

Clinical Lipidology Roundtable Discussion

JCL Roundtable: Health information technology in the management of lipoprotein disorders

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Abstract: One of the most serious challenges to all physicians is the maintenance of therapy for those chronic disorders that at present cannot be cured. Elevations of low-density lipoprotein and very low-density lipoprotein are among the most common of those disorders. We are now in an era in which 2 fundamental developments of modern technology have come together. These are the supply of effective and safe lipid-lowering drugs as well as the ability to closely monitor pertinent measures in our patients. The rapid conversion of our health care systems into large teams of professionals with direct support from third-party payers has made it possible to coordinate chronic care through electronic medical records and electronic communication. As a result, with effective planning and organization, we can guide our patients toward better adherence to successful medical regimens. These issues are evolving rapidly and have been presented in some detail in the December 2013 issue of the *Journal*. I was joined in this Roundtable discussion by 3 health professionals who have had extensive experience with the application of health information technology. They are Dr. Karen Aspry and Dr. Alan Brown, both clinical cardiologists, and Dr. Matthew Ito, a Doctor of Pharmacy.

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Regeneron and Sanofi, and a research grant from Kowa Pharmaceuticals.

Dr. Virgil Brown: Dr. Aspry, you've been involved in assessing the problems of achieving goals and treatment in lipid disorders in a very large health care system. What were the major problems that you discovered before you began this process of monitoring and feedback through the electronic system?



Dr. Virgil Brown

Dr. Aspry: I was fortunate to have practiced at Kaiser Permanente in Northern California from 1998 to 2005. The healthcare system had computerized databases in place even before 1998 that tracked gaps in cholesterol testing

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Dr. Aspry

and provided a “clinical prompt” if a patient was overdue, even if he or she was being seen for an unrelated problem. However, as the region embarked on tracking quality outcomes in those with coronary and other chronic diseases, it became clear that achieving and maintaining quality goals in large populations of high-risk patients required more than clinical prompts. So a “chronic conditions management” infrastructure, and key disease management programs, were established. For those with the highest cardiovascular risk, that is post-myocardial infarction or other coronary event, Stanford’s Multi-Fit case-management program was adopted to help achieve lipid control over a short time frame. But after graduating, lipid control tended to erode over time. So a chronic cholesterol management program was developed to serve a second tier of high-risk patients, those with chronic coronary disease or complex lipid disorders. Both programs used computerized tracking and achieved good results, but neither was able to provide continuous quality reporting to primary care physicians (PCPs), and of course neither tracked high-risk patients after they left the program. In 2004, a few years after the Adult Treatment Panel (ATP) III extended a lower low-density lipoprotein (LDL) target to diabetics and those with peripheral vascular disease, the chronic conditions managers made the decision to create a single cardiovascular risk registry of patients with coronary disease, diabetes, peripheral vascular disease, and chronic kidney disease, totaling almost 300,000, or about 10% of the Northern California membership. After this, the region was able to engage in true “population management” of cardiovascular risk. A region-wide educational effort encouraged each of the region’s 10 medical centers to report individual lipid outcomes to physicians, and physicians in turn were educated on the need to prescribe statins and other cardioprotective medications, diet, and lifestyle interventions to all. Today, PCPs now receive computer-generated lists of registry patients not at lipid goals and work alongside trained care managers (nurses, pharmacists, and others) who carry out quality improvement interventions through phone and mail outreach. With the advent of HealthConnect, Kaiser’s version of the Epic electronic health record (EHR), the process has become even more “health information technology-enabled” through the use of electronic provider and patient tools. Approximately 72% of the almost 300,000 patients in the registry have now achieved an LDL cholesterol goal of <100 mg/dL, and cardiovascular outcomes have improved.

Dr. Virgil Brown: Were statins and other drugs not prescribed when appropriate or was the problem that feedback was not given to patients so that doses were not being adjusted and goals were not being achieved?

Dr. Aspry: It was both. Despite provider education, prompts, and printed guidelines, barriers existed, and inability to reach the large numbers of patients who were nonadherent, or failed to contact the healthcare system on

a regular basis, compounded the problem. With the establishment of a region-wide cholesterol management program, the gap narrowed. With a population-wide approach that includes continuous provider feedback and patient outreach to all, the gap has narrowed considerably.

Dr. Virgil Brown: At that point, did you have electronic recording of laboratory data and also electronic medical records in the clinical sites?

Dr. Aspry: Yes. Computerized lab reporting and EHR were in place, as were the disease management programs I mentioned. But there was no single cardiovascular risk registry until 2004, and no way to link it to the EHR until HealthConnect arrived in 2005. Also there were few of the provider-level tools that now exist in HealthConnect, including tools for panel management and tracking, decision support, and an integrated e-prescribing and e-referral system, all of which have contributed to improved lipid control.

Dr. Virgil Brown: By control do you mean as defined in the latest revision of the national cholesterol education program guidelines?

Dr. Aspry: Yes, the definition of lipid control for high-risk patients in the past decade, or an LDL cholesterol of less than 100 mg/dL.

Dr. Virgil Brown: Many large systems focused on the Health Effectiveness Data and Information Set (HEDIS) guidelines, others used the National Cholesterol Education Program (NCEP) Adult Treatment Panel guidelines of 2001 as modified over the subsequent years.

Dr. Aspry: Kaiser has traditionally used the HEDIS measure, and I believe the HEDIS target for LDL cholesterol has been 100 mg/dL for some time.

Dr. Virgil Brown: During the period you were with Kaiser and were using electronic data management for monitoring and communication, what was your role?

