

**An Environmental Scan of Methods for Assessing Age-Friendliness in Post-Secondary  
Institutions**

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### **Abstract**

The University of Calgary joined the Age-Friendly University (AFU) Global Network in 2018. As part of our university's AFU action plan, a baseline assessment of the institution's age-friendliness will be conducted to identify areas of strength and growth. To inform our approach and that of other institutions undertaking this work, an environmental scan was performed to determine methods used by post-secondary institutions to date to assess age-friendliness. Both academic and grey literature published between 2012 and 2022 in the English language was searched using diverse keywords. The academic literature was identified from four databases (Abstracts in Social Gerontology, Academic Search Complete, Education Research Complete, Scopus) and the grey literature from 84 institutional websites of AFU Global Network members. Twelve academic sources and four grey sources were included in the analysis. Seven methods were used to assess age-friendliness, with the most common approaches being surveys, inventories, focus groups, interviews, and photovoice. The Age-Friendly Inventory and Campus Climate Survey (Silverstein et al., 2022) was selected to evaluate the University of Calgary's age-friendliness due to its alignment with all 10 AFU principles, comprehensiveness, and involvement of multiple stakeholders. Other post-secondary institutions should consider their context and resources when selecting an assessment method.

*Keywords:* age-friendly university, age inclusivity, assessment, higher education, older adults

## Introduction

Age-friendly communities work to enhance environments and services that promote the participation, health, and well-being of older adults (World Health Organization [WHO], 2007). The Age-Friendly University (AFU) concept arose from this movement as post-secondary institutions have the potential to offer educational, professional, health and wellness, recreational, cultural, and social opportunities (Morrow-Howell et al., 2020; Silverstein et al., 2019). In 2012 Dublin City University (DCU) launched the AFU Global Network, a consortium of post-secondary institutions working to increase the inclusivity of campus environments, policies, practices, and programs for older adults (WHO, 2022). Since its establishment, the AFU Global Network has garnered international attention with 90 members as of June 2022 (DCU, n.d.a). With leadership from the Brenda Strafford Centre on Aging, the University of Calgary became a member in 2018.

A central tenet of the age-friendly movement is redressing ageism, which is defined as how we think, feel, and act towards others or ourselves based on age (WHO, 2021). Negative stereotypes and discrimination, often directed towards older adults, adversely impact all aspects of health and well-being. Increasing age diversity in post-secondary educational and workplace environments creates opportunities for intergenerational interaction and can help combat ageism (Morrow-Howell et al., 2020). An age-diverse campus community is also likely to better understand the needs of an aging society and can generate more creative solutions to aging-related problems. DCU led the development of 10 AFU principles (DCU, n.d.b) to guide activities that enhance the participation and inclusion of older adults in post-secondary settings and foster connections between generations that benefit faculty, staff, and students of all ages. The Gerontological Society of America (GSA) and its Academy for Gerontology in Higher

Education recommend that post-secondary institutions perform a self-evaluation of their age-friendliness to understand the extent to which they are meeting the AFU principles (GSA, 2021). This assessment can help inform changes to environments, policies, practices, and programs that address the needs and interests of older adults. The Brenda Strafford Centre on Aging is developing a research study to assess the University of Calgary's age-friendliness. To guide our methodological choices on how best to do this and those of other institutions undertaking this work, an environmental scan was performed to identify how post-secondary institutions have approached this challenge to date.

### **Considerations for Assessing Age-Friendliness**

Understanding the key aspects that contribute to a post-secondary institution's age-friendliness is important for developing or selecting an appropriate assessment method. Older adults experience various personal, social, situational, and structural barriers to participating in post-secondary opportunities (Chesser et al., 2020; Hansen et al., 2019; June & Andreoletti, 2021; Silverstein et al., 2019). However, accessibility (i.e., access to and use of environments, services, and products) and inclusivity (i.e., social dynamics and structures that affect full and meaningful participation) seem to be especially salient aspects of age-friendliness that should be assessed (Chesser et al., 2020; Silverstein et al., 2019). In addition, the six pillars of institutional activity (teaching and learning, research and innovation, lifelong learning, intergenerational learning, encore careers and enterprise, civic engagement) defined by DCU, which are reflected within the 10 AFU principles, should be considered.

Common methods that can be used to assess age-friendliness include surveys, interviews, and focus groups. Surveys are advantageous because they enable data collection from a large sample while being time and cost efficient (Williamson, 2018). They can be designed to be broad

or narrow in focus, avoid bias, and protect participant anonymity (Bruce et al., 2018). Lengthy surveys can result in participant fatigue though, and complex questions can lead to misunderstandings with no opportunities for clarification (Bruce et al., 2018). Interviews and focus groups involve a smaller sample that allow for an in-depth understanding of a particular phenomenon (Bruce et al., 2018). One-on-one interviews enable researchers to build rapport with participants and gather rich information but require considerable time (Williamson, 2018). Focus groups are more time efficient than individual interviews because they include several participants in a single discussion. However, focus groups are prone to group bias and are less effective at gathering insights from participants who have different perspectives from the group (Green & Thorogood, 2009).

The context of a post-secondary institution must be considered when assessing age-friendliness since strategic priorities, organizational structures, constituent populations, program offerings, and other characteristics vary widely (GSA, 2021). In preparing for such an assessment, understanding what other post-secondary institutions have done may offer helpful insights. This scan explored AFU self-assessments conducted thus far across a growing and diverse global network. Our environmental scan was guided by the research question: "What methods have post-secondary institutions used to assess their age-friendliness?"

### **Method**

An environmental scan is a methodology that aims to seek, gather, and interpret knowledge on a particular issue to inform decision-making and organizational action. Our scan followed the five-step framework proposed by Shahid and Turin (2018): (1) identifying why you are conducting an environmental scan; (2) determining relevant sources of literature; (3) clarifying and finalizing your research question; (4) gathering information; and (5) condensing,

presenting, and sharing the results. The *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*, which guides the conduct of our institutional review board and our research team, states that ethical review and approval is not required for research that relies on secondary use of information (Government of Canada, 2019). Ethical approval from our institutional review board was therefore not required for this environmental scan.

