

# Redefining Value in Healthcare:

*Why Providers need  
to take back their OR*

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The rules of healthcare delivery and access have changed drastically. Under the Patient Protection and Affordable Care Act (PPACA), the Centers for Medicare and Medicaid Services (CMS) will depart from their fee-for-service payment system that rewarded volume, to a reimbursement methodology that now holds Providers accountable for the quality and cost of their healthcare services.<sup>1</sup>

This new reimbursement system is mandatory for any hospital or physician receiving payments from CMS and includes financial incentives to reward quality, efficiency, safety and cost-reduction, and penalize inappropriate, unnecessary, and costly care (as defined by CMS). Providers who do not meet certain standards will be excluded from financial incentives and risk losing millions of dollars that could threaten the viability of physician practices and hospitals.

Since all players in the healthcare ecosystem will be impacted, stakeholders from both sides (hospital administration and physicians) must move from a subjective to an objective analysis of quality and cost – especially if they want to maintain control of their patient's care.

A key area where collaboration between healthcare providers can drastically eliminate hidden costs, increase profitability and enhance quality of care is in the operating room (OR). This white paper will examine what it really means for healthcare providers to take back control of the performance and management of their orthopedic surgical services and how adopting a carefully managed process can ensure that the transition won't disrupt daily operations or healthcare services to patients.

## Cause and Effect

### The following market drivers address the acute pressures facing healthcare providers:

**Unsustainable Healthcare Costs:** The most updated projections by economists and actuaries at the Centers for Medicare and Medicaid Services (CMS)<sup>2</sup>, is that U.S. health spending is expected to grow to 7.4 percent in 2014 as major coverage expansions from the PPACA begin. By 2021, the projection is that federal, state, and local government health care spending will be nearly 50 percent of national health expenditures, with federal spending accounting for about two-thirds of the total government share. This rise in government spending on health care is expected to be driven by faster growth in Medicare enrollment and expanded Medicaid coverage.

In an effort to control costs and keep state and local governments from collapsing under the financial burden, CMS, under direction of the PPACA, has begun instituting a plethora of reimbursement reductions and payment reforms that directly impact healthcare providers and patients:

**1. Value-Based Purchasing (VBP):** Starting October 1st, 2012, the PPACA requires healthcare providers receiving reimbursements from CMS to implement value-based purchasing programs. This means that physicians and hospitals alike need to demonstrate that they are identifying critical areas within their healthcare services where they are working to reduce cost, improve patient outcomes and provide more value for each dollar spent.

This new payment system shifts the focus from rewarding volume to one that rewards value. By linking provider payments to improved performance, cost and quality, VBP holds healthcare providers accountable for reducing inappropriate care and publically identifies and rewards the best-performing providers.

### Goals for CMS' VBP Initiatives i

- Improve clinical quality;
- Reduce adverse events;
- Improve patient safety;
- Encourage more patient-centered care;
- Avoid unnecessary costs in the delivery of care;
- Stimulate investments in structural components or systems that have been proven effective in improving quality and/or efficiency;
- Make performance results transparent and comprehensible so that consumers can make value-based decisions about their health care and;
- Encourage hospitals and clinicians to improve the quality of care.

VBP is a significant departure from CMS' fee-for-service (FFS) payment systems. By rewarding excessive, costly, and complex services rather than quality, FFS reimbursements are considered to be a main contributor to the unsustainable cost of healthcare.<sup>3</sup>

Another element is that data (quality, efficiency, patient satisfaction, safety, etc.) from VBP programs will be made public, as will information about how Providers compare to one another. Publicly disseminating this information is designed to promote transparency to help consumers make more informed decisions about their healthcare. Over time, Payers will also begin directing patients to hospitals and physicians that have the best VBP outcomes.

**2. Accountable Care Organizations (ACOs):** Under CMS' "Medicare Shared Savings Program," healthcare providers can voluntarily join together to form an ACO. In an ACO, Providers integrate and coordinate services with the goal of improving quality of care and lowering costs. ACOs that successfully meet performance and cost benchmarks set by the Secretary of Health and Human Services are rewarded through bonuses and share in any savings to the Medicare program<sup>5</sup>.

In addition to giving providers more autonomy and financial incentive to control national healthcare spending and practice higher-value medicine, organizations who meet eligibility to become an ACO will be more likely to gain and control market share at the expense of those who continue to offer a traditional healthcare delivery model<sup>6</sup>.

