McMaster University | HEALTH FORUM

Rapid Evidence Profile #48: Implementing diabetes prevention and risk management programs

(Last updated 3 May 2023)

Context

- Despite diabetes-prevention programs being a very well researched areas, there is relatively less documented about their implementation in real-world contexts and the different approaches that can be used to ensure uptake and retention.
- Further, many of the existing programs have not been adapted to meet the needs of different racial, ethnic, or cultural groups, at times resulting in limited acceptance of the intervention and sub-optimal outcomes.

Questions

- What consumer-, provider-, organizational- and system-targeted strategies can be used to support the implementation of diabetes prevention/risk factor reduction programs?
- What additional factors/strategies must be considered when developing diabetes prevention and risk-management strategies for equity-deserving populations who have higher rates of diabetes than do people in the general population (i.e., Black, Indigenous, South Asian, etc.)?

High-level summary of key findings

- We identified 21 highly relevant evidence syntheses that have been published since 2017.
- Most of the literature focused on patient-targeted implementation strategies including both recruitment strategies and adjustments to programs that led to high rates of retention.
- In general, the literature found that programs with greater intensity and that used multiple strategies to convey information yielded better prevention outcomes.
- With respect to approaches to adjust diabetes-prevention programs for equity deserving populations, the literature noted that adjustments need to be made in relation to many different equity considerations to be successful (i.e., how care is provided, by whom it is provided, where it is provided and with what supports).
- Across each of these domains, the literature focused on approaches that made diabetes prevention programs and risk-management strategies more accessible (e.g., by providing programs in different languages, using ethnically matched providers, delivering care in places where target populations visit regularly, and providing supports such as transportation, parking, or childcare).
- It should be noted that only one of the 21 included evidence syntheses focused specifically on a population in Canada (Indigenous peoples living in Canada) and, as a result, the high-level adaptations and strategies highlighted in this profile could be combined with local evidence about the preferences of target equity-deserving populations.

Framework to organize what we looked for

- Implementation strategies
  - Patient-targeted strategies
  - Provider-targeted strategies
  - Organizational-targeted strategies
  - System-targeted strategies
- Equity-oriented strategies
  - Changes to financial arrangements
    - Adjusting organizational funding
    - Adjusting provider remuneration
    - Incentivizing consumers
  - Changes to delivery arrangements
    - Adjusting how care is provided
    - Adjusting by whom care is provided
    - Adjusting where care is provided
    - Adjusting with what supports care is provided
- Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework
  - Place of residence
  - Race/ethnicity/culture/language
  - Occupation
  - Gender/sex
  - Religion
  - Education
  - Socio-economic status
  - Social capital
  - (plus) Personal characteristics associated with discrimination and/or exclusion (such as age, disability), features of relationships (e.g., young caregivers) and time dependant relationships (e.g., recently discharged from hospital, released from prison)

Box 1: Our approach

We identified evidence syntheses addressing the question by searching: 1) Health Systems Evidence; 2) Health Evidence and 3) PubMed. All searches were conducted on 01 May 2023. The search strategies used are included in Appendix 1. In reviewing these sources for relevant evidence syntheses, we included full systematic reviews, review-derived products such as overviews of systematic reviews, and rapid reviews.

We appraised the methodological quality of full systematic reviews and rapid reviews that were deemed to be highly relevant using AMSTAR. Note that quality appraisal scores for rapid reviews are often lower because of the methodological shortcuts that need to be taken to accommodate compressed timeframes. AMSTAR rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems or to broader social systems.

This rapid evidence profile was prepared in the equivalent of three days of a 'full-court press' by all involved staff.

What we found

We identified 24 evidence syntheses relevant to the question, of which we deemed 21 to be highly relevant. Due to time constraints in producing this rapid-evidence profile, we focused on evidence syntheses where the literature search was completed after 2017. We made an exception for two evidence syntheses that focused specifically on behavioural and implementation considerations for diabetes prevention programs. We also excluded syntheses related to gestational diabetes as these likely require different or additional strategies.

We outline in narrative form below our key findings related to the questions from highly relevant evidence documents. A detailed summary of our methods is provided in Appendix 1, the full list of included evidence documents (including those deemed of medium and low relevance) in Appendix 2, and hyperlinks for documents excluded at the final stage of reviewing in Appendix 3.

Key findings from highly relevant evidence sources

Key findings related to implementation strategies

The literature focused largely on patient-targeted and provider-targeted implementation strategies, with the majority on approaches to deliver diabetes prevention that were particularly effective or resulted in high-retention. We identified one organizational-targeted strategy and no system-targeted strategies.

