[Tom Burton]
Thanks, Tyler. I am excited to visit for a few minutes with you today about population health analytics, a topic I’m very passionate about.
And there’s been a lot of buzz recently about population health management. And so I want to start today by just asking what does that really mean? Is it managing health outcomes of a population of patients with a similar condition? Is it going at risk in some of the new fee-for-value models? Is it managing outcomes for high-risk, high-cost patients? Or is it engaging patients and communities for better health outcomes? There’s a lot of buzz in the industry and there’s a lot of different definitions about what population health management is and what population health analytics does to help in that process.
Common Thread: Outcomes

Provide the highest quality care with an optimal care experience for a population of patients at the lowest appropriate cost

Quality Outcomes
Experience Outcomes
Cost Outcomes

The key population health management question:

How do we **systematically improve outcomes** for a population of patients, one patient at a time?

But I think there’s a common thread and that common thread and outcomes. If I were to try to state it simply, our objective is to really provide the highest quality care with an optimal care experience for a population of patients at the lowest appropriate cost. And if you look at that statement, we have quality outcomes, we have experience outcomes, and we have cost outcomes that we’re really trying to improve.

And so, maybe the key population health management question is, how do we systematically improve outcomes for a population of patients, one patient at a time?

And so, hopefully what you’ll take away from today’s discussion are some key concepts and principles that will help you in that journey to systematically improve outcomes.
I like to kind of start with an analogy. If you think about what it takes to get a fire to start for combustion, it takes oxygen, it takes heat, and it takes fuel. And if any one of those are missing, you have a less effective fire. And I think we can draw an analogy that there are multiple things needed to improve outcomes, not just technology, not just analytics.
First, we need a content system, an analytic system, and a deployment system. And just like in combustion, all three of these are required for outcomes improvement.

So what do I mean by content system, deployment system, and analytic system? Well a content system describes what we should be doing, what are the evidence-based guidelines, what are the best practices, what knowledge should we be applying to improve outcomes. Second, the analytic system, we need to know how we’re doing – are we complying with the best practice guidelines? Are we providing the care in the most effective and safest way? If we’re not able to measure that, it’s really hard to improve. And third, how do we transform? The deployment system is all about getting an innovation or an improvement deployed broadly across the organization, not just at the flagship hospital but at every clinic, at every facility with every physician and clinician that’s providing the care.

So those are really the three questions – what should we be doing? How are we doing? And how do we get better or how do we transform?
I love this quote, “Every system is perfectly designed to get the results it gets.” And so, I would just add to that. So why don’t we re-design our systems to get better results, or in this case, better outcomes.
How **systematic** are we at Outcomes Improvement? [04:03]

So when you think about systematically improving outcomes, we go back to our fire analogy. Is our organization one that’s kind of rubbing two sticks together and maybe we get a fire after a hundred tries? Or do we have a machine that just systematically produces combustion, like an engine where we can just systematically produce outcomes improvement over and over again and sustain those improvements over time?
So we’re going to chat about each of these areas in a little bit more detail. I’m going to give you a quick overview of each of those areas and what we mean starting with the content system.
So if we think about what should we be doing, we need to start with thinking about the entire continuum of care, and we call this a care improvement map. It includes the workflow, it includes the clinician’s decision or thought process flow across the entire continuum. We’ll then need to identify common problems or potential improvements. These are specific AIM statements for outcomes and processes that we should measure so that we can focus our efforts on improving the things that matter most. Next, we’ll want to scope the problem, define precisely a patient registry. This is a specific inclusion and exclusion criteria for the sub-cohort of patients for that particular AIM that we’re working on. We’ll then want to adapt standardization aids. They could be checklists, they could be order sets, intervention, criteria, protocols to make it easy for clinicians to choose the best action. And finally, we want visualizations that are actionable - scorecards and dashboards that promote best practice and invite action to happen.

So those are all of the components that we’ll talk about today for what we would consider a content system.
Then we'll talk a little bit about the analytics system. So this is the ability to measure how we’re doing. We want to be able to find patterns in the data to show correlation and causation. We want to be able to integrate clinical, financial, and patient experience data, and be able to predict outcomes and prescribe actions that will be most appropriate for an individual patient.

So how we’ll be able to do that? Well, to do that, first, we’ll need to have an infrastructure in place that allows us to securely bring that data together. Every care delivery system has multiple sources of data, the EMR data, the claims data, the financial data, the patient satisfaction data. And typically that data is siloed in different areas. And so, we’ll need tools and capabilities in order to bring that data together.

And then there’s common things that we’ll have to do a lot. For example, defining registries, defining cohorts of patients, attributing different patients to specific providers, and understanding the severity of their illness and the comorbidities that exist, defining terms and calculations and being able to compare results within our own organization, between providers, between locations, but also external comparatives.
So those are all tasks, regardless of what we’re working on, we’ll have to do over and over again. And so, this kind of an infrastructure is what we would consider an analytics system, which really helps us measure how we’re doing. And so, we’ll talk about each of those areas.