Dr. Aspry: I was 1 of 10 physician champions within the Northern California region for the Multi-Fit program, which enrolled about 3000 patients per year, and the Cholesterol Management Program, which treated about 65,000 patients per year region-wide. Our role was to support the care managers, attend peer group meetings, and engage in local education to PCPs. Once the decision was made to transition to a single cardiovascular risk registry, we worked with the chronic conditions managers to design and implement population management strategies for lipid and risk factor control in our respective hospital networks.

Dr. Virgil Brown: Your experience was as an end user in the health care team so you were able to directly experience patient responses.

Dr. Ito, your experience has been with the management of pharmaceuticals in large health care settings. What is your perspective of the evolution to this new technology? What is necessary to make this work in improving the adherence to drug therapy?

Dr. Ito: That’s a great question. We’ve been involved since NCEP II in terms of trying to get more patients to their LDL cholesterol target. Certainly, having guidelines



Dr. Ito

that have target goals and also advocate follow-up blood serum levels is very important because those are what help patients adhere to their medications. Because, in most cases, physicians do not have access to refill records, and in order for a physician and other health care providers to assess the patients' adherence to their statin and other lipid-lowering medications, the follow-up cholesterol levels are very important so you can see whether or not patients are achieving their LDL cholesterol goal and adhering to their medications. Of course, patients can always, if they're not taking their medication, just start taking their medication a couple weeks before their next appointment. So again, it's a surrogate marker but very important in terms of being able to assess whether or not patients are adherent to their medication.

Dr. Virgil Brown: You have worked in 2 large systems, the Veteran's Administration (VA) Healthcare and the Oregon Health & Science University health care system. In those, was the focus totally on LDL cholesterol? Were other issues such as metabolic syndrome or triglycerides also part of the monitoring and feedback algorithms? How was high-density lipoprotein (HDL) built into this?

Dr. Ito: In the earlier models that we were involved in before NCEP ATP III, before the metabolic syndrome became a secondary target in terms of non-HDL cholesterol, our primary target was LDL cholesterol in these earlier programs that we had implemented to try to increase the number of patients meeting their LDL cholesterol goal.

Before I left San Diego, we just started implementing a program called the Lipid Optimization With Event Reduction Program to target metabolic syndrome in more than 40,000 active veterans seen at the VA Medical Center in San Diego. We sent out not only the survey to get the information we needed for the metabolic syndrome diagnostic criteria, but we sent out tape measures to assess waist circumference with measurement instructions, and laboratory slips. The objective of the program was to assess non-HDL cholesterol goal attainment and implement appropriate therapy in hopes to improve outcomes and reduce overall costs. However, I left the VA in 2005 and took my current position with Oregon State University, so the program did not continue.

Dr. Virgil Brown: This was really being driven by your interest in lipid control. It was not a VA-wide policy at that time?

Dr. Ito: That is correct. But each of these programs would not have happened without buy-in. We went to the Pharmacy and Therapeutics Committee and got approval and buy-in from all the various division chiefs, Chief of Staff, and Medical Center Director within the VA in San Diego. We had a small grant from a pharmaceutical company that helped offset some of the costs of these programs.

Dr. Virgil Brown: Is it sufficient to prescribe an effective and safe drug believing that proven effects of the

drug may bring about good outcomes or do you feel that having individual goals for specific treatments make these types of systems work? Are goals for targets of treatment essential for achieving proper patient management?

Dr. Aspry: I echo what Matt said. Meeting lipid targets is a marker for, and assurance of, adherence. However, I recently learned that some VA medical centers did away with LDL goals several years ago and now just measure statin adherence. This is a somewhat easy task in a closed and integrated health care system like the VA or Kaiser, where most patients obtain their prescriptions "in house," and pharmacy data such as refill rates are available to providers and quality managers. In a fragmented health care environment, information sharing between pharmacies and providers is very limited. So we must continue to monitor lipid levels, and I believe the guideline authors are in agreement.

Dr. Virgil Brown: How do you know they haven't gotten off their diet and other lifestyle improvements?

Dr. Aspry: [Interposing] Exactly. I think we must still monitor lipid control. Whether we use the term "goal" or "near goal" or "50% reduction in LDL attained" is a matter of semantics.

Dr. Virgil Brown: If we are only going to look at medication adherence, we don't need all of this integrated transfer of information, we just need to know that the pharmacy's refilling our prescriptions, right? That makes things very simple.

Dr. Aspry: The pharmacy tells us that the drug is being dispensed. It doesn't tell us that the patient is actually taking it as prescribed.

Dr. Virgil Brown: You stated in the article on health information technology, published in the December issue of the *Journal*, that a sizeable percentage of patients did not fill the prescription, a sizeable percentage filled the prescription and didn't take a single pill or very few pills, and others never refilled the first prescription. You found that less than half the patients were taking their drug at the end of the first 3 months after receiving a statin prescription. Is that correct?

Dr. Aspry: I believe Dr. Foody and others presented that data. Many types of datasets, from pharmacies, health plans, state-run Medicaid programs, and the Duke database, have shown that statin adherence rates after a year, at least in the past, have been around 50%.

Dr. Virgil Brown: So prescribing statins does not necessarily mean that patients will actually take statins and even if they take them it doesn't mean that they're going to get to an LDL cholesterol level that we would be comfortable with?

Dr. Ito: That is true. The primary nonadherence rate is approximately 12%. That is to say that about 12% of patients never pick up the prescription from the pharmacy. Another 12% never get their medication refilled. This is called secondary nonadherence. An additional 29% don't continue the medication long-term. This means that less than 50% of patients are taking the medication after a year. That's not good.

