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Comparing the implementation of advanced access strategies among primary health care providers

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ABSTRACT

The advanced access (AA) model is among the most recommended innovations for improving timely access in primary health care (PHC). Originally developed for physicians, it is now relevant to evaluate the model's implementation in more interprofessional practices. We compared AA implementation among family physicians, nurse practitioners, and nurses. A cross-sectional online open survey was completed by 514 PHC providers working in 35 university-affiliated clinics. Family physicians delegated tasks to other professionals in the team more often than nurse practitioners ($p = .001$) and nurses ($p < .001$). They also left a smaller proportion of their schedules open for urgent patient needs than did nurse practitioners ($p = .015$) and nurses ($p < .001$). Nurses created more alternatives to in-person visits than family physicians ($p < .001$) and coordinated health and social services more than family physicians ($p = .003$). During periods of absence, physicians referred patients to walk-in services for urgent needs significantly more often than nurses ($p = .003$), whereas nurses planned replacements between colleagues more often than physicians ($p < .001$). The variations among provider categories indicate that a one-size-fits-all implementation of AA principles is not recommended.

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Introduction

Timely access, defined as patients being able to access care when they perceive they need professional attention, is a core attribute of the patient-centered medical home model (Katz et al., 2017). Numerous innovations have been implemented to improve timely access, with one of the most recommended around the world being the advanced access (AA) model (Murray et al., 2003).

AA is an organizational model that aims to improve accessibility for patients and support their relational and informational continuity with a primary health care (PHC) provider or team (Murray & Berwick, 2003). Initially developed in the United States in 2001, AA has been implemented widely in North America, Europe, and Australia. The transition to AA entails organizational changes that require all PHC providers within a clinic to adapt their roles, tasks, and schedules, as well as to engage in more interprofessional collaboration to ensure both effective implementation and patient-centered care (Breton et al., 2020; Murray, 2005). In this study, we aimed to compare AA implementation among family physicians, nurse practitioners, and nurses in PHC clinics.

Background

The AA model was developed based on five guiding principles. Table 1 presents a summary of the five guiding principles.

Many researchers have demonstrated the AA model's effectiveness in various health care systems (Fournier et al., 2012; Hudec et al., 2010; Rose et al., 2011). The positive impacts of AA include reduced wait times for appointments, fewer missed appointments (no-shows), improved patient experiences, and increased satisfaction among providers (Bennett & Baxley, 2009; Rivas, 2020; Rose et al., 2011). Other positive impacts have also been found in other studies, such as greater continuity of care, increased appointment availability, and reduced workload (Goodall et al., 2006; Hudec et al., 2010; Salisbury et al., 2007).

However, the implementation of AA has increased concerns related to patients' responsibility for scheduling their appointments, which are no longer scheduled weeks in advance by the clinic staff. In the AA model, it is the patient's responsibility to contact the clinic to obtain an appointment within the recommended time frame (Breton et al., 2020). This increased responsibility has led to worries that some of the most vulnerable patients will be lost to follow-up.

Results of studies on the implementation of AA have revealed key factors that facilitate success, such as the engagement of leadership in change initiative (e.g., providing information on AA, supporting providers, physician involvement, team engagement to create team continuity, and collective leadership based on distributed work and responsibility within

Table 1. Five guiding principles of the advanced access (AA) model.

Principles of Advanced Access		Definition
1	Balancing supply and demand	Determining the service needs of patients (demand) and the number of working days required from each PHC provider to meet them (supply), to achieve a balance between the two
2	Reducing the backlog	Clearing the backlog to eliminate the wait list and informing patients about the AA model via a communications strategy using a range of tools (e.g. letters, phone messages, local newspaper ads, posters)
3	Reviewing the appointment system	Reviewing the appointment system to plan schedules and allow for a suitable proportion of open next-day slots
4	Integrating interprofessional practices	Rethinking the tasks and optimizing the roles of each PHC provider in the team, with the goal of redirecting patients to the appropriate provider to respond to their needs in a timely manner
5	Developing contingency plans	Devising organizational strategies to address seasonal increases in demand and to cover for healthcare providers' absences during vacation and sick leave

the team; Murray, 2005; True et al., 2013). Providing information on AA via training sessions and on the AA implementation process based on patient-level information from electronic medical records have also been identified as facilitators (True et al., 2013).

