
Developing an Analytics Strategy for Healthcare Quality and Performance Improvement

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The Genesis of Analytics Strategy Development

“We have all these dashboards,
but why aren't we seeing any
improvement?”

- An unnamed healthcare executive

Building a Strategy

- **Document current state**
 - Review strategy components with stakeholders
 - Identify how analytics are currently used
 - Document what will be needed
- **Identify gaps**
 - Boil down laundry list to key things that can be done
 - ID where the gaps occur
- **Execute strategy**
 - ID which gaps are the priority for the organization
 - Develop a plan to implement strategy's recommendations

Healthcare Analytics Overview

Components of an analytics system

What is “Analytics”

- Analytics consists of the systems, tools, and techniques that:
 - Help understand the patterns in data
 - Has a change really occurred (or not occurred)?
 - Identify “why” a change has (or has not) occurred
 - Suggest what the next logical steps should be
 - Correct negative trends or encourage positive trends
- Healthcare analytics improve decision making by replacing gut instinct with data-driven, transparent, verifiable, and robust decision methods.

What is an Analytics Strategy?

- A strategy that ensure analytics development and capabilities are in alignment with enterprise quality and performance goals
 - avoids the “all dashboard, no improvement” syndrome
- Helps to identify optimal use of analytics
 - can mean the difference between a “collection of reports” versus a high-value information resource
- Analytics Strategy should align with (or be a component of)
 - Business Intelligence (BI) or Information Technology (IT) strategy
 - Quality Improvement (QI) strategy

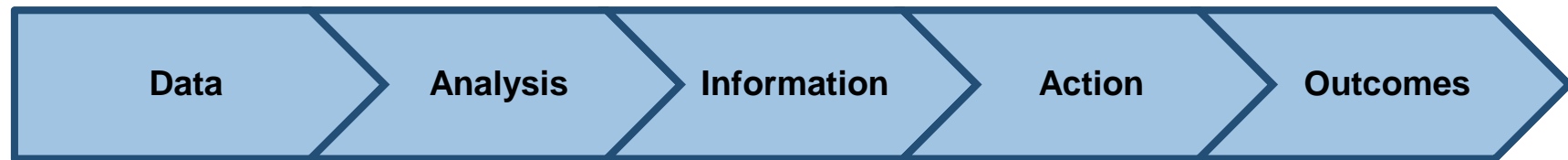
Why is a Strategy for Analytics Required?

- Analytics is currently “trendy”
 - Many buzzwords, marketing angles, white papers, opinions
 - Easy to get distracted from what is actually required by your organization
- A strategy helps keep focus on what is important for the organization
 - Invest *now* for what is required now, and invest *later* for what is required in the future.
- Analytics is a sophisticated *use* of data and technology
 - May trigger a cascade of enhancements throughout other components of IT and BI (i.e., reporting, data storage, ETL, etc)

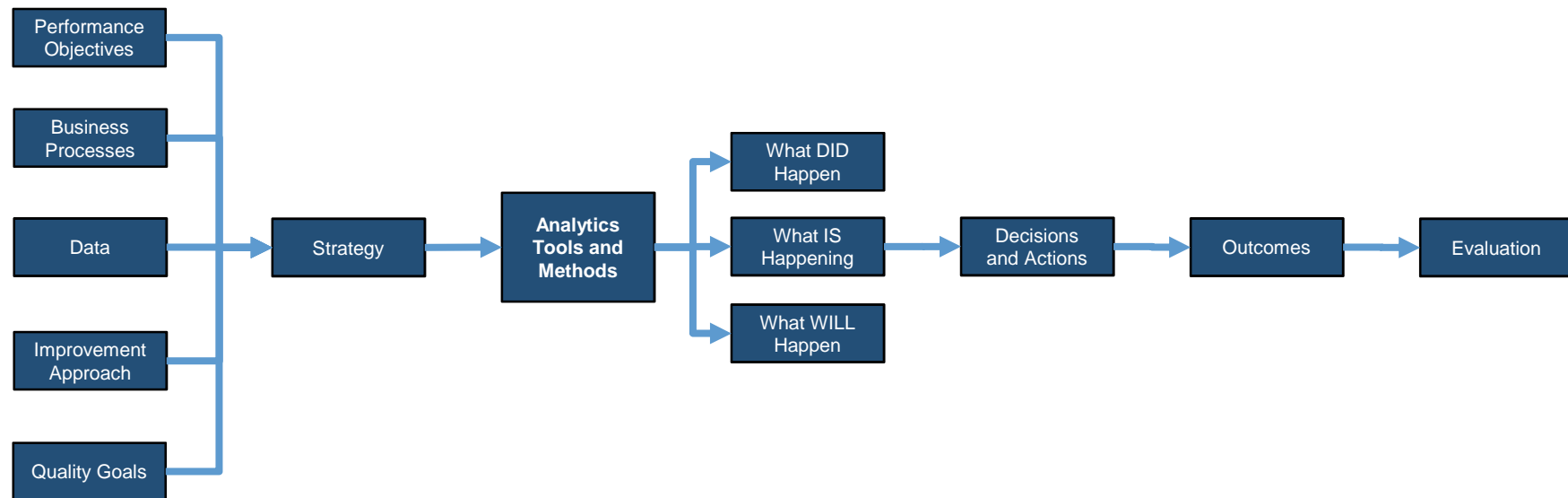
When to Develop (or Update) the Analytics Strategy

