Editorial

The Devil Is in the Details

Achieving Reductions in Global Cardiovascular Disease Mortality

Thomas A. Gaziano, MD, MSc

Achieving historic reductions in global cardiovascular disease (CVD) mortality will require attention to detail in 4 areas: a clear understanding of current trends in CVD mortality, an appreciation of what has influenced positive trends in CVD mortality, a knowledge of which interventions are cost-effective, and an ability to scale the interventions. Globally, CVD mortality has increased,[1] but this statistic belies significant successes that have already occurred. Although CVD mortality overall has increased, the reasons require a devil is in the details look at various trends that give us this summary statistic.[2] First, the world population is aging in part because of our successes in managing many of the challenges of previous centuries, including improved control of infectious diseases and increased food supplies to the starving. Second, the overall world population is growing. Third, we have recently developed and implemented successful solutions to control more recent afflictions, such as HIV/AIDS.

Article see p 541

A better statistic for evaluating success than total mortality is age-adjusted mortality where we have also seen tremendous reductions in age-adjusted CVD mortality. Recent estimates suggest that age-standardized death rates because of ischemic heart disease dropped from over 200 per 100 000 to <150 per 100 000 over the last 30 years.[3] Here again, a closer look suggests different trends by country within an overall global aggregate decline. In high-income countries (HICs), such as the United States and Finland, there have been dramatic declines in age-adjusted death rates from >300 per 100 000 to nearly 100 per 100 000 over the same time frame. In comparison, less dramatic declines occurred in most other countries and even increases in age-adjusted ischemic heart disease mortality occurred in some Latin American and many Eastern European countries, such as Russia.

With such varying experiences in age-adjusted mortality rates, it is essential to understand what works and what does not before adopting interventions in other countries. Previously, scientists have studied the declines in the HICs to determine what led to such dramatic developments. Ford and Capewell used a statistical model to assess the relative contribution of cardiac treatments and changes in risk factors in reducing the burden of CVD to better understand the trend of cardiovascular deaths in the United States.[4] Compared with deaths 2 decades before, there were ≈340 000 fewer deaths in 2000, of which 44% were attributed to reduction in risk factors (total cholesterol, systolic blood pressure, smoking prevalence, and physical inactivity) and 47% were attributed to acute management and secondary prevention (improved revascularization, treatment for acute myocardial infarction and heart failure, and other treatments).[5] In addition to improved therapies, the development of coronary care units, where patients with high cardiovascular acuity could be monitored and managed, also contributed to the reduction in cardiovascular mortality.[6] Similarly, there has been a 50% to 80% decline in CVD mortality in most HICs, including Canada, United Kingdom, Scotland, Sweden, and New Zealand.[7] As seen in the United States, the 40% to 75% of the reduction in mortality in other HICs can be attributed to changes in risk factors and 25% to 50% can be attributed to more effective treatments.[7]

The reductions in risk factors have been a result of both population-based strategies and individual-level treatments. Population-level strategies include efforts, such as taxation for smoking, education about healthy diets, and physical activity, and personal interventions include such activities as screening and treatment for those identified at high risk. Both strategies can be cost-effective. Population-based interventions target high proportions of the population and may achieve modest reductions in overall risk levels.[8] Personal interventions target smaller proportions of the population and may cost more per intervention but will achieve larger levels of absolute reductions in the targeted population. Depending on the efficiency of the intervention itself, one may be more cost-effective than the other.[9,10]

The 3 largest drivers on what is either cost-effective or cost-saving is the risk of the population being targeted, the benefit of the intervention itself, and then obviously the cost of the intervention. Furthermore, not all interventions or prevention strategies are cost-saving. A common misperception is that prevention activities are cost-saving and interventions after the development of disease are not cost-effective. However, summary data suggest that slightly <20% of all interventions are cost-saving.[11] Further, those interventions that are cost-saving are evenly split between prevention and treatment services. Many other interventions are cost-effective or a good value for the expenditure, but again these seem to be evenly split between preventive services and treatment interventions.

The study by Basu et al[12] in this issue of *Circulation: Cardiovascular Quality and Outcomes* shows that a proposal

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

From the Division of Cardiovascular Medicine, Brigham & Women's Hospital, Boston, MA; and Department of Health Policy and Management, Harvard TH Chan School of Public Health, Center for Health Decision Science, Boston, MA.

