Effect of advanced access scheduling on chronic health care in a Canadian practice

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Abstract

Objective To determine the effect of advanced access scheduling (AAS) on the care of patients with chronic disease within a Canadian family practice.

Design Chart abstraction.

Setting A single family physician's practice in Brantford, Ont.

Participants Patient charts were reviewed for all patients with a history of hypertension, type 2 diabetes mellitus, or coronary artery disease during the years before and after implementation of AAS.

Main outcome measures The following information was extracted for each study patient: total number of appointments, number of appointments specific to chronic disease management, number of appointments for non-chronic disease, blood pressure (BP), and laboratory markers, including hemoglobin A_{1c} (HbA_{1c}) and low-density lipoprotein levels.

Results For the year before and the year after implementation of AAS, the mean number of visits per patient was 4.3. The mean number of appointments for chronic disease management decreased significantly from 2.6 to 2.2 ($P=.024$), and the mean number of visits for non-chronic disease increased significantly from 1.7 to 2.1 ($P=.001$). The number of times clinical parameters of BP, HbA_{1c}, and low-density lipoprotein were measured decreased; however, there were no significant changes in actual BP or HbA_{1c} levels.

Conclusion Following a 1-year period using AAS, use of the family health practice by patients with chronic disease was unchanged overall; however, AAS allowed for an increase in visits for non-chronic health conditions without significantly affecting the clinical parameters of BP or HbA_{1c}.

EDITOR'S KEY POINTS

• With advanced access scheduling (AAS), patients are offered appointments the same day they call to see their physicians. One of the challenges of AAS is care of chronic disease patients who require regular follow-up appointments for optimal medical management.

• The goal of this study was to determine the effect of AAS on patients with hypertension, type 2 diabetes mellitus, or coronary artery disease as it related to the frequency and nature of visits, by comparing blood pressure, hemoglobin A_{1c}, and low-density lipoprotein levels before and after implementation of AAS.

• While the average number of chronic disease management visits per year for patients with chronic diseases decreased after AAS implementation, overall measures of their quality of care (blood pressure, hemoglobin A_{1c}, and low-density lipoprotein) did not decline.

Effets des rendez-vous accélérés sur les soins aux patients chroniques dans une clinique de médecine familiale canadienne

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Résumé

Objectif Déterminer les effets des rendez-vous accélérés (RVA) sur les soins aux patients souffrant de maladies chroniques dans une clinique de médecine familiale canadienne.

Type d'étude Revue de dossiers.

Contexte Une clinique de médecine familiale de Brantford, Ontario.

Participants On a revu les dossiers de tous les patients ayant une histoire d'hypertension, de diabète de type 2 ou de maladie coronarienne durant l'année précédant l'instauration des RVA et durant l'année suivante.

Principaux paramètres à l'étude Les données suivantes ont été extraites pour chaque patient de l'étude du nombre total de rendez-vous, du nombre de rendez-vous pour la maladie chronique, du nombre de rendez-vous pour des maladies non chroniques, de la tension artérielle (TA) et des résultats de laboratoire, y compris les niveaux d'hémoglobine A1c (HbA_{1c}) et de lipoprotéines de basse densité.

Résultats Pour l'année précédant comme pour celle suivant l'instauration des RVA, le nombre moyen de visites par patient était de 4,3. Le nombre moyen de visites pour la condition chronique montrait une diminution significative de 2,6 à 2,2 (P=,024) tandis que le nombre de visites pour des problèmes non chroniques augmentait significativement de 1,7 à 2,1 (P=,001). Le nombre de fois qu'on a mesuré les paramètres cliniques que sont la TA, l'HbA_{1c} et les lipoprotéines de basse densité a diminué; toutefois, il n'y a eu aucun changement significatif dans les valeurs de TA ou d'HbA_{1c}.

