Received: 12 September 2022 | Revised: 12 January 2023 | Accepted: 26 January 2023

DOI: 10.1111/jphd.12569

BRIEF COMMUNICATION

Building effective public dental care programs: The critical role of implementation evaluation

Anna Durbin PhD[1,2] | **Ariel Root MSc**[3] | **Herenia P. Lawrence DDS, MSc, PhD**[4] | **Sara Werb DDS**[5] | **Stephen Abrams DDS**[6] | **Janet Durbin PhD**[2,7]

[1]MAP Centre for Urban Health Solutions, Unity Health Toronto, Toronto, Ontario, Canada

[2]Department of Psychiatry, University of Toronto, Toronto, Ontario, Canada

[3]School of Public Policy & Administration, Carleton University, Ottawa, Ontario, Canada

[4]Department of Dental Public Health, Faculty of Dentistry, University of Toronto, Toronto, Ontario, Canada

[5]Toronto Children's Dentist, Toronto, Ontario, Canada

[6]Cliffcrest Dental Office, Four Cell Consulting, Toronto, Ontario, Canada

[7]Provincial System Support Program, Centre for Addiction and Mental Health, Toronto, Ontario, Canada

Correspondence
Anna Durbin, MAP Centre for Urban Health Solutions, St. Michael's Hospital, Unity Health Toronto, 30 Bond Street, Toronto, ON M5B 1W8, Canada.
Email: anna.durbin@unityhealth.to

Abstract

There are significant income-related inequities in oral health and access to oral health care. Public dental programs generally aim to increase access to oral health care for individuals with financial barriers through government payments for appointments. Low engagement from both oral health care providers and intended patients are common challenges in delivery of public dental programs, and are impediments to program impact and outcomes. Still, these programs rarely address the systemic issues that affect the experiences of intended users. This accentuates the importance of monitoring of program delivery to refine or adapt programs to better meet needs of service providers and users. As such, specifying program goals and developing a related monitoring strategy are critical as Canada begins to implement a national public dental program. Drawing on an example of a pediatric public dental program for children from low-income families or with severe disabilities in Ontario, Canada, this article illustrates how an implementation and evaluation framework could be applied to measure implementation and impact of the national program. The RE-AIM framework measures performance across five domains: (1) Reach, (2) Effectiveness (patient level), (3) Adoption, (4) Implementation (provider, setting, and policy levels), and (5) Maintenance (all levels). Given the disparities in oral disease and access to oral health care, the results can be used most effectively to adapt programs if relevant stakeholders participate in reviewing data, investigating quality gaps, and developing improvement strategies.

KEYWORDS

dental health services, equity, implementation science, oral health, program evaluation, public health

INTRODUCTION

Evidence and clinical guidelines suggest visiting the dentist every 6 months, starting from eruption of the first tooth or at 12 months of age [1]. Routine pediatric visits typically include cleaning and a combination of fluorides and dental sealants that reduce decay and prevent nearly all cavities [2]. However, in Canada and internationally, low-income groups are less likely to have dental insurance, visit the dentist, and experience good oral health [3]. Public dental programs generally aim to increase access to oral health care for individuals with financial barriers through government payments for appointment cost. Despite this intent, low engagement from both oral health care providers and intended patient groups continue to challenge program impact and outcomes [4–10]. Moreover, reliable and consistent data to evaluate and improve upon delivery are lacking [3, 11, 12].

ORAL HEALTH AND EARLY INTERVENTION

Low or inconsistent access to oral health care can result in high rates of oral health problems, including cavities and gum disease [13]. Without early intervention, oral

problems can become severe and require otherwise preventable emergency room visits and invasive treatments, such as surgery under a general anesthetic [1, 3, 11–13]. Additionally, poor oral health can have implications for other health issues. It is linked to higher rates of systemic diseases, such as diabetes, cardiovascular diseases, lung disease, and cancers [14].

ORAL HEALTH INEQUITIES

Significant income-related inequities exist in oral health and access to oral health care [3]. Due in large part to the legacy of colonization and systemic discrimination, individuals in racialized communities are generally overrepresented in groups with low-incomes or no dental insurance, with high rates of oral health problems, and with low access to oral health care [15, 16].

CANADA'S PUBLIC DENTAL PROGRAMS

In Canada, oral health care is not part of the universal health care program although provincial and federal governments have implemented limited-scope public dental health programs. Federal government programs provide coverage for Indigenous people, sponsored refugees, federal prisoners, and veterans. Provincial programs provide coverage for adults with disabilities, older adults, and children. However, only 6% of Canadian public health expenditure is on dental care [3]. Moreover, no consensus on standards for oral health care provision exist among federal, provincial, territorial, and municipal governments to guide delivery of these programs and assess impact.

