Canadian Hypertension Prevention and Control Programs

Home Blood Pressure Monitoring

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Objectives

• Review some of the impact of the Canadian programs
• Outline the rationale for preventing and controlling hypertension
• Review the key success factors of the Canadian effort
• Home BP assessment

Increase in total antihypertensive prescriptions

[Graph showing the increase in total antihypertensive prescriptions from 1996 to 2007]
Reductions in stroke deaths are strongly correlated with increase in anti-HTN prescribing

Cardiovascular deaths in Canada 1996 – 2004

Increasing intensity of therapy over time
Changes mirror CHEP recommendations

<table>
<thead>
<tr>
<th>Drug</th>
<th>% Change in Initial Prescriptions 1998-1999</th>
<th>% Change in Initial Prescriptions 1999-2003</th>
<th>% Change in Annual Prescribing Rate 1998-2003 vs 1999-1993 (95% CI, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total antihypertensive drugs</td>
<td>2.1</td>
<td>10.4</td>
<td>8.2 (3.0 to 12.7)</td>
</tr>
<tr>
<td>Thiazide diuretics</td>
<td>2.0</td>
<td>13.6</td>
<td>10.6 (0.0 to 21.7)</td>
</tr>
<tr>
<td>β-blockers</td>
<td>1.5</td>
<td>6.3</td>
<td>6.9 (2.0 to 11.9)</td>
</tr>
<tr>
<td>ACE inhibitors</td>
<td>3.8</td>
<td>12.2</td>
<td>8.1 (−1.9 to 18.1)</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td>−1.6</td>
<td>5.7</td>
<td>7.4 (2.1 to 13.0)</td>
</tr>
</tbody>
</table>

Data from IMS Health Compuscript database.

*Total antihypertensive drugs include diuretics, ACE inhibitors, angiotensin receptor blockers, β-blockers, and calcium channel blockers, as well as nonprescribed antihypertensive drugs. MIs were not included in this table given the instability of prescribing estimates because of too few time points and prescriptions for this drug class in this data set.

Changes in initiation of antihypertensive prescriptions in elderly Ontarians with beta blockers

Assess global cardiovascular risk in all hypertensive patients

91% of Hypertensive Patients Have at Least 1 Additional Risk Factor

 العالي = العالي Global CV risk

The Canadian Effort to Prevent and Control Hypertension
Can Other Countries Adopt Canadian Strategies?

Recommendations Task Force Subgroups

- Office Measurement of BP
- Follow-up of BP
- Risk Assessment
- Home-measurement of BP
- Ambulatory BP Monitoring
- Routine Laboratory Testing
- Echocardiography
- Lifestyle Modification
- Pharmacotherapy of Hypertension in Patients Without Other Compelling Indications
- Pharmacotherapy for Hypertension in Patients with Cardiovascular Disease
- Diabetes and Hypertension
- Renal and Renovascular hypertension
- Endocrine Forms of Hypertension
- Adherence Strategies for Patients
- Vascular Protection
- Hypertension and Stroke

2013 Canadian Hypertension Education Program: The Process

- Subgroups systematically reviewed the literature using a Cochrane librarian and supplemented the search with personal files to August 2012
- Application of an evidence-based grading scheme
- Use of a Review Committee comprised of methodologists to improve consistency of grading
- 1 day conference to discuss recommendations and evidence (October 2012)
- National presentation of draft recommendations (Canadian Hypertension Congress, October 2012)
- Voting and ratification of recommendations achieving >70% acceptance (Nov 2012)

Implementation

Implementation

• The need to engage ALL health care professionals
  – To ensure the public and patients receive consistent information
• The active participation of those directly involved in the management of hypertension (key individuals and organizations)
• The need to engage the public and patients
  – to understand the need for prevention, screening, diagnosis, treatment and control
• The active participation of those who oversee the health care system

Implementation

• People want educational materials that suit them (education level, interest level, amount of time and method of learning: visual and/or auditory)
• Focus on what is important for population awareness, treatment and control but … also keep it new and interesting
• Start with top priority items and build
Implementation

- Develop resources that actively engage people
- Remove all identified barriers to accessing resources
- Agreement of other national organizations to harmonize hypertension recommendations
- Networks of health care professional organizations and training schools

For your patients
- ask them to sign up at www.hypertension.ca for free access to the latest information & resources on high blood pressure

For health care professionals
- sign up at www.hypertension.ca for automatic updates and information on current hypertension educational resources
Interprofessional Executive Summaries

Canadian Hypertension Recommendations
“A summary suited to all health care professionals”

- Annual theme
- Key messages
- 1 page - clinical
- 4 page - short summary - clinical
- 6 page - scientific
- Large scientific document
- 4 page - public translation
- CHEP booklet
- Spiral book (full recommendations and scientific summary)