Conclusion Après une année d'utilisation des RVA, l'utilisation de la clinique de médecine familiale par les patients chroniques demeurait globalement inchangée; toutefois, les RVA ont permis un nombre accru de visites pour des conditions non chroniques, sans affecter significativement les paramètres cliniques de TA ou d'HbA_{1c}.

Cet article a fait l'objet d'une révision par des pairs.
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POINTS DE REPÈRE DU RÉDACTEUR

• Avec les rendez-vous accélérés (RVA), les patients se voient offrir un rendez-vous le jour où ils ont appelé pour rencontrer leur médecin. Un des défis de ce genre de rendez-vous concerne le soin des patients chroniques qui doivent être suivis régulièrement pour un traitement optimal.

• Le but de cette étude était de déterminer les effets des RVA sur le traitement des patients souffrant d'hypertension, de diabète de type 2 ou de maladie coronarienne, qui pourrait être influencé par la fréquence et la nature des visites, en comparant les tensions artérielles, les niveaux de l'hémoglobine A_{1c} et des lipoprotéines de basse densit, avant et après l'instauration des RVA.

• Alors que le nombre moyen de visites par année des patients souffrant de maladies chroniques a diminué après l'instauration des RVA, la qualité globale des soins (tension artérielle, hémoglobine A_{1c} et lipoprotéines de basse densité) n'a pas diminué.

Advanced access scheduling (AAS) was designed by Murray and Berwick in an effort to improve continuity of care and overcome challenges of telephone triage encountered in traditional models of scheduling.[1] With the AAS model, patients calling to see their physicians are offered appointments the same day they call. Some visits are scheduled in the future if patients decline offers for same-day visits or if they are seen on the day they call and need to return at some definite point in the future.[1] Over the past few years, clinics that have adopted AAS have begun to publish accounts of their successes. O'Hare and Corlett, family physicians in Minneapolis, Minn, who implemented AAS in 1999, found patient demand for visits decreased, patient satisfaction increased, and use of urgent care services decreased.[2] Similarly, in a Canadian family practice, Mitchell found that AAS resulted in fewer no-show appointments, increased patient satisfaction, and higher staff morale.[3] Other authors have voiced similar opinions.[4,5]

Casual observation suggests there are challenges with the AAS model, especially care of those with chronic disease who require regular follow-up for optimal medical management. The Canadian Practice Guidelines (CPGs) suggest monitoring blood pressure (BP) in patients with hypertension (HTN) every 6 months, checking hemoglobin A_{1c} (HbA_{1c}) levels in patients with type 2 diabetes mellitus (T2DM) every 3 months, and evaluating low-density lipoprotein (LDL) levels yearly in order to minimize cardiovascular risk.[6] It is possible that AAS places more responsibility on patients to return for follow-up and management of their diseases. This raises the question of whether, when left with the responsibility of telephoning to arrange follow-up, patients will continue to receive the same medical care as they would if appointments were prebooked at the most recent visit.

Solberg et al addressed this question by studying office visit rates in 7000 patients with diabetes and 3800 patients with coronary artery disease (CAD) and found that AAS was associated with very little change in overall office visits or costs of care for chronic disease patients.[7] Subramanian et al studied the effect of AAS on intermediate outcomes of diabetes care, including BP, HbA_{1c}, and LDL levels, as well as albumin-to-creatinine ratios.[8] They found that 1 year after the start of AAS there were small increases in BP rates and decreases in HbA_{1c} levels.[8] In a similar study by Sperl-Hillen et al, 7000 patients with T2DM were compared before and after implementation of AAS; improvements in HbA_{1c} and LDL control were documented.[9] These studies suggest that although the responsibility for follow-up is placed on patients, there does not appear to be a change in the care provided or their overall health. The studies examining care of patients with chronic disease were conducted within large multidisciplinary health centres in the United States[7-10]; however, it is unclear how these data would apply to a smaller, single-physician practice in Canada.