On November 17, 2022, the bill creating a public national dental-care program for low-income Canadians became law [17]. The program will initially cover children under 12 years and expand until all family members from households with incomes under $90,000 are covered. The federal budget has earmarked $5.3 billion over 5 years and then $1.7 billion annually for provision of the dental program [18]. Eligible services, remuneration rates, and performance targets have not been set.

NEED FOR IMPLEMENTATION EVALUATION

As investment in health programs alone does not translate into better health care [19], ongoing monitoring and support are critical to measure success, identify quality gaps and guide improvement, including program adaptation to better meet the needs of service providers and users [20]. To know whether Canada's national dental program is having its intended benefit, it is critical that standards of care be articulated and for implementation to be accompanied by ongoing monitoring of the program.

Internationally, many countries have accompanied their delivery of public dental programs with evaluation and performance monitoring, either by the provider or by an arm's length organization [21–31]. One example is the American CDC Healthy People 2030 initiative that sets data-driven national objectives to improve population health and well-being [32]. The program specifies performance targets in several areas of population health, including oral health. Progress toward the targets is routinely reported, and areas of underperformance are flagged to inform improvement efforts. Successes can also be indicated, and used to advocate for program sustainability or scaling.

RE-AIM IMPLEMENTATION EVALUATION FRAMEWORK

Emerging from the field of implementation science is a number of frameworks to guide implementation and evaluation, and support improved reporting on key issues related to implementation [20]. One such framework is RE-AIM, which is widely used in social and health care and public health [33–37], including public dental health [35]. RE-AIM assesses domains that are highly relevant to building effective public dental programs [33]. In addition to assessing the ***E****ffectiveness* of a program, RE-AIM examines key implementation questions including who is (and who is not) using a program (***R****each*); who is (and who is not) delivering it (***A***doption); what services are (and are not) being delivered (***I****mplementation*), and the trajectory over time (**M**aintenance). The underlying reasons for results are also examined [33]. In this article, we illustrate how the framework can guide evaluation of public dental programs by applying it to Healthy Smiles Ontario (HSO), a public pediatric dental program.

HEALTHY SMILES ONTARIO

In 2015, six public dental programs for children were amalgamated to create HSO. HSO provides access to free preventive, restorative, and emergency dental services for children and youth *17 years old and under* from low-income households. HSO services are delivered in both public and private dental clinics, with providers remunerated through salaried models (public clinics) and fee-for-service or salaried (private clinics) [38]. Authors of this article are not aware of pre-established HSO practice standards which could inform development of performance targets to measure program success. However, small-scale studies and reports have highlighted concerns regarding program delivery [39–41].

EVALUATING PUBLIC DENTAL PROGRAMS USING RE-AIM

Reach describes how well a program reaches its intended users - who accesses the program and the proportion of eligible participants they represent. In 2020, the Ontario Dental Association reported less than 50% of eligible children received HSO services [3, 41]. Access barriers identified in other settings that could affect use by children eligible for HSO include availability (e.g., clinic hours), accessibility (e.g., time and cost to travel to the clinic, care for children at home), awareness (e.g., oral health literacy, program awareness and enrolment process) and acceptability (e.g., mistrust of, or disrespect from, oral health care providers) [42–44]. Monitoring should include identification of eligible groups not accessing the program, followed by working with stakeholders to investigate root causes and possible responses [45, 46].

Examples of strategies to enhance access are employing a dental care navigator and hiring outreach workers to increase awareness and help families address barriers such as noted above [3, 8, 40, 44, 47].

Effectiveness assesses the impact of the program on patient level outcomes [33]. Regarding HSO, expected outcomes have not been clearly articulated. Additionally, there is no Canadian consensus on standards of oral health care provision [3]. Examples of indicators that could be monitored are receipt of preventive care (topical fluoride application and/or sealants), continuity of care (oral evaluation frequency), and oral health outcomes (rate and severity of cavities, root canal treatment, emergency room visits for oral pain, and day surgeries to extract decayed teeth) [48]. Again, root causes and potential responses to areas of weaker performance observed during monitoring could be investigated with program stakeholders. Root causes may include factors beyond dental care that may affect oral health (e.g., access to healthy food, home oral health practices, fluoridated water).

