

Impacts of Economic Policies on Hypertension Management and Control

Presented by Frank Luo, PhD, Senior Economist
and Jun Lee, PhD, Economist

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Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

Division for Heart Disease and Stroke Prevention



Hello and welcome to today's Coffee Break presented by the Applied Research and Evaluation Branch in the Division for Heart Disease and Stroke Prevention at the Centers for Disease Control and Prevention.

My name is Yu-Jan Huang, and I am an ORISE fellow with the branch. I will be acting as today's moderator.

Our presenters today are Frank Luo, a senior economist, and Jun Lee, an economist. Both presenters are in the Division for Heart Disease and Stroke Prevention's Applied Research and Evaluation Branch. They will be presenting their research papers about impacts of economic policies on hypertension management and control.

Before We Begin...

- Any issues or questions?
 - Use Q & A box on your screen
 - Email AREBHeartInfo@cdc.gov



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Before we begin, there are some housekeeping items. If you are having issues with audio or seeing the presentation, please message us using the Q&A or send us an email at AREBheartinfo@cdc.gov. Please submit any questions for the presenters using the Q&A as well. Since this is a training series on applied research and evaluation, we hope you will complete the poll at the end of the presentation and provide us with your feedback.

Disclaimer

The information presented here is for training purposes and reflects the views of the presenters. It does not necessarily represent the official position of the Centers for Disease Control and Prevention.

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So, without further delay. Let's get started. **Frank and Jun**, the floor is yours.

Presentation Outline

- Introduction to Relevant Economic Policies
- Review of Existing Evidence – A Systematic Review
- Presentation of New Evidence – An Empirical Study

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Thank you, Yu-Jan.

In today's presentation, we will talk about our two studies on impacts of economic policies on hypertension management and control. One is a systematic review, which reviews existing evidence in the literature, and the other one an empirical study, which presents new evidence.

Before that, I will give a quick introduction to economic policies that may be relevant to hypertension management and control.

Introduction to Relevant Economic Policies

- Why do economic policies matter?
 - Economic policies address social determinants of health and may have a profound population impact
- What may be relevant economic policies?
 - Minimum wages, unemployment benefits, and Medicaid expansion reduce cost barriers to health care among people with low income
 - Supplemental Nutrition Assistance Program addresses health-related social needs
 - Cost control policies or reimbursement models may have unintended, undesired consequences

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You may wonder why economic policies matter for hypertension management and control. Economic policies address social determinants of health, so they may have a profound population impact.

What may be relevant economic policies to hypertension management and control? We listed a few here. For example, minimum wages, unemployment benefits, and Medicaid expansion reduce cost barriers to health care among people with low income; Supplemental Nutrition Assistance Program addresses health-related social needs; and cost control policies or reimbursement models may have unintended, undesired consequences.

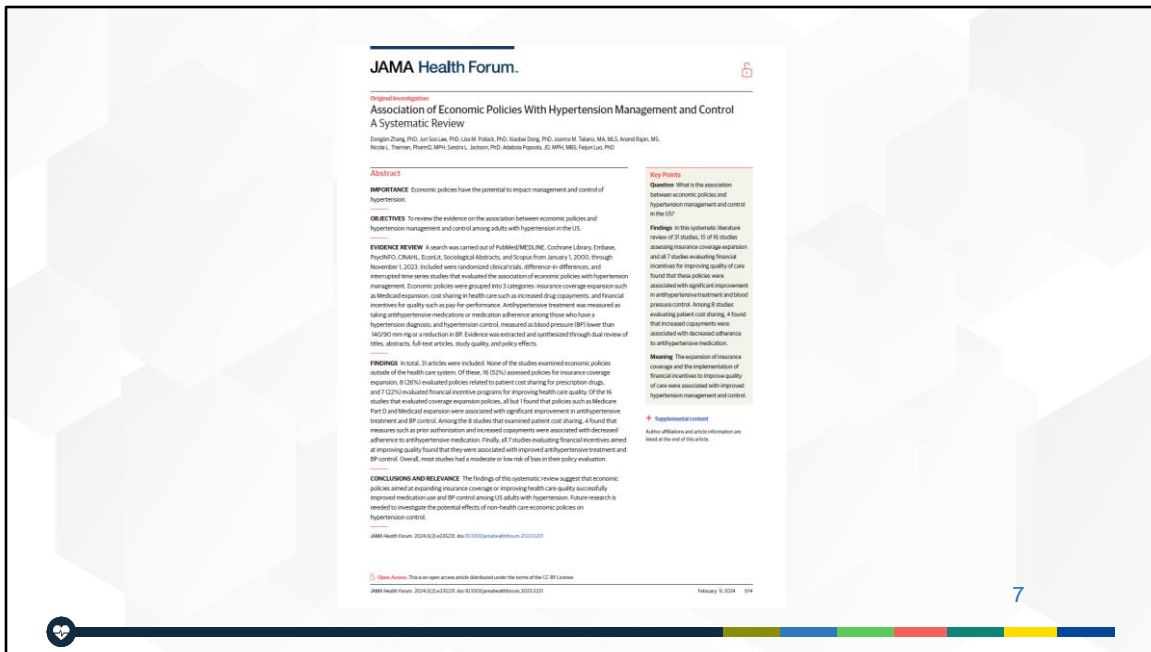
Review of Existence Evidence – A Systematic Review