In June 2007 a primary care physician working in Brantford, Ont, switched from standard booking to AAS. After implementing AAS, this physician preferred to have most appointments booked on the same day patients called, with exceptions being made for the elderly and those who lived out of town or had jobs that made same-day booking difficult. Casual observation of this practice suggested that indeed there was a group of patients who, left with the responsibility of arranging their own follow-up, appeared to return less frequently than recommended by the physician to align with CPGs. This observational data raises the question of whether this population of patients, coming in for fewer chronic disease management visits, might be receiving inadequate care, resulting in deterioration in their chronic diseases.

The objective of this study was to determine the effect of AAS on patients with HTN, T2DM, or CAD as it related to the frequency and nature of visits, by comparing BP, HbA_{1c}, and LDL levels before and after implementation of AAS.

METHODS

This study reviewed all patients with HTN, T2DM, and CAD in a single family physician practice in the city of Brantford. This physician is reimbursed under a capitated funding model and has approximately 2990 patients. In June 2007 the physician changed from standard booking to AAS.

A search was conducted in the "history and past health problems" (HPH) and "problems" (ie, current problems) sections of the electronic medical record for enrolled patients diagnosed with HTN, diabetes mellitus (DM), or CAD no later than January 1, 2007. All patient charts that included a diagnosis of HTN, DM, or CAD dating at least 1 year before the switch to AAS were selected. Patients were excluded if they no longer required medication for HTN, if they had type 1 DM (many in this population were youth patients and would not be responsible for booking their own return appointments), if they were deceased before the end of May 2009, or if they did not have at least 1 appointment during regular office hours in both years being studied.

The first author (J.G.) reviewed the charts. For the purpose of the chart review, June 1, 2007, through May 31, 2008, was the pre-AAS year (ie, year 1) and June 1, 2008, through May 31, 2009, was the post-AAS year (ie, year 2). Diagnosis of HTN, T2DM, and CAD were confirmed through review of "HPH" and "problems" sections of the charts. For years 1 and 2, the number of visits during regular office hours with the primary care physician

was extracted. Additionally, the number of visits that were specifically for management of patients' chronic diseases (as per a stamp inserted in the chart or if the assessment section of the SOAP note indicated HTN, T2DM, or CAD) was recorded. All other visits were considered non–chronic disease visits. Clinical parameters including BP, HbA$_{1c}$, and LDL levels were extracted from the "patient visit" and "laboratory data" chart sections.

Mean number of physician visits overall, those specifically for chronic and non-chronic disease, and number and value of laboratory and BP measurements were compared between year 1 and year 2. Control of BP among patients with HTN was calculated as the proportion of patients whose mean BP measurements of the past 3 readings within the time period were 140/90 mm Hg or lower among patients without diabetes or 130/80 mm Hg or lower for patients with diabetes. All other measures of chronic disease control were calculated using the means of all available readings. Paired t tests and McNemar χ^2 tests for paired comparisons were used to compare continuous and categorical variables, respectively. The criterion of statistical significance was set at $\alpha = .05$ (2-tailed). The analysis was done using SPSS version 17.0.

Hamilton Health Sciences and McMaster University Board of Ethics did not require ethics approval, as the project was a quality assurance chart audit.

RESULTS

Three hundred sixty-seven patients were identified using the search criteria. One hundred eight were excluded because they no longer required medication for HTN, they had diagnoses of pregnancy-induced DM or type 1 DM, or they did not have appointments in year 1 or year 2. Two hundred fifty-nine patients were included in the study. Fifty-one percent of the patients were male, with the average age being 69 years. Of the 259 patients, 216 (83.4%) had HTN, 156 (60.2%) had T2DM, and 77 (29.7%) had CAD.

There was no statistically significant difference in mean number of appointments per patient between the study years (**Table 1**). There was, however, a statistically significant decrease in mean number of chronic health appointments (2.6 vs 2.2, $P = .024$) and an increase in mean number of non–chronic disease appointments (1.7 vs 2.1, $P = .001$) from year 1 to year 2.