A major barrier identified in implementing the AA model is a lack of staff resources due to maternity leaves or retirements (Abou Malham et al., 2017). An insufficient number of clerical staff trained in AA is also a barrier, as they orient and assign patients the appropriate type of appointment (telephone or on site), ensure the pre-appointment preparation of patients, and enhance interprofessional collaboration by assigning specific work to the appropriate team member. High turnover of clerical staff and family physicians practicing in multiple clinical settings also hinder AA implementation (Abou Malham et al., 2017).

In the scientific literature, various strategies are recommended to implement the different AA guiding principles. Most studies on these strategies have been carried out at the clinic and physician levels. A brief summary of the strategies recommended in the literature according to each AA principle is presented below.

Principle 1: balancing supply and demand

Estimating the volume of demand based on patients' needs and adjusting the appointment schedule accordingly is a key strategy in AA implementation (Goodall et al., 2006). The basic principle is that supply can be planned according to the estimated demand based on patients' characteristics, such as the presence of chronic disease. A qualitative study conducted with the first family physicians to implement AA showed that reflecting on this principle leads physicians to relinquish certain administrative activities in order to balance their supply with the estimated demand (Breton et al., 2017). Results of two other studies showed that clinics in which supply was matched with demand increased appointment availability for same-day bookings (Goodall et al., 2006; Salisbury et al., 2007).

Also, a recent study on AA implementation by nurse practitioners indicated that, although they did not systematically measure supply and demand, they identified demand patterns and reduced the supply-demand imbalance (Abou Malham et al., 2020).

Principle 2: reducing the backlog

Studies have shown that increasing the number of same-day appointments available and adding extra consultations for a limited period helps clear backlogs (Goodall et al., 2006; Salisbury et al., 2007). It is sometimes necessary, as well, to maintain a list of certain vulnerable patients to be contacted by the secretary for follow-ups, so as to not lose track of those unable to make their own appointments when needed.

Principle 3: reviewing the appointment system

Studies have shown that the total number of appointments is more likely to be adjusted to meet demand in clinics where AA strategies have been implemented (Goodall et al., 2006). Also, access was improved in clinics that implemented strategies such as providing advice by telephone for new patients or offering online appointment booking (Pickin et al., 2004). However, the use of e-mail to correspond with patients, a strategy reported in the literature, was low (Goodall et al., 2006).

Also, the AA model increases patient's responsibility for making their own appointments. Some physicians have started to keep reminder lists of particular patients to avoid losing track of those who are unable to make their own appointments when needed (Cameron et al., 2010; Goodall et al., 2006).

Principle 4: integrating interprofessional practices

Some studies have shown that certain strategies lead to stronger collaboration between family physicians and registered nurses through the development of a shared practice,

especially for specific conditions (e.g., chronic illness, pregnancy follow-up). For instance, assigning nurse practitioners a leadership role in managing the care of patients with chronic conditions and other strategies designed to optimize collaboration among providers helps to reduce the number of physician visits (Pascucci et al., 2021) and improve timely access in PHC.

Principle 5: developing contingency plans

Several strategies are recommended to develop contingency plans so that providers are not overwhelmed upon returning from absences and to ensure accessibility for patients. These include increasing the number of slots before and after a provider's leave, adding temporary human resources, distributing and matching staff skills to demand, and involving registered nurses and nurse practitioners in clinical cases that fall within their scope of practice. Providers should implement strategies to ensure follow-up of their patients by colleagues during absences such as for test results and urgent medical consultations.

Since the AA model's development more than 20 years ago, PHC clinics have largely evolved toward more interprofessional practice models. To date, AA has been mainly geared toward physicians, who are generally supported by and collaborate with nurses, and not adapted to other providers within the PHC team. This reflects the dominant model of care in which physicians autonomously provide care to their own patients and delegate to other PHC providers mainly when the diagnosis requires it (Contandriopoulos et al., 2016). Also, differences in remuneration modalities, governance, and working routines among PHC providers (Breton et al., 2013) may influence their adoption of AA strategies. Little research has focused on comparing implementation of the AA model among different PHC providers, even though this organizational innovation requires the engagement of all team members (Gaboury et al., 2021). This narrow focus was apparent in a recent evidence synthesis that revealed knowledge gaps regarding the extent to which the key AA principles and corresponding strategies had been implemented by physicians and nurses (Rivas, 2020). This is noteworthy, as considerable variation in implementation among different categories of providers can impede the desired results in terms of timely response to patients' needs (Breton et al., 2020).

Thus, it now seems relevant to evaluate the implementation of the AA model in a contemporary and more interprofessional practice. There is a need to understand the inherent strategies adopted by different PHC providers when implementing AA. The aim of this study was to compare the implementation of recommended strategies for each AA principle as reported by family physicians, nurse practitioners, and nurses working in interprofessional university-affiliated PHC settings in Quebec.

