

# Community on Payment Innovations Newsletter



Len Nichols, PhD,  
Editor-in-Chief,  
*Community on  
Payment Innovations*

Paul N. Casale, MD, FACC  
Joseph G. Cacchione, MD, FACC  
Michael E. Chernew, PhD  
A. Mark Fendrick, MD

**Featured Interview** **1**

---

**Journal Scans** **3**

---

**Innovations From the Field** **13**

---

**Practice Economics** **15**

---

**Articles of the Month** **18**

---

ajmc.com

© Managed Care &  
Healthcare Communications, LLC

Supported by  
Janssen Pharmaceuticals, Inc.



A Supplement to

THE AMERICAN JOURNAL OF  
**MANAGED CARE**

© Managed Care & Healthcare Communications, LLC  
A358

*December 2011*

## Featured Interview

ACC CEO Dr Jack Lewin and healthcare economist Dr Len Nichols visited the ACC Update desk at Heart House in Washington, DC, to discuss payment reform and the new Payment Innovations Community on CardioSource ([www.cardiosource.org/paymentinnovations](http://www.cardiosource.org/paymentinnovations)).

## Payment Reform Landscape

---

### What are some of the biggest problems with the current payment system?

#### DR LEWIN:

For one thing, the fee-for-service payment system is something that we know a lot of people find frightful; some people are frightened of any change of anything, but it's a very awkward system. It rewards volume rather than quality. You get paid more for doing more, you get paid more even if the care isn't needed, or if something happens and it requires more care. It's not a system that leads us toward a more effective, efficient healthcare system. And, it's incredibly complicated and administratively complex in the sense that a physician's office has to hire a bevy of people just to deal with the coding complexities in it. So, it's administratively complex, it rewards volume instead of better performance, and it really just needs to be changed.

### What are some of the newer models that are being considered?

#### DR NICHOLS:

One idea is to take these 8000 CPT codes which we now pay physicians with and lump them into bigger bundles. The whole idea is to give clinicians incentives to minimize resource use while delivering optimal quality care. They know how, it's like Jack just said, they're now incentivized to do lots of stuff. And frankly our malpractice system is pretty bad and it encourages people to do things that are not necessary, for which they get paid. So, the combination of incentives is wrong. What we need to do is make the bundles bigger, give the clinician incentive to save money to deliver patient care, and that's how you get win-win out of this.

### ACC is looking at some progressive payment models. Can you talk a little about what those are and how they work?

#### DR LEWIN:

We're looking at the array of what the opportunities and options are. In some programs and some practices tweaking fee-for-service with

some kind of incentives for better quality may be the way we start and move in the right direction. But, in other practices, bundling, as Len just mentioned, will be appropriate. And, if you look out there in the real world of cardiovascular practice today, in large integrated groups and larger practices, some of those folks are already working with global budgeting or capitation where they're actually managing the whole budget sometimes with partners with hospitals or with other physician organizations to take care of a whole population of people in a more effective way. If Willie Sutton was going after the best system in the future, probably that kind of a global budget approach would be the most attractive, if the insurance companies were playing fair, it was all transparent, and everybody could see how the dollars were moving around. Well, in the Door-to-Balloon campaign for us with speeding up the treatment for heart attack and for ST elevation myocardial infarction heart attack, we've saved billions and billions of dollars for the nation by improving that treatment system of care, and hospitals got nothing for it, doctors got nothing for it, all the money went to the payers. So, we've got to develop a transparency out there so the payment reform allows everybody to understand what's happening, and be rewarded for their performance.

---

### Talk a little about the new Community on Payment Innovations; what are the key features?

#### DR NICHOLS:

The basic idea is to bring ideas from around the country that are going on now to everyone's awareness. So essentially we're like a reporting function. It is like journalism. We want to find out what is going on in real time to report so other clinicians can say, "Well, I've heard these conversations and people try to talk to me about sim-

ilar things I should think about, what I know is going on elsewhere, before I make a decision to inform the choices that clinicians are making." Jack made an excellent point, fundamentally this is about figuring out how to move us from where we are today to a better set of incentives. No one knows how to write out all the math to make it perfect. We know we need transparency, we know we need fairness, we need data. But, I think it's fair to say a lot of what is good is already going on. We don't have to reinvent something completely out of whole cloth. We just have to take the best of what America is doing to the rest of America, and our community is about helping that transition.

---

*The basic idea is to bring ideas from around the country that are going on now to everyone's awareness.*

---

---

### What other things do you want to accomplish with this community?

#### DR NICHOLS:

We would love to engage more cardiologists in what you might call the economics of the discussion. I am an economist, so I love this stuff, I deal with people in the payer and employer communities who are always thinking about this stuff, but we're not docs. Turns out that really matters. Turns out what you really want is for clinicians to be deeply engaged, just like ultimately you want patients to be deeply engaged in making these choices, and they will do a better job, I think, of helping us structure the incentives if they're engaged from day one as opposed to,

"Here's your new payment schedule, good luck."

---

### What's the ideal payment system 5 years down the road?

#### DR LEWIN:

You know, it's hard to say what that is. I think we'll figure that out through our experience, but it may very well be that more doctors are happier in some kind of larger organization with a salary and set of incentives. Maybe 50% of their pay will be incentives based on improving quality, improving efficiency, perhaps patient satisfaction, and other physician satisfaction. That may be the easiest for doctors to understand in the future, and might allow us to get back to seeing patients in an environment where actually payment is fair, but it might also be in one of these other models that has developed and worked.

#### DR NICHOLS:

I would expect that as diverse as our country is, that there is going to be more than 1 model in the long run, and that's OK. I would say the best payment system is one that enables us to deliver healthcare to all Americans that's high quality that we can afford both as people and as a society. And, if it's different in Greenville, South Carolina, than it is in Seattle, Washington, so be it.

#### DR LEWIN:

And hopefully administratively simpler.

#### DR NICHOLS:

It's got to be or we can't afford it.

**Interviewee Disclosures:** Dr Lewin and Dr Nichols report no relationships or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

## Journal Scans

### Summaries of Key Journal Articles

Kim A. Eagle, MD, Editor-in-Chief, Journal Scan, *Ann Arbor, MI*

Christopher P. Cannon, MD, Editor-in-Chief, *Cardiosource, Boston, MA*

Len Nichols, PhD, Editor-in-Chief, Community on Payment Innovations, *Washington, DC*

William F. Armstrong MD, *Ann Arbor, MI*; David S. Bach, MD, *Ann Arbor, MI*; Ragavendra R. Baliga, MBBS, *Columbus, OH*; Timothy B. Cotts, MD, *Ann Arbor, MI*; Jennifer Cowger, MD, *Ann Arbor, MI*; Daniel T. Eitzman, MD, *Ann Arbor, MI*; James B. Froehlich, MD, *Ann Arbor, MI*; Caren S. Goldberg, MD, *Ann Arbor, MI*; Hitinder S. Gurm, MBBS, *Ann Arbor, MI*; Jennifer C. Hirsch, MD, *Ann Arbor, MI*; Elizabeth Anne Jackson, MD, *Ann Arbor, MI*; Fred Morady, MD, *Ann Arbor, MI*; Debabrata Mukherjee, MD, *Lexington, KY*; Himanshu J. Patel, MD, *Ann Arbor, MI*; John E. Rectenwald, MD, *Ann Arbor, MI*; Melvyn Rubenfire, MD, *Ann Arbor, MI*; Associate Editors, *Cardiosource*.

### The Central Question for Health Policy in Deficit Reduction

Aaron HJ.

*N Engl J Med* [published online ahead of print October 12, 2011]. 2011;365:1655-1657.

**Perspective:** The author of this opinion piece in the *New England Journal of Medicine* outlines his concern that preservation of Medicare and Medicaid in any form even resembling their current condition must inevitably include increases in federal budget revenue generation; in other words: raising taxes. When Congress raised the debt ceiling, it built in an automatic \$1.2 trillion deficit reduction, either from a newly created “super committee” or a set of automatic cuts (taken half from defense and half from domestic/international spending) that would go into effect should the super committee fail. The author points out, however, that even successful cutting of the deficit by \$1.2 trillion over the next decade will ameliorate the deficit picture for only approximately 2 years, at which time we will be in a position roughly identical to that

in which we find ourselves today. Yet *another* \$1.2 trillion deficit reduction spread out over *another* decade would merely postpone for another 2 years a conundrum simi-

*...the author makes the point that shrinking the deficit exclusively through cost-cutting without gutting Medicare and Medicaid is simply impossible given the large portion of the federal budget taken up by healthcare expenses—and the expected growth in healthcare costs.*

lar to the current one. Only a politically unfeasible deficit reduction of \$4 trillion to \$5 trillion spread over

a single decade could actually stabilize the ratio of debt to national income for any reasonable period of time—if no taxes are raised. Both scenarios would cut government spending so much that the intended goal of providing the aged, disabled, and poor with the same standard of healthcare enjoyed by other Americans is virtually impossible without any government revenue increase in the form of taxes.

Basically, the author makes the point that shrinking the deficit exclusively through cost-cutting without gutting Medicare and Medicaid is simply impossible given the large portion of the federal budget taken up by healthcare expenses—and the expected growth in healthcare costs. He argues that we simply must, at the same time, increase federal budget revenue by raising taxes or else, he threatens without saying, government-funded healthcare in the future would have to rely on rationing care. The author never discusses what he thinks will happen to Medicare and Medicaid, but opines that they would look totally different. Also, he fails to consider that potential healthcare cost savings may soften the blow. He sounds a bleak warning directly to “healthcare interest groups” who fail to seek and achieve “sizable revenue increases” as they lobby for

their “specific interests”: Any policy victories that do not include revenue increases are “like securing a nicer cell for a prisoner facing certain execution.”

*Summary written by: James B. Froeblich, MD, MPH, FACC.*

---

## Medicare Drug Prices and the Deficit

Frank RG.

*N Engl J Med* [published online ahead of print October 21, 2011]. 2011;365:1657-1659.

