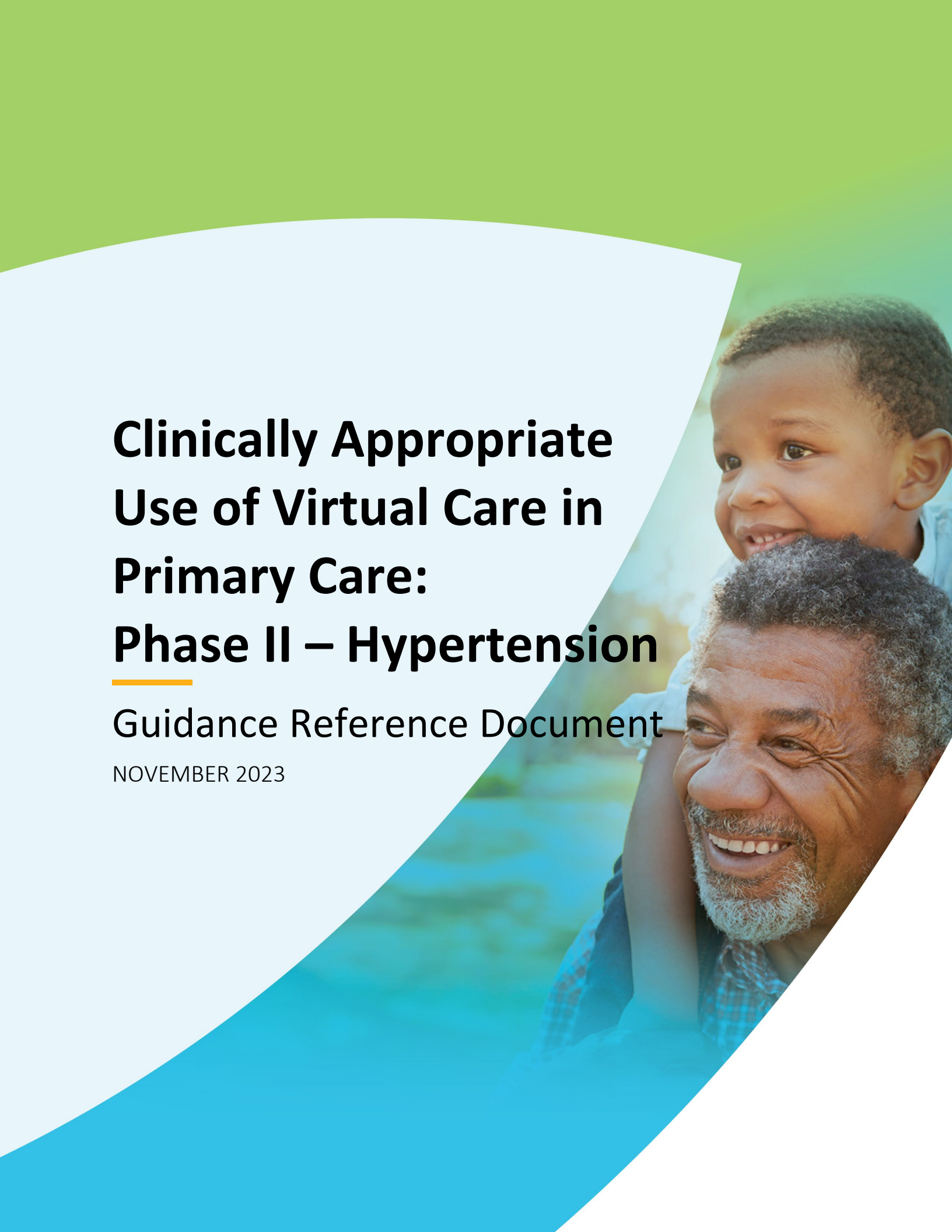
Clinically Appropriate Use of Virtual Care in Primary Care: Phase II – Hypertension

Guidance Reference Document

NOVEMBER 2023



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This document is intended to provide guidance for the use of virtual care in clinical practice in Ontario. Physicians seeking information on how to bill OHIP for virtual care services are advised to refer to the Health Insurance Act, the regulations thereunder, including the Schedule of Benefits for Physician Services or to contact the Ministry of Health.

About This Document

This reference document for the clinically appropriate use of virtual care in primary care (phase II: hypertension, hereafter referred to as "the guidance") builds on the *Clinically Appropriate Use of Virtual Care in Primary Care* (phase I guidance) and assumes that the reader of this guidance document is familiar with the phase I guidance.

This guidance is focused on providing support for primary care clinicians in the screening for, assessment of, and management of patients with hypertension using virtual modalities such as messaging, telephone, videoconferencing, and remote care management. It also assumes that the primary care clinician uses virtual care within a hybrid model of care (i.e., patients will have periodic in-person visits as required for effective management of their condition in addition to using virtual modalities appropriate to their care journey).