### **Academic Literature Search**

To identify relevant academic literature, a comprehensive and systematic search was conducted in four electronic databases: Abstracts in Social Gerontology, Academic Search Complete, Education Research Complete, and Scopus. Databases with literature spanning multiple areas of study including gerontology, education, psychology, and health sciences were chosen because the AFU literature is published in various disciplinary journals. A preliminary search indicated that these multi-disciplinary databases seemed to capture the most relevant literature. The databases, keywords, and limits used were selected by the research team based on advice received from a research librarian. The keywords reflected different ways of referring to an AFU (age-friendly universit\* OR age friendly universit\* OR afu) and assessment (assess\* OR evaluat\* OR measur\* OR audit OR tool\* OR survey\* OR questionnaire\* OR instrument\*). MG searched for English-language articles published between January 1, 2012 (the year the AFU Global Network was established) and February 3, 2022 that contained the keywords in the titles or abstracts. MG imported the results from each database into Covidence™ systematic review software (Veritas Health Innovation, Melbourne, Australia) to facilitate the screening process.

The search resulted in 263 articles. After removing 67 duplicates, MG and CZ independently screened the titles and abstracts of 196 articles to select those for a full-text review. Articles were excluded if they did not mention assessing a post-secondary institution's

age-friendliness. MG and CZ then separately reviewed the full-text of 10 articles and their reference lists to identify additional relevant sources. Three articles were excluded at this stage because they did not focus on assessing age-friendliness, focused on very limited aspects (i.e., one AFU principle) of age-friendliness, or did not provide sufficient information about the methods used. However, one additional article was identified through citation searching and one through an AFU Global Network email. After being informed about the newly published article from the AFU Global Network coordinator, an updated search (from February 3, 2022 to July 25, 2022) was conducted using the methods described above to ensure other recent academic literature was not missed. No other relevant literature was identified during the screening process. Disagreements between MG and CZ about the inclusion of articles were discussed until a consensus was reached. Nine articles were retained for data extraction (see Figure 1).

### **Grey Literature Search**

To identify relevant grey literature, websites of post-secondary institutions belonging to the AFU Global Network were searched. MG determined these institutions using the AFU members web page (DCU, n.d.a) and searched their websites between February 14, 2022 and May 3, 2022. Five of the 90 institutional members (Munster Technological University, University of Pai Chai, Pontifical Catholic University of Campinas, University of Maribor, University of Murcia [Lorca campus]) were excluded from the search because their website did not have a search function or could not be translated into English. The University of Calgary was also excluded. Limited keywords containing terminology most pertinent to the research question (age-friendly OR age friendly) were used for feasibility purposes, as well as the *relevance* sort option for the results when it was available. The search strategy, keywords, and limits were determined by the research team and a research librarian.



The search yielded 169,551 results (e.g., web pages, documents). MG screened the content of the results while conducting the search. For feasibility, up to the first 50 results from each institutional website were screened resulting in a total of 3,151 sources. Sources were excluded if they did not mention assessing age-friendliness or provided insufficient information about the methods used. MG recorded the title and URL for each source deemed to have relevant content in a spreadsheet for a full-text review to be completed. CZ reviewed the 45 identified sources to confirm their inclusion in the scan. Other web pages and documents accessible through the sources were also reviewed to find additional grey literature. Four more results (three academic and one grey) were identified. Forty-two sources were excluded at this stage because they did not assess age-friendliness, did not provide sufficient information about the methods used for assessing age-friendliness, were an advertisement for a study to assess age-friendliness, assessed community rather than university age-friendliness, or the web page could no longer be accessed. Seven results were retained for data extraction (see Figure 1).

### **Data Extraction and Analysis**

A data extraction spreadsheet was developed by the research team to gather information of interest from the 16 included sources. MG extracted the following data: research team composition, location, objective, research design, participant recruitment strategy and characteristics, methods, and analyses. She then extracted contextual data from the websites of 12 post-secondary institutions identified as having relevant literature. Contextual data extracted included: total operating budget, number of students, number of faculty and staff, presence of graduate (masters, doctorate) and professional programs, and presence of an aging hub (i.e., aging or gerontology institute, centre, or department). CZ compared all data extracted against the original sources to ensure accuracy. The two researchers resolved disagreements during a follow-

up discussion. To report the results, MG conducted a basic numerical analysis of key academic, grey, and contextual information. She also organized the academic and grey literature by the data collection methods used to assess age-friendliness to examine similarities and differences in approaches. Descriptions of these methods are provided in the next section.

### **Results**

The results are based on 12 academic and four grey literature sources (see Table 1 and Supplement 1). Less than half of the studies had multi-disciplinary research teams and fewer had inter-institutional teams. The majority of studies were conducted at post-secondary institutions in either the United States or Canada, though one study included institutions in Europe and Asia (Lim et al., 2022). The total operating budgets of the 12 institutions identified ranged quite substantially, as did their total student, faculty, and staff populations. All institutions had masters programs, and the majority had doctorate programs, professional programs, and an aging hub.

Most studies employed mixed methods followed by qualitative, quantitative, and review approaches. Across the studies, researchers collected data from staff, faculty, students, older adult community members, alumni, emeriti, and institutional AFU leads. Surveys, inventories, focus groups, interviews, and photovoice were the most common methods used for assessing age-friendliness.

#### **Surveys**

Seven studies used surveys to examine participants' perspectives or experiences of age-friendliness (Cannon et al., 2021; Gautam et al., 2020; June & Andreoletti, 2021; McMaster Institute for Research on Aging, 2019; Revell et al., 2020; Silverstein & Beaulieu, 2021; Silverstein et al., 2022). Silverstein et al. (2022) administered an online Campus Climate Survey (CCS) to faculty, staff, and students. The CCS consists of 131 questions with Likert scale

responses to assess subjective elements of age-friendliness within four distinct categories: awareness of the AFU initiative, awareness of age-friendly campus practices, perceptions of overall age-friendliness, personal beliefs about age inclusivity. Responses of various campus constituent groups were compared. The CCS has been used at three other institutions (Gautam et al., 2020; Revell et al., 2020; Silverstein & Beaulieu, 2021). However, some adaptations were made to the survey to fit with their contexts and obtain more in-depth information, such as including open response questions on age-friendliness and institutional responses to COVID-19.