**Perspective:** This opinion piece, published in the *New England Journal of Medicine* and written by a faculty member in the Department of Health Care Policy at Harvard Medical School, offers an explanation and justification for a Medicare drug price policy change proposed by President Obama. In 2006, Part D of Medicare for drug coverage was implemented with the intent of harnessing competition among Medicare prescription drug plans (PDPs) to lower drug prices. The author points out that market-based competition does not always work in this setting, for a few reasons. First, he points out, the competition only exists when there are multiple competing medications to treat the same condition. This is not always the case. Second, competition in prescription drug plans is undercut by a regulation that “protects” certain drug classes from market-based competition by mandating coverage for all drugs in these classes. (This was put in place to prevent restricting access to life-saving medications.) It has been observed that, for some medications, Medicaid programs reimburse at a lower price than even the “best price” obtained by the Medicare Part D programs. President Obama has suggested that Medicare beneficiaries who qualify for low-income subsidies should receive the same prices paid under

the Medicaid program. The estimated savings from this proposal are \$135 billion. The author suggests this is a “win-win” proposal, by simply directing the Medicare drug price policy to provide for low-income Medicare beneficiaries the same “best price” already in the system for Medicaid beneficiaries.

The author here makes an excellent point about the shortcomings of market competition to actually drive down medication prices. Most Medicare and Medicaid beneficiaries lack the pricing and medication option information to truly make informed-consumer choices among prescription drug plans. His point is also well taken that the government could save a great deal of money by more broadly applying already established “best prices” to all low-income beneficiaries—whether through Medicare or Medicaid. His argument is based on the problems inherent in reliance on market competition to lower prices. What is completely absent from this essay—and from the entire Medicare drug price policy debate—is the concept of price negotiation. Most insurance companies and hospitals in this country negotiate with pharmaceutical companies to obtain best prices. This is also what most federal governments around the world do. It is high time for the US federal government, as one of the largest purchasers of medications, to negotiate directly for lower medication prices.

*Summary written by: James B. Froeblich, MD, MPH, FACC.*

---

## Making Good on ACOs’ Promise—The Final Rule for the Medicare Shared Savings Program

Berwick DM.

*N Engl J Med* [published online ahead of print October 20, 2011]. 2011;365:1753-1756.

**Perspective:** This opinion piece,

authored by Donald Berwick, the administrator of the Centers for Medicare and Medicaid Services (CMS), describes the “final rule” for the Medicare Shared Savings Program; in other words, the rules for the establishment of Accountable Care Organizations (ACOs). ACOs are “voluntary groups of physicians, hospitals, and other health-care providers that are willing to assume responsibility for the care of a clearly defined population of Medicare beneficiaries attributed to them on the basis of patients’ use of primary care services.” It

---

*It is high time for the US federal government, as one of the largest purchasers of medications, to negotiate directly for lower medication prices.*

---

is the intention that these ACOs will be charged with controlling the costs of care for patients thus assigned to them. Savings would then be shared between CMS and the ACO as an incentive to lower cost growth. These rules have undergone a period of public comment and criticism, and are now being released in updated form. Highlights of some of the changes include:

1. The proposed measures to assess quality of care were reduced from 65 measures in 5 domains to 33 measures in 4 domains.
2. Establishment and use of an Electronic Health Record (EHR) is no longer a precondition of

participation. EHR use will now be a quality measure, weighted higher than any other measure for quality-scoring purposes.

3. Marketing materials will no longer require CMS approval, although they will apparently have to comply with CMS market guidelines, and use CMS-approved language.
4. Savings shared between CMS and ACOs will now begin on a “first dollar” basis once a minimum savings rate has been achieved.
5. Assignment of patients to an ACO can now be prospective, with beneficiaries identified quarterly, reconciled each year, and made on the basis of patients receiving primary care from an ACO.

Dr Berwick goes on to explain that the ACO structure is an essential part of the Affordable Care Act signed into law by President Obama. By giving responsibility for long-term care and the expense of that care to these ACOs, and then sharing savings from lower costs with the ACOs, it is the intent that these financial incentives will induce greater cost efficiency. At the same time, quality metrics will be used to assess the quality of care delivered.

The Affordable Care Act will dramatically change the nature of healthcare delivery in this country, as it was intended to do. However, our current “system” directly incentivizes the provision of services and the use of procedures and tests, while it also lacks almost any assessment of quality of care. Although many within the healthcare system may find the imposition of rules and quality metrics constraining, the fact that this system leaves it to ACOs to determine how to limit costs and improve efficiency actually leaves decision making regarding healthcare delivery in the hands of the providers themselves.

It is clear to even the most casual

observer that our current healthcare system is inefficient in the extreme, costly and growing beyond sustainability, and by many measures produces inferior quality of care. Although a dramatic change, the Affordable Care Act will actually leave most of the current healthcare system essentially intact, while providing incentives for efficiency and metrics to allow us to assess and improve quality of care.

*Summary written by: James B. Froehlich, MD, MPH, FACC.*

---

### **Association Between Physician Billing and Cardiac Stress Testing Patterns Following Coronary Revascularization**

Shah BR, Cowper PA, O'Brien SM, et al. *JAMA*. 2011;306:1993-2000.

**Study Question:** What is the association between patients undergoing cardiac stress imaging after coronary revascularization and the pattern of stress imaging billing of the physician practice providing their follow-up care?

**Methods:** Using data from a

---

*Patients treated by practices who billed for the technical and professional fees were significantly more likely to order nuclear stress imaging after revascularization.*

---

national health insurance carrier, 17,847 patients were identified between November 1, 2004, and June 30, 2007, who had coronary revascularization and an index cardiac outpatient visit more than 90 days following the procedure. Based on overall billings, physicians were classified as billing for both technical (practice/equipment) and professional (supervision/interpretation) fees, professional fees only, or not billing for either. Logistic regression models were used to evaluate the association between physician billing and use of stress testing, after adjusting for patient and other physician factors. The primary outcome measure was the incidence of nuclear and echocardiographic stress tests within 30 days of an index cardiac-related outpatient visit.

**Results:** The overall cumulative incidence of nuclear or echocardiography stress testing within 30 days of the index cardiac-related outpatient visit following revascularization was 12.2% (95% confidence interval [CI], 11.8%-12.7%). The cumulative incidence of nuclear stress testing was 12.6% (95% CI, 12.0%-13.2%), 8.8% (95% CI, 7.5%-10.2%), and 5.0% (95% CI, 4.4%-5.7%) among physicians who billed for technical and professional fees, professional fees only, or neither, respectively. For stress echocardiography, the cumulative incidence of testing was 2.8% (95% CI, 2.5%-3.2%), 1.4% (95% CI, 1.0%-1.9%), and 0.4% (95% CI, 0.3%-0.6%) among physicians who billed for technical and professional fees, professional fees only, or neither, respectively. Adjusted odds ratios (ORs) of nuclear stress testing among patients treated by physicians who billed for technical and professional fees and professional fees only were 2.3 (95% CI, 1.8-2.9) and 1.6 (95% CI, 1.2-2.1), respectively, compared with those patients treated by physicians who did not bill for testing ( $P < 0.001$ ).

The adjusted OR of stress echocardiography testing among patients treated by physicians billing for both or professional fees only were 12.8 (95% CI, 7.6-21.6) and 7.1 (95% CI, 4.0-12.9), respectively, compared with patients treated by physicians who did not bill for testing ( $P < 0.001$ ).

**Conclusions:** The authors concluded that nuclear stress testing and stress echocardiography testing following revascularization were more frequent among patients treated by physicians who billed for technical fees, professional fees, or both, compared with those treated by physicians who did not bill for these services.

**Perspective:** This novel study examined the association between physician billing and patterns of stress testing after coronary revascularization, and reported that patients treated by practices who billed for the technical and professional fees were significantly more likely to order nuclear stress imaging after revascularization relative to those who did not directly bill for these tests. This association between physician billing status for stress tests and testing frequency persisted after adjusting for patient

and physician factors that influence testing. These findings highlight the

---

*These findings highlight the need for broader application of the American College of Cardiology Foundation appropriate use criteria in clinical practice to eliminate/minimize any possible influence of financial incentives on the decision to perform cardiac stress testing after revascularization.*

---

need for broader application of the American College of Cardiology Foundation appropriate use criteria in clinical practice to eliminate/minimize any possible influence of financial incentives on the decision to perform cardiac stress testing after revascularization. Recent policy proposals such as global payments for care, accountable care organizations, and value-based purchasing arrangements may also mitigate the influence of billing status on diagnostic testing in select patient populations.

Summary written by: Debabrata Mukherjee, MD, FACC.

---

**Associate Editors Disclosures:**

Dr Froehlich reports receiving consulting fees/honoraria from Pfizer, Merck, and sanofi-aventis; he also reports receiving research grants from the Fibromuscular Disease Society of America and Blue Cross/Blue Shield of Michigan. Dr Mukherjee reports that he is a member of the data safety monitoring board for the Cleveland Clinic

Evolving anticoagulation in patients with NVAf, including those at increased stroke risk...

# HELP INTERCEPT STROKE RISK



...combining proven protection, a demonstrated safety profile, and convenient once-daily dosing

XARELTO® (rivaroxaban) is indicated to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation (NVAf).

There are limited data on the relative effectiveness of XARELTO® and warfarin in reducing the risk of stroke and systemic embolism when warfarin therapy is well controlled.

## IMPORTANT SAFETY INFORMATION

### WARNING

#### A. DISCONTINUING XARELTO® IN PATIENTS WITH NONVALVULAR ATRIAL FIBRILLATION

Discontinuing XARELTO® places patients at an increased risk of thrombotic events. An increased rate of stroke was observed following XARELTO® discontinuation in clinical trials in atrial fibrillation patients. If anticoagulation with XARELTO® must be discontinued for a reason other than pathological bleeding, consider administering another anticoagulant.

Please see additional Important Safety Information and brief summary of Prescribing Information, including Boxed WARNINGS, on following pages.

ONCE-DAILY  
**Xarelto**®  
rivaroxaban tablets



## IMPORTANT SAFETY INFORMATION (cont'd)

### WARNING (cont'd)

#### B. SPINAL/EPIDURAL HEMATOMA

Epidural or spinal hematomas have occurred in patients treated with XARELTO® who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures. Factors that can increase the risk of developing epidural or spinal hematomas in these patients include:

- ◆ Use of indwelling epidural catheters
- ◆ Concomitant use of other drugs that affect hemostasis, such as nonsteroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, other anticoagulants, see Drug Interactions
- ◆ A history of traumatic or repeated epidural or spinal punctures
- ◆ A history of spinal deformity or spinal surgery

Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary.

Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated for thromboprophylaxis.

#### CONTRAINDICATIONS

- ◆ Active pathological bleeding and severe hypersensitivity reaction to XARELTO®.

