# Can Pharmacists Provide Affordable and Effective Hypertension Care in the United States?

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# Disclosures

- Received grant funding (PI) from Boehringer Ingelheim, Inc.

- Received an honorarium from the George Mason Mercatus Center to support the research presented today.

# Scope of the Problem

**Hypertension** often has **NO SIGNS OR SYMPTOMS**, and therefore frequently goes undiagnosed

Hypertension affects

**1.3 BILLION**

people (1 in 4 adults)

Fewer than

**1 IN 5**

have their hypertension under control

Hypertension is the

**#1**

risk factor for death globally

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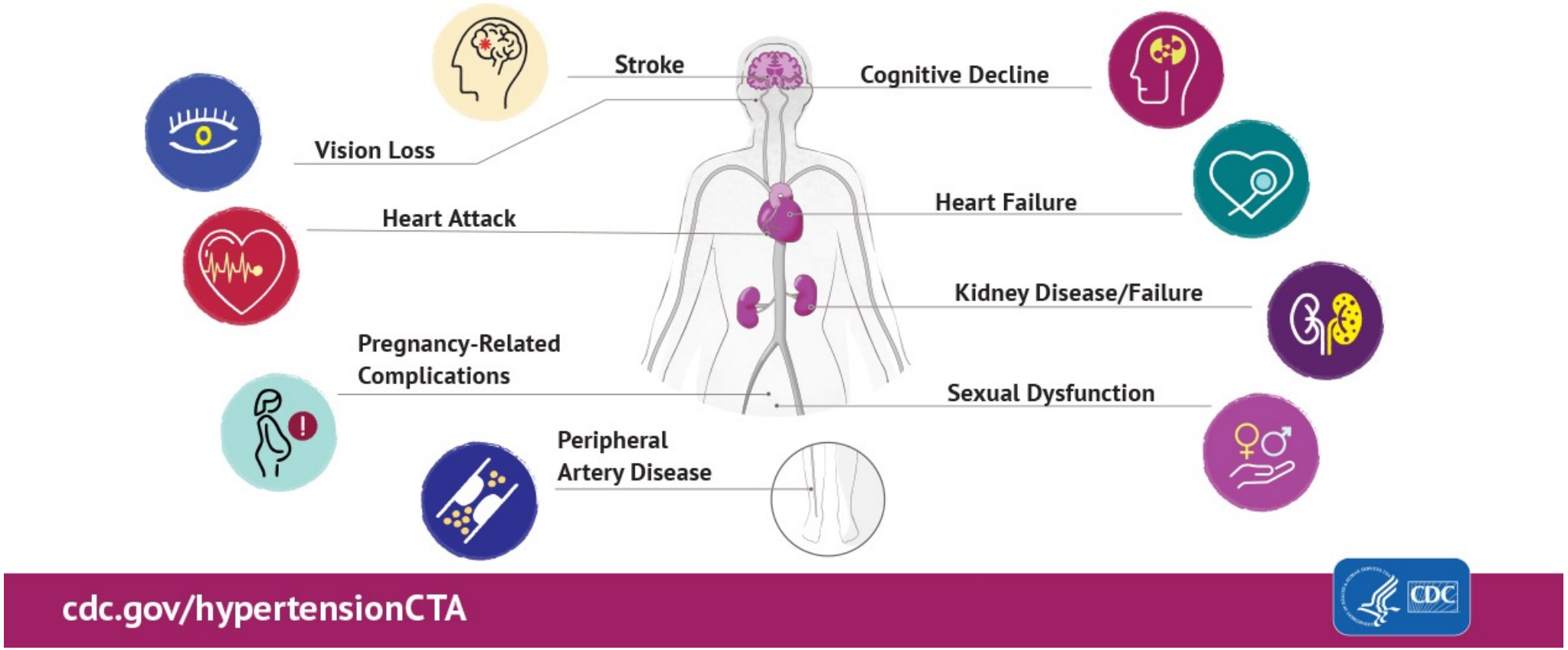
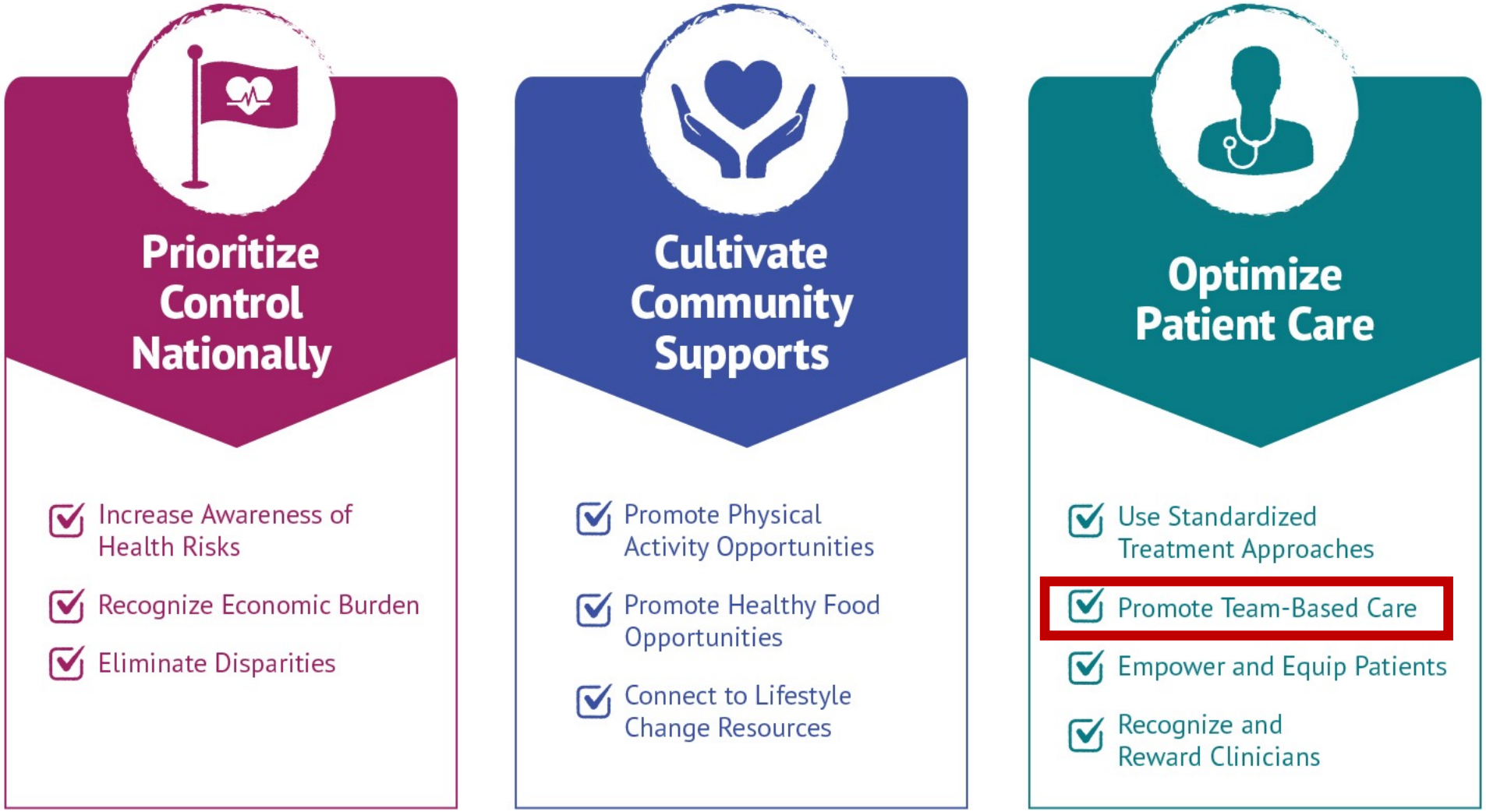
World Heart Federation Roadmap for Hypertension - A 2021 Update. Glob Heart. 2021 Sep 10;16(1):63.