In terms of achieving an LDL cholesterol level we would be comfortable with, I think the issue is do you or do you not believe that lower is better? If you've got a patient who has coronary disease on high-intensity statin therapy and that patient suffers another event, what do you do? What if his or her LDL cholesterol is 115 on high-intensity statin therapy? Do you do nothing more to reduce LDL cholesterol? I would argue that you further intensify therapy.

Dr. Aspry: It raises the question of whether a separate guideline may be needed for the very high risk, especially those with early and recurrent vascular events, because the new framework does not address this issue. It's worth noting that the American College of Clinical Endocrinology guideline has endorsed LDL, non-HDL, and several advanced lipid parameters as targets for those with diabetes and cardiovascular disease.

Dr. Virgil Brown: Dr. Aspry, is there anything else you'd like to say about Kaiser's health information system that made it particularly effective?

Dr. Aspry: I believe Kaiser's health information technology approaches have been effective because all have been implemented region-wide in a coordinated fashion within a system that also recognizes the value of, and has provided resources for, team-based care. But maybe most importantly, its new EHR has been well-tailored for population management. So not only are there provider tools at the point of care, and patient portal, but continuously updated registry and reporting functions essential for quality improvement by care teams.

Dr. Ito: I think what's important about the Kaiser program is not only all the things you mentioned but also that they do integrate a lot of other aspects that help get patients to goals. They use care managers. These are pharmacists and specially trained nurses that are assigned to contact patients and find out what's going on in terms of their adherence to drugs and to laboratory follow-up. Their electronic medical records (EMR) system, HealthConnect, was built in collaboration with the end-users so it is fully integrated in their standard workflow, which is very important. I believe Dr. Alan Brown will share the observation that you've got to consider work flow to make health information technology (HIT) work and to get more patients to LDL goals.

Dr. Virgil Brown: Before we go to Dr. Alan Brown, I wanted to ask Dr. Aspry about her experience with the triglyceride issue and its management in these systems. There we have no specific targets.

Dr. Aspry: The cholesterol management program used treatment guidelines that mirrored the national guidelines and included targeting triglycerides once LDL was at goal. The care managers were trained to adhere to algorithms and a treatment manual aimed at keeping combination therapy safe. For patients not enrolled in the cholesterol management program, physicians could intensify therapy themselves and make use of patient education tools, including handouts and classes.

Dr. Virgil Brown: How was that reported to the physicians? Did they get a red flag on that lab data when elevated?

Dr. Aspry: High triglycerides would be flagged by the lab information system. This was often a trigger for PCPs to refer patients to the cholesterol management program.

Dr. Virgil Brown: In these larger health care systems, was there resistance on the part of the physician to receiving all this electronic input? Was there a problem in actually having this become a part of the everyday practice?

Dr. Aspry: In a prepaid healthcare system like Kaiser, everyone is incentivized to prevent disease, which helps create a culture of continuous quality improvement. However, when the new cardiovascular risk registry and individual provider reports were rolled out in 2004, the quality managers built in some "protected time" for providers to review their lists and work with care managers on closing care gaps. This is important—so providers don't feel that there is more work being forced upon them. With point-of-care provider tools such as computerized alerts and decision support, there is some evidence from the literature that "alert fatigue" and resistance to electronic decision support can occur.

Dr. Virgil Brown: Was there positive feedback or reward to the physician or other members of the health care team for having done a particularly good job at achieving goals? Was success recognized in some way?

Dr. Aspry: Internal transparency, that is sharing of performance data, is also part of the culture at Kaiser. When I was there, the performance of each of the 10 medical centers in achieving lipid control was shared in peer group meetings and benchmarked against the regional goal for that quarter. Hospitals that were below average were incentivized to improve their performance. Now that individual providers are receiving performance data for quality measures like lipid control, which I suspect is benchmarked against their peers, this incentivizes underperforming physicians and recognizes high-performing physicians.

Dr. Virgil Brown: The key issue it would seem is that there was a tabulation and a ranking in the performance expected. In my experience, that never happened at the VA for individual physicians. In the Kaiser system, was there feedback about a level of success in this effort?

Dr. Aspry: The sharing of unblinded performance data is common at Kaiser and is part of the culture of transparency and accountability.

Dr. Virgil Brown: Let me turn now to Dr. Alan Brown. Perhaps he offers a different perspective. He is part of a very large full-service cardiology practice in the Midwest. You've been involved in bringing electronic systems, recordkeeping, and communication into your delivery of patient services. What were the factors that led you to take early actions in this area?

Dr. Alan Brown: Our practice is now part of 12-hospital system called Advocate Healthcare, so we have the same issues as the other large systems. Back in 2002, when we were a group of about 26 cardiologists, we embraced HIT decision support for 2 reasons. First, we had a lipid clinic for which I was the director. We were very proud of our lipid management in the clinic for about 5000 patients

but were doing a much poorer job managing the almost 150,000 patients with coronary artery disease (CAD) in the practice who were not followed in the lipid clinic. In addition, the practice was rapidly expanding and acquiring new cardiologists every year. Our practice had participated in the Merck Quality Assessment Program and I had asked for the assessment of our lipid clinic patients' charts to be performed separately from the charts for the rest of the practice. The results revealed that 22% of the practice's patients had an LDL cholesterol at 100 mg/dL or less among those with stable coronary disease. The lipid clinic had close to 75% of their CAD patients with LDL cholesterol <100 mg/dL. My initial thought after reviewing the data was that everybody with CAD should go to lipid clinic for their treatment. Upon suggesting this to my senior partner, I was politely told that "this is not an option" because the lipid clinic is expensive to operate, generates little revenue, and to do so, we would have to hire an enormous amount of new staff, which "was not going to happen," so come up with something different.