Adoption is the number, proportion, and representativeness of dental practices that adopt a program [33]. For HSO and other Ontario public dental programs, dentist remuneration rates in Ontario are an average of 63% lower than the Ontario Dental Association suggested fees [49]. Low remuneration is a disincentive to joining the program and providing full range of expected care for the program participants. Remuneration that is too low to cover a practice's costs of providing the service is a common problem in public dental programs [3, 39]. Monitoring could compare the characteristics of participating and non-participating practices. Follow up could explore strategies to build practice participation beyond higher reimbursement. These could include more diverse workforces, and continuing education to enhance understanding, comfort and skills of oral health care providers in treating lower income groups including those affected by systemic discrimination, and pediatric patients [6].

Implementation is the fidelity of program delivery to the intended model or practice standards [33]. Monitoring can assess the services provided and compare them to recommended practice [48]. In HSO, low reimbursement rates may be a barrier to implementation fidelity by affecting the frequency of services provision [34]. Follow-up may explore possible adaptations to delivery standards or to reimbursement.

Maintenance is the extent to which a program or policy becomes part of routine practice. Common threats are fidelity drift and de-adoption. Monitoring over time can assess whether dental practices sustain their participation in the program, program reach, quality of delivery and cost. A study of 18 Ontario dentists reported that many dentists declined to participate in the HSO program initially, or de-adopted the program [39].

STAKEHOLDERS

To build a public dental program that is acceptable to intended patients (program users), meaningful participation from cross-sectoral stakeholders (e.g., public health units, oral health care providers, dental associations, community leaders, and program users, and families) is critical from initial design stages to quality improvement design and efforts [50, 51]. Stakeholders must include individuals who are knowledgeable of the needs, culture, and history of the populations and communities that are expected to be primary users of the programs, as well deeper understandings of systems and policies from which oral health inequities arise.

CONCLUSION

Success of Canada's national healthcare program in achieving improved dental health access for low-income populations will require strategic and ongoing assessment. Integration of critical evaluable components should include ongoing performance monitoring based on an implementation science framework and consideration of the systemic issues that affect the experiences of intended users and providers. Setting performance targets may be an iterative process based on evidence and what is desired for the Canadian population.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

ORCID

Anna Durbin https://orcid.org/0000-0002-8495-1203
Stephen Abrams https://orcid.org/0000-0003-2042-7805