# Prevalence, Control, and Treatment of HTN Among US Adults

# Health Problems Caused by Hypertension



# Goals and Strategies to Improve Hypertension Control




*Source: Adapted from the U.S. Department of Health and Human Services.* The Surgeon General's Call to Action to Control Hypertension. *Washington, DC: U.S. Dept. of Health and Human Services, Office of the Surgeon General; 2020.*

# Team-Based Care for Hypertension


Centers for Disease Control and Prevention. Using the Pharmacists' Patient Care Process to Manage High Blood Pressure: A Resource Guide for Pharmacists. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; 2016

J Am Coll Cardiol. 2018 May 15;71(19):e127-e248.
Hypertension. 2023 Oct;80(10):e143-e157.

**Using the Pharmacists' Patient Care Process to Manage High Blood Pressure:**

A Resource Guide for Pharmacists


**Recommendation for Monitoring Strategies to Improve Control of BP in Patients on Drug Therapy for High BP**

**References that support the recommendation are summarized in Online Data Supplement 29.**

| COR | LOE | Recommendation |
|---|---|---|
| I | A | 1. Follow-up and monitoring after initiation of drug therapy for hypertension control should include systematic strategies to help improve BP, including use of HBPM, team-based care, and telehealth strategies.[S8.3.2-1–S8.3.2-6] |

**Recommendation for Structured, Team-Based Care Interventions for Hypertension Control**

**References that support the recommendation are summarized in Online Data Supplement 62.**

| COR | LOE | Recommendation |
|---|---|---|
| I | A | 1. A team-based care approach is recommended for adults with hypertension.[S12.2-1–S12.2-7] |