**Deployment System Overview**

**How do we transform?** [07:58]

And then finally, the deployment system, is really about how we transform. So first, we need to understand our current capacity for improvement, evaluate the organization’s current capabilities, the challenges and the gaps. Next, we’ll need a good governance model that allows for both data governance and data stewardship, as well as advanced organizational governance and prioritization. This is probably one of the most challenging things to accomplish. Getting the governance structure right will accelerate or stall the actual improvement with population health. Next, we’ll want to implement the right tools at the right time, including an improvement methodology that incorporates LEAN and PDSA that incorporates AGILE software development and systematically go about our improvement. And finally, we’ll need advance training, the ability to add skills and add capabilities to our team members, our clinicians, our technical folks, so that we’ll all be able to accelerate our ability to improve outcomes.
So those are the major areas we’re going to cover today and we’ll start by diving into our content system. Again, what should we be doing. Again, what should we be doing?
Care Improvement Map
Sepsis and Septic Shock [09:30]

So, this is an example of a care improvement map for sepsis and you can see on this map it contains the major processes included in delivering safe care for sepsis patients. And it also includes potential areas for problems. You see those storm clouds. Each of those identifies a potential problem area. And then below each of the main boxes there are metrics that are important to understand for that particular step in the process. This care improvement map is just an example of the types of things we want to do right upfront to understand all of the components across the continuum of care that we should be thinking about and that a clinical and technical team will want to collaborate together on to improve.
Identify Potential Improvements
Process AIMS and Outcome Goals [10:24]

The next component is deciding which of those storm clouds on that process map are the most important to work on first. So if we select heart failure as the area we’re working on, one improvement AIM might be to improve medication reconciliation. And we’ll want to set specific goals and targets around improving that. So, let’s say we’re currently at 58% compliance to our medication reconciliation standards. We may want to get that to 80% by a specific date. We may then work on a second AIM, which is making sure that a follow-up visit occurs for patients being discharged. And so, as we work on AIM after AIM and improve specific process steps, we hope that it has a significant impact on an outcome goal, for example, maintaining or increasing cardiac function for our heart failure patients. And we can again set specifics around those goals.

“AIM defines a system”, as Deming once said. And so, deciding what part of the care we’re trying to improve is a really critical step.
Next, we’ll want to really define the registry of patients or the cohort of patients for a particular AIM. We can start with a standard registry from administrative codes but we’ll want to move quickly beyond just at the administrative definition.
Let me give you an example of how this would work. We were working with a Children’s Hospital and focused on improving care for the asthma population. And so, we started with an ICD-9 code for asthma, 493.XX, and we found that there were about 29,000 patients. But then as we worked to get a more precise registry, we found additional patients that should be in the cohort that we’re thinking about improving care for. Many patients had an ICD code on their problem list related to asthma. There were also codes, like wheezing, that were actually asthma patients but they received a different kind of a code for wheezing during the care delivery process. And then we found that there were a lot of patients who had specific medications that only asthma patients received and we found 70,000 additional patients.

And so, when we combined that broader registry, we found there were 101,389 patients that we identified through those additional inclusion criteria. And as you combine those two, there was some overlap but there were a lot that we needed to include that we hadn’t originally included. There ended up being about 106,000 total patients in this precisely defined registry for asthma.
So defining that problem that we’re working on and then designing a specific clinically defined cohort or patient registry is a very important task. And having the tools that will help you do that is critical.

Next, we want to adopt standardization aids or we sometimes call these knowledge assets. There are three major types of knowledge assets – Utilization knowledge assets, order sets, and workflow. And we can kind of ask a question to describe each of these knowledge asset types.

Utilization is all about who should get the care and the examples would be things like a triage criteria, which patient should go, be admitted to the hospital, which could be cared for by their primary care physician. An intervention criteria might be should we do this procedure or should we just use a physical therapy. Indications for referral would be something like should this patient be referred to a specialist or should the primary care physician manage this patient. So those are just a few examples of knowledge assets related to utilization. And typically, these aren’t standardized. There may be a few standardized triage criteria or diagnostic algorithms but across the Board, these are often just based on the opinion of whoever the physician is treating the patient and not based on evidence which may exists but not be fully utilized.
The second group is order sets. So once we’ve decided that care should be given, what should be included in that care? This could be admission order sets, pre-imposed procedure order sets, or supplementary order sets. Also includes which medications or substances should be selected and what supply chain components will be a part of this patient’s care. Often, these are not standardized as well. And so, if we can identify, for example, with appendectomy patients, there may be a particular antibiotic which has been shown to be most effective (15:45). And so, is that the default order set.