#### WARNINGS AND PRECAUTIONS

- ◆ **Increased Risk of Stroke After Discontinuation in Nonvalvular Atrial Fibrillation:** Discontinuing XARELTO®, in the absence of adequate alternative

anticoagulation, increases the risk of thrombotic events. An increased rate of stroke was observed during the transition from XARELTO® to warfarin in clinical trials in atrial fibrillation patients. If XARELTO® must be discontinued for a reason other than pathological bleeding, consider administering another anticoagulant.

- ◆ **Risk of Bleeding:** XARELTO® increases the risk of bleeding and can cause serious or fatal bleeding. In deciding whether to prescribe XARELTO® to patients at increased risk of bleeding, the risk of thrombotic events should be weighed against the risk of bleeding. Promptly evaluate any signs or symptoms of blood loss. Discontinue XARELTO® in patients with active pathological hemorrhage.
  - A specific antidote for rivaroxaban is not available. Because of high plasma protein binding, rivaroxaban is not expected to be dialyzable. Protamine sulfate and vitamin K are not expected to affect the anticoagulant activity of rivaroxaban. There is no experience with antifibrinolytic agents (tranexamic acid, aminocaproic acid) in individuals receiving rivaroxaban. There is neither scientific rationale for benefit nor experience with systemic hemostatics (desmopressin and aprotinin) in individuals receiving rivaroxaban. Use of procoagulant reversal agents such as prothrombin complex concentrate (PCC), activated prothrombin complex concentrate (APCC), or recombinant factor VIIa (rFVIIa) may be considered, but has not been evaluated in clinical trials.
  - Concomitant use of drugs affecting hemostasis increases the risk of bleeding. These include aspirin, P2Y12 platelet inhibitors, other antithrombotic agents, fibrinolytic therapy, and NSAIDs.

Please see additional Important Safety Information and brief summary of Prescribing Information, including Boxed WARNINGS, on following pages.

# Once-daily XARELTO® delivers...

## Proven protection

- ◆ Effective reduction in risk of stroke and non-CNS systemic embolism\*
- ◆ Results achieved in NVAf patients with multiple comorbidities reflecting increased risk of stroke

## A demonstrated safety profile

- ◆ Comparable major bleed rates<sup>†</sup> versus warfarin: rivaroxaban 3.6, warfarin 3.5 per 100 patient-years
- ◆ In bleeding categories of great concern, such as bleeding into a critical organ<sup>‡</sup> and fatal bleeding, fewer events were observed with XARELTO®<sup>§</sup>
- ◆ In the categories of transfusions and gastrointestinal bleed, more events were observed with XARELTO®<sup>§</sup>

## Convenient once-daily dosing and administration

- ◆ Oral 20-mg fixed dose taken once daily with the evening meal (15 mg for patients with CrCl 15 mL/min to 50 mL/min)
- ◆ No routine monitoring of INR or other coagulation parameters is required<sup>1</sup>
- ◆ If a dose of XARELTO® is not taken at the scheduled time, administer the dose as soon as possible on the same day

<sup>§</sup>Event rates per 100 patient-years, rivaroxaban versus warfarin: critical-organ bleeding 0.8 versus 1.2; fatal bleeding 0.2 versus 0.5; bleeding resulting in transfusion of ≥2 units of whole blood or packed red blood cells 1.7 versus 1.3; gastrointestinal bleeding 2.0 versus 1.2.

## IMPORTANT SAFETY INFORMATION (cont'd)

- ◆ Concomitant use of drugs that are combined P-gp and CYP3A4 inhibitors (eg, ketoconazole and ritonavir) increases rivaroxaban exposure and may increase bleeding risk.
- ◆ **Spinal/Epidural Anesthesia or Puncture:** When neuraxial anesthesia (spinal/epidural anesthesia) or spinal puncture is employed, patients treated with anticoagulant agents for prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma, which can result in long-term or permanent paralysis. An epidural catheter should not be removed earlier than 18 hours after the last administration of XARELTO®. The next XARELTO® dose is not to be administered earlier than 6 hours after the removal of the catheter. Delay the administration of XARELTO® for 24 hours if traumatic puncture occurs.
- ◆ **Risk of Pregnancy-Related Hemorrhage:** Use with caution in pregnant women and only if the potential benefit justifies the potential risk to the mother and fetus. The anticoagulant effect of XARELTO® cannot be monitored with standard laboratory testing and is not readily reversed. Promptly evaluate any signs or symptoms suggesting blood loss (eg, a drop in

hemoglobin and/or hematocrit, hypotension, or fetal distress). **Pregnancy Category C**

- ◆ **Severe Hypersensitivity Reactions:** There were postmarketing cases of anaphylaxis in patients treated with XARELTO® to reduce the risk of deep vein thrombosis (DVT). Patients who have a history of a severe hypersensitivity reaction to XARELTO® should not receive XARELTO®.

## DRUG INTERACTIONS

- ◆ **Drugs That Inhibit CYP3A4 Enzymes and Drug Transport Systems:** Avoid concomitant administration of XARELTO® with combined P-gp and strong CYP3A4 inhibitors (eg, ketoconazole, itraconazole, lopinavir/ritonavir, ritonavir, indinavir/ritonavir, and conivaptan), which cause significant increases in rivaroxaban exposure that may increase bleeding risk.
- ◆ **Drugs That Induce CYP3A4 Enzymes and Drug Transport Systems:** Avoid concomitant use of XARELTO® with drugs that are combined P-gp and strong CYP3A4 inducers (eg, carbamazepine, phenytoin, rifampin, St. John's wort) due to decreases in rivaroxaban exposure that may decrease efficacy.

CNS = central nervous system; CrCl = creatinine clearance; INR = international normalized ratio.

\*A randomized, phase 3, multicenter, active-controlled, double-blind, double-dummy, event-driven study in more than 14,000 patients with NVAf. Patients received XARELTO® 20 mg once daily (15 mg once daily in patients with CrCl 30 mL/min-50 mL/min) or dose-adjusted warfarin titrated to an INR range of 2.0-3.0.<sup>1</sup>

<sup>†</sup>Defined as clinically overt bleeding associated with a decrease in hemoglobin of ≥2 g/dL, transfusion of ≥2 units of packed red blood cells or whole blood, bleeding at a critical site, or with a fatal outcome. Hemorrhagic strokes were counted as both bleeding and efficacy events. Major bleeding rates excluding strokes were 3.3 for XARELTO® and 2.9 for warfarin per 100 patient-years.

<sup>‡</sup>The majority of critical-organ bleeding events were intracranial, and also included intraspinal, intraocular, pericardial, intra-articular, intramuscular with compartment syndrome, or retroperitoneal.



Learn more at [www.XARELTOhcp.com](http://www.XARELTOhcp.com)

## IMPORTANT SAFETY INFORMATION (cont'd)

- ◆ **NSAIDs/Aspirin:** NSAIDs/aspirin are known to increase bleeding; therefore, bleeding risk may be increased when these drugs are used concomitantly with XARELTO®. Promptly evaluate any signs or symptoms of blood loss if patients are treated concomitantly with aspirin, other platelet aggregation inhibitors, or NSAIDs.
- ◆ **Clopidogrel:** Promptly evaluate any signs or symptoms of blood loss if patients are treated concomitantly with clopidogrel.
- ◆ **Drug-Disease Interactions With Drugs That Inhibit CYP3A4 Enzymes and Drug Transport Systems:** Use in patients with CrCl 15 mL/min to 50 mL/min who are receiving concomitant combined P-gp and weak or moderate CYP3A4 inhibitors only if the potential benefit justifies the potential risk.

### USE IN SPECIFIC POPULATIONS

- ◆ **Nursing Mothers:** It is not known if rivaroxaban is excreted in human milk. Because of the potential for serious adverse reactions in nursing infants from rivaroxaban, a decision should be made whether to discontinue nursing or discontinue XARELTO®, taking into account the importance of the drug to the mother.
- ◆ **Geriatric Use:** In clinical trials the efficacy of XARELTO® in the elderly (65 years or older) was similar to that seen in patients younger than 65 years. Both thrombotic and bleeding event rates were higher in these older patients, but the risk-benefit profile was favorable in all age groups.
- ◆ **Renal Impairment**
  - Patients with renal impairment taking P-gp and weak to moderate CYP3A4 inhibitors may have significant increases in exposure, which may increase bleeding risk.
  - For patients with CrCl 15 mL/min to 50 mL/min, the recommended dose of XARELTO® is 15 mg once daily with the evening meal. Avoid use in patients with CrCl <15 mL/min. Periodically assess renal function as clinically indicated (ie, more frequently in

situations in which renal function may decline) and adjust therapy accordingly. Discontinue XARELTO® in patients who develop acute renal failure while on XARELTO®.

- ◆ **Hepatic Impairment:** No clinical data are available for patients with severe hepatic impairment. Avoid the use of XARELTO® in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy.

### OVERDOSAGE

- ◆ Overdose of XARELTO® may lead to hemorrhage. A specific antidote for rivaroxaban is not available. Rivaroxaban systemic exposure is not further increased at single doses >50 mg due to limited absorption. Discontinue XARELTO® and initiate appropriate therapy if bleeding complications associated with overdose occur. The use of activated charcoal to reduce absorption in case of XARELTO® overdose may be considered. Due to the high plasma protein binding, rivaroxaban is not expected to be dialyzable.

### ADVERSE REACTIONS IN CLINICAL STUDIES

- ◆ **Hemorrhage:** The most common adverse reactions with XARELTO® were bleeding complications.
- ◆ The most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 4.3% for XARELTO® versus 3.1% for warfarin. The incidence of discontinuations for nonbleeding adverse events was similar in both treatment groups. In XARELTO®- versus warfarin-treated patients, respectively, major bleeding events were 5.6% versus 5.4%.
- ◆ **Other Clinical Trial Experience:** In an investigational study of acute medically ill patients being treated with XARELTO® 10-mg tablets, cases of pulmonary hemorrhage and pulmonary hemorrhage with bronchiectasis were observed.

Please see brief summary of Prescribing Information, including Boxed WARNINGS, on following pages.



Learn more at [www.XARELTOhcp.com](http://www.XARELTOhcp.com)

**Reference:** 1. Patel MR, Mahaffey KW, Garg J, et al; and the ROCKET AF Steering Committee, for the ROCKET AF Investigators. Rivaroxaban versus warfarin in nonvalvular atrial fibrillation. *N Engl J Med.* 2011;365(10):883-891.

