Preparing for the Coming Change:  
An Overview of the Healthcare Analytics Market

Overview of the Health Care Analytics Market
BI Needs Outpace Vendor Tools and Health-Care Organizations’ Capabilities [00:01]

[Jim Adams]
Thank you so much, Tyler and thanks for the opportunity to present to this audience today. This is an update and a repeat of a presentation, a session that was held in last fall at the Health Analytics Summit that was hosted by Health Catalyst®. I’m really pleased to have this opportunity today.

Before we get started, why don’t we start with a polling question.
What is your current role, function, or department within your healthcare organization?

[00:28]

[Tyler Morgan]
Alright, here’s our first poll. What is your current role, function, or department within your healthcare organization? Finance, Clinical or Quality, IT, Executive, or Operational?

We’ll leave this poll up for just a few moments to give everyone a chance to answer that.

Okay. We’ll go ahead and close that poll and let’s share the results here.
Okay, Jim, it looks like we’ve got 10% who answered the poll with finance, 25% identified as clinical or quality, 25% IT, 25% executive, and 14% operational.
Jim Adams

Alright. Thanks, Tyler. That’s very helpful. I appreciate the information upfront. It helps me to understand where the questions might be coming from or how to tailor the talk track. So with that, let’s get started. It looks like we have a really good mix of skills and backgrounds attending this session.
Road Map

Beyond Population Health Management – The Coming Retail Revolution

1. BI Requirements and Challenges
2. The Ever-Changing BI Marketplace

So today’s session will be in three parts. We’re going to start off with talking about a factor that we feel is a major driver of change within healthcare and also driver of need for business intelligence and that’s what we call the coming retail revolution. The second section, we’ll take a look at the journey that most organizations are taking and their BI efforts. And then the third session, we’ll take a look at the BI marketplace itself.

Now, back to the first section on the retail revolution. Much of our research in the past at the Advisory Board and for the last year or two has been focused on one of two factors. First factor is population health management. You’ve probably heard that expression more than you cared to. We all are talking about population health management in virtually every conversation with healthcare. And of course by that we’re talking about moving from healthcare or medicine to end the acute care episodes, focus on prevention and wellness, chronic disease management, more holistic care where you consider economic or financial factors and psychosocial factors, etc., more focus on patient engagement. That’s the whole world of population health management. That does apply also to what we’ll be talking about today and we’ll tie the retail revolution to population health management at the end of the presentation.
But we’re going to focus more today on the first section, on the retail revolution. And by that, we’re talking about more than just retail clinics. We’re talking about individuals that now will be making more decisions about the health plans they buy and the providers they see. So let’s take a look at what’s going on here.

### Our Existing Business Model

**Staying Afloat Through Cross-Subsidization**

#### Traditional Hospital Cross-Subsidy

- **Commercial Insurance**
  - Above-cost pricing
  - Robust fee-for-service volume growth

- **Public Payers**
  - Steady price growth
  - Only one component of our total business

#### Above Cost

- **149%**
  - Hospital Payment-to-Cost Ratio, Private Payer, 2012

#### Below Cost

- **86%**
  - Hospital Payment-to-Cost Ratio, Medicare, 2012

Our Existing Business Model

**Staying Afloat Through Cross-Subsidization [03:20]**

If you look at our existing business model, if you’re a healthcare provider, a hospital, a health system, or a large physician group, it has been an interesting world to live in. We have two major sets of payers, or customers, if you will. There’s the public payers and the commercial insurers. The public payers, Medicare and Medicaid for example, have paid us historically about 86%, as the latest numbers from 2/2012. However, it’s fully burden cost. So, we’re losing money on every patient that comes through. It does help to contribute and cover some of the fixed overhead. But meanwhile, we’ve got the second payer, the commercial insurers, who are paying about 149% of cost. So that enables us to continue to exist and operate with the business model we have.
Now you might ask, why is it that commercial payers are willing to do this? And it’s been an interesting world we live in. As an established provider, we’ve had what we call pricing power, that is as our cost increased, we’ve been able to raise our prices. That in turn is reflected then by the payer and they would have pricing power to raise premiums on employers and employers have typically done a pretty good job in the past of shielding their employees, our patients, from these price increases.
Nearing the Limits of Extractive Growth Strategies
Legacy Growth Levers Increasingly Time-Limited

So that’s the world we’ve lived in but that world is changing now. So we’re seeing that that impact hospital strategies or healthcare system strategies.

In the past, if you were a large healthcare system, what you really loved to do was consolidate your market position. We’ve seen a lot of alliances, acquisitions, both vertical and horizontal. You lock up the referral streams, that is, you affiliate, you acquire physician practices, for example, and then you go in demand price increases back in this world that we were just talking about, and again the payers have been able to absorb that.
Impending Collapse of the Cross Subsidy

Three Trends Threatening the Traditional Provider Business Model

1. Medicare Payment Innovation
   - A growing wave of Medicare beneficiaries
   - Reductions in FFS payments
   - New mandatory and optional risk-based payment models
   - Growth of Medicare Advantage

2. Market-Based Medicaid Reform
   - Growth of Medicaid Managed Care
   - Commercialization through "Private Option"

3. Increased Commercial Market Competition
   - Many private employers shifting to private exchanges or converting to self-funding
   - New dynamic individual market on both public and private HIXs
   - New channels for competition in group market

What we're seeing now are three factors, three threats, if you will, to this traditional business model. The first threat, and we'll spend a good bit of time on this slide going through some of these bullet points here, the first threat is really Medicare reform and the transition to risk. So if you look at what's going on in the world of Medicare, one of our largest payers for most providers, we're seeing a growing wave of Medicare beneficiaries. About 7,000 to 10,000 people per day are turning 65. Now, that's taking people many times from that commercial side, paying us 149% of our cost, to the public payer side, paying us 86%. We're also seeing reductions in fee-for-service payments. One of the things you can say about Medicare and Medicaid is, particularly Medicare, they have been pretty good at increasing prices, even though they were paying us less than cost that was predictable. Well now with the Affordable Care Act and with sequestration, we're seeing $415 billion being cut out of our Medicare payments over the next 10 years. So those guaranteed price increases are no longer in the works for us.

We're also seeing mandatory and optional risk payment models. Mandatory risks, for example, in the form of hospital readmission penalties, hospital-acquired conditions penalties, also of course value-based purchasing. So, along with that, in efforts about 6% of a typical
organization’s revenue at risk, which is enough to take many organizations from the black into the red. We’re also seeing optional risks. You might be saying with all of this going on, Medicare fee cuts, risk-based payments, why would any organization want to take on even more risks through a pioneer ACO or through a Medicare-shared savings plan, for example. Well that’s because the future under fee-for-service doesn’t look that promising, and this is a way to experiment with risk, with a fairly low downside. So what we’ve seen is the latest number show about a little over 600 organizations, for example, that are now participating in the Medicare-shared savings plan. But again, that changes the dynamics also of your cost structure and some of the other factors we’ll talk about going forward.

The last thing under Medicare is the growth of Medicare Advantage. If you’re familiar with Medicare Advantage, there’s been a lot of talk about it being challenged or having payment reductions. None of that has held up so far and Medicare Advantage continues to be very popular. With Medicare Advantage, it allows the government to not be in effect the payer but they become the purchaser of the services and health insurance plan takes the money from the government and then provides you the insurance and builds networks for you to take advantage of, for example. So, what’s interesting about it is it’s risk-based for the payer or for the provider. But it’s also an individual market. So individuals can now select between different Medicare or across different Medicare Advantage programs. So for example, in my area where I live in Colorado, if you key in my zip code under the Medicare Advantage part of the website for healthcare.gov, you’ll find that there is over 30 plans that I can select from. So again, it’s not only risk-based but it’s an individual market. What’s really interesting too about that is, like other areas we’ll talk about, we’re seeing more and more individuals in Medicare. About two-thirds of them are choosing relatively narrow networks, that is, they’re choosing HMO plans rather PPO plans.