Correspondence to Thomas A. Gaziano, MD, MSc, 75 Francis St, Boston, MA 02115. E-mail tgaziano@partners.org

(*Circ Cardiovasc Qual Outcomes.* 2015;8:535-538. DOI: 10.1161/CIRCOUTCOMES.115.002314.)

***Circ Cardiovasc Qual Outcomes* is available at http://circoutcomes.ahajournals.org**

DOI: 10.1161/CIRCOUTCOMES.115.002314

to treat a relatively lower-risk population with inexpensive and highly effective medications can achieve an equally cost-effective result as treating a high-risk population (tertiary services) with more expensive but also highly effective services. Specifically, Basu et al examine the impact of increasing insurance coverage for cardiovascular services in India. They test in their simulation model whether it is cost-effective to provide coverage for primary, secondary, and tertiary services. Primary prevention included generic medications for those with hypertension and statins for those at high overall cardiovascular risk. Secondary prevention consisted of a combination of generic aspirin, β-blocker, angiotensin-converting enzyme inhibitor, and statin for those with a prior stroke or ischemic heart disease. Tertiary care included management of acute myocardial infarction and stroke, including potentially percutaneous coronary interventions and coronary artery bypass surgery. They found that a combination of coverage for primary, secondary, and tertiary services would be cost-effective compared with no insurance coverage of these services. The intervention combining the 3 levels of services would cost $1331/disability-adjusted life years averted, which would be cost-effective in India using the international convention of <1 times GDP/capita as a good buy.

The results were, however, sensitive to the level of suboptimal or inappropriate care, particularly in the tertiary services. If just over 10% of individuals received inappropriate care or unnecessary procedures, then treatment for tertiary care would no longer be cost-effective. This situation is analogous to the American Heart Association/American Stroke Association recommendations regarding carotid artery stenting or endarterectomy for those with asymptomatic carotid artery stenosis.[13] In the updated guidelines, surgery or stenting would only be recommended if the peri-procedural risk is <3%.

Thus, in order for the tertiary care procedures to be recommended, local guidelines evaluating the appropriateness of procedures should also be implemented. In addition, quality of the services to ensure that the same event reductions that have occurred elsewhere should be put in place to guarantee success of the coverage for these interventions. In the other direction, improving the quality of the services will enhance the cost-effectiveness of the care delivered. Understanding what exactly are the unnecessary procedures will be important. The authors allude to unnecessary coronary artery bypass surgery procedures, but where exactly that line is drawn will need further evaluation. Furthermore, the authors assume that capacity already exists to provide the tertiary level of services. In areas where capacity is not in place for any of the services, the cost-effectiveness of the interventions will be diminished. Whether that is enough to no longer make them attractive would need to be assessed separately.

Despite successes to reduce CVD globally in many HICs, only more recently have concerted efforts been made to address this problem on a more global scale. In 2011, noncommunicable diseases were a focus of the UN General Assembly. Eight months later, the 65th World Health Assembly passed a resolution to reach a global target of 25% reduction in premature mortality from noncommunicable diseases,such as cardiovascular disease, cancer, diabetes mellitus, and chronic respiratory diseases, by 2025.[14] This historic resolution was adopted by all 194 member countries, highlighting the shared burden faced by all nations. To achieve the goal, the WHO established targets for 6 risk factors (hypertension, tobacco, sodium intake, physical inactivity, harmful alcohol intake, and obesity) and 2 health systems–based goals (better access to essential medications and technologies and drug and counseling therapy). In parallel, in 2013, the Global CVD Taskforce brought together leading organizations to address the goals, including the World Heart Federation, the American Heart Association, the American College of Cardiology, the European Society of Cardiology, European Heart Network. One of the initial actions of the Taskforce was a commitment to a 25% reduction in premature cardiovascular mortality by the year 2025.

The target seems to be reasonable given the prior evidence that the specific risk factors targeted, and access to essential medications, seem critical to success. The challenge is whether insurance coverage itself will facilitate the use of the needed services in India and other countries to achieve these goals. Initial evaluation of the natural experiment in Oregon suggests some caution.[15] The state of Oregon was unable to expand Medicaid insurance to all who qualified based on income. Individuals on a waiting list were randomized through a lottery system to either Medicaid insurance coverage or no coverage. After 2 years, no significant difference was noted in the prevalence or diagnosis of hypertension or high cholesterol levels or the use of medications for these conditions, even though there was a higher proportion in the insured group who were diagnosed with diabetes mellitus and catastrophic expenditures were nearly eliminated. In contrast, other studies,[16,17] including a recent evaluation based on propensity score matching of a national sample from the National Health and Nutrition Examination Survey, suggest that there is a positive association between insurance status and probability of being diagnosed and managed with improved indices for hypertension, hypercholesterolemia, and diabetes mellitus.[18]