Patient-targeted strategies

With respect to patient-targeted strategies, two evidence syntheses identified recruitment approaches for diabetes prevention programs with the highest uptake, including the use of invitation letters/ mail flyers, diabetes assessment campaigns, presentations and bulletins, or referral from medical records (1, 2).

Similarly, evidence syntheses identified the following approaches as contributing to high-retention rates:

- providing manageable amounts of information so as not to overwhelm individuals (1)
- using goal setting for both process goals (e.g., participating in physical activity twice a week) and outcome goals (e.g., weight loss) (1)
- providing clear instructions about how to perform a new behaviour (1)
- providing multiple sessions that reinforce messages (though lower intensity strategies may still be useful in resource constrained settings) (1, 2, 3)
- using material to reinforce verbal advice (1)
- using vicarious or observational learning strategies, particularly when tackling nutrition-related topics (1)
- providing structured programs and in some cases direct supervision for strategies related to physical activity (1)
- considering the use of digital logs for self-management and self-monitoring that may allow for coaches to comment or provide support (1, 2, 3)
- providing financial incentives or small prizes to encourage participation (though in some syntheses this was thought to undermine clinical objectives) (1)
- including spouses, family members, or other social supports who can reinforce new behaviours (1).

Provider-targeted strategies

In addition to the patient-oriented strategies, one evidence synthesis highlighted three provider-targeted strategies that supported improved implementation of primary prevention interventions, which include:

- training in a biopsychosocial model as opposed to medical model
- training in risk communication
- including alarms and reminders for assessment within patient EHRs (1)

Organizational-targeted strategies

One evidence synthesis included an organizational-targeted strategy which focused on implementing primary prevention programs in primary care to ensure the practice provides clear roles to staff and ensures the availability of providers (e.g., avoiding over scheduling or tight appointment times).

Key findings related to equity-oriented strategies

In general, evidence syntheses found that adjustments need to be made in relation to many different equity considerations to be successful. While one evidence synthesis found that adjustments to the location of the intervention and type of facilitator were found to be the most effective approaches for developing diabetes-prevention strategies for equity-deserving populations, another noted that who delivered the intervention had little effect on outcomes.

The literature focused largely on changes to delivery arrangements, though two evidence syntheses noted how incentivizing consumers can help reach select populations, particularly in offsetting costs associated with behaviour changes (e.g., equipment for participating in physical activity, travelling to the location of the program, purchasing healthy food alternatives) (1, 2).

Changes to delivery arrangements for equity-deserving populations included adjustments to how care is delivered, by whom care is delivered, where care is delivered and with what supports.

Evidence syntheses identified the following adjustments for how care is provided:

- assessing population preferences prior to setting the number or intensity of program sessions (1)
- encouraging provider training in cultural competencies and cultural differences in diabetes prevention across ethnicities (1)
- translating materials as well as providing education and other activities in other languages (1)
- incorporating cultural aspects within prevention programs, such as facilitating guided prayer for Indigenous Māori populations within a program, and providing an option to participate in traditional Indian dancing among other physical activities for South Asian Americans.(1, 2)

With respect to adjusting by whom care is provided, evidence syntheses identified providing diabetes prevention strategies by ethnically matched providers as being effective with a range of populations including Sikh, South East Asian, Korean, Hispanic, and African American populations including those of both immigrant and non-immigrant status.(1, 2, 3) These providers included peer leaders, administrative staff, and community health workers.

Adjustments to where care is provided focused on improving accessibility to equity-deserving populations. These included providing a telehealth option.(1) delivering diabetes prevention in churches (1, 2, 3) and other community centres that have specific community/population reach,(1, 2) or using parks and other public spaces in communities with high proportions of specific-target populations.(1)

Finally, two evidence syntheses identified the need to adjust the supports with which care is delivered to consider existing barriers. Suggested supports included offering services that improve accessibility such as free transportation, parking and childcare.(1, 2)

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Appendix 1: Methodological details

We use a standard protocol for preparing rapid evidence profiles (REP) to ensure that our approach to identifying research is as systematic and transparent as possible in the time we were given to prepare the profile.

Identifying research evidence

For this REP, we searched Health Systems Evidence, Health Evidence and PubMed using the following search terms. In Health Systems Evidence and Health Evidence, we combined key word searches for "prevention" with filters for diabetes under diseases (non-communicable) in Health Systems Evidence and under chronic condition in Health Evidence. We also applied a date limit of 2017 in both databases. In PubMed, we combined key word searches for "diabetes" AND "prevention" with filters for systematic reviews and applied a date limit of 2017.

