Active transportation promotion for Canadian adults: A scoping review and environmental scan

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Executive summary (2 pages max)

Background: Active transport (i.e., moving oneself from place to place by walking, cycling, or other active means) is recognized as a sustainable and inclusive form of transportation. It is also a primary source of physical activity for most adults and the associated benefits are clear for community well-being, air pollution, climate change, environment, and health. Unfortunately, the majority of Canadian adults do not employ active transport (AT) on a daily basis. However, increases have been observed over the past 20 years and more adults in the largest metropolitan areas of the country are engaging in AT to commute to work. Gaining insight on how and why the prevalence of AT has increased in the past decade in Canada is critically important for setting policy and funding the development of relevant infrastructure.

Objectives: For this project, we conducted two reviews. First, we performed a rapid review on the promotion of AT among Canadian adults (Review 1). This involved searching the research literature for Canadian specific reviews summarizing evidence of policies, interventions, or programs that supported AT among Canadian adults. Second, a scoping review was conducted of reviews, including both international and Canadian content, that described policies and interventions that influence or affect AT among adults (Review 2). A scoping review is a type of systematic review that is good for identifying gaps in the literature and may be particularly relevant for addressing research topics with limited or emerging evidence.

Results: Based on our preliminary scan of Canadian based research and our scoping review, it is apparent that many studies and reviews have attempted to examine policies and interventions in relation to AT among adults. In Canada, most provinces and territories have some dedicated programs and/or strategies to facilitate AT. The research evidence shows that walkability and land use are consistently associated with walking for transport in this country. Similarly, the majority of systematic reviews in Review 2 focused on the built environment and showed consistent associations between AT and walkability, availability of destinations near residential areas, and supportive infrastructure for cycling. Though few reviews were available on interventions to foster AT, some evidence exists for encouraging shifts in travel modes from privately owned automobiles

and for constructing bike lanes. Overall, the evidence was considered weak because most of the studies in the reviews were cross-sectional, which limits making causal claims.

Key messages: The findings from both our environmental scan of Canadian specific evidence and initiatives and our scoping review may have implications for policy, practice, and research. With regard to policy, most of the evidence supports a critically important role for the influence of the built environment on AT. Thus, any evaluation of the National Active Transportation Strategy, should consider employing an ecological perspective when assessing impact on AT. This would involve documenting changes to the spaces and places in which AT occurs (e.g., pedestrian friendly environment, construction of bike lanes, increased access to public transit) along with individual behaviour. For research, given that most of the studies included in the reviews were cross-sectional, more information is needed on the effectiveness of interventions to change AT behaviour. In addition, more Canadian-specific research is needed on the policy determinants of cycling for transport and how AT can be facilitated during the winter season.

Methodology: The methods for our reviews were to follow the standard procedures for scoping reviews: (1) Identify the research question; (2) Identify relevant studies (e.g., systematic search of bibliographic databases); (3) Study selection (e.g., title and abstract scans); (4) Chart the data (e.g., code for relevant variables); (5) Collate, summarize, and report the results. For the Canadian scan (Review 1), we identified two recently published reviews that overlapped with our originally proposed review. Thus, instead of duplicating our efforts, we decided to synthesize the findings from those reviews and then plan to update their searches since 2018 to present. In addition, we were also to include a summary of data from a municipal survey conducted by the CFLRI. However, that survey was delayed in going to the field because of COVID-related restrictions in the communities. We anticipate the data to be available in March of this year. For Review 2, the initial search of databases and manual searches resulted in 1039 potential includes. After removal of duplicates and title and abstract screening, 39 documents were then subjected to a preliminary review, which resulted in 21 documents being included in the final analysis. Among other things, those documents were then coded for the nature of the policy or intervention, the mode of AT (e.g., walking), and whether an association or effect was observed for the policy or intervention on AT.

Background

Active transport (i.e., moving oneself from place to place by walking, cycling, or other active means) is recognized as a sustainable and inclusive form of transportation (United Nations, n.d.). It is also a primary source of physical activity for most adults (Fishman et al., 2015; Wilson et al., 2020). The benefit of engaging in this type of transportation is clear for community well-being, air pollution, climate change, environment, and health (Glazener & Khreis, 2019; Gordon, 2018; Larouche et al., 2016; Lorenzo et al., 2020; Raine et al., 2012; Stevenson et al., 2016). For instance, Walker (2012, p. 17) describes the pedestrian as being the "foundation of urban design" implying that communities with many pedestrians and well-connected public transport systems are vibrant and more attractive for their residents.

