Hypertension in Michigan
A Status Update for Oral Health Providers

Phillip D. Levy, MD, MPH, FACEP, FAHA, FACC
Professor of Emergency Medicine and Associate Vice President for Translational Science - Wayne State University
Chief Innovation Officer - Wayne Health
Doctor Levy has received research grants from the organizations listed above. All of the relevant financial relationships listed above for Doctor Levy have been mitigated.
A call to action and a lifecourse strategy to address the global burden of raised blood pressure on current and future generations: the Lancet Commission on hypertension


Executive summary
Elevated blood pressure is the strongest modifiable risk factor for cardiovascular disease worldwide. Despite extensive knowledge about ways to prevent as well as to treat hypertension, the global incidence and prevalence of hypertension and, more importantly, its cardiovascular complications are not reduced—partly because of inadequacies in prevention, diagnosis, and control of the disorder in an ageing world.
Trends in Blood Pressure Control Among US Adults With Hypertension, 1999-2000 to 2017-2018

Paul Muntner, PhD; Shakia T. Hardy, PhD; Lawrence J. Fine, MD; Byron C. Jaeger, PhD; Gregory Wozniak, PhD; Emily B. Levitan, ScD; Lisandro D. Colantonio, MD, PhD

A. Blood pressure control among all adults with hypertension

B. Blood pressure control among adults taking antihypertensive medication

Foreword from the Surgeon General,
U.S. Department of Health and Human Services

As a physician, I’ve seen firsthand the devastating effects of hypertension. Left uncontrolled, it leads to heart attacks, stroke, kidney disease, and cognitive decline in later life, and it can impact mother and baby during and after pregnancy. In addition, as evidenced from the global COVID-19 outbreak earlier in the year, we’ve seen the broad impact of preventable health conditions on worse outcomes.

Hypertension is unfortunately common, but there are interventions and programs that have been successful in improving control. Our country has many hypertension control champions—doctors, practices, communities, and health systems that have excelled at achieving high rates of hypertension control among their patients. We need to learn from their many years of “blood, sweat, and tears” and apply their principles in new settings.

While hypertension is more prominent among older adults, it is not simply a condition of the elderly. All ages are impacted, and early identification and long-term control can preserve cardiovascular health now and into the future. We know that lifestyle changes, such as being physically active and adopting a healthy diet, can promote hypertension control, yet many communities have significant barriers that prevent people from making these changes. We also know that many people with hypertension require medications to achieve control. Access to high-quality healthcare, prescription of appropriate medications, and clinical and community support are needed to prevent and treat hypertension, publicize local resources, and establish a plan for care supportive of long-term control.

The Surgeon General’s Call to Action to Control Hypertension summarizes recent data on hypertension control, identifies select goals and strategies, and provides recommendations for areas of focus when resources are limited. While the recent trends don’t look good—we’ve hit a plateau in hypertension control—I believe that with focus and collaboration, we can improve our trajectory.

Join me in taking control of hypertension across our nation. Together, we’ve got this!

Jerome M. Adams, MD, MPH
Vice Admiral, U.S. Public Health Service
Surgeon General
U.S. Department of Health and Human Services
Health Care Spending as a Percentage of GDP, 1980–2019

Notes: Current expenditures on health. Based on System of Health Accounts methodology, with some differences between country methodologies. GDP refers to gross domestic product.

* 2019 data are provisional or estimated for Australia, Canada, and New Zealand.

https://www.commonwealthfund.org/publications/fund-reports/2021/aug/mirror-mirror-2021-reflecting-poorly
Health Care System Performance Scores: Affordability

Note: To normalize performance scores across countries, each score is the calculated standard deviation from a 10-country average that excludes the US. See How We Conducted This Study for more detail.

https://www.commonwealthfund.org/publications/fund-reports/2021/aug/mirror-mirror-2021-reflecting-poorly
Cost-Related Access Problems Affect Low Income Populations, Especially in the U.S.

Percent who reported any cost-related access problem to medical care in past year, 2020

Definition of cost-related access problem: Skipped needed doctor visits, tests, treatments, follow-up, or prescription medicines because of cost in the past year.

https://www.commonwealthfund.org/publications/fund-reports/2021/aug/mirror-mirror-2021-reflecting-poorly
Avoidable Deaths and 10-Year Reduction in Avoidable Mortality Across Countries

Deaths per 100,000 population

2009 (or most recent year)  2019 (or most recent year)

SWIŽ†  AUS*  SWE*  NETH*  NOR‡  FRA‡  NZ‡  CAN†  GER  UK‡  US†

-25%  -18%  -21%  -19%  -24%  -19%  -23%  -17%  -13%  -19%  -5%

Notes: Health status: avoidable mortality. Data years are: 2009 and 2019 (Germany); * 2008 and 2018 (Australia, the Netherlands, Sweden); † 2007 and 2017 (Canada, Switzerland, US); and ‡ 2006 and 2016 (France, New Zealand, Norway, UK).

https://www.commonwealthfund.org/publications/fund-reports/2021/aug/mirror-mirror-2021-reflecting-poorly
Average Michigan life expectancy is 77.7 years (at birth).

Age-adjusted Mortality Rates per 100,000 Population for the Ten Leading Causes of Death in the City of Detroit, Wayne County, State of Michigan, and the United States, 2020

1. Heart Disease
2. Cancer
3. COVID-19
4. Unintentional Injuries
5. Stroke
6. Chronic Lower Respiratory Diseases
7. Alzheimer's Disease
8. Diabetes Mellitus
9. Kidney Disease
10. Pneumonia/Influenza

The City of Detroit ■ Wayne County ■ State of Michigan ■ The United States

Health–disease continuum

- Avoidable threshold 1: development of elevated BP
- Avoidable threshold 2: development of subclinical target-organ damage
- Avoidable threshold 3: development of clinical disease

Early vascular ageing
Average lifecourse
Ideal lifecourse

More individualised strategies (e.g., absolute risk-based)
Population-based strategies

Lifecourse

Childhood, Early adulthood, Middle-age, Advanced age, Elderly (>80 years)

The Association Between Income and Life Expectancy in the United States, 2001-2014

Raj Chetty, PhD; Michael Stepner, BA; Sarah Abraham, BA; Shelby Lin, MPhil; Benjamin Scuderi, BA; Nicholas Turner, PhD; Augustin Bergeon, MA; David Cutler, PhD

![Graph showing the association between income and life expectancy for men and women in the United States from 2001 to 2014. The graphs display the expected age at death for 40-year-olds across different household income ventiles.](image)

Three Public Health Interventions Could Save 94 Million Lives in 25 Years
Global Impact Assessment Analysis