Simultaneously, the practice was looking for an electronic record that would be capable of scheduling, billing and patient record-keeping, but that also could be easily incorporated into the practice workflow and even ideally improve our efficiency. One of my partners who was involved with the search for an EMR suggested that rather than send everybody to the lipid clinic, we could put alerts on the electronic record and make a so-called virtual lipid clinic for the vast majority of patients. It was with that background of trying to find an effective EMR and incorporate an attempt to affect physician behavior that led to the development of a very simple alert to identify patients who were not at their LDL cholesterol goals or who did not have an LDL cholesterol on the chart.



Dr. Alan Brown

Dr. Virgil Brown: In doing this, what are the critical communication lines? Who needs to talk to whom to optimize this effort? Do the pharmacists need to talk to anyone other than the physician? Does the lab provide direct information to anyone other than the physician? What's the total integrated communication system look like to optimize getting to goal for your individual patients?

Dr. Alan Brown: I was very interested in Dr. Asprey's review of the literature for the document on HIT and the consistent finding in randomized trials that if you just implement an electronic alert without other process improvement, it is difficult to demonstrate an improvement in quality. The EMR provides data, but it is how one acts on that data through changes in the delivery of care that determines optimal outcomes. One must establish a care team, similar to that described by Kaiser in the document, so the information leads to the development of a systematic approach for all patients that are at high risk and need lipid therapy. We established such a team, consisting of one nurse, one med tech, and one physician all responsible

for their quality measures. Their assignment was to establish a process improvement strategy, act on the data from the EMR and improve treatment to appropriate goals. The alerts were soon expanded to include not just lipid values, but also hypertension control, atrial fibrillation rate control, aspirin for those with coronary disease, angiotensin-converting enzyme (ACE) inhibitors for heart failure, etc. Our team would then get a report card showing how we compared with the other Midwest Heart teams as well as to a "gold standard." We would then sit down and discuss where we fell short and develop strategies for better interventions and documentation to improve our outcomes. In other words, each team would embark on a process improvement project that was tailored to that team's practice setting and unique environment. My suspicion is that, depending on what office they were in and who was on their team, their strategy for improvement might have been slightly different, but effective because it allowed flexibility to find the best options in their particular environment. The electronic record provided the data to start that process but without the team approach for implementation of goal attainment, there would likely have been little result from receiving EMR data.

Dr. Virgil Brown: You worked as a team. How large were those teams?

Dr. Alan Brown: In general, the teams consisted of four people, including a physician, a med tech, a nurse and an administrative assistant previously assigned to that physician. It should be noted that for efficiency, some of those teams cross-covered more than one physician so they might be involved with two or three physicians/teams. It was the individual team's responsibility to have efficient patient flow, quality measure evaluation and improvement, and to facilitate communication with patients.

Dr. Virgil Brown: Your electronic system fed performance data on those things you as clinicians identified as important when you considered the successful management of your patients. What interval did you use to provide these analyses?

Dr. Alan Brown: We receive quarterly report cards that are sent by the system automatically and anonymously to the physician on the team. The data provided feedback to the individual physician as well as how his or her team compared with those of other Midwest Heart Specialist physicians and to clinical benchmarks. For lipids, the benchmark was the lipid clinic data.

Dr. Virgil Brown: How did you use these to improve performance and aid those having problems? Were these quarterly reports helpful in making needed changes?

Dr. Alan Brown: Team meetings were mandated every 1 to 2 months to assess any issues needing improvement on the report cards as well as to hear suggestions from the team on all aspects of the efficiency and quality of care.

Dr. Virgil Brown: Do you have any data on how your judgment of your success changed over that period? What were the assessment tools that you used and how did they change over the first few years of your use of this system?

Dr. Alan Brown: We published that data several years ago. The findings of the Merck quality assessment program data that was based on review of outpatient charts in multiple practices, was that 11% of CAD patients nationally were at LDL cholesterol less than a 100 mg/dL. Our practice, as per this review, started with 22% at LDL cholesterol less than 100 mg/dL in those not in the lipid clinic. Our data after initiation of the EMR alerts and the team strategy in the first 20,000 consecutive patients using the electronic alerts improved to close to 70% at goal. The most recent data with 52 cardiologists and almost 200,000 total patient visits over time was approximately 78% at goal. I was intrigued that with this approach; we had achieved results similar to that of the lipid clinic for the majority of patients. We were then able to use the lipid clinic to focus on more difficult patients such as those with the need for multiple drug therapy, genetic dyslipidemia, drug intolerances, special populations, or those continuing to have progressive atherosclerosis despite therapy.

Dr. Virgil Brown: How do you provide feedback to the total team with regard to the actions used by those who are succeeding. Is good performance methodology transferred over to those who are not succeeding?

Dr. Alan Brown: We have an intermediate authority, so-called site coordinators who oversee specific geographic sites. If the site coordinator notices that 1 team is doing much better than other local or regional teams, then as part of the culture of the organization, we analyze how to share best practices throughout the site. Through this approach, we can help those with poorer performance learn techniques to be successful.

I would point out that, as a lipidologist, the approach of alerting physicians to start a statin for all patients with CAD seemed simplistic. The results of this simple approach, however, were spectacular. Applying this simple treatment plan to a large population likely saved many more lives than the more intensive attention that could only be given to a very few in the lipid clinic. For this reason, I am reasonably comfortable with the approach taken in the new guidelines as a population-based approach to reduce CAD events. In a sense, our experience showed that by using a very simple message with very simple instructions, and prescribing at least moderate dose statin therapy, almost 70% of the typical CAD patients achieved their LDL goal.