Other health care professional activities

- Core curriculum development with presentation at annual meeting and audio visual recording with posting at hypertension.ca
- Accredited learning programs based on key hypertension gaps
The Canadian Hypertension Education Program: key messages

- Know the current blood pressure of all your patients
- Encourage the use of approved devices and proper technique to measure blood pressure at home
- Assess and manage CV risk in hypertensives including: high dietary sodium intake, smoking, dyslipidemia, dysglycemia, abdominal obesity, unhealthy eating, and physical inactivity
- Sustained lifestyle modification is the cornerstone for the prevention and control of hypertension and the management of CV disease
- Treat blood pressure to <140/90 mmHg in people with diabetes target to <130/80 mmHg and more than one drug is usually required including diuretics to achieve BP targets

Home BP monitoring; A Canadian perspective

- Evidence base and its limitations
- Clinical recommendations
- Monitoring and evaluation
- Implementation and resources
American resources

• Millions Hearts Self Measured Blood Pressure Monitoring (SMBPM). Action steps for public health practitioners. A Million Hearts Action Guide. CDC
• SMBPM recommended by AHA, ASH and Preventative Cardiovascular Nurses Association but caution in use with people with atrial fibrillation

Choosing a home measurement device

<table>
<thead>
<tr>
<th>Preferred</th>
<th>Not Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated</td>
<td>Manual</td>
</tr>
<tr>
<td>Upper arm cuff</td>
<td>Wrist or finger cuff</td>
</tr>
<tr>
<td>Validated by AAMI, BHS, or BHS</td>
<td>Not validated</td>
</tr>
<tr>
<td>Memory storage capacity</td>
<td>No memory storage</td>
</tr>
<tr>
<td>Accuracy checked by physician or nurse after purchase</td>
<td>Patient uses monitor without consulting physician</td>
</tr>
</tbody>
</table>

Self measured blood pressure monitoring (SMBPM). Action steps for public health practitioners. A Million Hearts Action Guide. CDC

Home BP monitoring - Evidence

• Reductions in BP and strong tendency to improved BP control
• Improvement in drug adherence in those who are non adherent
• Enhanced ability to identify high risk patients and to assess prognosis
  – Identify white coat hypertension and masked hypertension
Home BP monitoring - Evidence

Other less evidence based rationale
• Engagement in self care - 95% are capable
• Increased cost effectiveness of treatment
• Fewer office visits?

Some evidence limitations
• Uncertainty about exact therapeutic cut points for diagnosis and target blood pressures - 135/85 mmHg is a rough estimate (age, gender and treatment issues)
• Inaccuracies in assessing/reporting BP (not unique to home assessment)

Comparing home BP to ABPM
• Comparisons of ABPM and home BP indicate they are both superior to office readings in predicting outcomes.
• There is little evidence to suggest ABPM is superior to home BP, but they do provide additive value and also add to office readings.
• There are multiple modeling exercises comparing home measurement with ABPM that conclude that ABPM is better or more cost effective. These models are fundamentally flawed as the premise of the analyses is that ABPM is the standard of comparison and where results differ home measurement is wrong - that basic premise is not supported by currently evidence.
II. Criteria for the diagnosis of hypertension and recommendations for follow-up

**BP: 140-179 / 90-109**

- **ABPM (If available)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension Visit 2</td>
<td>Target Organ Damage or Diabetes or Chronic Kidney Disease or BP &gt;180/110?</td>
</tr>
</tbody>
</table>

**BP: 140-179 / 90-109**

- **Clinic BPM**
- **ABPM (If available)**
- **Home BPM (If available)**

2012 Canadian Hypertension Education Program Recommendations

**Patients with high normal blood pressure (clinic SBP 130-139 and/or DBP 85-89) should be followed annually.**
VII. Home measurement of blood pressure

Home BP measurement should be encouraged to increase patient involvement in care

• Which patients?
  – Uncomplicated hypertension
  – Suspected non adherence
  – Office-induced blood pressure elevation (white coat effect)
  – Masked hypertension

Average BP > 135/85 mm Hg should be considered elevated

Not all patients are suited to home measurement

• Undue anxiety in response to high blood pressure readings
• Physical or mental disability prevents accurate technique or recording
• Arm not suited to blood pressure cuff (e.g. conical shaped arm)
• Irregular pulse or arrhythmias prevent accurate readings
• Lack of interest

Most patients can be trained to measure blood pressure Periodic reassessment of technique and retraining is desirable

VII. Home measurement of BP: confirm contradictory home measurement readings

If office BP measurement is elevated and home BP is normal or vice versa

Repeat home monitoring or perform 24-hour ambulatory blood pressure monitoring
VII. Suggested protocol for home measurement of blood pressure for the diagnosis of hypertension