The third category is workflow, and these are things more related to LEAN – things like checklist, standard work, things that we do over and over again. And the question we’re asking here is, how can the care be delivered in the most efficient manner possible? Examples include bedside care practice guidelines, patient injury prevention protocols, follow-up checklists, discharge checklists, etc.

In the far column here, you see possible measures that we can think about as we think about understanding the utilization of these types of knowledge assets in our care delivery. And for utilization, we’re thinking about admits per 1000 members or procedures per 1000 members. As we get into order sets and workflow, we’re thinking more cost per case and the number of minutes that a particular task takes or a particular location spends with the patient.

So these three types of knowledge assets are really important to understand and not just understand how to design them, but how to use them effectively throughout the continuum of care.
This is a map showing where each of those knowledge assets ends up across the continuum of care, and you can see the different knowledge assets are used in the clinic or ambulatory setting, in the acute medical, or the invasive setting. And you can see how these assets get used across the whole care delivery process.
Perhaps my most important slide today is understanding how payment structures can really impact the improvement work you’re doing. Sometimes doing the right thing for the patient can have a negative financial impact on the care delivery organization as a whole. So, I’ve taken the list on the left here. This is actually a slide that Dr. Burton pioneered. On the left-hand side, you see the different types of knowledge assets that we just discussed, whether it be an intervention criteria or an indication for referral criteria, some part of the process that you want to standardize.

Now, if you’re in a discounted fee-for-service payment arrangement, making a change to an intervention indication can actually have a negative impact on your bottom line. Whereas, if you’re in a full capitation or a condition capitation situation, it will have a very positive impact. So this grid is very crucial to understand as you’re working with a population of patients and trying to improve outcomes. The type of change you’re making, the type of knowledge asset that you’re trying to deploy will have a significant impact on your payment profitability. So one thing that you can think about is approaching your payers as you decide, we’re going to work on standardizing our indications for referral or our indications for intervention, and trying to move the bulk of your payers from a fee-for-service model into a full capitation or condition
capitation situation, so that you can make sure that a payer doesn’t benefit alone but that you share in the savings that you achieve by improving outcomes for our patients.

Actionable Visualizations
Heart failure Appointments [19:33]

The final component of our content system is actionable visualizations. What do I mean by actionable? It’s not just enough to know that, hey, on a whole, we’re managing our diabetic patients or our heart failure patients in this good or great manner. We need to know exactly what actions or steps we should be taking with specific patients.

So this is just a screenshot of one example of that. This is looking at heart failure patients and it’s looking at those that have been discharged recently, and it’s got a prioritized list of those who have not yet scheduled an appointment for a follow-up visit. And we can see that we have sorted it by risk of readmission. And so this is an example of using analytics and actionable visualizations to direct the work of the person who would be making a phone call to schedule this follow-up visit. So we work on the highest risk patients first and we call that first patient there that has a risk score of 81 as our top priority and then we can move down the list.
Another example of actionable visualizations is one that we’ve actually been working on with one of our ambulatory organizations and partners, and they’ve actually been working on helping to design a tool that a physician could use to sit down with an individual patient and talk about changes or actions that they should take in their life, whether it be trying to get their BMI to a better place, reducing their LDL or their hemoglobin A1c, and they can actually create a simulation here based on similar patients with similar conditions and demographics to move from the high-risk category down into the at risk or low-risk category. You can see the out of pocket impact that improving their care, improving their condition will have on them personally, and then also the impact they’ll have on other areas. So again, an example of very actionable metrics that help promote the right activities happening with clinicians and with patients.

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**Poll Question #1 – Content System**

What types of standardized content have you implemented to support Population Health Management? 192 respondents

A. Just Starting – 42%
   - We have not standardized content to support Population Health Management. Our clinicians use their best judgment based on their individual training.

B. Mid-Journey – 49%
   - We have begun to standardize some content (e.g. CPOE to implement standardized order sets – provided by our EMR vendor). We have not yet created standard content for both workflow and clinical domains across the continuum of care.

C. Mature – 9%
   - We have implemented standardized content to manage ambulatory and inpatient care management (e.g., ambulatory treatment algorithms, order sets, bedside care protocols) and utilization criteria (e.g., diagnostic algorithms, triage criteria, indications for referral and intervention) regardless of what unit or facility a patient enters the same workflow and care delivery content is followed and measured.
I’m going to pause here now and ask a poll question. And the poll question, I have a few poll questions today, and each of these poll questions is from a much larger set of questions that we are going to be providing in a couple of weeks, which is kind of a self-assessment that any care delivery organization can take to help them understand where are they on this journey – are they just starting, are they kind of mid-journey, or are they mature.

So our first poll question today is, what types of standardized content have you implemented to support Population Health? Now, if you’re just starting, you may not have any standardized content and everything is just kind of based on the individual physicians training. If you’re mid-journey, you may have done some work on standardization around your CPOE implementation with your EMR, but you may not have created all of the knowledge asset types that we talked about. If you’re mature, you’ve implemented standardized content across ambulatory and inpatient settings, you have all of those different types of utilization, work flow, and order sets in place and regardless of what unit or what clinic or what facility one of your patients visits, they’re going to get the same high-quality care that’s based on evidence.

