

The Importance of Setting Treatment Goals for Cardiovascular Diseases

David S. Schade*, Bramara Nagamallika Godasi, Teodor Duro, Robert Philip Eaton

University of New Mexico Health Sciences, Albuquerque, USA

Email: *dschade@salud.unm.edu

How to cite this paper: Schade, D.S., Godasi, B.N., Duro, T. and Eaton, R.P. (2024) The Importance of Setting Treatment Goals for Cardiovascular Diseases. *World Journal of Cardiovascular Diseases*, 14, 10-15. <https://doi.org/10.4236/wjcd.2024.141002>

Received: December 7, 2023

Accepted: January 15, 2024

Published: January 18, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution-NonCommercial International License (CC BY-NC 4.0). <http://creativecommons.org/licenses/by-nc/4.0/>



Open Access

Abstract

Background: Guidelines are issued by most major organizations that focus on a specific disease entity. Guidelines should be a significant help to the practicing physician who may not be up-to-date with the recent medical literature. Unfortunately, when conflicting guidelines for a specific disease are published, confusion results. **Purpose:** This article provides a suggested guideline outcome measure that would benefit the physician and patient. **Methods:** A review of 19 different guidelines for cardiovascular disease treatment is one example of the lack of specific outcomes that currently exist. The basic problem with most guidelines is that they do not state the expected end result (*i.e.*, the benefit to the patient) if that guideline is followed. When guidelines use cardiovascular disease risk factors to dictate therapy, the end benefit is never stated so that the patient can make an appropriate choice of which (if any) guideline to follow. **Results:** A good example is guidelines published by the American Heart Association for reducing cardiovascular disease. These guidelines are risk factor based and only indicate that cardiovascular disease would be reduced if followed. No specific percentage in the reduction of the incidence of disease is given. In contrast, when elimination of the disease is the stated goal of the guideline, the end result is clear. To date, this goal has been stated by only one organization devoted to eliminating cardiovascular disease. **Conclusion:** Guidelines need to be written to provide the physician and the patient with a specific end point that is expected when the guideline is followed. Patient acceptance and compliance will be much improved if the patient knows the risk/benefit of following the guideline's recommendations.

Keywords

Guideline Goals for Cardiovascular Disease Prevention, Cardiovascular Disease, Risk Factors for Cardiovascular Disease, Pooled Cohort Equations

1. Introduction

Treatment guidelines are an important method of conveying expert opinion to non-expert physicians in complex diseases. Unfortunately, guidelines published by different medical specialties are often conflicting, thereby causing confusion to the practitioner. This conundrum has clearly been documented for the treatment of cardiovascular disease. In a review of atherosclerotic cardiovascular disease (ASCVD) guidelines published by 19 major scientific organizations in the United States and Europe, no consistent agreements were present [1]. Although this confusion may relate in part to both regional differences in treatment and different experts writing the guidelines, the primary issue is that these guidelines do not specify a final result that the patient can expect. Of importance, there is a major difference between the anticipated goal of reducing the incidence of a disease and the specific goal of eliminating the disease.

All guidelines should state what the expected result will be if the recommended treatment guideline is followed. This expectation would provide the reader with critical information necessary to balance the benefits of therapy with the expected adverse outcomes after following that specific guideline (the risk/benefit ratio). This information is rarely provided. It would also permit the reader to choose the guideline that best fits his/her needs. It would also dictate the choice of disease detection modality and necessary treatment to reach that goal.

2. Methods

Symptomatic atherosclerotic cardiovascular disease in the United States can 1) either be eliminated (in most individuals) or 2) have a reduced incidence. Several diseases have already been eliminated in the United States including polio, yellow fever, plague, smallpox, and leprosy. The strategy to accomplish these two different goals is significantly different as attested to by the non-agreement of published guidelines. Furthermore, if the goal is to reduce cardiovascular disease, the percentage reduction goal will dictate the aggressiveness of the treatment recommendations. The debate between using risk factor equations (pooled cohort equations) versus coronary artery calcium scanning can be resolved by stating what the ultimate goal for the guideline should be. If it is only to reduce but not eliminate ASCVD, not every asymptomatic patient with CVD needs to be identified and therefore risk factor equations suffice. In contrast, if elimination of ASCVD is the goal, as many individuals as possible with asymptomatic ASCVD need to be identified with a coronary artery calcium scan [2].