The last comprehensive national transportation survey of adults was conducted in 2004 by the Canadian Fitness and Lifestyle Research Institute (CFLRI; 2006). It included topics such as prevalence of utilitarian walking and cycling, recreational walking and cycling, distance to locations, benefits of walking and cycling, barriers, and perceptions of opportunities and infrastructure supports. Since then, the CFLRI has included AT questions on many of its surveys of the public but not to the same depth. Similarly, general information on transportation choices is collected through the federal census. For instance, in 2011, 12% of Canadian adult commuters used public transport (PT) for the longest part of their trip, 5.7% walked to work, and 1.3% cycled (Turcotte, 2013). In the eight largest metropolitan areas, the proportion using AT within the urban core is much higher. Between 1996 and 2016 those who used AT to go to work increased from 19% to 47% in Toronto, from 16% to 38% in Montréal, from 15% to 38% in Calgary, from 17% to 39% in Vancouver and from 22% to 42% in Ottawa-Gatineau (Savage, 2019). Published peer-reviewed studies also suggest that the proportion of Canadian adults using AT has increased since the mid-1990s (e.g., Canizares & Badley, 2018; Juneau & Potvin, 2010). Gaining insight on how and why the prevalence of AT has increased in the past decade in Canada is critically important for setting policy and funding the development of relevant infrastructure. For instance, as the restrictions related to the first wave of COVID-19 were slackened or lifted in the late spring of 2019, anecdotal reports suggest that Canadians may have shifted their choice of transport from public to active forms (CBC, 2020a; CBCb). Furthermore, they demanded that measures to give walkers and cyclists space should become permanent (CBC, 2020b; CBC, 2020c).

The extent to which people engage in AT and/or PT is influenced by a range of factors including the built and transport environment (e.g., infrastructure, population density, extent of PT network), the natural environment (e.g., hilly terrain), climate, air pollution, culture, beliefs (e.g., values, motivation), distance, perceived costs, and value of time (Colley et al., 2019; Götschi et al., 2017; Mandic et al., 2020; Pikora et al., 2003; Walker, 2012). Furthermore, the average PT trip involves a person taking approximately 1250 steps (Morency et al., 2011). Thus, an interrelationship exists between these modes of transportation that often involve multi-modal trips (Lachapelle, & Nolan, 2012; Lachapelle, & Pinto, 2016). In the Canadian context, the now defunct Healthy Canada by Design initiative identified numerous policies and case studies that supported AT and other aspect of healthy living (Miro et al., 2015; Politis et al., 2017). Probably the most recent synthesis of AT related research was that of the Chief Public Health Officer's report on designing healthy communities (Government of Canada, 2018). However, that report was not specific to AT and/or PT. Thus, no clear current understanding exists about the promotion and facilitation of AT among Canadian adults.

Furthermore, as members of several national committees related to the promotion and monitoring of physical activity (e.g., ParticipACTION Research Advisory Group, ParticipACTION Report Card research writing group for both adults and children, FPT Surveillance and Monitoring Committee), we know that such a review would be useful for our deliberations and that our colleagues lack knowledge about current transportation behaviour of Canadians. Finally, the federal government recently announced the development of a National Active Transportation Strategy (see Government of Canada, 2020), presented a new climate change strategy entitled A Healthy Environment – A Health Economy (Government of Canada, 2020), and produced a national agenda for addressing the sustainability development goals (SDGs) of the United Nations (Government of Canada, 2019) . These strategies should be informed by the most recent evidence (i.e., summarized in a review of the literature).

Objectives

The objectives of this project were twofold. First, we performed an environmental scan on the promotion of AT among Canadian adults (Review 1). This involved searching the research literature for Canadian specific reviews summarizing evidence of policies, interventions, or programs that supported AT among Canadian adults. Second, a scoping review was performed on systematic reviews, both international and Canadian, describing policies and interventions that influence or affect AT among adults (Review 2). A scoping review is a type of systematic review that is good for identifying gaps in the literature and may be particularly relevant for addressing research topics with limited or emerging evidence.

This review was couched within ecological models of physical activity (Spence & Lee, 2003), AT frameworks (Götschi et al., 2017; Pikora et al., 2003), and the Behaviour Change Wheel (BCW; Michie et al., 2011). Consistent across these models, beliefs mediate the impact of the external environment on behaviours. Specifically, within the BCW, policies and interventions influence perceived capability, opportunity, and motivation for behaviour (COM-B). Policies were defined as "actions on the part of responsible authorities" (Michie et al., 2011) that influence or shape behaviour directly or via interventions (Michie et al., 2011; Winter et al., 2017).