Method

Setting

The AA model has been endorsed by several professional associations across Canada, including the College of Family

Physicians of Canada. In Quebec, the second most populous province of Canada with a population of 8 M inhabitants, the AA model has been widely promoted as a strategy to improve timely access by the Quebec College of Family Physicians as well as by the Ministry of Health and Social Services, leading to major organizational change in all family medicine groups (FMGs). FMGs are groups of physicians working closely with other PHC professionals to provide services to enrolled patients on a non-geographic basis (Breton et al., 2011). Since 2015, the FMG model has integrated different categories of PHC providers, including family physicians, nurse practitioners, nurses, social workers, and pharmacists, among others.

Design

We conducted a cross-sectional study based on an open e-survey hosted on a web platform specifically designed for the purpose of data collection. We used the CHERRIES reporting guidelines for cross sectional online surveys (Eysenbach, 2004). The e-survey was distributed to university family medicine groups (U-FMGs) in Quebec. U-FMGs are interprofessional family medicine groups affiliated with universities that have a clinical, research, and teaching mission for family medicine residents. For this study, we focused on U-FMGs because they are a core PHC model for all family medicine residents as well as other PHC providers. These exemplary settings expose trainees to best practices during their training program and, as such, potentially encourage their own implementation of AA in their future practice.

Data collection

We collected data from October 2019 to March 2020. We originally invited family physicians, nurse practitioners, and nurses from all U-FMGs ($n = 49$) to participate in the study. The study was interrupted by the COVID-19 pandemic in March 2020, by which time we had reached 35 of the 49 U-FMGs. Respondents were expected to complete the anonymous e-survey on a voluntary basis. The participation rate was estimated based on the numbers of PHC providers recorded in the Ministry of Health and Social Services administrative database for the participating U-FMGs. Our sample, based on the 35 U-FMGs, consisted of 724 family physicians, 79 nurse practitioners, and 271 nurses. The denominator included PHC providers on sick leave or maternity leave as well as unfilled positions; as such, the response rate is likely to be underestimated.

The self-administered questionnaire, which included 30 open-ended and closed questions for family physicians and nurse practitioners and 29 questions for nurses, took about 20 minutes to complete. We disseminated the questionnaires through a designated contact person in each U-FMG, who invited the providers to participate in the study. The research team prepared an e-mail message inviting people to participate in the e-survey, presenting the research project, explaining the involvement required of participants (length, confidentiality), and providing the hyperlink. This was forwarded to the designated person in each U-FMG. In line with (2014), we sent three

reminders to maximize the response rate. We sent e-mail invitations and reminders to the designated contact person in each U-FMG, who forwarded them to potential participants. With each reminder, we communicated the U-FMG's participation rate, but only the proportion of participants was shared.

Content of the e-survey

The questionnaire was developed by the research steering committee (MB, IG, SAM, LM, AD) by combining items of two existing questionnaires. The first was the Health Quality Ontario survey (Health Quality Ontario, 2012) aimed at assessing the implementation of the five AA guiding principles, which we used to map the relevant questions for our study. For principle 2, because nurses typically do not have their own patient roster, survey questions on this topic were addressed only to family physicians and nurse practitioners. For principle 4 on interprofessional collaboration, we used a short validated questionnaire (Orchard et al., 2018). To qualitatively evaluate content validity, each expert on the research team ($n = 5$, including experts on innovations, interprofessional collaboration, quality improvement in primary care, integrated multidisciplinary primary care models, governance, and implementation analysis) was asked to rate each item based on their relevance to the AA model and its implementation. They were also prompted to comment on the formulation of the items.

The questionnaire was pre-tested with two family physicians, one nurse practitioner, and one nurse using cognitive testing (Levine et al., 2005). A pilot test was conducted in the spring of 2018 with 24 FMGs in one health administrative region to assess the face validity of the questionnaire. A total of 81 family physicians, 16 nurse practitioners, and 45 registered nurses responded to this pilot survey. Time to complete the questionnaire as well as any recommendations to ease the reading of the questionnaire were documented. Following that pilot project, some of the questions were reformulated, and a few response scales were adjusted based on the results obtained. We removed items for which there was no variation or important ceiling effect and opened questions expecting numerical answers (e.g., number of weeks). Additionally, only the partnership subscale of the Orchard scale (Orchard et al., 2018) was included in the final version of the questionnaire to keep the survey length to a minimum. This decision was supported by an observed lack of variation among the types of professionals surveyed and the opinion of the experts on the team that collaborative behaviors expected within the AA model were more likely to be captured through that particular subscale. Because each principle of AA is composed of different concepts, calculating construct validity was judged to be meaningless.