[“Association of Economic Policies With Hypertension Management and Control: A Systematic Review.”](#) *JAMA Health Forum*, 2024 Feb; 5(2): e235231.

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Let me talk about our study 1, a systematic review. The manuscript, “Association of Economic Policies with Hypertension Management and Control: A Systematic Review,” was published in *JAMA Health Forum* in February 2024.

Link: [Association of Economic Policies With Hypertension Management and Control: A Systematic Review | Health Policy | JAMA Health Forum | JAMA Network](#)



This is the publication of the systematic review.

Objective

To review the evidence on the association of economic policies with hypertension management and control among adults with hypertension in the US

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The objective of this study is to review the evidence on the association of economic policies with hypertension management and control among adults with hypertension in the US.

Data Sources

PubMed/MEDLINE, Cochrane Library, Embase, PsycINFO, CINAHL, EconLit, Sociological Abstracts, and Scopus from January 1, 2000, through November 1, 2023

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We conducted literature search from the above common databases in public health, medicine, and economics from January 1, 2000 to November 1, 2023.

Literature Search

Combining Two Themes

- US Economic Policies
 - Medicaid expansion, Medicare Part D, minimum wage laws, unemployment insurance, earned income tax credit, paid family and medical leave, etc.
- Hypertension Treatment and Control
 - Antihypertensive treatment: measured as taking antihypertensive medications or medication adherence among those who have hypertension
 - Blood pressure (BP) control: measured as BP under control (<140/90 mmHg) or a reduction in BP

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When we conducted literature search, we combined two themes – one is US economic policies and the other hypertension treatment and control.

The theme “US Economic Policies” included terms such as Medicaid expansion, Medicare Part D, minimum wage laws, unemployment insurance, earned income tax credit, paid family and medical leave, etc., and their variants.

And the theme “Hypertension Treatment and Control” included terms related to antihypertensive treatment and blood pressure control.

Search Terms and Definitions

Concepts	Synonyms/Acronyms
Economic Policies ^{a,b}	
Minimum Wage	"Minimum Wage"
Unemployment Insurance	"Unemployment Insurance" OR "unemployment benefits"
Earned Income Tax Credit	"Earned Income Tax Credit" OR EITC
Temporary Assistance for Needy Families	"Temporary Assistance for Needy Families" OR TANF OR "Aid to Families with Dependent Children" OR "AFDC"
Paid leave	"Paid Family and Medical Leave" OR "Paid Family Leave" OR "Paid Maternity Leave" OR "Paid leave" OR "Sick leave"
Unpaid leave	"Family and Medical leave act" OR FMLA
Affordable Care Act	"Patient Protection and Affordable Care Act" OR "ACA" OR "Affordable Care Act" OR "Obamacare"
Medicaid expansion	"Medicaid Expansion"
Prescription drugs	"Medicare Part D" OR "Medicare Drug Coverage" OR "Medicare prescription drug benefit" OR "Cap on Prescription Drug" OR "Inflation Reduction Act"
Telehealth	"All-Payer Telemedicine Parity" OR "Medicaid reimbursement for audio-only services" OR "Medicare Expansion of Telehealth with 1135 Waiver"
Housing policy	"Eviction Moratoria" OR "Eviction Protection" OR "Housing Policy" OR "Mortgage Relief" OR "Foreclosure Relief" OR "Making Home Affordable"
Food policy: nutrition assistance	"Supplemental Nutrition Assistance Program" OR SNAP OR "emergency supplementary" OR "Meal Replacement Benefits" OR "Nutrition Assistance" OR "Women, Infants, and Children" OR WIC
Economic relief	"Economic Impact Payments" OR "Stimulus Checks" OR "Inflation Relief Checks" OR "Child Tax Credit" OR "American Rescue Plan"
Social Security	"Supplemental Security Income" OR SSI
Medicare Savings Programs	"Medicare Savings Programs" OR "MSP" OR "Qualified Medicare Beneficiary Program" OR QMB OR "Specified Low-Income Medicare Beneficiary Program" OR SLMB OR "Qualifying Individual Program" OR QI OR "Qualified Disabled Working Individual Program" OR QDWI
Prescription drugs: low-income subsidy	"Medicare Part D Low-Income Subsidy" OR "Medicare Part D LIS" OR "Part D Low-Income Subsidy" OR "LIS/Extra Help" OR "State Pharmaceutical Assistance Programs" OR "SPAP" OR "SPAPs" OR "Medicaid Drug Cap"
Reimbursement Policy, Financial incentive	"Reimbursement, Incentive" OR "financial incentive" OR "economic incentive" OR "monetary incentive" OR "pay-for-performance" OR "P4P"