Expertise and experience of the applicant and co-applicants

John C. Spence (PI), University of Alberta, has expertise in the measurement of physical activity, determinants of physical activity and sedentary behaviour, and has co-authored numerous papers on active transport including a recent set of policy recommendations in New Zealand (Mandic et al., 2020). Furthermore, Dr. Spence has been involved with many systematic reviews including scoping reviews done by his lab group (e.g., Spence et al., 2020; Lindeman et al., 2020; McCurdy et al., 2020). Christine Cameron is the President of the CFLRI and has extensive experience in the measurement of physical activity, active transport, and evaluating policy initiatives in Canada. Guy Faulkner, UBC, is one of the foremost experts on active transport in Canada and has expertise in program evaluation, mental health and physical activity, and qualitative methods. Marie-Soleil Cloutier, Institut National de la Recherche Scientifique, is a health geographer who examines the impact of the urban built environment on walkability, active transport and pedestrian safety, using the Vision Zero framework. She studies vulnerable populations such as child and older adult

pedestrians and is involved with the Child Active Transportation Safety and the Environment (CHASE) team.

Methods

Review 1: Rapid review on the promotion of AT among Canadian adults

We had originally proposed to conduct a scoping review of Canadian studies. However, our preliminary searches via Google, revealed several recently published reports and reviews that overlapped substantially with our topic (Farkis et al., 2019; Christie et al., 2021; Transportation and the Environment Task Force, 2018). Thus, we decided to forgo the scoping review and to, instead, synthesize these three documents in a rapid review (Grant & Booth, 2009). Specifically, we searched for reviews of Canadian based studies that were published since 2018.

In addition to those documents identified through our searches, we had originally proposed to include findings from several surveys to be conducted by the CFLRI. These sector studies are national, administrator-responded surveys that assess opportunities for physical activity and sport within communities and municipalities, worksites, and federal, provincial and territorial governments. The surveys provide critical information about the capacity of these settings to impact participation rates for physical activity and sport, including AT and the provision of PT supports. In addition, the surveys include questions related to policies, infrastructure, and promotional efforts related to AT. This information will provide insight on the role of these sector-based organizations as intermediaries to support such behaviour. Although cross-sectional in nature, iterations of many of these sector-based surveys have been conducted over time, producing valuable trend information to assess changes in AT or access to PT modalities. The community/municipality survey ($N \approx 3{,}500$ communities) and workplace survey ($N \approx 10{,}000$ workplaces) were to be conducted between December 2020 to March 2021. The federal, provincial, territorial governments' survey were to be collected between April to June 2021. Unfortunately, all of the surveys were delayed significantly by COVID-related restrictions in the communities and settings. For instance, recreation departments in many municipalities were closed for several months. These surveys are now in the field and we anticipate having access to the data in the late winter or spring of 2022. At that time, we will finalize the rapid review.

Review 2: Scoping review of reviews on policies or interventions and AT among adults

The proposed scoping review of reviews followed the steps recommended by Arksey and O'Malley (2005) and Levac and colleagues (2010): (1) Identify the research question; (2) Identify relevant studies (e.g., systematic search of bibliographic databases); (3) Study selection (e.g., title and abstract scans); (4) Chart the data (e.g., code for relevant variables); (5) Collate, summarize, and report the results; and (6) Consult potential target users (e.g., decision makers). In addition, the findings are reported according to the PRISMA extension for Scoping Reviews (Tricco et al., 2018).

Research question(s). What policy areas or interventions focusing on AT are represented in the literature? 2) Which policies or interventions influence AT among adults?

Identification of relevant documents. A reference librarian at the University of Alberta, Allison Sivak, helped identify the relevant documents. Databases such as SPORTDiscus, CINAHL, MEDLINE, PubMed, Transport Research International Documentation, Compendex, Scopus, and Web of Science were searched. Keywords for searches included terms such as policy, environment, active transport*, active travel, active commuting, public transit, public transport*, walk*, and cycling. To be included in the review, documents need to (1) be a systematic review; be published since 2012; (3) report data on promotion of AT (e.g., policies, changes in infrastructure, interventions); (4) involve either quantitative or qualitative data; and (5) be in English or French. Reviews of physical activity that did not perform domain specific syntheses of AT studies were excluded. In addition, similar to Dixon and colleagues (2020), reviews of reviews were excluded.