AHA/AMA SCIENTIFIC STATEMENT

**Implementation Strategies to Improve Blood Pressure Control in the United States: A Scientific Statement From the American Heart Association and American Medical Association**

# Effectiveness of Pharmacist-led Interventions to Improve BP Control

- 2014 Meta-analysis of 39 RCTs
  - ↓ SBP -7.6 mm Hg and ↓ DBP -3.9 mm Hg (vs. usual care)
  - *Larger effect size if the intervention was pharmacist-led and performed at least monthly*

- 2018 Los Angeles Barbershop BP Study
  - ↓ SBP -21.6 mm Hg and ↓ DBP – 14.9 mm Hg (vs. control)
    - BP <130/80 mm Hg: Pharmacist (64%) vs. Control (12%)
  - 2021 cost-effectiveness study found the intervention to be highly cost-effective at 10 years ($42,717 per QALY gained)



1) J Am Heart Assoc. 2014 Apr 10;3(2):e000718. 2) N Engl J Med 2018; 378:1291-1301 3) Circulation. 2021;143:2384–2394.

# Randomized Trial of the Effect of Pharmacist Prescribing on Improving Blood Pressure in the Community:

# The Alberta Clinical Trial in Optimizing HTN (RxACTION)

## Multi-center, randomized, controlled trial

## Intervention group (enhanced pharmacist care)

- *Independent patient assessment, counseling, and prescribing of antihypertensive medications*

## Pharmacy Practice Settings

- Community (20 pharmacists)
- Hospital outpatient clinics (2 pharmacists)
- Primary care clinics (6 pharmacists)

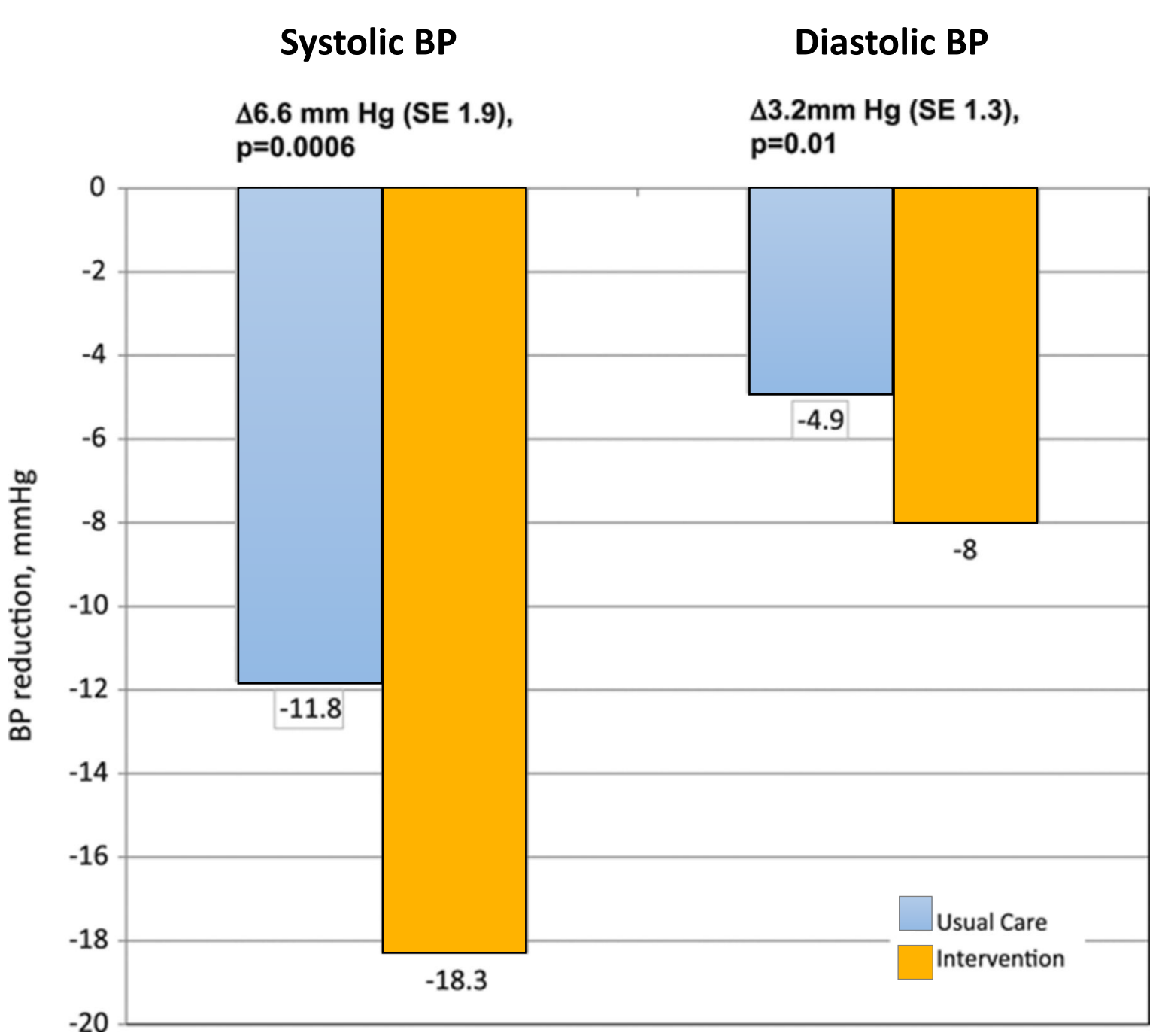
## Comparator group (enhanced usual care)

