

Original Paper

My Hypertension Education and Reaching Target (MyHEART): Development and Dissemination of a Patient-Centered Website for Young Adults with Hypertension

Heather M Johnson^{1,2}, MD, MS; Jamie N LaMantia^{1,2}, BS; Colleen M Brown^{2,3}, BA; Ryan C Warner^{2,4}, MS, CRC; Laura M Zeller^{2,5}, MS; Ryan C Haggart², BA; Keven Stonewall²; Diane R Lauver⁶, PhD, RN, FAAN

¹Department of Medicine, School of Medicine and Public Health, University of Wisconsin-Madison, Madison, WI, United States

²Health Innovation Program, School of Medicine and Public Health, University of Wisconsin-Madison, Madison, WI, United States

³Department of Population Health Sciences, School of Medicine and Public Health, University of Wisconsin-Madison, Madison, WI, United States

⁴Department of Counselor Education and Counseling Psychology, Marquette University, Milwaukee, WI, United States

⁵Department of Preventive Cardiology, University of Wisconsin Hospitals and Clinics, Madison, WI, United States

⁶School of Nursing, University of Wisconsin, Madison, WI, United States

Corresponding Author:

Heather M Johnson, MD, MS

Department of Medicine

School of Medicine and Public Health

University of Wisconsin-Madison

H4/512 Clinical Sciences Center, MC 3248

600 Highland Avenue

Madison, WI, 53792

United States

Phone: 1 608 262 2075

Fax: 1 608 263 0405

Email: hm2@medicine.wisc.edu

Abstract

Background: Young adults (18 to 39 years old) with hypertension have the lowest rates of blood pressure control (defined as blood pressure less than 140/90 mmHg) compared to other adult age groups. Approximately 1 in 15 young adults have high blood pressure, increasing their risk of future heart attack, stroke, congestive heart failure, and/or chronic kidney disease. Many young adults reported having few resources to address their needs for health education on managing cardiovascular risk.

Objective: The goal of our study was to develop and disseminate a website with evidence-based, clinical information and health behavior resources tailored to young adults with hypertension.

Methods: In collaboration with young adults, health systems, and community stakeholders, the My Hypertension Education and Reaching Target (MyHEART) website was created. A toolkit was also developed for clinicians and healthcare systems to disseminate the website within their organizations. The dissemination plan was guided by the Dissemination Planning Tool of the Agency for Healthcare Research and Quality (AHRQ).

Results: Google Analytics data were acquired for January 1, 2017 to June 29, 2017. The MyHEART website received 1090 visits with 2130 page views; 18.99% (207/1090) were returning visitors. The majority (55.96%, 610/1090) approached the website through organic searches, 34.95% (381/1090) accessed the MyHEART website directly, and 5.96% (65/1090) approached through referrals from other sites. There was a spike in site visits around times of increased efforts to disseminate the website.

Conclusions: The successfully implemented MyHEART website and toolkit reflect collaborative input from community and healthcare stakeholders to provide evidence-based, portable hypertension education to a hard-to-reach population. The MyHEART website and toolkit can support healthcare providers' education and counseling with young adults and organizations' hypertension population health goals.

(*JMIR Cardio* 2017;1(2):e5) doi: [10.2196/cardio.8025](https://doi.org/10.2196/cardio.8025)

KEYWORDS

hypertension; young adults; World Wide Web; quality improvement; patient engagement

Introduction

Prevalence of Hypertension among Young Adults

Uncontrolled hypertension among young adults (18 to 39 year-olds) [1] is an enormous public health burden [2,3]. In the United States, over 10 million 18 to 39 year-olds (1 in 5 men; 1 in 6 women) have hypertension [4-7], increasing their risk of premature heart failure, stroke, and chronic kidney disease [4,8-11]. Young adults with hypertension have a high lifetime risk for cardiovascular disease due to the longer exposure to high blood pressures and ongoing risk of organ damage [11-17]. Hypertension control reduces morbidity, mortality, and future healthcare costs [18-22]. Yet, only 40% of young adults with hypertension in the United States have achieved blood pressure control (defined as a blood pressure less than 140/90 mmHg) [23-27]. Our prior research demonstrated that within 1 year of developing hypertension, almost half of young adults do not receive guideline recommended lifestyle counseling [28]. Young adults are also less likely to receive a hypertension diagnosis and, if necessary, medication initiation compared to middle-aged and older adults [29,30].

Hypertension Control Barriers among Young Adults

To further understand barriers to young adults achieving hypertension control, we engaged racially and ethnically diverse young adults in 6 focus groups and conducted one-on-one interviews with primary care providers [31,32]. Two focus groups were conducted at each site: 1 academic, 1 urban, and 1 rural healthcare system [31,32]. The young adult respondents identified hypertension education topics that were not commonly addressed in current educational materials [32]. Young adult respondents shared their preferred social media channels and requested Web-based education to provide flexible access to hypertension information “when they wanted it” [32]. Primary care providers shared similar views of lacking hypertension materials and/or the time for extended education for young adults [31]. Both groups also highlighted other common barriers (eg, transportation, work-life balance, financial limitations) to hypertension care delivery. The combined qualitative and quantitative data highlighted the need to provide a website tailored to young adults with hypertension.