Analysis

Statistical analysis

We sought to recruit all family physicians ($n = 724$), nurse practitioners ($n = 79$), and nurses ($n = 271$) in the 35 participating U-FMGs. We hypothesized that each of the three categories of providers had implemented strategies for each AA principle differently. We performed descriptive analyses to

describe participants' characteristics (sex, years of practice, etc.) and response frequencies (% valid) for each PHC provider category (median, percentages).

For bivariate analyses, we performed chi-square tests between *provider category* (family physician, nurse practitioner, nurse) and dichotomous categorical variables to assess differences among provider categories. For continuous variables we used an ANOVA or Kruskal-Wallis test, depending on the data distribution. When the difference was significant among the three categories of PHC providers, we performed 2×2 post-hoc analyses to identify between which categories of PHC providers the difference was located.

We calculated a score based on the partnership subscale proposed by Orchard and colleagues (Orchard et al., 2018). For the eight variables from this subscale, we assigned values to the five response options (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *always*) and calculated the mean total score (range: 8–40). We used IBM SPSS version 26 (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY) for all analyses. Incomplete responses were excluded from the analysis.

Ethics considerations

This study was approved by the Research Ethics Committee of Center de recherche Hôpital Charles-Le Moyne (MP-04-2019-368). Participants were given information on the study (length of survey, confidentiality, opportunity to withdraw) and consented to participate before completing the survey. The survey was anonymous.

Results

Participants' characteristics

Within the sample frame, 514 (out of 1074) PHC providers responded to the e-survey. Overall, the response rate was 48%: 44% of family physicians ($n = 324/724$); 56% of nurse practitioners ($n = 44/79$); and 54% of nurses ($n = 146/271$). The overall completion rate of survey questions was 66%: 74% of family physicians ($n = 238/324$), 75% of nurse practitioners ($n = 33/44$); and 46% of nurses ($n = 68/146$). Our respondents' characteristics are similar to the profiles of the PHC providers in the studied settings with very small variations. Of the total respondents, family physicians were slightly less represented than in the sample (67% of the sample vs. 63% of the respondents) compared to nurse practitioners (7% vs. 9%) and nurses (28% vs. 26%), who were slightly more represented. Table 2 presents the respondents' characteristics.

The following sections present results for each of the five AA principles covered in this study, based on responses from the three categories of PHC providers.

Principle 1: balancing supply and demand

Table 3 compares providers in relation to the principle of balancing supply and demand. There were no significant differences in how the three categories of PHC providers implemented two of the eight strategies covered: *including as many services as possible on each visit* and *anticipating patient needs*. The six other strategies differed among the three categories of

Table 2. Characteristics of respondents, n (%).

	Family physicians n = 324	Nurse practitioners n = 44	Nurses n = 146
Women, n (%)	219 (70%)	36 (88%)	127 (93%)
median [min-max]			
Years of practice	11 [0-50]	4.5 [0-30]	17 [1-41]
Number of half-days per week*	7 [1-12]	N/A	N/A
Number of hours worked per week*	N/A	35 [7-45]	35 [1-70]
Number of patients assigned	649 [100-2400]	350 [0-1600]	N/R
Patients seen on average per half-day	N/A	5 [2-6]	5 [0-30]

*Working time is organized as half-days for family physicians and hours for nurse practitioners and nurses

Table 3. Principle 1: strategies implemented by family physicians, nurse practitioners, and nurses, n (%).

Principle 1: Balancing supply and demand	Family physicians	Nurse practitioners	Nurses	p value
Include as many services as possible on each visit	212 (84)	31 (86)	55 (75)	0.225
Delegate tasks to other professionals in the team when appropriate	206 (81)	21 (58)	34 (51)	< 0.001
Anticipate patient requests/needs	178 (77)	24 (80)	45 (69)	0.387
Renew prescriptions for more than one year	163 (70)	12 (40)	12 (19)	< 0.001
Extend the intervals between follow-ups	165 (65)	14 (39)	44 (61)	0.011
Create alternatives to in-person visits	141 (56)	24 (67)	62 (85)	< 0.001
Adjust the schedule to demand	73 (32)	14 (47)	41 (62)	< 0.001
Change the duration of appointments	51 (22)	11 (37)	32 (48)	< 0.001

providers, with most differences found between family physicians and nurses for three strategies ($p < .001$). For these three strategies specifically, nurse practitioners appeared closer to family physicians for *creating alternatives to in-person visits*, closer to nurses for *changing the duration of appointments*, and between family physicians and nurses for *adjusting the schedule to demand*. Family physicians reported *delegating tasks to other professionals in the team when appropriate* and *renewing prescriptions for more than one year* more often than nurse practitioners and nurses (post-hoc analyses, $p = .001$ and $p < .001$, respectively). Also, family physicians differed only from nurse practitioners (post-hoc analyses, $p = .003$) in reporting using the strategy *extending the intervals between follow-ups* significantly more often.