A report released by the Boston Consulting Group<sup>7</sup> at AdvaMed 2012 stated that ACOs will de-emphasize the "relationship sell" between the doctor and the sales rep and will re-focus device sales on products that bring significant value to hospitals.

**3. Physician Fee Reductions.** The recent 2 percent reduction in Medicare reimbursement is likely to be the tip of the iceberg when it comes to payment reductions to Providers. While threats of CMS reimbursement cuts are nothing new, the reality is that much larger cuts are highly probable in the future, especially as government takes on more responsibility for healthcare costs<sup>8</sup>. The complicated and controversial sustainable growth rate (SGR) formula has called for rate reductions every year since 2002. While congress has postponed every one since 2003, the concern is that each postponement makes the next year's cuts even larger<sup>9</sup>.

**4. Bundled Payments:** As momentum builds to replace the current fee-for-service payment system, bundled payments are perceived as one strategy to help support this effort. Medical care providers who agree to receive bundled payments by Payers (CMS, private insurance, etc.) will be paid as a team rather than each provider getting a separate payment.

In a bundled payment structure, a hospital and its physicians set one price for providing care to one patient over a set period — usually 30, 60, 90 or 120 days. Under the PPACA, Medicare bundles their payments to hospitals and physicians for “episode of care” services to seniors, such as a surgical procedure that would put them in a hospital. It also requires that Providers assume the financial risk for delivering all care, including any complications.

Bundled payment meets many of the PPACA and CMS’ objectives for value-based purchasing, including payment incentives to both physicians and hospitals that are linked to quality and efficiency. As a result, many hospitals are becoming early adopters of this payment reform in the hopes of seizing the opportunity to acquire volume.

A compelling incentive for many providers is that bundles for cardiac or orthopedic surgery can be the most profitable cases in hospitals, making them crucial for hospital success<sup>10</sup>. In addition, hospitals and physicians are provided more latitude to design and develop how they deliver the care to improve outcomes. Bundled payments can also help Providers attract and capture more Payers, thus further solidifying the Provider’s position in the marketplace.

**Emergence of “Disruptive” Innovations:** Clayton Christensen, Harvard Business School Professor and author of *The Innovators Dilemma*, defines disruptive innovations as “cheaper, simpler, more convenient products or services that start by meeting the needs of less-demanding customers,”<sup>11</sup> (i.e. high-maintenance surgeons).

Christensen explains that, as companies innovate faster than their customers’ needs evolve, they end up producing products or services that are actually too sophisticated, too expensive, and too complicated for many customers in their market. However, companies that pursue disruptive innovations allow a whole new population of consumers at the bottom of a market to access products or services that had only been accessible to consumers with a lot of money or a lot of skill<sup>12</sup>.

In a marketplace that is increasingly concerned about maintaining margins, interest in disruptive healthcare innovations is expected to grow. While there are numerous examples of disruptive innovations in healthcare, the concept of “stable technology” medical devices has gained a lot of attention, especially with regard to orthopedic implants.

Similar to prescription medications that have lost their intellectual property, Stable-Technology™ implants are FDA-cleared and typically sold at approximately 50-60 percent of the cost of brand name devices<sup>13</sup>. In addition to a stabilizing orthopedic device market over the past decade, clinical data to support the superiority of new technology over traditional products has not only been unsubstantiated, but proven otherwise.

For example, a recent study evaluating registry survival of higher-cost “premium” knee and hip components compared to lower-priced standard components concluded that there was no difference in the cumulative revision rate at 7–8 years between premium and standard TKAs or THAs<sup>14</sup>. While the cost of the premium implants was approximately \$1000 higher than the standard implants, premium implants did not demonstrate better survival than standard implants. Revision indications for TKA also did not differ.

Some new devices represent major technological innovations and are supported by significant clinical evidence on safety and efficacy. However, most, especially for orthopedic and spine surgery, are introduced as incremental modifications of existing products without studies of performance relative to alternatives and for specific patient populations.<sup>15</sup>