<table>
<thead>
<tr>
<th>Effect of Hypertension Treatment on Systolic Blood Pressure</th>
<th>Percent of Patients With Hypertension Treated, %*</th>
<th>Sodium Intake Reduction, %†</th>
<th>Number (Millions) of Deaths That Could Be Delayed (95% Uncertainty Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mm Hg</td>
<td>50</td>
<td>10</td>
<td>Women: 11.3 (10.1–12.5) 17.0 (15.1–18.8) Total: 28.2 (25.2–31.3)</td>
</tr>
<tr>
<td>10 mm Hg</td>
<td>50</td>
<td>30</td>
<td>Men: 23.5 (20.7–26.2) 32.1 (27.8–36.0) Total: 55.6 (48.5–62.2)</td>
</tr>
<tr>
<td>10 mm Hg</td>
<td>70</td>
<td>10</td>
<td>Women: 17.8 (16.0–19.5) 23.5 (21.3–25.7) Total: 41.2 (37.3–45.2)</td>
</tr>
<tr>
<td>10 mm Hg</td>
<td>70</td>
<td>30</td>
<td>Men: 29.6 (26.4–32.8) 38.2 (33.5–42.4) Total: 67.8 (59.9–75.2)</td>
</tr>
<tr>
<td>15 mm Hg</td>
<td>50</td>
<td>10</td>
<td>Women: 13.5 (12.1–14.9) 21.0 (19.0–23.1) Total: 34.5 (31.1–38.0)</td>
</tr>
<tr>
<td>15 mm Hg</td>
<td>50</td>
<td>30</td>
<td>Men: 25.6 (22.6–28.4) 35.9 (31.4–40.1) Total: 61.5 (54.0–68.5)</td>
</tr>
<tr>
<td>15 mm Hg</td>
<td>70</td>
<td>10</td>
<td>Women: 23.0 (20.8–25.2) 30.5 (27.8–33.3) Total: 53.5 (48.6–58.5)</td>
</tr>
<tr>
<td>15 mm Hg</td>
<td>70</td>
<td>30</td>
<td>Men: 34.6 (31.1–38.2) 44.8 (39.9–49.5) Total: 79.5 (71.0–87.7)</td>
</tr>
</tbody>
</table>

*Increasing hypertension coverage alone to 50% could delay 13.4 million (12.2–14.6) deaths if assuming a 10-mm-Hg decline and 19.8 million (18.1–21.7) deaths if assuming a 15-mm-Hg decline. With 70% coverage, the deaths delayed could be 26.7 million (24.3–29.2) with a 10-mm-Hg decline and 39.4 million (35.9–43.0) with a 15-mm-Hg decline.

†Reducing salt intake by 10% could delay 15.3 million (12.9–17.7) deaths, and reducing salt intake by 30% could delay 43.4 million (36.9–49.5) deaths globally.
Reducing the Blood Pressure–Related Burden of Cardiovascular Disease: Impact of Achievable Improvements in Blood Pressure Prevention and Control

Shakia T. Hardy, MPH; Laura R. Loehr, MD, PhD; Kenneth R. Butler, PhD; Sujatro Chakladar, MS; Patricia P. Chang, MD, MHS; Aaron R. Folsom, MD, MPH; Gerardo Heiss, MD, PhD; Richard F. MacLehose, PhD; Kunihiro Matsushita, MD, PhD; Christy L. Avery, PhD

Population Level BP Reduction of 2 mm Hg
A Cluster-Randomized Trial of Blood-Pressure Reduction in Black Barbershops

Ronald G. Victor, M.D., Kathleen Lynch, Pharm.D., Ning Li, Ph.D., Cianntel Blyler, Pharm.D., Eric Muhammad, B.A., Joel Handler, M.D., Jeffrey Brettler, M.D., Mohamad Rashid, M.B., Ch.B., Brent Hsu, B.S., Davontae Foxx-Drew, B.A., Norma Moy, B.A., Anthony E. Reid, M.D.,* and Robert M. Elashoff, Ph.D.

ABSTRACT

BACKGROUND
Uncontrolled hypertension is a major problem among non-Hispanic black men, who are underrepresented in pharmacist intervention trials in traditional health care settings.

METHODS
We enrolled a cohort of 319 black male patrons with systolic blood pressure of 140 mm Hg or more from 52 black-owned barbershops (nontraditional health care setting) in a cluster-randomized trial in which barbershops were assigned to a pharmacist-led intervention (in which barbers encouraged meetings in barbershops with specialty-trained pharmacists who prescribed drug therapy under a collaborative practice agreement with the participants’ doctors) or to an active control approach (in which barbers encouraged lifestyle modification and doctor appointments). The primary outcome was reduction in systolic blood pressure at 6 months.

From the Smidt Heart Institute at Cedars-Sinai Medical Center (R.G.V., K.L., C.B., E.M., M.R., B.H., D.F.-D., N.M., A.E.R.), the Department of Biomathematics, David Geffen School of Medicine, University of California, Los Angeles (N.L., R.M.E.), and Kaiser Permanente (J.H., J.B.) — all in Los Angeles. Address reprint requests to Dr. Victor at ronald.victor@cshs.org.

*Deceased.

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Hypertension Screening Guidance for Michigan Oral Health Professionals
Screening for Hypertension in Adults
US Preventive Services Task Force Reaffirmation
Recommendation Statement

US Preventive Services Task Force

**IMPORTANCE** Hypertension is a prevalent condition that affects approximately 45% of the adult US population and is the most commonly diagnosed condition at outpatient office visits. Hypertension is a major contributing risk factor for heart failure, myocardial infarction, stroke, and chronic kidney disease.

**OBJECTIVE** To reaffirm its 2015 recommendation, the US Preventive Services Task Force (USPSTF) commissioned a systematic review to evaluate the benefits and harms of screening for hypertension in adults, the accuracy of office blood pressure measurement for initial screening, and the accuracy of various confirmatory blood pressure measurement methods.

**POPULATION** Adults 18 years or older without known hypertension.

**EVIDENCE ASSESSMENT** Using a reaffirmation deliberation process, the USPSTF concludes with high certainty that screening for hypertension in adults has substantial net benefit.

**RECOMMENDATION** The USPSTF recommends screening for hypertension in adults 18 years or older with office blood pressure measurement. The USPSTF recommends obtaining blood pressure measurements outside of the clinical setting for diagnostic confirmation before starting treatment. (A recommendation)

Screening for High Blood Pressure at the Dentist’s Office

Mohammad Abdulwahab, Mohammad Kamal, Ali Akbar

Department of Surgical Sciences, Faculty of Dentistry, Health Sciences Center, Kuwait University, Jabryia, Kuwait

Correspondence: Mohammad Abdulwahab, Department of Surgical Sciences, Faculty of Dentistry, Health Sciences Center, Kuwait University, Jabryia, Kuwait, Tel +965-978-95760, Email mabdulwahab@hsc.edu.kw

Background: High blood pressure is a worldwide issue that can go undetected. Many are unaware of such a problem due to the lack of symptoms in early stages. Visiting the dentist can be a good place to screen for such health issues. Screening dental patients at every dental visit can be of great benefit. The aim of this study was to determine if screening for blood pressure at the dental office is efficient and beneficial for patients.

Methods: The HEYER VizOR Digital Blood Pressure Monitor was used to measure the blood pressure of all the patients visiting the dental clinic, ranging in age from 18 to 85. The study was comprised of patients who had never been diagnosed as hypertensive by a physician or if they had been diagnosed before.

Results: A total of 273 participants met the inclusion criteria. One hundred and thirty-seven (50.1%) patients had high blood pressure readings compared to 136 (49.8%) patients with normal blood pressure readings. It also showed that 54 (38%) of patients with high blood pressure readings had never been diagnosed by a physician with hypertension and were unaware of their blood pressure status. In addition, 83 (63.3%) of patients who had been diagnosed with hypertension by a physician had high blood pressure readings. The data also showed that 5.3% of patients diagnosed by their physician do not take their prescribed medication.