My next question, as a lipid enthusiast, was whether many people that have high non-HDL would be undertreated with this approach. For this reason, when the ATP III guidelines were released, I went back and reviewed the data from those 20,000 consecutive office visits, not lipid clinic visits, but just stable coronary patients and asked the following question: Based on ATP III guidelines for those that were treated to LDL at goal but still had triglycerides higher than 200, what percent of them were not at their non-HDL goal? I fully expected to find that most of the patients on statin monotherapy who still had triglycerides higher than 200 mg/dL would not be at their non-HDL

targets. To my surprise, a full 89% were at both their LDL and non-HDL targets on a statin alone. This likely occurred because the majority of patients had only mildly elevated baseline LDL levels and triglyceride levels just over 200 mg/dL, and hence, when placed on moderate statin doses, their LDL became low enough to normalize their non-HDL. I was encouraged and reassured by the success of a relatively simple approach for the vast majority of CAD patients knowing that almost 90% of the average patient with CAD would achieve LDL and non-HDL goals on a statin alone. It should be kept in mind, however, that the results were from an era where LDL target was 100 mg/dL and non-HDL was 130 mg/dL.

Dr. Virgil Brown: In Kaiser or in the VA, were there any cross-stimulations between those physicians who took this very seriously and were working toward achieving goals vs those who considered this less important? How did this whole system motivate the providers to make the whole thing work? What sorts of stimuli were put into place as a result of this data flow?

Dr. Aspry: Large meetings and videoconferences take place in which performance data are shared and new guidelines, programs, and initiatives, typically designed at the regional level, are introduced. Physician champions play a large role. The goal is to obtain buy-in from everyone. However, professional autonomy is also accepted, and some providers elect to practice outside the system's guidelines. There was no "pay for performance" program when I was a partner there.

Dr. Ito: Within the VA system, as I mentioned, we were strategic in the way we went about the programs we implemented. We went to the P and T Committee first to get buy-in from the P and T Committee, the chiefs of medicine, cardiology, endocrinology, and the chief of staff. The division chiefs educated and developed support among their own providers.

In our programs, we had the ability for individual physicians to opt out. If they felt strongly against it and they wanted to manage the patients on their own and they didn't want advice they could simply opt out of the program. For the most part, we had very few individual physicians not buying into the program. Once we started to share the results of what was happening, this further stimulated interest and buy-in into the programs we did.

Dr. Alan Brown: We actually used these data to support contract negotiation with payers. Of course, this wasn't a primary goal. Our group had a culture like both of your large organizations that focuses on providing good quality care for patients. However, there is a competitive advantage when you can compare the outcomes from your organization with other systems. Payers, particularly managed care payers, have their own quality report cards and are interested in showing that their providers offer the highest quality for their clients. If they know that if a patient is cared for by your practice, they can expect a high level of care; this provides a competitive advantage over another provider who is not able to provide such data.

Dr. Virgil Brown: In that sense, there's an economic advantage for everyone in the enterprise. I understand the Medicare system has a formula that will be applied in the near future. You get paid 3% more if you meet certain guidelines and you get paid 1% less than the standard if you fail a certain level of achievement in those guidelines. This is a question for all of you. Do you see that as something that's going to develop more fully in the future and that people are going to be paid in part on their achievement of very specific goals?

Dr. Alan Brown: My suspicion is that there will be an initial mandate for everyone to submit data on a regular basis with an incentive in the form of a bonus for higher quality care. It is likely in the future, however, considering the current economics of health care, that benchmarks will be set and we may not get paid at all if we don't achieve certain benchmarks.

Dr. Virgil Brown: Do you see that as the beginning of something much larger where quality management is going to be a factor in terms of your reimbursement schedule?

Dr. Ito: Of course, with the new guidelines it might be even easier now to achieve those quality measures because you have to show you're on a statin rather than having to do the extra work to get the patient to their LDL cholesterol goal.

Dr. Virgil Brown: The final measure is the incidence of acute clinical events and procedures that are observed in our enrolled patient population. Reducing these is our ethical responsibility. If the policies do not succeed in addressing this issue, they will not achieve these ultimate goals and this will come back to the health care system in other negative ways.

Dr. Alan Brown: The reality is that clinical guidelines can't solve the entire problem. Even with goals, only about half our patients stay on their statin. If we move toward a system where goals are not going to be the target, I think that requires a different message to the patients, which actually may be more effective. In the past, we have told patients to "take this medicine to get your cholesterol down," which hasn't been as compelling as we had hoped to stimulate compliance. Many patients stop their statins or often never even fill their prescriptions. It will be interesting to see if a new message such as "take this medication because it's going to cut your risk of heart attack or stroke in half during the next 5 years" may be a much more effective approach.

I am hopeful that as we discuss the issue of new treatment approaches that one of the good things that will come out this is more thought about what messages are given to the patients and the study of those that are most compelling. I certainly encouraged our physicians to focus on statins as a way to reduce heart attack and stroke when starting a statin and develop some tools to provide realistic expectations regarding side effects and toxicity.

Dr. Ito: Kaiser does that already.

Dr. Aspry: Yes—according to the data presented by Dr. Ron Scott of Southern California, the message on their

electronic statin prescription states it is to be taken to "lower cholesterol and help keep arteries open," leveraging the fact that even patients know a closed artery is not a good thing.

Dr. Virgil Brown: But closed arteries may occur 5 years or 10 years from now. We tend to think in 10-year time frames. Most of my patients, when they come back, want to know whether they are in fact succeeding. Is there a benchmark for success at that visit, not 10 years from now. Without intermediate goals, how do I explain that to the patient?