June and Andreoletti (2021) administered a 30-question online survey to community members who attended a Continuing Education speaker series. Most questions focused on attendees' engagement with the speaker series and university, but questions about particular AFU principles (1, 4, 6, 8) that aligned with the university's areas of strength and growth were asked as well. Cannon et al. (2021) also surveyed older adults, but from a local senior centre adjacent to their institution. The 32-question paper survey asked about the frequency and purpose they used the centre and university as well as barriers and facilitators to accessing them. The survey was part of a broader assessment of age-friendliness utilizing other methods, with a similar approach taken by the McMaster Institute for Research on Aging (2019). Faculty, staff, students, alumni, and community members were emailed a 10-question survey to determine if and how the 10 AFU principles were being met. Participants indicated whether each principle was met using a 5-point Likert scale and provided written examples of how they were met and ways to improve.

### **Inventories**

Seven studies used inventories to assess the age-friendliness of institutional environments and activities (Claver et al., 2020; Gautam et al., 2020; Lim et al., 2022; Melchionno, 2021;

Revell et al., 2020; Silverstein & Beaulieu, 2021; Silverstein et al., 2022). Silverstein et al. (2022) developed a 93-item inventory to determine the presence of age-friendly environments and practices across seven function-based categories: outreach and engagement, personnel, physical environment, research, services and resources, student affairs, teaching and learning. Administrators from different institutional units responded to items applicable to their unit with *yes*, *no*, or *don't know* and qualified responses if necessary. The institution's level of age-friendliness was calculated. The inventory and CCS form the Age-Friendly Inventory and Campus Climate Survey (ICCS). Scores from both components can be compared to determine the extent of fit between objective and subjective responses to age-friendliness. The inventory has been used in five other post-secondary institutions (Claver et al., 2020; Gautam et al., 2020; Melchionno, 2021; Revell et al., 2020; Silverstein & Beaulieu, 2021).

Lim et al. (2022) also developed a 60-item inventory to assess an institution's current performance across five functions: social engagement and support, lifelong learning, reflecting the needs of older people, environment, administrative support. The inventory was emailed to AFU leads of post-secondary institutions belonging to the Global Network to complete in order to test the appropriateness and acceptability of the items. Participants rated the performance of their institution on each item using a 5-point Likert scale, and the level of performance of each institution was calculated.

### **Focus Groups**

Focus groups were used in six studies (Cannon et al., 2021; Chesser & Porter, 2019; Gautam et al., 2020; Lim et al., 2022; McMaster Institute for Research on Aging, 2019; Whalen et al., 2019). Lim et al. (2022) led four focus groups with a working group of experts to develop an inventory. Initial discussions focused on age-friendly indicators reflected by the 10 AFU

principles, WHO age-friendly cities guidelines, and other applicable measures. The list of indicators was refined in subsequent discussions and the items were grouped into themes that represented core AFU functions. In contrast, Gautam et al. (2020) facilitated table discussions with attendees of an annual forum sponsored by their institution's aging centre to understand age-friendliness, while the McMaster Institute for Research on Aging (2019) held a focus group with older adults to identify current institutional work and gaps linked to the 10 AFU principles. Participants in the latter study were initially provided the 10 AFU principles to think about age-friendliness from a personal and institutional standpoint (McMaster Institute for Research on Aging, 2019). They then individually indicated whether the university was meeting each principle using a 5-point Likert scale. Participants shared their responses with the group and discussed ways to improve age-friendliness based on their knowledge and experience.

Whalen et al. (2019) conducted a focus group with older adults who participated in a walk-along interview to learn more about their experience navigating campus. During the group discussion, participants talked about the elements they perceived as essential for increasing campus walkability and their confidence in navigating the campus. Chesser and Porter (2019) and Cannon et al. (2021) also conducted focus groups following other data collection activities. Chesser and Porter (2019) asked members of their institution's AFU committee to categorize, prioritize, and discuss photos they had taken of campus features that were age-friendly facilitators or barriers. Similarly, Cannon et al. (2021) asked older adults to participate in a focus group after a photovoice activity to understand their perceptions of facilitators and barriers on campus and suggestions for improvement.

## **Interviews**

Interviews were utilized in four studies (Cannon et al., 2021; Silverstein et al., 2019; Simon et al., 2022; Whalen et al., 2019). Silverstein et al. (2019) conducted 30-minute interviews with representatives from various institutional units to develop the ICCS. Participants reviewed statements relevant to their unit and indicated whether they reflected age-friendliness. Probes were used to encourage participants to elaborate on their responses. Simon et al. (2022) conducted face-to-face and phone interviews with stakeholders from different university divisions, including faculty, staff, students, alumni, and emeriti. The 25-60 minute interviews explored the following: participants' history at the university, what the term age-friendly meant to them, the perceived benefits and barriers of having older learners on campus, and what their division was currently doing to be age-friendly. Participants were presented the 10 AFU principles near the end of the interview to discuss how the university could be more age-friendly.

Cannon et al. (2021) interviewed older adults who completed their survey about barriers and facilitators to accessing the local senior centre and university, to gain a deeper understanding of their perceptions. Participants were asked 24 questions about the benefits and perceived barriers to visiting the university. Whalen et al. (2019), however, conducted walk-along interviews with older adults to understand their experiences navigating the campus environment. Trained student researchers walked with the participants and facilitated the interviews using prompts. Participants also instructed the student researchers to take photos of aspects that might positively or negatively impact campus walkability. The research team chose walking routes that older adults were most likely to use prior to the interviews based on certain criteria. After walking each segment of campus, participants were asked to rate the age-friendliness of particular campus features on a 7-point Likert scale.

### **Photovoice**

Three studies used photovoice (Cannon et al., 2021; Chesser & Porter, 2019; Chesser et al., 2020). Chesser and Porter (2019) conducted three pilot projects with different groups of participants: (a) members of their institution's AFU committee, (b) older adults who regularly or intermittently were on campus, and (c) students in a second-year undergraduate course on social aspects of aging. All participants took photos and recorded audio commentaries of perceived age-friendly and unfriendly features of their campus using smartphones or tablets. Participants were given the 10 AFU principles and the WHO's checklist for age-friendly cities as a guide. They were also encouraged to capture physical, psychological, social, and spiritual aspects of age-friendliness. Following the photovoice activity, participants in the first and second projects were invited to a group session to discuss their photos and audio recordings, contributing to data analysis. In contrast, students in the third project were given a worksheet to record the barriers and facilitators they captured. Their course instructor analyzed the data.