- **NOW!** (If you don't have one)
- When major quality improvement initiatives kick-off
- In the planning stages of IT infrastructure and software deployment projects
- In the absence of above, annual reviews (at minimum) should be conducted on your analytics strategy.
- *The analytics strategy should be a living document; don't hesitate to update it as the environment or requirements change.*

Information Value Chain



Data, Dashboards, and Decisions

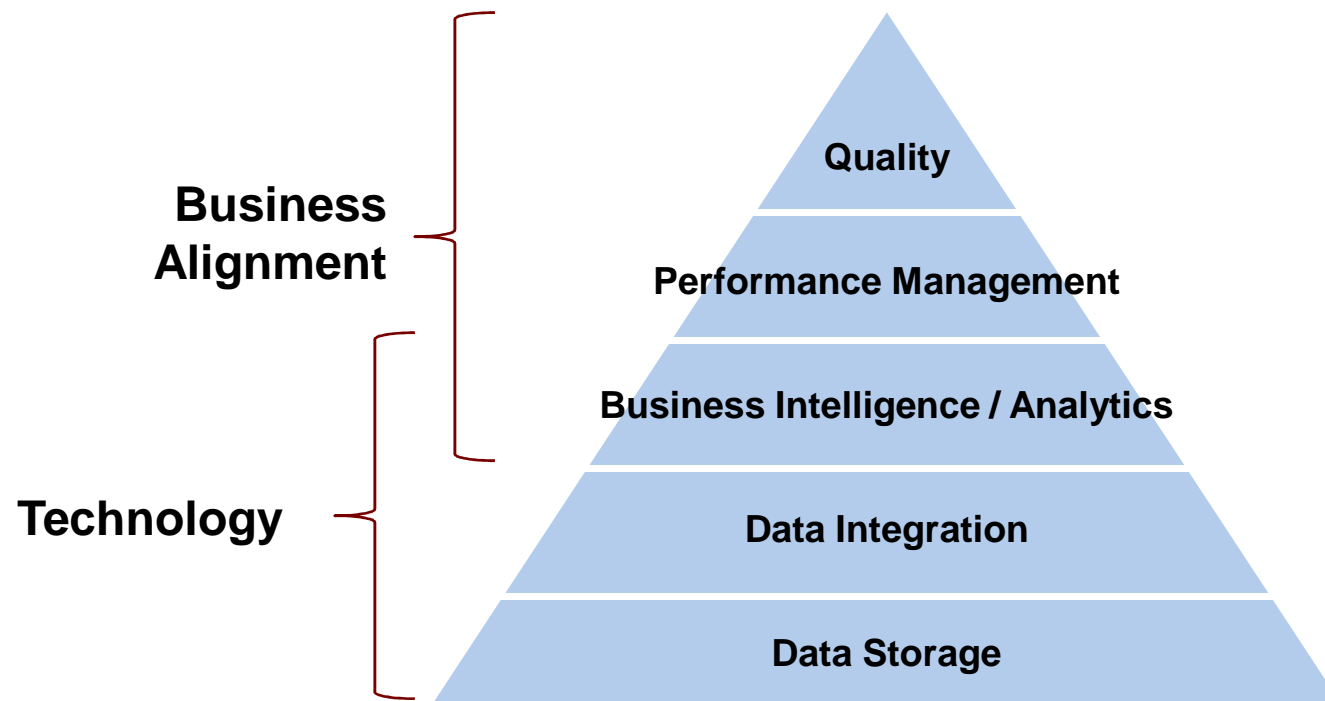


Becoming an Analytical Healthcare Organization

1. The analytic needs of the business are understood.
2. The HCO possesses the right analytical people and skillsets.
3. The technology infrastructure supports the analytical people and the analytical needs of the business.
4. The analytical people are deployed to the right projects and are working on activities that move the organization closer to achieving its performance and quality goals.
5. Healthcare leaders, quality improvement teams, and other decision-makers actually use the information and insight available through analytics.
6. The health data that make analytics possible and that drive quality and performance improvement is held secure, and that it is accessed and used in responsible ways.

Start with the Needs of the Business

- Focus on how analytics can support the needs of quality and performance improvement within the healthcare organization.



Analytics Strategy Framework

Components of Analytics Strategy



Adding SWOT to Strategy

- Traditional “SWOT” analysis can be layered onto the components (and sub-components) of analytics strategy.

	Strengths	Weaknesses	Opportunities	Threats
Business & Quality Context				
Stakeholders & Users				
Data & Processes				
Tools & Techniques				
Team & Training				
Technology & Infrastructure				

Business & Quality Context



Problem Domain

- The three fundamental objectives of healthcare improvement are to identify:
 - What needs to improve?
 - What processes must change?
 - What change has occurred?

plus...

- determine if a change is likely to occur (i.e., predictive analytics, simulation)

Enterprise Goals, Objectives, and Strategy

- Goals:
 - Are what the organization is aiming to achieve.
 - Define the performance and quality targets of the organization
 - Answer “why” the organization is (or should be) engaging in certain activities
- Strategy
 - Outlines how the organization expects to achieve its goals
- Analytics *must* provide insight into past, current, and anticipated future progress towards meeting the enterprise goals.