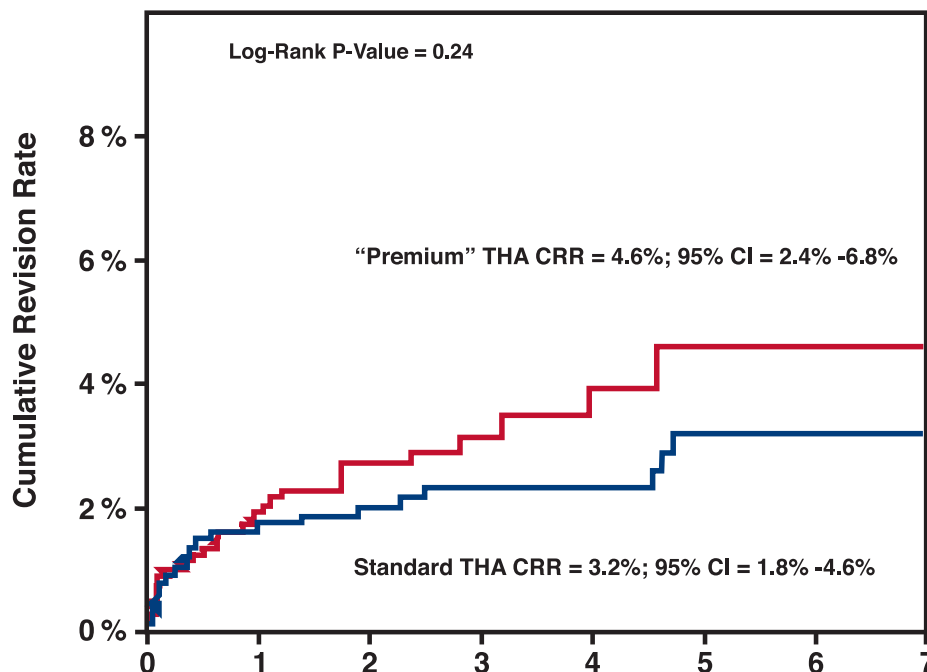


Figure 1 shows the CRR by type of implant for TKA. There was no difference ( $p = 0.94$ ) in the CRR between premium and standard TKAs at 7 years (2.2% versus 3.0%). CI = confidence interval. ii

As physicians learn more about the validity and effectiveness of Stable-Technology™ devices, compared to higher cost premium ones, they are likely to embrace their use —especially for less-complicated, orthopedic and spinal surgeries — as it will enable them to help more patients access and afford musculoskeletal care.

## Medical History

Medical device sales representatives have become fixtures in operating rooms across the country, but it hasn't always been that way. Traditionally, nurses and surgical technicians took on the role now performed by sales people representing medical device firms.

Over the past few decades, medical technologies began rapidly proliferating, but the data to substantiate one product's effectiveness over another has lacked. Medical device sales reps stepped in to fill that gap and “enlighten” doctors on why their product was superior. In fact, many sales reps developed such strong relationships with physicians that they began contributing to clinical decisions, particularly younger and less experienced surgeons. Physicians started trusting their OR team less and less, and became increasingly reliant on their medical device sales reps.

Over time, as more advanced technologies were developed, the justification became that certain medical devices could not be used — or used safely — without sales reps. And as the number of sales reps increased, so did the prices of medical devices. With every artificial hip, knee, anterior spinal implant and pedicle screws system, came implant-specific instruments and a knowledgeable sales rep. These additional services were sold on “consignment,” but were actually included in the price of the implant.

While many sales reps have genuinely helped physicians shorten surgery times and improve surgical outcomes, the fact is that those “consigned” services weren't free. A review of the seven largest orthopedic medical device manufacturers reveal that in 2009, more than 43 percent of the cost of their implants came from selling, general and administrative (SG&A) (See Figure 2) In comparison, the cost of goods for an implant was less than 30 percent. Though SG&A includes several components, the largest is payment to the sales group.<sup>16</sup>