Let’s take a look at the second factor, covered expansion and the rise of the individual insurance. Part of the grand bargain in exchange for these fee-for-service cuts was the assurance that we would have more people insured. The primary mechanism for doing that is through Medicaid. Now, about 28 states so far have expanded Medicaid that became optional as a result of a Supreme Court ruling in July of 2012 and the rest have chosen not to. But what’s interesting is that some of those that have chosen to expand haven’t just expanded their traditional Medicaid programs, they’ve gone with other options. So for example, Arkansas and some other states, Arkansas was the first to go with a voucher system. So they would give an individual a voucher which would be the equivalent of a silver plan and they would be able to then go buy insurance on the public exchanges. So once again, it’s an individual making a decision of what plan to buy and selecting from the various plans offered on the public exchanges. And of course, we know that the public exchanges in 2013 have gone off to a rocky start, particularly healthcare.gov, but the numbers showed that about 7 million people signed up and a few more million people have signed up for 2014. We don’t have the final numbers yet, but again they’ve been pretty popular. But again, it’s an individual signing up for a plan as opposed to an employer or a group purchaser buying, selecting a narrow set of plans for you to choose from.
If you look at what’s going on with employers, employers really have three choices today. They can either drop insurance, very few are doing that, it’s not like it was predicted; or they can convert to private exchanges; or they can convert to self-funding. And many of them are going from defined benefits, that is, here’s your health plan and you pay a portion of the premium and the employer pays the portion of the premium to defining contribution, that is, they’re going to take it to the individual and say, here’s the money we will kick in for your health plan, you go to a private exchange and you select the health plan that you want. If you select a very lucrative health plan, one that has great benefits, you may have to pay a lot more out of your pocket or at least a little more out of your pocket, but anyway it’s the individual, again, who is making that decision. Now, these private exchanges are expected to outpace the public exchanges and grow.

Some of them were also converting to self-funding. And when they convert to self-funding, they are typically offering a set of plans that also include the high deductible plans and many times a proliferation of narrow networks because these narrow networks, in combination with high deductible plans, can keep the premiums pretty low, and that’s a deciding factor for many of the individuals, as far as which plan they’re going to select.

We’re also seeing in this employer and value space new non-traditional competitors. We’ve all heard about the retail clinics and Walgreens or CVS or Wal-Mart, but now Wal-Mart has announced in the last few months that it’s going to enter full primary care. It’s going to charge $40 for an office visit. It’s also going to refer patients to specialists and given the Wal-Mart business model, they’re probably going to pick more cost-efficient specialists. You can assume that. So again, maybe covered, in fact, the network assembler. So once again, we’re seeing pressure on the prices that organizations or healthcare organizations are able to charge on the commercial side.
Poll # 2 - Trends

Which of these three trends worries you the most? – 236 respondents
A. Medicare payment innovation – 38%
B. Market based Medicaid reform – 19%
C. Increased commercial market competition – 43%

Poll #2 – Trends
Which of these three trends worries you the most? [12:27]

So let’s take another poll question here. Back to you, Tyler.
Which of these three trends is most likely to impact your business model? [12:33]

[Tyler Morgan]
Alright. Our next poll question, which of these three trends is most likely to impact your business model? Medicare payment innovation, market-based Medicaid reform, or increased commercial market competition?

We’ll leave this poll question up for a few moments to give you a chance to answer that. We have had several questions come in asking about the availability of the slides and I would like to let everybody know that yes, after this webinar, we will be sending out an email to everyone with a link to the recording of this webinar, as well as the link to these presentation slides. So they will be available to everyone that’s attended today.

Okay. We’ll go ahead and close the poll. And let’s share the results.
Okay. Jim, it looks like 38% who answered the poll answered the trend that’s most likely impacting them is Medicare payment innovation and 19% said market-based Medicaid reform, and 43% increased commercial market competition.
Poll #2 – Trends
Which of these three trends worries you the most? [13:36]

[Jim Adams]
Very interesting. Thank you for that. I mean all three are major factors for most organizations but it’s interesting to see that commercial market competition is the biggest concern, if you will, or trend that worries our members the most. That may be tied into the types of the people who are attending from finance and from clinical and from the executive. So thank you for that response.

Alright. Let’s move forward now.
A Burgeoning Retail Market
Disrupting Traditional Channels of Coverage

If you look at the cumulative effect of what we’re seeing, if you look at the public exchanges and where the projected to be by 2018, if you look at the private exchanges, if you look at the private option for Medicaid, as I talked about with the State of Arkansas where they’re giving vouchers to individuals and allowing them to go on to do public exchanges to buy insurance, if you look at Medicare exchanges, that is the Medicare Advantage programs we talked about, it’s projected to be 87 million people who are making individual decisions by 2018. Again, that’s a very different market than we lived in in the past and then pretty substantial, impacts our overall business models.
From Individual Inputs to Consumer Products
Designing Around Purchaser Preferences

So what we’re seeing with our member organization is the leading organizations today, we’ve got a lot of pieces and parts, so to speak, of our healthcare system. How do we package that for these retail buyers and what are they wanting to buy. This is very different from what we’ve looked at in the past and the way we’ve looked at the market. But there’s really three things that we’re seeing, three packages of products, so to speak. First is shoppable procedures, what kind of diagnostics or surgeries or things that, again, where consumers can actually compare prices, compare quality. Obviously there’s emergent care. That’s a little harder to take the time to - if you’re having a heart attack, to want to be able to compare prices and all. But again, that’s another need that the market has. And of course, enhanced care management is also part of this. And that has to be a key part of it actually. You can say, well that sounds a lot more like population health management. But if we go back to our premises that we were talking about earlier, that premiums matter and that you may not be included but we’re seeing a proliferation of narrower networks, that your ability to manage populations and health status of people over time can reflect your premium rate of increase over time and which would also make you, the lower you can keep the rate increase, of course the more attractive you’ll be in the future.
So let’s take a look at how different this world is. We’ve always, as providers, had to secure enrolled lives and then win share of volumes. The securing of enrolled lives is fairly simple in the past because most providers were participating on a number of broad networks. And so, most of the time, the network assembly was not a problem. The network selection may not have been a problem because most of the organizations, for example commercial organizations, offered pretty broad networks, you were included in those networks. So being included in the network assembly and network selection was not a big deal. And the care decision was many times driven by the physicians, the referring physician. So what we’re seeing now is these factors are changing. We’re seeing different considerations for network assemblers. We’re seeing, and we’ll talk a little bit more about that, we’re seeing of course individuals having the opportunity during enrollment to select your network. And again, what we’re seeing is this proliferation of narrower networks to hold down cost and improve quality. And then many times patients are making decisions at the point of care. And so, it’s a very different world from what we’ve lived in in the past.
Capturing New Channels of Growth

Key Decision-Makers in Traditional and New Growth Channels [17:30]

So as opposed to this, as we talked about earlier, this established provider who works with entrenched payers who have broad networks or providers and focusing on referring physicians, now we’re seeing the need to address a number of new growth channels, that is these custom network, like the builders, the activated employers, are using custom network builders, for example, they exchange operators.