Quality Goals

- Quality is “doing the right thing, at the right time, for the right person, and having the best possible result.”
 - Agency for Healthcare Research & Quality
- Quality improvement is “better patient experience and outcomes achieved through changing provider behavior and organization through using a systematic change method and strategies.” *
- Quality goals should be in relation to strategy and objectives of the organization.

* Ovretveit J. *Does improving quality save money? A review of the evidence of which improvements to quality reduce costs to health service providers.* London: Health Foundation, 2009, p8.

Quality Goals

- Quality goals are the specific improvements area and targets set out to achieve by the healthcare organization.
- Quality goals should be *time-specific* and *measurable*; goals should also define the specific population of patients that will be affected.

Sample Quality Goals

Patient Safety – Reduce treatment-related critical incidents in hospital inpatients by 50% in six months and to zero in 18 months.

Patient Flow – Decrease Emergency Department Length of Stay (LOS) to less than four hours for 95% of non-admitted patients and less than six hours for 95% of admitted patients within 18 months.

Quality Strategy / Improvement Approach

- The achievement of improvement goals require specific and appropriate strategies, methodologies, and information.

Sample Quality Strategies

Improve Patient Flow – Currently using Lean to reduce waste from current processes and workflows, and using 5S to standardize storage spaces, treatment spaces, etc.

Improve Patient Flow – Want to radically re-design patient flow to “eliminate the Emergency waiting room” starting in 12 months, but need to simulate new processes to determine likely impact.


Improve Patient Flow – Want to identify patients at-risk for long Emergency Department and/or inpatient stays based on previous history and clinical prediction model.

Improve Patient Safety – Will employ Six Sigma to re-engineer certain nursing and physician workflows to reduce (and eliminate) medication errors and quality issues such as central-line associated blood stream infections.

Aligning Strategic and Tactical Quality Objectives

- Objectives of improvement initiatives should, *where possible*, align with the quality objectives of the organization as a whole.
 - Prevents mis-directed activity
- Enables the HCO to monitor progress and evaluate outcomes
- Analytics is the “glue” which ties strategic objectives and tactical activities together.

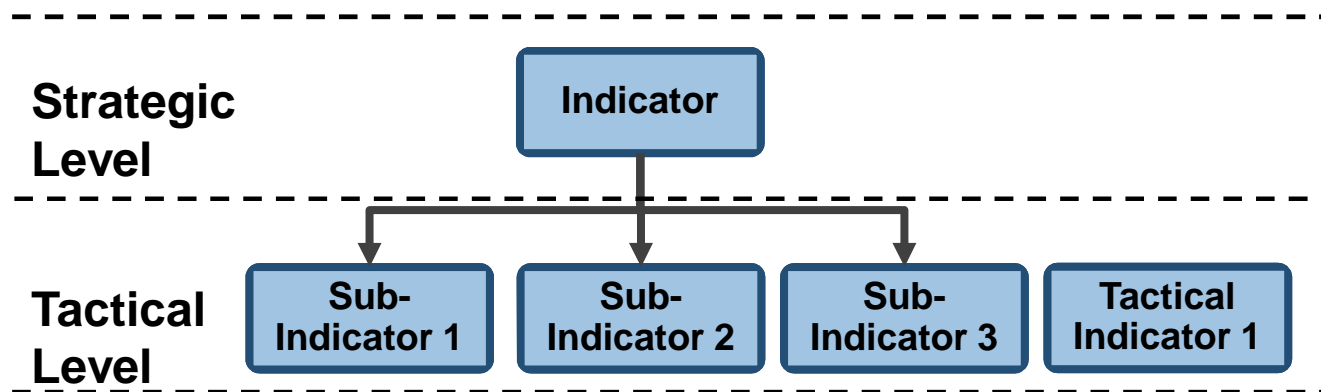
Strategic Level	Strategic Objectives		
Analytics	Metrics	Indicators	Targets
Tactical Level	Tactical Objectives		Voice of the Customer



A reminder that the customer (“the patient”) is the ultimate reason for the work we’re doing.

Using Appropriate Indicators

- Using appropriate indicators that align between tactical and strategic levels are necessary.
 - Tactical indicators should align with strategic indicators
 - Some tactical-specific indicators might be necessary for initiatives that are important, but don't directly align with strategic goals.



Quality Strategy / Improvement Approach

- Quality Strategy outlines the steps and approach the organization is going to be taking to achieve quality goals/objectives.
- Which QI approaches are utilized will impact on what data is required, how it is analyzed, and how it is disseminated.
- Analytics development and quality improvement initiatives must work closely together.
- *When executing the analytics strategy, ask “are we taking appropriate and necessary steps to achieve the organization’s quality goals?”*

Quality Metrics and Key Performance Indicators (KPIs)

- Key Performance Indicators are:
 - “quantifiable metrics which reflect the performance of an organization in achieving its goals and objectives (and)... reflect strategic value drivers” *
- KPIs are often where analytics “start” in a healthcare organization.
- *Will the analytics strategy enable stakeholders to “measure the right things, and to measure the right things correctly?”*

* <http://www.information-management.com/issues/20040901/1009207-1.html>

Quality Metrics and Key Performance Indicators (KPIs)

- Quality goals of the HCO will have associated KPIs with which to monitor and evaluate overall performance and help gauge the effectiveness of improvement initiatives.