- Received a wallet card for recording BP, education, and BP measurement by the pharmacist at 3-month intervals

Circulation. 2015;132:93-100.

# RxACTION:

# Primary Results




Circulation. 2015;132:93-100.

# Cost-Effectiveness of RxACTION Implementation in Canada

## Cost-effectiveness of pharmacist care for managing hypertension in Canada

*Carlo Marra, PharmD, PhD, ACPR, FCSHP; Karissa Johnston, MSc, PhD; Valerie Santschi, PharmD, PhD; Ross T. Tsuyuki, BSc(Pharm), PharmD, MSc, FCSHP, FACC*

ABSTRACT

**Background:** More than half of all heart disease and stroke are attributable to hypertension, which is associated with approximately 10% of direct medical costs globally. Clinical trial evidence has demonstrated that the benefits of pharmacist intervention, including education, consultation and/or prescribing, can help to reduce blood pressure; a recent Canadian trial found an 18.3 mmHg reduction in systolic blood pressure associated with pharmacist care and prescribing. The objective of this study was to evaluate the economic impact of such an intervention in a Canadian setting.

**Methods:** A Markov cost-effectiveness model was developed to extrapolate potential differences in long-term cardiovascular and renal disease outcomes, using Framingham risk equations and other published risk equations. A range of values for systolic blood pressure reduction was considered (7.6-18.3 mmHg) to reflect the range of potential interventions and available evidence. The model incorporated health outcomes, costs and quality of life to estimate an overall incremental cost-effectiveness ratio. Costs considered included direct medical costs as well as the costs associated with implementing the pharmacist intervention strategy.

**Results:** For a systolic blood pressure reduction of 18.3 mmHg, the estimated impact is 0.21 fewer cardiovascular events per person and, discounted at 5% per year, 0.3 additional life-years, 0.4 additional quality-adjusted life-years and $6,364 cost savings over a lifetime. Thus, the intervention is economically dominant, being both more effective and cost-saving relative to usual care.

**Discussion:** Across a range of one-way and probabilistic sensitivity analyses of key parameters and assumptions, pharmacist intervention remained both effective and cost-saving.

**Conclusion:** Comprehensive pharmacist care of hypertension, including patient education and prescribing, has the potential to offer both health benefits and cost savings to Canadians and, as such, has important public health implications. *Can Pharm J (Ott)* 2017;150:184-197.

## KNOWLEDGE INTO PRACTICE

- Pharmacist intervention (either partial or full) is an effective management strategy for hypertension.
- Pharmacists are ideally placed to fill in the care gap for the 35% to 65% of hypertensive patients who are inadequately controlled.
- Full management (prescription, education and consultation) of hypertension by pharmacists is a dominant (saves money and improves outcomes) strategy.
- Partial management by pharmacists improves outcomes at a cost generally thought to be cost-effective.
- Given the compelling economic argument for pharmacist management of hypertension, pharmacists and policy-makers have a societal duty to implement this type of care.

Can Pharm J (Ott). 2017 Mar 21;150(3):184-197.

# Question 1: What proportion of US adults with HTN are uncontrolled?

A. 1 in 2
B. 1 in 3
C. 3 in 4
D. 4 in 5

# Question 2: Which of the following best describes the most unique aspect of the pharmacist intervention used in the RxACTION trial?

A. Independent prescribing
B. Education and counseling
C. Prescribing via collaborative practice agreement
D. Sent recommendations to the participant's medical provider

What would be the cost-effectiveness of implementing a *pharmacist-prescribing intervention* to improve blood pressure control in the United States?