So let’s just take a minute and open this poll question. Are you just starting, mid-journey, or mature?

[Tyler Morgan]
Alright. We’ve got that poll question up. We’ll give you some time to answer that. Again, what types of standardized content have you implemented to support Population Health Management?

If you do have questions, we’d like to remind you, you can enter those into the questions pane on your control panel. We have had several questions come in asking about the availability of these slides. I would like to let everyone know that in fact that we will be providing these slides to everyone, to all those who have registered to this webinar, after the event.

Alright. We’re going to go ahead and close this poll now. And let’s share the results.

Alright, Tom, it looks like we’ve got 42% that responded to poll answered A) just starting, 49% mid-journey, and we do have 9% answering as mature.

[Tom Burton]
Great. Thanks, Tyler. That’s really interesting. I think we want to see our whole industry move into that mature category, where we have standardized content and we’re leveraging that across the entire continuum.
Alright. Let’s move now into the analytic system. So, how are we doing?
Just as a refresher, we talked about analyzing and interpreting data, sharing similar tools over different types of domains, integrating source data together, and having infrastructure that produces a secure data that’s available.
So perhaps the most important thing we’re trying to solve here is the amount of time that it takes to get information. And we’ve seen this pattern a lot as we’ve worked with different care delivery organizations across the country. A good kind of litmus test on how strong is your analytic system is how much time your analysts and your data architects spend gathering and compiling data, hunting for data versus how much time they spend interpreting data. So, a weak analytic system, there’s little time spent understanding the question, most of the time spending hunting for the data and gathering and compiling the data. In a strong analytic system, the majority, the vast majority of the time is spent interpreting the data, and that’s the place we want all care delivery organizations to get – to those value-added steps of understanding the question in detail and really interpreting the patterns that you see in the data.

So how do we make that easier? What are the components to make that easier?
Well the first is implementing an enterprise data warehouse. Now, there are different models for doing that and I would say there are three prevailing data architectures that are present in the industry today. So, many technology vendors have adopted the enterprise data modeling technique and this has worked very well in other industries, like manufacturing and retail, but it has had some challenges in healthcare. So the idea with this model is there is a pristine enterprise data model that contains every concept that you could possibly want to know for care delivery. And then you map your data sources from your EMRs to your administrative, financial, departmental, and patient experience sources to that model. In theory, this seems like a very organized and logical way of doing that, but in practice, it has some challenges. That data model is never perfect and those underlying transactional systems are always changing, as are our definitions of what excellent care is, as we expand our knowledge.

So one of the challenges of this model is that it binds data very early in the process to a specific definition and that becomes challenging as definitions change, as needs change, as complexities of the data increase. This model has some challenges. Many times you’ll spend years modeling versus actually improving care, and the whole reason we’re doing any kind of data warehousing is to improve outcomes.
The second model that’s often used is the dimensional data model, and this is often used by EMR vendors or healthcare point solutions and it starts out working a lot better than the enterprise data model. The idea is that I have a specific clinical area or operational area where I’m trying to do something, let’s take an oncology for example, and I pull data from all of the transactional systems where I have interesting analytical data, and I create a summary data mart, if you will, that describes how I’m doing. This starts out well but the challenge is we have more than just one summary mart that we need to build. And so, over time, this becomes very hard to maintain because we have multiple data feeds going to every one of these different dimensional data marts. And so, over time, we end up with a lot of redundant data extracts which means when one of these underlying transactional systems does an upgrade, we have a maintenance nightmare on our hands.

The other challenge with this is oftentimes the granular atomic level of detail is not sorted in those summary marts. And so, as the clinician asks another question, a deeper question, “well
why?” or “can you show me and stratify this”, oftentimes that data is not included. And so, it’s a redesign of that data mart.

Steve Barlow and I tried both of these architectures when we were working at Intermountain Healthcare and failed miserably with both of these architectures.

Adaptive Data Modeling

It was until Dale Sanders brought some ideas that he borrowed from the Air Force and we implemented an adaptive data model that we started to see real traction. The difference with an adaptive data model is that it’s a Late-Binding ™ Model. We don’t try to pre-determine how the data will be bound. And so, the way that this model works is we bring data from all of the transactional systems into what we call source marts, but there’s very little transformation of that data. And so, those transactions are very quick and very simple. Once we’ve co-located the data and linked common identifiers, like patient identifiers and provider identifiers, location identifiers, then we’re able to look at specific use cases and build subject area marts around those use cases and visualizations on top of those subject area marts.

