When evaluating the quality of a clinical practice guideline, the presence of an appropriate dissemination and implementation (D&I) strategy is critical (1). However, there is a paucity of evidence to guide strategies for the successful dissemination and implementation of diabetes clinical practice guidelines. This report describes the innovative dissemination and implementation strategies created and promoted by the Canadian Diabetes Association (CDA) 2008 Clinical Practice Guidelines (CPGs) Dissemination and Implementation Committee.

The Canadian Diabetes Association, under the auspices of its Clinical and Scientific Section (C&SS; a group of healthcare professional volunteers) creates and updates its evidence-based clinical practice guidelines every 5 years. These CPGs have, until now, been disseminated at a single time, every 5 years, primarily by mailing out the CPG document shortly after the guidelines have been completed and published. For the 2008 CPGs the CDA undertook a different, novel strategy. This report summarizes that strategy - its rationale, methods, results, and, most importantly, lessons learned - with the aspiration that this information will prove useful for other, future clinical practice guidelines committees, be it for diabetes or other health issues, whether domestic or abroad.

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Timely Striking of a Dissemination and Implementation Committee

In order to make the CPGs maximally effective, the CDA struck a dissemination and implementation committee tasked with the exclusive role of developing and implementing a strategy to bring about meaningful behaviour change based on state-of-the-art diabetes care as espoused by the 2008 Clinical Practice Guidelines. This committee was struck well in advance of the actual launch of the CPGs to allow for sufficient time to:

a) Recruit individuals to the committee.

b) Develop a strategy that could be launched at the time of the CPG launch rather than after the fact to benefit from the attention - and interest - the CPGs would garner at the time of their launch.

c) Distil the CPGs to identify those key elements which the CPG D&I committee would promote. (It was felt to be neither practical nor advisable for all elements of a highly detailed and lengthy set of guidelines to be actively promoted.)

Determining the Composition of the Dissemination and Implementation Committee

The chair of the D&I committee was appointed in 2006; that is, two years in advance of the planned launch of the 2008 CPGs. Potential committee members were then selected based on the following criteria:

a) Geographical diversity. Given Canada’s geographic enormity and regionally heterogeneous cultural, social, political, financial, health-funded, ethnic, linguistic diversity, it was felt that truly national representation would be necessary. This would help ensure tools and strategies were being developed that would be of value nation-wide.

b) Representation of a wide variety of health care disciplines. The CPGs are used by a wide spectrum of health care providers including primary care and specialist physicians, diabetes nurse educators, dietitians, pharmacists, foot care professionals, and other allied health care providers. As such, it was felt imperative to have representatives from these various groups on the D&I committee to not only receive their input and insights from the perspective of their particular health care discipline, but also to then have them reach out to practitioners in their field with the created materials.

c) Inclusion of people living with diabetes (PLWD). Although the CDA CPGs are aimed primarily toward a health care provider readership, it was felt that successful implementation of the CPGs would be more likely if people living with diabetes were also targeted to receive key messages from the CPGs. To help with this process, and also to provide input by virtue of their own personal experiences, people living with diabetes were invited to serve on the D&I committee.
d) *Inclusion of content experts on the subject of dissemination and implementation of clinical practice guidelines.* In order to create materials and strategies that were most in keeping with known best practices, content experts on the subject of dissemination and implementation of clinical practice guidelines were invited to serve on the D&I committee.

e) *Inclusion of researchers.* Researchers were invited to serve on the D&I committee to provide both expertise based on the known evidence-based medicine available for dissemination and implementation strategies, and, given the paucity of evidence-based medicine on this subject, to create studies measuring outcomes of our D&I approaches.

f) *CDA staff representation.* The CDA CPGs are created for the CDA by professional volunteers (from the CDA Clinical and Scientific Section and from the CDA Diabetes Educators Section) working in conjunction with CDA staff who provide robust logistical, technical, and operational support. It was implicit that for the CPGs to be successfully disseminated and implemented, ongoing support by CDA staff would be critical. CDA staff would play roles in helping develop dissemination and implementation ideas and transforming them into workable materials and strategies.