XARELTO® is licensed from Bayer HealthCare AG, 51368 Leverkusen, Germany.  
© Janssen Pharmaceuticals, Inc. 2011 November 2011 02X11227

Janssen Pharmaceuticals, Inc.

janssen  PHARMACEUTICAL COMPANIES  
OF  Johnson & Johnson

**XARELTO®** (rivaroxaban) tablets, for oral use  
See package insert for full Prescribing Information

**WARNINGS: (A) DISCONTINUING XARELTO IN PATIENTS WITH NONVALVULAR ATRIAL FIBRILLATION INCREASES RISK OF STROKE, (B) SPINAL/EPIDURAL HEMATOMA**

**A. DISCONTINUING XARELTO IN PATIENTS WITH NONVALVULAR ATRIAL FIBRILLATION**

Discontinuing XARELTO places patients at an increased risk of thrombotic events. An increased rate of stroke was observed following XARELTO discontinuation in clinical trials in atrial fibrillation patients. If anticoagulation with XARELTO must be discontinued for a reason other than pathological bleeding, consider administering another anticoagulant [see Dosage and Administration (2.1) in full Prescribing Information, Warnings and Precautions, and Clinical Studies (14.1) in full Prescribing Information].

**B. SPINAL/EPIDURAL HEMATOMA**

Epidural or spinal hematomas have occurred in patients treated with XARELTO who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures. Factors that can increase the risk of developing epidural or spinal hematomas in these patients include:

- use of indwelling epidural catheters
- concomitant use of other drugs that affect hemostasis, such as non-steroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, other anticoagulants
- a history of traumatic or repeated epidural or spinal punctures
- a history of spinal deformity or spinal surgery [see Warnings and Precautions and Adverse Reactions].

Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary [see Warnings and Precautions].

Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated for thromboprophylaxis [see Warnings and Precautions].

**INDICATIONS AND USAGE**

**Reduction of Risk of Stroke and Systemic Embolism in Nonvalvular Atrial Fibrillation:** XARELTO (rivaroxaban) is indicated to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation.

There are limited data on the relative effectiveness of XARELTO and warfarin in reducing the risk of stroke and systemic embolism when warfarin therapy is well-controlled [see Clinical Studies (14.1) in full Prescribing Information].

**CONTRAINDICATIONS**

XARELTO is contraindicated in patients with:

- active pathological bleeding [see Warnings and Precautions]
- severe hypersensitivity reaction to XARELTO [see Warnings and Precautions]

**WARNINGS AND PRECAUTIONS**

**Increased Risk of Stroke after Discontinuation in Nonvalvular Atrial Fibrillation:** Discontinuing XARELTO in the absence of adequate alternative anticoagulation increases the risk of thrombotic events. An increased rate of stroke was observed during the transition from XARELTO to warfarin in clinical trials in atrial fibrillation patients. If XARELTO must be discontinued for a reason other than pathological bleeding, consider administering another anticoagulant [see Dosage and Administration (2.1) and Clinical Studies (14.1) in full Prescribing Information].

**Risk of Bleeding:** XARELTO increases the risk of bleeding and can cause serious or fatal bleeding. In deciding whether to prescribe XARELTO to patients at increased risk of bleeding, the risk of thrombotic events should be weighed against the risk of bleeding.

Promptly evaluate any signs or symptoms of blood loss. Discontinue XARELTO in patients with active pathological hemorrhage.

A specific antidote for rivaroxaban is not available. Because of high plasma protein binding, rivaroxaban is not expected to be dialyzable [see Clinical Pharmacology (12.3) in full Prescribing Information]. Protamine sulfate and vitamin K are not expected to affect the anticoagulant activity of rivaroxaban. There is no experience with antifibrinolytic agents (tranexamic acid, aminocaproic acid) in individuals receiving rivaroxaban. There is neither scientific rationale for benefit nor experience with systemic hemostatics (desmopressin and aprotinin) in individuals receiving rivaroxaban. Use of procoagulant reversal agents such as prothrombin complex concentrate (PCC), activated prothrombin complex concentrate (APCC), or recombinant factor VIIa (rFVIIa) may be considered, but has not been evaluated in clinical trials.

Concomitant use of drugs affecting hemostasis increases the risk of bleeding. These include aspirin, P2Y<sub>12</sub> platelet inhibitors, other antithrombotic agents, fibrinolytic therapy, and non-steroidal anti-inflammatory drugs (NSAIDs) [see Drug Interactions].

Concomitant use of drugs that are combined P-gp and CYP3A4 inhibitors (e.g. ketoconazole and ritonavir) increases rivaroxaban exposure and may increase bleeding risk [see Drug Interactions].

**Spinal/Epidural Anesthesia or Puncture:** When neuraxial anesthesia (spinal/epidural anesthesia) or spinal puncture is employed, patients treated with anticoagulant agents for prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma which can result in long-term or permanent paralysis [see Boxed Warning].

An epidural catheter should not be removed earlier than 18 hours after the last administration of XARELTO. The next XARELTO dose is not to be administered earlier than 6 hours after the removal of the catheter. If traumatic puncture occurs, the administration of XARELTO is to be delayed for 24 hours.

**Risk of Pregnancy Related Hemorrhage:** XARELTO should be used with caution in pregnant women and only if the potential benefit justifies the potential risk to the mother and fetus. XARELTO dosing in pregnancy has not been studied. The anticoagulant effect of XARELTO cannot be monitored with standard laboratory testing

**XARELTO® (rivaroxaban) tablets**

nor readily reversed. Promptly evaluate any signs or symptoms suggesting blood loss (e.g., a drop in hemoglobin and/or hematocrit, hypotension, or fetal distress).

**Severe Hypersensitivity Reactions:** There were postmarketing cases of anaphylaxis in patients treated with XARELTO to reduce the risk of DVT. Patients who have a history of a severe hypersensitivity reaction to XARELTO should not receive XARELTO [see Adverse Reactions].

**ADVERSE REACTIONS**

**Clinical Trials Experience:** Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

During clinical development for the approved indications, 11598 patients were exposed to XARELTO. These included 7111 patients who received XARELTO 15 mg or 20 mg orally once daily for a mean of 19 months (5558 for 12 months and 2512 for 24 months) to reduce the risk of stroke and systemic embolism in nonvalvular atrial fibrillation (ROCKET AF) and 4487 patients who received XARELTO 10 mg orally once daily for prophylaxis of DVT following hip or knee replacement surgery (RECORD 1-3).

Hemorrhage: The most common adverse reactions with XARELTO were bleeding complications [see Warnings and Precautions].

**Nonvalvular Atrial Fibrillation:** In the ROCKET AF trial, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 4.3% for XARELTO vs. 3.1% for warfarin. The incidence of discontinuations for non-bleeding adverse events was similar in both treatment groups.

Table 1 shows the number of patients experiencing various types of bleeding events in the ROCKET AF study.

**Table 1: Bleeding Events in ROCKET AF\***

Parameter	XARELTO N = 7111 n (%)	Event Rate (per 100 Pt-yrs)	Warfarin N = 7125 n (%)	Event Rate (per 100 Pt-yrs)
Major bleeding <sup>†</sup>	395 (5.6)	3.6	386 (5.4)	3.5
Bleeding into a critical organ <sup>‡</sup>	91 (1.3)	0.8	133 (1.9)	1.2
Fatal bleeding	27 (0.4)	0.2	55 (0.8)	0.5
Bleeding resulting in transfusion of ≥ 2 units of whole blood or packed red blood cells	183 (2.6)	1.7	149 (2.1)	1.3
Gastrointestinal bleeding	221 (3.1)	2.0	140 (2.0)	1.2

\* For all sub-types of major bleeding, single events may be represented in more than one row, and individual patients may have more than one event.

<sup>†</sup> Defined as clinically overt bleeding associated with a decrease in hemoglobin of ≥ 2 g/dL, transfusion of ≥ 2 units of packed red blood cells or whole blood, bleeding at a critical site, or with a fatal outcome. Hemorrhagic strokes are counted as both bleeding and efficacy events. Major bleeding rates excluding strokes are 3.3 per 100 Pt-yrs for XARELTO vs. 2.9 per 100 Pt-yrs for warfarin.

<sup>‡</sup> The majority of the events were intracranial, and also included intraspinal, intraocular, pericardial, intraarticular, intramuscular with compartment syndrome, or retroperitoneal.

**Postmarketing Experience:** The following adverse reactions have been identified during post-approval use of rivaroxaban. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

**Blood and lymphatic system disorders:** agranulocytosis

**Gastrointestinal disorders:** retroperitoneal hemorrhage

**Hepatobiliary disorders:** jaundice, cholestasis, cytolytic hepatitis

**Immune system disorders:** hypersensitivity, anaphylactic reaction, anaphylactic shock

**Nervous system disorders:** cerebral hemorrhage, subdural hematoma, epidural hematoma, hemiparesis

**Skin and subcutaneous tissue disorders:** Stevens-Johnson syndrome

**DRUG INTERACTIONS**

Rivaroxaban is a substrate of CYP3A4/5, CYP2J2, and the P-gp and ATP-binding cassette G2 (ABCG2) transporters. Inhibitors and inducers of these CYP450 enzymes or transporters (e.g., P-gp) may result in changes in rivaroxaban exposure.

**Drugs that Inhibit Cytochrome P450 3A4 Enzymes and Drug Transport Systems:** In drug interaction studies evaluating the concomitant use with drugs that are combined P-gp and CYP3A4 inhibitors, increases in rivaroxaban exposure and pharmacodynamic effects (i.e., factor Xa inhibition and PT prolongation) were observed. Significant increases in rivaroxaban exposure may increase bleeding risk.

- **Ketoconazole (combined P-gp and strong CYP3A4 inhibitor):** Steady-state rivaroxaban AUC and C<sub>max</sub> increased by 160% and 70%, respectively. Similar increases in pharmacodynamic effects were also observed.

- **Ritonavir (combined P-gp and strong CYP3A4 inhibitor):** Single-dose rivaroxaban AUC and C<sub>max</sub> increased by 150% and 60%, respectively. Similar increases in pharmacodynamic effects were also observed.

- **Clarithromycin (combined P-gp and strong CYP3A4 inhibitor):** Single-dose rivaroxaban AUC and C<sub>max</sub> increased by 50% and 40%, respectively. The smaller increases in exposure observed for clarithromycin compared to ketoconazole or ritonavir may be due to the relative difference in P-gp inhibition.

- **Erythromycin (combined P-gp and moderate CYP3A4 inhibitor):** Both the single-dose rivaroxaban AUC and C<sub>max</sub> increased by 30%.