This has a much faster time-to-value proposition. With one of our clients recently, we implemented 9 of these source marts in about 9 weeks. And so, very quickly, you’re getting all
of that data co-located and then you can start to address specific challenges and problems to improve outcomes. And as we choose an AIM statement to work on, that’s when we bind the data, that’s when we start using that data for improvement. We don’t have to pre-bind everything to get started.

So, as we think about information management and using an analytic system, there are three major components of that. Number one is capturing the data, number two is provisioning that data and moving that from all of the different systems into a centralized place where we can then take the third step, which is analyzing the data. And these are three very distinct tasks. And so, being good at all three of these is important. We want as much as possible to automate the capture of data and the provisioning of data and spend most of our time on data analysis. That’s where the real insights are gained. That’s where the real value is added.
Less Effective Approach
“Punish the Outliers” [32:03]

One of the first things we’ll want to do is figure out which areas should we focus on and how do we get improvement to have it. Well there’s a couple of ways we could approach that. One way is what I call the “punish the outliers” method or “rank and spank” and that is to set a minimum standard, then identify the physicians that are below that minimum standard for the population of patients they’re serving, and kind of try to shame them into doing better. Well, if you apply pressure, they will get better and you will not have anybody below the minimum standard. The challenge is you haven’t really impacted the care delivery for all of the rest of the providers that were already above that minimum standard.
Effective Approach to Improvement:
Focus on “Better Care” [32:55]

A better approach may be to look that and identify what is the best practice, what are our very best clinicians doing, and can we tighten the curve, reduce the variability and create what we would call a shared baseline? It’s not that we will mandate that care should be delivered in a specific way, but for the typical cases, we’ll want to create what we call a shared baseline for, you know, what should happen most of the time. That’s where we use those knowledge assets that we described in the content system. And so, we tighten the curve, we’ll get more consistent about using those best practice guidelines, and then we’ll shift the curve towards excellent outcomes.
We can think about which areas to focus on first in this four-box matrix. If we think about how much or how many resources are we using to deliver the care across the continuum for a particular care domain, and then on the Y axis, we put how variable is the care from provider to provider, from location to location. And if we think about focusing on the large processes, where we’re consuming a lot of resources that are highly variable and make those our top priority, we can actually use data to help in the prioritization process.
Internal Variation versus Resource Consumption [34:25]

So this is an example of what we would call a key process analysis or a Pareto analysis, where we would look at that top quadrant and focus on those care conditions first, those populations of patients first because they’ll have the most impact.
Prioritize: Pareto Analysis App

This is an example of a screenshot of that tool in action where very quickly, within just a few weeks, we can identify high cost, high variability care areas, so that we can focus.
And what’s interesting is there is this Pareto principle of the 80/20 Rule, where a very small number of processes, in this example here, 13 of the top care processes account for 34% of the opportunity of improvement. If you go to the top 40, you’re up to 62%, and if you go to the top 85 processes, you’re at 80%. So the 80/20 rule definitely applies here. And we can see that by focusing on the vital few, we can have a huge impact on the improvements.
Poll Question #2
Analytics System
How is data from disparate transactional systems integrated? (e.g. EMR, Cost, Patient Satisfaction) 215 respondents

A. Just Starting – 37%
   – Analyst manually integrate data into spreadsheets.

B. Mid-Journey – 50%
   – We use one of our transactional systems (e.g. EMR or Financial) to integrate a limited subset of data for some of our transactional systems for key operational reports.

C. Mature – 13%
   – We have implemented an Enterprise Data Warehouse Platform, fully automated load from all of our transactional systems runs at least daily which integrates data based on common linkable identifiers (e.g. patient and provider IDs), with near-real time loads for selected data.

Poll Question #2 – Analytic System
How is data from disparate transactional systems integrated? [35:35]

So it’s time now for our second poll question around the analytics system. So I have two questions for the analytics system. The first question is how is data from disparate transactional systems integrated? If you’re just starting, you may be doing most of this integration manually in spreadsheets. If you’re mid-journey, you may be using your EMR or your financial system at that co-location and you’re bringing financial data into your EMR or EMR data into your financial system, and on a very limited subset of data, you’re integrating data for key operational reports. If you’re mature, you have implemented an Enterprise Data Warehouse Platform, you have fully automated loads running at least daily, in some cases hourly, and all of your data from all 50 plus transactional systems is co-located and integrated in an Enterprise Data Warehouse.

So let’s open the poll up and see, are you just starting, mid-journey, or mature when it comes to integrating data?
Alright. Our poll is up. So how is data from disparate transactional systems integrated? Just starting, mid-journey, or mature? We’ll leave that open for a little bit to give you a chance to respond.

Also, I would like to remind everyone that if you do have questions or comments, please be sure to enter those into the questions pane of your control panel.

Alright. We’re going to go ahead and close that poll now and let’s share the results. I would like to remind everyone that all these results will be summarized and shared with the slides that we provide out after the webinar.