Each source for these documents is assigned to one team member who conducts hand searches (when a source contains a smaller number of documents) or keyword searches to identify potentially relevant documents. A final inclusion assessment is performed both by the person who did the initial screening and the lead author of the rapid evidence profile, with disagreements resolved by consensus or with the input of a third reviewer on the team. The team uses a dedicated virtual channel to discuss and iteratively refine inclusion/exclusion criteria throughout the process, which provides a running list of considerations that all members can consult during the first stages of assessment.

During this process we include published, pre-print and grey literature. We do not exclude documents based on the language of a document. However, we are not able to extract key findings from documents that are written in languages other than Chinese, English, French or Spanish. We provide any documents that do not have content available in these languages in an appendix containing documents excluded at the final stages of reviewing.

Assessing relevance and quality of evidence

We assess the relevance of each included evidence document as being of high, moderate, or low relevance to the question. We then use a colour gradient to reflect high (darkest blue) to low (lightest blue) relevance.

Two reviewers independently appraise the methodological quality of systematic reviews and rapid reviews that are deemed to be highly relevant. Disagreements are resolved by consensus with a third reviewer if needed. AMSTAR rates overall methodological quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. High-quality reviews are those with scores of eight or higher out of a possible 11, medium-quality reviews are those with scores between four and seven, and low-quality reviews are those with scores less than four. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to health-system arrangements or to economic and social responses. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered 'high scores.' A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8.

Preparing the profile

Each included document is hyperlinked to its original source to facilitate easy retrieval. For all included guidelines, systematic reviews, rapid reviews, and single studies (when included), we prepare a small number of bullet points that provide a brief summary of the key findings, which are used to summarize key messages in the text. Protocols and titles/questions have their titles hyperlinked given that findings are not yet available. We then draft a summary that highlights the total number of different types of highly relevant documents identified (organized by document), as well as their key findings, date of last search (or date last updated or published), and methodological quality.

Appendix 2: Key findings from evidence documents that address the question, organized by document type, and sorted by relevance to the question

Type of document	Relevance to question	Key findings	Recency or status
Systematic review	• Implementation strategies ○ Patient targeted strategies	• Though diabetes prevention program is increasingly common, there are many places where they are not physically accessible or feasible to implement. • The review highlights components of mHealth diabetes prevention programs that contribute to behaviour change • mHealth prompts such as text messages or push notifications are used to reinforce behaviour. • The review found a lack of specificity in the included studies about what statements were included in prompts, limiting the ability to draw replicable conclusions. • The review also found underreporting in studies of key characteristics including time of day and frequency of mHealth prompts. Source (AMSTAR 3/9)	Published April 2022
	• Implementation strategies ○ Patient-targeted strategies	• The review synthesized evidence that assessed the impact of real-world diabetes prevention programs and interventions • Most interventions were adapted for number of sessions and mode of delivery (e.g., decreased number of sessions, group-based vs. one-on-one) to reduce required resources and to adapt to cultural needs; overall, the interventions were found to improve weight management • The programs and interventions were culturally modified to increase accessibility in terms of resources and location (e.g., use of well-established networks, telehealth, use of churches from which African Americans were invited to be screened or receive the intervention); however, no outcomes specific to different ethnic groups were reported • The authors indicated that effectiveness is reflected based on intensity of the intervention, proven behavioural strategies, and modified versions of the core modules of the original diabetes prevention program • Lifestyle changes to reduce weight and diabetes were reported to be generalizable; however, considerations such as available resources, healthcare delivery organisations, and cultural variations should be taken into consideration when adapting diabetes prevention programs into real-world settings Source (7/10 AMSTAR rating from McMaster Health Forum)	Literature last searched 2011

Type of document	Relevance to question	Key findings	Recency or status

	• Implementation strategies
	  ○ Patient-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	  ▪ Adjusting by whom care is provided
	  ▪ Adjusting where care is provided
	  ▪ Adjusting with what supports care is provided
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework
	  ○ Race/ethnicity/culture/language
		• The review aimed to evaluate cultural tailoring in lifestyle interventions for type 2 diabetes prevention or management for populations of Black African ancestry.
		• Most interventions were facilitated by or supported by members of the community (e.g., ethnically matched or concordant) such as peer leaders, administrative staff, community health workers, health professionals
		• Almost all interventions were in convenient locations for the participants (e.g., community centres, local churches, parks, local primary care centres)
		• Some interventions adapted educational materials for literacy, which were tailored based on diet, family, faith, and gender.
		• Some interventions included ways to increase accessibility to proper care such as free transportation, parking, and/or childcare to participants.
		• Overall, the cultural tailoring to more than one domain (i.e., combination of facilitator, location, language, messaging) resulted in improved glycemic control among the participants, with location and type of facilitator providing the most success.
		Source (5/10 AMSTAR rating from McMaster Health Forum)
			Literature last searched 2020