Chesser et al. (2020) recruited older adult citizen scientists comprising retired faculty, retired staff, a current student, and community members who accessed university programs and facilities to assess the age-friendliness of their main campus. The authors define citizen scientists as members of the public who collaborate on scientific research projects to address real world problems (p. 1529). The citizen scientists completed a 30- to 90-minute daytime walk to take photos and record short explanatory audio commentaries describing age-friendly and unfriendly features of campus areas they typically frequented. Six participated in at least one of two 2-hour follow-up group discussions to identify facilitators and barriers to age-friendliness. Similarly, Cannon et al. (2021) conducted a photovoice activity with older adults, but trained students to be the researchers. Students were matched with participants and toured the campus together. Students used smartphones to photograph facilitators and barriers to using the environment from

the participant's perspective. A focus group was held with the student researchers and participants to discuss the photos.

### **Other**

Two additional methods were used to assess age-friendliness. Silverstein et al. (2019) facilitated a 3-hour workshop with participants representing faculty, staff, students, and alumni to operationalize the 10 AFU principles. Participants were introduced to the principles and then asked to develop statements that reflected age-friendliness. A second 3-hour workshop was held to train the participants to conduct interviews with university representatives to determine their perceptions of age-friendliness based on the statements developed.

To understand their institution's context and needs related to age-friendliness, Luz and Baldwin (2019) conducted an internal scan of aging-related initiatives already on campus. Their scan initially focused on research that was conducted by searching for funded grants via a database accessible through their institution. They also examined models of campus-wide aging programs at other major universities to determine organizational missions, structures, finances, etc. Similarly, Melchionno (2021) obtained institutional documents from administrators and faculty to track AFU activities at their university.

### **Discussion**

The objective of this environmental scan was to determine how other post-secondary institutions have assessed their age-friendliness in order for the University of Calgary and other institutions to learn from this work. The results demonstrate that relatively few institutions have assessed their age-friendliness to date, despite the growing AFU Global Network membership. Seven methods were identified from our scan. While nearly all researchers employed these methods to understand the age-friendliness of their institutional environments and/or activities, it



should be noted that June & Andreoletti (2021) instead surveyed participants about their interests in continuing to engage with the university in ways that align with the AFU principles (refer to Supplement 1 for specific study objectives). Because older adults' engagement in educational and research activities is a critical part of an AFU, we felt this study merited inclusion in the scan.

The most comprehensive approach we found was taken by Silverstein et al. (2022) who developed and validated the ICCS to evaluate an institution's age-friendliness against all 10 AFU principles. The ICCS comprises two measures: an inventory to assess objective elements of age-friendliness and a survey to assess subjective elements. Together, the inventory and survey capture actual and perceived age-friendliness from multiple stakeholders, which is advantageous because the mere presence of an age-friendly environmental feature or practice may not necessarily translate to the perception of it being age-friendly. Silverstein et al. (2022) have noted that actual and perceived age-friendliness do not always align. Understanding where discrepancies exist can inform further exploration of areas critical to increasing age-friendliness and facilitate meaningful change. Based on our review of the instrument and the contexts in which it has been implemented, we feel this instrument best meets our needs and have elected to utilize the ICCS for our baseline assessment.

The ICCS may not be the preferred choice of assessment for others. Its age-friendly environmental features and practices span multiple areas of an institution (e.g., teaching and learning, research, personnel) and therefore likely requires buy-in from the institution's senior leadership team. Ethical approval from the institution's review board may also be required since data collection involves a range of administrative units and campus constituent groups. Further, the inventory and survey are lengthy. Considerable resources will be needed to administer the

full instrument, especially at multiple time points if it is used to determine progress an institution has made towards increasing their age-friendliness. More focused methods may be less resource intensive for researchers yet still provide important insights to guide future work that enhances age-friendliness.

The 60-item inventory developed by Lim et al. (2022) is shorter than the ICCS but determines an institution's level of performance across several AFU functions, some of which overlap with the ICCS. However, it relies on a single respondent's knowledge of their institution's age-friendliness. Another approach that can be taken is that of June and Andreoletti (2021) who developed a survey based on some of the 10 AFU principles. Researchers interested in examining the status of their institution's prioritized AFU principles or areas of concern could adopt similar methods. Focus groups, interviews, and photovoice may also be useful for better understanding the experiences different campus constituent groups have with core aspects of age-friendliness, such as navigating campus and engaging in campus activities. These methods could be utilized alone or following the ICCS (Silverstein et al., 2022) or 60-item inventory (Lim et al., 2022) to learn more about why an institution is not excelling in particular areas. For example, the ICCS or inventory might indicate that the environment is not very age-friendly. Other methods could be used to examine environmental issues in more depth and make evidence-informed recommendations to administrative units responsible for facility development and maintenance.

We recommend that institutions that have not yet comprehensively assessed their age-friendliness consider using the ICCS at least initially, if feasible from a resource standpoint, given its qualities mentioned earlier. While the endorsement of an institution's senior leadership team may be required, this process can be leveraged to increase awareness about the importance

of an AFU and establish connections with key institutional leaders. Its widespread administration can also help educate stakeholders about the concept of an AFU and the institution's membership in the AFU Global Network. Further, findings framed around functions can influence institution- and unit-level strategies to advance age inclusivity (Silverstein et al., 2022).

### **Limitations and Future Directions**

Several sources included in our scan lacked detailed descriptions of the methods used to assess age-friendliness, such as participant recruitment strategies and data collection methods and procedures. The characteristics of participants (e.g., status - faculty, staff, student, community member; age, gender, etc.) were not reported in some sources either and older adult community members' association with the institution being assessed was at times unclear. Researchers should report this information to help contextualize participants' knowledge and perceptions of an institution's environments and activities. Our results ultimately reflect the varying level of detail provided by the authors. Another limitation of the included sources was that none addressed assessing age-friendliness over time. However, all sources were published within the past four years, not allowing sufficient time for follow-up assessments to be undertaken or completed. Researchers should consider effective methods for conducting longitudinal assessments of their institution's age-friendliness to monitor progress and share their experiences to guide other researchers. Using the ICCS as an example, researchers could investigate whether all or only select items should be assessed following baseline.

Limitations of the current scan include restricting our search to English-language literature, which may partially explain why nearly all sources came from the United States or Canada. Given that the AFU initiative spans the globe, future reviews on this topic should consider literature published in other languages. This scan only focused on existing knowledge

(Shahid & Turin, 2018) as well for feasibility purposes. New knowledge was not generated by engaging with key stakeholders to learn more about the methods used to assess age-friendliness and work that may not be publicly available. Researchers would benefit from knowing more about additional methods that may have been used to make informed decisions based on their situation and institution's context.