So alright. Tom, it looks like 37% who responded said just starting, 50% said mid-journey, and 13% answered as mature.

Wonderful. Thanks, Tyler.
What technical tools do you use to move your organization away from reactionary, emotional decisions toward data-driven decisions? [37:38]

The next poll question is what technical tools do you use to move your organization away from reactionary or emotional decisions toward data-driven decisions? And an example of that would be what we just showed with prioritizing based on the data, not just based on the loudest voice. So if you’re just starting, you maybe don’t have any technical tools to help with data driven prioritization. If you’re mid-journey, you may use some spreadsheets and analysis to evaluate options but it’s typically decisions are still based on politics and crisis management or whoever the loudest physician is. If you’re mature, you will have robust applications which provide clinical and operational governance committees, objective criteria to prioritize, and that would include identifying processes that have significant resources consumed and large variability.

So again if you could answer this poll question, as far as data-driven decision-making, are you just starting, mid-journey, or mature?

[Tyler Morgan]
Alright. We have that poll up and we’ll leave that open for a few moments. Okay. We’ll give just a few more moments to give everyone a chance to respond and then we’ll close the poll.

Okay. We’re going to go ahead and close that poll now and share the results. Okay. Our results. Tom, we’ve got 27% responded as just starting, 57% responded as mid-journey, and 17% responded as mature.

[Tom Burton]
Excellent. Well it’s very interesting. We all have opportunity to improve and hopefully some of the principles I’m sharing today will help you on your journey. It’s not an easy journey but it’s worth it.
Let’s now move in to the final area, which is the deployment system. How do we transform?
Deployment System Overview
How do we transform? [39:45]

It’s a combination of understanding our current capacity as an organization, implementing excellent governance principles, standardizing our improvement methodology, and providing great training to our fellow team members.
So this is just an example when we’ve shared just three or four of the questions in our self-assessment survey. Well this is an example of an organization that did a broader survey and how they kind of ranked themselves in the three systems we’ve talked about today – Analytics, Deployment, and Content. Being self-aware and being able to understand where differences of opinions lie is a really important exercise to go through and something we recommend for every organization on this journey.
The second component is governance and this is a really challenging area. First is an executive leadership team has to be the sponsor of any kind of outcomes improvement effort, if it’s going to really stick. One of the things that they’ll design is the sequence in which permanent teams should be organized and they may use something like I showed earlier, a data-driven approach, to analyze the most important processes to focus on those with the large variation and significant volume.

Next is a guidance team. We could organize a guidance team either around a clinical support service or a clinical program. So a clinical program might be something like Women’s and Children Care. And then within that, you may have experts, OB-GYN, pediatricians that will participate on that leadership team. The guidance team would figure out which AIM statements should be approved to work and would meet on a regular basis to review the progress and help remove road blocks.

You then have a small integrated team of physicians, nurses, and technical and analytical folks that will actually design innovation. They meet weekly. They draft the changes that are going to be made, and then they take those drafts to a larger broader team, which would represent
the entire care continuum – the clinics, the inpatient settings, where that care is delivered. And that team would iterate between the small and the broad team in a way that would get fingerprinting or adoption in the minds of those that are going to have to change their behavior. So there’s a lot here and this is probably the hardest part of making improvements and outcomes stick and really last and be able to be sustained.

**Improvement Types [42:41]**

There are different types of improvements that they’ll work on. They may first start, and this is, being from Utah, this is a little bit of a ski analogy here, they may start on the easiest areas, which is just better identifying the opportunities. Examples might be looking at the variation and calculating how much could be saved by improving or standardizing the care delivery. Next, we might focus on process improvements, increasing our ability to do the root cause or the steps within the process that leads to the outcome. And finally, the outcome improvements. Those are the things like measuring the reduction in mortality or the improvement in health function or actual hard or soft cost dollar savings.
And so, all three of these are important to work on and the most difficult are the outcomes, more difficult process improvements, and the easy are just the identification of the improvement opportunities.

Improvement Methodology [43:41]

As we think about identifying those opportunities and then going and actually making the change, this is the real work of identifying the content, the best practices, defining those cohorts, choosing an AIM statement to work on, iterating on the metrics, and then redesigning how we’re going to deliver the care in a more systematic way, rolling out those changes in measuring results. Now, throughout any of that process, we may use different techniques. We may use some LEAN and Six Sigma techniques, we may use AGILE software development techniques, but the overall process is all about reducing the amount of time it takes to improve the outcomes.
Just a little bit more on the agile approach to software development. We have found this is critical. There’s a traditional way of deploying software or building software, which is sometimes referred to as the “waterfall” method, where you try to get a lot of documentation upfront about what’s going to be built, you get people to sign up and you do more documentation and design specs, you eventually code and the clinicians first see the product after about four months, then they test it and correct all of the errors, and eventually after six months, they get to use the analytics system.