According to their professional scope of practice, only family physicians can *eliminate appointments for an annual exam for certain clientele*, and this was the strategy most often used by those in our study (93%). Among strategies that currently applied only to family physicians and nurse

practitioners, no significant differences were observed in their implementation of strategies such as *assessing appointment needs* (family physicians: 42%; nurse practitioners: 32%; $p = .276$) and *assessing the supply of services offered* (family physicians: 61%; nurse practitioners: 59%; $p = .784$). However, *identifying panel size* (number of patients registered in their name) appeared to be applied more often by family physicians (42%) than by nurse practitioners (12%; $p < .001$).

Principle 2: reducing the backlog

This principle is mainly based on managing the patient roster. Therefore, as nurses do not have their own patient roster, [table 4](#) presents only data from family physicians and nurse practitioners. Results showed no significant differences between family physicians and nurse practitioners in the use of strategies to reduce the backlog. Also, these strategies were overall relatively underused, with the majority of respondents reporting not using them.

Table 4. Principle 2: strategies implemented by family physicians and nurse practitioners, n (%).

Principle 2: Reducing the backlog	Family physicians	Nurse practitioners	p value
Temporarily offer more appointment availability	88 (35)	14 (39)	0.630
Transfer time from administrative tasks to appointment time	83 (33)	14 (47)	0.135

Table 5. Principle 3: strategies implemented by family physicians, nurse practitioners, and nurses.

Principle 3: Reviewing the appointment system	Family physicians	Nurse practitioners	Nurses	p value
Number of weeks open for appointments	3 [1-90]	5 [1-52]	4 [2-26]	< 0.001
Modify appointment duration according to the reason for consultation (minutes)				
- New patient assessment	30 [5-60]	60 [30-60]	60 [15-60]	< 0.001
- Follow-up	30 [15-60]	30 [30-45]	30 [15-60]	< 0.001
- Urgent or semi-urgent consultation	20 [10-60]	30 [15-45]	30 [10-45]	< 0.001
Proportion of schedule left open for urgent or semi-urgent patient needs	10 [0-82]	20 [0-90]	25 [0-100]	< 0.001
Regularly calculate time to the third next available appointment	27 (40)	7 (31)	32 (36)	0.581
Use reminder lists to facilitate the follow-up of certain clientele	120 (48)	22 (61)	36 (52)	0.303
Provide phone access to speak with a doctor or nurse during clinic hours	203 (89)	26 (93)	66 (99)	0.043
Set up a dedicated phone line for appointment booking	157 (69)	25 (83)	56 (82)	0.036
Offer online appointment booking	87 (38)	14 (47)	21 (32)	0.398
Use email to address medical questions or concerns	39 (17)	11 (38)	27 (42)	< 0.001

Principle 3: reviewing the appointment scheduling system

Table 5 shows a low uptake of three strategies among the three categories of providers: using reminder lists to facilitate the follow-up of certain clientele; regularly calculating time to the third next available appointment; and offering online appointment booking. There were no significant differences among the categories of providers. Nonetheless, family physicians differed from both nurse practitioners and nurses (post-hoc analyses, both $p < .001$) in spending significantly less time on assessing new patients and conducting urgent or semi-urgent consultations. They also had the lowest median proportion of their schedules left open for urgent or semi-urgent patient needs compared to nurse practitioners and nurses (post-hoc analyses, $p = .015$ and $p < .001$, respectively). However, family physicians seemed to be following the AA recommendation related to opening the schedule from 2 to 4 weeks for appointments more closely than were nurse practitioners and nurses (post-hoc analyses, $p = .024$ and $p < .001$, respectively).

Principle 4: integrating interprofessional practices

Table 6 presents the results related to integrating interprofessional practices. Regarding providers' perceptions of changes in their practices, tasks, and roles in AA implementation, significant differences were seen among the three categories of providers. One-third of family physicians (34%) and fewer than half of nurses (42%) reported that their role had changed a lot (median 3/5), whereas more than half of nurse practitioners (54%) perceived little or no change (median 2/5; $p < 0.001$).