### **Conclusion**

This environmental scan will help to advance age inclusivity at the University of Calgary and elsewhere. The findings contribute more broadly to gerontology and geriatrics education by identifying methods other post-secondary institutions have used to assess age-friendliness from both the academic and grey literature. The results of this scan will inform decisions made by the research team interested in assessing the University of Calgary's age-friendliness while being applicable to other researchers striving to achieve the full vision of an AFU at their institution.

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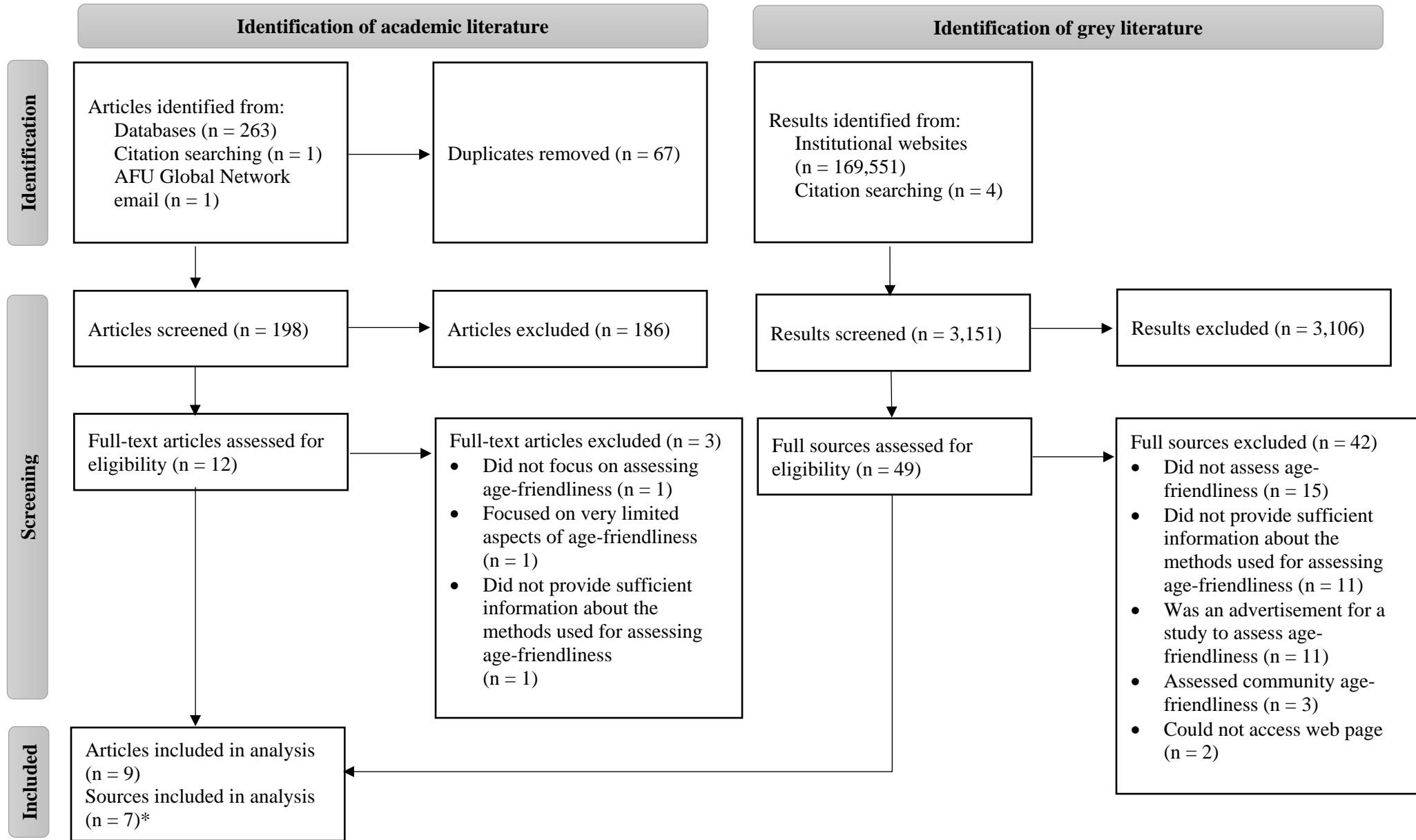


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Figure 1

PRISMA Flow Diagram



\*3 of 7 sources were academic literature

**Table 1***Basic Numerical Analysis of the 16 Included Sources*

<b>Source</b>
<ul style="list-style-type: none"> <li>• Academic literature (n = 12) <ul style="list-style-type: none"> <li>○ Peer-reviewed article (n = 9)</li> <li>○ Conference abstract (n = 3)</li> </ul> </li> <li>• Grey literature (n = 4) <ul style="list-style-type: none"> <li>○ Research report (n = 2)</li> <li>○ YouTube research video (n = 1)</li> <li>○ Honours thesis abstract (n = 1)</li> </ul> </li> </ul>
<b>Location</b>
<ul style="list-style-type: none"> <li>• North America (n = 15) <ul style="list-style-type: none"> <li>○ United States (n = 10); 2 of 11 studies were conducted at 1 institution</li> <li>○ Canada (n = 2); 4 studies were conducted at 2 institutions</li> </ul> </li> <li>• Global (n = 1) <ul style="list-style-type: none"> <li>○ United States, Canada, Europe, Asia</li> </ul> </li> </ul>
<b>Research Team Composition</b>
<ul style="list-style-type: none"> <li>• Multi-disciplinary research teams (n = 6); based on available data from 10 of 16 sources</li> <li>• Inter-institutional teams (n = 3); based on available data from 14 of 16 sources</li> </ul>
<b>Research Design</b>
<ul style="list-style-type: none"> <li>• Mixed methods (n = 9)</li> <li>• Qualitative (n = 4)</li> <li>• Quantitative (n = 2)</li> <li>• Review (n = 1)</li> </ul>
<b>Sample Size</b>
<ul style="list-style-type: none"> <li>• Mixed methods (n = 2,268; M = 252; Range = 7-1,741); based on available data from 7 of 9 sources</li> <li>• Qualitative (n = 54; M = 14; Range = 3-19); based on available data from 3 of 4 sources</li> <li>• Quantitative (n = 702); based on available data from 1 of 2 sources</li> <li>• Review (n = 28)</li> </ul>
<b>Participants</b>
<ul style="list-style-type: none"> <li>• Staff (n = 9)</li> <li>• Faculty (n = 8)</li> <li>• Students (n = 8)</li> <li>• Older adults (n = 8)</li> <li>• Alumni (n = 4)</li> <li>• Emeriti (n = 1)</li> <li>• Institutional AFU leads (n = 1)</li> </ul>
<b>Data Collection Methods</b>
<ul style="list-style-type: none"> <li>• Survey (n = 7)</li> </ul>