	• Implementation strategies
	  ○ Patient-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	  ▪ Adjusting by whom care is provided
	  ▪ Adjusting where care is provided
	  ▪ Adjusting with what supports care is provided
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework
	  ○ Race/ethnicity/culture/language
		• Community navigators were trained and supported various ethnic communities for chronic disease prevention and management, screening, and access to primary healthcare.
		• Specific to diabetes management, community navigators were at times patients with diabetes (i.e., peer navigators) or had family with a history of diabetes.
		• Community navigators received training from health professionals, and provided patients with culturally tailored education on healthy lifestyle and diabetes self-management.
		• Specific population groups included Sikh Asian, Korean, Hispanic, and African-American people with both immigrant and non-immigrant status
		Source (3/9 AMSTAR rating from McMaster Health Forum)
			Literature last searched 2015

Type of document	Relevance to question	Key findings	Recency or status

	• Implementation strategies
	  ○ Patient-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	  ▪ Adjusting with what supports care is provided
		• The primary objective of this review was to identify and synthesize evidence of the effectiveness of health-related educational interventions in adult disadvantaged populations
		• The primary outcome was health related behaviour, and the secondary outcome was a biomarker related to the health intervention.
		• The secondary objective was to summarize the characteristics of effective interventions.
		• Educational interventions were unlikely to have changed physical activity in disadvantaged populations.
		• Educational interventions had a small, pooled effect on cancer screening rates, but certainty for this evidence was very low.
		• The review found that educational interventions aimed at disadvantaged populations were less effective compared to interventions targeting other socio-economic groups.
		• This suggests that interventions that are widely promoted based on their positive effects may not be meeting the needs of those who need them the most.
		• Overall, the evidence did not demonstrate consistent, positive impacts of educational interventions on health behaviours or biomarkers in socio-economically disadvantaged populations.
		Source (9/10 AMSTAR rating)
			Literature last searched April 2022

	• Implementation strategies
	  ○ Patient-targeted strategies
	  ○ Provider-targeted strategies
	  ○ Organizational-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	  ▪ Adjusting by whom care is provided
	  ▪ Adjusting with what supports care is provided
		• The reviewed compared different dietary intervention strategies in ethnic Chinese women with gestational diabetes.
		• The review aimed to see which strategies were most effective in improving glycemic control and reducing negative pregnancy outcomes.
		• Potentially effective strategies include:
		  ○ increasing awareness and knowledge about diabetes risk factors and prevention strategies
		  ○ improving provider education and training about diabetes prevention, focusing on cultural differences
		  ○ incorporating cultural competence into prevention and management strategies to ensure that they are accessible and acceptable to diverse populations.
		Source (8/10 AMSTAR rating)
			Literature last searched June 2018

Type of document	Relevance to question	Key findings	Recency or status
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework ○ Race/ethnicity/culture/language		

	• Implementation strategies
	  ○ Patient-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	  ▪ Adjusting by whom care is provided
	  ▪ Adjusting where care is provided
	  ▪ Adjusting with what supports care is provided
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework
	  ○ Race/ethnicity/culture/language
		• The focus of this review was to examine the effectiveness of lifestyle interventions in preventing type 2 diabetes mellitus (T2DM) and whether their efficacy differs across different ethnic groups.
		• The review used the Template for Intervention Description and Replication (TIDieR) framework to examine the effects of intervention characteristics of lifestyle interventions on diabetes incidence and weight loss by ethnicity.
		• The review found that when examining lifestyle interventions in different ethnic groups using the TIDieR framework, the number of sessions was found to be associated with a greater reduction in both diabetes incidence and body weight.
		• The review also found that factors such as who delivered the intervention, how it was delivered, and whether technology was used did not have a significant impact on the incidence of diabetes or body weight.
		• This indicates that these factors could be adjusted based on specific contextual needs.
		• Short-term interventions tended to be more effective for weight loss in most ethnic groups.
		• Strategies should be developed to maintain long-term weight loss in each ethnic group.
		• The study highlights that there may be ethnic preferences for the optimal number of sessions required for diabetes prevention.
		Source (7/10 AMSTAR rating)
			Published November 2021