One key component of AA is collaboration among team members within the clinic, including residents, social workers, pharmacists, and other categories of PHC providers present in the clinic. There was no significant difference in the extent to which family physicians, nurse practitioners, and nurses reported working with each other. However, nurse practitioners reported working with residents slightly less than did the two other categories of providers. Family physicians reported working with social workers and pharmacists more than did nurses (post-hoc analyses, $p = .005$ and $p = .008$, respectively).

Table 6. Principle 4: strategies implemented by family physicians, nurse practitioners, and nurses.

Principle 4: Integrating interprofessional practices	Family physicians	Nurse practitioners	Nurses	p value
				n (%)
Collaboration with team members				
- With family physician	217 (88)	36 (100)	72 (99)	0.002
- With nurse practitioner	209 (84)	31 (86)	68 (94)	0.065
- With nurse	252 (100)	36 (100)	72 (100)	1
- With resident	238 (95)	26 (74)	68 (96)	< 0.001
- With psychologist	188 (75)	29 (83)	42 (68)	0.241
- With social worker	249 (99)	34 (97)	65 (93)	0.019
- With pharmacist	237 (94)	33 (94)	55 (85)	0.025
Orchard partnership score - Mean (sd)	29 (4.33)	31 (3.22)	30 (4.71)	0.123
Orchard partnership items:				n (%)
Listen to the wishes of their patients when determining the process of care chosen by the team	214 (86)	32 (89)	58 (82)	0.574
Include patients in setting goals for their care	200 (80)	32 (89)	60 (83)	0.369
Work with the patient and his/her relatives in adjusting care plans	192 (76)	29 (83)	52 (75)	0.666
Use consistent communication with team members to discuss patient care	186 (75)	32 (89)	53 (76)	0.182
Encourage each other and patients and their families to use the knowledge and skills that each of us can bring in developing plans of care	165 (66)	32 (89)	53 (76)	0.010
Are involved in goal setting for each patient	134 (54)	27 (75)	42 (60)	0.049
Meet and discuss patient care on a regular basis	105 (42)	17 (47)	30 (42)	0.837
Coordinate health and social services (e.g., housing, connections with community) based upon patient care needs	91 (36)	18 (51)	39 (56)	0.005

Table 7. Principle 5: strategies implemented by family physicians, nurse practitioners, and nurses, n (%).

Principle 5: Developing contingency plans	Family physicians	Nurse practitioners	Nurses	p value
For follow-up				
- No established replacement plan	29 (12)	7 (21)	11 (15)	
- Patients referred to walk-in	47 (19)	2 (6)	1 (1)	
- Planned replacement between colleagues	161 (66)	25 (73)	49 (69)	< 0.001
- Replacement planned by the manager(s)	7 (3)	0	10 (14)	
For urgent patient needs				
- No established replacement plan	4 (2)	1 (3)	2 (3)	
- Patients referred to walk-in	147 (59)	14 (40)	9 (14)	
- Planned replacement between colleagues	92 (37)	20 (57)	49 (77)	< 0.001
- Replacement planned by the manager(s)	4 (2)	0	4 (6)	
Reading lab and imaging results for quick/urgent follow-up				
- No established replacement plan	6 (2)	3 (9)	7 (11)	
- Patients referred to walk-in	1 (1)	0	0	
- Planned replacement between colleagues	237 (96)	32 (91)	52 (84)	0.018
- Replacement planned by the manager(s)	3 (1)	0	3 (5)	

There were no significant differences among the three categories of providers on the Orchard partnership scale score. The highest possible score of 40 indicates maximum integration of the eight interprofessional partnership items (see partnership items in Table 6). Regarding these practices, *meeting and discussing patient care on a regular basis* was similarly underused by all three provider categories. However, nurse practitioners reported *encouraging each other and patients and their families to use the knowledge and skills that each of us can bring in developing plans of care* more than did family physicians (post-hoc analyses, $p = .006$). Nurses differed from family physicians in most often *coordinating health and social service strategies (e.g., housing, connections with community) based upon patient care needs* (post-hoc analyses, $p = .003$). Nurse practitioners appeared closer to high uptake than nurses for this last strategy specifically.