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Here's a partial list of our search terms and definitions. For example, we included terms like minimum wage, telehealth, Medicaid expansion, etc., which can potentially impact hypertension management and control.

Study Selection

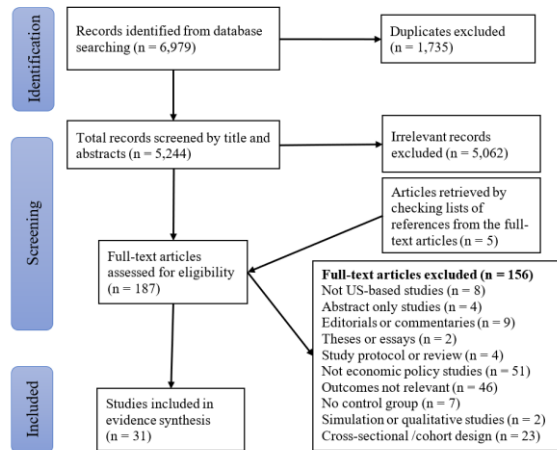
- Dual review of titles, abstracts, and full-text articles
- Two investigators independently conducted reviews at each stage and their discrepancies were resolved through discussions with a third/fourth reviewer

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After the literature search, we conducted the study selection. During this process, we applied a dual review to title screening, abstract screening, and full-text screening.

A dual review is a protocol that two investigators independently conducted their reviews and their discrepancies were resolved through discussions with a third/fourth reviewer.

Flow Chart of Study Selection Process



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Here's the flow chart of study selection process.

We first identified 6,979 articles from the literature search.

After dropping 1,735 duplicates, we kept 5,244 articles for title and abstract screenings.

After screening titles and abstracts, we retrieved 187 full-text articles and assessed them against the inclusion criteria.

Overall, 31 articles met the inclusion criteria and were included in the systematic review.

Data Extraction

For each selected study, data on study population, study design, analytical models, hypertension outcome measures, data sources, economic policies, comparator, main findings, conclusions, and funding sources were extracted

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After identifying articles included in the systematic review, we conducted data extraction. For each selected study, we extracted data on study population, study design, analytical models, hypertension outcome measures, data sources, economic policies, comparator, main findings, conclusions, and funding sources.

Risk of Bias Assessment

For each selected study, risks from 4 types of biases were assessed:

- confounding bias
- selection bias
- outcome measurement bias
- results reporting bias

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We also assessed risk of bias for each selected study. We considered 4 types of biases: confounding bias; selection bias; outcome measurement bias, and results reporting bias.

Results

Thirty-one studies were selected and grouped into 3 categories:

- Insurance Coverage Expansion (16 studies)
- Cost-Sharing in Health Care (8 studies)
- Financial Incentives for Quality (7 studies)

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Here's a summary of our results. We identified 31 studies included in this systematic review and grouped them into 3 categories. The category "Insurance Coverage expansion" has 16 studies, the category "Cost-Sharing in Health Care" 8 studies, and the category "Financial Incentives for Quality" 7 studies.