REFERENCES

1. Dental Care FAQs. Canadian Dental Association. http://www.cda-adc.ca/en/oral_health/faqs/dental_care_faqs.asp Accessed June 2022.
2. Prevention and treatment of dental caries with mercury-free products and minimal intervention. Geneva: World Health Organization; 2022. https://www.who.int/publications/i/item/9789240046184 Accessed June 2022.
3. Improving access to oral health care for vulnerable people living in Canada. Canadian Academy of Health Sciences. 2014 https://cahs-acss.ca/wp-content/uploads/2015/07/Access_to_Oral_Care_FINAL_REPORT_EN.pdf Accessed September 2022.
4. Blackwelder A, Shulman JD. Texas dentists' attitudes toward the dental Medicaid program. Pediatr Dent. 2007;29(1):40–6.
5. Damiano PC, Brown ER, Johnson JD, Scheetz JP. Factors affecting dentist participation in a state Medicaid program. J Dent Educ. 1990;54(11):638–43.
6. Bedos C, Loignon C, Landry A, Allison PJ, Richard L. How health professionals perceive and experience treating people on social assistance: a qualitative study among dentists in Montreal, Canada. BMC Health Serv Res. 2013;13:464.
7. Morris PJ, Freed JR, Nguyen A, Duperon DE, Freed BA, Dickmeyer J. Pediatric dentists' participation in the California Medicaid program. Pediatr Dent. 2004;26(1):79–86.
8. Binkley CJ, Garrett B, Johnson KW. Increasing dental care utilization by Medicaid-eligible children: a dental care coordinator intervention. J Public Health Dent. 2010;70(1):76–84.
9. Horst K. Barriers to Accessing Oral Health Care. A report for the Waterloo Region Oral Health Coalition. 2017 https://kdchc.org/wp-content/uploads/2018/03/Barriers-to-Accessing-Oral-Health-Care-in-Waterloo-Region.pdf Accessed September 2022.
10. Abrams SH. Did the CAHS report improving access to Oral health Care for Vulnerable People Living in Canada really address the underlying issues? Ont Dent. 2014;91(10):18–9.
11. Oral Health - More Than Just Cavities. A Report by Ontario's Chief Medical Officer of Health. Ministry of Health, Ministry of Long-Term Care. 2012 https://www.health.gov.on.ca/en/common/ministry/publications/reports/oral_health/oral_health.aspx Accessed September 2022.
12. Filling the cavities: improving the efficiency and equity of Canada's dental care system. Toronto: The C.D. Howe Institute; 2018. https://www.cdhowe.org/sites/default/files/2021-12/Final%20April%2026%20Commentary%20510.pdf Accessed September 2022.
13. Putting our money where our mouth is: the future of dental Care in Canada. 2011.
14. Zemedikun DT, Chandan JS, Raindi D, Rajgor AD, Gokhale KM, Thomas T, et al. Burden of chronic diseases associated with periodontal diseases: a retrospective cohort study using UK primary care data. BMJ Open. 2021;11(12):e048296.
15. Millar WJ, Locker D. Dental insurance and use of dental services. Health Rep. 1999;11(1):55–67. (Eng); 59-72(Fre).
16. Locker D, Maggirias J, Quiñonez C. Income, dental insurance coverage, and financial barriers to dental care among Canadian adults. J Public Health Dent. 2011;71(4):327–34.
17. Aiello R. A national dental-care benefit is now law, here's who is eligible. CTV Health News. 2022. https://www.ctvnews.ca/health/a-national-dental-care-benefit-is-now-law-here-s-who-is-eligible-1.6157800 Accessed November 2022.
18. Chapter 6: strong public health care. Ottawa: Government of Canada; 2022. https://budget.gc.ca/2022/report-rapport/chap6-en.html#m107 Accessed November 2022.
19. Mettrick J, Kanary P, Zabel MD, Shepler R. Centers of excellence - intermediary experience from the United States. Develop Practice Child Youth Family Work J. 2017;48:62–82.
20. Durlak JA, DuPre EP. Implementation matters: a review of research on the influence of implementation on program outcomes and the factors affecting implementation. Am J Community Psychol. 2008;41(3–4):327–50.
21. Schroth RJ, Boparai G, Boparai M, Zhang L, Svitlica M, Jacob L, et al. Tracking early visits to the dentist: a look at the first 3 years of the Manitoba dental Association's free first visit program. J Can Dent Assoc. 2015;81:f8.
22. ORAL HEALTH PROGRAM Dental Health Reports. Saskatchewan Health Authority. 2022 https://www.saskatoonhealthregionca/locations_services/Services/Oral-Health/Pages/Dental-Health-Reportsaspx Accessed November 2022.
23. Children's Oral Health Improvement Programme Board: evaluation report year 1. London: UCL Institute of Epidemiology and Health Care; 2018.
24. Wyatt CC, So FH, Williams PM, Mithani A, Zed CM, Yen EH. The development, implementation, utilization and outcomes of a comprehensive dental program for older adults residing in long-term care facilities. J Can Dent Assoc. 2006;72(5):419.
25. Lalloo R, Solanki GS. An evaluation of a school-based comprehensive public oral health care programme. Community Dent Health. 1994;11(3):152–5.
26. Christensen LB, Hede B, Petersen PE. Public dental health care program for persons with disability. Acta Odontol Scand. 2005;63(5):278–83.
27. Alsumait A, ElSalhy M, Behzadi S, Raine KD, Gokiert R, Cor K, et al. Impact evaluation of a school-based oral health program: Kuwait National Program. BMC Oral Health. 2019;19(1):202.
28. Petersen PE, Nörtov B. Evaluation of a dental public health program for old-age pensioners in Denmark. J Public Health Dent. 1994;54(2):73–9.
29. *Evaluation of BC early childhood dental programs*. Human early learning Partnership's early childhood screening research and evaluation unit at the. Vancouver: University of British Columbia; 2011.
30. NSW early childhood Oral health program evaluation. Sydney: Centre for Oral Health Strategy NSW Department of Health; 2010.
31. Wehipeihana N, Oakden J, Spee K, Cram F, Pipi K, Porima L. Evaluation of the Māori Oral health providers project. Wellington: New Zealand Ministry of Health; 2011.
32. Oral Conditions. Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services. https://health.gov/healthypeople/objectives-and-data/browse-objectives/oral-conditions Accessed November 2022.
33. Gaglio B, Shoup JA, Glasgow RE. The RE-AIM framework: a systematic review of use over time. Am J Public Health. 2013;103(6):e38–46.
34. Holtrop JS, Estabrooks PA, Gaglio B, Harden SM, Kessler RS, King DK, et al. Understanding and applying the RE-AIM framework: clarifications and resources. J Clin Transl Sci. 2021;5(1):e126.
35. Wang L, Liu H, Wang L, Zhang Y, Guo W, Wu P, et al. Evaluating an oral health programme for the prevention of dental decay among school-aged children in China: protocol for a mixed-methods study based on the RE-AIM framework. BMJ Open. 2022;12(9):e061601.
36. Oldroyd JC, White S, Stephens M, Neil AA, Nanayakkara V. Program evaluation of the inner south community health Oral health program for priority populations. J Health Care Poor Underserved. 2017;28(3):1222–39.
37. Blank AE. Use of the RE-AIM chronic care framework to evaluate efforts to expand access to Oral health care for HIV+ patients: select baseline data and evaluation design. 136st APHA annual meeting and exposition 2008; 2008.

