In early 2014, the American College of Cardiology (ACC) and the American Heart Association (AHA) announced the publication of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease. The guideline is the first to be released on valvular heart disease (VHD) since a focused update in 2008. For the first time, the guideline addresses the use of transcatheter aortic valve replacement (TAVR) as a therapeutic option (see Update for ACC/AHA Guidelines for Valvular Heart Disease sidebar).

The document provides practice guidance for managing patients with VHD and includes updated definitions of disease severity, categorization of four disease stages that progress from “at risk” to “symptomatic severe,” and new thresholds for intervention in select patient populations. Additionally, the 2014 document incorporates a more complex evaluation of interventional risk than the previous guideline, as well as indications for newer catheter-based therapies.

Additionally, the ACC, American Association for Thoracic Surgery, Society for Cardiovascular Angiography and Interventions (SCAI), and Society of Thoracic Surgery (STS) jointly published an overview of transcatheter therapies for mitral regurgitation in the Journal of the American College of Cardiology. Cardiac Interventions Today discussed these updated recommendations with a panel of experts to get their insights on what this will mean for VHD patients.

**CHANGES IN THE GUIDELINES**

Dr. Feldman: One of the changes to the guidelines is an emphasis on the heart team. I think the heart team concept has become familiar to everybody. It started with the SYNTAX trial and the idea of a cardiologist and cardiovascular surgeon consensus on the management of multivessel coronary disease patients. The second group of trials to implement this approach were the EVEREST I and II MitraClip (Abbott Vascular) trials beginning in 2003. As TAVR trials and practices have developed, the concept of
the heart team has become ingrained in practice, internationally and in the United States, and the spirit of the heart team is well understood by those with successful TAVR programs. I think when people who aren’t familiar with heart teams hear about them, they envision the cardiologist and the surgeon shaking hands and smiling. But it really goes beyond just those two physicians and, at some level, is multidisciplinary across the board and in terms of many services being deeply involved.

**Dr. Sorajja:** The heart team is important not just for high-risk patients with multiple comorbidities and multiple complex treatment options, but it’s also important when we’re considering different types of treatment options (eg, valve repair versus replacement) and for asymptomatic patients who might benefit from prophylactic therapy. The idea is to apply a multidisciplinary approach across the entire disease spectrum, not just for patients who are at high risk.

**Dr. Tommaso:** The heart team structure is really very deep and it goes well beyond just the surgeon and the interventionist and contains many different levels that are modified depending on what the procedure is.

One of the great benefits of this approach is that it has gotten the surgeons and interventionists talking again. There was a period when, I think because of the predominance of percutaneous coronary intervention (PCI) over coronary artery bypass surgery (CABG), there was a lack of communication between surgeons and cardiologists, which has dissipated now with incorporation of the heart team.

**Dr. Reardon:** I agree. I think that the heart team is very rightly emphasized, because as care becomes more complex, the ability to have slightly different viewpoints based on experience and training brings all the answers to the table for the patient.

Another change is that we have a more clinically oriented set of guidelines with more clinical decision-making pathways than we had before. If we look back to 2006, class I evidence was about 0.3% of the document, and since these new guidelines came out, data from two more randomized trials have been reported.²³ I think these new guidelines are set up so that those types of data can be incorporated more quickly. This is more of a living document that better reflects clinical practice.

**Dr. Sorajja:** The biggest change right now is the shift in paradigms and how we think about valve disease. When we look at valve disease now, we base most of our treatment decisions on the presence of left ventricular (LV) dysfunction or the presence of symptoms. What the guidelines have started to increasingly emphasize is to think about earlier intervention as a prophylactic measure to minimize the risk of heart failure. There’s currently a lot of discussion about treating patients earlier. The guidelines recommend that an intervention should be performed in a center where the outcomes are relatively well known and are at a level that is acceptable in terms of success and procedural risk. The guidelines discuss this as a change in how we intervene in patients with valve disease, which has caused us to consider the recommendations with regard to the timing of valve intervention, as well as a description of how we should look at valve disease, and that is modeled after what we look for in terms of heart failure.

In the heart failure guidelines, there are stages A, B, C, and D, and the valve guidelines now also have stages A through D, with “A” being an at-risk patient and “D” being one who is decompensated. The idea is that we need to follow these patients carefully and not simply wait until they’re in heart failure before intervening.