Results (Cont'd)

- Among 16 studies on insurance coverage expansion policies, all but 1 found that policies such as Medicare Part D and Medicaid expansion significantly improved antihypertensive treatment and BP control.
- Among 8 studies on cost-sharing in health care policies, 4 found that policies such as prior authorization and increased copayments led to decreased adherence to antihypertensive medication.
- All 7 studies on financial incentives for quality policies found that they improved antihypertensive treatment and BP control.

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More specifically, among 16 studies on insurance coverage expansion policies, all but 1 found that policies such as Medicare Part D and Medicaid expansion significantly improved antihypertensive treatment and blood pressure control.

Among 8 studies on cost-sharing in health care policies, 4 found that policies such as prior authorization and increased copayments led to decreased adherence to antihypertensive medication.

Finally, all 7 studies on financial incentives for quality policies such as Medicare Accountable Care Organizations and Medicaid financial incentive programs found that they improved antihypertensive treatment and blood pressure control.

Table 1. Selected Characteristics of the 31 Included Studies

Source	Location	Population	Study design	Data source	Economic policy	IMP. year	Hypertension-related measure
Fischer et al, 2007	National	Medicaid	Quasi-experimental (DD)	CMS	Prior authorization ^b	2004	% ARB dispensed
Maciejewski et al, 2010	4 VAMC	VA	Quasi-experimental (DD)	VAMC	Drug copay ^b	2002	Medication adherence
Zhang et al, 2010	National	Medicare	Quasi-experimental (DD)	CMS	Part D ^a	2006	Medication adherence
Zhang et al, 2011	National	Medicare	Quasi-experimental (DD)	CMS	Part D ^a	2006	% ARB dispensed
Li et al, 2012	National	Medicare	Quasi-experimental (DD)	CMS	Coverage gap ^b	2006	Medication adherence
Wang et al, 2013	LA, IN	Medicaid	Quasi-experimental (DD)	Medicaid	Prescription limit ^b	2003	Medication discontinuation
Baicker et al, 2013	OR	Uninsured	RCT	Data collection	Expansion ^a	2008	SBP and DBP; an inventory of medications
Bardach et al, 2013	NYC	Medicaid, uninsured & privately insured	Cluster RCT	EHR	P4P ^c	2009	BP
Petersen et al, 2013	12 VA Clinics	VA	Cluster RCT	EHR	Incentives ^c	2008	Control rate; medication use
Zimmer et al, 2014	National	Medicare	Quasi-experimental (DD)	MEPS	Part D ^a	2006	No. prescriptions
Hirth et al, 2016	7 states	Insurance for state employees	Quasi-experimental (DD)	Commercial claims	VBID ^b	2011	Medication adherence
Amin et al, 2017	NC, GA	Medicaid	Quasi-experimental (DDD)	CMS	Drug copay ^b	2001	Medication adherence
Cole et al, 2017	National	Medicaid	Quasi-experimental (DD)	HRSA	Expansion ^a	2014	Control rate

Here’s part of Table 1, “Selected Characteristics of the 31 Included Studies.” For each selected study, we reported study location, study population, study design, data source, economic policy, implementation year, and hypertension-related measure.

Table 2. Association Between Economic Policies and Hypertension Management and Control