Conclusion: In this study, we showed that screening blood pressure at the dental office can detect high blood pressure readings in dental patients. It is also a useful screening tool for blood pressure for diagnosed and undiagnosed patients. Screening dental patients at the dental office is a useful tool that can help in the screening for blood pressure and should be implemented at every visit.
Patients’ attitudes toward screening for medical conditions in a dental setting

Barbara L. Greenberg, PhD; Mel L. Kantor, DDS, PhD; Shuying S. Jiang, MSc; Michael Glick, DMD

1 University of Medicine and Dentistry of New Jersey, New Jersey Dental School, Newark, NJ
2 University at Buffalo, School of Dental Medicine, Buffalo, NY

Keywords
medical screening; chairside; patient attitudes; dental offices.

Correspondence
Dr. Barbara L. Greenberg, University of Medicine and Dentistry of New Jersey, New Jersey Dental School, 110 Bergen Street, Room D741, Newark, NJ 07103. Tel.: 973-972-1921; Fax: 973-972-1568; e-mail: greenbbl@umdnj.edu. Barbara L. Greenberg, Mel L. Kantor, and Shuying S. Jiang are with the University of Medicine and Dentistry of New Jersey, New Jersey Dental School. Mel L. Kantor is currently with the University of Kentucky, College of Dentistry. Michael Glick is with the University at Buffalo, School of Dental Medicine.

Abstract
Objectives: Previous studies demonstrated the efficacy of chairside medical screening by dentists to identify patients who are at increased risk for developing cardiovascular-associated events and the favorable attitude of dentists toward chairside medical screening. This study assessed patient attitudes toward chairside medical screening in a dental setting.

Methods: A self-administered questionnaire of eight five-point response scale questions was given to a convenience sample of adult patients attending an inner-city dental school clinic and two private practice settings. Wilcoxon–Mann–Whitney tests and t-tests were used to compare responses between study groups. Friedman nonparametric analysis of variance was used to compare response items within each question.

Results: Regardless of setting, the majority of respondents was willing to have a dentist conduct screening for heart disease, high blood pressure, diabetes, human immunodeficiency virus infection, and hepatitis infection (55–90 percent); discuss results immediately (79 percent and 89 percent); provide oral fluids, finger-stick blood, blood pressure measurements, and height and weight (60–94 percent); and pay up to $20 (50–67 percent). Respondents reported that their opinion of the dentist would improve regarding the dentist’s professionalism, knowledge, competence, and compassion (48–77 percent). The fact that the test was not done by a physician was ranked as the least important potential barrier. While all respondents expressed a favorable attitude toward chairside screening, the mean score was significantly lower among clinic patients across most questions/items. The priority rankings within an item were similar for both groups.

Conclusions: Acceptance by patients of chairside medical screening in a dental setting is a critical element for successful implementation of this strategy.

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The Need for Accurate Data on Blood Pressure Measurement in the Dental Office

Merrill F. Elias\textsuperscript{1,2} and Amanda L. Goodell\textsuperscript{1}

In this paper we argue that we have a paucity of data about how blood pressure (BP) measurement is performed in the dentist’s office. We argue that these data are needed soon, preferably, but in the interim, the following common sense approach to BP measurement will take us a long way toward accurate measurement in the dental office: (i) using automated BP assessment and following the instructions provided by the manufacturers and (ii) using the general BP assessment guidelines provided by the American Heart Association,\textsuperscript{1,2} among other sources.

Both elements of this common sense approach are necessary as simply following the use instructions provided by the manual cuff manufacturer will often be insufficient to measure BP properly. Articles on measuring BP manually involve rules for traditional methods of measurement using the stethoscope and pressure cuff method. These rules require more training and practice and generally do not apply to automated BP assessment. Thus, we will focus on automated BP assessments which are perfectly acceptable for the dental office.\textsuperscript{1}
7 SIMPLE TIPS TO GET AN ACCURATE BLOOD PRESSURE READING

- **Use Correct Cuff Size**
  - Cuff too small adds 2–10 mm Hg

- **Don’t Have a Conversation**
  - Talking or active listening adds 10 mm Hg

- **Put Cuff on Bare Arm**
  - Cuff over clothing adds 5–50 mm Hg

- **Support Arm at Heart Level**
  - Unsupported arm adds 10 mm Hg

- **Empty Bladder First**
  - Full bladder adds 10 mm Hg

- **Support Back/Feet**
  - Unsupported back and feet adds 6 mm Hg

- **Keep Legs Uncrossed**
  - Crossed legs add 2–6 mm Hg

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The common positioning errors can result in inaccurate blood pressure measurement. Figures shown are estimates of how improper positioning can potentially impact blood pressure readings.

**Sources:**

2. Handler J. The Importance of accurate blood pressure measurement. The Permanente Journal/Summer 2009/Volume 13 No. 3 S1

This 7 simple tips to get an accurate blood pressure reading was adapted with permission of the American Medical Association and The Johns Hopkins University. The original copyrighted content can be found at https://www.ama-assn.org/ama-johns-hopkins-blood-pressure-resources.

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Blood Pressure Screened by Oral Health Provider

Systolic Blood Pressure > 180 mm Hg or Diastolic Blood Pressure > 110 mm Hg?

No

Systolic Blood Pressure > 130 mm Hg or Diastolic Blood Pressure > 80 mm Hg?

No

Proceed with dental treatment; no further follow-up is needed.

Yes

Proceed with dental treatment and refer to primary care for follow-up evaluation.

Yes

Are signs or symptoms* of a hypertensive emergency present?

No

Discontinue dental treatment and refer to primary care for follow-up evaluation.

Yes

Discontinue dental treatment and call 911.
*Signs and symptoms of a hypertensive emergency include:
  - Chest pain
  - Dizziness
  - Shortness of breath
  - Numbness or weakness
  - Confusion
  - Lethargy
  - Difficulty with vision or speech
Canceling dental procedures due to elevated blood pressure
Is it appropriate?

Steven A. Yarows, MD; Olga Vornovitsky, MD; Robert M. Eber, DDS, MS;
John D. Bisognano, MD, PhD; Jan Basile, MD

ABSTRACT

Background. In 1974, the American Dental Association first considered recommending that dental offices measure blood pressure (BP) routinely, and it has been further encouraged since 2006. Investigators in several dental publications have recommended cancellation of dental procedures based solely on BP greater than 180/110 millimeters of mercury for urgent oral health care and greater than 160/100 mm Hg for elective oral health care, in the absence of prior medical consultation.

Methods. The authors reviewed the evidence for cancellation of any dental or surgical procedures by using an Ovid MEDLINE search for the terms dental, elevated blood pressure, and hypertension. In addition, the authors searched resources at ebd.ada.org using the same criteria. The authors collaborated to develop recommendations in view of 2017 guidelines on this subject.

Results. To the authors’ knowledge, there are no professionally accepted criteria or study evidence indicating a specific BP elevation at which to prohibit oral health care. Researchers of a 2015 review on management of comorbidities in ambulatory anesthesia failed to find increased morbidity from hypertension in the outpatient setting.

Conclusions. To the authors’ knowledge, there are no prospective study investigators that have addressed whether or when to cancel dental procedures due to office-measured elevated BP. The authors recommend using current anesthesiology guidelines based on functional status and past BP measurements to prevent unnecessary cancellations.

Practical Implications. It is seldom necessary to cancel dental procedures on the basis of BP measured before a planned procedure for patients under a physician’s care.
Box 2. Risk stratification for patients whose correctly measured blood pressure is greater than 180/110 millimeters of mercury.*

RISK STRATIFICATION CATEGORY

Category A
- Is the patient taking antihypertensive medication, and did he or she take it this day?
- Does the patient have a health care provider managing his or her hypertension and has he or she been seen in the past 6 months?
- Does the patient appear anxious, acknowledge anxiety about the procedure, or have a heart rate > 100 beats per minute?