We’re also seeing that as far as winning share of volume, that many times the physicians are becoming more cost-conscious. So many of the plans we’re seeing put in place have some incentives for the primary care physicians, for example, to refer to the more cost-efficient, high quality specialists.

We’re also seeing price sensitivity on the part of the consumers. If you have a high deductible health plan, and by the way the average deductible we’re seeing selected is over $3000, and more and more of the healthcare that you’re getting upfront may, unless you have a very serious condition, may be more like having no insurance at all – that is, you’re paying forward out of your pocket. So a consumer who may not be sensitive to the price differences of an MRI, if they’re paying a $50 co-pay, no matter where they go, maybe very sensitive to the price
differences of that kind of imaging. We did a study, for example, on our own area of Washington, DC where the Advisory Board’s headquarter and the price range for an MRI was from $400 on the low end to about $22,000 on the high end. Again, that’s going to be tough to sustain, those kinds of price differences when you have price-sensitive consumers.

No Longer Insulated From Market Forces
Catalyzing a Shift in Network Demands
Characteristics of a Traditional vs. Retail Market [19:04]

So wrapping up this section. What are we seeing? Well we’re seeing a growing number of buyers. Again, we’re seeing activist employers who are really interested in managing the health status of their employees and also their overall cost grade. We’re seeing price-sensitive individuals, that’s the 87 million we talked about. We’re seeing narrow, custom networks being built. For example, some of the organizations that are constructing networks have been able to reduce premiums by up to 26% by constructing a narrower network rather than having the broad open networks. We’re seeing increased transparency. In the past, it was pretty hard to compare plans, for example, when you had these broad plans. Now, if you’re on an exchange and purchasing as an individual and looking at narrow networks, it’s pretty easy to compare and see the price and the pricing quality transparency.
Also, as far as switching costs, for employers, it’s pretty tough to change health plans or provider, for example, to go from a BlueCross plan to a United or to a Cigna plan. Very tough to do that sometimes. I’d had to do that in my past when I was working in smaller businesses as the decision-maker for those kinds of decisions and it’s very difficult. It’s pretty easy for an individual to switch plans annually. All they have to do is go on to the exchange and pick a different plan. And also, they’re more willing to do that because of the greater cost exposure that we’re seeing. Again, with high deductible health plans, with sometimes diminishing contributions from the employers, for example, for those who do have employer-based insurance, they’re becoming much more price-sensitive. So what this is really leading to is more competition, that is we’re seeing more networks evolve, we’re seeing more individual choice and more individual responsibility. So that makes it more look like a free market than a government takeover of healthcare. And the reason that’s important is that in a free market, you typically see a few studied economics, you typically see lower prices and many times also higher quality. So we’ll take a look at how that impacts in the next section that impacts our provider organizations.
So that’s what we’re seeing with the retail revolution. And very brief, again, we’ve got an entire presentation that goes into this in a lot more detail, for those of you who have access to our resources.

Expand Your BI Focus for PHM³ and Retail Revolution [21:33]

So now let’s take a look at the BI requirements and challenges. Let’s take a look at what we see going on with our member organizations as a result. But if you look at who our member organizations are, many of them, as we’ve surveyed them, have a number of BI efforts in place of course, everything from cost management to quality reporting to operational improvements, the operational needs, meeting the operational needs of their managers, for example. And we feel like that’s really good and it’s a good foundation. But it’s not enough. They’re going to have to expand the BI offerings as they go forward. And of course, from the quote on the right-hand side, the time to do that is now before things get even worst for us and give us a shorter timeline, so to speak, to be able to implement these initiatives.
BI Technologies Key to Redefining “Value”

Examples of Key BI-Related Capabilities for the Four Retail Imperatives

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<th>Desirable Network Attributes</th>
<th>Essential</th>
<th>Nice to Have</th>
<th>Future Need</th>
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| Geographic Reach and Clinical Scope | • Service line planning  
• Facility planning  
• Referrals analysis | • Network modeling (for narrow networks) | • Facility optimization  
• Population-based planning |
| Clinical and Service Quality | • Quality scorecards  
• Patient satisfaction and loyalty monitoring  
• Site-specific CDS | • CDS on integrated data  
• Access / scheduling optimization  
• Predictive modeling for consumer behavior | • Persuasion modeling for consumer behavior  
• Personalized care  
• Cognitive support  
• Social media analytics |
| Low Unit Price | • Pricing monitoring and benchmarks  
• Supply chain monitoring  
• Resource monitoring | • Cost accounting  
• Supply chain optimization  
• Resource optimization | • Real-time costing data  
• Dynamic pricing tools |
| Total Cost Control | • Contract modeling  
• Risk stratification  
• Physician performance  
• Service line performance  
• Registries | • Cost accounting  
• PHM scorecards  
• Real-time risk identification  
• Real-time referral analytics | • Patient-reported data  
• Patient-reported outcomes |

So what are we talking about? Let’s take a look at BI. This is a very busy slide and I won’t go through it all but just a framework of the slide. If you look at the four retail imperatives to address the cost and quality needs that we talked about in the last section, what we’re seeing, if you look at the first column here, is that organizations that are putting together these networks are focusing on making sure they have the right geographic reach and clinical scope, that is do you have access to the right kinds of care for the people that are going to select that network, and also of course do you have the clinical and service quality that’s needed. So that’s really the quality aspects of your network.

But costs are becoming incredibly important. Again, many times people are basing their decision based on premiums. And even within the tiers, for example, on the public exchanges, where you have bronze, silver, gold, platinum within a tier, like a silver tier, many times the lowest price, premium price, are those plans that are winning the most. So it’s very important to have low unit prices today for those retail shoppers, but we know we’ve got to be able to continue. They have the ability to re-up every year, so to speak. So we’ve got to keep our prices low over time. So we’ve got to have total cost control over time, which again looks like population health management.
So what we’ve done here is looked at some examples of BI-related capabilities, what we considered to be essential, nice to have in the future need. So again, two things, these are just examples, and as a result, we’re not trying to list every BI need that you would have. And the second thing is your needs may vary. This is just a starter slide to give you some ideas of what we’re seeing that will be required.

### Analytics Enabling Population Health Management

#### Examples of Tools and Processes with Analytic Underpinning

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<th>Identify Population</th>
<th>Map and Track</th>
<th>Deliver Care</th>
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<td>PCP attribution</td>
<td>Disease or PHM(^1) dashboards</td>
<td>Registries</td>
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<td>Risk segmentation</td>
<td>- Registries</td>
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<td>- Frequent utilization</td>
<td>- Smart portals</td>
<td>- Clinical decision support</td>
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<td>- Chronic conditions</td>
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<th>Coordinate Cross-Continuum Care</th>
<th>Engage Patients</th>
<th>Administer, Monitor, and Report</th>
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<td>Real-time monitoring/alerts</td>
<td>Predictive/persuasive engagement</td>
<td>Contracting (pre/post)</td>
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<td>Registries</td>
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\(^1\) PHM = population health management

By the same token, if you’re going to manage prices over time and costs over time, again it begins to look a lot like population health management. So, taking a different slice of what BI need, organizations might have. We’ve laid out a framework of six different capabilities that are required for population health management and we’ve also given you some examples here of what would be required from a BI perspective under each one of those. So for example, the first thing you have to do if you’re going to manage the health status of the population of patients is to identify the populations. And so, there’s PCP attribution and there’s risk segmentation. Once you’ve segmented the patients, then you have to map their predicted or clinical status and conditions to care guidelines and many times that’s done to create registries...
to enable organizations to manage and track what’s going on with those patients in order to create dashboards. Then you have to deliver and coordinate care, again a number of tools that would be required there. You have to engage the patients because engaged patients typically have higher quality and lower cost, better outcomes, if that is, and a lower cost.