Rationale for This Guidance

Hypertension is a common condition that affects nearly 25% of adult Canadians.[1] In Ontario, 17.5% of people aged 12 years and older (or more than 2 million Ontarians) and 44% of people aged 65 years and older reported having hypertension in 2018.[2] Hypertension is the most common modifiable risk factor for death or disability. It can lead to cardiovascular morbidity, chronic kidney disease, complications affecting numerous organ systems (including the brain, heart, eyes, kidneys, and peripheral vasculature), and death.[3] Common risk factors for developing hypertension include obesity, smoking, alcohol use, a family history of hypertension, and having any comorbidity such as diabetes or high cholesterol.[4,5] Multimorbidity (having more than one chronic condition), including hypertension, negatively impacts the quality of life of younger and older adults, and significantly increases the risk of disability and mortality among older adults.[6]

Management of hypertension has improved greatly in Canada over the past 30 years.[7] However, one third of people with hypertension have blood pressure levels above the target range (generally systolic blood pressure [SBP] ≥ 140 mm Hg and diastolic blood pressure [DBP] ≥ 90 mm Hg), and 17% are unaware that they have hypertension.[8]

[1] Padwal RS, Bienek A, McAlister FA, Campbell NR. Epidemiology of hypertension in Canada: an update. Can J Cardiol. 2016;32(5):687-94.
[2] Table 13-10-0096-09: High blood pressure, by age group [Internet]. Ottawa (ON): Statistics Canada; 2020 [updated 2021; cited 2022 Aug 3]. Available from: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009609&pickMembers%5B0%5D=1.7&pickMembers%5B1%5D=3.1
[3] Cloutier L, Daskalopoulou SS, Padwal RS, Lamarre-Cliche M, Bolli P, McLean D, et al. A new algorithm for the diagnosis of hypertension in Canada. Can J Cardiol. 2015;31(5):620-30.
[4] Leenen FHH, Dumais J, McInnis NH, Turton P, Stratychuk L, Nemeth K, et al. Results of the Ontario survey on the prevalence and control of hypertension. Can Med Assoc J. 2008 May;178(11):1441-9.
[5] Whelton PK, Carey RM, Aronow WS, Casey DE, Jr., Collins KJ, Dennison Himmelfarb C, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2018;71(6):1269-324
[6] Sakib MN, Shooshtari S, St. John P, Menec V. The prevalence of multimorbidity and associations with lifestyle factors among middle-aged Canadians: an analysis of Canadian Longitudinal Study on Aging data. BMC Public Health. 2019;19(1):243
[7] Schiffrin EL, Campbell NRC, Feldman RD, Kaczorowski J, Lewanczuk R, Padwal R, et al. Hypertension in Canada: past, present, and future. Ann Glob Health. 2016;82(2):288-99.
[8] Cloutier L, Daskalopoulou SS, Padwal RS, Lamarre-Cliche M, Bolli P, McLean D, et al. A new algorithm for the diagnosis of hypertension in Canada. Can J Cardiol. 2015;31(5):620-30.

It is important to note that hypertension disproportionately impacts people from Black, Indigenous, South Asian, and Francophone populations, older age groups, women 65 years of age and older, as well as people living in rural and remote settings who experience barriers to accessing care.[9,10,11,12,13] For example, in Ontario, people who are Black or South Asian are three times more likely to have hypertension than White people.[14]

Health impacts during the COVID-19 pandemic were worse for seniors, essential workers, racialized populations, people living with disabilities and women.[15] Virtual care became the dominant care format with virtual visits accounting for 77.5% of all primary care visits as cited in an Ontario-based study. Patients seeking care for hypertension remained one of the top three reasons for primary care in this same study.[16]

Multiple virtual modalities, video, telephone, remote care management and text messaging have been used in the assessment and management of hypertension both prior to and during the pandemic and has the potential to assist in improving access to and efficiency in care delivery however, it may also contribute to inequitable access (e.g., in the case where a patient does not have access to devices, connectivity or does not have the requisite digital literacy to use virtual modalities.) Guidance on decision making between use of the modalities for aspects of hypertension care is required, however, is lacking.

This guidance document is intended to provide support for clinicians - those who have a professional obligation to use their clinical judgement to determine which, if any, virtual care modality should be used in a particular clinical context and using virtual care modalities in the assessment and management of patients at risk for and who have been diagnosed with hypertension.