	• Implementation strategies
	  ○ Organizational-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
		• The focus of this review was to summarize the effects of workplace interventions that follow the US-based Diabetes Prevention Program (DPP) for weight loss, BMI, and physical activity.
		• A secondary aim of this review was to assess and describe DPP workplace interventions using the Template for Intervention Description and Replication (TIDieR) to support future implementation.
			Published February 2022

Type of document	Relevance to question	Key findings	Recency or status
	▪ Adjusting where care is provided • Adjusting with what supports care is provided	• Workplace DPP-based interventions with coaches, goal setting, structured classes, and support for reaching goals can be successful even with fewer resources and when offered in group settings • The studies included in the review showed clinically relevant improvements in weight loss, BMI, and physical activity outcomes, with moderate to low certainty of evidence. Source (6/10 AMSTAR rating)	
	• Implementation strategies ○ Patient-targeted strategies	• The review examined the use of behaviour strategies to improve the uptake and use of diabetes prevention programs. • Theoretical approaches included were Social Cognitive Theory, the Transtheoretical Model, and the Theory of Planned Behaviour. • Approaches used in the included studies were: ○ Staging of information provision and individual tailoring of the program components ○ Multiple sessions, reinforcement, specified small group size and individual or group programs. ○ Written materials to reinforce verbal advice and the use of logs for self-management and self-monitoring. ○ Shaping of behaviour using small steps, vicarious and observational learning (particularly about nutrition), identification of barriers to change, and learning to deal with relapse. ○ For physical activity, studies employed perspective approach including progressive increases in volume and frequency, structured programs, building problem solving and decisional balance, and direct supervision of exercise. • All included studies used a moderate to very large number of face-to-face contracts with research and clinical staff. • All studies also included maintenance or adherence supports either in person or by phone. • The review found that information and advice approach is not sufficient effective, and that translation and dissemination of this evidence base requires the use of intensive behavioural change strategies. Source (AMSTAR 5/10)	
	• Implementation strategies ○ Patient-targeted strategies ○ Provider-targeted strategies	• The review focuses on synthesizing what is known about barriers and facilitators to implementing primary prevention interventions in adults.	Literature last searched January 2013

Type of document	Relevance to question	Key findings	Recency or status
	○ Organizational-targeted strategies ○ System-targeted strategies • Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework ○ Race/ethnicity/culture/language ○ Socio-economic status	• The review identified factors affecting implementation according to five levels: intrapersonal factors, interpersonal processes, institutional factors, community factors and public policy. • Intrapersonal factors include their experience dealing with a given risk factor, skills and knowledge, motivation, and attitude, with those that adopt a biopsychosocial perspective having more effective implementation of primary prevention initiatives. • Interpersonal factors include the relationship with the patient and the factors that mediate it, this can be improved by having team member act as facilitators such as a practice manager. • Institutional factors include the prioritized model of care (i.e., biopsychosocial model versus medical model) as well as how the practice is organized to facilitate primary prevention activities (e.g., availability of times, clear roles) ○ Financial incentives such as management by objectives are perceived as facilitators, however in some cases they were seen to undermine clinical objectives. ○ Other facilitators are tools such as guidelines and alarms/reminders. • Community factors focused on the context where the patient-physician interaction occurs this including the cultural context, mass media, pharmaceutical industry and curriculum in the university and social resources available • Public policy factors focused on the socioeconomic and political context that affects the distribution of resources as well as the position individuals or groups hold within societies. • The primary factor affecting implementation was related to the beliefs, attitudes and motivations of professionals which may be addressed through knowledge transfer and top-down requirements of clinicians. ○ The review also notes the importance of training and university education that moves from the biomedical model the biopsychosocial model of care which can provide the necessary skills and reinforces the professionals' self-concept. • Additional approaches that can facilitate implementation include the use of assessment campaigns, training in risk communication, the use of reminders in computerized clinical histories, and mass media campaigns to inform the population of primary prevention. Source (AMSTAR 6/10)	