And you also have to administer, monitor and report. Now, we’ve had to do these activities, the administering, monitoring and reporting for years. But just to give you an example how the world has changed. When I worked for IBM, I worked pretty closely at times with Paul Grundy, the gentleman who’s responsible for the patient-centered medical home place over the last few years. And as he was purchasing services for IBM and also representing other large self-funded employers, he would give the example of – and it’s pretty common today, I think we all can relate to it, but he was saying, what we don’t want to continue to buy as employers are world-class or high quality foot amputations and kidney transplants for our diabetics. So what we want to be able to buy are services to keep our diabetics from needing those foot amputations or kidney transplants, or even better, we want services to keep people from becoming diabetics. Well, think about the difference in your performance scorecards and the data that’s required to say, are we doing a good job of keeping people healthy and keeping them from becoming diabetic, or are we doing a good job of managing our diabetics versus the performance scorecards that would be required to say, yeah, we’re doing, what we’re doing good at amputation or good outcomes with our foot amputations. So again, very different world we’re living in.
Making the Case for Care Management Capabilities

Assuring Employers of Ability to Manage Future Costs

Four Ways to Demonstrate Care Management Capabilities

So if you’re going to be trying to convince organizations, that is the payer organizations, for example the purchasers of your service, that you can manage costs over time, that could be a tough sell because we haven’t done that very well in the past. So, one of the ways that payers are evaluating providers is increasing or they’re looking and saying, well what kind of investments are you making not only in your care management programs but in the data and the systems that are required to manage these populations, for example? So they’re looking at saying, are you making the right investments in data analytics? Are you able to integrate clinical data and claims data? Are you able to get out of network claims data? Are you implementing Telehealth? Again, a lot of implications here and a lot of this directly relates to our BI-related capabilities. So a short message here is investments in these kinds of capabilities will be essential for you to be successful and they may even be necessary if you even have a chance to be successful in managing populations.
Collecting Data for Analysis, Sharing Data for Care

Building a Network of Owned and Affiliated Entities

Varied Mechanisms of Exchange

Public and Private HIEs, HL7\(^1\) Messages, CDA/CCD,\(^2\) Custom Development

So if you look at what we’re trying to accomplish, we’re facing now challenges for accessing, aggregating, normalizing, and analyzing the data. Typically, we focus more of our BI efforts on, if you are a hospital or a physician office on your own facilities, but now we need to increasingly pull data from things like long-term care facilities, which may not be very advanced in their automation. We need to be able to bring in payer data and even from additional sites that we may not have been quite as concerned about in the past – patient self-reported data or monitoring devices at a patient’s home or a care that’s being given at retail clinics. So again, the scope of our efforts has increased considerably as far as the types of data and the different sources of data that will be required for the Business Intelligence and analytics.
### Expanding the Data Connection Net

#### It Only Gets More Complex

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<td>Diagnostic Images</td>
<td>Public Data</td>
<td>Scanned Consents</td>
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<td></td>
<td>Benchmarks</td>
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<td></td>
<td>Contracts</td>
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</table>

Also, if you look at the types of data that we’re collecting, not only from the different sources, but historically we focused more on internal structured data with analytics. We’ve looked at transaction data, for example. We’re now seeing the focus again on claims data or patient satisfaction or other kinds of survey data, but we’re still taking mostly structured data. Over time, we feel like this has to evolve to a much greater focus on unstructured data and even external unstructured data.
So if you look at this journey that people are taking, a couple of years ago, we developed a maturity model for our member organizations. And one of the reasons we did this was because we were having member organizations say, what can we move, if we need to do some of these more advanced things that you’re talking about, what tools should we buy? Well, it’s a lot more than just buying tools. So the journey we see most of our member organizations taking is they start off in what we call a fragmented maturity model phase or stage, and at that point, they have several point solutions. So if they have a quality issue, they have a quality solution. If they have a financial need, they have a financial solution, etc. They may have inpatient tools, but there are several point solutions that meet very specific needs.

Over time, they realized that many times the costs of these point solutions as they begin to accumulate can get pretty high. The complexity can get pretty high. They don’t have a single source. The mythical single source of the truth are getting conflicting reports or different results, had different solutions, for example. And so, they began to move toward what we call an enterprise perspective and they realized that data is an enterprise asset and needs to be treated as such. One of the key indicators of the move to this, many times we think of this conceptually as removing from fragmented data marts to more of an enterprise data

<table>
<thead>
<tr>
<th>Fragmented</th>
<th>Enterprise Perspective</th>
<th>Advanced Analytics</th>
<th>Big Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI architecture</td>
<td>None or several point solutions</td>
<td>Central infrastructure foundations implemented</td>
<td>BI tools and services infrastructure in place</td>
</tr>
<tr>
<td>Data sources/data currency</td>
<td>Transactional applications and systems for both core processes and legacy systems</td>
<td>ETL established to combine data from primary sources such as EHR and revenue cycle</td>
<td>ETL established for secondary data sources and/ or blockchain technology including more frequently than daily</td>
</tr>
<tr>
<td>Types of analysis/role of analytics</td>
<td>Automated data processing</td>
<td>Proactive, prescriptive analytics, data exploration, and hypothesis generation</td>
<td>Analytics combining multiple data sources, cognitive analytics, and visual analytics for personal and internal use</td>
</tr>
<tr>
<td>Data models</td>
<td>No or limited single purpose transformation</td>
<td>Consolidated approach of single models including dimensional, flat file, and in-memory models</td>
<td>Multiple, optimized data models</td>
</tr>
<tr>
<td>Data governance</td>
<td>Loose oriented, departmental decision making, ad hoc usability</td>
<td>Compliance, policies and standards, complete, managed master, shared documentation, focus on data quality and cost savings</td>
<td>Puts in place quality, enterprise data management, and user management</td>
</tr>
<tr>
<td>Tools</td>
<td>Independent choice for limited purpose, redundant products</td>
<td>Centralized tools, integration, processes for basic data acquisition, management, and visualization</td>
<td>Advanced analytics including self service</td>
</tr>
<tr>
<td>Systems</td>
<td>SQL, Excel, basic data modeling, data visualization</td>
<td>In-depth knowledge of databases, logical data modeling, basic statistics, and MDM use</td>
<td>In-depth knowledge of statistics and operations analysis, predictive programming</td>
</tr>
<tr>
<td>Culture/enterprise data</td>
<td>Value of data under stepped use, decisions based on or limited basis</td>
<td>Champions emerging and growing focus on data governance and self-driven decision making</td>
<td>Training on data literacy, identifying BI opportunities, data exploration and data-driven decisions</td>
</tr>
<tr>
<td>BI governance/organizational structure</td>
<td>Local control</td>
<td>Centralized and federated BI and ecosystem reviews</td>
<td>Resources harmonized between central staff and shared infrastructure and business processes in place</td>
</tr>
</tbody>
</table>

2. EHR = electronic health record, ETL = extraction, transformation, and loading, KP1 = key performance indicator, MD = master data management, NLP = natural language processing, ODS = operational data store, SQL = structured query language.

The BI Maturity Model; 2014 Edition [27:18]
warehouse. But what we see here as one of the key indicators here is the growing emphasis on data governance, and beginning it to change the culture from gut-based decisions to more fact-based or data-informed decisions. Now, many times this is done to facilitate the degeneration of enterprise, key performance indicators offer certain kinds of reporting that requires more than that can be accomplished by any individual point solution. So it’s more of what we would call descriptive and instead they just try to figure out what happened or what is happening and create scorecards, dashboards, reports. They also realized that they have a need for more advanced analytics at this point, the predictive and prescriptive analytics, for example. And so, they began to try to use this data for more than just figuring out what happened but also to look at what might happen with predictive or what should we do with prescriptive analytics.