- **Fluconazole (moderate CYP3A4 inhibitor):** Single-dose rivaroxaban AUC and C<sub>max</sub> increased by 40% and 30%, respectively.

Avoid concomitant administration of XARELTO with combined P-gp and strong CYP3A4 inhibitors (e.g., ketoconazole, itraconazole, lopinavir/ritonavir, ritonavir, indinavir/

## XARELTO® (rivaroxaban) tablets

ritonavir, and conivaptan), which cause significant increases in rivaroxaban exposure that may increase bleeding risk.

**Drugs that Induce Cytochrome P450 3A4 Enzymes and Drug Transport Systems:** In a drug interaction study, co-administration of XARELTO (20 mg single dose with food) with a drug that is a combined P-gp and strong CYP3A4 inducer (rifampicin titrated up to 600 mg once daily) led to an approximate decrease of 50% and 22% in AUC and  $C_{max}$ , respectively. Similar decreases in pharmacodynamic effects were also observed. These decreases in exposure to rivaroxaban may decrease efficacy.

Avoid concomitant use with drugs that are combined P-gp and strong CYP3A4 inducers (e.g., carbamazepine, phenytoin, rifampin, St. John's wort).

**Anticoagulants:** In a drug interaction study, single doses of enoxaparin (40 mg subcutaneous) and XARELTO (10 mg) given concomitantly resulted in an additive effect on anti-factor Xa activity. Enoxaparin did not affect the pharmacokinetics of rivaroxaban. In another study, single doses of warfarin (15 mg) and XARELTO (5 mg) resulted in an additive effect on factor Xa inhibition and PT. Warfarin did not affect the pharmacokinetics of rivaroxaban.

**NSAIDs/Aspirin:** In ROCKET AF, concomitant aspirin use (almost exclusively at a dose of 100 mg or less) during the double-blind phase was identified as an independent risk factor for major bleeding. NSAIDs are known to increase bleeding, and bleeding risk may be increased when NSAIDs are used concomitantly with XARELTO. In a single-dose drug interaction study there were no pharmacokinetic or pharmacodynamic interactions observed after concomitant administration of naproxen or aspirin (acetylsalicylic acid) with XARELTO.

Promptly evaluate any signs or symptoms of blood loss if patients are treated concomitantly with aspirin, other platelet aggregation inhibitors, or NSAIDs [see *Warnings and Precautions*].

**Clopidogrel:** In two drug interaction studies where clopidogrel (300 mg loading dose followed by 75 mg daily maintenance dose) and XARELTO (15 mg single dose) were co-administered in healthy subjects, an increase in bleeding time to 45 minutes was observed in approximately 45% and 30% of subjects in these studies, respectively. The change in bleeding time was approximately twice the maximum increase seen with either drug alone. There was no change in the pharmacokinetics of either drug.

Promptly evaluate any signs or symptoms of blood loss if patients are treated concomitantly with clopidogrel [see *Warnings and Precautions*].

**Drug-Disease Interactions with Drugs that Inhibit Cytochrome P450 3A4 Enzymes and Drug Transport Systems:** Based on simulated pharmacokinetic data, patients with renal impairment receiving full dose XARELTO in combination with drugs classified as combined P-gp and weak or moderate CYP3A4 inhibitors (e.g., amiodarone, diltiazem, verapamil, quinidine, ranolazine, dronedarone, felodipine, erythromycin, and azithromycin) may have significant increases in exposure compared with patients with normal renal function and no inhibitor use, since both pathways of rivaroxaban elimination are affected.

While increases in rivaroxaban exposure can be expected under such conditions, results from an analysis in the ROCKET AF trial, which allowed concomitant use with combined P-gp and weak or moderate CYP3A4 inhibitors (e.g., amiodarone, diltiazem, verapamil, chloramphenicol, cimetidine, and erythromycin), did not show an increase in bleeding in patients with CrCl 30 to <50 mL/min [Hazard Ratio (95% CI): 1.05 (0.77, 1.42)]. XARELTO should be used in patients with CrCl 15 to 50 mL/min who are receiving concomitant combined P-gp and weak or moderate CYP3A4 inhibitors only if the potential benefit justifies the potential risk [see *Use in Specific Populations*].

### USE IN SPECIFIC POPULATIONS

**Pregnancy:** Pregnancy Category C: There are no adequate or well-controlled studies of XARELTO in pregnant women, and dosing for pregnant women has not been established. Use XARELTO with caution in pregnant patients because of the potential for pregnancy related hemorrhage and/or emergent delivery with an anticoagulant that is not readily reversible. The anticoagulant effect of XARELTO cannot be reliably monitored with standard laboratory testing. Animal reproduction studies showed no increased risk of structural malformations, but increased post-implantation pregnancy loss occurred in rabbits. XARELTO should be used during pregnancy only if the potential benefit justifies the potential risk to mother and fetus [see *Warnings and Precautions*].

Rivaroxaban crosses the placenta in animals. Animal reproduction studies have shown pronounced maternal hemorrhagic complications in rats and an increased incidence of post-implantation pregnancy loss in rabbits. Rivaroxaban increased fetal toxicity (increased resorptions, decreased number of live fetuses, and decreased fetal body weight) when pregnant rabbits were given oral doses of  $\geq 10$  mg/kg rivaroxaban during the period of organogenesis. This dose corresponds to about 4 times the human exposure of unbound drug, based on AUC comparisons at the highest recommended human dose of 20 mg/day. Fetal body weights decreased when pregnant rats were given oral doses of 120 mg/kg. This dose corresponds to about 14 times the human exposure of unbound drug.

**Labor and Delivery:** Safety and effectiveness of XARELTO during labor and delivery have not been studied in clinical trials. However, in animal studies maternal bleeding and maternal and fetal death occurred at the rivaroxaban dose of 40 mg/kg (about 6 times maximum human exposure of the unbound drug at the human dose of 20 mg/day).

**Nursing Mothers:** It is not known if rivaroxaban is excreted in human milk. Rivaroxaban and/or its metabolites were excreted into the milk of rats. Because many drugs are excreted in human milk and because of the potential for serious adverse reactions in nursing infants from rivaroxaban, a decision should be made whether to discontinue nursing or discontinue XARELTO, taking into account the importance of the drug to the mother.

**Pediatric Use:** Safety and effectiveness in pediatric patients have not been established.

**Geriatric Use:** Of the total number of patients in the RECORD 1-3 clinical studies evaluating XARELTO, about 54% were 65 years and over, while about 15% were >75 years. In ROCKET AF, approximately 77% were 65 years and over and about 38% were >75 years. In clinical trials the efficacy of XARELTO in the elderly (65 years or older) was similar to that seen in patients younger than 65 years. Both thrombotic and

## XARELTO® (rivaroxaban) tablets

bleeding event rates were higher in these older patients, but the risk-benefit profile was favorable in all age groups [see *Clinical Pharmacology (12.3)* and *Clinical Studies (14)* in full *Prescribing Information*].

**Females of Reproductive Potential:** Females of reproductive potential requiring anticoagulation should discuss pregnancy planning with their physician.

**Renal Impairment:** The safety and pharmacokinetics of single-dose XARELTO (10 mg) were evaluated in a study in healthy subjects [CrCl  $\geq 80$  mL/min (n=8)] and in subjects with varying degrees of renal impairment (see Table 2). Compared to healthy subjects with normal creatinine clearance, rivaroxaban exposure increased in subjects with renal impairment. Increases in pharmacodynamic effects were also observed.

**Table 2: Percent Increase of Rivaroxaban PK and PD Parameters from Normal in Subjects with Renal Insufficiency from a Dedicated Renal Impairment Study**

Parameter	Renal Impairment Class (CrCl (mL/min))			
	Mild [50 to 79] N=8	Moderate [30 to 49] N=8	Severe [15 to 29] N=8	
<b>Exposure</b>	<b>AUC</b>	44	52	64
(% increase relative to normal)	<b><math>C_{max}</math></b>	28	12	26
<b>FXa Inhibition</b>	<b>AUC</b>	50	86	100
(% increase relative to normal)	<b><math>E_{max}</math></b>	9	10	12
<b>PT Prolongation</b>	<b>AUC</b>	33	116	144
(% increase relative to normal)	<b><math>E_{max}</math></b>	4	17	20

PT = Prothrombin time; FXa = Coagulation factor Xa; AUC = Area under the concentration or effect curve;  $C_{max}$  = maximum concentration;  $E_{max}$  = maximum effect; and CrCl = creatinine clearance

Patients with renal impairment taking P-gp and weak to moderate CYP3A4 inhibitors may have significant increases in exposure which may increase bleeding risk [see *Drug Interactions*].

**Nonvalvular Atrial Fibrillation:** In the ROCKET AF trial, patients with CrCl 30 to 50 mL/min were administered XARELTO 15 mg once daily resulting in serum concentrations of rivaroxaban and clinical outcomes similar to those in patients with better renal function administered XARELTO 20 mg once daily. Patients with CrCl 15 to 30 mL/min were not studied, but administration of XARELTO 15 mg once daily is also expected to result in serum concentrations of rivaroxaban similar to those in patients with normal renal function [see *Dosage and Administration (2.1)* in full *Prescribing Information*].

**Hepatic Impairment:** The safety and pharmacokinetics of single-dose XARELTO (10 mg) were evaluated in a study in healthy subjects (n=16) and subjects with varying degrees of hepatic impairment (see Table 3). No patients with severe hepatic impairment (Child-Pugh C) were studied. Compared to healthy subjects with normal liver function, significant increases in rivaroxaban exposure were observed in subjects with moderate hepatic impairment (Child-Pugh B). Increases in pharmacodynamic effects were also observed.

**Table 3: Percent Increase of Rivaroxaban PK and PD Parameters from Normal in Subjects with Hepatic Insufficiency from a Dedicated Hepatic Impairment Study**

Parameter	Hepatic Impairment Class (Child-Pugh Class)		
	Mild (Child-Pugh A) N=8	Moderate (Child-Pugh B) N=8	
<b>Exposure</b>	<b>AUC</b>	15	127
(% increase relative to normal)	<b><math>C_{max}</math></b>	0	27
<b>FXa Inhibition</b>	<b>AUC</b>	8	159
(% increase relative to normal)	<b><math>E_{max}</math></b>	0	24
<b>PT Prolongation</b>	<b>AUC</b>	6	114
(% increase relative to normal)	<b><math>E_{max}</math></b>	2	41

PT = Prothrombin time; FXa = Coagulation factor Xa; AUC = Area under the concentration or effect curve;  $C_{max}$  = maximum concentration;  $E_{max}$  = maximum effect

Avoid the use of XARELTO in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy [see *Dosage and Administration (2.3)* in full *Prescribing Information* and *Warnings and Precautions*].