[9] Walsemann KM, Goosby BJ, Farr D. Life course SES and cardiovascular risk: heterogeneity across race/ethnicity and gender. Soc Sci Med. 2016;152:147-55.
[10] Chiu M, Austin PC, Manuel DG, Tu JV. Comparison of cardiovascular risk profiles among ethnic groups using population health surveys between 1996 and 2007. CMAJ. 2010;182(8):E301-10.
[11] Bushnik T, Hennessy DA, McAlister FA, Manuel DG. Factors associated with hypertension control among older Canadians. Statistics Canada; 2018.
[12] Anand SS, Abonyi S, Arbour L, Balasubramanian K, Brook J, Castleden H, et al. Explaining the variability in cardiovascular risk factors among First Nations communities in Canada: a population-based study. Lancet Planet Health. 2019;3(12):e511-e20.
[13] Bouchard L, Batal M, Imbeault P, Gagnon-Arpin I, Makandi E, Seidigh G. The Health of Francophones in Ontario. A region-by-region portrait developed from the Canadian Community Health Survey (CCHS). 2012.
[14] Leenen FHH, Dumais J, McInnis NH, Turton P, Stratychuk L, Nemeth K, et al. Results of the Ontario survey on the prevalence and control of hypertension. Can Med Assoc J. 2008 May;178(11):1441-9.
[15] From Risk to Resilience: An Equity Approach to COVID-19, Chief Public Health Officer of Health Report on the State of Public Health in Canada, October 2020. https://www.canada.ca/en/health-canada/corporate/transparency/health-agreements/bilateral-agreement-pan-canadian-virtual-care-priorities-covid-19/enhancing-access-principle-based-recommendations-equity.html
[16] Stephenson E, Butt DA, Gronsbell J, Ji C, O'Neill B, Crampton N, et al. (2021) Changes in the top 25 reasons for primary care visits during the COVID-19 pandemic in a high-COVID region of Canada. PLoS ONE 16(8): e0255992. https://doi.org/10.1371/journal.pone.0255992

Target Patient Populations

This guidance is focused on the adult patient population. There are two main patient populations targeted in this guidance:

- Patients who require screening for possible hypertension due to a potential risk based on genetic, environmental, or behavioral factors
- Patients who have been diagnosed with hypertension and who are being treated for hypertension

This latter group can be further categorized as those at higher or lower risk for cardiovascular complications.[17] For the purposes of this guidance, there may be different care needs that affect which virtual care modalities are used and the nature and frequency with which these modalities are used. These include:

- Patients who are newly diagnosed, learning about their condition and undergoing medication titration
- Patients with controlled blood pressure requiring routine follow-up
- Patients with controlled blood pressure who may experience fluctuations of blood pressure, blood pressure rises over time, and/or intermittent acute periods of uncontrolled blood pressure and who may need intermittent, on demand follow-up
- Patients who are not at their target blood pressure
- Patients experiencing comorbidities who are resistant to antihypertensive treatment or who are showing low adherence to the therapeutic plan

As hypertension disproportionately impacts people from Black, Indigenous, South Asian, and Francophone populations, older age groups, women 65 years of age and older, as well as people living in rural and remote settings who experience barriers to accessing care[18] it is important to be cognizant of their needs and the impact of decision-making regarding modality of care for these populations.

The recommended use of virtual care and type of modality used may vary depending on these categories, the patient population and in accordance with the considerations outlined in the phase I guidance for clinically appropriate use of virtual care for primary care.

[17] Omboni S, McManus RJ, Bosworth HB, Chappell LC, Green BB, Kario K, et al. Evidence and recommendations on the use of telemedicine for the management of arterial hypertension: an international expert position paper. Hypertension. 2020;76:1368-1383.
[18] Op. cit.

A: Screening for Hypertension Using Digital Tools

While generally considered a "digital" modality, the electronic medical record (EMR) can be a useful adjunct to identify patients at risk for hypertension who may require assessment for hypertension. While each EMR vendor may have different means for running a report to identify patients at risk for hypertension, clinicians in Ontario are currently using these means to identify patients at risk.

Recommendations: Screening for Hypertension

A1. Provided that office resources are available, report features in the electronic medical record (EMR) may be used to identify patients who are at risk for hypertension and who have not been screened for hypertension within a period of time as recommended in current clinical guidelines[19] and in consideration of the practice context. Patients can be notified that follow-up may be required through an in-office or virtual visit. The use of the EMR to identify patients and the notification of patients can be delegated to another team member.

A2. Virtual modalities including messaging, telephone, and video, may be used to communicate with patients in screening for hypertension.

Rationale

The American Heart Association states in section 12.3 of their guidance relating to health information technology–based strategies to promote hypertension control that:

- Use of electronic health records (EHRs) and patient registries are beneficial for the identification of patients with undiagnosed or undertreated hypertension
- Use of EHRs and patient registries are beneficial for guiding quality improvement efforts designed to improve hypertension control[20]

Recommendations on screening criteria leveraging the EMR or EHR are out of scope for this guidance; however, once a patient at risk has been identified, there is an opportunity to use virtual means to advise the patient of their risk and to use virtual means to provide advice to confirm or rule out a diagnosis of hypertension. See Appendix A for more details.