I think the most significant change in the guidelines is serial evaluation with staging of disease or monitoring and also evaluating and treating these patients earlier, particularly in a heart valve center of excellence.

### CENTERS OF EXCELLENCE

**Dr. Feldman:** A new concept in this set of guidelines is the idea of a heart valve center of excellence. The guidelines recommend as class IIa, level of evidence C, that “consultation with or a referral to a Heart Valve Center of Excellence is reasonable when discussing treatment options for (1) asymptomatic patients with severe VHD, (2) patients who may benefit from valve repair versus valve replacement, or (3) patients with multiple comorbidities for whom valve interventions are considered.” Specific criteria for a heart valve center of excellence include experienced providers from multiple disciplines, an ability to offer all available options for diagnosis and management, participation in regional or national outcome registries, demonstrated adherence to guidelines, ongoing quality improvement processes, and public reporting of intervention, mortality, and success rates.

This is a broad statement. Would the rest of the panel apply that definition to the 1,500 surgical and interventional programs around the country? What proportion of these are heart valve centers of excellence by the guideline definition?

**Dr. Tommaso:** When writing the TAVR document, with the criteria that we put in place based on the STS database and National Cardiovascular Data Registry, we
estimated that there would be about 400 centers. When accounting for MitraClip use, we came up with 256 centers. Part of our goal was to balance access to care with the competence of interventionists who regularly perform these procedures and have a significant volume experience. These numbers reflect the presence of a center in at least 48 of the 50 states.

**Dr. Sorajja:** In a discussion about what a center of excellence is, there are a number of attributes: multidiscipline, quality improvement, and public outcome reporting, as well as having all of the treatment options available (ie, not just catheter-based therapy but also surgery and other invasive options). These attributes are described in the latest version of the guidelines, but there are no granular details. For example, guideline adherence is an attribute that’s described, but no one knows exactly how to measure guideline adherence for a center of excellence.

An analogy is that 100% of patients who have acute myocardial infarction should be on aspirin. Are we going to say that for mitral valve disease all these valves should have a 100% repair rate? I think that needs to be defined in granular detail, but at least those attributes have been put forth. How they’re going to be worked out in the future remains to be seen. I don’t know if we have enough data to define the minimum standards right now.

The problem with this type of analysis is that there are essentially three types of centers: (1) a center that has experience from participating in the research aspect of the transcatheter mitral valve repair studies; (2) a center that is new, with no experience, and is beginning to perform these procedures because they’re now commercially available; and (3) a hybrid center where there is experience but also new operators there that are being trained.

It’s going to be difficult because these procedures are not that common, and there is a learning curve, and that learning curve has not been studied yet. It’s not just about the operator, it’s about the entire system of care. That’s why there is an emphasis on multidisciplinary collaboration. You can perform a successful MitraClip procedure, but if a medical mistake occurs elsewhere during the hospital stay, it’s not necessarily a reflection on the operators but of the entire care system.

**Dr. Reardon:** The interesting thing to me is that we have been talking about this on the surgical side for a long time, mainly surrounding surgical mitral valve repair. You need a center and a surgeon who perform enough of these procedures to gain competency. There really weren’t many cardiology centers of excellence for structural heart disease; however, as we move toward catheter-based therapy, I think that we’re seeing the same learning curve for the cardiology part of the team now that we saw for the surgical part of the team before. This reemphasizes how much it is a team activity.

**Dr. Feldman:** I think PCI is a different kind of intervention. PCI carries less risk with it, although there’s certainly appreciable risk, and it has never been superior to surgery in terms of survival. As surgeons, we believed that although bypass was a much more invasive procedure, we thought we could provide better outcomes. With some of the data starting to come out, I’m going to have to ask myself, “In certain groups of patients, is surgery the best option?” I think that in about 5 or 6 years, the answer is going to be “No” as we gather more good data.

**Dr. Tommaso:** I think the guidelines are particularly vague because they don’t want to offend anybody. They want readers to think that they’re all inclusive and that they have the ability to join the club. But, it would be better if we could have teeth in all these things.
**Stages of Heart Valve Disease**

The revised guidelines include a new classification of heart valve diseases with four progressive stages: A, at risk; B, progressive; C, asymptomatic severe; and D, symptomatic severe. For each valve lesion, stages are based on valve anatomy, valve hemodynamics, hemodynamic consequences, and symptoms.