There were statistically significant decreases in the numbers of times BP, HbA$_{1c}$, and LDL were measured per patient from year 1 to year 2.

Clinical parameters of BP and HbA$_{1c}$ were not significantly different between the 2 years. There was a small but statistically significant reduction in LDL levels (2.7 vs 2.6 mmol/L, $P = .035$).

Table 1. Visits and clinical parameters for year 1 and year 2

VISITS AND CLINICAL PARAMETERS	YEAR 1	YEAR 2	P VALUE
Mean (SD) visits			
• No. of visits	4.3 (2.5)	4.3 (3.5)	.906
• No. of visits for chronic disease	2.6 (1.8)	2.2 (1.9)	.024
• No. of visits for non-chronic disease	1.7 (1.9)	2.1 (3.0)	.001
Clinical parameters			
• Total no. of BP readings	858	743	NA
• Mean (SD) no. of BP readings	3.3 (2.1)	2.9 (2.2)	.001
• Mean (SD) systolic BP, mm Hg	132.5 (13.1)	132.9 (13.3)	.626
• Mean (SD) diastolic BP, mm Hg	70.5 (8.0)	70.7 (8.1)	.737
• Patients with elevated BP on last 3 readings,* %	41.8	41.4	>.99
• Total no. of HbA$_{1c}$ measurements	299	258	NA
• Mean (SD) no. of HbA$_{1c}$ measurements	1.7 (1.3)	1.5 (1.2)	.012
• Mean (SD) HbA$_{1c}$, %	7.2 (1.1)	7.1 (1.1)	.168
• Total number of LDL measurements	376	301	NA
• Mean (SD) no. of LDL measurements	1.5 (1.2)	1.2 (1.1)	<.001
• Mean (SD) LDL, mmol/L	2.7 (0.7)	2.6 (0.8)	.035

BP—blood pressure, HbA$_{1c}$—hemoglobin A$_{1c}$, LDL—low-density lipoprotein, NA—not applicable.
*Greater than 130/80 mm Hg in patients with diabetes and 140/90 mm Hg in patients without diabetes.

DISCUSSION

Similar to Solberg et al,[7] we found that there was no difference in total number of office visits made by those with chronic disease following the implementation of AAS; however, we found a shift away from chronic disease management visits toward visits for non-chronic disease. Perhaps, before implementation of AAS, patients might have received advice regarding non-chronic health matters at regularly scheduled chronic disease visits, eliminating the need for non–chronic health appointments.

With respect to CPGs, this study population reached appropriate standards for measurement of BP and LDL levels in both years but fell short of the recommended frequency for measurements of HbA$_{1c}$ levels. There was

a decrease in frequency of measurement of all of these parameters in year 2. Despite this decreased frequency of measurement, and unlike Subramanian et al[8] and Sperl-Hillen et al,[9] we did not find any difference in clinical parameters of BP or HbA$_{1c}$ between years 1 and 2; however, there was a small, statistically significant decrease in LDL levels (P = .035).

It can be hypothesized that, despite not always meeting CPGs standards for recommended follow-up, there were no significant changes in clinical parameters of BP or HbA$_{1c}$ levels owing to the relatively short study period. All selected patients with HTN were receiving treatment for their BP and all patients with T2DM were identified before the start of the study period. Hypothetically, with treatment initiated already in these patients, large fluctuations would not be seen over a 1-year period. It is unclear why, despite the decrease in number of LDL measurements in year 2, there was a small but statistically significant improvement in LDL values (P = .035).

This study suggests that over a short period of time, AAS appears to be an acceptable method of scheduling for patients with HTN, T2DM, or CAD. Nearly all chronic disease monitoring parameters were within guideline-recommended targets for frequency, on average, while also enabling more visits for non–chronic disease management or urgent care visits.