- Inventory (n = 7)
- Focus group (n = 6)
- Interview (n = 4)
- Photovoice (n = 3)
- Other (n = 3)
  - Scan of existing material (n = 2)
  - Workshop (n = 1)

**Institutional Contextual Data\***

- Operating budget: M = \$761.6 million; Range = \$91.4 million – 3.2 billion\*\*
- Student population: M = 23,300; Range = 4,019 – 49,695
- Faculty and staff population: M = 5,030; Range = 1,103 – 14,715
- Masters programs (n = 12)
- Doctorate programs (n = 11)
- Professional programs (n = 11)
- Aging hub (n = 9)

\*Contextual data is not reported for Lim et al. (2022) because the study was conducted across multiple unspecified institutions.

\*\*Local currency (USD or CAD).

Supplement 1

Summary of the 16 Included Sources

Authors & Contributors	Type of Literature	Study Location & Context	Study Objective	Study Design	Sample Size & Characteristics	Summary of Methods & Procedures
Cannon et al., 2021  NR multi-disciplinary team; no inter-institutional team	Academic (peer-reviewed article)	Western Oregon University, United States  \$91.4 million operating budget; 4,019 students; 1,118 faculty and staff; masters programs	To explore barriers, facilitators, and opportunities for an Oregon public university to engage its older community members and become more age-friendly upon receiving the AFU designation.	Mixed methods	N = 46; older adults who were members of the local senior centre adjacent to the university campus; F = 69.6%, M = 30.4%; mean age = 75.2 years; 97.8% White; mean household size = 2; 89.1% completed at least some college; 21.7% used mobility devices	Survey: Distributed a 32-item paper survey to members of a local senior centre to assess their use of the centre's services and activities as well as the university's services, amenities, and resources, including their frequency and purpose for using them and barriers and facilitators to accessing them. Two faculty members reviewed the survey to establish face validity. Each survey included a pre-stamped envelope so a participant could complete it at their own pace and return it by mail.
					N = 9; older adults who were members of the local senior centre adjacent to the university campus; F = 66.7%, M = 33.3%; mean age = 73.4 years; 100% White; mean household size = 2; 88.8% completed at least some college;	Interview: Recruited a sample of survey respondents who indicated an interest in participating in an interview. Semi-structured interview protocol was designed to gain a deeper understanding of answers participants

					<p>none used mobility devices</p> <p>N = 7; older adults who were members of the local senior centre adjacent to the university campus; F = 42.9%, M = 57.1%; mean age = 72.1 years; 100% White; mean household size = 1.7; 85.7% completed at least some college; 14.3% used mobility devices; some participants completed the survey and/or interview</p>	<p>provided on the survey.</p> <p>Photovoice, focus group: Student researchers were paired or grouped with one participant to navigate campus with them and discuss barriers and facilitators to using the environment. Students used their smartphones to take pictures. A focus group was held with students and participants to share and discuss the photos using the “SHOWeD” protocol (i.e., the facilitator asks “What do you see here? What is really happening? How does this relate to our lives? Why does this problem or strength exist? What can we do about it?”).</p>
<p>Chesser &amp; Porter, 2019</p> <p>No multi-disciplinary team; no inter-institutional team</p>	<p>Academic (peer-reviewed article)</p>	<p>University of Manitoba, Canada</p> <p>\$660.45 million operating budget; 31,037 students; 9,090 faculty and staff; masters, doctoral, and professional programs; Centre on Aging</p>	<p>To explore age-friendliness through a variety of stakeholder lenses in order to better inform AFU committee decision-making on mandates.</p>	<p>Qualitative</p>	<p>N = 3; members of the university’s AFU committee</p>	<p>Photovoice, focus group: Participants used their personal devices to take photos of university features perceived as age-friendly or unfriendly. To guide data collection, participants were provided the 10 AFU principles, the WHO checklist for</p>

						age-friendly cities, and an instruction guide for ethically taking photos. Participants then categorized, prioritized, and discussed 5 facilitators and barriers important to age-friendliness in a focus group.
					N = 10; older adults who interacted with the university's main campus either regularly or intermittently. Eligible participants included older adult faculty, staff, students, volunteers, community members, and university service users; mean age = 71.5 years	Photovoice: Participants completed a 30- to 90-minute walk around the Fort Garry campus and used the Discovery Tool tablet application to document age-friendly and unfriendly university features. They were given specific prompts of what to think about when taking pictures, and to consider features beyond simply getting around campus.
					N = NR; undergraduate students in a second-year course	Photovoice: Students worked in groups of 5 to document age-friendly barriers and facilitators around campus using their smartphones. Students were provided a worksheet to explain age-friendly and unfriendly features they captured. Groups

						presented their findings as well as possible implications and solutions to the class.
Chesser et al., 2020  Multi-disciplinary team; inter-institutional team	Academic (peer-reviewed article)	University of Manitoba, Canada  \$660.45 million operating budget; 31,037 students; 9,090 faculty and staff; masters, doctoral, and professional programs; Centre on Aging	To describe how collaborative citizen science was used to have older people assess the age-friendliness of the institution.	Qualitative	N = 10; older adults who were retired faculty, retired staff, students, or community members that used university programming and/or recreation facilities; F = 80%, M = 20%; mean age = 71.5 years, age range = 68-78 years; mean years of education = 17.9; 20% self-reported being in excellent health, 40% in very good health, and 30% in good health, 10% did NR	Photovoice: Prior to walking Fort Garry campus, participants received instructions about safe walking and ethical photography procedures. They were also given two documents about AFUs and age-friendly community features. Participants then completed a 30- to 90-minute walk and used the Discovery Tool tablet application to document age-friendly and unfriendly university features. The walking routes followed were unique and freely chosen based on the areas of campus participants typically frequented.
Claver et al., 2020  NR multi-disciplinary team; no inter-institutional team	Academic (conference abstract)	California State University Long Beach, United States  \$462 million operating budget; 39,313 students; 3,600+ faculty and staff; masters,	To identify strengths and opportunities for growth at the university as related to each of the 10 AFU principles.	Qualitative	N = NR; university administrators	Inventory: Participants indicated the activities and programs offered at the university. Data were collected from administrators through email after a phone introduction and entered into an Excel document.