Quality Goal	Sample KPIs
Improve Patient Flow	<ul style="list-style-type: none">• Patient Length of Stay (LOS)• Time between patient arrivals• Time to clean and prepare treatment spaces• Waiting-time to see a physician• Admission to hospital rate• Time waiting to be admitted after treatment
Improve Quality of Care and Patient Safety	<ul style="list-style-type: none">• Time between medication errors• Time between central line infections

Quality Improvement Methodologies

- Many, if not most, successful HCOs employ an established improvement or management methodology.
- There are many of these methodologies/frameworks used in healthcare today, including:
 - Lean
 - Six Sigma
 - Total Quality Management (TQM),
 - Constraints Management
 - Numerous variants (such as Lean Six Sigma).
- Frameworks differ in their philosophies, tools, and techniques, but all provide a structured approach for analyzing and improving quality and performance within a complex organization.

Common Quality Improvement Methodologies in Healthcare

Methodology	Approach to Improvement	Process Overview
PDSA	Conducting experiments and testing improvements iteratively on a local, small-scale basis.	Plan Do Study Act
Lean	Eliminating waste, improving flow, maximizing value-added and minimizing non-value-added activities.	Identify value Identify value stream Flow Pull Perfection
Six Sigma	Reducing variation and eliminating deviation in processes.	Define Measure Analyze Improve Control

Stakeholders & Users



Stakeholder Analysis

- A stakeholder is a person (or group of persons) that are:
 - impacted by, users of, or otherwise have a concern (or interest in) the development and deployment of analytical solutions throughout the healthcare organization.
- When developing an analytics strategy, it is important to understand what each of the likely analytics stakeholders will require, and develop approaches to ensure they are getting what they need.

HCO Stakeholder Types

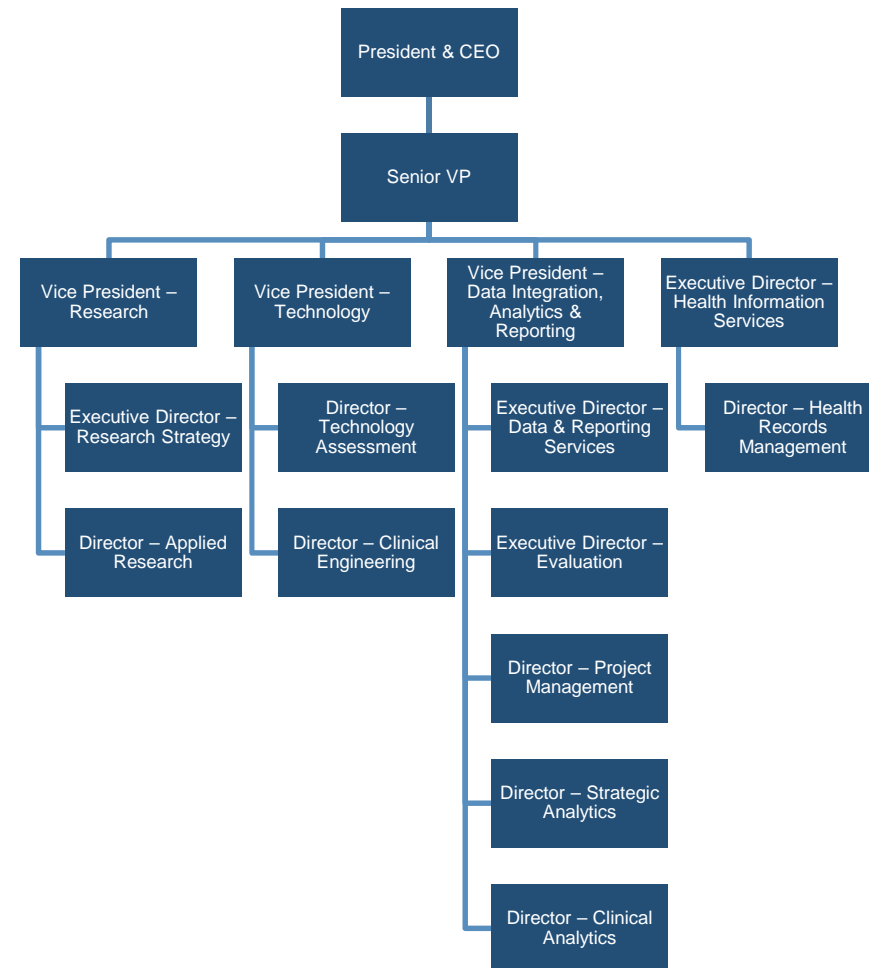
Stakeholder	Description
Patient	The person whose health and healthcare experience we're trying to improve with the use of analytics
Sponsor	The person who supports and provides financial resources for the development and implementation of the analytics infrastructure
Influencer	A person who may not be directly involved in the development or use of analytics, but who holds considerable influence over support of analytics initiatives.
Customer / User	A person in the HCO who accesses analytical tools, or uses the output of analytical tools, to support decision making and to drive action.