Document selection. The selection of documents and all coding was performed by two research assistants and Dr. Spence. First, titles and abstracts were screened according to our inclusion criteria. Second, once the initial set of potential includes were narrowed down, the documents were retrieved and further checked for inclusion. Reliability checks were performed on 20% of the document selection coding. That is, individual cases were pulled and verified by a second coder.

Charting of the data. Coding of the documents was guided by a codebook which include characteristics of the document (e.g., author, year of study); characteristics of the reviews (e.g.,

review type; quality of the review); characteristics of the policy or intervention (e.g., built environment, fiscal measures, regulation, environmental restructuring); characteristics and context of AT (e.g., walking, cycling); and purpose and findings. Reliability checks were done on 20% of the charting of the data.

Collating, summarizing, and reporting the results. Frequencies were calculated for all of the categorical variables. The main findings were recorded as text and subjected to content analysis.

Results

Review 1

Two systematic reviews have examined associations between features of the built environment and AT in Canada, summarizing 18 unique observational studies (Christie et al., 2021; Farkas et al., 2019). One longitudinal and 17 cross sectional studies representing 366, 084 participants were conducted largely across Quebec (6 of 18), British Columbia (6 of 18), Alberta (4 of 18), and Ontario (3 of 18), with 3 studies conducted at the national level. Overlap between reviews was minimal with only one finding represented by both reviews. Positive relationships were observed between AT and objective measures of the built environment, including density of businesses and services (1 of 1 association), overall walkability (44 of 64 associations), personal safety (1 of 2 associations), proximity to destinations (3 of 10 associations), land use (9 of 33 associations), and street connectivity (1 of 6 associations). Only null or negative relationships were reported for population density (3 associations), traffic safety (2 associations), and aesthetics (2 associations). Based on subjective measures of the built environment, null findings were observed for both safety (1 of 1 association) and aesthetics (1 of 1 association).

With respect to the grey literature, the search identified one Canadian policy report put forth by the Transportation and the Environment Task Force (2018), a consortium of stakeholders working within select transportation ministries in Canada. The task force conducted a survey and literature review, providing a descriptive profile of the mandate, role, and aims of various Canadian transportation ministries and authorities as well as existing active transportation policies, programs and initiatives in Canada and other select regions. The survey captured the views of 44 stakeholders

within the federal government (2%), municipalities (32%), provincial and territorial governments (45%), nongovernmental organizations (14%), and transit service providers (7%) representing mainly Quebec (36%), Manitoba (16%), and Prince Edward Island (11%). Authors highlighted differences in the scope and objectives of different stakeholders, mixed awareness of the existence of regulations and legislation, variations in formal active transportation policies and plans, and funding structures. Existing initiatives, examples of collaborative efforts, and cases of self-reported success stories were outlined. The task force recommended the implementation of strategic partnerships among different sectors and levels of government that recognize the multifaceted nature of AT. Additionally, authors recommend the commitment of stable, dedicated funding to support a greater number of AT initiatives.

Review 2

As recommended by the PRISMA extension for Scoping Reviews guidelines (Tricco et al., 2018), Figure 1 presents a flow chart of the search and selection process for the scoping review (Appendix A). The initial search of databases (n=1031) and manual searches (n=8) resulted in 1039 potential includes. After removal of duplicates, 516 were considered for title and abstract screening. A further 477 documents were excluded at that stage. The remaining 39 documents were then subjected to a preliminary review, which resulted in 21 systematic reviews being included in the final analysis (see Appendix B for a list of the included reviews).

The majority of reviews focused on associations between policies and AT (17; 81%) and a smaller proportion examined outcomes of interventions (4; 19%). Though the majority of reviews included quantitative studies of adults in general, others did have unique or specific interests in older adults (Cerin et al., 2017; Yun, 2019), workplace environments (Lin et al., 2020; Zhu et al., 2020), financial incentives (Martin et al., 2012), and qualitative studies (Moran et al., 2014; Salvo et al., 2018). Overall, 67% of the reviews reported consistent associations of policies or effects of interventions on AT. However, most of the reviews noted that the evidence was of poor quality in terms of making claims about causation (e.g., Farkas et al., 2019; Sugiyama et al., 2012)