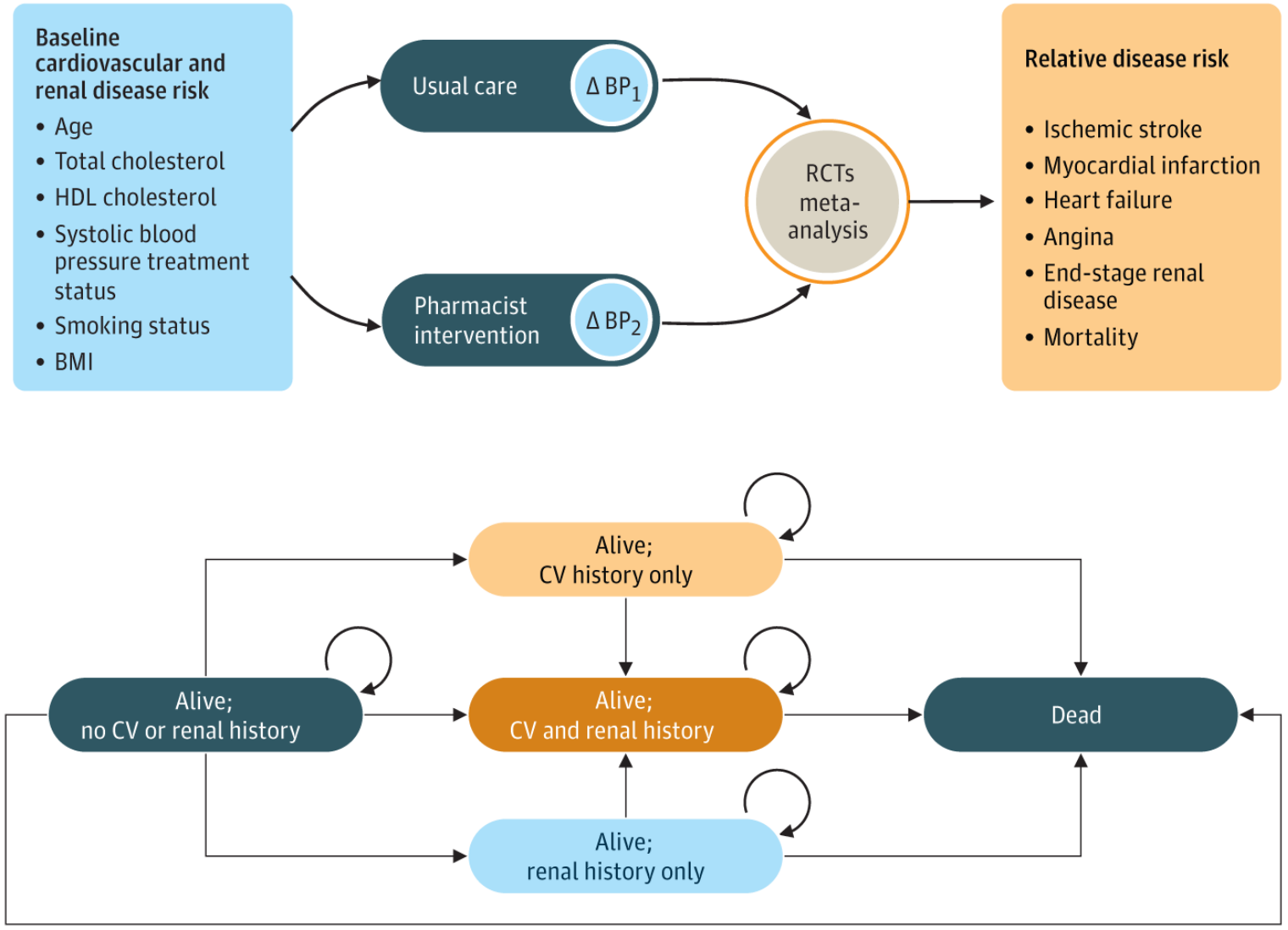
# Methods

- 5-state Markov model
  - Patients entered with uncontrolled HTN and no prior cardiovascular or kidney disease
- Conceptual model
  - Pharmacist-prescribing intervention would reduce BP, with a resultant decrease in cardiovascular and kidney disease risk
  - The cost of model implementation would be compared with long-term cost offsets and health/mortality benefits from BP reduction
- 30-year time horizon and assumed a 50% uptake
- QALYs discounted at 3% per annum



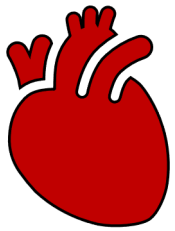
*JAMA Netw Open.* 2023;6(11):e2341408.

# Model Structure




*JAMA Netw Open.* 2023;6(11):e2341408.