Type and source	Economic policies	N	Main findings	
			Outcome measurement	Estimates
A. Insurance Coverage Expansion				
Zhang et al, 2010	Medicare Part D	T: n=418 C: n=3027	Number of antihypertensive pills taken per day of treatment	0.22 (95% CI, 0.16-0.28)
Zhang et al, 2011	Medicare Part D	T: n=1478 C: n=4253	Average daily counts of any antihypertensive filled each year	OR = 1.40 (95% CI, 1.25-1.56)
Baicker et al, 2013	Medicaid expansion	T: n=10405 C: n=10340	Mean SBP and DBP; Current use of antihypertensive medications	No difference (NS)
Zimmer et al, 2014	Medicare Part D	T: n=15 133 C: n=21 008	Number of antihypertensives prescribed per senior per year	11% (<i>P</i> <0.05)
Cole et al, 2017	Medicaid expansion	T: n=492 (CHCs) C: n=365 (CHCs)	Hypertension control rate (BP < 140/90 mm Hg) for each CHC	2.1 (95% CI, 0.2-4.0)
Hatch et al, 2017	Medicaid expansion in Oregon	T: n=622 C: n=622	Time from uncontrolled hypertension to a controlled hypertension	HR = 1.35 (<i>P</i> < 0.001)
Cole et al, 2018	Medicaid expansion	T: n=578 (CHCs) C: n=431 (CHCs)	Hypertension control rate for each CHC	2.1% (95% CI, 0.2-4.0)
Diebold et al, 2018	Medicare Part D	T: n=536 C: n=1172	HBPUC is better, about the same, or worse than it was in the previous wave	0.59 (<i>P</i> < 0.05)
Angier et al, 2020	Medicaid expansion in 5 states	T: n=3054 C: n=2264	Controlled hypertension defined as whether a patient's BP was < 140/90 mm Hg	T: 8.6% (<i>P</i> < 0.05) C: 0.9% (NS)
Margerison et al, 2020	Medicaid expansion	T: n=16 499 C: n=41 866	Self-reported measure of BP medication currently taken	7.9% (95% CI, 3.1-12.8)
Marino et al, 2020	Medicaid expansion in 10 states	T: n=2483 C: n=2888	Mean SBP and DBP	SBP: -1.76 (95% CI, -1.34 - -2.19) DBP: -1.04 (95% CI, -0.77 - -1.30)
Cole et al, 2021	Medicaid expansion	T: n=578 FQHCs C: n=368 FQHCs	Proportion of patients with hypertension with a BP < 140/90 mm Hg	1.61% (95% CI, 0.58-2.64); by Year 5, 2.36% (95% CI, 1.01-3.71)
Gotanda et al, 2021	Medicaid expansion	T: n=4232 C: n=1869	Mean SBP and DBP	SBP: -3.03 (95% CI, -5.33 - -0.73) DBP: No difference (NS)

Here's part of Table 2, "Association between Economic Policies and Hypertension Management and Control." We grouped 31 selected studies into 3 categories. For each included study, we reported the economic policy examined, sample sizes for the treatment and control groups, and main findings such as effect sizes and their confidence intervals.

Table 3. Risk of Bias Assessment Results

	Risk of bias due to confounding (0-3) ^a	Risk of bias due to selection (0-2)	Risk of bias in measurement of outcomes (1-3)	Risk of bias in reported results (0-2)	Overall study quality (1-10)	Overall study quality metrics ^b
Fischer et al, 2007	1	1	2	1	5	Moderate risk
Maciejewski et al, 2010	2	1	2	1	6	Moderate risk
Zhang et al, 2010	2	0	2	1	5	Moderate risk
Zhang et al, 2011	2	0	2	2	6	Moderate risk
Li et al, 2012	3	1	2	1	7	Moderate risk
Wang et al, 2013	2	1	2	2	7	Moderate risk
Baicker et al, 2013	3	2	3	2	10	Low risk
Bardach et al, 2013	3	2	2	2	9	Low risk
Petersen et al, 2013	3	2	2	2	9	Low risk
Zimmer et al, 2014	1	1	1	1	4	High risk
Hirth et al, 2016	2	1	2	2	7	Moderate risk
Amin et al, 2017	2	1	2	1	6	Moderate risk
Cole et al, 2017	3	2	2	1	8	Low risk
Hatch et al, 2017	3	0	2	2	7	Moderate risk
McWilliams et al, 2017	3	1	2	1	7	Moderate risk
Kostova et al, 2017	3	1	2	2	8	Low risk
Adams et al, 2017	2	1	2	2	7	Moderate risk

Here’s part of Table 3, “Risk of Bias Assessment Results.” Among 31 included studies, 10 had a low risk of bias, 18 a moderate risk of bias, and 3 a high risk of bias.

Conclusions

- Policies aimed at expanding insurance coverage or improving health care quality improved antihypertensive medication use and BP control among US adults with hypertension
- Future research is needed to investigate the potential impact of non-healthcare economic policies on hypertension control

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Here're our key takeaways. We found that policies aimed at expanding insurance coverage or improving health care quality improved antihypertensive medication use and BP control among US adults with hypertension. Because all 31 studies included are in the healthcare sector, we believe future research is needed to investigate the potential impact of non-healthcare economic policies on hypertension control.

Presentation of New Evidence – An Empirical Study

“Impact of State Telehealth Parity Laws for Private Payers on Hypertension Medication Adherence before and during the COVID-19 Pandemic.” Forthcoming in *Circulation: Cardiovascular Quality and Outcomes*.

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Next, I'd like to invite Dr. Jun Lee to present our empirical study, “Impact of State Telehealth Parity Laws for Private Payers on Hypertension Medication Adherence before and during the COVID-19 Pandemic.” This study was published in *Circulation: Cardiovascular Quality and Outcomes* on July 29, 2024.

