differences in any of the measured individual medical conditions. In contrast, the less adherent groups were more likely to be from areas with lower median income and were also more likely to be African-American or Hispanic. Prior studies have shown that adverse cardiovascular outcomes and poor utilization of evidence-based discharge care after myocardial infarction are independently associated with each of these groups (3,4). Even so, the authors attempted to minimize confounding by appropriately adjusting for race and income. However, there are likely other socioeconomic variables such as education level, social support, employment status, and cultural differences that were not fully captured in this data set which may have impacted both adherence as well as cardiovascular outcomes. The differences in characteristics between adherent and less adherent groups further emphasize the need to better incorporate these types of socioeconomic variables into our methods of identifying and managing high-risk patients in both routine clinical care as well as clinical research studies, particularly in relation to medication adherence.

It is also worth emphasizing that although medication adherence is complicated by various socioeconomic factors that are often difficult to measure, let alone modify, Armstrong and McAlister are correct in pointing out that progress in this area remains both necessary and possible. We should remain optimistic that innovative studies such as the ongoing ARTEMIS (Affordability and Real-world Antiplatelet Treatment Effectiveness After Myocardial Infarction Study) trial (5), a multicenter randomized trial of copayment vouchers for $P2Y_{12}$ inhibitors after myocardial infarction, will help find ways to impact both adherence and cardiovascular outcomes. The most important initial intervention, however, will remain our decision to discuss the importance of medication adherence with our patients, as a problem never discussed will likely be a problem never solved.

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REFERENCES

1. Bansilal S, Castellano JM, Garrido E, et al. Assessing the impact of medication adherence on long-term cardiovascular outcomes. J Am Coll Cardiol 2016;68:789–801.

2. Armstrong PW, McAlister FA. Searching for adherence: can we fulfill the promise of evidence-based medicines? J Am Coll Cardiol 2016;68:802–4.

3. Bucholz EM, Ma S, Normand SL, Krumholz HM. Race, socioeconomic status, and life expectancy after acute myocardial infarction. Circulation 2015;132:1338–46.

4. Guzman LA, Li S, Wang TY, et al. Differences in treatment patterns and outcomes between Hispanics and non-Hispanic Whites treated for ST-segment elevation myocardial infarction: results from the NCDR ACTION Registry-GWTG. J Am Coll Cardiol 2012;59:630–1.

5. Doll JA, Wang TY, Choudhry NK, et al. Rationale and design of the Affordability and Real-world Antiplatelet Treatment Effectiveness after Myocardial Infarction Study (ARTEMIS): a multicenter, cluster-randomized trial of P2Y12 receptor inhibitor copayment reduction after myocardial infarction. Am Heart J 2016;177:33–41.

REPLY: Medication Adherence and Cardiovascular Outcomes

We welcome Dr. Faridi's thoughts regarding our publication (1) and commend him on his astute observations regarding drivers of medication non-adherence. Our group has previously shown in the FOCUS (Fixed-Dose Combination Drug for Secondary Cardiovascular Prevention Study) trial (2) that younger age, depression, being on a complex medication regimen, poorer health insurance coverage, and a lower level of social support are all predictive of poorer medication adherence.

Previously, the MI-FREE (Myocardial Infarction Free Rx Event and Economic Evaluation) trial, and currently the ARTEMIS (Affordability and Real-world Antiplatelet Treatment Effectiveness after Myocardial Infarction Study) (3), are both outstanding investigations attempting to tease out the role of monetary burden on medication compliance for our patients. We agree with Dr. Faridi on the critical importance of discussing medication adherence with our patients, early and often, as elegantly outlined in his recent publication (4).

Our group is pursuing the use of a true polypill as a novel strategy to improve medication adherence and impact cardiovascular outcomes through the SECURE (Secondary Prevention of Cardiovascular Disease in the Elderly) trial, which will enroll 3,602 post-myocardial infarction elderly patients (5).