• Home blood pressure values should be based on:
  – Duplicate measures
  – Morning and evening
  – For an initial 7-day period
• First day home BP values should not be considered
• The following six days blood pressure readings should be averaged
• Average BP equal to or over 135/85 mmHg should be considered elevated (for those patients whose clinic BP target is less than 140/90 mmHg)

Recommended electronic blood pressure monitors for home blood pressure measurement

• Monitors that have been validated as accurate and available in Canada are listed at www.hypertension.ca in the ‘device endorsements’ section
• AHA Heart.org directs people to an international website for validated devices and devices marked as validated by AAMI, ESH or BHS
• The boxes containing the device are also GENERALLY marked with

VII. Home measurement of BP: patient education

• Assist patients in selecting a model with the correct size cuff
• Measure and record the patient’s mid arm circumference so they can match it to cuff size
• Recommend devices listed at www.hypertension.ca or marked with this symbol
• Ask patients to carefully follow the instructions with device and to record only those blood pressures where they have followed recommended procedure
• Advise patients that average readings equal to or over 135/85 mmHg are high
• In patients with diabetes, lower therapeutic targets and diagnostic criteria are likely required
Web based home monitoring

- Website resources are available at www.heartandstroke.ca/bp
- https://www.heart360.org/
  - Individualized automated counseling and tracking to assist patients with home monitoring and to enhance self-management of lifestyle
- https://www.millionhearts.hhs.gov/DOCS/MH_SMBP.PDF

More resources for home monitoring

- www.hypertension.ca
- www.heart.org

- Information to assist you in training patients to measure blood pressure at home
  - Brief action tool for health care professionals (under resources in the education tools for health care professionals section)
- Information for patients on how to purchase a device for home measurement and how to measure blood pressure at home
  - Learn how to measure your blood pressure at home and home measurement of blood pressure (under resources in the education tools for health care professionals section)
- A training DVD on home measurement of blood pressure is available for download at www.hypertension.ca

Advice for patients on when to contact a health care professional based on high average home blood pressure readings

<table>
<thead>
<tr>
<th>Systolic BP reading</th>
<th>Diastolic BP reading</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 130</td>
<td>Less than 85</td>
<td>Normal follow-up</td>
</tr>
<tr>
<td>130 – 179</td>
<td>85 – 109</td>
<td>Check reading again using the correct technique. If the readings remain high, discuss with your healthcare provider at your next regularly scheduled appointment</td>
</tr>
<tr>
<td>180 – 199</td>
<td>110 – 119</td>
<td>Check reading again using the correct technique. If the readings remain high, schedule an appointment with your doctor to discuss your treatment plan</td>
</tr>
<tr>
<td>More than 200*</td>
<td>More than 120*</td>
<td>Check reading again using the correct technique. If the readings remain high, schedule an urgent appointment with your doctor to discuss your treatment plan</td>
</tr>
</tbody>
</table>

*Patients with diabetes, chronic kidney disease or who are at high risk of cardiovascular events require individualized advice.

(Resource available at www.hypertension.ca in the 3 Minute Hypertension Action Tool or www.heartandstroke.ca/BP)
Canadian data

• 45.9% (95% CI: 43.5%-48.3%) monitor their own blood pressure at home
  – 25.5% did not measure their own blood pressure at home, but measured it outside of a clinic or medical setting, usually a pharmacy
• 29.7% (95% CI: 41.1%,46.3%) received health professional instruction
• 35.9% (95% CI: 33.5%,38.4%) share the results with their health professional
• 16% regularly measure, were instructed in how to measure and share their results with their HCP

Canadian data

• Regular HBPM was more likely among:
  – older adults (age <45 PRR 0.64, 95%CI .47-0.87 vs age 65-97)
  – individuals who had a plan on how to control their blood pressure (PRR: 1.8, 95% CI: 1.37,2.34)
  – those who had been shown how to HBPM by a health professional (PRR: 2.8, 95% CI: 2.4, 3.4)

Home measurement resources

List of Validated Home Blood Pressure Monitors
  [Website Link]

British Hypertension Society: [Website Link]

Resources for Working with Health Care Providers

AHRQ Clinician Research Summary: Effectiveness of Self-Measured Blood Pressure Monitoring in Adults with Hypertension: [Website Link]

American Heart Association. Heart 360: An Online Tool for Patients to Track and Manage Their Heart Health and Share Information with Healthcare Providers: [Website Link]

American Heart Association. Home Blood Pressure Monitoring Instructional Video: [Website Link]

American Heart Association. Information on Home Blood Pressure Monitoring and Online and Printable Blood Pressure Tracking Log: [Website Link]
Home measurement resources


Conclusion

- Although evidence is evolving on the utility of home assessment of blood pressure the potential to improve self efficacy, blood pressure control and reduce costs makes it very attractive
- In Canada, the CHEP has strongly promoted home measurement of BP for several years but our surveillance system is not currently adequate to assess the impact of the interventions