[19] Available evidence on optimal screening intervals for hypertension remains limited. The U.S. Preventive Services Task Force recommendations for hypertension screening suggest the following: annual screening for hypertension in adults 40 years or older and for adults at increased risk for hypertension (such as Black persons, persons with high–normal blood pressure, or persons who are overweight or obese). Screening less frequently (i.e., every 3 to 5 years) is appropriate for adults aged 18 to 39 years not at increased risk for hypertension and with a prior normal blood pressure reading. Available from: https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/hypertension-in-adults-screening

[20] Whelton PK, Carey RM. High blood pressure clinical practice guideline 2017 . ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Available from: https://www.fmda.org/Journal/2017%20Hypertension%20Guideline.pdf

B: Assessment and Diagnosis of Hypertension Using Virtual Modalities

Hypertension (or high blood pressure) is a leading modifiable risk factor for cardiovascular disease and accounts for more than 10% of the population-attributable fraction (PAF) for mortality worldwide. Hypertension affects almost 1 in 4 Canadian adults, and the lifetime incidence of developing high blood pressure is estimated to be 90%.[21] According to Statistics Canada, there were just under 2.3 million Ontarians with hypertension in 2021[22] and a 2021 publication in the *Canadian Medical Association Journal* states "Canada is now facing its lowest rates of hypertension treatment and control in more than a decade."[23]

While Canada has been an international leader in hypertension care, this appears to be changing. After more than 60 years of declining rates of cardiovascular death, trends are now reversing, along with reduced rates of detection, treatment, and control of hypertension. According to a survey conducted between 2007 and 2009, 82% of Canadians with hypertension were treated and 69% were controlled; by comparison, survey data from 2016/17 showed that only 72% of affected adults were treated and a mere 58% were adequately controlled.[24]

While data on the use of virtual care for services among hypertensive patients worldwide are not available, recent statistics suggest that around the world 7 million patients are managed by telemedicine, with the most popular applications targeting patients with heart failure, hypertension, and diabetes mellitus.[25] Recent studies have demonstrated that hypertension can be safely managed at home,[26] and some patients who have access to a validated blood pressure monitoring device may be motivated and able to measure their blood pressure at home.

Recommendations: Assessment and Diagnosis of Hypertension

B1. Home-based blood pressure monitoring (HBPM) and patient-reported results shared through virtual means may be used to assist in the assessment of and contribute to the diagnosis of hypertension.

B2. Virtual modalities can be used to help patients learn how to check their blood pressure at home accurately when a timely in-office visit is not feasible or practical. Use of video allows for visual review of technique. Telephone and messaging can be used to point to reliable on-line reference material for support.

B3. Patients who have access to a validated blood pressure monitor, who are deemed capable of taking accurate self-measurement, and who take their blood pressure at home, can provide their measurements to

[21] Leung AA, Bushnik T, Hennessy D, McAlister FA, Manuel DG. Health reports. Risk factors for hypertension in Canada. Ottawa (ON): Statistics Canada; 2019 [cited 2023 Mar 20]. Available from: https://www150.statcan.gc.ca/n1/pub/82-003-x/2019002/article/00001-eng.htm
[22] Statistics Canada. High blood pressure by age group in Ontario. Available from: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009609.
[23] Leung AA, Bell A, Tsuyuki RT, Campbell NRC. Refocusing on hypertension control in Canada. CMAJ. 2021;193:E854-5.
[24] Ibid.
[25] Omboni S, McManus RJ, Bosworth HB, Chappell LC, Green BB, Kario K, et al. Evidence and recommendations on the use of telemedicine for the management of arterial hypertension: an international expert position paper. Hypertension. 2020;76:1368-1383.
[26] Ibid.

the primary care clinician/primary care team according to direction provided by the primary care clinician/primary care team. This can be recorded as such within the patient's health record.

Rationale

Several US and other international hypertension guidelines, scientific statements, and position papers endorse the use of self-measured blood pressure monitoring for the diagnosis and management of high blood pressure.[27] According to Hypertension Canada, home blood pressure monitoring (HBPM) can be used in the diagnosis of hypertension, and monitoring on a regular basis should be considered for all hypertensive patients and particularly those with:

- Inadequately controlled hypertension
- Diabetes mellitus
- Chronic kidney disease
- Suspected non-adherence
- Demonstrated or suspected white coat effect
- Blood pressure controlled in the office but not at home (masked hypertension)

The Canadian guidelines suggest that if white coat or masked hypertension is suggested by HBPM, it should be confirmed by repeat HBPM or ambulatory blood pressure monitoring (ABPM) before treatment decisions are made (see Appendix B for the excerpt from the Hypertension Canada guidelines along with strength of evidence notations).[28] Further, American guidelines clearly recommend the use of telemedicine to confirm the diagnosis of hypertension as an adjunct to standard intervention to improve blood pressure control and adherence.[29] However, the American guidelines also refer to the use of validated blood pressure monitors being used properly for self-measurement of blood pressure by patients at home.

Considerations for the Use of Home-Based Blood Pressure Measurement

When self-measurement of blood pressure is being considered, it is important to direct patients to use a validated blood pressure measurement device, with a properly sized cuff. It is also important to use the proper procedure for taking a blood pressure.