3. Results

Symptomatic atherosclerotic cardiovascular disease is a preventable disease in almost all individuals if it is identified early, before clinical symptoms occur [3]. This result can be accomplished by significantly reducing residual atherosclerotic particles (LDL cholesterol and chylomicron residual cholesterol) with lifestyle changes and medication (Figure 1) [4] [5]. The same type of statement can be

How to Eliminate Atherosclerosis

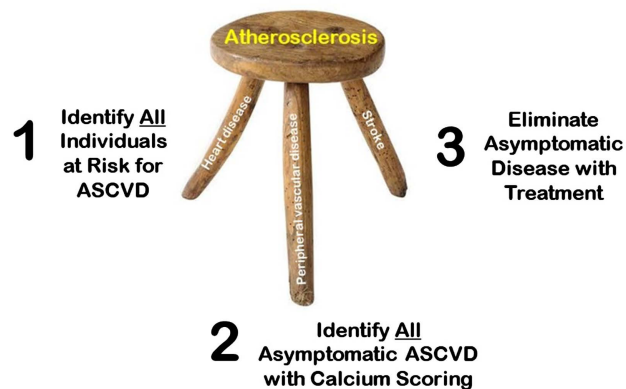


Figure 1. An approach to eliminating atherosclerotic cardiovascular disease can be illustrated with a three legged stool. First, identify individuals who may have asymptomatic ASCVD by family history, presence of any risk factors such as diabetes, smoking, hypertension and hyperlipidemia, age greater than 50 years, etc. Second, screen these individuals with a coronary artery calcium scan. If negative, rescreen in four to five years. If positive, treat aggressively to reduce risk factors. Third, reduce LDL cholesterol to less than 50 mg/dl with a low cholesterol diet, rosuvastatin and ezetimibe [3]. ASCVD = atherosclerotic cardiovascular disease.

made for other lethal diseases such as breast cancer and colon cancer. Organizations for these latter two fatal conditions have recognized this disease elimination opportunity and established guidelines for periodic procedural screening for identifying asymptomatic disease. For example, approximately 75% of women in the United States undergo breast mammograms every two years. Only one non-profit organization has taken this approach for cardiovascular disease [6]. Other organizations have been hesitant to take this aggressive approach for many reasons, including scientific, financial, and political.

4. Discussion

This article has attempted to point out the major defect in the current published cardiovascular guidelines. This defect may be the reason that many of the guidelines reach different recommendations for treating a patient to prevent ASCVD. This conundrum makes it very difficult for the physician and patient to choose and follow a specific guideline. On the other hand, if guidelines would recommend the total elimination of ASCVD, then similar strategies would exist for identifying and treating all patients at risk.

The financial and political reasons are intertwined for not recommending the total elimination of atherosclerotic cardiovascular disease. According to the American Heart Association, the annual cost of treating cardiovascular disease in the United States is approximately 350 billion dollars/year and this amount is expected to triple by 2030 [7]. These dollars support a wide range of the medical establishment, including physician salaries, medical institutions, and cardiovascular infrastructure [7]. It has been estimated that if ASCVD were to be elimi-

nated, the annual cost would be reduced to 50 billion dollars/year [8]. Clearly, eliminating atherosclerotic disease would require a major shift in funding for both medical institutions and individuals that rely on the treatment of cardiovascular disease.

The scientific reasons against eliminating ASCVD are more straightforward. To eliminate ASCVD, it must be identified and treated prior to the advent of clinical symptoms. To accomplish this task, a test must be used that is inexpensive, safe, widespread, and highly specific and sensitive. The only current test that meets these requirements is the coronary artery calcium scan [9]. This test is not perfect but is sufficiently sensitive that patients in the United Kingdom presenting with chest pain but having a zero calcium scan are discharged home without invasive coronary angiography or non-invasive but expensive CT angiography [10]. Opponents of coronary artery calcium scanning point out that studies have demonstrated that when this test is used prospectively in a large population, no benefit in reducing cardiovascular disease is observed [11]. In rebuttal, others have emphasized that a coronary artery calcium scan is only a test to identify a disease and that no test has ever been shown to prevent a disease [12]. Prevention requires a follow-up treatment plan and application of therapy to be effective. They point to a similar situation: e.g., an electrocardiogram has never cured an arrhythmia but has identified a condition requiring effective intervention.