In summary, successful efforts to reduce premature CVD mortality in low- and middle-income countries are likely to combine a mix of population and individually based interventions. Certainly, cost-effective interventions exist for both if they can be implemented with efficiency at scale. Primary and secondary prevention interventions focused on those individuals at high risk of CVD are likely to succeed if restricted to those interventions with prior proven success and delivered at low cost. Further, tertiary services must be able to be provided with high quality and appropriateness to be cost-effective. Finally, efforts at evaluating the best strategies to increase the scaling of proven interventions need to be encouraged. Insurance coverage will at a minimum lead to a reduction in catastrophic expenditures related to CVD hospitalizations. Its impact on efficient use of primary care services may need more evaluation.

Disclosures

Dr Gaziano has received grant funding from the National Heart, Lung, and Blood Institute for research on cost-effectiveness of CVD prevention in the United States and South Africa and has served as an advisor to the Healthy Hearts Africa program sponsored by AstraZeneca.

References

1. GBD 2013 Mortality and Causes of Death Collaborators, Naghavi M, Wang H, Lozano R, Davis A, Liang X, Zhou M, Vollset SE, Ozgoren AA, Abdalla S, Abd-Allah F. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2015;385:117–171.
2. GBD 2013 DALYs and HALE Collaborators, Murray CJ, Barber RM, Foreman KJ, Ozgoren AA, Abd-Allah F, Abera SF, Aboyans V, Abraham JP, Abubakar I, Abu-Raddad LJ, Abu-Rmeileh NM, Achoki T, Ackerman IN, Ademi Z, Adou AK, Adsuar JC, Afshin A, Agardh EE, Alam SS, Alasfoor D, Albittar MI, Alegretti MA, Alemu ZA, Alfonso-Cristancho R, Alhabib S, Ali R, Alla F, Allebeck P, Almazroa MA, Alsharif U, Alvarez E, Alvis-Guzman N, Amare AT, Ameh EA, Amini H, Ammar W, Anderson HR, Anderson BO, Antonio CA, Anwari P, Arnlöv J, Arsenijevic VS, Artaman A, Asghar RJ, Assadi R, Atkins LS, Avila MA, Awuah B, Bachman VF, Badawi A, Bahit MC, Balakrishnan K, Banerjee A, Barker-Collo SL, Barquera S, Barregard L, Barrero LH, Basu A, Basu S, Basulaiman MO, Beardsley J, Bedi N, Beghi E, Bekele T, Bell ML, Benjet C, Bennett DA, Bensenor IM, Benzian H, Bernabé E, Bertozzi-Villa A, Beyene TJ, Bhala N, Bhalla A, Bhutta ZA, Bienhoff K, Bikbov B, Biryukov S, Blore JD, Blosser CD, Blyth FM, Bohensky MA, Bolliger IW, Başara BB, Bornstein NM, Bose D, Boufous S, Bourne RR, Boyers LN, Brainin M, Brayne CE, Brazinova A, Breitborde NJ, Brenner H, Briggs AD, Brooks PM, Brown JC, Brugha TS, Buchbinder R, Buckle GC, Budke CM, Bulchis A, Bulloch AG, Campos-Nonato IR, Carabin H, Carapetis JR, Cárdenas R, Carpenter DO, Caso V, Castañeda-Orjuela CA, Castro RE, Catalá-López F, Cavalleri F, Çavlin A, Chadha VK, Chang JC, Charlson FJ, Chen H, Chen W, Chiang PP, Chimed-Ochir O, Chowdhury R, Christensen H, Christophi CA, Cirillo M, Coates MM, Coffeng LE, Coggeshall MS, Colistro V, Colquhoun SM, Cooke GS, Cooper C, Cooper LT, Coppola LM, Cortinovis M, Criqui MH, Crump JA, Cuevas-Nasu L, Danawi H, Dandona L, Dandona R, Dansereau E, Dargan PI, Davey G, Davis A, Davitoiu DV, Dayama A, De Leo D, Degenhardt L, Del Pozo-Cruz B, Dellavalle RP, Deribe K, Derrett S, Jarlais DC, Dessalegn M, Dharmaratne SD, Dherani MK, Diaz-Torné C, Dicker D, Ding EL, Dokova K, Dorsey ER, Driscoll TR, Duan L, Duber HC, Ebel BE, Edmond KM, Elshrek