### OVERDOSAGE

Overdose of XARELTO may lead to hemorrhage. A specific antidote for rivaroxaban is not available. Rivaroxaban systemic exposure is not further increased at single doses >50 mg due to limited absorption. Discontinue XARELTO and initiate appropriate therapy if bleeding complications associated with overdose occur. The use of activated charcoal to reduce absorption in case of XARELTO overdose may be considered. Due to the high plasma protein binding, rivaroxaban is not expected to be dialyzable [see *Warnings and Precautions* and *Clinical Pharmacology (12.3)* in full *Prescribing Information*].

Active Ingredient Made in Germany

Finished Product  
Manufactured by:  
Janssen Ortho, LLC  
Titusville, NJ 08560  
Kusabo, PR 00778

Licensed from:  
Bayer HealthCare AG  
51368 Leverkusen, Germany

© Janssen Pharmaceuticals, Inc. 2011  
10185201 02X11309BBA



Foundation.

*Due to a printing error, this article was not published in its entirety in the October/November 2011 newsletter. The article appears in its entirety in this issue. We apologize to the author for this error.*

## Innovations From the Field

### Direct-to-Employer Contracting

Joseph G. Cacchione, MD, FACC

#### BACKGROUND

The health insurance industry evolved in an effort to spread the risk—and cost—of healthcare across a population. This service created value by reducing the variability in costs for the purchaser as well as creating a benefit that employers used to attract employees. However, over time the industry has evolved from a purely risk-bearing business to an industry that also provides simple claims administration services for employers who choose to bear their own risk through a self-funded arrangement. In fact, nearly 100 million individuals are covered under plans where employers bear the risk for the cost of healthcare for their population.<sup>1</sup> Even in fully insured models, the cost of actuarial risk has been passed on to the purchaser as a part of the premium. Furthermore, if an employer experiences an outlier year for healthcare costs, it may be hit with massive increases in its premiums.

For self-funded employers, the value they receive from traditional health insurers is isolated to administrative tasks such as performing the tedious claims payment process and developing solutions to decrease their cost of care. The administration of the claims is an estimated \$150 billion business of the \$2.4 trillion national health expenditure.<sup>2</sup> Many of

the nation's Third Party Administrators (TPAs) have focused on creating value for the employer for claims adjudication by automating the claims process and reducing the cost. The unintended side effect, however, is that TPAs may have difficulties in modifying their processes to meet the needs of innovative employers.

A survey of employers' satisfaction rates with the performance of insurers shows a continued decline, with only 59% of large employers indicating that they were satisfied with their vendor in 2009—down from 64% in 2008.<sup>3</sup> Employers have long sought to improve the value they receive for their healthcare expenditure. They are looking for health insurers to provide access to tools to continue to reduce waste, provide solutions for personal health tools, and provide more meaningful data that simultaneously improve health status and reduce cost.<sup>3</sup>

#### VALUE

Employers have become more sophisticated in what they ask of providers and insurers for the “value” that they deliver. Thus, there is need for risk-adjusted cost and quality data both for comparative assessments and contracting. In many circumstances, insurer and employer quality data are derived from claims data because the clinical quality data are not available. The claims data are inherently flawed in terms of ability to assess true outcomes, and are often limited to 1 unique payer or purchaser, yielding small numbers. Aggregated data sets often used for public reports about providers can be incongruent, as they utilize many different criteria, risk-adjusting methodologies, and data sources. They are therefore limited

in their utility.<sup>4</sup> Lastly, insurer and employer data sets are often incomplete when patients leave employment or the insurers are changed.

The providers are challenged by a number of similar issues around proof of value and longitudinal outcomes. There are very few ambulatory data sets that can be used for comparison or benchmarking to demonstrate differentiation in a meaningful way. In addition, even provider data<sup>5</sup> about the largest employers are often too small to draw a meaningful conclusion or proof of value. National registries have helped to mitigate this volume limitation; however, “value proof” remains a challenge. Low frequency events with large differences in provider outcome, and high frequency events with little difference in outcomes, will continue to challenge the value determination. The ideal situation for a value determination is a high-frequency event with a large difference in provider outcomes. In cardiovascular disease, procedures or diagnoses that are coveted for providers would include cardiac surgery, which is however often challenged by low frequency; and percutaneous coronary intervention, which often has high frequency but similar outcomes, making differentiation a challenge.

The desire for direct-to-employer programs stems from the lack of perceived value by purchasers or employers and the ability of these programs to reduce cost by eliminating the middleman. However, implementing these programs, for both the employer/purchaser and the provider, is not necessarily a simple process. The employer side requires value-based insurance design (VBID).<sup>4</sup> VBID creates ben-

efits for beneficiaries such as lower copays or deductibles based on the value of the clinical outcomes. This tiered benefit structure is one method that a VBID utilizes to encourage patients to use one provider over another that has demonstrated superior clinical outcomes. In the model of a Preferred Provider Organization (PPO), which often has a similar tiered benefit, it is most often simply a contractual allowance rather than based on some measure of outcomes. The barriers for VBID identified by Chernew et al<sup>4</sup> include insufficient research or data to determine a difference between high and low value providers, the cost of implementation, adverse selection, and human resource concerns.

On the provider side, many of these implementation issues exist as well. Creating specialized contracts directly with an employer requires the ability to process a claim or outsource to a more traditional insurer. These contracts also require specialized portals for entry into a delivery system that may not be by a traditional mechanism such as a family physician that has relationships with a local provider network. Also, depending on benefit design, the sickest patients may be driven to the contracted valued provider, thus creating potential adverse selection. National employer programs that require travel often create family logistic problems with travel expense and accommodations. In addition, longitudinal follow-up with local provider resentment can make post care challenging. In dealing with many of these issues of non-traditional access, robust care coordination is necessary both on the entry of an employee, and for follow-up care. Lastly, expanding to many employers in this way could be detrimental to existing relationships with traditional insurers as the provider becomes competition.

The most recent nationally recognized program for direct-to-employer contracts involves the Cleveland

Clinic Foundation and a large national retailer. This program is now in the second year of existence and has largely been considered successful by both the employer and Cleveland Clinic. The initial service offered was cardiac surgery, but it has expanded to other elective cardiac procedures. The cases have had some selection

---

*There are many employers looking for predictable quality, predictable costs, and essentially better value. Employers are more sophisticated consumers of healthcare services today than ever before, so providers with the desire to have direct-to-employer contracts will need to demonstrate true value.*

---

bias in that one-half of the surgical patients are in the Society of Thoracic Surgeons (STS) category of “other.” The employer has designed a value benefit including travel for the employee to Cleveland Clinic for high level cardiac procedures and lower copay. Cleveland Clinic has benefited with additional revenue and more national exposure. The employer has used a third party to manage/administer the claims and they have seen

no increase in the index expenditure despite the travel benefit with improved quality; however, long-term benefits remain to be determined. The measures of program success from both employer and provider will include better outcomes, satisfaction, and predictable cost and revenue, respectively. In addition, better hospital outcomes will lead to lower downstream costs for the employer. In this case, the employer has already realized a higher level of employee satisfaction with those that have taken advantage of the benefit, but longitudinal data are pending.

## FUTURE

There are many employers looking for predictable quality, predictable costs, and essentially better value. Employers are more sophisticated consumers of healthcare services today than ever before, so providers with the desire to have direct to employer contracts will need to demonstrate true value. Reducing the middle administrative costs long-term could be beneficial to the purchaser and the provider community.

These programs are one potential solution for employers to find more value for their healthcare dollar. Other evolving models of risk and payment will also likely be added to complement these programs in the near future, to create a portfolio of solutions for enhanced value.

## REFERENCES

1. US Department of Labor and Self-Insurance Institute of America. Report to Congress. Annual Report on Self-Insured Group Health Plans, March 2011.
2. Martin A, Lassman D, Whittle L, Catlin A; National Health Expenditure Accounts Team. Recession contributes to slowest annual rate of increase in health spending in five decades. *Health Aff (Millwood)*. 2011;30(1): 11-22.
3. PricewaterhouseCoopers' Health Research Institute. What employers want from health insurers in 2010: better information, more value. [http://www.pwc.com/mx/es/industrias/archivo/2011-01-sector-salud-What\\_employers\\_want\\_from\\_health\\_insurer\\_in\\_2010.pdf](http://www.pwc.com/mx/es/industrias/archivo/2011-01-sector-salud-What_employers_want_from_health_insurer_in_2010.pdf). January 2010.

4. Chernew ME, Rosen AB, Fendrick AM. Value-based insurance design. *Health Affairs*. 2007;26:w195-w203.

5. Rothberg MB, Morsi E, Benjamin EM, Pekow PS, Lindenauer PK. Choosing the best hospital: the limitations of public quality reporting. *Health Affairs*. 2008;27:1680-1688.

**Author Disclosure:** Dr Cacchione reports receiving consulting fees/honoraria from Humana, Paragon Health, and Riner Group.

## Program: Cardiac Care Initiative

Beth Goldman, MD, MPH  
Emily Santer, MPH

The use and cost of cardiac diagnostic imaging increased substantially from the late 1990s through the mid 2000s.<sup>1</sup> Studies have documented significant regional variation in the use of cardiac diagnostic and therapeutic procedures,<sup>2,3</sup> suggesting that a proportion of these procedures may not be appropriate. Patients undergoing unnecessary imaging may experience potentially avoidable diagnostic and therapeutic procedures downstream.

The Blue Cross Blue Shield of Michigan (BCBSM) Physician Group Incentive Program (PGIP) is an innovative incentive program that brings together physician organizations (POs) from across Michigan to collaborate on initiatives designed to improve the value of healthcare. A key principle of PGIP is that communities of caregivers—including primary care physicians and specialists—have shared responsibility for managing a patient population. As of October 2011, PGIP includes 40 physician organizations and almost 15,000 primary care and specialty physicians who provide care to nearly 2 million BCBSM members.

Close to 80% of the BCBSM network cardiologists participate in PGIP.