**The Heart Valve Team**

The guidelines recommend (class I) that the management of patients with severe heart valve disease is best achieved by a heart valve team, composed minimally of a cardiologist and a cardiac surgeon, but potentially including cardiologists, structural valve interventionists, cardiovascular imaging specialists, cardiovascular surgeons, anesthesiologists, and nurses, all of whom have expertise in the management and outcome of patients with severe heart valve disease.

**Heart Valve Centers of Excellence**

The guidelines recommend (class IIa) that consultation with or referral to a heart valve center of excellence is reasonable for asymptomatic patients with severe valve disease, patients with disease that could be best treated with valve repair rather than replacement, and patients with multiple comorbidities in whom valve intervention is considered. Specific criteria for a heart valve center of excellence include experienced providers from multiple disciplines, an ability to offer all available options for diagnosis and management, participation in regional or national outcome registries, demonstrated adherence to guidelines, ongoing quality improvement processes, and public reporting of intervention mortality and success rates.

**Evaluation of Surgical and Interventional Risk**

The guidelines provide specific recommendations for the assessment of surgical and interventional risks that include the STS predicted risk of mortality calculator, patient frailty (eg, Katz Index of Independence in Activities of Daily Living), the number of compromised major organ systems, and procedure-specific impediments.

**Management of Primary MR**

A clear distinction is drawn between chronic primary (degenerative) MR, with pathology of one or more components of the valve (leaflets, annulus, chordae, papillary muscles), and chronic secondary (functional) MR. Intervention for severe chronic primary MR remains indicated (all class I) for symptoms, LV dysfunction (LV ejection fraction ≤ 60% and/or systolic diameter ≥ 40 mm), and at the time of other cardiac surgical intervention. Changes in the recommendations for mitral valve repair include the following:

- Mitral valve repair is recommended over mitral valve replacement when pathology is limited to the posterior leaflet (class I).
- Mitral valve repair is recommended over mitral valve replacement when pathology involves the anterior or both leaflets and a successful and durable repair can be accomplished (class I).
- “Prophylactic” mitral valve repair (repair in an asymptomatic patient with preserved LV function) is reasonable when performed at a heart valve center of excellence and the likelihood of successful and durable repair without residual MR is > 95% and operative mortality risk is < 1% (class IIa).
- Mitral valve repair is reasonable in an asymptomatic patient with severe nonrheumatic MR and preserved LV function in the setting of new-onset atrial fibrillation or resting pulmonary artery systolic pressure > 50 mm Hg (class IIa).
- Mitral valve repair may be considered in the setting of rheumatic mitral valve disease when surgery is indicated and either successful repair is likely or when long-term anticoagulation management appears unreliable (class IIb). There is a class III (harm) indication for mitral valve replacement in the setting of isolated disease involving less than half of the posterior mitral leaflet unless repair was attempted and was unsuccessful.
- Finally, transcatheter mitral valve repair may be considered in severely symptomatic patients who have favorable anatomy and a reasonable life expectancy and a prohibitive surgical risk due to comorbidities, and remain severely symptomatic despite optimal medical therapy (class IIb).

**Management of Secondary MR**

Chronic secondary (functional) MR occurs as a result of abnormalities of the LV and has more differences than similarities with chronic primary MR (see above). The treatment of chronic secondary MR involves treatment of the underlying cardiomyopathy (class I) and cardiac resynchronization therapy if indicated (class I). Intervention for chronic secondary MR is reasonable at the time of coronary artery bypass grafting or other cardiac surgery if MR is severe (class IIa) and not unreasonable if MR is moderate (class IIb). Surgical intervention performed primarily for chronic secondary MR remains limited to severely (New York Heart Association class III–IV) symptomatic patients with persistent symptoms despite optimal medical therapy for heart failure (class IIb), new in these guidelines is acceptance of equivalence among these patients between mitral valve replacement and mitral valve repair.
EVALUATION OF RISK

Dr. Feldman: Another new addition to the guidelines is an emphasis on the evaluation of surgical and interventional risk. By now, I think everybody is familiar with the STS risk score, but there is a new emphasis on frailty assessments, with the Katz activities of daily living and independence scores and other measures (eg, handgrip strength being one of the most objective) included in the valve guidelines.