Prior studies demonstrated that when patients with hypertension receive health education targeted to their needs, their self-management of hypertension improves (eg, behavior changes, home blood pressure monitoring) [33]. In addition, patient education should provide a sense of personal medical empowerment to promote, initiate, and maintain health behavior changes [32,34]. Finally, hypertension education can serve as a bridge between clinic visits. To address an unmet need in the delivery of hypertension care for young adults, we developed the My Hypertension Education and Reaching Target (MyHEART) program, a young adult hypertension education program.

Rationale for Development of the MyHEART Website

The aims of MyHEART are to (1) decrease barriers to young adult hypertension care delivery; and (2) improve hypertension control in this hard to reach population. It is known that website education alone is insufficient for long-term health behavior change; however, it can be effective as an additional component to ongoing hypertension control initiatives [35]. Therefore, the goals of the MyHEART website [36] are to (1) be a portable resource for young adults’ questions and challenges with managing blood pressure; and (2) supplement the hypertension clinical care and education of healthcare teams and organizations. The aims of this proposal were to (1) develop the architectural structure of the MyHEART website through community engagement partnerships; and (2) launch and disseminate the MyHEART website to clinicians, healthcare systems, and community organizations committed to hypertension control.

Methods

Ethics

Prior studies [31,32,37] that informed the MyHEART website development were approved by the University of Wisconsin-Madison Health Sciences Institutional Review Board (IRB) and informed consent was obtained from patient and clinician stakeholders. Neither IRB approval nor written consent were needed to design or implement this website because the data that informed MyHEART development was already described in the original IRB submission for the prior studies.

MyHEART Website Development

Community Stakeholders

Our stakeholders consisted of 38 young adult patients with a mean age of 26.7 (SD 9.6) years old and were 34% (13/38) male, 45% (17/38) Black, and 42% (16/38) with 1 or more years of college [32]. In addition, there were 15 primary care clinicians [31] and 3 hypertension quality improvement teams across multiple healthcare systems. The Wisconsin Network for Research Support (WINRS) is a community and patient engagement resource based at the University of Wisconsin-Madison School of Nursing. WINRS developed the Community Advisors on Research Design and Strategies (CARDS), an innovative consultation service that engages lay community members. CARDS includes members from diverse backgrounds, including underrepresented communities and “hard to reach” populations. Members are trained to (1) review project materials (eg, websites, survey questions, mobile phone apps); and (2) provide unique feedback for research, education, and outreach. For our website development, 10 to 12 CARDS members were engaged monthly for 6 months, either in-person or by electronic communication, for feedback on content, architecture, and dissemination plans [38]. In addition, there were 2 90-minute meetings with the CARDS group to discuss updated MyHEART versions and pilot test the user-interface,

website usability, and technological options for accessing Web information (eg, mobile phone, tablet).

Website Architecture

We built the website in partnership with the University of Wisconsin Health Innovation Program (HIP) using the Drupal 7 Content Management Framework (TurnKey Linux). Based on stakeholder input, the MyHEART website has the following 3 main categories ([Multimedia Appendix 1](#)): (1) defining blood pressure and understanding high blood pressure; (2) information on initiating and maintaining behaviors to control blood pressure; and (3) relevant resources, such as exercise options, questions for clinicians, and recipes via website links to the American Heart Association (AHA), Centers for Disease Control (CDC), and National Institutes of Health (NIH). We also feature peer-reviewed publications on cardiovascular health in young adults from established scientific resources (eg, NIH, CDC, AHA) because young adult focus group informants requested to be kept up-to-date [32]. A Twitter feed (@MyHeartMyChoice) was included as another means of sharing important health topics with young adults. A discussion forum is being designed and will be added in the future as the MyHEART program staff expands to support the exchange of ideas.

Iterative Website Design Process

The website's architectural structure was cyclically evaluated by the lay advisory group (CARDS), information technology specialists, and clinical content experts (ie, physicians, nurses) using established categories: internal reliability, external security, content usefulness, navigation usability, and system interface attractiveness [39,40]. A sample of the detailed notes on MyHEART's architectural structure is shown in [Multimedia Appendix 2](#); CARDS lay advisory group full meeting notes are available upon written request to the corresponding author. The educational content for the website was formatted with a Flesch-Kincaid readability of the 6th grade or less [41]. Website edits continued over 12 months, with testing on desktop and mobile computer devices, until the final iteration was launched in January 2017.

Website Toolkit

A toolkit was developed for the MyHEART website to assist clinicians and healthcare systems with incorporating the website in clinical practice and community outreach. The toolkit provides customizable materials and Web and social media communication drafts to share the website with members of their organization ([Multimedia Appendix 3](#)).