So again, they began to change their data models and also have to acquire new tools at this point, for example. And the ultimate goal maybe is what we would call big data where you’re going to bring in more external sources. The classic definition of big data is increase in volume, increase in variety, increase in velocity of the data, that is, you may have been feeding it monthly at some point, you may have moved to weekly or daily now, you may even be taking into account near real-time or streaming data. And that requires, again, a different set of capabilities, a different set of technologies.

So that’s generally the journey that we see our member organizations going through and it’s not quite as linear as we projected here. Key message though is that it takes more than buying a tool. I know I’ve said this, but if you look at what can trip an organization up, we’ve listed nine different dimensions to each one of these stages and tried to give you an example of where you might be. What we strongly suggest you do is figure out where you are on each one of these dimensions, if you will, or each one of these factors for the maturity model. If you have anything that’s way out in front, you may have gotten a little too far advanced on your tools, for example, and you don’t have the data models or the data governance to support those tools, if you see this thing really lagging behind, like your data governance or your BI governance, then that may be keeping you from moving to that next level.

So if you look at the rows here, you’ve got to say, a typical question we get is what’s hardest for your members? What are you hearing?
Top 3 Challenges
Data Governance, Culture, Organization [33:24]

We surveyed our members and typically it’s cultural transformation that is, again, moving from gut-based or intuitive decision-making to data driven or data informed decision-making. It’s also having the skills and resources. 46% of our respondents said that’s a major factor for them, and also data governance. And all of these are related, of course, and particularly data governance and cultural transformation. If you don’t have good data governance, so that is if you can’t ensure the use and usability of your data, then it’s pretty tough to say we need to be data-driven and are data informed in our decision-making.

So again, we’ve got a lot more detail on all of these but in the interest of time, I’m going to move on to our third section here.
So let’s talk about what we see going on with the BI marketplace itself.
Poll #3 BI Vendors
How many BI vendors does your (or a typical) health system have? [34:14]

Let’s start with a polling question. How many BI vendors...and now back to you, Tyler.

[Tyler Morgan]
Alright. Our next poll question, how many BI vendors does your (or a typical) health system have? 1, 2-5, 6-10, or more than 10?

And we are getting a lot of great questions in. I would like to remind everyone that if you do have any questions or comments, choose the questions pane in your control panel.

So we’ll leave this open for just a few more moments to give everyone a chance to respond.

Alright. We’ll go ahead and close this poll now, and let’s look at the results.
Okay. Jim, it looks like we’ve got 9% of the respondents answered 1, 54% answered 2-5, 22% answered 6-10, and 16% answered more than 10.

[Jim Adams]
Quite a range there. But most of the...54% answered 2 to 5. Well let’s compare that to what we’ve seen with our members for just a moment.
Fragmented BI Software Market
Our Survey Confirms That No One Is Using a Single Solution [35:21]

We surveyed our members for the Advisory Board Services and say how many solutions do you have, and about 43% had less than 2, 25% had 3 to 4, and 32% had more than 5. So the point is you have to have a number of solutions, and the more advanced you get, the more likely you will have a higher number of BI tools, if you will. There is no BI for population health management. There is no BI tool for the retail marketplace, for example, or the retail to address the needs of the retail revolution. So there’s a number of – you have to put these pieces and parts together. So that’s the world we live in today in this market.
So when we asked them the follow-up question, well then what is it that you’re looking to buy? So this describes what they have today. Not surprisingly, most people are in pretty good shape on ETL and access controls and audits and some of the basic capabilities. The red area indicates purchasing plans. Very high interest in natural language processing, predictive modelling, advanced statistics and analytics, which begin to look a lot like it overlaps with predictive modelling, and of course prescriptive modelling tool also. I was surprised personally that there’s many organizations that are interested in acquiring prescriptive modelling at this point. But again, I think that’s a good sign showing there would be awareness of the various needs and the various tools.
Different Roads to Take on Your BI Journey
You’ll Live in the Overlaps [36:49]

So if you look at how can organizations proceed and get the capabilities they need, very classic diagram here that can apply to BI also. Some want to build some of their capabilities; others want to just buy it, for example, getting a point solution. Others may want to outsource it. So taking that, and of course the typical answer is it depends and the rest of the story is organizations are doing all three, bits and parts of all three.
Use Deliberate Criteria to Choose Your BI Approach
Match the Approach to Your Organization’s Strengths and Goals

1. Enterprise Development Platform
   Broad-based functional capability to use as a basis for self development to support a belief that analytics is a differentiator

2. Analytics-as-a-Service
   Application (often bundled with infrastructure) including process and analytic components, for aggregation and comparison

3. Point Solutions
   Stand-alone components with narrow but deep subject matter expertise

4. EMR Subsystem
   Analytic and process routines tightly integrated with the transaction systems

So if you ask the question, how do we get through this maturity model that you described, Jim? How do we move from a fragmented to an enterprise, to an advanced, to a big data perspective? What we’re seeing is that here’s no one best path for all organizations, of course. No one size fits all, so to speak. And even for organizations within those particular organization, most organizations are following some kind of combination of all four of these choices. What they’re typically doing is taking a core strategy and say, this is our preferred way to go but realistically we will use, whatever one they use. They may use some of the others to support that and to get to where they need to be. It’s a very dynamic world we live in.

So what are we talking about for the core strategies? First is some organizations want to basically build it themselves. They want to bring in their own enterprise data warehouse, so to speak. So these are organizations that’s from an aspirational standpoint may want to lead the pack. They want to be the advanced analytics companies, for example, or organization. Others may want to send their data off and have analytics be run as a service and many times they leave a lot of the heavy lifting on the analysis to the analytics provider and they make a comparison information, for example. Others are still buying point solutions, and again they may be doing this to get deep and narrow subject-matter expertise that could be either clinical
or business or even technical. Maybe they’re using something like QlikView for data visualization. Others are saying we’re going to depend heavily on upon our EMR vendor and we’re going to use it for everything we can.

So again, these are four different approaches and four different ways to bring in a solution and what we’re seeing, some of our member organizations, for example, have said, yeah, our basic, our core strategy, if you will, is to become an enterprise development platform and develop that. There are times when we ship off data and have it analysed or bring in a point solution or certainly we’ll exploit our EMR capabilities to its maximum capability, but it may not do a lot of the things that we want to do. So again, we’re not trying to say these are mutually exclusive or you need to pick one but these are the four choices and they all have different strengths and weaknesses.

Poll #4 Approaches
Which of these 4 approaches best matches your organizational strengths and goals? – 234 respondents
A. Enterprise development platform – 29%
B. Analytics-as-a-service – 20%
C. Point solutions – 11%
D. EMR subsystem – 10%
E. Unsure or not applicable – 30%

Poll #4 Approaches
Which of these 4 approaches best matches your organizational strengths and goals? [39:39]

So at this point, I’d ask, our next polling question. Back to you, Tyler.
Which of these 4 approaches best matches your organizational strengths and goals? [39:44]

[Tyler Morgan]
Alright. Which of these four approaches best matches your organizational strengths and goals? Enterprise development platform, analytics-as-a-service, point solutions, the EMR subsystem, or unsure or not applicable?

We will leave this open for a few moments to let everybody have the opportunity to answer this poll question.

And now this is great. We are getting in a lot of great questions from our audience today, and we will address these during our questions and answers time.