Category B
- Did the patient take public transportation or drive and walk in for the procedure?
- Does the patient take care of his or her own house or apartment?
- Does the patient state he or she can walk up a flight of stairs?

SBP >180 mm Hg and/or DBP >120 mm Hg

Target organ damage new/progressive/worsening

Yes

Hypertensive emergency

Admit to ICU (Class I)

Conditions:
• Aortic dissection
• Severe preeclampsia or eclampsia
• Pheochromocytoma crisis

Yes

Reduce SBP to <140 mm Hg during first h* and to <120 mm Hg in aortic dissection† (Class I)

No

Markedly elevated BP

Reinstitute/intensify oral antihypertensive drug therapy and arrange follow-up

Conditions:
• Aortic dissection
• Severe preeclampsia or eclampsia
• Pheochromocytoma crisis

Reduce BP by max 25% over first h‡, then to 160/100–110 mm Hg over next 2–6 h, then to normal over next 24–48 h (Class I)

Trends in the Incidence of Hypertensive Emergencies in US Emergency Departments From 2006 to 2013

Alexander T. Janke, BS; Candace D. McNaughton, MD, MPH, PhD; Aaron M. Brody, MD, MPH; Robert D. Welch, MD, MSc; Phillip D. Levy, MD, MPH
### Trends in the Incidence of Hypertensive Emergencies in US Emergency Departments From 2006 to 2013

Alexander T. Janke, BS; Candace D. McNaughton, MD, MPH, PhD; Aaron M. Brody, MD, MPH; Robert D. Welch, MD, MSc; Phillip D. Levy, MD, MPH

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**Table: End Organ Damage Among ED Visits for Hypertensive Emergency**

<table>
<thead>
<tr>
<th>Condition</th>
<th>#</th>
<th>% (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papilledema/Retinal Hemorrhage</td>
<td>189</td>
<td>0.13% (0.09% to 0.18%)</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>84,244</td>
<td>59.02% (57.74% to 60.31%)</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>15,737</td>
<td>11.03% (10.29% to 11.76%)</td>
</tr>
<tr>
<td>Dissection of Major Vessel</td>
<td>20,936</td>
<td>14.67% (14.05% to 15.29%)</td>
</tr>
<tr>
<td>Intracranial Hemorrhage</td>
<td>8,624</td>
<td>6.04% (5.36% to 6.73%)</td>
</tr>
<tr>
<td>Other Cerebrovascular Disease</td>
<td>39,642</td>
<td>27.77% (26.80% to 28.75%)</td>
</tr>
<tr>
<td>Ruptured Aneurysm</td>
<td>4,744</td>
<td>3.32% (3.03% to 3.62%)</td>
</tr>
<tr>
<td><strong>Total Hypertensive Emergencies</strong></td>
<td>142,731</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

Based on data from a valid, nationwide, representative sample, the estimated number of visits for hypertensive emergency and the rate per million adult ED visits has more than doubled from 2006 to 2013. However, hypertensive emergencies are rare, occurring in about 2 of every 1000 adult ED visits in the United States, and 6 in 1000 adult ED visits carrying any diagnosis of hypertension. This figure is far lower than what has been sometimes cited in previous literature.

2. In patients with asymptomatic markedly elevated blood pressure, does ED medical intervention reduce rates of adverse outcomes?

Patient Management Recommendations

*Level A recommendations.* None specified.
*Level B recommendations.* None specified.
*Level C recommendations.* (1) In patients with asymptomatic markedly elevated blood pressure, routine ED medical intervention is not required.
Blood Pressure Treatment and Outcomes in Hypertensive Patients without Acute Target Organ Damage: A Retrospective Cohort

Phillip D. Levy, MD, MPH, James J. Mahn, MD, Joseph Miller, MD, Alicia Shelby, MD, Aaron Brody, MD, Russell Davidson, MD, Michael J. Burla, DO, Alexander Marinica, BS, Justin Carroll, BS, John Purakal, MD, John M. Flack, MD, MPH, Robert D. Welch, MD, MS

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Not Treated</th>
<th>Treated</th>
<th>Diff (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED Visit 24 Hrs, n (%)</td>
<td>14 (2.4)</td>
<td>19 (4.4)</td>
<td>-2.0 (-4.5, 0.3)</td>
</tr>
<tr>
<td>Hospital Admission 24 Hrs, n (%)</td>
<td>0 (0.0)</td>
<td>3 (0.7)</td>
<td>-0.7 (-2.0, 0.1)</td>
</tr>
<tr>
<td>HTN Related Complication at 24 Hrs, n (%)</td>
<td>0 (0.0)</td>
<td>1 (0.2)</td>
<td>-0.2 (-1.3, 0.5)</td>
</tr>
<tr>
<td>ED Visit within 30 d, n (%)</td>
<td>88 (15.2)</td>
<td>82 (18.9)</td>
<td>-3.7 (-8.5, 0.9)</td>
</tr>
<tr>
<td>Hospital Admission within 30 d, n (%)</td>
<td>15 (2.6)</td>
<td>13 (3.0)</td>
<td>-0.4 (-2.7, 1.6)</td>
</tr>
<tr>
<td>HTN Related Complication within 30 d, n (%)</td>
<td>6 (1.0)</td>
<td>11 (2.5)</td>
<td>-1.5 (-3.5, 0.1)</td>
</tr>
<tr>
<td>Death within 30 d, n (%)</td>
<td>1 (0.2)</td>
<td>1 (0.2)</td>
<td>0.0 (-1.1, 0.7)</td>
</tr>
<tr>
<td>Death within 1 year, n (%)</td>
<td>9 (1.6)</td>
<td>9 (2.1)</td>
<td>-0.5 (-2.5, 1.2)</td>
</tr>
</tbody>
</table>
# Characteristics and Outcomes of Patients Presenting With Hypertensive Urgency in the Office Setting

Krishna K. Patel, MD; Laura Young, MD; Erik H. Howell, MD; Bo Hu, PhD; Gregory Rutecki, MD; George Thomas, MD; Michael B. Rothberg, MD, MPH

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. (%) of Patients</th>
<th>P Value&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Referred to Hospital (n = 426)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Sent Home (n = 852)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>MACE&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 d</td>
<td>2 (0.5)</td>
<td>0</td>
</tr>
<tr>
<td>8-30 d</td>
<td>2 (0.5)</td>
<td>0</td>
</tr>
<tr>
<td>1-6 mo</td>
<td>4 (0.9)</td>
<td>8 (0.9)</td>
</tr>
<tr>
<td>Uncontrolled hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mo&lt;sup&gt;f&lt;/sup&gt;</td>
<td>349 (81.9)</td>
<td>735 (86.3)</td>
</tr>
<tr>
<td>6 mo&lt;sup&gt;g,h&lt;/sup&gt;</td>
<td>213 (66.6)</td>
<td>393 (64.6)</td>
</tr>
<tr>
<td>All-cause hospital admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 d</td>
<td>35 (8.2)</td>
<td>40 (4.7)</td>
</tr>
<tr>
<td>8-30 d</td>
<td>48 (11.3)</td>
<td>59 (6.9)</td>
</tr>
</tbody>
</table>
Hypertension screening guidelines and treatment protocol:

1. Blood pressure will be checked on every patient over 18 years of age at every visit as well as on any children with a medical history of hypertension. Blood pressure will be taken for all pregnant patients, regardless of age.