Dr. Reardon: I think that the current generation of TAVR trials that have come out are going to help us develop risk scores to help us understand this issue. As a surgeon, I know that frailty was a big addition to the STS score in adding risk. If you’re frail, you do not have the physiologic ability to respond to stress. Frailty actually matters less in TAVR cases, because you don’t have as much physiologic stress, but disabilities seem to matter a lot. I do think surgery and TAVR risk factors are going to be different with regard to how frailty will affect outcome, and the data collected in the PARTNER and the CoreValve trials are going to help us sort these out. The new guidelines are enough of a living document that, in a year or two, we’ll start adding in some risk comments.

Dr. Tommaso: I think it is important to be able to define things like frailty. You can look at a patient and say this patient is frail, but how can you define it, and how can you use it for comparative study without some objective evidence?

Dr. Feldman: Another addition to risk assessment is an increased emphasis on the use of exercise testing in the evaluation of asymptomatic patients with valve disease.

Dr. Reardon: I think that’s a good addition. If you are symptomatic, you clearly don’t need exercise testing, but we all see patients who say they’re asymptomatic and you have no idea whether they’re actually not just by talking to them. The judicious application of stress testing in asymptomatic patients is going to save lives.

Dr. Feldman: A lot of patients are offended if you just say, “I don’t believe that you’re asymptomatic.” I tell them that I want to measure their exercise capacity as a baseline so that, in a year, if anything changes, we can figure it out.

Dr. Reardon: Right. I think people don’t take it very kindly if you tell them they are not being honest with you. It’s a lot better to explain that we need to know a little bit more about the physiology of what’s going on so we’re going to do a little exercise testing and see how your heart responds. Then it’s easier to go back to them and say, “You know, with a little bit of exercise, here’s what changed.”

Dr. Feldman: Another significant change in the guideline document is the characterization of aortic stenosis.

Dr. Reardon: Under the new guidelines, the designation of aortic stenosis has been changed to: (1) at risk; (2) progressive, which is mild to moderate; and (3) severe, which is broken up into asymptomatic and symptomatic, and then symptomatic is further broken up into low flow/low gradient; low EF; or low gradient and normal EF. This has elevated them into more clinical definitions.

Dr. Feldman: So, very severe is defined as Vmax > 5 m/sec or mean gradient > 60 mm Hg, symptomatic severe is subdivided into Vmax > 4 m/sec or gradient > 40 mm Hg or low flow/low gradient with a reduced EF. This is helpful in terms of putting a finer point on stratifying patient severity. In practice, I don’t know how much difference it makes.

Dr. Reardon: I think in practice it makes very little difference for those who treat this all the time. We are already doing these internal divisions in our heads. I do think it is nice that they are starting to better define low flow/low gradient.

Dr. Feldman: With regard to low flow/low gradient, does it make that much of a difference in your decision to intervene or not? It’s bad sign prognostically, but does it mean that you are not going to treat the patient?

Dr. Reardon: As a surgeon, it depends if the patient is low flow/low gradient, and you don’t augment. In this situation, I am somewhat hesitant to operate because my chance of doing harm is really very high. I don’t think it will necessarily keep you from operating if it’s a surgical candidate, but I think it has helped focus people’s thought patterns in this regard.

Dr. Feldman: It may heavily influence our decision to operate, but it’s less of a factor in selecting patients for TAVR.

Dr. Reardon: As we go forward and gather more data on TAVR, the real question is not going to be our 30-day mortality rate with the low-flow/low-gradient patients, it’s going to be 1- and 2-year mortality. In thinking of some of the patients with low stroke volume based on a normal ventricle, and I’m certainly worried about how they are going to do in the long-term.
HOW THE GUIDELINES AFFECT TAVR

Dr. Feldman: There’s certainly a lot of discussion in the new guideline about TAVR. Clearly, surgery remains the gold standard. The class I TAVR indication is for those at prohibitive surgical risk, and the class IIa indication is for those at high surgical risk.

Dr. Reardon: We have a recent randomized trial with superiority of TAVR to surgery, so one wonders what the next set of guidelines might look like as we get more trial data.

Dr. Feldman: Although this is beyond the scope of the guidelines, one of the arguments is that TAVR may be superior to surgical AVR in an intermediate-risk population. That is a difficult issue for a guideline statement.