The PGIP Cardiac Care Initiative reaches out to primary care physicians and cardiologists through their POs to reduce the variation in cost and use of diagnostic cardiac procedures among POs and reduce the overall cost and use of such procedures. The Initiative also aims to improve compliance with clinical guidelines for appropriate ambulatory cardiac care. The Initiative provides comparative data on the cost and utilization of diagnostic cardiac procedures and the quality of ambulatory cardiac care at the PO level. In the first year of participation, POs receive payments for participation. In the second year of participation and beyond, POs receive incentive payments based on performance and improvement in cost and quality over a prior measurement period. Payments are weighted by the number of members attributed to PGIP primary care physicians within each PO. POs choose how to invest the payments received from BCBSM in, for example, infrastructure development, care management processes, and rewards to physician practices.

The Initiative is in its first year and performance results are not yet available. Next steps include providing a unique set of flow diagrams and

data on PO-level performance along the “diagnostic therapeutic cascade” to assist POs in identifying additional opportunities for improvement and targeting performance-based incentive payments to the narrow set of diagnostic and therapeutic services identified in the “cascade.” BCBSM will also begin to offer fee uplifts (a percentage increase in fees for select evaluation and management codes, emphasizing the importance of cognitive services/relationship-based care) to PGIP cardiologists who are actively engaged with their POs and who contribute to the efficient and effective management of patient populations.

## REFERENCES

1. US Government Accountability Office. *Medicare Part B Imaging Services: Rapid Spending Growth and Shift to Physician Offices Indicate Need for CMS to Consider Additional Management Practices*. <http://www.gao.gov/products/GAO-08-452>. Published June 2008.
2. Udow-Phillips M, Ogundiu T, Ehrlich E, Kofke-Egger H, Stock K; Center for Healthcare Research and Transformation. *CHRTBook: Health Care Variation in Michigan*. <http://www.chrt.org/assets/price-of-care/CHRTBook-September-2010.pdf>. Published 2010.
3. Wennberg JE, Wennberg DE. *The Dartmouth Atlas of Cardiovascular Healthcare*. Hanover, NH: Dartmouth Medical School; 2000.

## Practice Economics

### The Basics

Len Nichols, PhD  
Cathleen Biga, RN

**Author Disclosure:** Dr Goldman and Ms Santer report no relationships or financial interest with any entity that would pose a conflict of interest with

the subject matter of this article.

The cacophony of “payment reform” models and debates can seem and be overwhelming, especially to clinicians who have “day

jobs” delivering patient care as best as they can under the current, sometimes trying conditions. As a baseline reference point against which to compare payment innovation mod-

els that may be proposed or imposed by government or private payers or hospital partners in the coming months and years, we thought it would be helpful to explain specialist practice financial management 101 in a straightforward way. This is the first in a series to begin discussions around building a business model for practices of the future.

## SPECIALTY PRACTICE ECONOMICS 101

There are 4 basic models of cardiology practice organization that are different enough to affect practice economics: small single specialty (1-4), single specialty large (11-25+), multi-specialty group, and employee of hospital (or integrated system). In addition to being employed, many integrated cardiology groups also manage their cardiology service line. About half of the members of cardiology groups are larger than 11 physicians and/or have become employees of hospitals in recent years. Economies of scale for clinical information systems, for administrative information systems, and for management functions (like contracting) are quite different across the practice model types. This means that the per-patient and per-clinician cost of investments in facilities and equipment varies considerably by model type.

Although many forces, including federal reform, are incentivizing practice consolidations and mergers, the old adage in the business literature, “Culture eats strategy for lunch every single day,” should not be forgotten, for it is highly relevant to the pace at which payment and practice innovations can occur in the real world. The reality (apparently) is that many clinicians do not know much about the specifics of payment schedules, and are particularly ill-informed about price variance across payers for the same service. While this fact is perhaps comforting to patients, it also explains why a broader understanding of practice economics is a prerequisite to widespread comfort and

(voluntary) adoption of new incentive arrangements.

“No margin, no mission.” This is a long-standing shorthand from the world of non-profit hospitals, but it is also a good way of stating the obvious for any going concern: Most physician practices and hospitals are not going to be subsidized by some anonymous benign force indefinitely; they must find ways to break even or produce a margin to justify the efforts of managers, owners, and employees alike. An overly simplified profit equation looks like this:

$$\pi = P_1Q_1 + P_2Q_2 + \dots + P_nQ_n - C(Q_1, Q_2, \dots, Q_n) - FC$$

where  $P_1$  represents price received for the first service,  $Q_1$  represents the quantity of the first service provided,  $C(\dots)$  is the cost of providing all the services in a given period of time that varies with quantities of outputs (and includes those elements that are service specific—drugs, labor per test/visit, equipment, etc), and  $FC$  is fixed costs independent of the number of  $Q_s$  provided (eg, utilities, medical malpractice insurance costs, depreciation, rent, and interest expense). Note: the method of allocating fixed or joint costs across services and patients will have a lot to do with perceptions of the profitability of any particular service or patient mix.

## CURRENT PAYMENT STRUCTURE

One feature most physician payment contracts have in common is the “fee schedule,” typically based on Medicare’s Resource Based Relative Value Scale (RBRVS). Each billable CPT code has a number of relative value “units” (RVUs) assigned to it (by a long and controversial process undertaken by CMS with considerable specialty society input). As an example, a follow-up office visit has fewer RVUs than a cardiac catheterization. Specific RVUs are set by professional committee judgments based on the

amount of training required to perform the service, the time required to perform the service, and the practice expense associated with the service, including professional liability costs. The RVU amount is multiplied by the “conversion factor” to actually determine the value of  $P$ , the price received for the specific service rendered to a Medicare patient. Medicare uses 1 conversion factor for all RVUs, and this conversion factor is updated each year for increases in inflation, or cut, depending on Congressional budgetary decisions. Medicare takes stakeholder input into account in a variety of ways, but does not formally negotiate with physicians or hospitals over the RVU schedule or the conversion factor as such.

Since there are almost 8000 CPT codes now, most private insurers piggyback on the considerable cost and investment in the very detailed RVU schedule that Medicare has already expended, and just adopt the relative payments in the schedule in their entirety, although they sometimes do not “accept” a specific CPT code. However, they typically negotiate with each physician group and pay a different conversion factor than Medicare’s. This difference in conversion factors is why profit margins are usually larger for privately insured patients than for publicly insured or uninsured patients, though counterexamples do exist (Medicare pays well for some services, especially new codes, and some well-heeled foreign uninsured pay high list prices as well). Some physician groups are able to negotiate better conversion factors with some private insurers than with others, depending on who has the most local market leverage. Many physician groups, especially the smaller ones, are price takers from all third-party payers.

Medicaid programs typically use lower conversion factors than Medicare or have their own fee schedule, the net effect of which is to have much lower physician payments

than Medicare, and certainly lower than private payers, on average. This, in addition to administrative burden, is the main reason securing access to specialists for Medicaid patients is such a challenge in many states.

### **CHURNING PROFITS UNDER CURRENT STRUCTURE**

So far we have explained how fee-for-service payment for physician services works, but 2 key facts may not be readily apparent yet. Fact number 1, profit margins vary considerably by service, owing to differences in the relative number of RVUs assigned to a particular code compared with the actual cost of providing the service, the combinations of codes that are used for some clinical or diagnostic procedures, and the conversion factor of payers who purchase large quantities of these services for their patients. The reality of variable profit margins, despite the fact that margin variance is an artifact of arbitrary fee schedules from any given provider's vantage point, guarantees that some services in effect cross-subsidize others, either in terms of bearing a larger share of the practice's fixed cost burden or making it possible to deliver some services to some patients at a loss without bankrupting the practice. The degree of cross-subsidization can be byzantine, but it also becomes a barrier to incentive realignment, since reducing the profitability of some services necessarily threatens access to other services unless commensurate savings can be found.

Fact number 2, which follows from fact number 1, incentives to provide more services to many patients are virtually unchecked, and depend to a large degree, in this unfettered fee-for-service system, on physician professionalism in limiting services to those that are efficacious and thereby self-limiting physician income. In the absence of extremely strong professional norms, adherence to practicing evidence-based medicine, and appropriate use of benchmarking pro-

grams, this fee-for-service incentive structure makes it difficult to change service delivery patterns much until we get incentives far better aligned with clinical value added. This is why incentive realignment through payment reform and quality reporting is so central to serious health system reform discussions today.

Another increasingly important element of physician practice revenue in a fee-for-service rubric is facility fees, which physician groups can capture if they perform work in certain settings, for hospitals are allowed to bill for facility fees separate from the professional fees of performing the service. Historically, facility fees were allowed to compensate for the greater fixed costs of maintaining the full array of hospital-based equipment and multiple sterile environments appropriate to different levels of patient acuity. The "facility fee" issue has caused confusion and some controversy when formerly free-standing physician practices get acquired by hospitals, and patients note that fees have gone up despite services being performed by the same clinician in the exact same place. The billing of a facility fee in addition to the evaluation and management fee has created consumer backlash in some markets. Some private payers are refusing to pay facility fees in some circumstances.

The facility fee that is generating the most attention in this era of physician hospital integration involves the payment variances between the independent physician office (via the Physician Fee schedule) and the Hospital Outpatient Prospective Payment Schedule (HOPPS) in the technical fees of many imaging modalities. The delta between these fee schedules is significant, and in this era of healthcare reform, renewed focus on the rationale for this differential is inevitable.

Writing out the profit equation in complete detail would be quite cumbersome since each payer may pay a different amount for each service

and since different payers' patients will need different mixes of services on average. Therefore it might be simpler, and accurate to a first-order approximation, to think about the Ps as the average price collected for a particular type of payers' patients (Medicare, Medicaid, private insurers, uninsured), and the Qs as the average set of services provided to patients of different payers. Then you can think about constructing profit equations for each payer, or for clinically and/or financially distinct subsets of patients who are served by the practice. Medicare cardiac patients might have an average margin quite different from Medicare diabetics without a heart condition, for example.