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REFERENCES

1. Bansilal S, Castellano JM, Garrido E, et al. Assessing the impact of medication adherence on long-term cardiovascular outcomes. J Am Coll Cardiol 2016;68:789–801.

2. Castellano JM, Sanz G, Penalvo JL, et al. A polypill strategy to improve adherence: results from the FOCUS project. J Am Coll Cardiol 2014;64:2071–82.

3. Doll JA, Wang TY, Choudhry NK, et al. Rationale and design of the Affordability and Real-world Antiplatelet Treatment Effectiveness after Myocardial Infarction Study (ARTEMIS): a multicenter, cluster-randomized trial of P2Y12 receptor inhibitor copayment reduction after myocardial infarction. Am Heart J 2016;177:33–41.

4. Faridi KF, Peterson ED, McCoy LA, Thomas L, Enriquez J, Wang TY. Timing of first postdischarge follow-up and medication adherence after acute myocardial infarction. JAMA Cardiol 2016;1:147–55.

5. Secondary Prevention of Cardiovascular Disease in the Elderly (SECURE) Trial. Available at http://www.secure-h2020.eu/. Accessed 01/12/2017.

What Is the Best Disease-Guided Approach to Statin?

Silverman et al. (1) report that in a meta-regression analysis, the use of statin and nonstatin therapies that act via upregulation of low-density lipoprotein (LDL) receptor expression to reduce LDL cholesterol (LDL-C) were associated with similar relative risks of major vascular events per change in LDL-C. Lower achieved LDL-C levels were associated with lower rates of major coronary events. In complying with this, Pender et al. (2) discussed new findings since 2013 and proposed strategies emanating from the current guidelines in lower-risk patients.

Nonetheless, this guideline has been criticized. The impact of the American College of Cardiology (ACC)/American Heart Association (AHA) strategy is huge because a very large number of subjects would be eligible for lifelong statin treatment from >40 years old. The potential side effects should be considered if such a large fraction of the population is put on statin treatment (3). Furthermore, the ACC/AHA guidelines have been overestimated in Asians. To overcome this paramount and important limitation, Mortensen et al. (4) reported that withholding statins in individuals without coronary artery calcium or carotid plaque could spare a significant proportion of elderly people from taking a pill that would benefit only a few. This individualized disease-guided approach is simple and easy to implement in routine clinical practice. This disease-guided approach looks pretty attractive in both Caucasians and Asians. However, it should be tested in Asians.

Also, it should be noted that a recent meta-analysis reported that exposure to LDL-C-lowering genetic variants in or near NPC1L1 and other genes was associated with a higher risk of type 2 diabetes despite a significant reduction in coronary artery disease risk. These data provide insights into potential adverse effects of LDL-C-lowering therapy (5).

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REFERENCES

1. Silverman MG, Ference BA, Im K, et al. Association between lowering LDL-C and cardiovascular risk reduction among different therapeutic interventions: a systematic review and meta-analysis. JAMA 2016;316:1289–97.

2. Pender A, Lloyd-Jones DM, Stone NJ, Greenland P. Refining statin prescribing in lower-risk individuals: Informing risk/benefit decisions. J Am Coll Cardiol 2016;68:1690–7.

3. Ridker PM, Rose L, Cook NR. A proposal to incorporate trial data into a hybrid ACC/AHA algorithm for the allocation of statin therapy in primary prevention. J Am Coll Cardiol 2015;65:942–8.

4. Mortensen MB, Fuster V, Muntendam P, et al. A simple disease-guided approach to personalize ACC/AHA-recommended statin allocation in elderly people: the BioImage study. J Am Coll Cardiol 2016;68:881–91.

5. Lotta LA, Sharp SJ, Burgess S, et al. Association between low-density lipoprotein cholesterol-lowering genetic variants and risk of type 2 diabetes: a meta-analysis. JAMA 2016;316:1383–91.