Dr. Alan Brown: I think this presents a real dilemma. It seems that implementation of any guidelines by physicians seems to always be inversely proportional to the number of pages in the document. For example, if the guideline is "take an aspirin after a heart attack," more than 90 percent of patients receive appropriate treatment. If a guideline states "Use an ACE inhibitor for heart failure", over 90 percent of patients with heart failure are placed on an ACE inhibitor. Conversely, when you have to calculate 10-year risk and decide if the patient has 2 or more Framingham risk factors followed by the determination of goal if their 10-year risk is greater or less than 20%, etc., the implementation falls off sharply. This is why, for the average physician, a simple guideline like "start a statin" makes some sense to me. On the other hand, I agree with you completely that some measure of how we are doing with our therapy is very helpful. We all would be uncomfortable with familial hypercholesterolemic patients being left with LDL cholesterol of 150 mg/dL even though they were on a high-dose statin. I am hopeful that there will be many healthy discussions regarding the approach to the large number of patients that have not yet had the good fortune of being represented in randomized clinical trials. Clinical judgment will still be critical for a large number of our patients.

We're all uncomfortable with patients who are on a statin and whose non-HDL cholesterol is still high. These patients have not been adequately studied in randomized clinical trials as stated in the new guideline document. I agree with you that having a number that makes the patients as well as their physicians feel like they're making headway and also helps us determine if the patients are actually taking their pills. I can think of multiple examples of instances where the only way I knew the patient was not taking his or her medicine was that their midterm blood test came back to me with higher than expected LDL levels. This prompted communication with the patient even though he or she didn't have an appointment for another 6 months.

Dr. Virgil Brown: What's the best correlate of reduced clinical events when you look at the data set from trials?

The answer is the degree of LDL reduction. We know that drug adherence data in trials is very untrustworthy.

Dr. Aspry: Yes, and LDL cholesterol reduction of 40% or more improves outcomes and was what regression studies showed was needed to halt disease progression.

Dr. Alan Brown: They say the absence of data gives you the illusion of adequacy. It appears that because the guidelines were mandated to be driven by randomized clinical trial data, there are a lot of clinical issues in which there are no data and hence no recommendations. That doesn't mean that what seems intuitively obvious is wrong, which seems that "you can't be skinny enough, you can't be rich enough, and your LDL cholesterol can't be low enough." Though this might be absolutely true, unfortunately it hasn't yet been studied in a randomized trial. Observational data and epidemiological data, however, remain encouraging. I look forward to the design of new randomized controlled trials to answer definitively the best approach for those patients not previously studied. I was pleased to see the topics for further investigation carefully pointed out in the new guideline document. In the meantime, I am confident that the National Lipid Association will continue to provide the wisdom necessary to help the practitioner exercise appropriate clinical judgement for those patients.

Dr. Virgil Brown: Goals are not necessarily as scientifically based as we'd like them, but on the other hand they are a very practical clinical tool. My question to all of you is could you see a system, such as those described here today, working successfully if we had no goals for reducing atherogenic lipoproteins? What if we had no goals in the treatment of blood pressure? How would diabetes be managed without goals for hemoglobin A1c? Does that make any sense?

Dr. Alan Brown: It would be interesting to apply the same rules for diabetic patient guidelines as those required for the lipid management guidelines and to see the outcome.

Dr. Ito: It certainly would make future systems easier because all you have to do is prescribe the statins and hope the patient is taking them. Looking back at programs that we've all implemented in the past it would be impossible to implement these strategies without having targets and goals.

I do want to mention 1 thing though. Using randomized control trials to inform guidelines development is extremely important. But, I think that needs to be balanced with epidemiology, genetic, and observational data as well. In part because, unfortunately, randomized controlled trials for the most part have been supported by pharmaceutical companies trying to get their drugs approved by the Food and Drug Administration. These studies were designed in a certain way to answer a particular question. Not always the important questions we need clinically. Unfortunately, we don't have the randomized controlled trials to specifically look at treat to goal issues and outcome. Such as differences in outcomes between less than 70 vs less than a hundred and titrating medications to make sure your patients get to that goal in one group vs another. We don't have those specifically designed trials, but you can still look at the controlled trials that randomized patients to different intensity statin treatments and the median or average LDL cholesterol levels achieved in those groups. I feel the data

do suggest that the lower the LDL cholesterol is, the better patients do. It's difficult to ignore that data.

Dr. Alan Brown: One could still use an EMR alert without goals. One would simply alert whether or not a patient is at high or moderate risk and what dose of statin is prescribed. We do this in the case of aspirin for CAD patients and alert for whether or not the patient with a CAD diagnosis is on aspirin.

Dr. Virgil Brown: There's only 1 dose of aspirin. You're either on or off.

Dr. Alan Brown: Electronic records allow you to measure almost whatever you want. The alert could be for the use of a statin drug, modest or high dose, based on the patient's level of risk, and whether the dosage is that suggested by the new guidelines. At present, my suspicion is that people will set goals that are used by payers and by regulators to determine quality of care. What have not yet changed are the goals used for assessment of quality. If a quality measure is that your LDL has to be less than a 100 mg/dL, I don't see a major change in EMR goals away from that benchmark. Until all of those quality indicators change to reflect new recommendations, I don't think we should be rushing to change our EMRs. We will be watching carefully to see how the payers respond to the new recommendations so we can be thoughtful about how to retool our systems appropriately if and when it is necessary. These projects are time- and resource-intensive, so we only want to make these changes once if possible.

Dr. Virgil Brown: Let me come back to an issue that will concern many considering the beginning of an electronic HIT. If you look at the acceptability among your physician colleagues, was the EMR and the feedback toward achieving goals readily accepted or were there legitimate complaints about time consumption? In practice, did this make the job easier or harder for the physician and other team members?