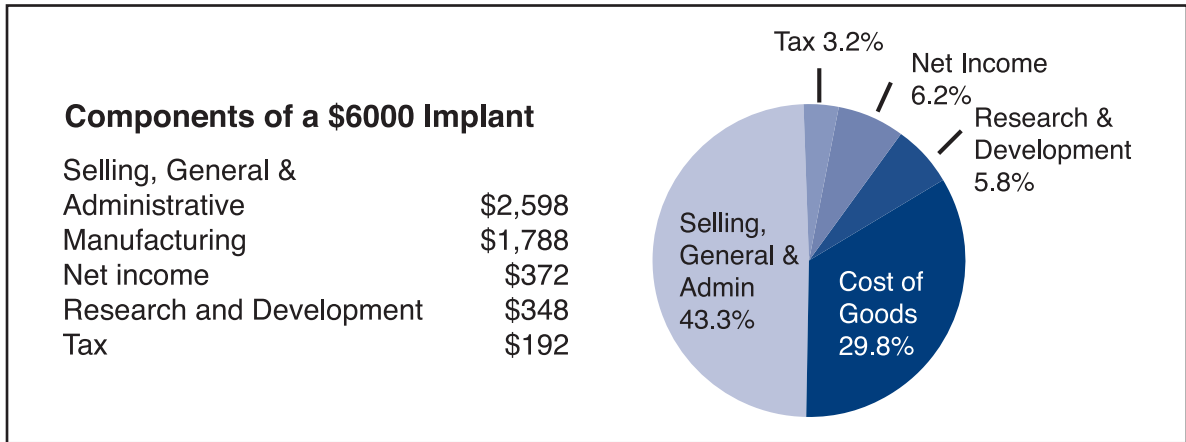


Figure 2: SG&A of an Orthopedic Implant.iii

Medical devices sales reps became so ubiquitous with the OR that a status quo evolved. Both hospitals and physicians abdicated responsibility for the handling of inventory, instruments and surgical guidance to the sales reps and the medical device companies they represented. This was especially true for new implant systems that were touted — by the sales rep — to significantly improve patient outcomes, but at a steep price and without valid evidence.

### The Growth of GPOs

Before the rise of medical device sales reps in the OR, Group Purchasing Organizations (GPOs) were gaining traction. As Medicare instituted fixed-rate reimbursements, hospitals across the country looked for ways to control costs. By consolidating their purchasing power through a GPO, hospitals felt they could negotiate better terms with suppliers, including price, than they could individually.

While GPOs have helped hospitals bargain for lower prices from manufacturers, the trade off was that they took purchasing responsibility away from hospital supply chain personnel. In addition, as a part of the negotiation process between GPOs and medical device manufacturers, it became commonplace for device firms to insert price confidentiality clauses into their invoices and enforce them against efforts by GPOs and hospital consultants to gather and compare price information.<sup>17</sup> Consequently, physicians wanting to compare price information before ordering certain medical devices for their patients were unable to do so.

### Dissecting the Problem

Under the new realities of the U.S. healthcare delivery system, hospitals and physicians who do not come together to take back the responsibility of managing their operating room and surgical services will find it increasingly prohibitive to provide healthcare to their communities. There are four primary reasons for this: denied financial incentives; lack of progress; perception of substandard care; lack of control.

**Denied Financial Incentives** - Under PPACA, healthcare providers who eliminate waste and redundancies, demonstrate improved quality and reduce Diagnosis Related Group (DRG) reimbursements will receive incentive payments. However, if the physicians do not know (or does not care about) the true cost of their medical devices — especially those physician preference items (PPIs) — then they will likely fail to meet those performance targets and will be excluded from financial incentives.



For example, a hospital's capacity to deliver quality care, improve outcomes and manage expenses can greatly depend on the type of medical devices their surgeons select. A new or premium technology is likely to have a high purchase price, and under CMS' Value-based Purchasing (VBP) initiative, it is unlikely that Medicare or Medicaid will reimburse for it, leaving the hospital responsible for the cost.

A Provider who does not give adequate consideration to the cost of their devices and how that cost may affect a patient's ability to access and afford quality care reflects poorly on the hospital and the physicians and compromises their performance evaluation under CMS.

**Lack of Progress** – Physicians and hospitals who work in concert to control and manage their OR and surgical services will ultimately contain costs while improving quality outcomes. As a result, they will be eligible for more CMS' incentive payments, which will provide them the means to reinvest in improved equipment, staffing, and patient-focused programs. These improvements will enable certain hospitals to enhance their healthcare services and help them gain competitive advantage.

Conversely, those Providers who do not take courageous and calculated measures to transform how their medical devices are purchased and managed are positioning themselves to continually miss out on essential financial incentives. This gap in revenue will make it harder and harder for them to compete.

**Perception of Substandard Care** – No healthcare provider wants to be seen as delivering inferior or inadequate care. But if a healthcare provider does not consistently deliver efficient, cost-effective medical care that is precisely what will happen under VBP and other pay-for-performance initiatives. Providers will not only be publically scrutinized and labeled as being poor-performers, but Payers will steer patients to providers that are delivering more patient-focused, value-based care. In fact, this is already happening.<sup>18</sup>

In order for hospitals and physicians to ensure that their healthcare meets the PPACA's expectations for accountability and value-driven care, they must work collaboratively to carefully evaluate their medical device technologies for quality and cost. And since expenditures for medical devices, specifically PPIs, have historically accounted for one-third of overall hospital supply costs — and are rising as a percentage of the total<sup>19</sup> —, it makes the most sense to start in the operating room.