Policies and AT

Of the reviews on policies and AT, the vast majority (15; 88%) examined some aspect of the built environment (e.g., walkability, destinations, cycling infrastructure). The most consistent associations were seen for walkability and AT (Cerin et al., 2017; Grasser et al., 2013), walkability and walking for transport (Cerin et al., 2017; Farkas et al., 2019; Hilland et al., 2020; Sugiyama et al., 2012; Van Holle et al., 2012; Wang & Chen, 2017), cycling infrastructure (e.g., bike lanes, cycling paths) and cycling for transport (Piatkowski et al., 2021), and destinations (e.g., shops, services, workplaces, public transit) and AT (Lin et al., 2020; Moran et al., 2014; Piatkowski et al., 2021; Salvo et al., 2018; Sugiyama et al., 2012; Van Holle et al., 2012). Though less evidence was observed for safety (Hilland et al., 2020; Moran et al., 2014; Salvo et al., 2018), both reviews of qualitative studies identified traffic safety as an important theme for AT (Moran et al., 2014; Salvo et al., 2018). As for the role of public transport, one review reported that 8-33 minutes of walking is associated with public transport (Rissel et al., 2021). The authors concluded "…a greater uptake of public transport by inactive adults would lead to significantly greater increases in the adult population considered sufficiently active." (p. 2554). Finally, no or limited evidence was noted for financial incentives (Martin et al., 2012).

Interventions for AT

Of the four reviews that examined interventions, two reported consistent findings (Kent et al., 2014; Scheepers et al., 2014) and two noted some or inconsistent findings (Stankov et al., 2020; Stewart et al., 2015). For instance, Scheepers et al. reported that most studies in their review showed positive effects on AT of interventions that reduced car use among their participants. Similarly, the introduction of bike lanes and bus rapid transit (BRT) resulted in increased cycling, BRT mode share, AT duration, and number of trips using these modes (Stankov et al., 2020). In addition, enlisting in a carsharing program appears to increase the likelihood of engaging in more AT (Kent et al., 2014). Regardless of their findings, all of the intervention reviews commented on the need for more longitudinal and intervention research examining determinants of AT.

Implications

The findings from both our environmental scan of Canadian specific evidence and initiatives and our scoping review may have implications for policy, practice, and research. With regard to policy, strategic partnerships should be fostered and supported among different sectors and levels of government that recognize the multifaceted nature of AT (Transportation and the Environment Task Force, 2018). In addition, dedicated funding is needed to support a greater number of AT initiatives in Canada. The National Active Transportation Strategy and the related investment of funds is a good step in that direction.

From practice and policy perspectives, most of the evidence supports a critically important role for the influence of the built environment on AT. Thus, to monitor progress on national strategies such as the Framework for Recreation in Canada (Canadian Parks and Recreation Association, 2015) and the Common Vision (Public Health Agency of Canada, 2018), spaces and places should be measured/tracked along with the behaviour of individuals. That is, we should not focus solely on individual behaviour (e.g., % of Canadians who are physically active), but, instead, we should also assess the settings in which such behaviours may occur. Similarly, any evaluation of the National Active Transportation Strategy, should consider employing an ecological perspective (e.g., Spence & Lee, 2003) when assessing impact on AT. If no change occurs in the spaces and places, then why should we expect a change in the AT of individuals? These findings provide further support for the United Nations' SDGs (United Nations, n.d.) and are consistent with the notion that sustainable practices such as walking and cycling for transport are hampered by automobile-friendly environments.

Conclusions

Based on our preliminary scan of Canadian based research and our scoping review, it is apparent that many studies and reviews have attempted to examine policies and interventions in in relation to AT among adults. In Canada, most provinces have some dedicated programs and/or strategies to facilitate AT. The research evidence shows that walkability and land use are consistently associated with walking for transport (Farkas et al., 2019). Similarly, the majority of systematic reviews in our scoping focused on the built environment and showed consistent associations

between AT and walkability, availability of destinations near residential areas, and supportive infrastructure for cycling. Though few reviews were available on interventions to foster AT, some evidence exists for encouraging shifts in travel modes from privately owned automobiles and for constructing bike lanes. Given that most of the studies included in the reviews were cross-sectional, more information is needed on the effectiveness of interventions to change AT behaviour. Future areas of research include examinations of natural experiments (e.g., evaluations of AT infrastructure enhancement projects) and further exploration of the factors that may moderate the influence of the environment on AT and other sources of physical activity (e.g., winter conditions). In Canada, more research is needed on supports for AT in rural areas and the territories (Farkas et al., 2019). Finally, the uptake of micro-mobility and the potential of autonomous vehicles for affecting AT choices and engagement will require further study (Spence et al., 2020).