**Creating the Dissemination & Implementation Committee and Subcommittees**
Invitations to join the D&I committee were made at CDA meetings, through word-of-mouth, electronic and other forms of solicitation. To maximize the utility of the various skillsets of the D&I committee members, health care disciplines subcommittees were then formed based on health care discipline and, in the case of people living with diabetes, by virtue of having this condition. The health care disciplines subcommittees (chair in parentheses) were:

- Primary Care Physicians (Dr. Maureen Clement)
- Endocrinologists/Internists (Dr. Alice Cheng)
- Pediatricians (Dr. Margaret Lawson)
- Exercise Specialists (Dr. Paul Oh)
- Diabetes Nurse Educators (Marian Barltrop RN CDE)
- Dietitians (Jennifer Snyder PDt MSc)
- Mental Health Professionals (Jeff Packer SW)
- Pharmacists (Karen McDermaid BSP CDE)
- Foot Care Specialists (Dr. Axel Rohrmann)
- Aboriginal Peoples Diabetes Health Care Experts (Dr. Onil Bhattacharyya)
- People Living With Diabetes (Nel Peach, Todd Janes)
- Researchers (Dr. Baiju Shah)

An executive committee was also struck, this committee being comprised of the head of the D&I committee (Dr. Ian Blumer), the chair of the CPG committee (Dr. Vincent Woo), an endocrinologist with both university-based and community-based practices (Dr. Alice Cheng), a family physician diabetes expert (Dr. Maureen Clement), and the CDA staff lead.

The steering committee was comprised of the chairs of the health care disciplines subcommittees and the members of the executive committee.
Determining Elements of the CDA CPGs to Promote
The CDA 2008 CPGs are approximately 200 pages long, cover many dozens of topics, and contain approximately 200 recommendations. Attempting to disseminate and implement all these numerous components of the CPGs was considered to be logistically impossible, impractical, and, moreover, considering the vast array of messages, was thought highly unlikely to lead to meaningful behaviour change. The executive committee, therefore, elected to restrict dissemination and implementation efforts to certain select areas. It was ultimately decided that six key topics would be promoted, each topic being rolled out at six monthly intervals then actively promoted for a six month duration. It was felt that promoting a topic for less than six months would not allow for sufficient impact, and promoting a topic for more than six months might lead to “message fatigue” on the part of the target audience.

Each health care disciplines subcommittee was then charged with determining which components of the 2008 CPGs their subcommittee would recommend be disseminated. The executive committee stipulated that any proposed topic must:

1. Be practical for the CDA in and of itself to promote. (Thus, topics that would require broad societal change or vast financial or personnel resources were not to be considered.)
2. Be unlikely to have other champions who, independent of the CDA, would likely widely promote these messages.
3. Have broad interest, value, and importance to a large number of health care providers and people living with diabetes.
4. Have the capacity, ideally, to lend itself to measurable outcomes so as to allow evidence-based research to be employed to determine the impact of any D&I efforts.

Each health care disciplines subcommittee held internal discussions (via electronic discussion boards, other forms of electronic communication, and by teleconference) to come to a consensus as to which topics they would recommend be promoted. The steering committee then met in May 2007 where each health care disciplines subcommittee chair presented their subcommittee’s recommendations. At the conclusion of the presentations the steering committee members held a closed vote and the six topics garnering the most votes were selected for dissemination. These six topics were then designated as “themes.”

The themes (discussed in detail below) that were chosen, listed by the order by which their subsequent dissemination was planned, were:

1. Cardiovascular Risk Reduction
2. Organization of Care
3. Protecting Mothers and Children
4. Exercise Promotion
5. Foot Care
6. Promoting Awareness of Diabetes Education

With the theme topics having been established, new health care theme subcommittees were then created; one for each theme. These subcommittees were led by content experts on the theme’s
subject, and had representatives from a variety of related health care disciplines as well as people living with diabetes.