Dr. Alan Brown: We were in the midst of becoming all electronic so the actual alerts were part of the whole process of moving from paper records to electronic and it was one of our goals to improve efficiency with the whole project and I think we've succeeded in that. Part of the electronic system was to allow the physician to minimize dictation. Most of the note-taking was point and click and very easy and only 1 paragraph called "decision making" was dictated to express the physician's thoughts in a concise manner. If the patient's physical exam or history hadn't changed from the last visit, one could click on "last visit" and physical findings would be unchanged. The amount of work for documentation that the physician had to do actually became much less, allowing for more time to talk with the patient. This was discussed thoroughly with the practice before we converted to EMR. Our efficiency after EMR implementation was later assessed and we found that we could see 4 to 6 more patients a day after going electronic because of the time we had saved on documentation. There were obviously bumps along the road, any change is difficult, but overall the physicians and staff were pleased at

how efficiency improved, as did readability of the notes and the retrieval of lab and imaging data.

Dr. Aspry: In a prepaid health care system, the EHR is changing the way care is being delivered. Many more visits are occurring on the phone and electronically. I think Kaiser Hawaii published these data. So providers spend more time managing complex and refractory patients, or reaching out to those who are lost to follow-up or not making contact with the health care system vs seeing controlled patients in the clinic. This only works in a capitated system, however.

Dr. Virgil Brown: Looking to the future, what are the essential things that need to be done in the information flow in a medical care system to make things better?

Dr. Ito: My perspective, as has been well pointed out by Dr. Alan Brown's system, the Kaiser program, and the VA system, it's more than just implementing an EHR system. You have to have comprehensive EMR with electronic prescribing. Any interventions you implement need to be at the level that target providers, the system, and patient to have an effect on goal achievement or "moving the needle." You've got to intervene at all levels to make this happen. Most importantly, they must be fully integrated into standard workflow.

Dr. Aspry: I would also say that if you are in a large health care system, multispecialty practice, or even single-specialty practice, you ideally want the executive leadership to be oriented toward disease management and prevention and to support these financially. The electronic record should ideally bridge inpatient and outpatient settings in real time, be programmable, and have registry creation and reporting functions. After quality reporting, quality improvement can be tailored to the resources available, but team-based approaches are ideal.

Dr. Virgil Brown: It would seem that you need an analysis plan that can provide appropriate feedback from cumulative data so that you can look at the totality of your practice activity in chosen areas.

Dr. Aspry: Yes, provider-level and practice-level reporting are needed if reimbursement becomes tied to the delivery of accountable, coordinated care. Some EHRs can interface directly with center for medicare and medicaid services, so reporting occurs automatically.

Dr. Alan Brown: And the last piece is the culture. I think none of us went into medicine to do a bad job. I think having a culture within your organization that excellence drives all activity makes this a "no-brainer." My favorite quote, as many of you know, is that "the way you influence people has little to do with what they think about you and everything to do with how they feel about themselves when they're in your presence." If you can use this process improvement to take better care of patients and make your physicians feel more satisfied and perceive that their life has gotten easier you will have great success. Nothing is more satisfying than helping physicians feel that they are good doctors and giving them the tools to prove it. It all requires more, as we've all said, than just the electronic system. It requires a culture of striving for excellence and then

the motivation and enough mobility to change one's practice to achieve the targets that you set for the organization.

Dr. Virgil Brown: If physicians with a large cardiology practice tell you that they want to do what you are doing with HIT, how would you tell him to start?

Dr. Alan Brown: The organization must have a champion, as Dr. Aspry pointed out. Someone of authority has to convince the rest of the practice that the goals that you're setting are achievable and in the best interest of patients. It has to be communicated that the project will enhance each physician's personal and professional reputation as well as the reputation of the organization. I don't think physicians generally like to talk about reimbursement even though you can't help having it in the back of your mind. The argument for change to drive reimbursement is not nearly as powerful as the argument for clinical excellence for the vast majority of physicians in my opinion. Once a champion is identified, a process improvement strategy needs to be implemented. This requires more than just adding an electronic record but also assessment of how the physician group actually takes care of patients, the structure of the care teams, an assessment of how data get back to individual physicians and how it is acted upon, and knowing that different practice settings will have different ways of dealing with care delivery. Flexibility to devise different solutions based on different practice settings is critical for success.

Dr. Virgil Brown: How can the pharmacist be a more powerful influence in this system and what sorts of feedback can be provided by that source to the whole health care system?

Dr. Ito: I think pharmacists can obviously provide a vital source of information not only to the physicians but also to the patients. I hate to bring up differences in salary into this, but pharmacists generally are not paid as much as a physician, so we can use pharmacists in a more cost-effective manner in terms of helping manage these patients and improve adherence to their medications.

Dr. Virgil Brown: How can you use pharmacists for direct patient contact regarding medical adherence? Are there systems actually doing that?

Dr. Ito: Yes. Kaiser's a very good example. As I mentioned previously, Kaiser uses care managers and they're part of the team in which they report to 10 providers I think. They look at treatment gap reports and then they discuss these with the physicians. They formulate plans, and the pharmacists will call the patient to intervene. They notice that a patient's adherence rate is poor and assess why they haven't been refilling their medication. Or if they haven't been in for a laboratory evaluation recently, advise them to do so. Or if their medication needs to be titrated, the pharmacists will do that in cooperation with the PCP.

Dr. Virgil Brown: How is that done in Kaiser? Is there a member of the team with this special responsibility?