Alright. We’re going to go ahead and close the poll.
And here are the results. Alright. Jim, our audience answered 29% on enterprise development platform, 20% on analytics-as-a-service, 11% on point solutions, 10% on EMR subsystems, and 30% answered that they were unsure or it’s not applicable.

[Jim Adams]
Alright. Thank you. That’s probably pretty indicative and pretty representative of the world as a whole. Again, it means that people are taking different approaches. We’re seeing fewer and fewer organizations as they become more advanced in analytics, depending particularly on point solution. So that smaller number doesn’t surprise me. So, very good information. Thank you.

Alright. Let’s continue then.
Let’s take a look at these different approaches. First is the enterprise development platform. Again, if you look at some pros and cons, most of the organizations, people, the healthcare organizations that are following this strategy typically believe that this can be a differentiator and many times they may have a fairly heterogeneous environment. So there’s quite a data governance, quite an ETL set of requirements, if you will, to be able to pull all these data together to do it. So as a result, some of the potential cons can be there could be higher start-up cost, there could be a slower initial time-to-value. It doesn’t mean that there will be. It depends on how you do it. Of course, there’s ways to do these, any one of these strategies or approaches well and there’s ways to do them not quite so beneficially. So again, it depends. But we would encourage you, if you’re thinking about moving this direction, that you talk to your vendor and say, how can we minimize the time-to-value. How can we make sure it’s not one of these, you know, come back and see me in three years and we’ll have a great enterprise data warehouse built for you.
Core Strategy: Analytics as a Service

If you look at the analytics as a service, again the strategy there many times, just to say, well we want to get benchmarking and comparative analytics and we don’t want to develop all of this capability internally to ourselves and all the analytics capabilities, for example. So it can be relatively inexpensive many times to start but one of the concerns may be that there may be limited analytics flexibility and adaptability. So for example, many of our member organizations for risk stratification are using this approach initially, that is they ship off data, get a risk stratifier, and get the results back. The problem is many times what’s going on, to risk stratify the data is really just a black box and they don’t understand the algorithms or they don’t have access to the algorithms to really understand is this working well, are there things we could do, for example, to improve it.
Core Strategy: Point Solutions

Point Solutions. Again, this has been a solution or an approach, a strategy, for quite a while, and it’s still relevant today in today’s world because it can provide expertise and specific analytics, for example, and to me the specific need and typically it’s fairly cost-effective to do it that way for one point solution and it reduces the time to value because many times these point solutions can be implemented relatively quickly. But the challenge may be, again, it can create a fairly complex environment over time and many times it can create challenges to your governance models and particularly your data governance because you have so many different ETL functions running, there are so many different perspectives on what the data really means, there’s no single source of truth. You’re not even getting close to that with this. And so many times you get conflicts coming out of different conflicting reports, conflicting information coming out of different applications, for example, or different point solutions.

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<tr>
<th>Consideration</th>
<th>Potential Pros</th>
<th>Potential Cons</th>
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<tbody>
<tr>
<td>Enterprise Strategy</td>
<td>May be used as an interim solution against a larger integrated plan</td>
<td>Does not provide a single analytic perspective</td>
</tr>
<tr>
<td>Expertise</td>
<td>Provides expertise and specific analytics in vertical business and clinical areas</td>
<td>Analytics may not be generalizable</td>
</tr>
<tr>
<td>Cost</td>
<td>Buy just what is essential</td>
<td>Multiple solutions may be costly and more complicated to maintain</td>
</tr>
<tr>
<td>Governance</td>
<td>Narrow focus</td>
<td>Challenges governance models to create unified data picture and use</td>
</tr>
<tr>
<td>Timeto Value</td>
<td>Reduced time to value</td>
<td></td>
</tr>
<tr>
<td>Transition Effort</td>
<td>Smaller footprint allows easier migration</td>
<td>New solution may be challenged to go as deep</td>
</tr>
<tr>
<td>Agility</td>
<td>Can surround with other products and services</td>
<td>Limited ability to customize</td>
</tr>
</tbody>
</table>

Sample Vendors
- AltaSoft
- Allscripts
- MedeAnalytics
- Medventive
- Midas+
- Omnicell
- The Advisory Board (Crimson)
- Cloudera
- Qlikview

Source: Health Care If Suites research and analysis
Core Strategy: EMR Module [44:15]

The last one is the EMR module. And so, if you look at that one, most of our member organizations, if they do have a fairly robust EMR and it has BI capabilities and if they plan to stick with that EMR, they will certainly try to exploit all of BI capabilities from that, and because of the strong support for operational analytics. Some of the challenges that they’re facing, of course, is that many times these EMR vendors have traditionally been EMR vendors, not BI vendors. And so, they may lack the ability to incorporate external data. They may lack some of the types of analytics that you need. But again, it makes sense, it’s where you can to utilize them as much as you possibly can.
Now, if you take a look at the future, where do we see this going? Well, obviously we’re in the early stages of the BI market in healthcare. There’s some advantages to each one of these approaches. The enterprise development platform allows maximum customization. For example, you’re building it yourself. There’s a lot more work. Obviously, there’s things you can buy from vendors, some CAD applications, some starter application. But again, it allows a lot of customization, if that’s what you’re interested in, and you have to have the expertise to be able to utilize that data and conduct the analytics and incorporate the results back in. Analytics as a service gives you a pretty broad set of functions. Point solutions can give you specific domain expertise and EMR modules sometimes offer closed-loop functionality, that is, the data has already been captured, it’s in the EMR and can analyse it via dashboard feed and action back into the workflow. We feel like these distinctions may begin to blur over time, where you’ll see some of these capabilities being merged into the others. It won’t be quite so clear, so the boundaries between these types of solutions won’t remain quite so clear in the future.
So if you’re looking at what you do, again, there’s no one right solution, there’s no cookie cutter answer. It depends on your organization’s aspirations. We’ve seen various organizations take different approaches. For example, one of our member, these are real examples, one of our member organizations wanted to combine EMR and revenue cycle data. So they took a small step toward an enterprise data warehouse and created their own data mart on the way to this more unified platform that they’re going to build or have eventually, but they couldn’t wait for the overall unified platform.

Another one of our member organizations said, well cloud-based analytics-as-a-service is a way to go for us for certain capabilities, and of course, so the time-to-value was fairly good for them and it met their needs.

And some other organizations, another example, they choose to build, to move in the direction of the enterprise data warehouse or because they recognize the importance of having this single source of data, so to speak, and having the data together, having the right kind of data governance capabilities it takes to have that enterprise perspective.
Low Total Cost A Difficult Balance to Strike

Long-Term Trend Control Requires Short-Term Investments [47:11]

So now beginning to wrap up and tie it back to what we’ve started with that’s on the retail marketplace and population health management. When we survey and when we talk to our member organizations, they’re put in a bind to date. They have a number of short-term investments that they need to make, IT infrastructure, BI is key to that, of course there are other infrastructure and applications that are needed to be on BI. But at the same time they’re trying to do a care management staff and care coordination programs and new access points, physical and virtual, through tele-medicine, physical through, you know, again facilities of certain kinds, urgent care centers, free standing EDs, physician offices, etc.

Meanwhile, they know that they need to make these investments that we’ve talked about and to be able to control cost over time and improve health outcomes. So, they’re finding themselves in a squeeze at this point in time. They’re having to make significant investments at the same time that they’re having to really manage their unit prices. So again, the time-to-value, the cost factors are becoming front and center for many of our member organizations.
So let’s look at how this might be impacting some of your organization’s decisions. Tyler, back to you for the next polling question.