Website Dissemination

The Dissemination Planning Tool of the Agency for Healthcare Research and Quality (AHRQ) [42] was used to outline and navigate the dissemination plan that was started in February 2017. The website and toolkit were first disseminated through

HIPxChange [43] in association with the University of Wisconsin HIP. In late 2012, HIP launched HIPxChange to disseminate evidence-based programs, tools, and other materials for free to the public [44]. The goal of HIPxChange is to accelerate the translation of new and existing knowledge into clinical practice to improve healthcare delivery and health outcomes.

Additional dissemination avenues included clinician notifications, academic and healthcare marketing teams, university/campus health centers, research communities, and public community announcement boards (eg, grocery stores, coffee shops, etc). Regional dissemination efforts include the Wisconsin Collaborative for Healthcare Quality (WCHQ). This is a voluntary consortium of 37 Wisconsin healthcare organizations (physician groups, hospitals, health plans) that has led the nation in measuring and improving healthcare quality for multiple chronic conditions [45,46]. Social media streams (eg, Facebook, Twitter, health blogs) have been activated.

Results

Google Analytics data were acquired for January 1, 2017 to June 29, 2017. In this time, the MyHEART website received a total of 1090 visits, with an average of 1.95 pages/session (range 1 to 7 pages/session for 95% of users). The number of site visits were in line with our expectations during this implementation period. Among the site visitors, 81.01% (883/1090) were new visitors ([Figure 1](#)). The majority (55.96%, 610/1090) approached the website through organic searches, 34.95% (381/1090) accessed the MyHEART website directly, and 5.96% (65/1090) approached through referrals from other sites. Overall, 40 sessions (3.67%, 40/1090) were referred from social media; 23 (2.11%, 23/1090) from Twitter, and 17 (1.56%, 17/1090) from Facebook, with Facebook demonstrating a greater number of unique visitors (10) than Twitter (2 unique visitors).

Among new users, the bounce rate was 77%, while the bounce rate among returning users was 49%. Most users spent a short time on the site (0 to 10 seconds), but the time among the remaining users was approximately evenly distributed between 11 and 1800 seconds. The page with the largest number of views among new users was "What do the blood pressure numbers mean?" (eg, understanding blood pressure values). Interestingly, among new users who accessed that page, the majority (89.8%, 495/551 of page views) accessed the page by conducting an organic search; new users spent an average of 2 minutes and 32 seconds on this page. Across all viewers, the most viewed content was the "What do the blood pressure numbers mean?" (55.41%, 604/1090 views), followed by the MyHEART website home page (47.06%, 513/1090 views). The spike in website visits noted during February and May 2017 ([Figure 2](#)) likely reflects stages of the MyHEART website dissemination plan and viewers directly accessing the MyHEART website via academic center emails, newsletters, and media inquiries.

Figure 1. Percentage of new versus returning visitors to the MyHEART website from January 1, 2017 to June 29, 2017 (N=1090).

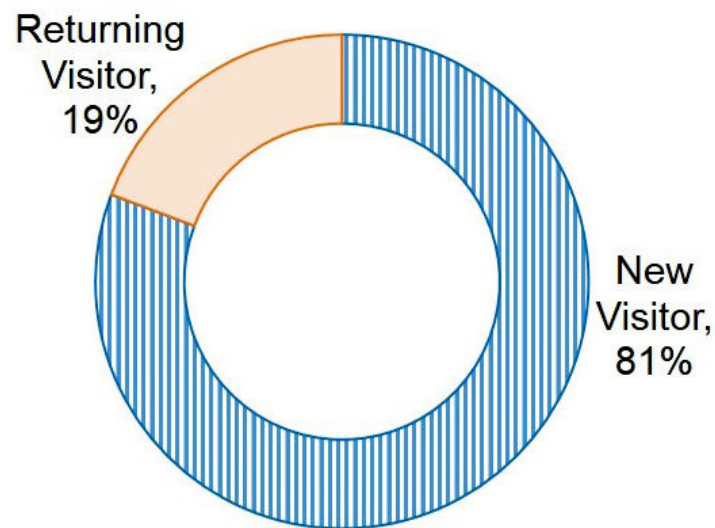
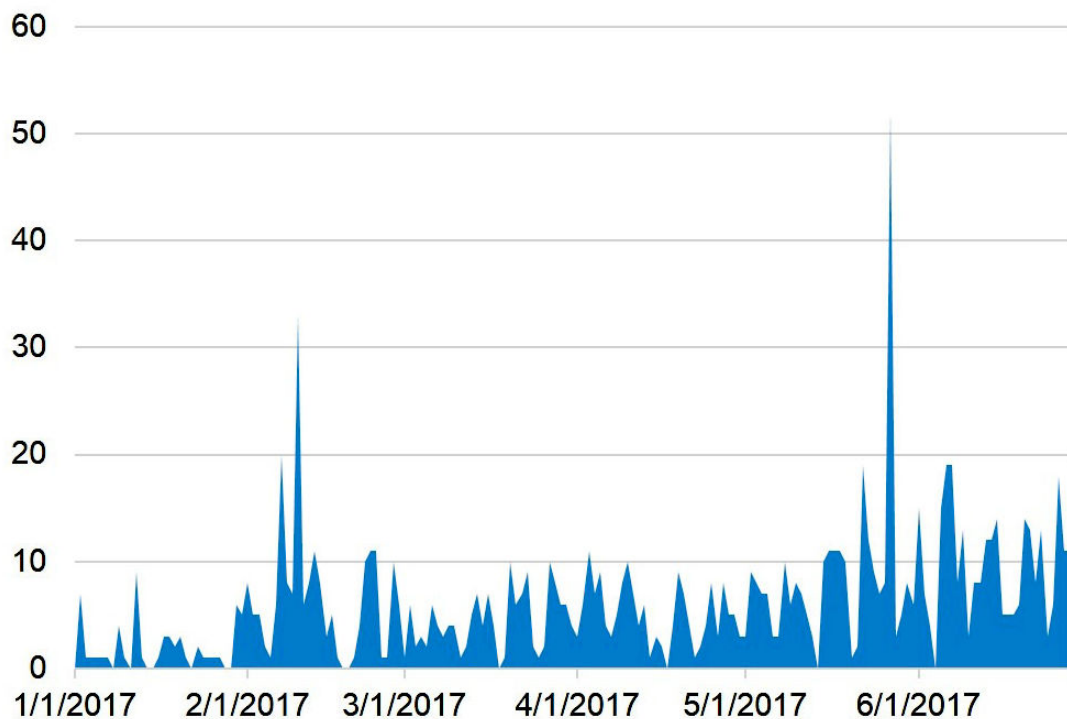