Validated Blood Pressure Monitors

Hypertension Canada provides a list of approved blood pressure monitors that meet the standard for clinical use.

Measuring Blood Pressure Accurately

Hypertension Canada has information on measuring blood pressure here, while the Heart and Stroke Foundation has a 2-minute video for patients on how to measure your blood pressure.

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[27] Shimbo D, Artinian NT, Basile JN, Krakoff LR, Margolis KL, Rakotz MK, et al. self-measured blood pressure monitoring at home a joint policy statement from the American Heart Association and American Medical Association. Circulation. 2020;142:e42–e63.
[28] Hypertension Canada. 2020-2022 hypertension highlights a practical guide informed by the Hypertension Canada guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension. Available from: https://guidelines.hypertension.ca/wp-content/uploads/2022/09//2020-22-HT-Guidelines-E-WEB_v3b.pdf
[29] Omboni S, McManus RJ, Bosworth HB, Chappell LC, Green BB, Kario K, et al. Evidence and recommendations on the use of telemedicine for the management of arterial hypertension: an international expert position paper. Hypertension. 2020;76:1368-1383.

Not all patients have the cognitive or manual dexterity to take their blood pressure reliably nor may they be able to communicate measurements accurately, using available means, to their primary care provider. For these patients, either identifying a caregiver to assist or arranging for an in-person visit may be best.

C: Managing Patients Diagnosed with Hypertension Using Virtual Modalities

With the changes in practice since the beginning of the COVID-19 pandemic, the clinical context required the use of virtual modalities to assess and communicate with patients to support the management of hypertension. An international consensus paper reports: "During the pandemic, there has been a dramatic increase in home blood pressure measurement for the diagnosis of hypertension and monitoring. In several study populations in the United States, France and China, 45–50% of patients monitored their blood pressure at home."[30] The use of virtual modalities for the management of hypertension is expected to continue. Given this, the primary care expert panel[31] has discussed and makes the following recommendations.

Recommendations: Managing Patients Diagnosed with Hypertension

C1. Provided that office resources are available, report features in the EMR may be used to identify patients diagnosed with hypertension for whom a blood pressure measurement has not been recorded according to the frequency recommended in the Hypertension Canada guidelines.[32] If appropriate given the clinical context, patients may be notified that follow-up may be required through an in-office or virtual visit. The use of the EMR to identify patients and the notification of patients can be delegated to another team member.

C2. Virtual modalities, including telephone, video, and reliable online resources, may be used to provide patients with relevant information about hypertension, including but not limited to behaviour management.

C3. Virtual modalities, including messaging, telephone, and video, may be used for the process of titrating medication for hypertension, provided that parameters are established and communicated with patients as to when and how patients should seek in-person medical attention if indicated.

C4. Virtual modalities, including messaging, telephone, and video, may be used in the regular follow-up of patients with controlled hypertension, provided that parameters are established and communicated with patients as to when and how patients should seek in-person medical attention if indicated.

[30] Khan NA, Stergiou GS, Omboni S, Kario K, Renna N, Chapman N, et al. Virtual management of hypertension: lessons from the COVID-19 pandemic: International Society of Hypertension position paper endorsed by the World Hypertension League and European Society of Hypertension, Journal of Hypertension. 2022;40 (8):1435–1448. https://journals.lww.com/jhypertension/Fulltext/2022/08000/Virtual_management_of_hypertension__lessons_from.1.aspx

[31] A primary care expert panel, with membership comprising primary care clinicians and patient partners from each of the five regions of the province, was convened to provide advice to Ontario Health in the development of this guidance; see Appendix E.

[32] Hypertension Canada. 2020-2022 hypertension highlights a practical guide informed by the Hypertension Canada guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension. Available from: https://guidelines.hypertension.ca/wp-content/uploads/2022/09//2020-22-HT-Guidelines-E-WEB_v3b.pdf

C5. Where hypertension is poorly controlled, or the presence or risk of comorbidities requires periodic assessment that goes beyond patient-reported blood pressure measurements, in-person follow-up may be indicated.

Rationale

According to a recent position paper by Canadian authors:

> In general, telemedicine in hypertension is feasible on a wide scale and well-received with excellent acceptability. In 13 studies (5 performed in hospitals, 5 in general practices, and 3 in the community) including 1662 patients, the average adherence to telemedicine-based hypertension management programs was reasonably high: 76.8% of patients complied with the telemonitoring schedule (range, 48%–90%). In 10 studies (3 performed in hospitals, 5 in general practices, and 2 in the community) enrolling 1120 patients, 87.1% of the participants regarded the telemedicine solution as useful to manage their condition (range, 69%–100%).[33]