**Poll Question**

On a scale of 1-5, how is your organization managing the short-term IT-related investment vs. total future cost benefit balance? [48:25]

*Tyler Morgan*

Okay. On a scale of 1-5, how is your organization managing the short-term IT-related investment vs. total future cost benefit balance? Very little short-term investment, some short-term investment, moderate short-term investment, good short-term investment, or very strong short-term investment?

And we’ll leave this poll open for a while. We’ve got some more questions about the availability of the slides. We would like to remind everyone that we are recording this webinar, and after the webinar is over, we will be sending an email out to everyone with a link to the recorded webinar, as well as the link to these presentation slides.
Alright. We’re going to go ahead and close this poll now and take a look at the results.

Poll Results [49:23]

Here are our results. Jim, it looks like 6% answered very little short-term investment, 28% answered some short-term investment, 36% answered moderate, 20% answered good short-term investment and 10% responded very strong short-term investment.
[Jim Adams]
Thank you, Tyler. That’s pretty consistent again with the results that we’ve seen when we’ve talked to our members or when we polled our members. Most of the emphasis is on, you know, the high numbers are on some moderate or good.

Just to give you, we recently did a survey of our CIO members and our CFO members, and the area that we’re seeing the strongest interest in as far as continued investment are clinical systems and BI systems and of course the infrastructure that it takes to support all the new applications and the new requirements of the organization. So those are the three areas that were driving most of the cost.

Alright. Thank you. Well let’s wrap up now with just a couple more slides.
The Missing Link for Population Health?
Retail, Population Health Strategies Converge [50:25]

Now let’s link population health management and retail one more time. We know that in the retail world, it’s really important. You have moments of truth, if you will. Well, the first moment of truth for that individual is when they’re signing up for a plan or taking that health plan that they’re going to have to live with for the next year and that determines which providers they have access to. Then there’s various encounters with the system, maybe throughout the year one or more encounters. Those are moments of truth. We’ve got to win their loyalty. But we also need to engage patients because, again, the importance that has in the overall satisfaction and the overall clinical outcomes and the overall financial results. So it begins again to take on some of the characteristics. So saying, if we’re going to manage populations, if we’re very successful at population health management, we can lower our total cost over time. But instead of being able, in the past, if you were really able to lower cost many times, the health insurance companies or the providers were able to pocket that money, in this increasingly competitive market, we’re going to have to lower the premiums, which makes us more desirable then in going forward and being selected in the future, so that we can, again, continue to service that patient. Bottom line is the retail movement that we’re seeing is a compelling reason to develop successful population health management capabilities so that
you can manage cost and prices over time and premium prices over time, even if there’s uncertainty regarding the transition to risk-based payments.

**Key Take-Aways**

- **BI is Essential to Population Health Management and Retail Revolution**

1. Population Health Management will require new applications of analytics in support of risk assessment and management, population health monitoring and patient engagement.
2. In addition to PHM-focused needs, the retail revolution will require BI-related capabilities to address additional requirements such as for low unit prices, adequate geographic reach and clinical scope, and service quality.
3. Use the BI Maturity Model to ensure the value of your current BI investments while developing the capabilities for the Advanced Analytics and Big Data phases.
4. Although important, BI is not just about having the right tools. Address your biggest challenges in dimensions (rows) of the BI maturity model such as those related to data governance, cultural transformation, and BI-related skills.
5. Identify the BI “core strategy” or architectural approach that best addresses your organization’s capacity, capability and goals while appropriately utilizing other core strategic approaches.
6. Plan for the future by developing plans that consider patient-reported data, events-driven architecture, social media, streaming data and machine learning.
7. Balance principles with pragmatism. Health care BI is an immature and rapidly evolving area so progress may be made by taking “two steps forward and then one step back.”

**Key Take-Aways**

**BI is Essential to Population Health Management and Retail Revolution [51:56]**

So we’ll end and I won’t go through this but this is our key take-away slide. It talks about, again, population health management, the retail revolution, the BI maturity model, and some of the challenges organizations are facing, it describes the core strategies and what we’re seeing, some of the challenges.

I just want to emphasize the last point though. It’s good to have guiding principles in what you’re doing but again, you have to be pragmatic. This is a very immature market and the investments may behave a bit differently than what you’re used to at your traditional transaction systems. Progress may be made by taking two steps forward and then one step back. You may have to buy a throw-away tool or you may have to say, just like our one member organization says that while we’re waiting for our enterprise data warehouse, we’re going to build this custom data mart that combines clinical and financial data because it can meet our needs. You may have to make those kinds of decisions.
So again, good luck to you on your journey. It’s an exciting journey. It’s a great time to be in healthcare and it’s a great time to see the importance of BI in healthcare as we move forward.

Tyler, back to you.

**QUESTIONS AND ANSWERS**

*Tyler Morgan*

Alright. Thank you so much, Jim. We’ve got a lot of great questions. Let’s get right into it.

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<tr>
<th>QUESTIONS</th>
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<tr>
<td>How large does a healthcare organization need to be to begin behaving like a health insurance company?</td>
<td>A short answer. I don’t know if I can give you a specific number but again, the question becomes, if you became an insurance company, could you make sure that you could attract enough members to your insurance company to make it worth your while for that kind of investment. Being an insurance company is not a trivial endeavour. The core competencies are much different. So again, the bottom line question is, do we have the resources to do it or do the potential benefits to do this, how might it affect our competitor, our position with our competitors but also our relationship with the existing payers. But in general what we’re seeing are those organizations, they’re typically multiple hospitals and on a lot of physician groups. So they’re typically fairly large organizations that are trying this.</td>
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<tr>
<td>Do you have recommendations for registries? I hear many people talk about registries in general but no details.</td>
<td>There are so many different ways to approach registries and I wouldn’t give a specific example of a vendor but I know they can range all the way from fairly simple. Even some organization or some physician offices, for example, may start with just an extract or an Excel spreadsheet, they can be very focused tools, they can be hung off of the HIEs, they can be part of your analytics. The general solution, I think, long-term is I think a better solution as many times if you can incorporate these as part of your overall BI or analytics needs because of the importance of the quality of the data that goes into those registries and the importance of the decisions of the exclusion and the inclusion criteria that are needed for those registries. But again, you can start simple. It can be just a simple list of patients or a simple application that’s Cloud-based and standalone. It can be as simple as something that’s run by one physician office. It can be shared access by</td>
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### Do you see a shortage of qualified analysts, actual people, as a bottleneck preventing a provider organization’s movement along the BI spectrum?

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<td>Yeah, definitely. And again, if you remember, our three major challenges had to do with culture, data governance, and then also skills and resources. It takes time and it’s a very different mindset and skill set to do the types of analytics for descriptive analytics. It’s where you tend to be pretty organized and you like to summarize data to do predictive analytics, then where you’re doing data mining and trying to find hidden patterns in data or to program prescriptive models. So those are very different mindsets and skill sets. And so, again, that’s the reason that some of our member organizations are shipping data out of the analytics as a service or behind point solutions in the interim. And the skills take time. It’s easier to find people with either analytics skills or healthcare skills than the people that have both. So skill sets are definitely a great limiting factor. But again, I think one of our member organizations said that, well, they hired somebody who was very advanced in analytics and this person said, you know, I’ve been spending my life on medicine avenue, trying to get people to click through ads. At some point, that’s not very fulfilling. I can come to healthcare and make a difference in people’s lives. So that mission-driven work can sometimes be a selling point to attract the right levels of skills and resources.</td>
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### At the beginning of the BI journey, do you start with high level system-wide metric and definition development or do you start with concrete actionable or frontline metrics development? We have a significant amount of executive support, the ones, the high level system level metrics and dashboards or the culture change and volume from the frontline is lagging behind?