**Blind Operation** – Did you know that the prices of cardiac and orthopedic implantable medical devices (IMDs) are increasing at a higher rate than any other medical care?<sup>20</sup> And that the price hospitals must pay for medical devices account for 30-80 percent of the reimbursement it receives from public (Medicare/Medicaid/Medi-Cal) and private insurers?<sup>21</sup>

If you're a surgeon and you aren't aware of how your purchasing decisions impact the hospital that you practice in and the patients that you care for, you're essentially operating in the dark. As mentioned previously, accessing transparent price information has historically been very difficult for physicians. Unfortunately, this leaves them very dependent on medical device sales reps to make their purchasing decisions. As a result, physicians often express strong preferences for certain manufacturers and models of medical devices that are often much higher in cost and not included in pre-negotiated, value-based purchasing decisions.

The relationship between physicians and manufacturers greatly influences the prices that hospitals pay for their medical device implants. If that is not managed properly, then Providers will continue to struggle to contain costs and make objective purchasing decisions that are in the best interest of their patients. This is because the prices that a hospital pays for their implants will likely be higher than they otherwise would be.

For instance, data reported by hospitals and GPOs discloses one hospital spending about \$4,500 for a specific primary total hip construct in 2010 while a GPO-member hospital paid about \$8,000 for the same device construct, or 78 percent more. Similarly, another GPO provided data on two of its member hospitals that purchased the same primary total knee construct. One hospital paid about \$5,200 for the primary total knee construct, while the other hospital paid about \$9,500, or 83 percent more.<sup>22</sup>

Excess or unnecessary IMD costs that are incurred and passed on to CMS will have serious repercussions for the physician in terms of reduced reimbursements and lower public rankings as a healthcare provider. Physicians also leave themselves vulnerable to unscrupulous sales reps that shrewdly circumvent capitated prices by billing Providers for undisclosed “accessories” and marginal services that were not included in the original capitation.

In essence, physicians who continue to abdicate responsibility for the purchasing and management of their medical devices compromise themselves, their hospitals and their patients.

## Examining the Solution

Objectively evaluating and responding to changes in technological opportunities; evaluating the potential cost and quality of innovative products; and predicting the longer-term consequences of purchasing decisions is essential to a Provider’s ability to provide value-focused care to their communities. And the most direct path to accomplishing this is for hospitals and physicians to commit to collaboratively regaining control over the management of their operating room and surgical services.

Many hospitals and physicians often perceive “taking back the OR” as simply implementing a rep-less model and purchasing generic products. This product-focused solution only serves to alienate physicians for two main reasons. First, they often see lower-cost, Stable-Technology™ implants as being lower in quality. Second, since medical device sales representatives have been fixtures in the operating room for so long, surgeons are often concerned that their removal will mean incompetent help in the OR.

While taking back the OR does mean owning and managing the implants and instruments that are purchased instead of consigning them, it does not mean that lower quality medical devices are used or that surgeons will be left with inefficient and inadequate support in the OR. Just the opposite, in fact.

By re-defining what products are purchased; how they are purchased; where they are purchased; why they are purchased (based on both cost and quality data); and who they are purchased from, Providers start making patient value the basis for their decision-making.

This requires a process-focused change, not a product-focused change, which is why it is imperative for hospitals and physicians to collaborate. Process-focused change is about coordinating responsibilities across multiple hospital departments and re-aligning the day-to-day interactions with the suppliers. The outcome is that Providers are able to focus more on delivering value-based patient care as opposed to getting distracted by turf-war politics.

Coming to grips with this reality and implementing the change needed to take back the OR can be overwhelming, but it does not have to be. Leveraging the time, expertise and resources of an un-biased Learning Development and Change Management (LDCM) group will make the valuable and vital change of taking back the OR significantly less complicated and formidable.

In addition to facilitating a process that accommodates conflicting schedules and different levels of



transparency, the skilled LDCM will be considerate and respectful of the often opposing interests and agendas of multiple decision-makers. With cultural collaboration as the focus, the LDCM will work toward solutions that are in the best interest of both the Provider and their patients.

## Healthy Benefits

When hospitals and physicians come together and partner with a LDCM group, the benefit to the Providers, their patients and their Payers are prolific.