One of the major studies evaluating the impact of telemedicine in hypertension management, the TASMINH2 Study (Telemonitoring and Self-Management in the Control of Hypertension II) included 480 hypertensive patients recruited in 24 general practices in the United Kingdom. It evaluated whether an intervention consisting of self-monitoring of blood pressure and self-titration of antihypertensive drugs, combined with telemonitoring of home blood pressure measurements, could lead to substantial reductions of blood pressure over 1 year of follow-up. This intervention was more effective in lowering blood pressure than usual care and represented a cost-effective use of health care resources. In the TASMINH4, the same group assessed the efficacy of self-monitored blood pressure, with or without telemonitoring, versus usual care for antihypertensive titration in 142 general practices comprising 1,182 high-risk hypertensive patients with poorly controlled blood pressure. After 12 months of follow-up, self-monitoring of blood pressure – with or without telemonitoring – was associated with lower blood pressure values and lower costs than usual care. Although this study did not find any significant difference in the effect of telemonitoring compared with that of self-monitoring after 12 months, blood pressure in the telemonitoring group dropped more quickly (at 6 months) than in the self-monitoring alone group, an effect that is desirable in high-risk patients to further decrease the risk of cardiovascular events. Furthermore, telemonitoring was cost-effective, even when compared with self-monitoring alone.[34]

Virtual care has been used to manage patients who are newly diagnosed with hypertension in the areas of education, medication titration, and self-management. However, more detailed evidence to support recommendations on the frequency of virtual to in-person care or the type of virtual modality which should be optimally used and under which circumstances is not yet available.

See Appendix C, “Use of Virtual Modalities (Excluding Remote Care Management) for Managing Patients with Hypertension” for more details.

[33] Omboni S, McManus RJ, Bosworth HB, Chappell LC, Green BB, Kario K, et al. Evidence and recommendations on the use of telemedicine for the management of arterial hypertension: an international expert position paper. Hypertension. 2020;76:1368-1383.
[34] Ibid.

D: Use of Remote Care Management (RCM) in the Management of Patients with Hypertension

Remote care management (RCM) is a model of care enabled by technology to provide high-quality, evidenced-informed care and promote patient self-management. RCM is not the solution or platform itself, but rather an approach to care management that is enabled by such a platform and focuses on supporting patient self-efficacy and self-management. It makes use of motivational interviewing techniques and is generally operationalized centrally for a group of patients who are referred to a program for a specific purpose and who are on the program for a set period to meet defined health-related goals. This form of care is made possible by digital technologies that collect health data from individuals in one location, such as a patient's home, and electronically transmit the information to health care providers in a different location for assessment and recommendations and can be supported through periodic telephone, video, or in-person interactions. Evidence from studies using rigorous research methods associate home-based RCM interventions with beneficial results such as reductions in use of health care services, including hospital admissions/readmissions, length of hospital stays, and emergency department visits.[35]

While not indicated for all patients newly diagnosed with hypertension, RCM may be indicated for patients in whom comorbidities exist and significant lifestyle modifications may be required in order to achieve and maintain blood pressure control and for patients who are motivated to engage in behaviour modification.

Recommendation: Use of Remote Care Management (RCM) in the Management of Patients with Hypertension

D1. Referral to a remote care management (RCM) program/use of RCM combined with self-management coaching, where available, can be offered to patients with hypertension if patient health behaviour management would be seen as beneficial for the control of hypertension and/or program inclusion criteria are met.

Rationale

Evidence has shown that the systematic provision of education and supportive interventions (such as motivational interviewing and health coaching) to increase patients' skills and confidence in managing their health problems, including regular assessment of progress and problems, goal-setting, and problem-solving support, has been effective in giving patients the tools they need to have the best quality of life as possible, delay progression of disease, and reduce the impact of chronic disease on the health care system. Self-

[35] Bashur RL, Shannon GW, Smith BR, Alverson DC, Antoniotti N, Barsan WG, et al. The empirical foundations of telemedicine interventions for chronic disease management. Telemedicine and e-Health. 2014; 20(9): 769-800.

management support is a recommended component of Ontario's Chronic Disease Prevention and Management Framework, as part of the chronic care model which includes motivational interviewing.[36]

Omboni and colleagues (2020), in a recent paper,[37] conclude:

> The best proposed healthcare model for telemedicine in hypertension management should include remote monitoring and transmission of vital signs (notably blood pressure) and medication adherence plus education on lifestyle and risk factors, with video consultation as an option. The use of mixed automated feedback services with supervision of a multidisciplinary clinical team (physician, nurse, or pharmacist) is the ideal approach. The indications include screening for suspected hypertension, management of older adults, medically underserved people, high-risk hypertensive patients, patients with multiple diseases, and those isolated due to pandemics or national emergencies.