**Moving Forward With Themes**
Conventional CPG D&I strategies, be they for diabetes or other health conditions, are to release the entire guideline document at once with the simultaneous launch of some clinical tools and public awareness initiatives. The CDA D&I executive committee felt, however, that sequentially launching the six CDA CPG themes, each theme being promoted for six months, would be more effective as this would allow for:

1. Delivery of a single key message at a time (thereby not diluting the message).
2. Dedicated resource allocation to a single initiative rather than taxing personnel with multiple messages developed and delivered concurrently.
3. The target audience receiving smaller packets of information which would be more digestible than would be a large “information dump.”
4. Keeping the 2008 CPGs in the spotlight far longer than if all the themes were disseminated for one brief time.
5. More robust and sustainable funding as monies could be allocated from sequential CDA budgets, or external sources, rather than coming from a single year’s budget.

**Setting Goals and Strategies**
The D&I committee set as an over-riding principle that each theme would have two parallel components: one component geared toward health care providers and one geared toward people living with diabetes (or, in the case of the “Protecting Mothers and Children” theme, geared toward women who have had gestational diabetes, and parents/caregivers of children respectively). It was felt that this would create synergy between the two target audiences. In particular, the aspiration was that members of the target audience, having become aware of theme information, would initiate pertinent discussions at the time of visits to their health care providers.

A second principle was that in addition to conventionally distributed, written materials, tools would be developed and employed using new media or other innovative distribution channels.

A third principle was that the written materials would be made available in both English and French.

At the time of the launch of the first theme, a folder was distributed to 50,000 Canadian health care providers (HCPs) including primary care providers (PCPs), endocrinologists, internists, diabetes nurse educators, dietitians, and other select HCPs. With this folder was a covering letter explaining the purpose of the folder, a letter explaining the D&I strategy, and materials for the first theme. It was hoped that having a folder would not only allow all related materials to be kept in one place, but also would serve as a reminder to the HCP, whenever they placed new materials in the folder, of the other information they’d previously received.

Materials subsequently sent out to HCPs at the time of each theme’s launch included:

- A covering letter or “postcard” introducing the theme topic under discussion.
A two to four page summary of the relevant sections of the CPGs. This document discussed key elements from the guidelines, highlighted pertinent recommendations, and provided tips on how to employ the recommendations.

Materials for distribution by the HCP to their patients living with diabetes.

Also, for each theme:

- Related articles appeared in CDA lay and professional publications, mass media publications, and news releases.
- Materials were hosted on the CDA website (www.diabetes.ca).
- CDA Regional Leadership Centers were briefed and encouraged to use materials in local education events.
- Written material reprints were made available for order from the CDA.
- Presentations were made at the CDA professional conference/annual meetings.
- Partnerships were established with other, allied health care organizations including the Canadian Pharmacists Association, the Canadian Nurses Association, the Public Health Agency of Canada, and the Royal College of Physicians and Surgeons of Canada.

The Six Themes

1. Cardiovascular Risk Reduction (Subcommittee Chairs: Dr. Alice Cheng, Dr. Clarissa Wallace)

Goal: To reduce cardiovascular events in people living with diabetes.

Tools For People Living With Diabetes:

a. A video was produced and placed online. The video shows the interaction between a physician and a person living with diabetes as they discuss the individual’s cardiovascular (CV) risk factors and what options are available to ameliorate the person’s CV risk.

b. A tear-off pad was printed and distributed to HCPs for them, in turn, to give to their patients living with diabetes to make them aware of the association between diabetes and CV risk; and what measures can be undertaken to reduce this risk. This was, essentially, a lay equivalent version of the HCP tool (see below). The goal of this tool was to engender conversation on the topic at the time of a health care visit.

Tools For Health Care Providers:

a. A document discussing CV risk and diabetes was created to help HCPs, and in particular, primary care providers, determine which of their patients living with diabetes were at increased cardiovascular risk and what measures were available and should be employed to reduce cardiovascular risk in high risk patients.

b. A laminated card that illustrated an algorithmic approach to determining CV risk for a given individual and what therapeutic options could be employed to reduce that risk.
2. Organization of Care (Subcommittee Chair: Dr. Maureen Clement)

Goal: To improve the provision of diabetes health care services during visits to primary care providers.

Tool For People Living With Diabetes:
   a. A tear-off pad was printed and distributed to HCPs for them, in turn, to give to their patients living with diabetes to make them aware of what is a diabetes-focused visit to a primary care physician, what to expect during the visit, and how best to prepare for the visit in order to maximize the visit’s utility.