- **Access to Stable-Technology™**. By definition, Stable-Technology™ products are FDA-cleared device designs that have been used effectively for years with positive clinical outcomes. What makes them unique is that their intellectual property protections have lapsed, so they are more affordable. These matured technologies comprise at least 75 percent of the implant market and are available at wholesale pricing when purchased directly from manufacturers.

A key component of a Provider's ability to successfully control their orthopedic surgical services is their capacity to take advantage of Stable-Technology™ products. Stable-Technology™ medical implants fall in line with Clayton Christensen's concept of "disruptive innovations" in which lower cost, more efficient and convenient alternatives improve access of care while maintaining—if not improving—the quality of care provided to patients.

Gaining the knowledge of how to access and own high-quality, FDA-cleared Stable-Technology™ products empowers healthcare providers to change how they deliver care. In the process, the concept of value changes within the organization. Additionally, once manufacturers realize that they are dealing with an informed buyer, they will aim to secure that Provider's business by offering them their proprietary products at wholesale prices.

- **Transparency**. When healthcare providers regain control of their OR, they learn to evaluate the real cost of their medical devices. For example, they are able to see the evidence that there is a 70-80 percent mark-up on consigned implants that come with specialized instruments and sales reps. Transparency also helps stop the virtuous/vicious cycle in which sales reps in the OR stimulate higher costs by surreptitiously charging Providers for implant add-ons, and the Provider is held hostage because they are unable to scrutinize the actual cost.

When healthcare providers are able to clearly compare their consigned products and services with similar, lower-cost options, they can make more empowered, value-based decisions that are in the best interest of their patients.

- **Improved OR support**. Transitioning to specially-trained device technicians in the operating room eliminate the need for expensive, on-call sales reps to assist a physician during surgery. Device technicians who receive specialized, high-level training and certification are able to provide a standard of service and support that exceeds what surgeons are accustomed to receiving from their medical device sales rep.

Device technicians are carefully selected (by the healthcare provider) hospital personnel who are extensively trained to become an on-site OR Device Technician (ORDT™). They receive in-depth training by the LDCM in lean implant management, direct-access purchasing and specific medical device disciplines. In addition, they are closely mentored and trained by former medical device sales reps to

ensure that the surgeon is receiving competent, high-caliber support during surgical procedures.

- **Cost reduction.** By transitioning from subjective to objective decision-making, purchasing Stable-Technologies™ directly from manufacturers and relying on OR device technicians (ORDTs™) to provide high-value surgical support, Providers will significantly reduce costs while maintaining quality of care.

As a result of operating more efficiently and effectively, Providers will see that CMS and other Payers are directing patients to them because they are providing value-based healthcare.

- **Expands opportunities.** The financial incentives and financial savings earned from taking back the OR can be reinvested back into improved equipment, staffing, and expanded service lines that benefit the patients, the surgeons, and the community at large. These enhancements give the health-care provider a competitive advantage and strengthen their position in the marketplace.

For example, some institutions appropriate financial incentives by investing in management service organizations (MSOs) and service line institutes, allowing them to share in the rewards while avoiding individual physician compensation issues or conflicts of interest.

- **More choice and control.** By purchasing directly from multiple manufacturers (Direct-Access™ model), the provider is able to procure their orthopedic implants at wholesale pricing. This gives them more control and objectivity, enabling them to access better price and product options, positioning them as a value-based purchaser. This Direct-Access™ model also strengthens the Provider's negotiating position with all vendors over any product or service and gives Providers the choice of purchasing products that do not have sales rep commission or consignment costs built into the selling price.

- **Establishes a culture of continuous improvement.** Transitioning to an internally-controlled orthopedic implant management model enables healthcare providers to evaluate products and processes for both cost and quality. As a result, Providers reinforce and sustain a culture within their organization that links waste reduction and the elimination of redundancies with continuously improving patient care. Staff within the organization feel a sense of pride and newfound enjoyment from their re-aligned responsibilities and begin to see themselves as part of a larger, more meaningful cause.

## What to Look For in a LDCM Partner:

When seeking a partner to help facilitate the process of regaining control over the management of the OR and surgical services, healthcare providers should consider collaborating with a Learning Development and Change Management firm who can contribute the following:

- Provides **independent, impartial and technology-neutral recommendations** to the hospital and physicians so they can make more informed, value-based decisions.
- **Promotes transparency and improves service-line profitability** by disclosing all pricing for all orthopedic products, without receiving financial compensation from any technology supplier or vendor.
- A **proven process** that helps the hospital leadership educate personnel on the implications of Value-based Purchasing; the importance of cost-containment; and how to preserve resources to provide better patient care.