2. The initial blood pressure must be taken after the patient has been seated quietly for at least 5 minutes, using an appropriate size cuff, according to the proper protocol for taking blood pressure, and documented in the patient’s record.

3. If the initial reading is above normal (greater than 120/80 mm Hg), retake it in 1 to 2 minutes.

4. If the second reading is above normal, refer to the algorithm on the next page for guidance and notify the supervising dentist.

5. Inform the patient of all readings both verbally and in writing. Use the office referral form to communicate elevated blood pressure readings to the patient’s primary care provider.

6. Schedule a follow up visit or phone contact with the patient at 1 week, 3 weeks, and 6 weeks after elevated blood pressure readings.
Globally, as of 5:16pm CEST, 30 May 2022, there have been 526,182,662 confirmed cases of COVID-19, including 6,286,057 deaths, reported to WHO. As of 24 May 2022, a total of 11,811,627,599 vaccine doses have been administered.

Global Situation

526,182,662 confirmed cases

6,286,057 deaths

Source: World Health Organization

Data may be incomplete for the current day or week.
GLOBAL TOLL

By January 2022, there had been 5.5 million official COVID-19 deaths worldwide in the pandemic. But models estimate that there have been between two and four times that number of excess deaths — that is, mortality above what was expected — since the start of 2020.

- Excess deaths estimate
- 95% confidence interval
Nine Lessons Learned From the COVID-19 Pandemic for Improving Hospital Care and Health Care Delivery

Eric K. Wei, MD, MBA; Theodore Long, MD, MHS; Mitchell H. Katz, MD

• Prepare for Unexpected Increases in Demand for Services
• Maintain Line of Sight
• Mind the Air
• Emotionally Support Health Care Workers
• Masks Forever (at Least for Some)
• Use Technology to Connect Families Near and Far
• Maintain Caches of Supplies and Diversify Supply Chains
• Reduce the Burden of Unnecessary Documentation
• **Address Persistent Racial and Ethnic Disparities in Health**
Research Paper

Elevated COVID19 mortality risk in detroit area hospitals among patients from census tracts with extreme socioeconomic vulnerability


*Department of Internal Medicine, Division of Infectious Diseases, Detroit Medical Center, Wayne State University School of Medicine, Detroit, MI, United States
Department of Family Medicine and Public Health Sciences, Wayne State University School of Medicine, Detroit, MI, United States
Department of Emergency Medicine, Detroit Medical Center, Wayne State University School of Medicine, Detroit, MI, United States
Department of Internal Medicine, Division of Pulmonary and Critical Care Medicine, Detroit Medical Center, Wayne State University School of Medicine, Detroit, MI, United States

ABSTRACT

Background: the incidence of novel coronavirus disease (COVID19) is elevated in areas with heightened socioeconomic vulnerability. Early reports from US hospitals also implicated social disadvantage and chronic disease history as COVID19 mortality risk factors. However, the relationship between race and COVID19 mortality remains unclear.

Methods: we examined in-hospital COVID19 mortality risk factors in a multi-hospital tertiary health care system that serves greater Detroit, Michigan, a predominantly African American city with high rates of poverty and chronic disease. Consecutive adult patients who presented to emergency departments and tested positive for COVID19 from 3/1/2020 through 4/18/2020 were included. Using log-binomial regression, we assessed the relationship between in-hospital mortality and residence in census tracts that were flagged for extreme socioeconomic vulnerability, patient-level demographics, and clinical comorbidities.

Findings: a total of 1,015 adults tested positive for COVID19 during the study period; 81% identified as Black people. 52% were male and 55% were ≥ 65 years of age. The median body mass index was 30.4 and the median Charlson Comorbidity Index score was 4. Patients from census tracts that were flagged for vulnerability related to socioeconomic status had a higher mortality rate than their peers who resided in less vulnerable census tracts ($\beta$ 0.26, standard error (SE) 0.11, degrees of freedom (df) 378, t-value (t) 2.27, exp(\(\beta\)) 1.29, p-value 0.02). Adjustment for age category, Black race, sex and/or the Charlson Comorbidity Index score category reduced the magnitude of association by less than 10% (exp(\(\beta\)) 1.29 vs. 1.21). Black race (p = 0.38) and sex (p = 0.62) were not associated with mortality in this sample.

Interpretation: people who lived in areas flagged for extreme socioeconomic vulnerability had elevated mortality risk in our predominantly African-American cohort of COVID19 patients who were able to seek hospital care during the so-called "first wave" of the pandemic. By contrast, Black race was not associated with mortality in our sample.

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Syndemics

Disparity conditions that promote disease clustering

Disease 1

Adverse interactions

Disease 2

Enhanced disease transmission, progression, and negative health outcomes

SPECIAL REPORT

Inequities in Hypertension Control in the United States Exposed and Exacerbated by COVID-19 and the Role of Home Blood Pressure and Virtual Health Care During and After the COVID-19 Pandemic

Adam P. Bress, PharmD, MS; Jordana B. Cohen, MD, MSCE; David Edmund Anstey, MD, MPH; Molly B. Conroy, MD, MPH; Keith C. Ferdinand, MD; Valy Fontil, MD, MAS; Karen L. Margolis, MD, MPH; Paul Muntner, PhD; Morgan M. Miller, MA, PhD; Kolawole S. Okuyemi, MD, MPH; Michael K. Rakotz, MD; Kristi Reynolds, PhD; Monika M. Saford, MD; Daichi Shimbo, MD; John Stullgross, BS; Beverly B. Green, MD, MPH; April F. Mohanty, MPH, PhD

ABSTRACT: The COVID-19 pandemic is a public health crisis, having killed more than 514,000 US adults as of March 2, 2021. COVID-19 mitigation strategies have unintended consequences on managing chronic conditions such as hypertension, a leading cause of cardiovascular disease and health disparities in the United States. During the first wave of the pandemic in the United States, the combination of observed racial/ethnic inequities in COVID-19 deaths and social unrest reinvigorated a national conversation about systemic racism in health care and society. The 4th Annual University of Utah Translational Hypertension Symposium gathered frontline clinicians, researchers, and leaders from diverse backgrounds to discuss the intersection of these 2 critical social and public health phenomena and to highlight preexisting disparities in hypertension treatment and control exacerbated by COVID-19. The discussion underscored environmental and socioeconomic factors that are deeply embedded in US health care and research that impact inequities in hypertension. Structural racism plays a central role at both the health system and individual levels. At the same time, virtual healthcare platforms are being accelerated into widespread use by COVID-19, which may widen the divide in healthcare access across levels of wealth, geography, and education. Blood pressure control rates are declining, especially among communities of color and those without health insurance or access to health care. Hypertension awareness, therapeutic lifestyle changes, and evidence-based pharmacotherapy are essential. There is a need to improve the implementation of community-based interventions and blood pressure self-monitoring, which can help build patient trust and increase healthcare engagement.
## Use and Content of Primary Care Office-Based vs Telemedicine Care Visits During the COVID-19 Pandemic in the US

G. Caleb Alexander, MD, MS; Matthew Tajanlangit; James Heyward, MPH; Omar Mansour, MHS; Dima M. Qato, PharmD, MPH, PhD; Randall S. Stafford, MD, PhD