Type of document	Relevance to question	Key findings	Recency or status

	• Equity-oriented strategies
	  ○ Changes to financial arrangements
	  ▪ Incentivizing consumers
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided.
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-PLUS framework
	  ○ Race/ethnicity/culture/language
		• The review identified enablers and barriers to adaptions for diabetes prevention programs and Māori people.
		• Enablers included social connection (e.g., having a sense of community that supported connection and sharing of education resources), achievable changes (e.g., setting small achievable goals), cultural centres (e.g., using a family-centred approach and incorporating tangible aspects of the Te Ao Māori such as guiding prayer and Māori inspired exercises), small prizes for incentives, good coordination and ease of participation, and gender separation of exercise.
		• Reported barriers included difficulty maintaining motivation particularly over summer holiday period, lack of social support, malfunctioning or lost equipment, and a short duration of intervention.
		Source (AMSTAR rating 5/10)
			Literature last searched June 2021

	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided.
	  ▪ Adjusting by whom care is provided.
	  ▪ Adjusting where care is provided.
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework
	  ○ Race/ethnicity/culture/language
	  ○ Religion
		• The review identifies components from community-based lifestyle interventions that have been associated with positive outcomes among South Asian Americans
		• Adaptations for community-based lifestyle interventions included:
		  ○ Changing the venue to religious institutions, non-profit organizations with specific community/population reach, and local fitness facilities
		  ○ Cultural or linguistic tailoring which in some cases included using community partners or Sikh nutrition experts to create healthy recipes.
		  ○ Group exercise including providing Zumba and aerobics-based exercise as well as group melas, traditional Indian dancing, work-out videos, and group walks.
		  ○ Culturally tailored cooking activities were explored including having a South Asian Chef teach healthy cooking and have cooking competitions.
		Source (AMSTAR rating 8/10)
			Literature last searched October 2019

	• Equity-oriented strategies
	  ○ Changes to financial arrangements
	  ▪ Incentivizing consumers
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided.
		• Though the review was predominantly focused on describing the trends in diabetes among Indigenous peoples in Canada, there were discussions about barriers and facilitators to participation in diabetes prevention.
		• The review highlights a lack of trust of colonial institutions, geographic location and transportation barriers, gaps in health literacy, and cost of behaviour changes (e.g., health food, medication) as barriers to care.
			Literature last searched 2022

Type of document	Relevance to question	Key findings	Recency or status
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework ○ Race/ethnicity/culture/language	• The review identified the need for financial supports for self-management and culturally appropriate education rooted in Indigenous ways of knowing as possible facilitators. Source (AMSTAR rating 4/9)	

	• Implementation strategies
	  ○ Patient-targeted strategies
		• The review identifies recruitment strategies associated with high response rates and uptake as well as identify behaviour change elements that were predominantly group-based with high levels of retention.
		• Diabetes prevention programs with the highest uptake used the following techniques: invitation letters/mailing and flyers, presentations and bulletins, medical records and referrals, telephone calls, and newspaper advertisements, radio, and TV advertisements.
		• Programs with the highest retention rates included the following features:
		  ○ used credible sources to design the program.
		  ○ instructed participants on how to perform a behaviour.
		  ○ used goal setting, demonstrated the behavioural
		  ○ used problem-solving and social support.
		  ○ provided incentives for participation.
		  ○ techniques to reduce negative emotions, used behavioural practice/rehearsal or goal setting.
		• The review also found that programs with high levels of retention were more likely to focus on the process of behaviour change rather than the outcome (e.g., weight loss)
		Source (AMSTAR rating 7/10)
			Literature last searched October 2019

	• Equity-oriented strategies ○ Adjusting how care is provided	• The review assesses differences in the effects of lifestyle interventions for diabetes prevention between various ethnic groups. • The review found that current diabetes prevention programs focused on lifestyle changes (i.e., weight loss, increasing physical activity and improving diet) are broadly effective across all included ethnicities. • However, the review found ethnic differences in two hours glucose with significant reduction only found in the east and southeast Asian groups (e.g., people of Chinese, Thai, and Malay descent) • Similarly, for anthropometric measures, significant ethnic differences were found with a reduction in body weight for all ethnicities except those of African descent, suggesting the need for culturally tailored responses.	Literature last searched June 2020

Type of document	Relevance to question	Key findings	Recency or status
		Source (AMSTAR rating 8/11)	