38. Healthy Smiles Ontario Operational Guide for Dental Providers. Population and Public Health Division Ministry of Health and Long-Term Care. 2018 https://www.health.gov.on.ca/en/pro/programs/dental/docs/HSO_Operational_Guide_for_Dental_Providers_en.pdf Accessed September 2022.
39. Andrews R. *Unintended consequences in a Children's public dental care program*: Faculty of Dentistry. Toronto: University of Toronto; 2020.
40. Impact of the implementation of the integrated healthy smiles Ontario program on Toronto public health dental program. Toronto: Toronto Public Health; 2017. https://www.toronto.ca/legdocs/mmis/2017/hl/bgrd/backgroundfile-108992.pdf Accessed September, 2022.
41. Ontario's dentists asking for $50 million Investment in Kids' dental program. Toronto: Ontario Dental Association; 2020. https://www.oda.ca/news-publications/ontarios-dentists-asking-for-50-million-investment-in-kids-dental-program/ Accessed September 2022.
42. Como DH, Stein Duker LI, Polido JC, Cermak SA. The persistence of Oral health disparities for African American children: a scoping review. Int J Environ Res Public Health. 2019;16(5):1–16.
43. Velez D, Palomo-Zerfas A, Nunez-Alvarez A, Ayala GX, Finlayson TL. Facilitators and barriers to dental care among Mexican migrant women and their families in North San Diego County. J Immigr Minor Health. 2017;19(5):1216–26.
44. Noushi N, Bedos C. Developing person-Centred dental care: the perspectives of people living in poverty. Dent J (Basel). 2020;8(3):1–9.
45. King DK, Shoup JA, Raebel MA, Anderson CB, Wagner NM, Ritzwoller DP, et al. Planning for implementation success using RE-AIM and CFIR frameworks: a qualitative study. Front Public Health. 2020;8:59.
46. Implementation research for digital technologies and tuberculosis: a toolkit for evaluating the implementation and scale-up of digital innovations across the TB continuum of care. Geneva: World Health Organization & UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases; 2021. https://apps.who.int/iris/handle/10665/352589 License: CC BY-NC-SA 3.0 IGO. Accessed November 2022.
47. Lutfiyya MN, Gross AJ, Soffe B, Lipsky MS. Dental care utilization: examining the associations between health services deficits and not having a dental visit in past 12 months. BMC Public Health. 2019;19(1):265.
48. Dental quality Alliance user guide for adult measures calculated using administrative claims data. Chicago: American Dental Association; 2022. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/dqa/dental-quality-measures/2022-measures/2022_dqa_adult_measures_user_guide.pdf?rev=14db8f1ce8584775935c697a6912d916&hash=6ECC8E5696988FEB949C75905E1D915C Accessed September, 2022.
49. If all of our kids Aren't smiling, none of us should Be. Toronto: Ontario Dental Association; 2022.
50. Feng P, Di Ruggiero E, Reid R, Pinto A, Upshur R. Public Health and Learning Health Systems White Paper. 2021 https://ihpme.utoronto.ca/wp-content/uploads/2021/08/Public-Health-LHS-White-Paper.pdf Accessed June 2022.
51. ver Ploeg M, Perrin E, editors. National Research Council panel on DCoRE, data. Eliminating health disparities: measurement and data needs. Washington (DC): National Academies Press (US); 2004.

How to cite this article: Durbin A, Root A, Lawrence HP, Werb S, Abrams S, Durbin J. Building effective public dental care programs: The critical role of implementation evaluation. J Public Health Dent. 2023. https://doi.org/10.1111/jphd.12569