YM, Endres M, Ermakov SP, Erskine HE, Eshrati B, Esteghamati A, Estep K, Faraon EJ, Farzadfar F, Fay DF, Feigin VL, Felson DT, Fereshtehnejad SM, Fernandes JG, Ferrari AJ, Fitzmaurice C, Flaxman AD, Fleming TD, Foigt N, Forouzanfar MH, Fowkes FG, Paleo UF, Franklin RC, Fürst T, Gabbe B, Gaffikin L, Gankpé FG, Geleijnse JM, Gessner BD, Gething P, Gibney KB, Giroud M, Giussani G, Dantes HG, Gona P, González-Medina D, Gosselin RA, Gotay CC, Goto A, Gouda HN, Graetz N, Gugnani HC, Gupta R, Gupta R, Gutiérrez RA, Haagsma J, Hafezi-Nejad N, Hagan H, Halasa YA, Hamadeh RR, Hamavid H, Hammami M, Hancock J, Hankey GJ, Hansen GM, Hao Y, Harb HL, Haro JM, Havmoeller R, Hay SI, Hay RJ, Heredia-Pi IB, Heuton KR, Heydarpour P, Higashi H, Hijar M, Hoek HW, Hoffman HJ, Hosgood HD, Hossain M, Hotez PJ, Hoy DG, Hsairi M, Hu G, Huang C, Huang JJ, Husseini A, Huynh C, Iannarone ML, Iburg KM, Innos K, Inoue M, Islami F, Jacobsen KH, Jarvis DL, Jassal SK, Jee SH, Jeemon P, Jensen PN, Jha V, Jiang G, Jiang Y, Jonas JB, Juel K, Kan H, Karch A, Karema CK, Karimkhani C, Karthikeyan G, Kassebaum NJ, Kaul A, Kawakami N, Kazanjan K, Kemp AH, Kengne AP, Keren A, Khader YS, Khalifa SE, Khan EA, Khan G, Khang YH, Kieling C, Kim D, Kim S, Kim Y, Kinfu Y, Kinge JM, Kivipelto M, Knibbs LD, Knudsen AK, Kokubo Y, Kosen S, Krishnaswami S, Defo BK, Bicer BK, Kuipers EJ, Kulkarni C, Kulkarni VS, Kumar GA, Kyu HH, Lai T, Lalloo R, Lallukka T, Lam H, Lan Q, Lansingh VC, Larsson A, Lawrynowicz AE, Leasher JL, Leigh J, Leung R, Levitz CE, Li B, Li Y, Li Y, Lim SS, Lind M, Lipshultz SE, Liu S, Liu Y, Lloyd BK, Lofgren KT, Logroscino G, Looker KJ, Lortet-Tieulent J, Lotufo PA, Lozano R, Lucas RM, Lunevicius R, Lyons RA, Ma S, Macintyre MF, Mackay MT, Majdan M, Malekzadeh R, Marcenes W, Margolis DJ, Margono C, Marzan MB, Masci JR, Mashal MT, Matzopoulos R, Mayosi BM, Mazorodze TT, Mcgill NW, Mcgrath JJ, Mckee M, Mclain A, Meaney PA, Medina C, Mehndiratta MM, Mekonnen W, Melaku YA, Meltzer M, Memish ZA, Mensah GA, Meretoja A, Mhimbira FA, Micha R, Miller TR, Mills EJ, Mitchell PB, Mock CN, Ibrahim NM, Mohammad KA, Mokdad AH, Mola GL, Monasta L, Hernandez JC, Montico M, Montine TJ, Mooney MD, Moore AR, Moradi-Lakeh M, Moran AE, Mori R, Moschandreas J, Moturi WN, Moyer ML, Mozaffarian D, Msemburi WT, Mueller UO, Mukaigawara M, Mullany EC, Murdoch ME, Murray J, Murthy KS, Naghavi M, Naheed A, Naidoo KS, Naldi L, Nand D, Nangia V, Narayan KM, Nejjari C, Neupane SP, Newton CR, Ng M, Ngalesoni FN, Nguyen G, Nisar MI, Nolte S, Norheim OF, Norman RE, Norrving B, Nyakarahuka L, Oh IH, Ohkubo T, Ohno SL, Olusanya BO, Opio JN, Ortblad K, Ortiz A, Pain AW, Pandian JD, Panelo CI, Papachristou C, Park EK, Park JH, Patten SB, Patton GC, Paul VK, Pavlin BI, Pearce N, Pereira DM, Perez-Padilla R, Perez-Ruiz F, Perico N, Pervaiz A, Pesudovs K, Peterson CB, Petzold M, Phillips MR, Phillips BK, Phillips DE, Piel FB, Plass D, Poenaru D, Polinder S, Pope D, Popova S, Poulton RG, Pourmalek F, Prabhakaran D, Prasad NM, Pullan RL, Qato DM, Quistberg DA, Rafay A, Rahimi K, Rahman SU, Raju M, Rana SM, Razavi H, Reddy KS, Refaat A, Remuzzi G, Resnikoff S, Ribeiro AL, Richardson L, Richardus JH, Roberts DA, Rojas-Rueda D, Ronfani L, Roth GA, Rothenbacher D, Rothstein DH, Rowley JT, Roy N, Ruhago GM, Saeedi MY, Saha S, Sahraian MA, Sampson UK, Sanabria JR, Sandar L, Santos IS, Satpathy M, Sawhney M, Scarborough P, Schneider IJ, Schöttker B, Schumacher AE, Schwebel