Figure 2. Number of visitors per day to the MyHEART website from January 1, 2017 to June 29, 2017.



Discussion

Principal Findings

The MyHEART website and corresponding toolkit were successfully developed with diverse young adult, community, and academic stakeholders. The website can provide young adults with evidence-based hypertension information to support their self-management goals. The corresponding toolkit can support clinicians' efforts to share knowledge about hypertension with young adults and offer counseling about behavior change. The authors successfully engaged clinical staff and their patients across healthcare systems and are actively

working to engage young adults in the community (with limited healthcare access). The MyHEART website's accessibility on mobile platforms helps target the young adult population. However, the authors are learning how to increase the duration of engagement of young adults on the website. For example, an interactive functionality is in development with the goal of increasing the length of time young adults use the website and acquire hypertension information.

Limitations

We recognize that the website and toolkit were created in English, limiting access to young adults and clinicians who are not fluent in English. However, our team plans to make these

materials available in Spanish. The website also currently lacks interactivity, but we plan to add this in the near future. Finally, we did not conduct a comparative analysis with other technology or programs. We are continuing to expand our dissemination activities and will develop multidimensional interventions in the future.

Conclusions

In collaboration with young adults, health systems, and community stakeholders, the MyHEART young adult website is a portable resource to provide evidence-based information to a hard-to-reach population. The MyHEART website and toolkit provide resources for patients, clinicians, and healthcare organizations to improve hypertension control in young adults

Acknowledgments

The project was supported by the Clinical and Translational Science Award (CTSA) program, previously through the National Center for Research Resources (NCRR) [grant number 1UL1RR025011], and now by the National Center for Advancing Translational Sciences (NCATS) [grant number UL1TR000427]. Heather M. Johnson is supported by the National Heart, Lung, and Blood Institute of the NIH [grant number K23HL112907]. Additional support was provided by the UW School of Medicine and Public Health from The Wisconsin Partnership Program.

The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. None of the sponsors had a role in study design, in the collection, analysis or interpretation of data, in the writing of the report, or in the decision to submit the article for publication.

Authors' Contributions

HJ and JL conceptualized and designed the study. HJ, JL, CB, RW, LZ, RH, KS, and DL were responsible for the acquisition of data, analysis and interpretation of data, drafting the manuscript, revising the manuscript critically for important intellectual content, and final approval of the version to be submitted. The authors greatly appreciate the time and continued dedication of the CARDS lay advisory group who provided the foundation for the MyHEART website. We are also grateful for the staff and students at the University of Wisconsin HIP who provided assistance with proofreading the website.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Selected screenshots of the MyHEART website.

[\[PDF File \(Adobe PDF File\), 379KB-Multimedia Appendix 1\]](#)

Multimedia Appendix 2

Sample of detailed notes from CARDS Lay Advisory Group meeting on MyHEART's architectural structure.

[\[PDF File \(Adobe PDF File\), 218KB-Multimedia Appendix 2\]](#)

Multimedia Appendix 3

Examples of promotional materials for healthcare providers in the MyHEART toolkit.