Sponsors & Stakeholders

- Sponsor
 - Is there executive support for advancing analytics capability?
- Stakeholders
 - Many groups of people are potentially impacted by analytics
 - Information end-users (clinical staff, administrators, QI)
 - Subject Matter experts (business)
 - Analytics experts (business/IT)
- *All stakeholders are impacted by how well analytics strategy is executed; some may help execute the strategy.*

Organization Structure

- If possible, an organizational structure should be included in the analytics strategy to better understand where in the organization key stakeholders and users are situated.
- It is important to have stakeholders from all levels within the organization



Stakeholder Considerations

- When engaging stakeholders and eliciting their points of view, some items of consideration should include:
 - Who is using the analytics tools?
 - What is their analytical sophistication?
 - How are analytics tools being used?
 - What questions are being answered?
 - Why do they need this information?
 - Who uses the information?
 - How often is the information used?
 - How is the information being used?
 - How can use of (or access to) information be improved?

Analytics Use Cases

- Obtaining as much information as possible about the possible uses of analytics will help to:
 - identify any gaps in analytics capabilities, and
 - reduce the likelihood that critical analytics needs will be missed.
- Analytics use cases help identify:
 - what data elements are most important,
 - what indicators will be necessary to calculate, and
 - what types of usability factors (such as dashboards, alerts, and mobile access) need to be considered.

Analytics Use Cases

- A use case is a brief description of how analytics will be used by a stakeholder. Examples include:

Customer / user	Sample use case(s)
Physician	Use real-time analytics for improving diagnostic accuracy. Use personalized performance report to adjust care practices.
Unit manager	Determine which patients are likely to exceed length of stay targets.
QI team member	Identify bottlenecks in patient flow. Evaluate outcomes of QI initiatives.
Executive	Evaluate and monitor overall performance of the organization.

Analytics Use Cases

- When developing analytics use cases, information used to develop the use cases can include:
 - Decisions for which analytics insight is required
 - Actions that get triggered by analytics indicators
 - Risks that analytics identify and/or help to mitigate
 - What key processes need to be monitored and/or improved
 - What indicators are required to monitor quality and performance

Working well with stakeholders

- Identify key members of each of the stakeholder groups
- Understand the needs of each stakeholder group, and the needs of the members within each stakeholder group.
- Listen to, acknowledge, and act on the input of stakeholders.
- Keep stakeholders informed of progress.
- Deliver on promises made to stakeholders and demonstrate the value of analytics in addressing the stakeholders' needs.



Processes & Data



Data Quality & Data Stewardship

- Accurate, timely, and readily available data is the backbone of all analytics and quality improvement projects.
- Quality of the data available ultimately impacts what insights can be derived from analytics
 - Identify ways to improve data quality at the source
- Data stewardship is a critical function in the management large and complex data sets.
 - Improper management of data can lead to business intelligence producing incorrect information
- *When executing strategy, ensure that appropriate governance and stewardship structures are in-place.*

Data considerations

- Modern computerized clinical systems (such as electronic medical records) contain dozens if not hundreds of individual data elements.
- The potential exists for thousands of possible data items from which to choose for analytics.
- An analytics strategy must address:
 - how to determine which data is most necessary for quality and performance improvement
 - how the data is managed and its quality assured
 - how data links back to business processes for necessary context.

Data Considerations for Strategy

Data Issue	Example
Data Sources	<ul style="list-style-type: none">• What are the sources of data?• What data is necessary to address key business issues?
Data Quality	<ul style="list-style-type: none">• How good is the quality of available data?• Is the data “good enough” for analytics?• What gaps in data exist?• Does metadata exist?
Data governance	<ul style="list-style-type: none">• Who is responsible for data management, governance, and stewardship?• What policies and procedures exist?
Business Processes	<ul style="list-style-type: none">• What business processes and procedures align with important quality issues?• What data is available for measuring processes? Are proxy measures available?

Sources of Data

- Data is the backbone of all analytics and quality improvement projects.
- Analytics typically integrates data from multiple source-systems and from across multiple units/departments/programs.
- Data from source systems must be inventoried and aligned with business processes.
- *Successful execution of analytics strategy requires all relevant data to be identified, documented, processed, and made available to appropriate analytics applications.*

Sources of Data

- Successful execution of an analytics strategy requires relevant data to be:
 - identified,
 - documented,
 - processed, and
 - made available to appropriate analytics applications.
- It may not be possible, feasible, or even necessary to include or account for every possible data source in the analytics strategy.
- When embarking on, or improving, the use of analytics within an HCO, **focus on those data sources that are related to the major focus areas of the organization's quality goals.**

Data Quality

- Data that is used for healthcare quality and performance improvement needs to be:
 - **High quality**—to ensure that the information generated from analytics is valid and useful.
 - **Well documented**—so that analysts and developers using the data are aware of its context and meaning.
 - **Easily accessible**—and available in a data warehouse (or similar data store) to ensure that it is available for analysis when required.

Data Governance

- According to the Data Governance Institute, data governance is:
 - a system of decision rights and accountabilities for information-related processes,
 - executed according to agreed-upon models, which
 - describe who can take what actions with what information, and when, under what circumstances, using what methods.
- Data governance helps HCOs better manage and realize value from data, improve risk management associated with data, and ensure compliance with regulatory, legal, and other requirements.