In 2014, Canada Health Infoway conducted a pan-Canadian study on remote patient monitoring (RPM)[38] and performed an in-depth review of the four largest established programs in Canada that demonstrated strong evidence for quality, access, and system benefits, including reduced emergency department use and fewer hospitalizations. Among the four reviewed was Ontario Telemedicine Network's (OTN) Telehomecare Expansion Program, which was established in 2011 after a successful 2-year pilot from 2007 to 2009. For many years, the Telehomecare Expansion Program focused on providing remote self-management support for individuals with chronic obstructive pulmonary disease (COPD), heart failure, and/or diabetes with medium to high risk of being hospitalized. Such individuals have remained the focus of RCM programs, as they have most reliably demonstrated the ability to identify early signs and symptoms of potentially worsening conditions that are more readily managed remotely, delaying progression of disease and preventing more resource-intensive course of care.

Hypertension management has been an integral part of the established Ontario Health RCM programs[39] from outset, as a component of the COPD and heart failure chronic disease self-management RCM Telehomecare Program. The conclusion of one longitudinal study was that blood pressure levels were significantly reduced in patients enrolled in the telehomecare program with changes being more pronounced in patients with uncontrolled blood pressure.[40]

[36] Ministry of Health and Long-Term Care. Preventing and Managing Chronic Disease: Ontario's Framework. Toronto: Queen's Printer for Ontario; 2007. Available from: www.health.gov.on.ca/en/pro/programs/cdpm/pdf/framework_full.pdf

[37] Omboni S, McManus RJ, Bosworth HB, Chappell LC, Green BB, Kario K, et al. Evidence and recommendations on the use of telemedicine for the management of arterial hypertension: an international expert position paper. Hypertension. 2020;76:1368-1383.

[38] Canada Health Infoway. Connecting patients with providers: a pan-Canadian study on remote patient monitoring. Executive summary [Internet]. Toronto: Canada Health Infoway; 2014 [cited 2023 Mar 13]. Available from: https://www.infoway-inforoute.ca/en/component/edocman/resources/reports/benefits-evaluation/1890-connecting-patients-with-providers-a-pan-canadian-study-on-remote-patient-monitoring-executive-summary

[39] Ontario Telemedicine Network. Telehomecare for COPD and heart failure. Available from: https://otn.ca/providers/telehomecare/

[40] Sahakyan Y, Abrahamyan L, Shahid N, Stanimirovic A, Pechlivanoglou P, Mitsakakis N, et al, Changes in blood pressure among patients in the Ontario Telehomecare programme: An observational longitudinal cohort study. J Telemed Telecare. 2018;24(6):420-427.

Appendices

Appendix A: Use of Virtual Modalities to Screen for Patients at Risk for Hypertension

Action	EMR	Messaging	Phone	Video	In person
Identify patient at risk for hypertension	Run report identifying patients at risk				
Notify patient of need for assessment	Document contact and method	Contact patient via secure message/platform	Contact patient by phone		
Plan for screening/ conduct screening	Document material provided, encounter and virtual care or in person	Send patient links to educational material for home-based blood pressure measurement and directions for communicating results Patient can send clinician blood pressure results	Contact patient by phone to explain process, provide information and directions for providing clinician with results	Video can be used to provide directions for home blood pressure monitoring when visual assessment is required or when communication by messaging or phone is not expected to be sufficient for explanation	In-person care is most suitable when there are barriers to communication or in the use of technology, when patients are able to travel, and when in person is preferrable to the patient

Abbreviation: EMR, electronic medical record.

Appendix B: Home Blood Pressure Monitoring

Excerpt from Hypertension Canada's 2020 Comprehensive Guidelines for the Prevention, Diagnosis, Risk Assessment, and Treatment of Hypertension in Adults and Children published in the *Canadian Journal of Cardiology*[41]:

> The use of HBPM on a regular basis should be considered for patients with hypertension, particularly those with:
>
> i. Inadequately controlled hypertension (Grade B; revised recommendation);
> ii. Diabetes mellitus (Grade D);
> iii. Chronic kidney disease (Grade C);
> iv. Suspected nonadherence (Grade D);
> v. Demonstrated white coat effect (Grade C); or
> vi. Blood pressure controlled in the office but not at home (masked hypertension; Grade C)
>
> 2. Health care professionals should ensure that patients who measure their blood pressure at home have adequate training, and if necessary, repeat training in measuring their blood pressure. Patients should be observed to determine that they measure blood pressure correctly and should be given adequate information about interpreting these readings (Grade D) (p. 604)

Grading scheme used for the publication (page 599):

Table 1. Grading scheme for recommendations

Grade A*	Recommendations for interventions are on the basis of randomized trials (or systematic reviews of trials) with high levels of internal validity and statistical precision, and for which the study results can be directly applied to patients because of similar clinical characteristics and the clinical relevance of the study outcomes
Grade B*	Recommendations are on the basis of randomized trials, systematic reviews, or prespecified subgroup analyses of randomized trials that have lower precision, or there is a need to extrapolate from studies because of differing populations or reporting of validated intermediate/ surrogate outcomes rather than clinically important outcomes
Grade C*	Recommendations are on the basis of trials that have lower levels of internal validity and/or precision, or trials for which unvalidated surrogate outcomes were reported, or results from nonrandomized observational studies
Grade D*	Recommendations are on the basis of expert opinion alone

*Grade is on the basis of the strength and quality of the clinical evidence. Factors such as patient preferences, cost, and/or resource intensiveness are not included in this grading schema.