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<td>Again, it depends on what your organization is trying to accomplish. Many times, we’ve seen our member organizations start with some combination. A lot of it depends on what the need of the organization is. But also on the quality of the data. Sometimes you’ll find, if you want to start with those high-level metrics, you may not have the quality of data it takes to support the generation of accurate metrics. So sometimes it’s easier to start for some of the point solutions or the point specific needs that you’re describing – the frontline needs that can feed into those higher level metrics and make sure you’ve got the right data and you’re doing the right things, so that the two don’t have to be mutually exclusive.</td>
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### The difference between predictive modelling and prescriptive modelling.

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<td>Predictive modelling is really intended to answer the question, what might happen. Prescriptive is really to answer the question, what should we do. So there’s...</td>
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some general differences. Predictive models are typically generated by analysing lots of data and looking for correlations. So for example, what factors might indicate that a person might be a high-risk for admission.

Prescriptive models are typically you consider goals, constraints, and variables and they’re typically formulated or programmed, for example. Predictive models are typically pretty narrowly focused. Prescriptive models may have a very complex set of transactions or variables to have to be considered. So if you’re trying to say, what should we do, how do we optimize throughput through our organization, where do we best put – for example, if you took an ED and you looked at the factors and you said, well how many rooms do we have, how many nurses, how many doctors, what kind of equipment do we have in trying to optimize throughput. It’s fairly complex to analyse.

Prescriptive typically doesn’t require the amount of data. It may be helpful but again it typically requires lots of data. Predictive models are typically fairly quickly invoked. Sometimes prescriptive models can run for a long time as they try to optimize the various variables to achieve the goal, whether that is maximizing or optimizing cost or quality or throughput or whatever.

So again, very different skillsets and very different approaches but both and many times the two are linked. So if you can predict what might happen, then you could also predict or use prescriptive to determine what you should do.

**[Tyler Morgan]**

Alright. I’d like to let everybody know. We have reached the top of the hour. We will stay on to continue to answer questions as we have quite a few of them. We recognized that many of you may need to drop off with other appointments that you may have. I would like to remind everyone that we are recording this webinar and we are recording the Q&A portion as well, and again, we’ll be sending that out to everyone that’s attended today.

So let’s continue on with the questions here.

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<th><strong>QUESTIONS</strong></th>
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<td>Many of the exchange plans are reimbursing hospitals at Medicare rates. Are you seeing this in many markets? If someone has insurance, then goes to an</td>
<td>Yeah, obviously. Again, there’s a trade-off there. More insured people means less charity care, less bad debt, but also you’re getting paid less for those</td>
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exchange product, this is a problem. If they are uninsured and then they then by exchange, that’s a better outcome.

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<th>How does the emergence of ambulatory surgical centers with increasing offerings and independent imaging service centers affect this environment?</th>
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<td>Well again, we’re seeing a focus on making sure you have the right facilities in the right locations. And so that’s part of that. The move is certainly to increase the right clinical scope and geographic reach. But also the cost structure is very different. So, ambulatory surgical centers typically have much lower overhead than hospitals do or even particularly than an academic medical center. So again, that’s bringing price competitiveness to this world that we haven’t seen in the past. But most of our member organizations are certainly focused on expanding their footprint, so to speak, again both with facilities such as ambulatory surgery centers, if they have already done that, but also with virtual care and telemedicine.</td>
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<th>Are PFFS Medicare Advantage Plans likely to survive? Or will MA options be limited to HMO, PPO models?</th>
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<td>Medicare-shared savings plans and current fee-for-service plans, there probably will still be some fee-for-service, but again the clear indication or clear direction is to move away from fee-for-service. We can’t just go on and that’s why you keep seeing the rate cuts and it’s a crazy game we play. You get paid less for each unit, so you have to produce more units. That’s not a viable business model going forward. As for as the Medicare-shared savings plan, I think they’re a really good start for organizations to begin to try this transition to a more risk-based environment or</td>
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value-based environment, however you want to look at it. But again, the Medicare-shared savings program, there’s some fundamental flaws in it with the way patients are attributed. When you get data back, and so when you know that patients have actually incurred costs or left your network, there’s some fundamental problems with them. So I don’t think those are going to survive long-term. Again, they were intended to be, I think, a learning experience for us all. I think what we see will be more refined models that really address some of the issues of physician attribution or patient attribution to physicians and being able to get real-time data or much closer to real-time or near real-time data, cost and quality and what patients are doing.

So again, don’t think they’re the ultimate answer but again I don’t think we’ll ever go back more towards the fee-for-service environment either.

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<th>What are some lessons learned from the relationship between IT and the new BI unit?</th>
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<td>First is the classic lesson. These are not IT projects. These are IT-enabled BI initiatives, just like transaction systems are. The second is to make sure that you have the right skillsets involved and in the right location. So for example, one of the first steps that many times organizations do is to try to centralize the BI function and many times just centralize within IT. I don’t think it really belongs within IT. I mean that can make sense because initially your focus is on ETL tools and data governance and more technical topics, but it may not belong there. And also, many times organizations tend to over-centralize. So we typically see an evolution of having the BI function relatively scattered throughout the organization during the fragmented phase to maybe overly centralized during the enterprise phase to the eventual recognition that certain things have to be centralized and certain things are better left off in the departments themselves. So for example, the finance has a cost accounting system and they have cost accounting gurus, it probably doesn’t make sense. You need to have access to their expertise but it probably just make sense to centralize them on a BI function just using a simple example.</td>
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<th>How long on average do you think a provider will be able to see a return on their investment? Meaning, is it 1 to 5 years or longer? I know it depends on the level of commitment on the health system’s part. I’m just trying to get a feel for that.</th>
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<td>If it’s talking about the BI investments, well again I don’t think you can structure your strategies so that it’s beyond 5 years. Most organizations again are feeling a lot of cost pressures. What you have to do is develop short-term steps and quick time-to-value within the context of an overall strategy. That’s why we described the four core strategies. So I think there has to be some wins and some returns that come</td>
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relatively early. But I think your ROI, if you wanted to do an ROI calculation on your BI investments overall, I would just caution you to not make the mistake of thinking that the past is a reliable indicator of the future and just linearly project out what would happen if you didn’t do anything. You can’t do population health management. You can’t survive in this new world without BI. So, you’re going to have to figure out how you do it the most cost effectively. That’s not a decision of should we do it or should we not. And again, you’ll have to figure out if part of that cost effectiveness is return on investment and time-to-value.

[Tyler Morgan]
Alright. Thank you very much, Jim, for your time and this wonderful presentation. I would like to thank everyone for attending today. Before we close this webinar, we would like to remind everyone, we do have some upcoming webinars in the next few weeks. Be sure to go to Health Catalyst® main page on our website and see on the slider there, the various webinars you can register for.

But before we finish, we would like to ask one last poll question. Our webinars are meant to be educational about various aspects affecting our industry, particularly from a data warehousing and analytics perspective. We have had many requests, however, for more information about what Health Catalyst® does and what our products are. If you are interested in a Health Catalyst® introductory demo, please take the time to respond to this last poll question. Shortly after this webinar, you will receive an email with links to the recording of the webinar, the presentation slides, and the poll question results. Also, please look forward to the transcription notification we will send you once it is ready.

On behalf of Jim Adams, as well as the folks at Health Catalyst®, thank you for joining us today. This webinar is now concluded.

[END OF TRANSCRIPT]