Dr. Reardon: It should make it harder for TAVR to beat surgery, and yet it still did better. I think it depends on how we want to define high, intermediate, and low risk. If we only use the STS score, that’s a problem. But if you add in STS plus frailty, STS plus comorbidities, STS plus disabilities, and STS plus anatomy, then it starts to look like how we initially designed the SURTAVI trial. We realized that once you start adding these things up, you move into higher risk, and that’s what determines the true overall risk.

It certainly matches the mean STS that we see in the Transcatheter Valve Therapy registry; what we are treating in the United States right now is a mean STS of 7.5, which is similar to what we saw in the CoreValve high-risk registry. You may have noticed when we published the data, we didn’t call it “high risk,” we called it “increased risk” for just that reason. But I think you’re right, that is a different patient population.

MANAGEMENT OF MR

Dr. Feldman: For a therapy this early in its development, TAVR has a better evidence base than almost any new therapy. I think that one of the toughest issues in the guidelines is the management of MR. This is an immensely more complicated subject, with many published articles but few solid data.

Dr. Reardon: You’re right, it’s a lot more complicated. I think we’re starting to separate out primary organic MR from secondary functional MR. I’m still struggling with the definitions of moderate, severe, and functional MR. Should we move down to lower regurgitant fractions because those patients do worse, or do they just do worse because of the underlying disease? Should we change the definition of what is moderate and severe quantitatively as you move to functional? I don’t have the answers, and I think we’re still struggling at a guidelines level to figure out these definitions.

Dr. Feldman: This is one of the many unanswered questions. One thing that is new in the guideline is that there is a distinction between primary and secondary MR. For primary MR, there is little to argue about. Surgery has a long track record of being successful, and it’s interesting to me that intervention for severe, chronic, primary MR gets a class I in a symptomatic patient or an asymptomatic patient with LV dysfunction. I don’t argue with the spirit of class I, but there are no randomized trials to support it.

I also want to discuss “prophylactic mitral valve repair,” that is, “repairing an asymptomatic patient with preserved LV function is reasonable when performed at a heart valve center of excellence and the likelihood of successful and durable repair without residual MR is > 95% and the operative mortality risk is < 1% for class IIa.” I want to make the argument that nobody has demonstrated in a prospective trial with core labs and an event committee, either of those bars, and that in the published data (anything other than a single-center, self-reported trial), no one has achieved a success rate > 95% in a multicenter trial or database, and no center has an operative mortality rate of < 1%.

Dr. Reardon: Certainly not those that have been externally adjudicated.

Dr. Feldman: Exactly. So, I take issue with legitimizing repair in an asymptomatic patient. If we use carotid stenting as an example, it was found in prospective studies that in symptomatic patients, a 30-day stroke and death rate of 6% for surgery was offset by a favorable outcome. But, in asymptomatic patients, the interventional complication rate had to be < 3%. We haven’t done that study with mitral valve repair.

Dr. Reardon: I think you’re right, we don’t have a lot of data yet, and I think that true centers of excellence should run another trial. Mike Acker just ran a great functional MR trial looking at replacement versus repair and that opened some peoples’ eyes by showing that repair at these centers of excellence had a 30% return of moderate-to-severe MR at 1 year and no survival advantage over replacement. A good replacement is better than a poor repair, and repair of functional MR is difficult because it is a ventricular disease and not a valvular disease.

I think we often believe we have a 1% mortality rate without causing harm to patients, but it often turns out to be a little higher than we think if you follow them prospectively and independently adjudicate the outcomes.
I think it’s because we have mitral surgeons of excellence who really want to push this forward. I’m sure there’s a small cadre of physicians who can do this, but the problem is that your average mitral surgeon will claim to be a mitral surgeon of excellence. You are legitimizing something that only a handful of people can do really well, and other people aren’t going to do as well.

Dr. Feldman: The number of mitral valve surgeries at an institution has been used as one of the criteria for defining a center of excellence. Dr. Tommaso, do you recall if you use 50 mitral surgeries, not repairs, but 50 total mitral surgeries per operator as a cutoff? So how many such centers would we have in the United States?

Dr. Tommaso: Less than 50.

Dr. Reardon: Yes, it’s a very low number.

Dr. Feldman: Publishing a guideline that applies to 50 out of 1,500 centers is difficult for me to understand.