[\[PDF File \(Adobe PDF File\), 97KB-Multimedia Appendix 3\]](#)

References

1. Nwankwo T, Yoon SS, Burt V, Gu Q. Hypertension among adults in the United States: National Health and Nutrition Examination Survey, 2011-2012. NCHS Data Brief 2013 Oct(133):1-8 [FREE Full text] [Medline: [24171916](#)]
2. Go AS, Bauman MA, Coleman King SM, Fonarow GC, Lawrence W, Williams KA, et al. An effective approach to high blood pressure control: a science advisory from the American Heart Association, the American College of Cardiology, and the Centers for Disease Control and Prevention. J Am Coll Cardiol 2014 Apr 01;63(12):1230-1238 [FREE Full text] [doi: [10.1016/j.jacc.2013.11.007](#)] [Medline: [24246165](#)]
3. U.S. Department of Health and Human Services. Healthy People 2020: Heart Disease and Stroke. Washington, DC; 2014. Increase the proportion of adults with hypertension whose blood pressure is under control URL: https://www.healthypeople.gov/node/4555/data_details [accessed 2017-04-30] [WebCite Cache ID 6q8gGsO0s]
4. Writing Group Members, Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, American Heart Association Statistics Committee, Stroke Statistics Subcommittee. Heart disease and stroke statistics-2016 update: a report from the American Heart Association. Circulation 2016 Jan 26;133(4):e38-360 [FREE Full text] [doi: [10.1161/CIR.0000000000000350](#)] [Medline: [26673558](#)]

5. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988-2008. *JAMA* 2010 May 26;303(20):2043-2050. [doi: [10.1001/jama.2010.650](https://doi.org/10.1001/jama.2010.650)] [Medline: [20501926](https://pubmed.ncbi.nlm.nih.gov/20501926/)]
6. Nguyen QC, Tabor JW, Entzel PP, Lau Y, Suchindran C, Hussey JM, et al. Discordance in national estimates of hypertension among young adults. *Epidemiology* 2011 Jul;22(4):532-541 [FREE Full text] [doi: [10.1097/EDE.0b013e31821c79d2](https://doi.org/10.1097/EDE.0b013e31821c79d2)] [Medline: [21610501](https://pubmed.ncbi.nlm.nih.gov/21610501/)]
7. Centers for Disease Control and Prevention. High Blood Pressure Facts. Atlanta, GA; 2016. URL: <http://www.cdc.gov/bloodpressure/facts.htm> [accessed 2017-09-10] [WebCite Cache ID 6q8idgtS5]
8. Baker DW, Williams MV, Parker RM, Gazmararian JA, Nurss J. Development of a brief test to measure functional health literacy. *Patient Educ Couns* 1999 Sep;38(1):33-42. [Medline: [14528569](https://pubmed.ncbi.nlm.nih.gov/14528569/)]
9. Grubbs V, Lin F, Vittinghoff E, Shlipak MG, Peralta CA, Bansal N, et al. Body mass index and early kidney function decline in young adults: a longitudinal analysis of the CARDIA (Coronary Artery Risk Development in Young Adults) study. *Am J Kidney Dis* 2014 Apr;63(4):590-597 [FREE Full text] [doi: [10.1053/j.ajkd.2013.10.055](https://doi.org/10.1053/j.ajkd.2013.10.055)] [Medline: [24295611](https://pubmed.ncbi.nlm.nih.gov/24295611/)]
10. Schold JD, Goldfarb DA, Buccini LD, Rodrigue JR, Mandelbrot DA, Heaphy ELG, et al. Comorbidity burden and perioperative complications for living kidney donors in the United States. *Clin J Am Soc Nephrol* 2013 Oct;8(10):1773-1782 [FREE Full text] [doi: [10.2215/CJN.12311212](https://doi.org/10.2215/CJN.12311212)] [Medline: [24071651](https://pubmed.ncbi.nlm.nih.gov/24071651/)]
11. Mitchell AB, Cole JW, McArdle PF, Cheng Y, Ryan KA, Sparks MJ, et al. Obesity increases risk of ischemic stroke in young adults. *Stroke* 2015 Jun;46(6):1690-1692 [FREE Full text] [doi: [10.1161/STROKEAHA.115.008940](https://doi.org/10.1161/STROKEAHA.115.008940)] [Medline: [25944320](https://pubmed.ncbi.nlm.nih.gov/25944320/)]
12. Jones DW, Peterson ED. Improving hypertension control rates: technology, people, or systems? *JAMA* 2008 Jun 25;299(24):2896-2898. [doi: [10.1001/jama.299.24.2896](https://doi.org/10.1001/jama.299.24.2896)] [Medline: [18577736](https://pubmed.ncbi.nlm.nih.gov/18577736/)]
13. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. *Lancet* 2005;365(9455):217-223. [doi: [10.1016/S0140-6736\(05\)17741-1](https://doi.org/10.1016/S0140-6736(05)17741-1)] [Medline: [15652604](https://pubmed.ncbi.nlm.nih.gov/15652604/)]
14. Bautista LE. High blood pressure. In: Remington PL, Brownson RC, Wegner MV, editors. *Chronic disease epidemiology and control*. Washington, DC: American Public Health Association; 2010:335-362.
15. Lloyd-Jones DM, Leip EP, Larson MG, D'Agostino RB, Beiser A, Wilson PW, et al. Prediction of lifetime risk for cardiovascular disease by risk factor burden at 50 years of age. *Circulation* 2006 Feb 14;113(6):791-798 [FREE Full text] [doi: [10.1161/CIRCULATIONAHA.105.548206](https://doi.org/10.1161/CIRCULATIONAHA.105.548206)] [Medline: [16461820](https://pubmed.ncbi.nlm.nih.gov/16461820/)]
16. Brosius FC, Hostetter TH, Kelepouris E, Mitsnefes MM, Moe SM, Moore MA, American Heart Association Kidney Cardiovascular Disease Council, Councils on High Blood Pressure Research, Cardiovascular Disease in the Young, Epidemiology Prevention, Quality of Care Outcomes Research Interdisciplinary Working Group, National Kidney Foundation. Detection of chronic kidney disease in patients with or at increased risk of cardiovascular disease: a science advisory from the American Heart Association Kidney and Cardiovascular Disease Council; the Councils on High Blood Pressure Research, Cardiovascular Disease in the Young, and Epidemiology and Prevention; and the Quality of Care and Outcomes Research Interdisciplinary Working Group: Developed in Collaboration With the National Kidney Foundation. *Hypertension* 2006 Oct;48(4):751-755 [FREE Full text] [doi: [10.1161/CIRCULATIONAHA.106.177321](https://doi.org/10.1161/CIRCULATIONAHA.106.177321)] [Medline: [16990648](https://pubmed.ncbi.nlm.nih.gov/16990648/)]
17. Kernan WN, Dearborn JL. Obesity increases stroke risk in young adults: opportunity for prevention. *Stroke* 2015 Jun;46(6):1435-1436 [FREE Full text] [doi: [10.1161/STROKEAHA.115.009347](https://doi.org/10.1161/STROKEAHA.115.009347)] [Medline: [25944321](https://pubmed.ncbi.nlm.nih.gov/25944321/)]
18. Lloyd-Jones DM, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, Van HL, American Heart Association Strategic Planning Task Force Statistics Committee. Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic Impact Goal through 2020 and beyond. *Circulation* 2010 Feb 02;121(4):586-613 [FREE Full text] [doi: [10.1161/CIRCULATIONAHA.109.192703](https://doi.org/10.1161/CIRCULATIONAHA.109.192703)] [Medline: [20089546](https://pubmed.ncbi.nlm.nih.gov/20089546/)]
19. Paramore LC, Halpern MT, Lapuerta P, Hurley JS, Frost FJ, Fairchild DG, et al. Impact of poorly controlled hypertension on healthcare resource utilization and cost. *Am J Manag Care* 2001 Apr;7(4):389-398 [FREE Full text] [Medline: [11310193](https://pubmed.ncbi.nlm.nih.gov/11310193/)]
20. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, National Heart, Lung, Blood Institute Joint National Committee on Prevention, Detection, Evaluation, Treatment of High Blood Pressure, National High Blood Pressure Education Program Coordinating Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA* 2003 May 21;289(19):2560-2572. [doi: [10.1001/jama.289.19.2560](https://doi.org/10.1001/jama.289.19.2560)] [Medline: [12748199](https://pubmed.ncbi.nlm.nih.gov/12748199/)]
21. Ford ES, Ajani UA, Croft JB, Critchley JA, Labarthe DR, Kottke TE, et al. Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. *N Engl J Med* 2007 Jun 07;356(23):2388-2398. [doi: [10.1056/NEJMsa053935](https://doi.org/10.1056/NEJMsa053935)] [Medline: [17554120](https://pubmed.ncbi.nlm.nih.gov/17554120/)]
22. Yano Y, Stamler J, Garside DB, Daviglius ML, Franklin SS, Carnethon MR, et al. Isolated systolic hypertension in young and middle-aged adults and 31-year risk for cardiovascular mortality: the Chicago Heart Association Detection Project in Industry study. *J Am Coll Cardiol* 2015 Feb 03;65(4):327-335 [FREE Full text] [doi: [10.1016/j.jacc.2014.10.060](https://doi.org/10.1016/j.jacc.2014.10.060)] [Medline: [25634830](https://pubmed.ncbi.nlm.nih.gov/25634830/)]
23. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA* 2014 Feb 05;311(5):507-520. [doi: [10.1001/jama.2013.284427](https://doi.org/10.1001/jama.2013.284427)] [Medline: [24352797](https://pubmed.ncbi.nlm.nih.gov/24352797/)]