We find this to be a less effective way. And what’s more important is for the clinicians to see this on a weekly basis. And so, the tools that you use for analytics need to be very flexible so that they can weekly make adjustments and get value during the interim. It’s focused more around working software than on comprehensive documentation. And so, weekly iterations, working with that small group, redefining inclusion criteria, figuring out what the calculations for the metric should be, looking at different ways of stratifying and correlating the data, make for more value-added to the analytics that you’ll be using to improve outcomes.
Finally, training is critical. We recommend three types of training. The first is an immersive quality training program. This could be taught two to three days a month for multiple months and this is really to train the trainers, teaching them quality improvement theory, applying it to an actual project that they’re bringing through the intensive immersive course.

Second important type of training is executive training. Many of the executive team may not fully understand how hard it is to improve outcomes and how important it is. So providing some high level principles to the entire executive staff is critical for your long-term success.

And then just-in-time training. As we think about individual teams working on improvements, they may need a refresher of a particular concept. And so, having 10 to 15-minute modules that can be implemented as you’re working on a specific problem can be very useful.

And we recommend having a comprehensive training program that includes immersive training, executive training, and just-in-time training is critical to actually improving outcomes.

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**Accelerated Practices Program**

**Preparing Healthcare Teams to Accelerate Outcomes Improvement [42:52]**

<table>
<thead>
<tr>
<th>Immersive Quality Improvement Training</th>
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<tbody>
<tr>
<td>• 8 Session Course - taught over 4-6 months, 2 ½ days per month</td>
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<tr>
<td>• Train the trainers – required for coaches and team leaders</td>
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<td>• Quality Improvement Theory applied on actual project with 2-4 person team</td>
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<tr>
<th>Executive Training</th>
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<tr>
<td>• 2 day executive course taught quarterly</td>
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<td>• Provides leadership visibility into training and high level principles</td>
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<th>Just-in-time Training</th>
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<tr>
<td>• Library of 10-15 minute modules used as needed by permanent teams</td>
</tr>
<tr>
<td>• Readily available to clinical, technical and operational team members</td>
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Poll Question #4 – Deployment System

How are teams organized to improve the quality of care and sustain improvements? [47:07]

So, our last poll question, how are your teams organized to improve the quality of care and sustain improvements? Are you just starting, you have ad-hoc teams that kind of get organized on a project basis in a reactive mode, maybe in response to a sentinel event. And after the project ends, the team kind of disperses and goes back to their day jobs. That’s the just starting.

Mid-Journey, you may have a quality department that provides support to Service Lines and Departments and some individual units and facilities focus on quality but the dispersion of the improvements may just stay in the flagship facility or may not get spread to every clinic and every hospital.

If you’re mature, you’ve organized permanent interdisciplinary teams that have both clinical and technical resources as permanent team members. They own the quality cost, safety and satisfaction of the care delivery, and a great litmus test here is the percentage of time your board spends on reviewing the goals of these permanent teams versus on a capital budget for building new buildings is a great indicator on if you’re mature. A mature organization will
spend the vast majority, 90% plus time, thinking about these outcome and improvement goals, not on should we build a facility down the street or not.

So let’s open this poll. Are you just starting on your team structure, on your improvement or your deployment system, are you mid-journey, or are you mature?

[Tyler Morgan]
Alright. We’ve got that poll open right now. How are teams organized to improve the quality of care and sustain improvements?

I would like to remind everyone, we’ve have had a few additional questions, that this webinar is being recorded and we will provide link to the recording, as well as the presentation slides and the results of all of these poll questions to everyone after the webinar is over.

Alright. We’re going to go ahead and close this poll and let’s share our results.

Tom, it looks like 33% answered A) just starting, 55% answered mid-journey and 11% answered mature.

[Tom Burton]
Great. Thanks, Tyler. Well it’s interesting, as we look at all of these poll questions, a lot of you are just starting and many of you are mid-journey. Perhaps the most challenging time is mid-journey. You put in a lot of effort but you haven’t fully realized the results. And I would just encourage all of you doing this great outcomes improvement work to keep going. It’s worth it. The results are real and you can make it happen.
Just in summary, to conclude, we’ve talked about three systems that are critical for outcomes improvement. We’ve talked about the content system, the deployment system, and the analytic system. Well my last slide here is what happens if one of these or two of these systems are missing?

So if you just have the analytic system, this is kind of a “if we build it, they will come focus.” Very IT-centric.

If you just have the analytic system and the content system, you have science projects. You have pockets of excellence but you fail to roll that out across the entire organization.

If you just have the content system, you’re research-centric. You have some great published papers but no practical application of those improvements.

If you have the deployment system and the content system but you’re missing the analytic system, after the first few improvements, because you’re having to manually measure,
becomes very hard to sustain the gains. And sometimes LEAN can fall into this category because you’re manually measuring what’s a platform for analytics. And so, oftentimes, lean efforts or lean initiatives fall into this category.