Source: Hypertension Canada's 2020 comprehensive guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension in adults and children.[42] Reprinted with permission.

[41] Rabi DM, McBrien KA, Sapir-Pichhadze R, Nakhla M, Ahmed SB, Dumanski SM, et al. Hypertension Canada's 2020 comprehensive guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension in adults and children. Can J Cardiol. 2020;36(5):596-624.
[42] Ibid.

Appendix C: Use of Virtual Modalities (Excluding Remote Care Management) for Managing Patients with Hypertension

Action	EMR	Messaging	Phone	Video	In person
Provide patient with information on hypertension	Document encounter and modality	While messaging can be used for this purpose, initial information on hypertension may lead to questions that may be best attended to with a discussion, either virtually or in person	Phone can be used to provide information to patients and to respond to questions from patients, provided patients can hear well and can be reasonably expected to understand what's being communicated without visual cues	Video can be used to provide information to patients and to respond to questions from patients provided it is available and the patient has the ability to use it Video can be especially useful to confirm proper blood pressure monitoring technique and to assist patients who may benefit from visual cues	In-person care is most suitable when there are barriers to communication or in the use of technology, and when these cannot be otherwise resolved, provided patients are able to travel and in-person care is preferable to the patient
Provide patient with education on health behaviour management	Document encounter and modality	Messaging can be used to direct patients to links to recommended health education material, and to respond to questions from patients	Phone can be used to provide information to patients and to respond to questions from patients, provided patients can hear well and can be reasonably expected to understand what's being communicated without visual cues	Video can be used to provide information to patients and to respond to questions from patients provided it is available and the patient has the ability to use it. Video can be especially useful to confirm proper blood pressure monitoring technique and to assist patients who may benefit from visual cues	In-person care is most suitable when there are barriers to communication or in the use of technology and when these cannot be otherwise resolved, provided patients are able to travel and in-person care is preferable to the patient

Action	EMR	Messaging	Phone	Video	In person
Titration of medication	Document encounter and modality	Messaging can be used for titration of medication when a) the patient can see well and has the manual dexterity to use messaging; b) the patient can accurately take and record blood pressure; c) patients clearly understand the parameters for use of messaging; and d) there is a reasonable expectation that patients can understand and take appropriate action based on a message	Phone calls can be used to communicate with patients provided that patients can hear well and can understand what is being communicated without visual cues	Video can be used to communicate with patients; however, interactions with patients for titration purposes may be too brief to render a video as practical as other means of communication, provided that there is no requirement to ensure visual cues are necessary for clear communication	In-person care is most suitable when there are barriers to communication or in the use of technology, and when these cannot be otherwise resolved, provided patients are able to travel and in-person care is preferable to the patient
Routine follow-up	Document encounter and modality	Messaging can be used for follow-up, provided that a) there are no comorbidities that may require more thorough assessment; b) the patient can see well and has the manual dexterity to use messaging; c) the patient can accurately take and record blood pressure; d) patients clearly understand the parameters for use of messaging; and e) there is a reasonable expectation that patients can understand and take appropriate action based on a message Note: If these conditions aren't met, another modality or in-person visit is recommended.	Phone can be used for routine follow-up, provided there are no comorbidities that cannot be properly assessed without a visual assessment, and provided that patients can hear well and can understand what is being communicated without visual cues	Video can be used for routine follow-up, provided that it is available and the patient has the ability to use it It can be especially useful in instances where a visual assessment may be required given co-morbidities and when a patient may benefit from visual cues	In-person care is preferred when a patient has co-morbidities that require an assessment that may include the need for physical contact In-person is also most suitable if there are barriers to communication or in the use of technology, when these cannot be otherwise resolved, provided that patients are able to travel and in-person care is preferable to the patient.

Abbreviation: EMR, electronic medical record.

Appendix D: Resources

Hypertension Canada – Guidelines
https://hypertension.ca/wp-content/uploads/2020/10/2020-22-HT-Guidelines-E-WEB_v3b.pdf

Hypertension Canada – Blood Pressure Devices
https://hypertension.ca/public/recommended-devices

Hypertension Canada – Patient Resources

- Blood Pressure Log
- Blood Pressure Measurement Postcards
- 2020-22 Guidelines Booklet
- Understanding and Managing Your Blood Pressure
- Your Blood Pressure Action Plan

https://hypertension.ca/public

Heart and Stroke Canada Blood Pressure Program Resources

- How to measure your own blood pressure video
- 5-minute stress test
- Managing your blood pressure guide

https://www.heartandstroke.ca/articles/blood-pressure-program-resources

Appendix E: Acknowledgements

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