### Table 4. Content of Primary Care Office-Based and Telemedicine Visits, 2018-2020

<table>
<thead>
<tr>
<th>Variable</th>
<th>No., in thousands (%)</th>
<th>% Change (2020 Q2 vs 2018-2019 Q2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total visits, No. (95% CI)</td>
<td>119 199 (114 038-124 360)</td>
<td>-21.4</td>
</tr>
<tr>
<td>Blood pressure recorded</td>
<td>88 675 (74.4)</td>
<td>-50.1</td>
</tr>
<tr>
<td>Cholesterol assessed</td>
<td>27 617 (23.2)</td>
<td>-36.9</td>
</tr>
<tr>
<td>New medicines initiated</td>
<td>54 142 (45.4)</td>
<td>-26.0</td>
</tr>
<tr>
<td>Medicines continued</td>
<td>38 024 (31.9)</td>
<td>-8.9</td>
</tr>
</tbody>
</table>

### New treatment visits

<table>
<thead>
<tr>
<th>Condition</th>
<th>No., in thousands (%)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>3414 (2.9)</td>
<td>-39.1</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1408 (1.2)</td>
<td>-16.4</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>1274 (1.1)</td>
<td>-27.3</td>
</tr>
<tr>
<td>Asthma</td>
<td>1266 (1.1)</td>
<td>-49.8</td>
</tr>
<tr>
<td>Depression</td>
<td>193 (0.2)</td>
<td>-22.8</td>
</tr>
<tr>
<td>Insomnia</td>
<td>396 (0.3)</td>
<td>-24.5</td>
</tr>
</tbody>
</table>
Use and Content of Primary Care Office-Based vs Telemedicine Care Visits During the COVID-19 Pandemic in the US

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</tr>
</thead>
<tbody>
<tr>
<td>Total visits, No. (95% CI)</td>
<td>119 199 (114 038-124 360)</td>
<td>110 705 (105 734-115 676)</td>
</tr>
<tr>
<td>Blood pressure recorded</td>
<td>88 675 (74.4)</td>
<td>75 852 (68.5)</td>
</tr>
<tr>
<td>Cholesterol assessed</td>
<td>27 617 (23.2)</td>
<td>22 803 (20.6)</td>
</tr>
<tr>
<td>New medicines initiated</td>
<td>54 142 (45.4)</td>
<td>51 773 (46.8)</td>
</tr>
<tr>
<td>Medicines continued</td>
<td>38 024 (31.9)</td>
<td>35 541 (32.1)</td>
</tr>
<tr>
<td>New treatment visits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>3414 (2.9)</td>
<td>2714 (2.5)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1408 (1.2)</td>
<td>1226 (1.1)</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>1274 (1.1)</td>
<td>1326 (1.2)</td>
</tr>
<tr>
<td>Asthma</td>
<td>1266 (1.1)</td>
<td>1146 (1.0)</td>
</tr>
<tr>
<td>Depression</td>
<td>193 (0.2)</td>
<td>157 (0.1)</td>
</tr>
<tr>
<td>Insomnia</td>
<td>396 (0.3)</td>
<td>437 (0.4)</td>
</tr>
</tbody>
</table>
Use and Content of Primary Care Office-Based vs Telemedicine Care Visits During the COVID-19 Pandemic in the US

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Table 4. Content of Primary Care Office-Based and Telemedicine Visits, 2018-2020

<table>
<thead>
<tr>
<th>Variable</th>
<th>No., in thousands (%)</th>
<th>2018-2019 (Q2)</th>
<th>2020 (Q1)</th>
<th>2020 (Q2)</th>
<th>% Change (2020 Q2 vs 2018-2019 Q2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total visits, No. (95% CI)</td>
<td>119 199 (114 038-124 360)</td>
<td>110 705 (105 734-115 676)</td>
<td>93 712 (89 270-98 154)</td>
<td>-21.4</td>
<td></td>
</tr>
<tr>
<td>Blood pressure recorded</td>
<td>88 675 (74.4)</td>
<td>75 852 (68.5)</td>
<td>44 229 (47.2)</td>
<td>-50.1</td>
<td></td>
</tr>
<tr>
<td>Cholesterol assessed</td>
<td>27 617 (23.2)</td>
<td>22 803 (20.6)</td>
<td>17 413 (18.5)</td>
<td>-36.9</td>
<td></td>
</tr>
<tr>
<td>New medicines initiated</td>
<td>54 142 (45.4)</td>
<td>51 773 (46.8)</td>
<td>40 079 (42.8)</td>
<td>-26.0</td>
<td></td>
</tr>
<tr>
<td>Medicines continued</td>
<td>38 024 (31.9)</td>
<td>35 541 (32.1)</td>
<td>34 621 (36.9)</td>
<td>-8.9</td>
<td></td>
</tr>
<tr>
<td>New treatment visits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>3414 (2.9)</td>
<td>2714 (2.5)</td>
<td>2078 (2.2)</td>
<td>-39.1</td>
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</tr>
<tr>
<td>Diabetes</td>
<td>1408 (1.2)</td>
<td>1226 (1.1)</td>
<td>1177 (1.3)</td>
<td>-16.4</td>
<td></td>
</tr>
<tr>
<td>High cholesterol</td>
<td>1274 (1.1)</td>
<td>1326 (1.2)</td>
<td>926 (1.0)</td>
<td>-27.3</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>1266 (1.1)</td>
<td>1146 (1.0)</td>
<td>635 (0.7)</td>
<td>-49.8</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>193 (0.2)</td>
<td>157 (0.1)</td>
<td>149 (0.2)</td>
<td>-22.8</td>
<td></td>
</tr>
<tr>
<td>Insomnia</td>
<td>396 (0.3)</td>
<td>437 (0.4)</td>
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<td>-24.5</td>
<td></td>
</tr>
</tbody>
</table>
Use and Content of Primary Care Office-Based vs Telemedicine Care Visits During the COVID-19 Pandemic in the US

G. Caleb Alexander, MD, MS; Matthew Tajanlangit; James Heyward, MPH; Omar Mansour, MHS; Dima M. Qato, PharmD, MPH, PhD; Randall S. Stafford, MD, PhD

Figure. Geographic Variation in COVID-19 Burden and Telemedicine Adoption in the First 2 Quarters of 2020

A COVID-19 death rate

B Telemedicine adoption

Rate per 100,000 individuals
- Lowest tertile (19.9-25.3)
- Middle tertile (>25.3-29.7)
- Highest tertile (>29.7-124.9)
- Not applicable

Percentage of total visits
- Lowest tertile (15.1-17.2)
- Middle tertile (>17.2-19.4)
- Highest tertile (>19.4-26.8)
- Not applicable
Connecting Data for Michigan Healthcare

VISIT THE DASHBOARD
Hypertension Dashboard  Metro-Detroit (Wayne County)

Select a Vital Category to Explore: Systolic Blood Pressure (Mean)

Map by Census Tract

Tract ID: 26163518900

Number of Patient Records: 4,493
Mean SBP: 137.22
Mean DBP: 83.01
Mean HR: 88.64
Median SBP: 133.00
Median DBP: 81.00
Median HR: 88.00