### **REFORMING THE CURRENT STRUCTURE**

Insurers have typically followed 1 or 2 strategies to control costs, which to them is  $P \times Q$ : (1) use market leverage to lower  $P$ ; and (2) use utilization review/prior approval to control  $Q$ . For beneficiary-related political reasons, Medicare tends to focus more on  $P$ . Private payers use a combination (and include risk selection, ie, denying coverage for those patients likely to need a lot of  $Q$ ). Both strategies have their drawbacks, the alienation of providers and patients alike being a common one, but overall the lack of success in controlling healthcare cost growth has led payers to seek new and potentially more promising strategies. At its core, payment reform or incentive realignment is about linking clinician self-interest with the social interest in lowering costs or at least cost growth. Instead of micromanaging the Qs, which is in essence a never-ending argument with clinicians about what constitutes necessary and high-quality care for any particular patient, the new strategy is to let the clinicians decide on  $Q$  once incentives and information feedback loops are clearly set, and to tie the level of overall  $P$  paid/received to physician per-

formance on cost and measurable quality dimensions. Essentially, payers have more or less given up on the prospect of micromanaging the Qs, and switched tactics to offering physicians incentives to help manage total spend and therein allow physicians to choose how best to reduce the Qs to the minimally necessary and efficacious core set for each patient. Underlying this strategy is a belief, based on data from a variety of sources and a growing consensus of researchers, that much care delivered today does not improve health outcomes. Findings from the application of ACC's Appropriate Use Criteria to a large national registry data set support this general conclusion, though the degree of "excess use" surely varies across conditions, physician practices, and hospitals.<sup>1</sup>

The simplest form of "payment

reform" is to take current fee-for-service payment methods and essentially change 1 thing by linking its level to performance on some agreed-upon criteria. Increasingly, physician groups are being pushed by hospital partners and private payers to put the conversion factor for the RBRVS schedule partially "at risk," that is, to determine the actual level of the conversion factor after total cost and quality performance metrics on specific patients are reported. Contracts that tie 4% to 30% of the conversion factor to performance in this way are becoming increasingly common. A conversion factor of \$40 per RVU may have \$2 to \$12 at risk for meeting specific quality goals and patient outcome. This is one example of a "value-based performance" (VBP) payment methodology.

In the coming weeks and months

we will explain various forms of payment reform/incentive realignment being proposed, implemented, or discussed in private and public payer forums. The Patient Protection and Affordable Care Act (PPACA) has certainly generated momentum in this direction, but the ongoing search for cost-growth containment predates PPACA by roughly 4 decades. Our current public budget and economic growth debates will only intensify the interest in this topic. We hope to become a useful resource for your journey down this road.

## REFERENCE

1. Chan PS, Patel MR, Klein LW, et al. Appropriateness of percutaneous coronary intervention. *JAMA*. 2011;306:53-61.

**Author Disclosure:** Dr Nichols reports no relationships or finan-

cial interest with any entity that would pose a conflict of interest with the subject matter of this article. Ms Biga reports serving as an officer/director of Paragon Health; she also reports being an owner/partner/principal of Vertos Education.

## Articles of the Month

### Value-Based Insurance Design With a Large Retail Employer

Michael E. Chernew, PhD

**Editor's note:** *The following article analyzes Kim YA, Loucks A, Yokoyama G, et al. Evaluation of value-based insurance design with a large retail employer. Am J Manag Care. 2011;17:682-690.*

Addressing the challenges facing our healthcare system requires us to produce improved health outcomes with fewer resources. In many cases, payers and providers have attempted to accomplish this goal by improving management of chronic disease. Many different strategies have been tried. Generally, evidence suggests that programs are likely to improve health outcomes, but that finan-

*While the conclusion emphasizes VBID in the presence of disease management, an equally valid conclusion would emphasize disease management in the presence of VBID.*

cial savings are more elusive. The program evaluated by Kim et al combines a disease management initiative with reduced copays for relevant medications. The disease management program evaluated targeted high-risk patients for a more intensive intervention. The authors conclude "VBID may be effective in improving medication adherence and reducing total healthcare costs when active counseling is provided to high utilizers of care."

Closer examination of the study reveals the complexity of this type of analysis and the difficulty associated with drawing strong conclusions. Several issues are of note. First, the intervention combines VBID and disease management. While the conclu-

sion emphasizes VBID in the presence of disease management, an equally valid conclusion would emphasize disease management in the presence of VBID. The study illustrates that we must design composite interventions. In this case disease management was combined with VBID. Moving forward, physician payment reform must be included. Such payment reform must extend beyond pay-for-performance programs that promote use of high-value services to more bundled payment that rewards judicious use of care. Design of such programs is in its infancy, but work is proceeding rapidly.

Second, the analysis illustrates both the importance of targeting high-risk patients and the complexity such

targeting may generate for analysis. For example, in this case the results for the highest risk patients, who received nurse counseling, were very strong, but the results for the lower-risk patients, who received a mailing, were in fact in the opposite direction. Do we believe that the mailing led to greater spending? The study uses a matched control group drawn from individuals who had the opportunity to participate in the disease management program but declined. While the matching balances observable traits, unobservable traits may differ. Of course, while there is no particular reason to believe that any related bias would affect the high-risk and low-risk groups differently, the potential for bias exists. Thus, understanding

if these results reflect real effects or underlying statistical issues is crucial.

Of course, one can find flaws in any study. Evaluations of real-world settings often pose challenges present in this research. Randomization is often impossible. Data from other employers could help by permitting an intent-to-treat design. Moreover, the interventions and settings of different studies vary. No study will generalize perfectly to other settings. In the end, though, we must move forward, remembering that any study is just 1 piece of information. Each contributes to a body of knowledge but must be interpreted as just 1 piece of evidence. Ultimately no single study will be definitive, but we must evaluate the entire body of literature

for guidance. The Kim et al study is but 1 piece of contributing evidence.

**Author Disclosure:** Dr Chernew reports consulting fees/honoraria from VBIDI, PHE, Abbott, and Pfizer. He has received research grants from Universal American.

### Renewed Focus on Cost per Case as a Source of Health Cost Growth Is Warranted

Len Nichols, PhD

**Editor's note:** *This article provides commentary on Roebig CS, Rousseau DM. The growth in cost per case explains far more of US health spending increases than rising disease prevalence. Health Affairs. 2011;30:1657-1663.*

Healthcare cost growth gets plenty of attention these days, as it should, since it represents major fiscal, economic, and political challenges in the United States and around the world. Before lasting solutions are possible, underlying sources must be understood and addressed. The literature on sources of cost growth is growing, though still somewhat diffuse, and partly as a consequence, widely effective solutions remain elusive. A recent set of papers has refocused policy makers' attention on fundamental sources by decomposing real (inflation-adjusted) per capita cost growth into 2 main sources: treated

prevalence (of all conditions) and cost per case. (Note: cost per case is made up of both the average price and the number of units of service utilization.) The seminal papers that generated this new strand of the cost

University.<sup>1-3</sup> Those papers and others in a similar vein that focused on obesity analyzed household survey data and concluded that treated prevalence is far more important than cost per case in explaining health system cost growth.

This research has made the useful point that upstream disease prevalence must be addressed if we wish to tame long-term healthcare cost growth, especially as we expand access and thus treated prevalence for any given underlying level of clinical prevalence. This is manifestly important for obesity and obesity-related conditions like diabetes and hyperlipidemia. However, an overly broad inference of the relative importance of treated prevalence tends to divert attention from growth in cost per case as a source of health system cost growth. Indeed, a recent paper and new approach to analyzing the same survey data that Thorpe used strongly suggests that mea-

---

*. . . measurable progress toward reducing overall healthcare spending growth will require broad reductions in the growth rate of cost per case.*

---

growth literature all had the same lead author, Ken Thorpe of Emory

surable progress toward reducing overall healthcare spending growth will require broad reductions in the growth rate of cost per case.

The recent analysis by Roehrig and Rousseau we've chosen to highlight this month differs from those of Thorpe et al in 3 important ways: (1) it focuses on annual recent data, 1996-2006, rather than 2 "bookend" years, 1987 and 2002; (2) it focuses on spending on all conditions, not just the "top 20 most expensive;" and (3) it benchmarks total spending with the national health expenditure accounts of the CMS Actuaries, the official arbiters of health spending in the United States. Finally, Roehrig and Rousseau also supplement the household expenditure with household medical examination survey data, to put a much finer point on the rates of clinical versus treated prevalence over time. The basic data source of household expenditures by condition is the Medical Expenditure Panel Survey conducted annually by the Agency for Healthcare Research and Quality (<http://www.meps.ahrq.gov/mepsweb/>). The periodic clinical supplemental survey employed by Roehrig and Rousseau is the National Health and Nutrition Examination Survey conducted biannually by the Centers for Disease Control and Prevention.

Overall, the Roehrig and Rousseau conclusion is that three-fourths of the recent systemwide real per capita spending growth of 3.8% per annum can be explained by increases in cost per case. Thus, this analysis supports the growing emphasis on payment and delivery reform that has surrounded the debate over and implementation of the Patient Protection and Affordable Care Act. Their research also indicates spending growth facts and illustrates that the relative importance in explaining those facts—between prevalence and

cost per case—varies considerably across the full range of medical conditions. Some of the largest observed increases in spending and in cost per

---

*...this analysis supports the growing emphasis on payment and delivery reform that has surrounded the debate over and implementation of the Patient Protection and Affordable Care Act. Their research also indicates spending growth facts and illustrates that the relative importance in explaining those facts—between prevalence and cost per case—varies considerably across the full range of medical conditions.*

---

case were the genitourinary, digestive, and musculoskeletal clinical areas. Interestingly, for heart conditions, real spending growth per capita over the decade averaged only 0.3% per year, with treated prevalence exceeding

that rate and cost per case actually falling by 0.1% per year. Congestive heart failure had a particularly high treated prevalence growth rate, 4.2% per year, whereas treated prevalence of coronary heart disease actually fell 0.7% per year. These data suggest that growth in cost per case for heart conditions is not a major contributor to recent and sustained healthcare cost growth. Also of general interest, for the 5 conditions (hyperlipidemia, esophageal disorders, hypertension, diabetes, and anxiety/depression) for which treated prevalence had the greatest impact on spending growth, the percent of spending accounted for by prescription drugs ranged from 47% to 87%. This suggests that drug pricing models are worthy candidates for analysis in future payment innovation conversations as well.

Research on the sources of cost growth will and should continue, and more refined methods of attributing spending to more and more specific conditions and comorbidity patterns will surely be developed. In particular, much more careful work needs to be done on measuring the "units" of utilization so that appropriate inferences about "cost per case" and the relative contribution of sometimes highly variable "appropriate use" can be made. But this article has served to remind us that cost per case remains very important, in terms of both levels and rates of growth, as the search for ways to lower healthcare costs and cost growth continues.

## REFERENCES

1. Thorpe KE, Florence CS, Howard DH, Joski P. The impact of obesity on rising medical spending. *Health Affairs*. 2004;23:480-486.
2. Thorpe KE, Howard DH. The rise in spending among medicare beneficiaries: the role of chronic disease prevalence and changes in treatment intensity. *Health Affairs*. 2006;25:w378-w388.
3. Thorpe KE, Florence CS, Howard DH,