DC, Scott JG, Seedat S, Sepanlou SG, Serina PT, Servan-Mori EE, Shackelford KA, Shaheen A, Shahraz S, Levy TS, Shangguan S, She J, Sheikhbahaei S, Shi P, Shibuya K, Shinohara Y, Shiri R, Shishani K, Shiue I, Shrime MG, Sigfusdottir ID, Silberberg DH, Simard EP, Sindi S, Singh A, Singh JA, Singh L, Skirbekk V, Slepak EL, Sliwa K, Soneji S, Søreide K, Soshnikov S, Sposato LA, Sreeramareddy CT, Stanaway JD, Stathopoulou V, Stein DJ, Stein MB, Steiner C, Steiner TJ, Stevens A, Stewart A, Stovner LJ, Stroumpoulis K, Sunguya BF, Swaminathan S, Swaroop M, Sykes BL, Tabb KM, Takahashi K, Tandon N, Tanne D, Tanner M, Tavakkoli M, Taylor HR, Ao BJ, Tediosi F, Temesgen AM, Templin T, Ten Have M, Tenkorang EY, Terkawi AS, Thomson B, Thorne-Lyman AL, Thrift AG, Thurston GD, Tillmann T, Tonelli M, Topouzis F, Toyoshima H, Traebert J, Tran BX, Trillini M, Truelsen T, Tsilimbaris M, Tuzcu EM, Uchendu US, Ukwaja KN, Undurraga EA, Uzun SB, Van Brakel WH, Van De Vijver S, van Gool CH, Van Os J, Vasankari TJ, Venketasubramanian N, Violante FS, Vlassov VV, Vollset SE, Wagner GR, Wagner J, Waller SG, Wan X, Wang H, Wang J, Wang L, Warouw TS, Weichenthal S, Weiderpass E, Weintraub RG, Wenzhi W, Werdecker A, Westerman R, Whiteford HA, Wilkinson JD, Williams TN, Wolfe CD, Wolock TM, Woolf AD, Wulf S, Wurtz B, Xu G, Yan LL, Yano Y, Ye P, Yentür GK, Yip P, Yonemoto N, Yoon SJ, Younis MZ, Yu C, Zaki ME, Zhao Y, Zheng Y, Zonies D, Zou X, Salomon JA, Lopez AD, Vos T. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *Lancet*. 2015. pii: S0140-6736(15)61340-X. doi: 10.1016/S0140-6736(15)61340-X. [Epub ahead of print].
3. Ali MK, Jaacks LM, Kowalski AJ, Siegel KR, Ezzati M. Noncommunicable diseases: three decades of global data show a mixture of increases and decreases in mortality rates. *Health Aff (Millwood)*. 2015;34:1444–1455. doi: 10.1377/hlthaff.2015.0570.
4. Ford ES, Capewell S. Coronary heart disease mortality among young adults in the U.S. from 1980 through 2002: concealed leveling of mortality rates. *J Am Coll Cardiol*. 2007;50:2128–2132. doi: 10.1016/j.jacc.2007.05.056.
5. Ford ES, Ajani UA, Croft JB, Critchley JA, Labarthe DR, Kottke TE, Giles WH, Capewell S. Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. *N Engl J Med*. 2007;356:2388–2398. doi: 10.1056/NEJMsa053935.
6. Nabel EG, Braunwald E. A tale of coronary artery disease and myocardial infarction. *N Engl J Med*. 2012;366:54–63. doi: 10.1056/NEJMra1112570.
7. O'Flaherty M, Buchan I, Capewell S. Contributions of treatment and lifestyle to declining CVD mortality: why have CVD mortality rates declined so much since the 1960s? *Heart*. 2013;99:159–162. doi: 10.1136/heartjnl-2012-302300.
8. Rose G. Sick individuals and sick populations. *Int J Epidemiol*. 1985;14:32–38.
9. Zulman DM, Vijan S, Omenn GS, Hayward RA. The relative merits of population-based and targeted prevention strategies. *Milbank Q*. 2008;86:557–580. doi: 10.1111/j.1468-0009.2008.00534.x.
10. Gaziano TA, Galea G, Reddy KS. Scaling up interventions for chronic disease prevention: the evidence. *Lancet*. 2007;370:1939–1946. doi: 10.1016/S0140-6736(07)61697-3.
11. Cohen JT, Neumann PJ, Weinstein MC. Does preventive care save money? Health economics and the presidential candidates. *N Engl J Med*. 2008;358:661–663. doi: 10.1056/NEJMp0708558.
12. Basu S, Bendavid E, Sood N. Health and economic implications of national treatment coverage for cardiovascular disease in India: cost-effectiveness