24. Weber MA, Schiffrin EL, White WB, Mann S, Lindholm LH, Kenerson JG, et al. Clinical practice guidelines for the management of hypertension in the community: a statement by the American Society of Hypertension and the International Society of Hypertension. *J Clin Hypertens (Greenwich)* 2014 Jan;16(1):14-26 [FREE Full text] [doi: [10.1111/jch.12237](https://doi.org/10.1111/jch.12237)] [Medline: [24341872](https://pubmed.ncbi.nlm.nih.gov/24341872/)]
25. Holland N, Segraves D, Nnadi VO, Belletti DA, Wogen J, Arcona S. Identifying barriers to hypertension care: implications for quality improvement initiatives. *Dis Manag* 2008 Apr;11(2):71-77. [doi: [10.1089/dis.2008.1120007](https://doi.org/10.1089/dis.2008.1120007)] [Medline: [18426375](https://pubmed.ncbi.nlm.nih.gov/18426375/)]
26. Ma J, Urizar GG, Alehegn T, Stafford RS. Diet and physical activity counseling during ambulatory care visits in the United States. *Prev Med* 2004 Oct;39(4):815-822. [doi: [10.1016/j.ypmed.2004.03.006](https://doi.org/10.1016/j.ypmed.2004.03.006)] [Medline: [15351551](https://pubmed.ncbi.nlm.nih.gov/15351551/)]
27. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, American Heart Association Statistics Committee Stroke Statistics Subcommittee. Heart Disease and Stroke Statistics-2017 Update: a report from the American Heart Association. *Circulation* 2017 Mar 07;135(10):e146-e603 [FREE Full text] [doi: [10.1161/CIR.0000000000000485](https://doi.org/10.1161/CIR.0000000000000485)] [Medline: [28122885](https://pubmed.ncbi.nlm.nih.gov/28122885/)]
28. Johnson HM, Olson AG, LaMantia JN, Kind AJH, Pandhi N, Mendonça EA, et al. Documented lifestyle education among young adults with incident hypertension. *J Gen Intern Med* 2015 May;30(5):556-564 [FREE Full text] [doi: [10.1007/s11606-014-3059-7](https://doi.org/10.1007/s11606-014-3059-7)] [Medline: [25373831](https://pubmed.ncbi.nlm.nih.gov/25373831/)]
29. Johnson HM, Thorpe CT, Bartels CM, Schumacher JR, Palta M, Pandhi N, et al. Undiagnosed hypertension among young adults with regular primary care use. *J Hypertens* 2014 Jan;32(1):65-74 [FREE Full text] [doi: [10.1097/HJH.0000000000000008](https://doi.org/10.1097/HJH.0000000000000008)] [Medline: [24126711](https://pubmed.ncbi.nlm.nih.gov/24126711/)]
30. Johnson HM, Thorpe CT, Bartels CM, Schumacher JR, Palta M, Pandhi N, et al. Antihypertensive medication initiation among young adults with regular primary care use. *J Gen Intern Med* 2014 May;29(5):723-731 [FREE Full text] [doi: [10.1007/s11606-014-2790-4](https://doi.org/10.1007/s11606-014-2790-4)] [Medline: [24493322](https://pubmed.ncbi.nlm.nih.gov/24493322/)]
31. Johnson HM, Warner RC, Bartels CM, LaMantia JN. "They're younger... it's harder." Primary providers' perspectives on hypertension management in young adults: a multicenter qualitative study. *BMC Res Notes* 2017 Jan 03;10(1):9 [FREE Full text] [doi: [10.1186/s13104-016-2332-8](https://doi.org/10.1186/s13104-016-2332-8)] [Medline: [28057065](https://pubmed.ncbi.nlm.nih.gov/28057065/)]
32. Johnson HM, Warner RC, LaMantia JN, Bowers BJ. "I have to live like I'm old." Young adults' perspectives on managing hypertension: a multi-center qualitative study. *BMC Fam Pract* 2016 Mar 11;17:31 [FREE Full text] [doi: [10.1186/s12875-016-0428-9](https://doi.org/10.1186/s12875-016-0428-9)] [Medline: [26969619](https://pubmed.ncbi.nlm.nih.gov/26969619/)]
33. Saksena A. Computer-based education for patients with hypertension: a systematic review. *Health Educ J* 2010 May 04;69(3):236-245. [doi: [10.1177/0017896910364889](https://doi.org/10.1177/0017896910364889)]
34. Lauver DR, Ward SE, Heidrich SM, Keller ML, Bowers BJ, Brennan PF, et al. Patient-centered interventions. *Res Nurs Health* 2002 Aug;25(4):246-255. [doi: [10.1002/nur.10044](https://doi.org/10.1002/nur.10044)] [Medline: [12124719](https://pubmed.ncbi.nlm.nih.gov/12124719/)]
35. Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM. The effectiveness of Web-based vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes. *J Med Internet Res* 2004 Nov 10;6(4):e40 [FREE Full text] [doi: [10.2196/jmir.6.4.e40](https://doi.org/10.2196/jmir.6.4.e40)] [Medline: [15631964](https://pubmed.ncbi.nlm.nih.gov/15631964/)]
36. MyHEART. Madison, WI: University of Wisconsin Health Innovation Program; 2017. URL: <http://myheartmychoice.org/> [WebCite Cache ID 6tVYRPMxy]
37. Johnson HM, LaMantia JN, Warner RC, Pandhi N, Bartels CM, Smith MA, et al. MyHEART: a non randomized feasibility study of a young adult hypertension intervention. *J Hypertens Manag* 2016;2(2) [FREE Full text] [Medline: [28191544](https://pubmed.ncbi.nlm.nih.gov/28191544/)]
38. Stephan G, Hoyt MJ, Storm DS, Shirima S, Matiko C, Matechi E. Development and promotion of a national website to improve dissemination of information related to the prevention of mother-to-child HIV transmission (PMTCT) in Tanzania. *BMC Public Health* 2015 Oct 22;15:1077 [FREE Full text] [doi: [10.1186/s12889-015-2422-x](https://doi.org/10.1186/s12889-015-2422-x)] [Medline: [26494170](https://pubmed.ncbi.nlm.nih.gov/26494170/)]
39. Hong S, Kim J. Architectural criteria for website evaluation – conceptual framework and empirical validation. *Behav Inf Technol* 2004 Sep;23(5):337-357. [doi: [10.1080/01449290410001712753](https://doi.org/10.1080/01449290410001712753)]
40. Chiou W, Lin C, Perng C. A strategic framework for website evaluation based on a review of the literature from 1995–2006. *Inform Manage* 2010 Aug;47(5-6):282-290. [doi: [10.1016/j.im.2010.06.002](https://doi.org/10.1016/j.im.2010.06.002)]
41. Kincaid JP, Fishburne RP, Rogers RL, Chissom BS. Naval Technical Training Command Research Branch Report 8-75. Millington, TN: Naval Air Station Memphis; 1975 Feb. Derivation of new readability formulas (Automated Readability Index, Fog Count and Flesch Reading Ease Formula) for Navy enlisted personnel URL: <http://www.dtic.mil/dtic/tr/fulltext/u2/a006655.pdf> [accessed 2017-09-13] [WebCite Cache ID 6tS1LsHTc]
42. Carpenter D, Nieva V, Albaghali T, Sorra J. Agency for Healthcare Research and Quality. Rockville, MD; 2005. Advances in patient safety: from research to implementation volumes 1-4 URL: <http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/advances-in-patient-safety/index.html> [accessed 2017-09-13] [WebCite Cache ID 6tS0GrZKG]
43. Johnson H, LaMantia J. HIPxChange. Madison, WI: University of Wisconsin Health Innovation Program; 2016. MyHEART: information & resources for young adults with hypertension URL: <https://www.hipxchange.org/MyHEART> [WebCite Cache ID 6tVYdw9zT]
44. HIPxChange. Madison, WI: University of Wisconsin Health Innovation Program; 2016. URL: <https://www.hipxchange.org/> [WebCite Cache ID 6tVYoTIRn]
45. Berwick DM. Improving patient care. *My right knee*. *Ann Intern Med* 2005 Jan 18;142(2):121-125. [Medline: [15657160](https://pubmed.ncbi.nlm.nih.gov/15657160/)]