Link:

<https://www.ahajournals.org/eprint/NTZBNIGM7VBFS8YIPDY4/full?redirectUri=%2Fdoi%2F10.1161%2FCIRCOUTCOMES.123.010739>

State Telehealth Parity Laws and Hypertension Management



Thanks, Frank, for sharing the important findings. My name is Jun Lee, an economist at the Division for Heart Disease and Stroke Prevention. I will be presenting on the association of state telehealth parity laws with hypertension management.

[Check for updates](#)

Circulation: Cardiovascular Quality and Outcomes

ORIGINAL ARTICLE

Impact of State Telehealth Parity Laws for Private Payers on Hypertension Medication Adherence Before and During the COVID-19 Pandemic

Dingran Zhang¹, PhD; Jan Soo Liew¹, PhD; Abisola Popoola¹, JD, MPH, MSc; Sarah Liu¹, BA; Sarah L. Jackson¹, PhD, MPH; Lisa M. Ribicki¹, PhD, MPH, MPT; Xiaohu Dong¹, PhD; Nicole L. Trautner¹, PharmD, MPH; Fajun Luo¹, PhD

BACKGROUND: Telehealth has emerged as an effective tool for managing common chronic conditions such as hypertension, especially during the COVID-19 pandemic. However, the impact of state telehealth payment and coverage parity laws on hypertension medication adherence remains uncertain.

OBJECTIVE: Data from the 2016 to 2021 Medicare MarketScan Commercial Claims and Encounters Database were used to conduct the study cohort, which included nonpregnant individuals aged 25 to 84 years with hypertension. We coded telehealth parity laws related to hypertension management in all 50 US states and the District of Columbia, distinguishing between payment and coverage parity laws. The primary outcomes were measures of telehealth utilization, medication adherence, the average medication possession ratio, medication adherence (medication possession ratio), and average number of days of drug supply. We used a generalized difference-in-differences design to examine the impact of these laws.

RESULTS: Among 263,020 individuals (mean [SD] age, 69.6 [11.1] years; female, 45.55%), states with payment parity laws were significantly linked to increased medication possession ratios by 1.0% (95% CI, 0.07–0.70), and an increase of 0.43 (95% CI, 0.05–0.82) in the probability of medication adherence. Payment parity laws also led to an average increase of 2.14 days (95% CI, 0.11–4.17) in prescription supply after controlling for state-level effects, year-level effects, individual sociodemographic characteristics, and other time-varying covariates including unemployment rates, gross domestic product per capita, and poverty levels. In contrast, coverage parity laws were associated with a 2.13-day increase (95% CI, 0.15–4.12) in days of prescription supply but did not significantly increase the average medication possession ratio or probability of medication adherence.

CONCLUSIONS: State telehealth payment parity laws were significantly associated with greater medication adherence, whereas coverage parity laws were not. With the increasing adoption of telehealth parity laws across states, these findings may support policymakers in understanding potential implications on management of hypertension.

KEY WORDS: chronic disease • coverage parity • hypertension • pandemic • payment parity • telehealth

[See Editorial by Sammour and Spertus et al](#)

INTRODUCTION The COVID-19 pandemic brought about unprecedented changes in health care, leading to a rapid expansion of telehealth services to compensate for defunct medical care. Telehealth emerged as a critical and robust tool in managing prevalent chronic conditions like hypertension.^{1,2} Telemedicine for hypertension is especially well-received, with one report claiming an average adherence to telemedicine-based hypertension management programs as high as 77%.³ However, telehealth adoption has been largely influenced by

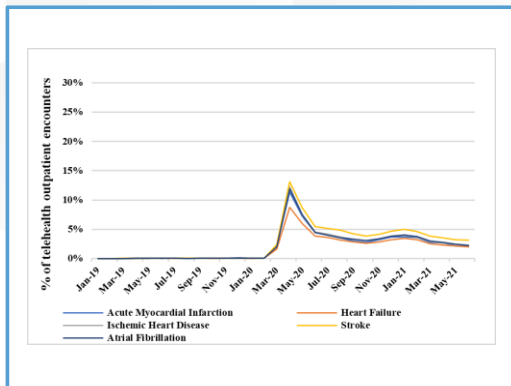
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Dr Zhang and Dr Liew are joint first authors.
Supplemental material is available at <https://www.ahajournals.org/doi/suppl/10.1161/CIRCOUTCOMES.123010739>.
For Sources of Funding and Conflicts of Interest, see page XXX.
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Circulation: Cardiovascular Quality and Outcomes is available at <http://www.ahajournals.org/journal/circoutcomes>
Circ Cardiovasc Qual Outcomes. 2024;17:e107398. DOI: 10.1161/CIRCOUTCOMES.123010739

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This is our publication in *Circulation: Cardiovascular Quality and Outcomes*.