Principle 5: developing contingency plans

Table 7 presents the results related to developing contingency plans. Regardless of their profession, the majority of respondents reported using the strategy of *planned replacement between colleagues* for the three types of consultations (follow-up, urgent patient needs, lab and imaging follow-up). More than half of family physicians *referred patients to walk-in* significantly more often than nurses to *respond to urgent patient needs* in their colleagues' absences, whereas nurses used *planned replacement between colleagues* significantly more often than family physicians (post-hoc analyses, both $p < .001$). Nurse practitioners were midway between family physicians and nurses for this strategy specifically. Family physicians also *planned replacement between colleagues* for *reading lab and imaging reports for quick/urgent follow-up* significantly more often than nurses (post-hoc analyses, $p < .001$).

Discussion

The AA model was developed 20 years ago in the United States. Since its conception, PHC clinics have evolved toward more interprofessional practice models and, although AA was originally geared toward physicians, it has since been implemented by other PHC providers (Gaboury et al., 2021). Therefore, we assessed and compared the implementation of recommended strategies for each AA principle among family physicians, nurse practitioners, and nurses working in interprofessional university-affiliated PHC settings in Quebec.

Overall, we found that the use of AA strategies differed among provider categories for four of the five guiding principles, with the most marked differences being between family physicians and nurses. No difference was found related to reducing the backlog. Nurse practitioners' adoption of AA strategies was sometimes close to that of family physicians and in other instances more aligned with that of nurses. The principle related to reviewing the appointment system showed more differences between family physicians on one hand and nurse practitioners and nurses on the other for strategies such as modifying the duration of consultation, 48-hour open slots for emergencies, and number of weeks open for appointments. The principle related to integrating interprofessional practice showed more similarities in how PHC providers implemented or underused partnership strategies. Differences were found related to their perceptions of role changes since the implementation of AA, which were significant according to family physicians and nurses but less so according to nurse practitioners.

More specifically, for principle 1, balancing supply and demand, the two strategies that were the most used by the three categories of PHC providers and showed no significant differences among them involved providing patient-centered care (e.g., *anticipating patient requests/needs*) and including as many services as possible on each visit, showing that these practices are now widespread. The differences observed for this principle reveal the impact of Quebec's health care context on the use of certain AA strategies; they also concur with the results of other studies showing that the dominant model of care and interprofessional collaboration persists, in which physicians autonomously provide care to their own patients and delegate to other PHC providers mainly when the diagnosis requires it rather than care being provided by an interprofessional team (Contandriopoulos et al., 2016; Lancaster et al., 2015). The fact that nurses and nurse practitioners did not often use these two strategies may reveal a gap between certain AA strategies and their narrow scope of practice, as well as the limited sharing of responsibilities among PHC providers in settings still influenced by solo medical practice (Contandriopoulos et al., 2016). Nurses have fewer opportunities to delegate to other PHC providers than do family physicians and are limited in their authority to prescribe. The lack of training or adaptation of these particular AA strategies to nursing practice has also been highlighted in another study (Abou Malham et al., 2020).

Strategies for principle 2, reducing the backlog, showed no significant differences between family physicians and nurse practitioners and were the least implemented among all the strategies on which respondents were surveyed. Although this

could conceivably have been due to the absence of backlog issues in our sample, a more likely explanation is the organizational aspects of these strategies. Until now, in most clinics, the dominant model has been supply driven rather than demand driven. In contrast, AA involves assessing demand (Goodall et al., 2006) and moving from a model in which services, schedules, and appointment planning are generally defined by providers' preferences to a more measured supply-demand balance (Contandriopoulos et al., 2016).

For principle 3, reviewing the appointment system, the more individual strategies, such as *adapting one's schedule*, showed greater variation among the three provider categories. With the implementation of AA, nurse practitioners and nurses have more flexibility to open up same-day or next-day appointment slots and are more easily accessible because they can handle some patients' needs autonomously and liaise with the medical team for other needs (Breton et al., 2017). However, a recent study highlighted that nurses had not been sufficiently educated to implement AA principles, including appointment scheduling. As a result, they were not strictly operating according to those principles and were redesigning the appointment system by introducing two or three open slots per day for urgent and semi-urgent care to increase their accessibility instead of improving their general appointment organization within the model (Abou Malham et al., 2020). The low proportion of 48-hour open slots for family physicians concurred with the Commonwealth 2020 survey results showing that only 30% of Quebecers were able to access a PHC provider within 2 days (Canadian Institute for Health Information, 2021). In some studies, this low number was attributed to the reluctance of physicians to open up more same-day or next-day appointments due to their apprehensions about flexible appointment scheduling and their misperception that the AA model would trigger unlimited demand (Cameron et al., 2010; Pope et al., 2008).