	• Implementation strategies
	  ○ Patient-targeted strategies
		• The review aimed to determine which technology-driven diabetes prevention interventions were effective in producing sustainable, clinically significant weight loss.
		• The review found that digital technologies were successful at achieving weight loss in the short-term but many failed to make sustainable changes (i.e., longer than one year)
		• Interventions which used a larger number of behaviours change techniques were more effective.
		• Seven behaviour change techniques were identified in effective interventions, including:
		  ○ social support
		  ○ goal setting related to behaviours.
		  ○ goal setting related to outcomes.
		  ○ feedback on behaviors
		  ○ self-monitoring of outcomes of behaviour
		  ○ self-monitoring of behaviours
		  ○ problem solving
		• With respect to digital technologies, interventions that used many passive and interactive features were more effective and were most effective when interactive features were included, however the effectiveness of these features decreases over time.
		• The most effective passive features included activity tracking, and diet tracking, while the most effective interactive feature was online health coaching.
		• The review concluded that self-monitoring may be most effective when digital technologies are used to track behaviours and outcomes and when feedback is provided digitally by a human-coach either in person or by phone.
		• In addition, approaches to social support were most effective when they capture online, face-to-face and phone support, while social media and support features were found in relatively few effective interventions.
		Source (AMSTAR rating 5/11)
			Literature last searched September 2018

	• Implementation strategies ○ Patient-targeted strategies	• This review examines the success factors for lifestyle-focused diabetes prevention program implementation using the penetration,	Literature last searched 2015

Type of document	Relevance to question	Key findings	Recency or status
		implementation, participation, effectiveness framework for population health impact. • Programs with a high degree of contact (that are more intensive), such as those modelled on the United States Diabetes Prevention Program, have shown promise in achieving desired outcomes, particularly weight loss; however, high contact programs tend to have low participation. • Studies of programs with low or moderate frequency but longer duration have shown promise in achieving desirable outcomes. • High penetration of invitations for the population of interest does not necessarily result in high participation rates, but high penetration was associated with positive risk reduction outcomes; this suggests that scalability is important for population-level impact. • The authors suggest that scalable interventions implemented with moderate- to low-frequency contact may have the potential to achieve positive risk reduction outcomes. Source (AMSTAR rating 4/10)	

	• Implementation strategies
	  ○ Provider-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	• Adjusting by whom care is provided
		• This review examines the roles of community health workers in diabetes prevention programs and their impact on outcomes.
		• Community health worker have played varied roles in diabetes prevention programs including developing and implementing lifestyle-related activities, leading community conversations, curating resource libraries, and linking patients with other healthcare providers.
		• Community health workers who share a culture and language with the patients they serve can improve the acceptability and appropriateness of diabetes prevention programs—particularly for vulnerable and underserved communities.
		• Diabetes prevention programs targeting specific minority populations are well suited to employ community health workers from these communities.
		• One study found that community health workers are as effective as nurses at using non-invasive risk screening tools.
		• The authors suggest that guidelines for how to train and engage community health workers in diabetes prevention programs could be useful.
		Source (AMSTAR rating 6/10)
			Literature last searched 2016

Type of document	Relevance to question	Key findings	Recency or status
	• Equity-oriented strategies ○ Changes to delivery arrangements • Adjusting by whom care is provided	• A vast majority of studies examining peer support programs aimed at complex behaviour change for disease prevention and management have shown beneficial effects. • In studies where peer support has not shown beneficial effects there have been competing sources of social support, implementation challenges, lack of acceptance of peer support interventions, potential harms from unmoderated peer support, and methodological challenges. • Source (AMSTAR rating 4/10)	Literature last searched 2015

	• Implementation strategies
	  ○ Patient-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	• Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework
	  ○ Race/ethnicity/culture/language
		• This cost-effectiveness analysis examines a lifestyle intervention for type 2 diabetes prevention from the perspective of the UK National Health Service using an individual patient simulation model.
		• These types of interventions are predicted to be cost-effective at a range of implementation intensities, with the greatest benefit coming from high-intensity interventions.
		• Targeting lifestyle interventions at individuals with high hemoglobin A1C, high Finnish Diabetes Risk probability scores, or high BMI can improve cost-effectiveness.
		• Targeting South Asian individuals was found to be less cost-effective than other targeting options.
		Source (AMSTAR rating 8/11)
			Published 2018