INTRODUCTION



- Telehealth use surged during the COVID-19 pandemic (e.g., Lee, Lowe Beasley, Schooley, Luo, JAHA 2023)
- Telehealth is an effective tool to manage prevalent chronic conditions both before and during the pandemic
- Telemedicine for hypertension is well-received – average adherence to telemedicine-based hypertension management programs is around 77%

- Compared to pre-pandemic levels, telehealth utilization has increased dramatically during the COVID-19 pandemic among patients with cardiovascular diseases. While many employer health plans covered telehealth prior to the pandemic, utilization of these services was relatively low, accounting for less than 1% of outpatient visits. At its peak during the pandemic, telehealth represented 13% of outpatient visits between March and August of 2020. As in-person care resumed, telehealth began to represent a smaller share of outpatient care.
- Telehealth is an effective tool for managing prevalent chronic conditions both before and during the pandemic.
- Telemedicine for hypertension is well-received, with average adherence to telemedicine-based hypertension management programs around 77%.

INTRODUCTION (CONT'D)

- Why State Telehealth Parity Laws?
 - Telehealth adoption has been largely influenced by state policies, particularly those governing private payers' reimbursement
 - Over half of insured individuals are covered by private insurance
- **Payment parity:** Payers must reimburse telehealth services at the same rate or amount as they would for in-person visits.
- **Coverage parity:** Mandates that services covered in-person must also be covered via telehealth, though not necessarily at an equal amount as in in-person care.

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- Telehealth adoption has been largely influenced by state policies, particularly those governing private payers' reimbursement. Over half of insured individuals are covered by private insurance.
- Payment parity means that payers must reimburse telehealth services at the same rate as in-person visits.
- Coverage parity mandates that services covered in-person must also be covered via telehealth, though not necessarily at the same reimbursement rate as in-person care.

INTRODUCTION (CONT'D)

State	2018	2019	2020	2021
Alabama	None	None	None	None
Alaska	None	None	Coverage	Coverage
Arizona	Coverage	Coverage	Coverage	Both
Arkansas	Both	Both	Both	Both
California	None	None	None	Both
Colorado	Coverage	Coverage	Both	Both
Connecticut	Coverage	Coverage	Coverage	Both
Delaware	Both	Payment	Both	Payment
District of Columbia	Coverage	Coverage	Coverage	Coverage
Florida	None	None	None	None
Georgia	None	None	Both	Both
Hawaii	Payment	Payment	Payment	Payment
Idaho	None	None	None	None
Illinois	None	None	None	Both
Indiana	Coverage	Coverage	Coverage	Coverage

- In 2018, one state had a payment parity law, 20 had coverage parity laws, and 6 had both.
- By 2021, these values had increased to 5 states with payment parity laws, 24 with coverage parity laws, and 16 with both.

- The table on the left shows a snapshot of the payment and coverage parity laws during our study period from 2018 to 2021.
- In 2018, one state had a payment parity law, 20 had coverage parity laws, and 6 had both.
- By 2021, these values had increased to 5 states with payment parity laws, 24 with coverage parity laws, and 16 with both.

INTRODUCTION (CONT'D)

Research objective:
investigate separately the
impact of state telehealth
payment parity laws and
coverage parity laws on
hypertension management
for private payers

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The research objective is to investigate separately the impact of state telehealth payment parity laws and coverage parity laws on hypertension management for private payers.



DATA

- Merative™ MarketScan® Commercial claims Database from January 1, 2016 to December 31, 2021.
- Geographically representative for all 50 U.S. states and Washington, D.C., although the distribution is uneven across the regions.
- The unique identifiers in the database allowed for continuous tracking of the same individuals over time.

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- We used the Merative™ MarketScan® Commercial Database from January 1, 2016, to December 31, 2021.
- The database contains administrative medical claims from a large subsample of employer-sponsored health insurance plans for employees aged under 65 years and their dependents.
- It is geographically representative of all 50 U.S. states and Washington, D.C., although the distribution is uneven across regions.
- The unique identifiers in the database allowed for continuous tracking of the same individuals over time.