Census Tract Information
Population: 2,122
Housing Units: 953
Occupied Housing Units (Households): 843
Median Age: 29.30
Population Age 65+: 15.08%
Median Household Income: $33,764
Families Below Poverty Level: 60.9%
Unemployment Rate: 35.30%
Uninsured Population: 12.40%
Life Expectancy at Birth: 72.10 years
Non-White Population: 96.09%
Renter-Occupied Housing Units: 99.29%
Unoccupied Housing Units: 11.54%
ADI National Ranking (median of block groups within tract): 100.00
ADI State Ranking (median of block groups within tract): 10.000

Race/Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Number of Records</th>
<th>Mean SBP</th>
<th>Mean DBP</th>
<th>Mean HR</th>
<th>Mean Age</th>
<th>Mean Temp</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African American</td>
<td>422,654</td>
<td>135.20</td>
<td>81.98</td>
<td>89.00</td>
<td>42</td>
<td>36.76</td>
<td>76.61%</td>
</tr>
<tr>
<td>White</td>
<td>87,775</td>
<td>135.72</td>
<td>80.33</td>
<td>90.02</td>
<td>46</td>
<td>36.72</td>
<td>15.00%</td>
</tr>
<tr>
<td>Other Race or More than One</td>
<td>31,395</td>
<td>136.51</td>
<td>81.22</td>
<td>87.79</td>
<td>48</td>
<td>36.73</td>
<td>5.69%</td>
</tr>
<tr>
<td>Unknown</td>
<td>8,950</td>
<td>134.57</td>
<td>80.85</td>
<td>90.05</td>
<td>42</td>
<td>36.77</td>
<td>1.62%</td>
</tr>
<tr>
<td>Spanish/Hispanic</td>
<td>5,916</td>
<td>134.17</td>
<td>81.47</td>
<td>89.49</td>
<td>42</td>
<td>36.72</td>
<td>1.07%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>551,690</td>
<td>135.33</td>
<td>81.67</td>
<td>89.11</td>
<td>43</td>
<td>36.75</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Targeting Areas of High Risk for Coronavirus

- Population Over Age 65 (20 - 27%)
- Social Vulnerability Index over 0.95
- Nursing Homes, Hospice Residence, and Homes for the Aged

SOURCE: Coronavirus Heatmap (Detroit Health Department, March 29, 2020); Social Vulnerability Index (CDC, 2018); Nursing Homes, Hospice Residence, and Homes for the Aged (Michigan LAMA, 2019)
COVID-19 and Hypertension in Detroit

Prevalence of Hypertension among Adults (≥18)
- 20.6 - 43.8
- 43.8 - 48.7
- 48.7 - 51.3
- 51.3 - 60.2

COVID-19 Burden by ZIP Code
- 0 - 248
- 248 - 566
- 566 - 838
- 838 - 1214

SOURCE: CDC 500 Cities - BPHIGH (2019): Detroit Health Department (COVID19 data as of 09/28/20)
Funding: Funding was supplied by donors and non-profit organizations including United Way for Southeastern Michigan, the Community Foundation of Southeast Michigan/Detroit Medical Center Foundation, the Ralph C. Wilson Foundation, Community Organized Relief Effort (CORE), DTE Energy Foundation, Blue Cross Blue Shield of Michigan, and the Cielo Foundation. Michigan Department of Health and Human Services (MDHHS) also collaborated and contributed funding to support further growth and extension of services. A CDC funded program (1817) with the MDHHS Heart Disease and Stroke Prevention Unit allowed for cardiometabolic risk factor screening. In addition, funding for the PHOENIX program was provided by the Michigan Health Endowment Fund and Delta Dental Michigan.

RESEARCH ARTICLE

From pandemic response to portable population health: A formative evaluation of the Detroit mobile health unit program

Phillip Levy¹, Erin McGlynn⁶*, Alex B. Hill⁴, Liying Zhang⁵, Steven J. Korzeniewski², Bethany Foster¹, Jasmine Criswell⁶, Caitlin O’Brien³, Katee Dawood³, Lauren Baird³, Charles J. Shanley⁴

¹ Department of Emergency Medicine, Wayne State University School of Medicine, Detroit, Michigan, United States of America, ² Department of Family Medicine and Public Health Sciences, Wayne State University School of Medicine, Detroit, Michigan, United States of America, ³ Wayne Health, Wayne State University, Detroit, Michigan, United States of America, ⁴ Department of Surgery, Wayne State University School of Medicine, Detroit, Michigan, United States of America

* ekmcglynn@wayne.edu
<table>
<thead>
<tr>
<th>Service</th>
<th>Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARS-CoV-2 Nasal Swab Diagnostic Testing</td>
<td>3/20/2020</td>
</tr>
<tr>
<td>SARS-CoV-2 IGG Antibody Testing</td>
<td>4/28/2020</td>
</tr>
<tr>
<td>HIV Testing</td>
<td>5/19/2020</td>
</tr>
<tr>
<td>Hypertension Screening</td>
<td>6/6/2020</td>
</tr>
<tr>
<td>Other Serology Testing (A1c and lipid panel)</td>
<td>9/26/2020</td>
</tr>
<tr>
<td>Linkage to Care for Social and Medical Services</td>
<td>10/1/2020</td>
</tr>
<tr>
<td>COVID-19 Vaccinations</td>
<td>3/15/2021</td>
</tr>
</tbody>
</table>
Portable Population Health

- Active COVID-19 (nasal swab)
- COVID-19 Antibody (blood draw)
- HIV Screening
- BP Measurement
- Lipids and Hgb
- A1c
- Vaccinations
- Patient Navigators
- Fresh food and produce distribution
Hypertension

RESEARCH LETTER

Utilizing Mobile Health Units for Mass Hypertension Screening in Socially Vulnerable Communities Across Detroit

Robert D. Brook, Katee Dawood, Bethany Foster, Randi M. Foust, Catherine Gaughan, Paul Kurian, Brian Reed, Andrea L. Jones, Barbara Vernor, Phillip D. Levy

Nearly half of all adults in the United States have hypertension, defined as a blood pressure (BP) $\geq 130/80$ mm Hg. However, both the prevalence (56%) and control rates (18%) are worse in Black patients.1 Numerous social determinants of health in socially vulnerable populations further exacerbate these disparities while reducing hypertension awareness and access to health care.2 Few places exemplify this crisis like the city of Detroit (78% Black race) where hypertension rates are the highest in Michigan (https://www.cdc.gov/places) and all census tracks are in health professional shortage areas (https://data.hrsa.gov/tools/shortage-area/). As such, the public health importance of large-scale screening efforts to identify the enormous number of individuals with hypertension cannot be overstated.2 We here describe the first-year results using our novel Wayne Health Mobile Unit program developed in collaboration with Wayne State University to address health disparities in Detroit.3

Given the large population serviced (while also ensuring resiliency of the program during cold weather and COVID restrictions), we developed a high-throughput method to offer screening for high BP (defined as $\geq 120/80$ mm Hg) beginning in November 2020. Those driving to a site ($\approx 90\%$) rested inside their parked car for 25 minutes before BP was then measured using an Omron 907XL monitor following a guideline-consistent protocol—up to an average of triplicate upper arm readings (1-minute intervals) using a correct cuff size with the arm supported at heart level (floor armrest) and feet resting on the car floor. A minority ($\leq 10\%$) of walk-up patients had seated BP measured in MHU canopy rooms. As privacy was limited, BP measurements were attended and cuffs were placed over long-sleeves when relevant.

