Children's Hospital of Philadelphia
PolicyLab

Hypertension and Prehypertension Underdiagnosed and Undertreated in U.S. Children

Hypertension and prehypertension in children often go undiagnosed, according to a new study published today in *Pediatrics*. The study focused on children with abnormal blood pressures across the United States, and is the first to show a widespread underdiagnosis of these conditions by pediatricians in children ages 3 to 18.

Researchers analyzed the electronic health records of 400,000 children from nearly 200 pediatric primary care sites across the country, between 1999 and 2014. They found that only 23 percent of those who had blood pressures consistent with hypertension at multiple primary care visits were diagnosed with the disease, and only 10 percent of patients with symptoms of prehypertension were diagnosed. Of those children and adolescents with diagnoses of hypertension for at least a year, only 6 percent of those who needed anti-hypertension medication received a prescription.

“Although over 95 percent of children and adolescents are checked for high blood pressure, doctors taking care of children are not putting all of the pieces of the puzzle together in terms of interpreting the results and following the appropriate guidelines for treatment,” said lead author David Kaelber, MD, chief medical informatics officer of The MetroHealth System and professor of pediatrics, internal medicine, epidemiology and biostatistics at Case Western Reserve University. He is also the co-chair of the American Academy of Pediatrics task force that is rewriting the pediatric blood pressure guidelines.

Pediatricians were more likely to diagnose hypertension and prehypertension in children who were tall, male, overweight or obese. Additionally, they were more likely to recognize the diseases in children with more abnormal blood pressure values and/or more frequent blood pressure reads. The researchers found that underdiagnosis could still occur in these populations.

“The new reality for pediatricians is that we’re taking care of more and more children who are winding up with chronic conditions, such as hypertension, that were previously seen primarily in adults,” said senior author Alexander Fiks, MD, MSCE, a pediatrician at Children’s Hospital of Philadelphia (CHOP), faculty member at CHOP’s PolicyLab and director of the Pediatric Research in Office Settings network at the American Academy of Pediatrics that coordinated this research. “This study shows that many pediatricians are not responding to this new reality – not only are we underdiagnosing hypertension, but we’re often not providing recommended treatment to children with the condition in order to minimize health risks.”

Hypertension (high blood pressure) is one of the ten most common chronic diseases in childhood, and predisposes children to adult hypertension. Children with hypertension can also show early signs of cardiovascular disease, that if left untreated can increase long-term morbidity and mortality.

In 2007, Dr. Kaelber found that within one health care system, studying approximately 15,000 pediatric patients, less than 25 percent with hypertension were diagnosed. The current study used “big data,” combining electronic health record data from almost 200 practices around the U.S. to show a very similar result at the national level. The authors said this demonstrates the importance of combining electronic health record data across many practices and health systems to examine treatments and outcomes that rarely occur.

This study, which was also conducted by Weiwei Liu, MS; Michelle Ross, PhD; A. Russell Localio, PhD; Janeen Leon, MS, RDH, LD; Wilson Pace, MD; and Richard Wasserman, MD, will appear in the December issue of *Pediatrics*. Ross and Localio are from the Perelman School of Medicine at the University of Pennsylvania. The Health Resources and Services Administration (grants R40MC24943, UB5MC20286 and UA6MC15585) and the Eunice Kennedy Shriver National Institute of Child Health and Human Development supported this research.

Limitations: Researchers relied on standard clinical (non-research), in-office blood pressure measurements, as well as electronic health records to identify prescribing of antihypertensive medications.

David Kaelber et al, "Diagnosis and Medication Treatment of Pediatric Hypertension: A Retrospective Cohort Study," *Pediatrics*, published online Nov. 22, 2016, to appear in print Dec. 2016.

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About The MetroHealth System: The MetroHealth System is an essential health system committed to providing health care to everyone in Cuyahoga County, Ohio, and improving the health of the community overall. Its 7,300 employees deliver care to everyone at its main campus, just west of downtown Cleveland, and at more than 25 other MetroHealth locations. It also provides health care at more than 40 additional sites in Cuyahoga County through community partnerships such as the School Health program.

MetroHealth is home to Cuyahoga County's only verified Level I Adult Trauma Center and Level II Pediatric Trauma Center, and it is one of two adult and pediatric burn centers in the state of Ohio verified by the American Burn Association and the Committee on Trauma of the American College of Surgeons. In the past year, MetroHealth provided more than one million patient visits in its hospital and health centers. MetroHealth also is an academic medical center committed to teaching and research; each of its active physicians holds a faculty appointment at Case Western Reserve University School of Medicine. MetroHealth has earned Magnet status, which places it in the top six percent of all hospitals nationwide for nursing excellence.

MetroHealth's mission is, "Leading the way to a healthier you and a healthier community through service, teaching, discovery and teamwork." For more information, visit metrohealth.org.

About PolicyLab at Children's Hospital of Philadelphia: PolicyLab at Children's Hospital of Philadelphia (CHOP) is dedicated to achieving optimal child health and well-being by informing program and policy changes through interdisciplinary research. Founded in 2008, PolicyLab is a Center of Emphasis within the CHOP Research Institute, one of the largest pediatric research institutes in the country. With more than 25 highly-regarded faculty and 35 passionate staff who bring expertise from myriad of fields covering health, research and health policy, our work focuses on improving public systems, improving health care delivery and improving child health outcomes. For more information, visit http://www.policylab.chop.edu.

About Children's Hospital of Philadelphia: Children's Hospital of Philadelphia was founded in 1855 as the nation's first pediatric hospital. Through its long-standing commitment to providing exceptional patient care, training new generations of pediatric healthcare professionals and pioneering major research initiatives, Children's Hospital has fostered many discoveries that have benefited children worldwide. Its pediatric research program is among the largest in the country. In addition, its unique family-centered care and public service programs have brought the 535-bed hospital recognition as a leading advocate for children and adolescents. For more information, visit http://www.chop.edu.

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