Dr. Aspry: Yes. In Kaiser Northern California, a large proportion of the care managers working alongside PCPs to close lipid treatment and adherence gaps are pharmacists. In

Kaiser's Colorado region, pharmacists run a cardiovascular risk management service more independently, and they have published data demonstrating improved lipid control compared with usual care. What I'd like to see is more partnership and data sharing between community pharmacies and providers. There's untapped leverage that community pharmacists could provide to help close adherence and treatment gaps. In single-payer systems like Canada, this already occurs.

Dr. Ito: This is true. However, the wider spread use of electronic prescribing should help in this regard. This will help to share information on medication history and adherence between various providers and pharmacies as well as direct information about prescription benefits via health information exchanges. This can also help reduce the potential for drug-drug interactions.

Dr. Aspry: [Interposing] Electronic prescribing systems probably have the capability to provide data to prescribers on primary and secondary nonadherence.

Dr. Virgil Brown: That sounds like an opportunity that we're not taking advantage of at the moment.

Dr. Aspry: If you go to the literature, you can find some partnerships between larger pharmacies and health care systems, but most are experimental. If hospital systems that are on track to become accountable care organizations build their own pharmacies that would help close gaps.

Dr. Virgil Brown: Some of the software that pharmacies use contains information that is out of date, and incorrect guidance is given to patients that may provide inappropriate warnings. That can be a problem. On the other hand, they are frequently the last gatekeeper that prevents some serious mistakes from being implemented.

Dr. Alan Brown: This came up during the HIT project discussion. We talked with the vendors about measuring compliance and their ability to get data about refills of prescriptions and it wasn't as simple as one would think it should be. There were market forces at play so certain pharmacies sell these data to certain organizations and others have no access to the data unless the patients get all their care and prescriptions from a single system. Kaiser is unique and can retrieve very accurate data because the patients go to a pharmacy within the system, they get their x-rays within the system, and they get their lab work within the Kaiser system. Ideally, we need to find ways to get all the community pharmacists to participate in some sort of a registry that's retrievable so we can better assess compliance and potential drug interactions.

Dr. Aspry: Agreed. Systems of care will benefit from more information from pharmacy databases, and pharmacy benefit management systems. Until then, these nonlinked systems will contribute to fragmented care.

Dr. Virgil Brown: As we close, would anyone like to comment on any important issues that I may have omitted?

Dr. Ito: I think I would reiterate based on the literature review that, interventions have to be at all levels, providers system, and patient and of course, workflow is extremely important. It cannot disrupt a physician's workflow otherwise it just won't work.

Dr. Aspry: The literature review published in the December 2013 issue showed that randomized trials so far do not support any one HIT approach for improving lipid management. Systems approaches that use care teams and patient-level tools that connect individuals to the health care system electronically have shown improved outcomes vs usual care. Point-of-care provider tools likely have value, though the data are more variable.

Dr. Alan Brown: I would say 1 thing we've learned over the years is that that 1 size will never fit all. One can effectively implement the electronic alerts. How you deal with those alerts to get better outcomes has to be flexible enough to fit different practice settings and different practice environments. And though that fact may be unsettling to some, it's a reality of life until we all belong to 1 big health care system.

The second issue is a lesson that interventional cardiologists learn early in their career, which is that "perfection is the enemy of good." This is why the HIT group decided to focus initially on the highest risk patients such as the diabetics and atherosclerosis patients. We will potentially save the most events in these groups and then, once we develop that architecture to get the highest risk people treated appropriately, it should be fairly easy to build on that foundation to expand the process to the next level, which would be to include the higher risk primary prevention patients.

I think that, in a sense, the new recommendations fit that method to go for the low hanging fruit even though there are a lot of peripheral issues unaddressed. If everybody pursues those high-risk patients and treats every one of them with moderate- to high-dose statins, we're going to save a lot of lives. That's what we chose to do with our initial steps in the HIT program also.

Dr. Virgil Brown: I don't think anyone can argue that we should take those people who are at highest risk as first priority but on the other hand when one takes the perspective of the entirety of our population still having CAD and stroke as the first and third most common causes of death as well as major issue in terms of hospitalization with life-threatening disorders, we must reach a much broader group of physicians.

One of the things I'm concerned about is that the benefits you all have been able to demonstrate in your various systems are going to be very hard to apply in the primary care of medicine particularly as it is organized today. In smaller primary practice groups, it is not just prescribing a drug but also choosing and maintaining an appropriate intensity of treatment and documenting an appropriate response to treatment.

Dr. Alan Brown: I agree with that completely. I struggle with the fact that even if we take the current recommendations that just were released and develop electronic alerts to make sure people are on moderate or high dose statins for the highest risk individuals, we may not have built an architecture that will allow us to address intermediate and lower risk primary prevention later when more data becomes available. We would obviously need to include the risk

assessment tool to assess 10 year risk and, as pointed out by the guideline committee, use other clinical tools such as calcium score, hsCRP, and lifetime risk to provide clinical judgement for the lower risk primary prevention patients. I am looking forward to more discussion and conferring with our colleagues on the guideline writing group to get their insights.

Dr. Virgil Brown: We've had a good, thorough discussion. I appreciate your sharing your experience in developing and using electronic systems to better communicate with your fellow health care providers and your patients. This is the future of medicine and shows great promise to

improve care of active disease as well as in prevention of atherosclerotic complications.

Health information technology in the management of lipoprotein disorders: Recommended reading

1. Cohen J, Aspry K, Brown A, et al. Use of health information technology (HIT) to improve statin adherence and low-density lipoprotein cholesterol goal attainment in high-risk patients: proceedings from a workshop. *J Clin Lipidol*. 2013;7:573–609.
2. Aspry K, Furman R, Karalis D, et al. Effect of health information technology interventions on lipid management in clinical practice: a systematic review of randomized controlled trials. *J Clin Lipidol*. 2013;7:546–560.