- A **keen understanding** of the different needs, concerns and interests of the cross-functional personnel involved in implementing change.
- A **training, mentoring and certification (credentialing) program** that provides on-site mentors and coaches who teach, train, and coach the Provider's personnel to best serve the surgeon in the OR.
- Knowledge of how to **find and evaluate the real cost** of consigned implants, instruments and sales reps.
- The ability to provide hospitals with **more choice** in the selection of Stable-Technology™ implants and procure them at wholesale prices.
- Coaching and training on how to implement a Direct-Access™ supply chain that **transforms the distribution channel** to be more favorable to both Providers and patients.
- Has the ability to introduce Providers to vendors who were not previously willing to sell their devices directly to the hospital (with no middlemen) and **help the Provider** gain their confidence and business.
- **Resources and expertise to enable Providers** to be more financially stable, secure and self-sufficient.

## About Dr. Gary Botimer

Gary D. Botimer, MD has been an Orthopaedic surgeon for over 28 years. Currently, he is Chairman and Associate Professor of Orthopaedic Surgery at Loma Linda University, School of Medicine (LLUSM) as well as Head, Arthroplasty Service at LLUSM. Dr. Botimer is also Institute Director of RONI (Rehab, Orthopaedics, Neuro/Neurosurgery Institute) at Loma Linda University Health.

Loma Linda University School of Medicine was established just after the turn of the 20th century to train physicians within a Christian service-oriented environment to help underserved communities access high-quality medical care. As a result, LLUSM became renowned for having the most graduates in the most countries around the world. The financial restraints of trying to provide adequate care to patients in many third world countries cultivated a natural impetus behind LLUSM's pursuit of delivering first-rate health-care while eliminating wasteful practices.

Dr. Botimer's passion to help hospitals and surgeons work together to take back control of their OR is his belief that he – and all physicians – have a moral imperative to protect patients access to quality care. His philosophy is that, in order to care for the whole person, doctors must ambitiously embrace – not abdicate – their role in helping patients maintain access to high-quality care. This requires doctors to respect and acknowledge the challenges, including financial, that their patient's face.

Dr. Botimer works diligently toward the research and development of newer, better orthopaedic procedures in order to help improve the health and well-being of his patients, as well as the world of joint replacement surgery. When he is not working on developing further advancements in knee replacements and orthopedic surgery, Dr. Botimer enjoys woodworking, playing guitar, wakeboarding, snowboarding and spending time with his lovely wife and four children. He continually gives thanks to God for his life, family and patients.