Tools For Health Care Providers:
   a. A document discussing the components of a diabetes-focused visit to PCPs, what topics should be covered during the visit, and how to organize the provision of diabetes care efficiently and effectively.
   c. A copy of the CDA anti-hyperglycemic treatment algorithm.
   d. A video was produced and placed online. The video shows a real-time, 8 minute, simulated, patient-physician diabetes-focused visit and illustrates the importance of a systematic, guideline-driven approach to diabetes care. Eight minutes was selected to demonstrate that even in the typically limited time of a patient encounter in primary care an organized approach can help ensure all the key elements of diabetes care are addressed.

3. Protecting Mothers and Children (Subcommittee Chairs: Jennifer Snyder PDt MSc, Dr. Margaret Lawson)

Goal For Women Who Have Previously Had Gestational Diabetes: To increase screening rates for type 2 diabetes amongst women who have previously had gestational diabetes.


Tools For Women Who Have Previously Had Gestational Diabetes (GDM):
   a. A tear-off pad was printed and distributed to HCPs for them, in turn, to give to their patients who have or have had GDM to make them aware of their increased risk of developing type 2 diabetes and the need to be screened for this post-partum, before future pregnancies, and routinely thereafter.
   b. An online document was posted on the CDA website for women with GDM to help them learn about healthy eating and activity choices to be followed both whilst pregnant and when postpartum.

Tool For Parents Of - And Caregivers For - Children:
a. Mass media were solicited and, by virtue of articles, public service announcements, and distribution of pads with tear off sheets, people were made aware of symptoms of new onset diabetes in children and youth, and what to do in the event these symptoms are observed.

Tools For Health Care Providers:

a. A document was created discussing the low rates of type 2 diabetes screening amongst women who have had GDM and the consequences of undiagnosed diabetes. It stressed the ways in which the many different HCPs who come in contact with women who have had GDM can be involved in ensuring screening for type 2 diabetes is performed.

b. A document was created discussing the importance of immediate testing for – and treatment of - type 1 diabetes in children with symptoms of hyperglycemia.

4. Promoting Exercise (Subcommittee Chairs: Dr. Paul Oh, Dr. Jonathon Fowles, Dr. Chris Shields)

Goal: To increase the number of people living with diabetes participating in regular exercise.

Tool For People Living With Diabetes:

a. An exercise prescription was printed and distributed to HCPs to be completed and given to patients in much the same way as would a pharmaceutical prescription. The exercise prescription contained instructions about how to initiate, maintain, and increase exercise intensity/amount.

Tools For Health Care Providers:

a. The exercise prescription (see immediately above) provided instructions to assist HCPs in providing individually tailored exercise prescriptions to their patients.

b. A partnership was struck with Acadia University to utilize their exercise teaching materials in workshops hosted by exercise specialists for diabetes educators where the theory and evidence for an exercise prescription would be taught. These learnings would then be used by diabetes educators as part of their on-going diabetes teaching to PLWD.

The remaining two themes, Foot Care (whose aim is to decrease the frequency of lower limb amputations in people living with diabetes; Subcommittee Chair: Dr. Alex Rohrmann) and Diabetes Education (whose aim is to increase the numbers of people aware of – and availing themselves of - diabetes education services; Subcommittee Chair: Lori Berard RN CDE) remain under development at the time of this writing.

Measuring Success
In order to both add to the sparse literature on evidence-based, proven-successful strategies for diabetes clinical guideline dissemination and implementation, and also to try to determine the “return on investment” of the considerable D&I financial expenditures, the intent was to have an evaluative research project undertaken for each theme. As it evolved, however, funding was ultimately secured only for research projects evaluating one theme (Cardiovascular Risk Reduction). Led by Dr. Baiju Shah, several evaluative measures were employed to determine if the distribution of that theme’s materials to primary care physicians led to effective behaviour change. At the time of this writing these results are not yet published.

One indirect measure of the success of the dissemination and implementation strategies has been the demand for additional D&I materials requested by health care providers; to either replenish their exhausted supplies or because they had not been part of the initial distribution and had become aware of the materials from third parties. To this time, over 16,000 such additional materials have been distributed to HCPs.