analysis. *Circ Cardiovasc Qual Outcomes*. 2015;8:541–551. doi: 10.1161/CIRCOUTCOMES.115.001994.

13. Meschia JF, Bushnell C, Boden-Albala B, Braun LT, Bravata DM, Chaturvedi S, Creager MA, Eckel RH, Elkind MS, Fornage M, Goldstein LB, Greenberg SM, Horvath SE, Iadecola C, Jauch EC, Moore WS, Wilson JA; American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Functional Genomics and Translational Biology; Council on Hypertension. Guidelines for the primary prevention of stroke: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2014;45:3754–3832. doi: 10.1161/STR.0000000000000046.
14. World Health Organization. Sixty-Fifth World Health Assembly Resolutions, Decisions, Annexes. Available from http://www.who.int/mediacentre/events/2012/wha65/en/. WHA65/2012/REC/1. May 21–26, 2012.
15. Baicker K, Taubman SL, Allen HL, Bernstein M, Gruber JH, Newhouse JP, Schneider EC, Wright BJ, Zaslavsky AM, Finkelstein AN, Carlson M, Edlund T, Gallia C, Smith J; Oregon Health Study Group. The Oregon experiment–effects of Medicaid on clinical outcomes. *N Engl J Med*. 2013;368:1713–1722. doi: 10.1056/NEJMsa1212321.
16. Wilper AP, Woolhandler S, Lasser KE, McCormick D, Bor DH, Himmelstein DU. Hypertension, diabetes, and elevated cholesterol among insured and uninsured U.S. adults. *Health Aff (Millwood)*. 2009;28:w1151–w1159. doi: 10.1377/hlthaff.28.6.w1151.
17. Ayanian JZ, Zaslavsky AM, Weissman JS, Schneider EC, Ginsburg JA. Undiagnosed hypertension and hypercholesterolemia among uninsured and insured adults in the Third National Health and Nutrition Examination Survey. *Am J Public Health*. 2003;93:2051–2054.
18. Hogan DR, Danaei G, Ezzati M, Clarke PM, Jha AK, Salomon JA. Estimating the potential impact of insurance expansion on undiagnosed and uncontrolled chronic conditions. *Health Aff (Millwood)*. 2015;34:1554–1562. doi: 10.1377/hlthaff.2014.1435.

KEY WORDS: Editorials ■ cardiovascular disease risk factors ■ coronary artery disease ■ cost-effectiveness ■ prevention

The Devil Is in the Details: Achieving Reductions in Global Cardiovascular Disease Mortality

Thomas A. Gaziano

Circ Cardiovasc Qual Outcomes. 2015;8:535-538; originally published online November 10, 2015;
doi: 10.1161/CIRCOUTCOMES.115.002314
Circulation: Cardiovascular Quality and Outcomes is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 1941-7705. Online ISSN: 1941-7713