This is an important finding, especially in these days of health care reform in which we recognize that patients are often being treated in inappropriate settings. The Health Council of Canada has found that too many Canadians have visited the emergency department for conditions that could have been treated by their primary care providers if they had been available.[10] The primary difficulty affecting availability was long wait times for appointments with their primary care providers.[10]

Limitations

Limitations to this study include that it was conducted in a single physician's office and so results might not be generalizable to other settings. A recent study of 46 family physicians across Ontario found that in patients with diabetes, targets for monitoring and management processes were met in approximately 65% of patients, which appears to be lower than in our study.[11] This might be due to this physician's patient population, which can generally be described as compliant. As previously mentioned, the time frame of 1 year after AAS implementation might not be sufficient to see declines in disease parameters if they were to happen as a result of fewer chronic disease visits. The study exclusion of patients who did not have physician visits in both time

periods might have introduced bias, as results can be applied only to patients who routinely visit the office. Furthermore, the search strategy could have been limited if the charts' "HPH" and "problem" sections were not appropriately updated and patients with a history of HTN, T2DM, or CAD were not included in the study as a result. There is no reason to suspect that these missed patients would have behaved differently than those whose charts were reviewed. Future studies that include a larger sample size, more chart reviewers, a longer time period, and a comparison group would strengthen the argument that AAS is an acceptable model of scheduling for patients with chronic disease.

Conclusion

Following a 1-year period of AAS, use of the family health practice by patients with chronic disease was unchanged overall; however, the AAS model allowed for an increase in non–chronic health visits without significantly affecting the clinical parameters of BP or HbA$_{1c}$. 🍁

Dr Gladstone recently completed family medicine residency at McMaster University in Hamilton, Ont. **Dr Howard** is Assistant Professor in Family Medicine at McMaster University.

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References
1. Murray M, Berwick DM. Advanced access: reducing waiting and delays in primary care. *JAMA* 2003;289(8):1035-40.
2. O'Hare CD, Corlett J. The outcomes of open-access scheduling. *Fam Pract Manag* 2004;11(2):35-8.
3. Mitchell V. Same-day booking. Success in a Canadian family practice. *Can Fam Physician* 2008;54:379-83.
4. Steinbauer JR, Korell K, Erdin J, Spann SJ. Implementing open-access scheduling in an academic practice. *Fam Pract Manag* 2006;13(3):59-64.
5. Murray M, Bodenheimer T, Rittenhouse D, Grumbach K. Improving timely access to primary care: case studies of the advanced access model. *JAMA* 2003;289(8):1042-6.
6. Greenberg DE, Muraca M. *Canadian clinical practice guidelines.* Toronto, ON: Elsevier Canada; 2008.
7. Solberg LI, Maciosek MV, Sperl-Hillen JM, Crain AL, Engebretson KI, Asplin BR, et al. Does improved access to care affect utilization and costs for patients with chronic conditions? *Am J Manag Care* 2004;10(10):717-22.
8. Subramanian U, Ackermann RT, Brizendine EJ, Saha C, Rosenman MB, Willis DR, et al. Effect of advanced access scheduling on process and intermediate outcomes of diabetes care and utilization. *J Gen Intern Med* 2009;24(3):327-33. Epub 2009 Jan 9.
9. Sperl-Hillen JM, Solberg LI, Hroscikoski MC, Crain AL, Engebretson K, O'Connor PJ. The effect of advanced access implementation on quality of diabetes care. *Prev Chronic Dis* 2008;5(1):A16. Epub 2007 Dec 15.
10. Health Council of Canada. *Fixing the foundation: an update of primary health care and home care renewal in Canada.* Toronto, ON: Health Council of Canada; 2008. Available from: **www.healthcouncilcanada.ca/docs/rpts/2008/phc/HCC_PHC_Main_web_E.pdf**. Accessed 2010 Nov 25.
11. Holbrook A, Thabane L, Keshavjee K, Dolovich L, Bernstein B, Chan D, et al. Individualized electronic decision support and reminders to improve diabetes care in the community: COMPETE II randomized trial. *CMAJ* 2009;181(1-2):37-44.

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