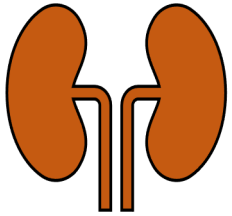
# Determining Associated Risks Over Time



## CVD Risk

Intervention: estimated using results from the BP Lowering Treatment Trialists' Collaboration

Comparator: estimated based on Framingham risk equations



## Kidney Disease Risk

Based on risk of ESKD according to reported association between BP and ESKD incidence in a US historical cohort and 25-year follow-up study

## Mortality Risk

Based on US life tables, with HR of 1.71 applied to account for increased risk of mortality in a population with CVD

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# Clinical Model Structure

- RxACTION
  - Face-to-face encounters with the pharmacists every 4 weeks until BP was controlled for 2 consecutive visits, followed by 12-week intervals
  - Estimated 6 visits in year 1, then 4 visits per year thereafter
- Model base case based on the mean 6-month reduction in systolic BP of -18.3 mm Hg
- Assumed BP would remain at baseline levels in the comparator group

**TABLE 1** Assumed patient characteristics for pharmacist hypertension intervention, based on observed population in Tsuyuki et al.[10] clinical trial

| Characteristic | Value |
|---|---|
| Age (years) | 63.5 |
| Sex (% male) | 48.8 |
| Systolic blood pressure (mmHg) | 149.5 |
| Diastolic blood pressure (mmHg) | 83.7 |
| Treatment for hypertension (%) | 77.8 |
| Smoking (%) | 16.5 |
| Diabetes mellitus (%) | 44.0 |
| Body mass index | 32.0 |

*JAMA Netw Open.* 2023;6(11):e2341408.

# Costs

- Pharmacist Visits = $23.10 (CPT 99211 Level 1)
- Antihypertensive Medications = $32.78/mo
- Annual background all-cause health care costs based on age-specific values reported by AHRQ
- Cost of events were stratified into the first-year post event and subsequent years and based on values from a US microsimulation for HTN and cost for ESKD was based on the US Renal Data System data
- All costs inflated to 2021 US dollar based on US Consumer Price Index-Medical Care

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# Base Case, Quality-Adjusted Life Years, and Costs

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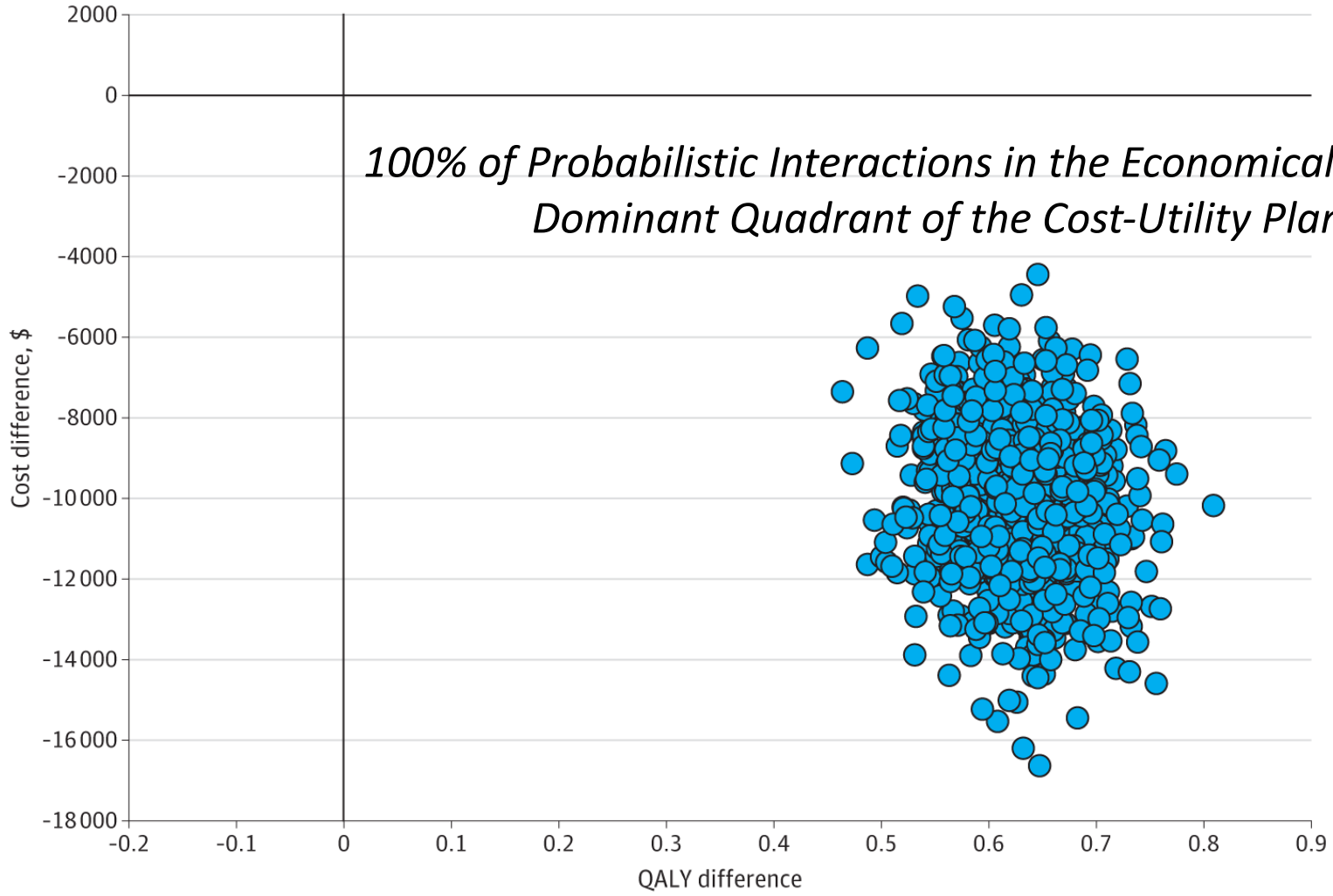
**Table 1. Base Case, Quality-Adjusted Life Years, and Costs[a]**