All patients are provided follow-up care in the Wayne Health system per individual needs/wishes. Health information, including prior hypertension status, is collected but not currently available for the entire cohort. Individuals with a screening systolic BP $\geq 130$ mm Hg requiring primary care or social services were invited to enroll into an associated CDC-supported quality improvement program (Bring-it-Down) capturing health information.
<table>
<thead>
<tr>
<th>Categories</th>
<th>Number (%)</th>
<th>BP* (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>3,039</td>
<td>126.9 ± 23.1 / 76.8 ± 14.7</td>
</tr>
<tr>
<td>Normal BP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP &lt;120 and diastolic BP &lt;80 mm Hg</td>
<td>1136 (37%)</td>
<td>105.5 ± 9.28 / 65.0 ± 8.34</td>
</tr>
<tr>
<td>High BP Categories**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevated BP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP 120-129 and diastolic BP &lt;80 mm Hg</td>
<td>306 (10%)</td>
<td>124.2 ± 2.8 / 70.1 ± 6.44</td>
</tr>
<tr>
<td>Hypertension categories***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP ≥130 and/or diastolic BP ≥80 mm Hg</td>
<td>1597 (53%)</td>
<td>142.7 ± 19.39 / 86.4 ± 12.43</td>
</tr>
<tr>
<td>Stage I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP 130-139 and/or diastolic BP 80-89 mm Hg</td>
<td>629 (21%)</td>
<td>127.7 ± 8.73 / 80.3 ± 6.84</td>
</tr>
<tr>
<td>Stage II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP ≥140 and/or diastolic BP ≥90 mm Hg</td>
<td>968 (32%)</td>
<td>152.4 ± 18.15 / 90.4 ± 13.6</td>
</tr>
</tbody>
</table>
The world is currently suffering through one of the greatest crises of the last century. The coronavirus disease 2019 (COVID-19) pandemic is taking an enormous toll on public health and stretching medical resources in an unprecedented fashion. Our priorities are rightly focusing on meeting this existential threat. Nonetheless, we wish to call to attention that during major catastrophes the health consequences of chronic diseases, in particular cardiometabolic risk factors (CMRFs), continue unabated. In fact, new and serious problems arise hand-in-hand with the catastrophe and conspire to hamper our already imperfect ability to control CMRFs. Our objective is to raise awareness that we need to anticipate (and not just be reactive to) the possible coming of a second crisis we term disastrous CMRFs. This refers to the worsening of CMRFs and their control rates during and following a major disaster. Health care providers, in particular cardiologists, need to recognize the potential for this serious problem as it could promote a burgeoning of cardiovascular morbidity and mortality if not addressed. The COVID-19 pandemic should also serve as a wake-up call to the antiquated flaws in our healthcare model that collude to undermine the successful management of CMRFs in general. This current crisis can be a catalyst for optimizing practices and creating critical new capacities that will be beneficial moving forward and serve as a bulwark against future crises.
Mean Systolic Blood Pressure (SBP) by Census Tract with at least 400 observations
- 130 - 132.9
- 132.9 - 138.2
- 138.2 - 149.7
- 149.7 - 201

Social Vulnerability Index
- Extreme Vulnerability (≥ 0.90)

SOURCE: Emergency Department Surveillance data from HFHS and DMC (n=979,965); CDC Social Vulnerability Index (SVI), 2018
$20M awarded for scientific research to ensure health equity in preventing hypertension

Teams from Beth Israel Deaconess Medical Center, Johns Hopkins University School of Nursing, NYU Grossman School of Medicine, University of Alabama at Birmingham and Wayne State University receive American Heart Association research grants to study high blood pressure prevention in underrepresented populations
LEAP-HTN
Linkage, Empowerment, and Access to Prevent Hypertension

Reach & Adoption
Geospatial Analysis

Mobile Outreach

Implementation
Adaptable Choice

CHW Support

Access & Empower
Linkage

Access to care
Under-insurance
Transportation
Food security
Housing security
Employment
Utility assistance
Physical activity
Knowledge and health literacy

Effectiveness

Aim 1
SBP (primary outcome)
Diastolic BP
Stage 2 hypertension

Aim 2
Number screened
Number enrolled
Retention rate
Number successfully establishing care post intervention
Cost effectiveness

Outcomes

Maintenance
Long-Term ↓ BP and Hypertension

Long-Term ↑ Lifestyle Behavior Change

Engagement Strategy
Interventions
Key Intervention Functions
SDoH Addressed

Impact

BP: Blood Pressure; CHW: Community Health Worker; SBP, systolic BP; SDoh, Social determinants of health
Wayne State wins $18 million from National Institutes of Health to intercept chronic disease in Black communities
ACHIEVE GREATER

Addressing Cardiometabolic Health Inequities by Early PreVENTion in the GREAT LakEs Region
<table>
<thead>
<tr>
<th></th>
<th>Detroit</th>
<th>Cleveland</th>
<th>Nat’l Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children in poverty (%)</td>
<td>52.2</td>
<td>50.9</td>
<td>20.4</td>
</tr>
<tr>
<td>Income inequity score</td>
<td>-39.6</td>
<td>-39.6</td>
<td>-1.1</td>
</tr>
<tr>
<td>Racial segregation score</td>
<td>40.3</td>
<td>32.5</td>
<td>10.9</td>
</tr>
<tr>
<td>Unemployment (%)</td>
<td>18.6</td>
<td>9.0</td>
<td>6.8</td>
</tr>
<tr>
<td>3rd Grade reading proficiency (%)</td>
<td>19.2</td>
<td>22.8</td>
<td>46.2</td>
</tr>
<tr>
<td>Violent Crime (per 100,000)</td>
<td>1900.4</td>
<td>1439.3</td>
<td>436.1</td>
</tr>
<tr>
<td>Air pollution (PM2.5)</td>
<td>9.7</td>
<td>9.6</td>
<td>8.5</td>
</tr>
<tr>
<td>Housing w/ Lead Risk (%)</td>
<td>44.2</td>
<td>47.6</td>
<td>17.6</td>
</tr>
<tr>
<td>Limited access to healthy food (%)</td>
<td>48.3</td>
<td>46.6</td>
<td>63.9</td>
</tr>
<tr>
<td>Smoking (% adults)</td>
<td>28.9</td>
<td>27.8</td>
<td>16.7</td>
</tr>
<tr>
<td>Physical inactivity (%)</td>
<td>37.6</td>
<td>36.9</td>
<td>23.9</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>43.6</td>
<td>42.7</td>
<td>30.4</td>
</tr>
</tbody>
</table>
New Mobile Dental Program Drives to Serve Detroiters
Prevalence of Complete Tooth Loss
Age ≥ 65 years, CDC PLACES

Note: Prevalence of complete tooth loss based on survey respondents age 65 years and older who have lost all their natural teeth due to tooth decay or gum disease. CDC, PLACES 2021 data based on Behavioral Risk Factor Surveillance Survey estimates.
Dental Encounter Incident Rate
Detroit Emergency Department Surveillance

Note: Detroit emergency department (ED) surveillance complete November 2018 through December 2021. Dental related ED encounters may include but are not limited to tooth fractures, dental caries, and gingivitis among individuals age 18 years and older.
Note: Prevalence of complete tooth loss based on survey respondents age 65 years and older who have lost all their natural teeth due to tooth decay or gum disease. CDC, PLACES 2021 data based on Behavioral Risk Factor Surveillance Survey estimates. Detroit emergency department (ED) surveillance complete November 2018 through December 2021. Dental related ED encounters may include but are not limited to tooth fractures, dental caries, and gingivitis among individuals age 18 years and older.