46. Robert Wood Johnson Foundation. Quality Field Notes: Public Reporting.: Robert Wood Johnson Foundation; 2015 May. What we're learning: how to report on the quality of physician practices URL: http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2015/rwjf419545 [accessed 2017-09-13] [WebCite Cache ID 6tS2V5U9A]

Abbreviations

AHA: American Heart Association
AHRQ: Agency for Healthcare Research and Quality
CARDS: Community Advisors on Research Design and Strategies
CDC: Centers for Disease Control
HIP: Health Innovation Program
IRB: Institutional Review Board
MyHEART: My Hypertension Education and Reaching Target
NIH: National Institutes of Health
WCHQ: Wisconsin Collaborative for Healthcare Quality
WINRS: Wisconsin Network for Research Support

Edited by G Eysenbach; submitted 11.05.17; peer-reviewed by T Bose, J Edwards, C Exeter; comments to author 22.06.17; revised version received 20.07.17; accepted 31.08.17; published 25.09.17

Please cite as:

Johnson HM, LaMantia JN, Brown CM, Warner RC, Zeller LM, Haggart RC, Stonewall K, Lauver DR

My Hypertension Education and Reaching Target (MyHEART): Development and Dissemination of a Patient-Centered Website for Young Adults with Hypertension

JMIR Cardio 2017;1(2):e5

URL: <http://cardio.jmir.org/2017/2/e5/>

doi: [10.2196/cardio.8025](https://doi.org/10.2196/cardio.8025)

PMID:

©Heather M Johnson, Jamie N LaMantia, Colleen M Brown, Ryan C Warner, Laura M Zeller, Ryan C Haggart, Keven Stonewall, Diane R Lauver. Originally published in JMIR Cardio (<http://cardio.jmir.org>), 25.09.2017. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR Cardio, is properly cited. The complete bibliographic information, a link to the original publication on <http://cardio.jmir.org>, as well as this copyright and license information must be included.