| Characteristic | Usual care | Pharmacist intervention | Difference |
|---|---|---|---|
| Base case | | | |
| Cardiovascular events | 0.61 | 0.40 | −0.21 i.e., 2100 |
| End-stage kidney disease events | 0.0038 | 0.0030 | −0.0008 i.e., 8 |
| Life years | | | |
| Discounted | 14.6 (14.3 to 14.9) | 15.0 (14.8 to 15.2) | 0.34 (0.23 to 0.45) |
| Undiscounted | 19.7 | 20.3 | 0.63 |
| Quality-adjusted life years | | | |
| Discounted | 11.8 (11.6 to 12.0) | 12.4 (12.3 to 12.6) | 0.62 (0.53 to 0.73) |
| Undiscounted | 15.7 | 16.7 | 1.03 |
| Costs | | | |
| Discounted | $189 648 ($151 188 to $237 055) | $179 485 ($140 586 to $225 972) | −$10 162 (−$13 581 to −$6636) |
| Undiscounted | $276 218 | $262 593 | −$13 625 |
| Category-specific costs (discounted) | | | |
| Intervention costs | $0 | $7318 | $7318 |
| Background medical costs | $97 481 | $99 751 | $2270 |
| Total cardiovascular disease | $45 506 | $28 242 | −$17 264 |
| Stroke | $10 652 | $6595 | −$4057 |
| Myocardial infarction | $17 905 | $11 152 | −$6753 |
| Angina | $5631 | $3493 | −$2138 |
| Heart failure | $11 319 | $7003 | −$4317 |
| Chronic kidney disease | $46 661 | $44 174 | −$2487 |

[a]Results presented are deterministic. Where available for key base-case outcomes, 2.5th to 97.5th percentiles from the probilistic sensitivity analysis are included.

# Probabilistic Sensitivity Analysis of Pharmacist Intervention

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# Sensitivity Analyses

1. Increased costs per pharmacist visit:
   - $100 for the initial visit; $50 per follow-up visit
2. Reduced time horizon to 5 years
3. Alternative assumptions for systolic BP decrease (-5 to -27 mm Hg)
4. Examining each type of health benefit (MI, angina, HF, stroke, ESKD)
5. Assuming the HTN benefit is only sustained for 10 years
6. Conservative scenario in which systolic BP decrease is assumed to be -10 mm Hg, losing 50% of benefit at 5 years, and 100% of benefit at 10 years.

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# Incremental Cost-Effectiveness Ratio (ICER) and One-Way Sensitivity Analyses Abbreviation

Table 2. Incremental Cost-Effectiveness Ratio and One-Way Sensitivity Analyses[a]

| One-way sensitivity analyses | ICER, $ |
|---|---|
| Increased cost per pharmacist visit ($100 first followed by $50) | Intervention dominates |
| 5-y Time horizon | 16 987 |
| Systolic blood pressure reduction: 7.6 mm HG | 2093 |
| Systolic blood pressure reduction: 27 mm HG | Intervention dominates |
| Only stroke benefits included | 14 572 |
| Only myocardial infarction benefits included | 6548 |
| Only angina benefits included | 21 995 |
| Only heart failure benefits included | 14 895 |
| Only kidney benefits included | 24 076 |
| Attenuating benefits to 10 y | Intervention dominates |
| Systolic blood pressure reduction: 10 mm HG, attenuating benefits to 10 y with 50% efficacy reduction after 5 y | Intervention dominates |