Data Stewardship

- The data steward is responsible for monitoring and evaluating data quality within a healthcare organization.
- The major functions associated with a data steward include:
 - Evaluating data quality, identifying issues, and making appropriate recommendations.
 - Ensuring that any modifications to data storage and management are in line with accepted policies and procedures.
 - Ensuring that data is used properly and that it is accessible.
 - Helping to establish enterprise-wide standards for data quality and usage.
- Within a large organization such as healthcare organization, the data stewardship function requires one data steward for each major data subject area or functional area.

Data Governance – Sample Governance Structure

- Include any applicable data governance structures from your HCO in the analytics strategy document.
- What data governance should *not* be, however, is just another layer of bureaucracy
 - Keep governance processes and procedures as agile as possible.

Source: Manitoba eHealth

Metadata

- Meta is “data about the data”, or information that defines, describes, and annotates the data that it accompanies.
- Metadata is essential so that the entire organization knows what information is available and how it can be used.

Source: Winnipeg Regional Health Authority / Manitoba Centre for Health Policy

Data model

- Data modeling helps to identify and understand all the potential uses of data within a healthcare organization.
- According to Hoberman (2009), a data model is:
 - a wayfinding tool for both business and IT professionals
 - uses a set of symbols and text to precisely explain a subset of real information to improve communication within the organization
 - leads to a more flexible and stable application environment.
- The data model documents the various relationships and attributes associated with the data.

Document current dimensions / data bus

- An understanding of what data is available in what source systems helps to better understand how data can be shared across the enterprise.
- Leverage a “heat map” of data quality over these dimensions to quickly highlight gaps and areas of low concern.

Data Mart / Source System	Data Dimensions												
	Date	Time	Location	Age Category	Gender	Patient Insurance	Postal Code / Zip Code	Provider	Mode of Arrival	Triage Score	Presenting Complaint	Discharge Diagnosis	Discharge Instructions
EDIS	H	H	H	M	H	H	M	L	L	H	H	M	M
EPR	H	H	M				H	H	L	M	M	M	M
RIS	H	H	M	H	H	H	M	M					
PHARM	H	H	H	H	H	M	H	M					
ADT	H	H	H	H	H	H	H	H	H	H	H		
Registry	H	H	H	H	H	H	H	H	H	H	H		

H	High Quality
M	Medium Quality
L	Low Quality
	N/A

Business Processes

- Knowing what a value “is” (data) is almost useless without knowing what it “means”
- Business processes provide valuable context to data provided by source systems.
- When aligned with business processes, analytics provides evidence for what changes in process need to occur.

Business Processes

- Essentially all quality improvement methodologies require indicators and metrics that examine intervals on the other process measures.
- This requires a strong alignment between business process components and the data that measures those components.
- As part of the analytics strategy, you should consider:
 - if and how current business processes are documented, and
 - how data items are mapped to these documented business processes.

Metrics

- A metric is a measurement used to gauge some **quantifiable** component of performance (1).
- Metrics should be **SMART**(2):
 - **Specific** (targeted to the area being measured)
 - **Measurable** (accurate data collection is possible)
 - **Actionable** (trends indicate when action needed)
 - **Relevant** (not everything is important)
 - **Timely** (data is available when required)

1. <http://searchcrm.techtarget.com/definition/business-metric>

2. <http://www.prosci.com/metrics.htm>

Key Performance Indicators (KPIs)

- Key Performance Indicators are:
 - “quantifiable measurements, agreed to beforehand, that reflect the critical success factors of an organization” (1)
 - “high-level snapshots of a business or organization based on specific predefined measures” (2)
 - “quantifiable metrics which reflect the performance of an organization in achieving its goals and objectives (and)... reflect strategic value drivers” (3)

1. <http://management.about.com/cs/generalmanagement/a/keyperfindic.htm>
2. <http://www.informationbuilders.com/kpi-key-performance-indicators.html>
3. <http://www.information-management.com/issues/20040901/1009207-1.html>

Analytics Tools and Techniques



Quality, Performance, and Analytics



Choosing the Right Analytics

	Past	Present	Future
Information	What Happened? (Reports)	What's Happening Now? (Alerts)	What Will Happen? (Extrapolation)
Insight	How and Why Did It Happen? (Modeling)	What's the next best action? (Recommendation)	What's the best/worst that can happen? (Prediction, Simulation)

Adapted from “Analytics at Work”, Paul Davenport.

Analyzing The “Right Things” the “Right Way”

- It is important to align analytics tools, methods, and capabilities with:
 - Business and quality questions that need to answered
 - Relevant quality goals and KPIs
 - Data available
 - Stakeholder analytical sophistication
 - Appropriate statistical analyses
 - Tools/software available

Inventory of Existing Analytical Tools

- Inventory existing analytics tools to determine if:
 - Capability is missing that will be required
 - Existing capability exists that may not be widely known
- Be aware that different programs/departments might have different analytics tools that are not shared with the organization as a whole.
 - These need to be inventoried and summarized

Example Analytical Applications

Analytical Application	Description
Statistical	<ul style="list-style-type: none">Used for deeper statistical analysis not available in “standard” business intelligence or reporting packages
Visualization	<ul style="list-style-type: none">Used for developing interactive, dynamic data visualizations that aid with analysis
Data Profiling	<ul style="list-style-type: none">Helps to understand and improve the quality of an HCO’s data.
Data Mining	<ul style="list-style-type: none">Analysis of large data sets to uncover unknown or unsuspected relationships.
Text Mining	<ul style="list-style-type: none">Analysis of unstructured, text-based data to extract high-quality information.
Online Analytical Processing	<ul style="list-style-type: none">Allows analysts to interactively explore data by drilling-down, rolling up, or “slicing and dicing” data.