OUTCOMES

- The primary outcomes of the study included antihypertensive medication use, measured by the three indicators:
 - 1) Average medication possession ratio (MPR) of antihypertensive drugs
 - 2) Medication adherence to antihypertensive drugs (defined as MPR \geq 80%)
 - 3) Average number of days of antihypertensive drug supply.
- Additionally, the number of hypertension-related and cardiovascular disease (CVD)-related telehealth visits.

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The primary outcomes of the study included antihypertensive medication use, measured by the three indicators:

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- 2) Medication adherence to antihypertensive drugs (defined as MPR \geq 80%)
- 3) Average number of days of antihypertensive drug supply.

Additionally, the number of hypertension-related and cardiovascular disease (CVD)-related telehealth visits were included.

STATISTICAL ANALYSIS

- **Generalized DID model:**
- **Linear regression for average medication possession ratio**
- **Logistic model for medication adherence**
- **Negative binomial model for numbers of days of antihypertensive drug supply**
- **Exponential hurdle model for number of hypertension- and CVD-related telehealth outpatient visits.**
 - All models were adjusted for state-fixed effects, year-fixed effects, COVID-19 diagnosis, number of in-person visits, age groups, sex, urbanicity of residence, and 17 Quan-Charlson comorbidities.
 - Average marginal effects with 95% CI are reported.

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- We used a generalized DID model for all outcomes.
- We used a linear regression for average medication possession ratio;
- a logistic model for medication adherence;
- a negative binomial model for numbers of days of antihypertensive drug supply, and
- exponential hurdle model for number of hypertension- and CVD-related telehealth outpatient visits.
- All models were adjusted for state-fixed effects, year-fixed effects, COVID-19 diagnosis, number of in-person visits, age groups, sex, urbanicity of residence, and 17 Quan-Charlson comorbidities.

THE ASSOCIATION OF TELEHEALTH PARITY LAWS WITH THE OUTCOMES

	Average Medication Possession Ratios	Medication Adherence (%)	Average days of drug supply
Payment parity	0.43*	0.46*	2.14*
	(0.07 - 0.79)	(0.00 - 0.92)	(0.11 - 4.17)
Coverage parity	0.26	0.10	2.13*
	(-0.14 - 0.66)	(-0.36 - 0.56)	(0.19 - 4.07)

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- After controlling for potential confounders, states with a payment parity law saw a statistically significant 0.43 percentage point increase in average medication possession ratios (MPRs) among individuals with hypertension.
- Furthermore, the payment parity law was significantly associated with a 0.46 percentage point increase in the probability of medication adherence and a significant increase in average days of antihypertensive drug supply by 2.14 days per patient per antihypertensive prescription.
- Coverage parity laws were not significantly associated with average MPR or medication adherence, but were associated with a significant increase in average days of antihypertensive 280 drug supply by 2.13 days per patient per antihypertensive prescription.

THE ASSOCIATION OF TELEHEALTH PARITY LAWS WITH NUMBER OF TELEHEALTH VISITS

	Number of hypertension-related telehealth visits per 1,000 patients	Number of CVD-related telehealth visits per 1,000 patients
Payment parity	2.61**	0.92**
	(0.99 - 4.23)	(0.23 - 1.61)
Coverage parity	1.49	0.76
	(-0.47 - 3.45)	(-0.04 - 1.56)

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- Payment parity laws were associated with a significant increase in the number of hypertension-related telehealth visits by 2.61 visits per 1,000 patients and CVD-related telehealth visits by 0.92 visits per 1,000 patients.
- On the other hand, coverage parity laws did not show a statistically significant association with the number of telehealth visits.

CONCLUSION

- State telehealth payment parity laws may significantly affect hypertension management, as by increasing related telehealth visits and medication adherence before and during the COVID-19 pandemic.
- However, coverage parity laws alone do not appear to have a significant impact on medication adherence.

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- Our findings suggest that state telehealth payment parity laws may be significantly associated with hypertension treatment based on increased related telehealth visits and medication adherence.
- However, coverage parity laws alone do not have a significant association with telehealth services or medication adherence.



Thank you, Frank and Jun! At this time, we'll take questions. First, we'll check to see if any questions have come in through the Q&A box.