Dr. Reardon: I agree. I think the strongest argument ought to be the number of people who did more than 50 procedures, which should be mitral surgeons of excellence. It’s a very small number that you are speaking to. Maybe they should be studying their patients in a randomized trial, not based on guidelines, until we obtain more data.

Dr. Feldman: I predict that it won’t happen. We’ll never see the trial.

Dr. Tommaso: We’ll never see that, that’s right.

Dr. Reardon: No, but it’s sad because it would give us some very interesting data. And, of course, when you move onto functional MR, unless you are operating on them for another reason, the best recommendation is class IIb.

Dr. Feldman: For management of secondary MR, or functional MR, there is a class I recommendation for treatment of the underlying cardiomyopathy and CRT, if indicated. The recommendation is class IIa for mitral surgery at the time of bypass, but surgical intervention performed primarily for chronic secondary MR, without concomitant revascularization, remains limited to severely symptomatic
patients with persistent symptoms despite optimal medical therapy and CRT, and that's class IIb.

Dr. Reardon: It says something about the disease when the best recommendation that you can get is a class IIb. We're failing in our treatment somewhere.

Dr. Feldman: New in these guidelines is an acceptance of the equivalence for secondary MR between repair and replacement, which is to say that they are either equally good or equally ineffective.

Dr. Reardon: But that is actually a real step forward because part of the problem until now was if you ever replaced the mitral valve, other surgeons looked at you as if you were some sort of criminal. If you would take subvalvular apparatus out, you had done a bad thing. But for functional MR, you put the patient at a higher up front risk, but once you get through the surgery, at least you have a functioning valve, and a good mitral valve replacement with the subvalvular apparatus preserved is better than a poor mitral valve repair.

Unfortunately, even in the centers of excellence, functional MR repairs do not have great outcomes, even when you have the best of the best performing them.

Dr. Feldman: Our guidelines have deferred on making any statement about the use of the MitraClip device in this population because there is an ongoing trial. The European guidelines define a MitraClip candidate this way: "Percutaneous edge-to-edge procedure may be considered in patients with symptomatic severe primary MR who fulfill the echo criteria of eligibility, are judged inoperable or at high surgical risk by a 'heart team,' and have a life expectancy greater than 1 year (recommendation class IIb, level of evidence C)."

Dr. Reardon: I think what it says is that basically your class IIb indication is a patient with severe MR with functional class 3 or 4 symptoms who hasn't responded to medical therapy and is either at very high risk or has a prohibitive risk for surgery.

In the European guidelines for secondary MR, surgery is indicated for patients with severe secondary MR undergoing CABG and an EF > 30%, class I. Surgery should be considered in patients with moderate MR undergoing CABG, class IIa. Surgery should be considered in symptomatic patients with severe MR, LV ejection fraction < 30, option for revascularization evidence of viability class IIa. Surgery should be considered in patients with severe MR, ejection fraction > 30 who remain symptomatic despite optimal medical therapy, including cardiac resynchronization therapy, and have few comorbidities with revascularization not indicated, class IIb.

Dr. Feldman: There's something in there for MitraClip.

Dr. Reardon: Evidence from a limited number of patients in the EVEREST trial and some observational studies suggest that edge-to-edge mitral valve repair is feasible, carries low procedural risk in patients with secondary MR in the absence of severe tethering, and may provide short-term improvement in LV function. These findings have to be confirmed in larger studies with longer follow-up with a randomized design, data on coronary sinus angioplasty is limited, and most initial devices have been withdrawn.* That's it; they don't make a specific recommendation that I see.

Dr. Feldman: What is different compared to our new guideline is that they even mention MitraClip. In the United States, the approval of MitraClip is for patients with prohibitive risk for surgery for degenerative MR, whereas the statement in the European guideline is for functional MR. There is a paradox.

Dr. Reardon: Well it's pretty hard for degenerative MR to get too interested in it, unless the patient is just not a surgical candidate.

SUMMARY

The new valve guideline is a real step forward in terms of better defining the way therapy for valve disease has evolved over the last few years. The emergence of catheter-based valve therapy has changed practice in many positive ways for both patients and providers. The new guideline emphasis on the heart team and valve centers reflects a lot of what we have learned from the recent TAVR and TMVR trials in terms of the importance of collaborative efforts for evaluating and treating patients with valvular heart disease.