## References

- <sup>1</sup> “Roadmap for Implementing Value-driven Health Care in the Traditional Medicare Fee-for-Service Program,” Centers for Medicare & Medicaid Services, <https://www.cms.gov/>
  - <sup>2</sup> [QualityInitiativesGenInfo/downloads/VBPRoadmap\\_OEA\\_1-16\\_508.pdf](https://www.cms.gov/QualityInitiativesGenInfo/downloads/VBPRoadmap_OEA_1-16_508.pdf)  
Keehan, Sean P., Cuckler, Gigi A., Sisko, Andrea M., Madison, Andrew J., Smith, Sheila D., Lizonitz, Joseph M., Poisal, John A., Wolfe, Christian J. National Health Expenditure Projections: Modest Annual Growth Until Coverage Expands And Economic Growth Accelerates. 2012. <http://content.healthaffairs.org/content/early/2012/06/11/hlthaff.2012.0404>
  - <sup>3</sup> Keckley, Paul H. PhD, Coughlin, Sheryl, PhD, MHA, Gupta, Shiraz, PharmD, MPH, Underwood, Howard, R. MD, FSA. Value-based Purchasing: A strategic overview for health care industry stakeholders. Deloitte. 2011. [http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Health%20Reform%20Issues%20Briefs/US\\_CHS\\_ValueBasedPurchasing\\_031811.pdf](http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Health%20Reform%20Issues%20Briefs/US_CHS_ValueBasedPurchasing_031811.pdf)
  - <sup>4</sup> Ibid. P.10
  - <sup>5</sup> Affordable Care Act Gives Providers New Options to Better Coordinate Health Care. <http://www.healthcare.gov/news/factsheets/2011/05/accountablecare05172011a.html>
  - <sup>6</sup> Keckley, Paul H., PhD., Hoffman, Michelle, PhD. Accountable Care Organizations: A new model for sustainable innovation. Deloitte. 2010. [http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US\\_CHS\\_AccountableCareOrganizations\\_070610.pdf](http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US_CHS_AccountableCareOrganizations_070610.pdf)
  - <sup>7</sup> Weisman, Robert. Study: The business model for the medical device industry is unsustainable. Boston Globe. October, 2012.
  - <sup>8</sup> Physician Claims Under the Sequestration Rules for Medicare. March 19, 2013. [www.acponline.org/running\\_practice/payment\\_coding/medicare/sequestration\\_rules\\_medicare.htm](http://www.acponline.org/running_practice/payment_coding/medicare/sequestration_rules_medicare.htm)
  - <sup>9</sup> Lowes, Robert. No April Fooling: 2% Medicare Pay Cut Hits Monday. Medscape Medical News Mar 28, 2013.
  - <sup>10</sup> Burns, Joseph. Bundled payment. Hospitals and Health Networks. [http://www.hhnmag.com/hhnmag/jsp/articledisplay.jsp?dcrpath=HHNMAG/Article/data/04APR2013/0413HHN\\_coverstory&domain=HHNMAG](http://www.hhnmag.com/hhnmag/jsp/articledisplay.jsp?dcrpath=HHNMAG/Article/data/04APR2013/0413HHN_coverstory&domain=HHNMAG).
  - <sup>11</sup> Christensen CM. The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail. Boston, MA: Harvard Business School Press; 1997.
  - <sup>12</sup> Christensen, Clayton. <http://www.claytonchristensen.com/key-concepts/>
  - <sup>13</sup> Ford, Ashley. What to watch for in orthopedics in 2013. The Advisory Board Company. The Pipeline: Technology Insights. January 25, 2013.
  - <sup>14</sup> Gioe, Terence J., MD, Sharma, Amit, MD, Tatman, Penny, MPH, Mehle, Susan, BS. Do “Premium” Joint Implants Add Value?: Analysis of High Cost Joint Implants in a Community Registry. Clin Orthop Relat Res. 2011 January. PMID: PMC3008865. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3008865/#CR3>.
  - <sup>15</sup> Paxton, E.W. et al. “The Kaiser Permanente National Total Joint Replacement Registry”, Permanente Journal 12, no 3 (2008): 12-16.
  - <sup>16</sup> Mendenhall, Stan. “Replis” Implants?” Orthopedic Network News. 2010.
  - <sup>17</sup> Thill, L. The Medical Device Muzzle. Journal of Healthcare Contracting (2006). <http://www.jhconline.com/article-marapr2006-lawsuit.asp>.
  - <sup>18</sup> Kowalczyk, Liz. Plans steer patients to lower-cost hospitals. Boston Globe. February 10, 2011.
  - <sup>19</sup> Financial Leadership Council, Enfranchising Physicians in Supply Reform: Best Practices to Achieve Procedural Cost Reduction (Washington: Advisory Board Company, June 2006).
  - <sup>20</sup> United States Government Accountability Office. Lack of Price Transparency May Hamper Hospitals’ Ability to Be Prudent Purchasers of Implantable Medical Devices. Report to the Chairman, Committee on Finance, U.S. Senate. January 2012. <http://www.gao.gov/assets/590/587688.pdf>
  - <sup>21</sup> “Medical Device Intensive DRGs. Orthopedic Network News 17, no. 3 (2006): 2
  - <sup>22</sup> United States Government Accountability Office. Lack of Price Transparency May Hamper Hospitals’ Ability to Be Prudent Purchasers of Implantable Medical Devices. Report to the Chairman, Committee on Finance, U.S. Senate. January 2012. P.28.
- i “Medicare Hospital Value-based Purchasing Plan Development,” Issue Paper, U.S. Department of Health & Human Services, 1st Public Listening Session, January 17, 2007, [https://www.cms.gov/AcuteInpatientPPS/downloads/hospital\\_VBP\\_plan\\_issues\\_paper.pdf](https://www.cms.gov/AcuteInpatientPPS/downloads/hospital_VBP_plan_issues_paper.pdf)
- ii “Ambulatory surgery Centers: A Positive Trend in Health Care.” Ambulatory Surgery Center Association. <https://higherlogicdownload.s3.amazonaws.com/ASCACONNECT/ASCs%20-%20A%20Positive%20Trend%20in%20Health%20Care.pdf?AWSAccessKeyId=AKIAJH5D4I4FWRALBOUA&Expires=1369780739&Signature=RZbZvohgrcXCF8PLF%2ByA9MFP6c0%3D>