Team and Training



Analytics – It's About the People

- PEOPLE are, by far, the most important consideration when developing an analytics infrastructure
- Although having the best ~~toys~~ tools are nice, having the best people is critical to achieving the goals and objectives of the HCO
- An analytics strategy must consider:
 - What kinds of people (and the skills they bring) are necessary
 - How to attract the best analytical talent
 - How to retain the analytic talent within your HCO

Organizational Considerations

- Do we have enough of the right types of people?
- Where do analytics professionals reside?
- To whom do they report?
- What support is available for analysts? What support do they need?
 - I.e., single voice of a distributed analyst group
- How are they trained, and what training opportunities are available?
- What are the standard hiring and performance requirements?
- Different models:
 - “centralized” analytics office
 - “distributed” analytics resources
 - “virtual” center of excellence / competency center

Desirable Attributes of Analytics Professionals

- **Natural curiosity** –revel in asking “what” and “why,” realizing that these questions do not “expose ignorance” but are truly the only way to gain full understanding of a problem.
- **Innovative mindset** – strive for effective yet creative solutions that provide efficient access to the right information to the right people when it is needed.
- **Business focus** – endeavor to know the pertinent details of the healthcare domains in which they work.
- **Technology savvy** – be comfortable and proficient with the current and emerging technologies, such as business intelligence platforms and data cleaning, analysis, and visualization tools.
- **Team player** – work well with other members of healthcare analytics and quality improvement teams, all while respecting the differing points of views that professionals in other disciplines bring to the discussion.

Analysts' Skill Sets

Skillset	Description
Communications	<ul style="list-style-type: none">• Analytics professionals must:<ul style="list-style-type: none">• be effective communicators, both in listening and explaining,• be able to listen to end users and subject matter experts,• understand what information stakeholders need and how they intend to use it, and• be able to explain analytics to those same people in a way that gets the point across.• Effective, clear, and accurate writing• Data graphing and visualization• Requirements elicitation
Technical	<p>Analytics can be a highly technical field, therefore analytics professionals need to be competent in several key areas in which healthcare analytics intersect with other technology disciplines.</p> <ul style="list-style-type: none">—Intermediate programming and computation skills—Database query skills
Clinical	<p>Healthcare analytics professionals must know enough about the business of healthcare, from both a clinical operations and a financial perspective, so that they are aware of the context from which the data used is drawn.</p> <ul style="list-style-type: none">—Basic healthcare processes—Basic healthcare financing models

Analysts' Skill Sets

Skillset	Description
Quality improvement	<p>Healthcare analytics professionals must be familiar with at least the major approaches and methodologies in use within their healthcare organization. They may not need to be Six Sigma Black Belts, but should be able to converse with the practitioners of quality improvement methodologies.</p> <ul style="list-style-type: none">—Lean, Six Sigma, or other improvement methodology—Process mapping—Team facilitation
Analytical	<p>Needless to say, healthcare analytics professionals must be analytical and curious in nature.</p> <p>The toughest of all challenges in healthcare analytics is identifying the root of the problem, and this requires more than simply going through the motions of applying statistical tests and building data models.</p> <ul style="list-style-type: none">—Ability to think critically and analytically—Data centered, obsession with evidence-based problem resolution—Familiarity with and ability to use scientific principles in addressing quality and performance problems

Technology and Infrastructure



Technology & Infrastructure

- Ideally, the analytical needs of an organization and the technological requirements to achieve those needs will figure prominently in the organization's analytics and IT infrastructure deployment strategy.
- It is important to document key elements of IT architecture to ensure that analytics is possible:
 - Enterprise data warehouse / data marts / etc.
 - Business intelligence infrastructure
- The analytics strategy likely will be an important *input* to IT hardware and infrastructure strategies and planning.

Components of an Analytics System – The “Analytics Stack”

- This stack is optimized for quality and performance improvement purposes.

Analytics Stack		
Presentation		
Visualization	Dashboards	Reports
Alerts	Mobile	Geospatial
Quality & Performance Management		
Processes	Indicators	Targets
Improvement strategy		Evaluation strategy
Analytics		
Tools	Techniques	Team
Stakeholders		Requirements
Deployment		Management
Data		
Quality	Management	Integration
Infrastructure		Storage
Business Context		
Objectives	Goals	Voice of patient

Technology & Infrastructure Considerations

Skillset	Description
Infrastructure	<ul style="list-style-type: none">• Networks• Servers• Storage
Data	<ul style="list-style-type: none">• Database Management Systems (DBMS)<ul style="list-style-type: none">• Columnar• Relational• In-memory
Integration	<ul style="list-style-type: none">• Data Warehouses (DW)• Operational Data Stores (ODS)• Data Marts (DM)• Extraction / Load / Transformation (ETL)• Data Quality (DQ) (cleansing, profiling, management)• Service Oriented Architecture (SOA)• Business Event Monitoring (BEM)• Complex Event Processing (CEP)• Business Process Management (BPM)• Business Rules Engine (BRE)• Enterprise Information Integration (EII)