		doctoral, and professional programs; Center for Successful Aging				
Gautam et al., 2020  NR multi-disciplinary team; NR inter-institutional team	Academic (conference abstract)	University of Massachusetts Lowell, United States  \$511.32 million operating budget; 18,369 students; 1,960 faculty and staff; masters, doctoral, and professional programs; Center for Gerontology Research & Partnerships	To inform other institutions how they might consider assessing age-friendliness and how to adapt the inventory to meet their unique campus characteristics.	Mixed methods	N = NR; attendees of the 5th annual healthy aging living well forum	Focus group: Conducted table discussions with attendees at a forum to identify themes related to the AFU principles.
					N = 12; key campus leaders and offices	Inventory: Administered the AFU inventory to campus leaders and offices.
					N = NR; faculty, staff, and students on the campus	Survey: Distributed the AFU campus climate survey to faculty, staff, and students.
June & Andreoletti, 2021  No multi-disciplinary team; no inter-institutional team	Academic (peer-reviewed article)	Central Connecticut State University, United States  \$200 million operating budget; 9,653 students; 1,434 faculty and staff; masters, doctoral, and professional programs	To assess the level of interest in continued and increased engagement with the university once on-campus activities are safe to resume (following COVID-19).	Mixed methods	N = 132; community members who attended the “Scholars For Life! Speaker Series” offered by the Office of Continuing Education; F = 75%; mean age = 69 years, age range = 37-86 years; 41% lived alone; 93% non-Hispanic White; 76% retired; most lived independently in the community; 70% attended the speaker series when it became virtual	Survey: Distributed a 30-item online survey to determine participants’ engagement with the virtual speaker series, and their satisfaction and future engagement with the university. To assess additional interest, participants responded to questions focused on the AFU principles (1,4,6,8) of including older adults and the topic of aging in the core activities of teaching and research on campus, fostering

					during the COVID-19 pandemic	intergenerational learning and connection, and accessing health, wellness, arts and cultural programs.
Lim et al., 2022  Multi-disciplinary team; inter-institutional team	Academic (peer-reviewed article)	United States, Canada, Europe, Asia	To develop an initial iteration of a global AFU indicators inventory that allows universities to self-evaluate their age-friendliness.	Mixed methods	<p>N = 7; experts in social welfare studies, lifelong education, aging studies, and health studies; F = 14%, M = 86%, age range = 40-70 years; PhD = 6, Masters = 1</p> <p>N = 26; AFU leads from 18 United States (69.2%), 4 Canadian (15.4%), 2 European (7.7%), and 2 Asian institutions (7.7%); 88.5% of institutions</p>	<p>Focus group: A working group of experts developed AFU indicators through a series of four focus group discussions. The items were initially based on the 10 AFU principles, 84 items across 8 topics from the WHO age-friendly cities guidelines, 20 questions from the age integration indicators, and 52 questions from the AFC-revised indicators developed in Korea. Items with similar attributes were integrated and grouped together to form themes, resulting in 68 items across 5 themes (only 60 items are recommended).</p> <p>Inventory: Emailed a 68-item inventory to AFU leads of institutions part of the AFU Global Network to determine their institution's current</p>

					were in urban areas, 11.5% in rural areas; 30.8% of institutions had 15,000–19,999+ students, 15.4% had 5,000–9,999 students, and 11.5% had <10,000-14,999 students.	performance and assess the perceived adequacy and acceptability of the items. Based on the results, 60 indicators are recommended for use.
Luz & Baldwin, 2019  Multi-disciplinary team; no inter-institutional team	Academic (peer-reviewed article)	Michigan State University, United States  \$3.2 billion operating budget; 49,695 students; 12,000 faculty and staff; masters, doctoral, and professional programs; AgeAlive	To describe what is involved in becoming age-friendly and provide lessons learned to assist other institutions in their own journey.	Mixed methods	NR	Scan: A preliminary assessment of aging-related assets at the university was conducted, starting with research. Searched a database of funded grants accessible through the university's sponsored programs office, using multiple keywords related to aging. Also assessed the range of existing models of campus-wide aging programs at other major universities to guide the form AgeAlive should take.
McMaster Institute for Research on Aging, 2019  NR multi-disciplinary team; no inter-institutional team	Grey (research report)	McMaster University, Canada  \$799 million operating budget; 37,370 students; 14,715 faculty and staff; masters, doctoral, and professional	To collect baseline data on McMaster University's work that aligns with the 10 AFU principles, and identify areas with well developed programming, research, and activities as well as areas that could use	Mixed methods	N = 269; faculty staff, students, alumni, and community members	Survey: Participants were shown the 10 AFU principles and asked if/how their area or department was meeting them. For each principle, participants wrote examples to demonstrate how they were met or

		programs; McMaster Institute for Research on Aging	further programming to build on its strengths.			opportunities for improvement.
					N = NR; older adults who were retired, senior class assistants, program participants, or community members; all participants had attended the university	Focus group: Participants were shown the 10 AFU principles and asked to think about what age-friendly means to them, what makes McMaster age-friendly, and what opportunities exist for McMaster to be more age-friendly. They rated their level of agreement (strongly agree, agree, neutral, disagree, strongly disagree, don't know) that McMaster meets each principle before describing to the group why they chose the answer they did and what opportunities there were to improve.
Melchionno, 2021 No multi-disciplinary team; no inter-institutional team	Grey (honours thesis abstract)	University of Rhode Island, United States  \$812.2 million operating budget; 16,828 students; 3,793 faculty and staff; masters, doctoral, and professional programs; Program in Gerontology	To determine AFU activities at the University of Rhode Island and the university's progress.	Mixed methods	NR	Scan: Tracked campus-wide AFU and related activities since the university got its designation. Gathered this information from faculty and examined administrative and correspondence documents.
					N = NR; faculty and staff from 14 units on campus	Inventory: Compiled responses to questions from faculty and staff of 14 units on campus