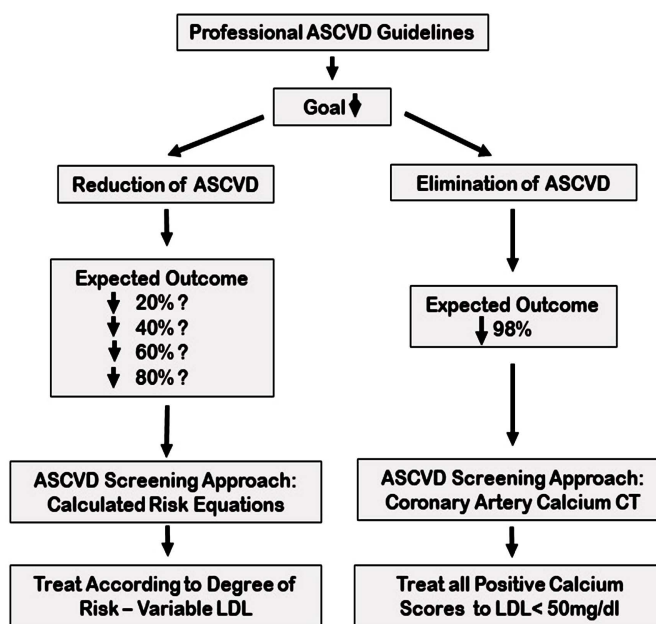


Figure 2. Two general approaches to issuing Atherosclerotic Cardiovascular Disease (ASCVD) guidelines—The first approach is based on reducing cardiovascular disease by an unknown amount. These guidelines do not state their expected final treatment goals, which is confusing to the patient and physician. The second approach has the goal of eliminating cardiovascular disease. This goal requires identifying subclinical atherosclerotic cardiovascular disease with calcium artery scanning and treating all patients who have positive scans.

5. Conclusion

Until organizations are willing to state their specific treatment recommendation goals and outcome statistics, confusion and disagreements in the medical literature will exist. For example, the 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease state “For adults 40 to 75 years of age, clinicians should routinely assess traditional cardiovascular risk factors and calculate 10-year risk of ASCVD by using the pooled cohort equations [13].” However, if this assessment is actually done by the physician, how effective would it be? In order to follow these guidelines, the patient will need to make difficult lifestyle changes and often take cholesterol lowering medications (Figure 2). His/her compliance will depend on how successful these changes are to achieving the reduction of ASCVD. The patient and physician want to know how effective the guideline will be before instituting lifestyle changes. Although all professional guidelines aim to ultimately eliminate ASCVD, nowhere do guidelines provide physicians with statistics on guideline effectiveness. This confusion is not productive and makes it difficult for the physician and patient to feel competent about following treatment guidelines. Since recommendations for treatment of breast and colon cancer have achieved this agreement, organizations making ASCVD recommendations should do the same. Both patients and physicians deserve this effort.

Conflicts of Interest

None of the authors has a conflict of interest in the submission of this manuscript.