An additional, less robust, but still helpful surrogate marker addressing the impact of the dissemination and implementation strategies is the frequency of unique visits to the relevant CDA host web pages. This metric reveals approximately five thousand unique page views from June 2009 to June 2011 with, on average, two and one half minutes spent on each viewed page.

Financial Considerations
As might be anticipated, an undertaking this broad has incurred significant costs. Some of these costs (such as printing, mailing, web development, and so forth) are easier to quantify than others such as CDA staff hours specifically allocated to this endeavor. By far the greatest theoretical “cost” has been the untold hours on this project volunteered by the approximately one hundred members of the D&I committee. Suffice to say, had these 100 dedicated individuals been engaged in financially remunerative efforts rather than volunteer efforts the costs for their time would have totaled in the millions of dollars.

Most funding was provided from the CDA global budget. A small percent of funding was provided, at arm’s length, by corporate sponsorship. The CDA allocated approximately $150,000 (not including staffing hours) toward each theme. As we were unable to perform research on the impact of the majority of themes – and, as the impact of our endeavors may well not be evident for many years (for example, a reduction in cardiovascular events resultant from behaviour change arising from use of the cardiovascular tools) we were unable to perform cost-effective analyses.

Challenges
A project this large, with so many participants and components, and with an extended timeframe, has had significant challenges; some expected, some unexpected.

1. Corporate-Volunteer Partnership
The Canadian Diabetes Association is a not-for-profit, charitable organization staffed by hundreds of full-time employees whose mission is “to lead the fight against diabetes by helping people with diabetes live healthy lives while we work to find a cure.” The Canadian Diabetes
Association Clinical and Scientific Section (C&SS) is a small group of professional volunteers one of whose tasks is to create the CDA Clinical Practice Guidelines and, working in partnership with the CDA staff and members of the Diabetes Educators Section, to disseminate and implement these guidelines.

Both the CDA and the C&SS have numerous roles, responsibilities, and priorities. The CDA and C&SS priorities do not, however, necessarily or always align. Indeed, the relative ranking of importance of CPG dissemination and implementation of the 2008 CPGs has differed at times due, in significant part, to changes in CDA leadership over the multiyear mandate of the D&I process. This challenge was rendered especially salient given the recent fiscal challenges that most all organizations – especially charitable institutions - have confronted.

Frequent turnover of the principal CDA staff member assigned to work with the D&I committee added further, at times great, challenges. Four different CDA staff members were assigned this role in the first three years of the D&I committee’s mandate. With each change, the D&I process became disrupted as the new staff member became familiar with the D&I principles and processes.

2. Funding
The CDA, as a charitable organization, is dependent on fund-raising in order to finance itself. The amount of funds raised varies year-to-year and, as such, the CDA must establish and review financial priorities on an ongoing basis. Corporate fiscal priorities to support annual plans do not necessarily align with the priorities of professional volunteers. Additionally, whether or not to seek external funding from for-profit corporations can be a contentious issue as is how such funds, if raised would be used: either as part of a global budget or targeted toward specific projects such as D&I. Given these realities, the D&I process did not have fixed funding and as a result the planning of strategies and initiatives has been challenging. Indeed, many proposed dissemination strategies, particularly broad public awareness campaigns, had to be scaled back or eliminated due to financial constraints.

3. Creating – and Maintaining – an Effective Dissemination and Implementation Committee
Creating a multidisciplinary, geographically diverse and representative volunteer committee proved surprisingly easy as health care professionals and people living with diabetes readily volunteered their time and efforts. Solicitations to specific individuals to join the committee were nearly uniformly immediately and readily accepted. Despite the huge efforts and both short- and long-term time commitments required of many volunteer members (especially members of the executive committee and subcommittee chairs), D&I committee membership turnover was limited.

4. Internal Communication Methods
Determining – and re-evaluating - the optimal methods for internal communication within the D&I committee was assessed on an ongoing basis. Ultimately the most cost-effective process was use of regular email communication and teleconferences. Early in the course of the
committee’s work, a secure, password-protected, online discussion board was set up but proved to be little-used and was eventually taken down.