						related to age-friendliness.
Revell et al. 2020  NR multi-disciplinary team; NR inter-institutional team	Academic (conference abstract)	University of Massachusetts Dartmouth, United States  \$264.66 million operating budget; 7,869 students; 1,103 faculty and staff; masters, doctoral, and professional programs; Ora M. DeJesus Gerontology Center	To begin informally surveying faculty and gerontology affiliates on age-friendly practices.	Quantitative	N = NR; administrators	Inventory: Emailed the AFU inventory to administrators.
					N = NR; students and employees	Survey: Emailed the AFU campus climate survey to all students and employees.
Silverstein & Beaulieu, 2021  NR multi-disciplinary team; no inter-institutional team	Grey (YouTube video)	Colorado State University, United States  \$1.36 billion operating budget; 32,908 students; 7,222 faculty and staff; masters, doctoral, and professional programs; Columbine Health Systems Center for Healthy Aging	To assess the age-friendliness of Colorado State University.	Mixed methods	N = NR; administrators	Inventory: Sent the AFU inventory to administrators.
					N = 1,741; 17.3% faculty, 43.1% staff, and 40.6% students; 18.0% were 18-24 years, 18.5% were 25-34 years, 15.5% were 35-44 years, 16.3% were 45-54 years, 20.9% were 55-64 years, 8.3% were 65-74 years, 2.5% were 75+ years	Survey: Sent the AFU campus climate survey to faculty, staff, and students. Included open response questions about participants' views of the age-friendly status of the campus and the campus' response to COVID-19.
Silverstein et al., 2019  Multi-disciplinary team; no inter-institutional team	Academic (peer-reviewed article)	University of Massachusetts Boston, United States  \$480.62 million operating budget;	To operationalize the AFU principles to: (1) create an audit to assess age-friendliness on any campus of higher education; (2) utilize	Qualitative	N = 12; students, faculty, and staff from multiple departments, older learners, and alumni	Workshop: The first 3-hour workshop introduced participants to the 10 AFU principles and asked them to brainstorm statements that

		16,259 students; 1,922 faculty and staff; masters, doctoral, and professional programs; Gerontology Institute	a team of age-diverse representatives of various constituencies at the university to engage in the audit process; and (3) identify where our campus is excelling in meeting the principles of age-friendliness and where challenges remain to make recommendations to our campus community.			indicate age-friendliness to gather perceptions of age-friendliness from university representatives. Participants were trained to conduct qualitative interviews with representatives in the second 3-hour workshop.
					N = 19; representatives from 17 units on campus, students, and alumni	Interview: Each interview was customized for the participant to reflect department-specific knowledge. Participants were presented relevant statements in an agree/disagree format and probed to elaborate on their responses.
Silverstein et al., 2022  Multi-disciplinary team; inter-institutional team	Academic (peer-reviewed article)	University of Massachusetts Boston, United States  \$480.62 million operating budget; 16,259 students; 1,922 faculty and staff; masters, doctoral, and professional programs; Gerontology Institute	To develop a comprehensive instrument of objective and subjective indicators of age-friendly campus practices and to assess awareness, perceptions, and beliefs about age inclusivity across campus constituencies.	Quantitative	N = 14; administrators	Inventory: An excel workbook was developed to organize the 93-items by administrative units using sheets. One participant completed each sheet in most cases, but missing information was sought from additional administrators if necessary. Participants selected yes, no, or don't know from the

						drop-down menu options to indicate the presence of an AFU practice. A comment column was available for participants to qualify responses.
					N = 688; 19.0% faculty, 31.5% staff, and 49.4% students; F = 66.3%, M = 3.2%, non-binary/other = 30.5%; 20.3% of all participants were < 25 years, 15.1% were 25-34 years, 12.8% were 35-44 years, 17.0% were 45-54 years, 23.7% were 55-64 years, 9.0% were 65-74 years, and 2.0% were 75+ years; 78.2% White, 7.9% Asian, 6.8% Hispanic, 2.2% Black, 4.9% other	Survey: The Provost's Office distributed the online campus climate survey with a letter from the research team member responsible for data collection. As this occurred during the COVID-19 pandemic, a note was included in the survey stating that "For the purposes of this survey, please answer the questions based on conditions at your university before COVID-19 emerged in the US (2019). If this is your first term at your institution, please answer to the best of your knowledge."
Simon et al., 2022  No multi-disciplinary team; no inter-disciplinary team	Academic (peer-reviewed article)	Eastern Michigan University, United States  \$297 million operating budget; 16,279 students; 2,400+ faculty and staff; masters, doctoral, and	To understand how university stakeholders perceive age-friendliness, identify current efforts and opportunities that exist within the university, and describe the	Review	N = 28; administrators with diverse experience from 18 units; F = 53.5%, M = 46.4%; mean length of time at the university = 12.4 years, range = <1-51 years	Interview: Semi-structured interviews were conducted either face-to-face or by phone. Participants were asked about their background at the university, what the term "age-friendly" meant to them, the

		professional programs	perception of barriers that older learners encounter.			possible benefits of having older learners on campus, perceived barriers facing older learners, and what their department was currently doing to be age-friendly. Participants were presented the 10 AFU principles toward the end of the interview and asked whether they had any additional perspectives on how the university could be more age-friendly.
Whalen et al., 2019 Multi-disciplinary team; no inter-institutional team	Grey (research report)	McMaster University, Canada  \$799 million operating budget; 37,370 students; 14,715 faculty and staff; masters, doctoral, and professional programs; McMaster Institute for Research on Aging	To understand the types of features within a post-secondary setting that can create a safe, comfortable campus space for people of all ages and abilities.	Mixed methods	N = 19; older adults; F = 63.2%, M = 36.8%; mean age = 72 years, age range = 66-89 years; 4 participants used a mobility aid some or most of the time (e.g., Nordic pole, cane, walker)	Interview: Semi-structured walk-along interviews to take photos of highlights that might positively or negatively impact campus walkability. Participants rated (strongly disagree, disagree, disagree somewhat, neither agree nor disagree, agree somewhat, agree, strongly agree) their perceptions of key campus features after each walking route. Criteria for selecting walking routes included: (a) passed by at least one transit stop; (b) were 1



						<p>km or less and could be completed at an easy pace in 15 minutes without breaks; (c) contained three segments (distinctive areas of the campus as determined by stakeholders); (d) passed two or more popular destinations; (e) had a bench at the end for participants to sit and complete the ratings.</p> <p>Focus group: Most participants who completed the walk-along interview engaged in the focus group. Participants were asked about the elements important for walkability, their confidence in navigating the campus, and their impressions of McMaster's campus and its walkability for older adults.</p>
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*Note.* NR = not reported; F = female; M = male