References

- [1] Khanji, M.Y., Bicalho, V.V.S., van Waardhuizen, C.N., Ferket, B.S., Petersen, S.E. and Hunink, M.G.M. (2016) Cardiovascular Risk Assessment: A Systematic Review of Guidelines. *Annals of Internal Medicine*, **165**, 713-722. <https://doi.org/10.7326/M16-1110>
- [2] Hecht, H.S. (2015) Coronary Artery Calcium Scanning: Past, Present, and Future. *JACC: Cardiovascular Imaging*, **8**, 579-596. <https://doi.org/10.1016/j.jcmg.2015.02.006>
- [3] Giannini, J., Padilla, J., Eaton, R.P., Gonzales, K. and Schade, D.S. (2022) Prevention of Coronary Heart Disease: A Translational Clinical Challenge. *World Journal of Cardiovascular Diseases*, **12**, 11-23. <https://doi.org/10.4236/wjcd.2022.121002>
- [4] Varbo, A. and Nordestgaard, B.G. (2016) Remnant Cholesterol and Triglyceride-Rich Lipoproteins in Atherosclerosis Progression and Cardiovascular Disease. *Arteriosclerosis, Thrombosis, and Vascular Biology*, **36**, 2133-2155. <https://doi.org/10.1161/ATVBAHA.116.308305>
- [5] Joshi, P.H., Khokhar A.A., Massaro, J.M., Lirette, S.T., Griswold, M.E., Martin, S.S., Blaha, M.J., Kulkarni, K.R., Correa, A., D’AgostinoSr, R.B, Jones, S.R., Toth, P.P. and The Lipoprotein Investigators Collaborative (LIC) Study Group (2016) Remnant Lipoprotein Cholesterol and Incident Coronary Heart Disease: The Jackson Heart and Framingham Offspring Cohort Studies. *Journal of the American Heart Association*, **5**, e002765. <https://doi.org/10.1161/JAHA.115.002765>

- [6] Schade, D.S., Obenshain, S., Hickey, M., Febbo, J., Wann, S. and Eaton, R.P. (2022) Guidelines for the Prevention of Symptomatic Cardiovascular Disease, Based upon the Presence of Coronary Artery Calcified Plaque—Provided by the Society for the Prevention of Symptomatic Heart Disease. *World Journal of Cardiovascular Diseases*, **12**, 320-341. <https://doi.org/10.4236/wjcd.2022.126032>
- [7] American Heart Association (2017) Cardiovascular Disease: A Costly Burden for America Projections Through 2035. <https://www.heart.org/-/media/Files/Get-Involved/Advocacy/Burden-Report-Consumer-Report.pdf>
- [8] Schade, D.S. and Eaton, R.P. (2019) A Simplified Approach to Reducing Cardiovascular Risk. *The Journal of Clinical Endocrinology & Metabolism*, **104**, 6033-6039. <https://doi.org/10.1210/jc.2018-02509>
- [9] Hecht, H., Blaha, M.J., Berman, D.S., Nasir, K., Budoff, M., Leipsic, J., *et al.* (2017) Clinical Indications for Coronary Artery Calcium Scoring in Asymptomatic Patients: Expert Consensus Statement from the Society of Cardiovascular Computed Tomography. *Journal of Cardiovascular Computed Tomography*, **11**, 157-168. <https://doi.org/10.1016/j.jcct.2017.02.010>
- [10] Nabi, F., Chang, S.M., Pratt, C.M., Peterson, L.E., Frias, M.E. and Mahmarian, J.J. (2010) Coronary Artery Calcium Scoring in the Emergency Department: Identifying Which Patients with Chest Pain Can Be Safely Discharged Home. *Annals of Emergency Medicine*, **56**, 220-229. <https://doi.org/10.1016/j.annemergmed.2010.01.017>
- [11] Lindholt, J.S., Sogaard, R., Rasmussen, L.M., Mejldal, A., Lambrechtsen, J., Steffensen, F.H., *et al.* (2022) Five-Year Outcomes of the Danish Cardiovascular Screening (DANCAVAS) Trial. *The New England Journal of Medicine*, **387**, 1385-1394. <https://doi.org/10.1056/NEJMoa2208681>
- [12] Hecht, H.S. (2008) The Deadly Double Standard (The Saga of Screening for Subclinical Atherosclerosis). *The American Journal of Cardiology*, **101**, 1805-1807. <https://doi.org/10.1016/j.amjcard.2008.02.086>
- [13] Arnett, D.K., Blumenthal, R.S., Albert, M.A., Buroker, A.B., Goldberger, Z.D., Hahn, E.J., *et al.* (2019) 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*, **140**, e596-e646. <https://doi.org/10.1161/CIR.0000000000000678>