure-related interventions may be needed to help organizations become more comprehensive in their transfer efforts. This may help ensure that once they become available, evidence-based CDP PPPs may spread quickly and efficiently through public health systems, increasing capacity to respond to the growing burden of chronic disease.

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Conflict of interest statement

None declared.

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