A question also remains as to how to strike the right balance between pre-booked and same-day-booked appointments (Pickin et al., 2004). As noted in other studies (Cameron et al., 2010; Goodall et al., 2006), ensuring follow-up and continuity of care for certain vulnerable patients, such as the elderly, those with chronic illnesses, and patients who cannot initiate consultations on their own, is the only pre-booking practice that helps to reduce the overuse of long-term pre-booking practices. In our study, the three categories of PHC providers underused reminder lists to facilitate the follow-up of certain specific clientele (e.g., pregnant women, young children, older adults, vulnerable patients). Pre-booking or keeping certain patients on a reminder list to be contacted by the secretary for follow-ups should be used only to ensure the team does not lose track of those unable to make their own appointments when needed (Abou Malham et al., 2017; Breton et al., 2017).

Differences in remuneration modalities and in professional governance among family physicians, nurse practitioners, and nurses working in PHC clinics may also have influenced their use of strategies related to this appointment system principle. Although Quebec's health care system includes various physician remuneration modalities, family physicians are mainly remunerated on a fee-for-service basis, whereas nurse practitioners and nurses are employed by public organizations and

remunerated by salary (Contandriopoulos et al., 2016; Gosden et al., 2000). As such, the working routines of nurse practitioners and nurses differ from those of family physicians, who usually devote less time per patient (Breton et al., 2013; Contandriopoulos et al., 2016).

For principle 4, integrating interprofessional practices, patient-centered collaboration strategies seemed to have been implemented with no significant differences among the three categories of providers. A team-based PHC clinic, in which patients are cared for by an interprofessional team rather than by the family physician only, can ensure continuity and minimize wait times (Abou Malham et al., 2017). Differences observed in the other Orchard subscale items are in line with the results of other studies, which showed that physicians and nurses tend to operate as separate PHC providers and do not communicate much with each other (Lancaster et al., 2015).

For principle 5, developing contingency plans for patient follow-ups and for reading lab and imaging results for quick or urgent follow-ups during absences, our results showed that a majority of providers reported using *planned replacements between colleagues*. These strategies related to informal practices have also been reported in other AA studies as means of facilitating physicians' reentry after a period of absence (Abou Malham et al., 2017; Breton et al., 2017). The formal strategy of *replacements planned by the manager(s)* was, however, widely underused. Results of an earlier AA study showed that only half of AA clinics had explicit contingency plans, and fewer than half reported using four of the five key principles (Goodall et al., 2006). In our study, the fifth principle was implemented, but mostly informally and individually, with family physicians most often tending to *refer patients to walk-in* for urgent needs and nurses most often using *planned replacements between colleagues* rather than replacements being managed at the clinic level.

Study strengths and limitations

One strength of this study is the relatively high overall response rate of 48%, considering that our data collection was unexpectedly halted by the COVID-19 pandemic and given the usually low response rate among PHC professionals in North America, especially when collecting data from several categories of providers (Cunningham et al., 2015). Also, we conducted a face-validity assessment of the survey with 5 experts. Nevertheless, certain aspects of this study may limit the generalizability of the findings. First, it was conducted in university-affiliated PHC clinics in Quebec, whose particular characteristics – notably their teaching mission, the broad range of PHC providers working alongside physicians (Abou Malham et al., 2018), their remuneration modalities, and their ability to take on new patients and carry a larger caseload – set them apart from other PHC settings. Also, our results are based on respondents' perceptions before the COVID-19 health crisis, and the general experience in PHC clinics may have changed since. Finally, another limitation is that we did not develop a survey for clerical staff, although they are essential actors in appointment planning (Breton et al., 2021). Future research should consider the perspectives of both clerical staff and patients regarding AA.

Conclusion

This research uncovered variations among PHC providers in the implementation of strategies regarding four of the five guiding principles of the AA model. The results showed similarly high implementation of strategies related to patient-centered care, as well as similarly moderate implementation of organizational strategies among the three categories of providers. The results also showed significant differences, especially between family physicians and nurses, on certain strategies related to individual practices, such as scheduling appointments or developing contingency plans, indicating a need to tailor future implementation strategies to provider categories. AA training programs are clearly required, given that no category of PHC provider had implemented all the strategies. Structural aspects, such as type of population served and type of clinic, might influence AA implementation. Therefore, future research is needed to better understand the factors influencing the variations in PHC providers' implementation of the guiding principles and to broaden the scope with a view to explore implementation by other providers, such as social workers and pharmacists.

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