Knowledge mobilization activities

We foresee several outcomes for our reviews. First, the scoping review (review 2) will be submitted for publication to a transportation-related journal (e.g., Active Travel Studies) and the findings will be presented at a conference. Second, the findings from both reviews will be shared with members of the taskforce who are charged with developing the National Active Transportation Strategy. Third, we hope the next version of the ParticipACTION adult report card on physical activity could highlight our findings. Finally, we will consult with our dissemination partners (CPRA, ParticipACTION) and other relevant organizations (e.g., Centre for Active Transportation) on both the findings and our identification of potential implications for practice and policy.

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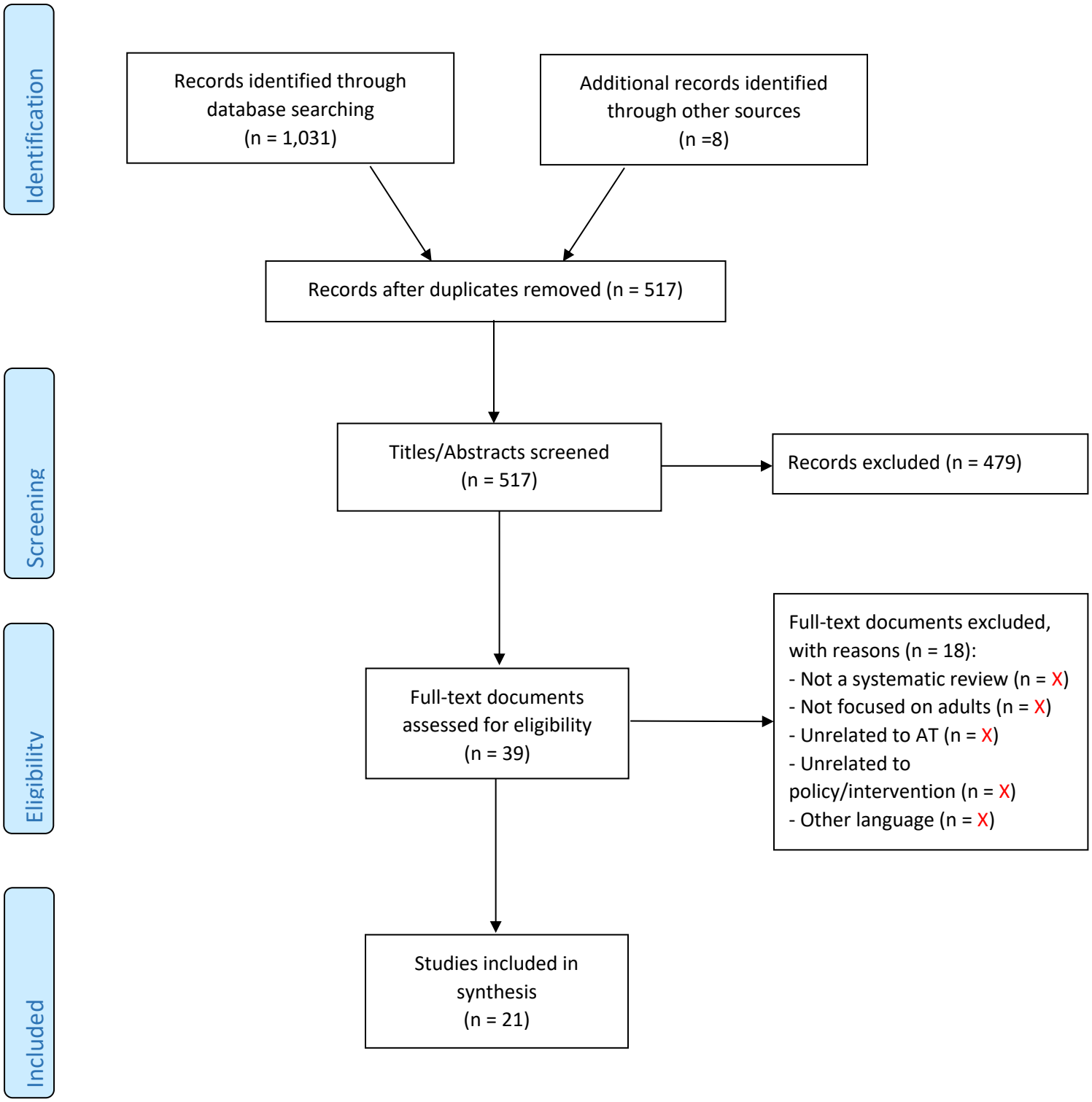
Appendix A: PRISMA chart (Review 2)



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