If you only have the deployment system, this is often viewed by clinicians as the “flavor of the month”. And if you don’t have evidence about best practices or a way to measure how you’re doing, you’ll get quick disengagement from clinicians.

And finally, if you only have the deployment system and the analytic system and you’re missing the content or those best practice knowledge assets or guidelines, I call this “paving cow paths”. You’ve automated something but you haven’t necessarily improved it. And a lot of EMR deployments fall into this category. We’ve gotten off of paper onto electronic but we haven’t actually improved any of the process.

So back to our fire analogy, we need heat, we need oxygen, we need fuel, we need all three of these to be working together to really ignite change and that change is scalable and sustainable outcomes improvement in population health.

I hope that this discussion has been helpful to you on your journey and we’ll help you improve outcomes in the population of patients that you serve.
And we’ll open it up now for some questions.

[**Tyler Morgan**]
Alright. I’d like to remind everyone to please if you do have questions or comments to enter those into the questions pane on your control panel.

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<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
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<td>I have seen many customers struggled to integrate Population Health Analytics Strategy with their EDW. Oftentimes, hospitals have two parallel initiatives, EDW and Population Health Management. Without having synergy between them for analytics, what would be your suggestion to such hospitals in having an integrated analytics strategy for their organization?</td>
<td>This is a really good question and I’ve seen this happen a lot. You have silos of improvement happening, you have a technical team that’s really focused on improving the measurement system or the analytic system, and you have population health quality improvement going on in a different area and they don’t even know that both exist sometimes. This goes back to that executive training that I talked about earlier. Making sure that the highest levels of your organization are aware of how crucial it is to integrate these is probably one of the first steps. And so, getting those executives to understand that is key.</td>
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<td>Question</td>
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<td>Based on your experience, how much of the content should be based on EBM or Evidence-Based Medicine?</td>
<td>Only about 15% of what we do today in healthcare is truly evidence-based or a double-blinded control study. That doesn’t mean that there isn’t a standard that we should opt. Many times you can get your experts to agree that a particular knowledge asset can be standardized, and even if there isn’t a reputable evidence that that’s the best way of doing it. And what’s interesting is we see a lot of our organizations we work with creating quasi experimental design, where they actually are creating evidence by experimenting with standardizing in a given way, creating the best baseline with a robust analytic system that they now have and then tweaking that standardization over time and figuring out which interventions work with which patients most effectively. And while it’s not a double-blinded study, it still is a form of standardization of knowledge asset which can significantly benefit patients.</td>
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<td>I love the about moving poor outcomes to excellent outcomes. I have a question. How are poor or excellent outcomes defined according to what criteria?</td>
<td>This goes back to those clinical teams that you want to build. We can start with a literature. We can start with what evidence is out there in the literature but it’s getting an integrated team of clinicians across your organization to come together and talk about, well, what should our standard of care delivery be, when should we intervene and do open heart surgery or when should a stent be the appropriate course of action. Many times those clinicians haven’t ever had those discussions across the entire organizations. Yeah, two clinicians might have a discussion but all 10 hospitals or all 50 clinics haven’t had a forum for those conversations. And so, just getting the group together to start to have those conversations can be a critical step.</td>
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<td>The Late-Binding ™ Model, I’m not quite understanding it. Would you mind explaining it again? Maybe with an example.</td>
<td>An example of Late-Binding ™ might be someone trying to define length of stay. And an early binding model would mean as soon as you move the data from the transactional system, you’re defining and locking in that definition because you have to map it to a model. A Late-Binding ™ approach would be bringing the data from, let’s say you have three EMRs in your organization. Bring all three of the data from those three different EMRs and co-locate the data in the data warehouse but allowing different use cases to define that differently. A surgeon may be interested in the time between incision and leaving the surgery room; whereas, an administrator may be interesting in defining the length of time from when they walk through the door and registered to when they were discharged. So those are similar concepts of measuring that time but I can define it differently</td>
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Based on a use case. So a Late-Binding™ approach allows for a later binding of the data rather than early binding of the data.

There’s some great articles out on our website on Late-Binding™ versus Early Binding and how that works.

[Tyler Morgan]
Well we are at the top of the hour and I would like to thank everyone who has joined us today. Before we close the webinar, we do have 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 the 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 this webinar, the presentation slides, and the poll question summary results. Also, please look forward to the transcript notification we will send you once it is ready.

On behalf of Tom Burton, as well as the rest of us here at Health Catalyst, thank you so much for joining us today. This webinar is now concluded.
Thank You

Upcoming Educational Opportunities

The Pioneers Take the Arrows and the Settlers Take the Land: Healthcare Predictions for 2015

Date: February 11, 2015, 1-2pm, EST
Host: Dale Sanders, Vice-President, Strategy
Register @ www.healthcatalyst.com

[END OF TRANSCRIPT]