**Recommendations**

Based on the experiences learned from the dissemination and implementation of the Canadian Diabetes Association 2008 Clinical Practice Guidelines, the following recommendations are made to those individuals and organizations who in the future will be charged with the development, and dissemination and implementation of their own clinical practice guidelines:

- People tasked with creating clinical practice guidelines should consider, *as they create these CPGs*, how they envision the guidelines will be disseminated and implemented, how they would define measures of success, and how success will be measured.

- Create a dissemination and implementation committee at the outset of – or even before - the creation of the CPGs rather than waiting until they have been completed and are ready for dissemination. Populate the committee with dedicated, expert individuals who are passionate about the guideline(s) being promoted. If the D&I committee is large, create subcommittees led by chairs that are not only content experts and thought leaders, but also skilled in engaging and retaining volunteers to assist them. Do not be surprised if many of the people creating the CPGs do not volunteer to then assist with their dissemination and implementation.

- Plan research projects as early as possible in the D&I process with the goal of deploying them coincident with the launch of the CPGs as initiating them only *after* the CPGs have been distributed makes measuring behaviour change directly attributable to the CPGs more problematic.

- Consider whether or not the CPGs are sufficiently brief and select that they can be disseminated all at once, or if they are so broad and voluminous that they should be disseminated sequentially to achieve the maximal likelihood of gaining the target audience’s attention and successfully changing behaviour.

- Seek and wherever possible secure a funding commitment for not only the creation of the CPGs, but for their subsequent dissemination and implementation and, ideally, their evaluation.

- CPGs created by professional volunteers *for* an organization are ultimately “owned” by that organization, not the volunteers. As such, creators of CPGs should be prepared for the possibility that there may well be conflicting ideas and priorities between the organization and the professional volunteers.

- Be prepared for budget shortfalls by having a nimble, flexible and scaled series of contingency plans in the event of financial challenges.

- Novel dissemination/implementation strategies should be sought and utilized; simply mailing out or posting CPGs on-line is highly unlikely to be sufficient to result in meaningful behaviour change.

**Conclusions**

The Canadian Diabetes Association’s 2008 Clinical Practice Guidelines dissemination and implementation process has been an enormous undertaking employing the efforts of well over one hundred people from coast to coast to coast. Many notable successes have been achieved including the:
• Establishment of a pioneering partnership between a large health care charity and a diverse team of professional and lay volunteers jointly tasked with disseminating and implementing clinical practice guidelines.
• Creation of a unique, sequentially launched, theme-based, inter-disciplinary, multiyear system of dissemination and implementation of clinical practice guidelines.
• Creation and deployment of an innovative parallel strategy of clinical practice guidelines dissemination and implementation – one geared toward health care providers and one geared toward people living with diabetes.

Whether or not the strategies employed by the Dissemination and Implementation Committee will lead to the ultimate measure of success, improved health care outcomes, may only become known with the passage of time.

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**Acknowledgements**

It has been a challenging and at times daunting, but ultimately hugely rewarding role to have served as chair of the Canadian Diabetes Association 2008 Clinical Practice Guidelines Dissemination and Implementation Committee.

There are a huge number of people that have assisted me in this journey; far too many, in fact, to acknowledge them all individually here. To all those people who have worked – directly or indirectly – with me; a heartfelt thanks. I must, however, mention a few people whose efforts and contributions deserve special recognition. Carolyn Gall Casey has been the prime CDA staff member charged with working with the D&I committee for the past several years. Without her insightful, thoughtful, and diligent help the D&I process would have not only floundered, it would have disintegrated. The tireless efforts and brilliant guidance provided by Dr. Maureen Clement and Dr. Alice Cheng deserve special recognition – and thanks. Ellen Malcolmson, the previous CDA Chief Executive Officer (CEO) deserves recognition as establishing the dissemination and implementation of the CPGs as a corporate priority. Her successor, the current CDA CEO, Michel Cloutier, deserves recognition for continuing to make this a corporate priority. Lastly I would like to extend my appreciation to those individuals who kindly reviewed this manuscript and provided such wonderful, constructive feedback.

**Reference**