	• Implementation strategies
	  ○ Patient-targeted strategies
	• Equity-oriented strategies
	  ○ Changes to delivery arrangements
	  ▪ Adjusting how care is provided
	  ▪ Adjusting by whom care is provided
	  ▪ Adjusting where care is provided
	• Adjusting with what supports care is provided
		• The primary aim of this systematic review was to examine the effectiveness of modifying strategies for the diabetes prevention program, with a particular emphasis on assessing how changing translational strategies and cultural adaptations affect the risk of type 2 diabetes risk reduction.
		• This systematic review included a total of 26 articles, from which, 28 interventions were identified and examined; the outcome measured included changes to body mass index (BMI) and/or weight.
		• The most frequently reported translational activities included: 1) a reduction in the number and timeline of diabetes prevention program classes as compared with the original, 16-classes over 16-week program, 2) the format of the class (e.g., group, individual, or internet-based), and 3) the implementation of additional staff (e.g., a combination of lay community workers and clinicians), while modifications to the program content was the most frequently reported cultural adaptation, as
			Published 2016

Type of document	Relevance to question	Key findings	Recency or status
		evidenced by the inclusion of culturally appropriate care for the local community and their needs • Within the examined interventions, the majority were modified through the incorporation of group sessions (n=24), a reduction in the timeline and number of classes (n=13), the implementation of health professionals (n=21), and a lack of program content modifications (n=16) • Overall, the findings of this review noted that resource-saving and locally contextualized modifications (e.g., timeline and number of classes, group sessions, and different staffing) can be implemented within the diabetes prevention program without compromising its effectiveness (i.e., the program still maintain reductions in the body mass index and weight of participants) Source (AMSTAR rating 4/10)	
	• Implementation strategies o Provider-targeted strategies o Organizational-targeted strategies • Equity-oriented strategies o Changes to delivery arrangements ▪ Adjusting with what supports care is provided	• The primary objective of this systematic review was to examine the role of partner and family supports in the management of diabetes (particularly, as it relates to therapeutic lifestyle interventions); this review included a total of 66 articles. • The findings from this paper noted that the role of spousal and family support is critical in helping individuals achieve glycemic control and reducing likelihood of diabetes-related complications by 1) enabling them to overcome barriers (financial support and encouragement), 2) improving behaviours related to diabetes control (adopting healthy diets and adhering to regimens), and 3) reducing distress, depression, and medication non-adherence. • Despite the findings from the review, the authors do recognize the scarcity of research in this field and recommend that further efforts be invested into conducting interventional studies that evaluate partner and family support roles in achieving weight loss for those with type 2 diabetes. Source (AMSTAR rating 3/10)	Published 2019
	• Implementation strategies o Provider-targeted strategies o Organizational-targeted strategies o System-targeted strategies • Equity-oriented strategies o Changes to delivery arrangements	• The focus of this article was to summarize the current body of evidence and potential use of digital health-supported lifestyle changes in the risk reduction of type 2 diabetes. • Key components of lifestyle change programs include: 1) the self-monitoring of diet, 2) coaching, 3) physical activity, 4) skills and development training, and 5) group support; digital health can	Published 2018

Type of document	Relevance to question	Key findings	Recency or status
	▪ Adjusting how care is provided ▪ Adjusting where care is provided ▪ Adjusting with what supports care is provided • Above findings in relation to one or more equity-deserving groups from PROGRESS-Plus framework ○ Race/ethnicity/culture/language ○ Socio-economic status	supplement and/or modify the existing delivery of these components (virtual offerings through videoconferencing, web-based platforms, mobile apps, text messaging, telephone calls, and telehealth) • Many comprehensive digital programs were identified including *Omada Health Inc* and *Noom*, with evidence to suggest that their asychonchrous curriculum delivery (e.g., personalized coaching via messaging and group support) coupled with digital self-monitoring tools (e.g., smart scales and wearables) were effective in improving weight loss among participants with prediabetes. • Overall, the findings from this review found that digital health-supported lifestyle programs possessed many benefits, including: 1) a high level of participant satisfaction and perception, 2) improving the reach of participant attendance and engagement (as opposed to traditional in-person programs), and 3) improved cumulative medical savings per person. • With respect to serving equity-deserving groups, the article noted that a study was conducted on a sample population of participants from a low-income and Spanish background and found elevated levels of engagement but noted logistical challenges associated with navigating the digital technology. • While the paper suggests that lifestyle change programs featuring digital health technology can help to minimize and/delay the likelihood of developing type 2 diabetes, further research is needed to examine its effectiveness in specific communities and determine how different digital health components affect specific health outcomes among participants. Source (AMSTAR rating 5/10)	

Appendix 3: Documents excluded at the final stages of reviewing

Type of document	Hyperlinked title
Primary study	Implementing lifestyle change interventions to prevent type 2 diabetes in US Medicaid Programs: Cost effectiveness, and cost, health and health-equity impact
	Dietary advice for the prevention of type 2 diabetes mellitus in adults