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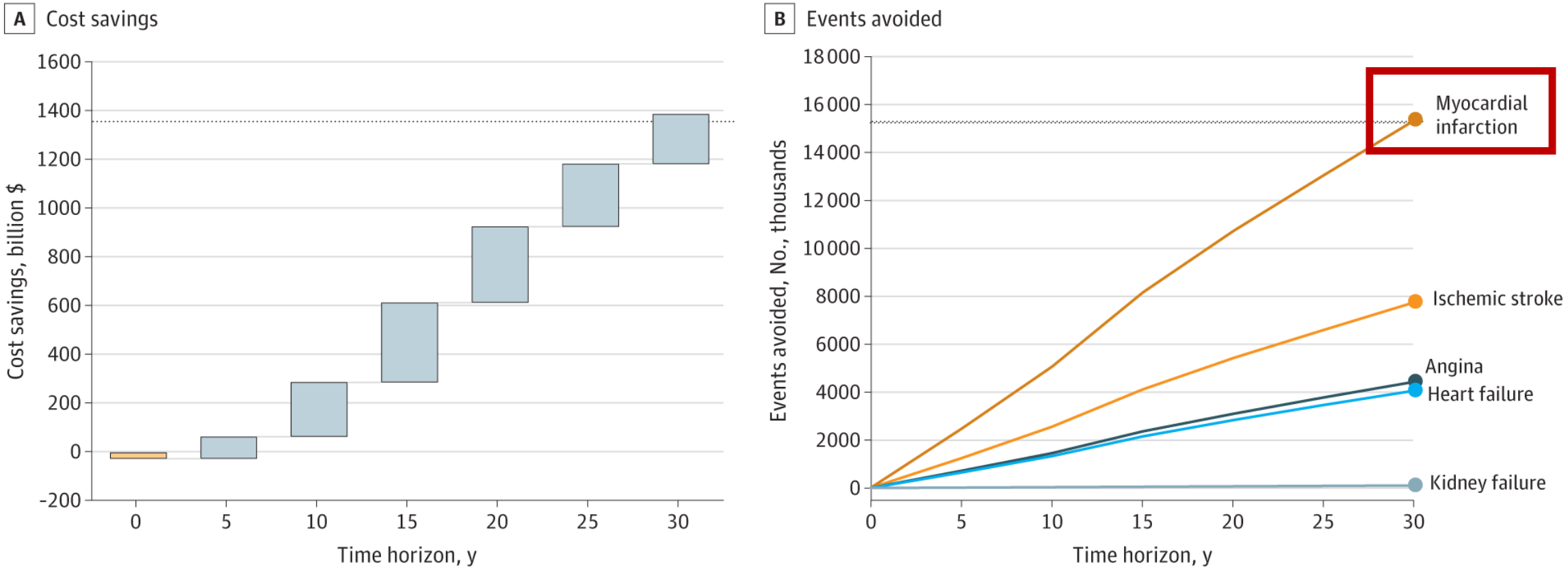
# Cumulative Cost Savings and Health Outcomes Averted With Estimated Population Use of the Pharmacist Intervention

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Conclusion: A 50% uptake of a pharmacist prescribing intervention would save $10,162 per person over a 30-year time horizon with and at the population level, a cumulative savings of $1.13 trillion.

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# Study Strengths, Implications, and Next Steps

- The most robust cost-effectiveness study of pharmacist-led HTN care in the US.
- Provides evidence with potential to impact state and federal healthcare policy in support of advancing roles for pharmacists.
- Obtain funding to support an international, multi-center study to demonstrate the effectiveness of this model outside of Canada, identify solutions to implementation barriers, and address racial/ethnic disparities in HTN outcomes.

# Key Limitations

50% uptake is ambitious; however, if an adequate reimbursement structure was in place, we believe this level of uptake to be possible and possibly an underestimate

We assumed BP control would not change in the comparator group; however, BP control is worsening in the US and the prevalence of HTN is increasing

The findings cannot be generalized to other special populations with HTN (pregnancy) and it is unknown how alternative delivery models would impact the cost-effectiveness of this model

Racial/ethnic demographics of the RxACTION trial participants may not be generalizable to the US



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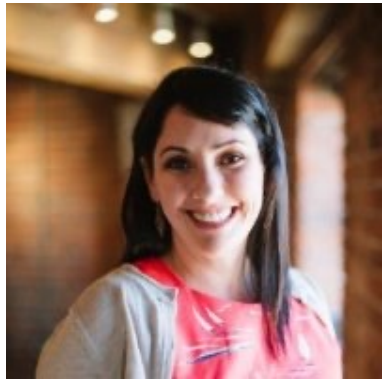
# Question 3: Which clinical outcome did the cost-effectiveness study show was most avoided by the pharmacist intervention over time?

A. Heart Failure
B. Kidney Failure
C. Ischemic Stroke
D. Myocardial infarction

# Question 4: Which of the following is the major barrier to implementing a pharmacist-led model for HTN in the US?

A. Lack of pharmacists
B. Lack of evidence supporting cost-effectiveness
C. Lack of evidence supporting clinical effectiveness
D. Lack of reimbursement for clinical pharmacy services

# THANK YOU!



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