Technology & Infrastructure Considerations

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Gap Analysis

Current State – Business Intelligence / Analytics

BI/Analytics Summary Framework

Category	Description	Users	Format	Frequency
Operational	Required to determine the current status of a unit or department	<ul style="list-style-type: none">• Front-line staff• Managers	<ul style="list-style-type: none">• Line List• Aggregate report	<ul style="list-style-type: none">• Real-time• Daily
Tactical	Used to monitor trends in metrics related to strategic initiatives/projects and identify where targets are not being met.	<ul style="list-style-type: none">• Managers• Program leadership• Analysts	<ul style="list-style-type: none">• Aggregate report• Dashboard	<ul style="list-style-type: none">• Daily• Weekly
Strategic	Used to monitor enterprise KPIs at an executive level to monitor progress towards enterprise goals.	<ul style="list-style-type: none">• Program leadership• Executives	<ul style="list-style-type: none">• Dashboard• Scorecard	<ul style="list-style-type: none">• Monthly
Research	Used to support initiatives that analyze deeper organizational, process, or clinical issues than are pre-defined as metrics or KPIs.	<ul style="list-style-type: none">• Analysts• Researchers	<ul style="list-style-type: none">• Line List• Aggregate report	<ul style="list-style-type: none">• Ad hoc

Future State & Gap Analysis

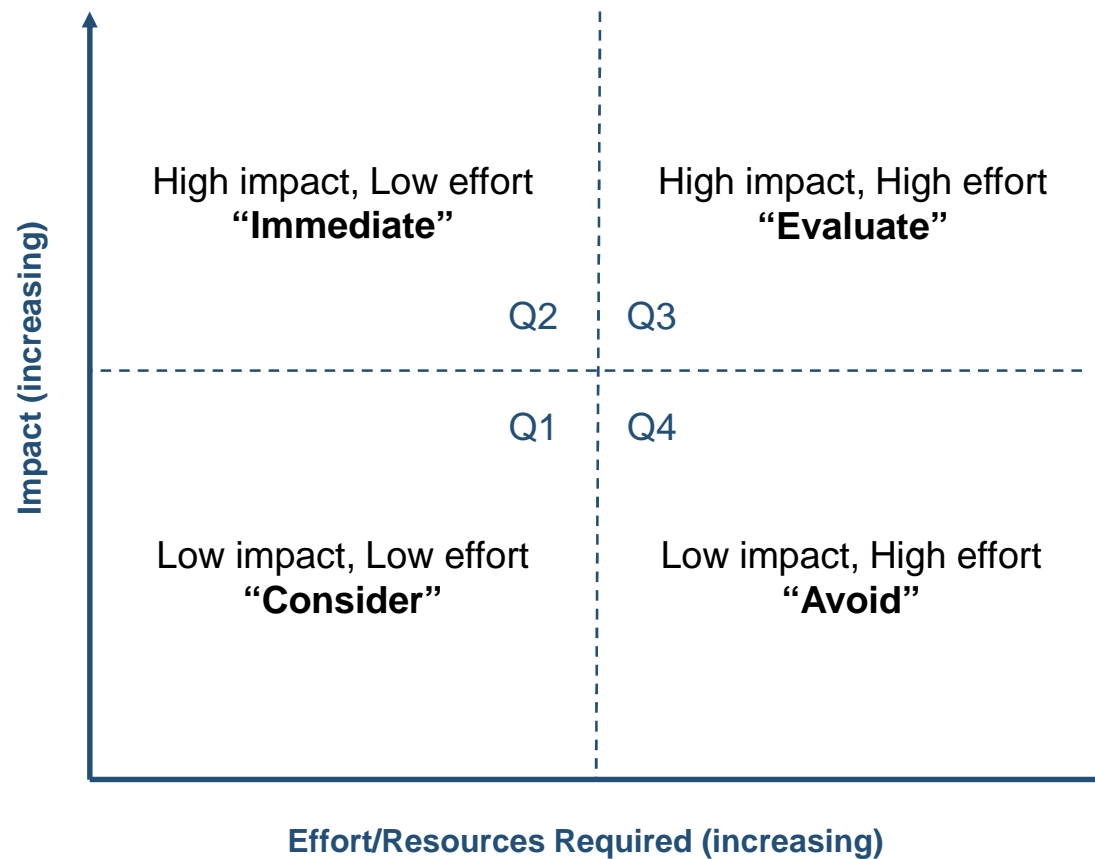
- The future state and gap analysis guide execution so that the intended analytics configuration and capabilities will:
 - Meet the needs of sponsors and stakeholders
 - Current
 - Future
 - Ensure analytics capabilities are aligned with the business and quality goals of the organization within scope of the strategy

Gap Analysis

- The gap analysis highlights which current shortcomings must be addressed to meet the requirements outlined in the future state.
- Identifies what elements must change, or what activities need to occur, so the analytics needs of quality and performance improvement are addressed.
- Determines what corrective action is required to address those needs. Examples of corrective action include:
 - Development projects (building new analytical apps)
 - Team training (to learn new skills)
 - Software acquisition (to obtain new tools)
 - Hardware acquisition (to enhance infrastructure)

Prioritizing Gap Corrective Actions

- Use the Impact / Effort matrix to help quantitatively determine priority for addressing analytics gaps.



Gap Analysis

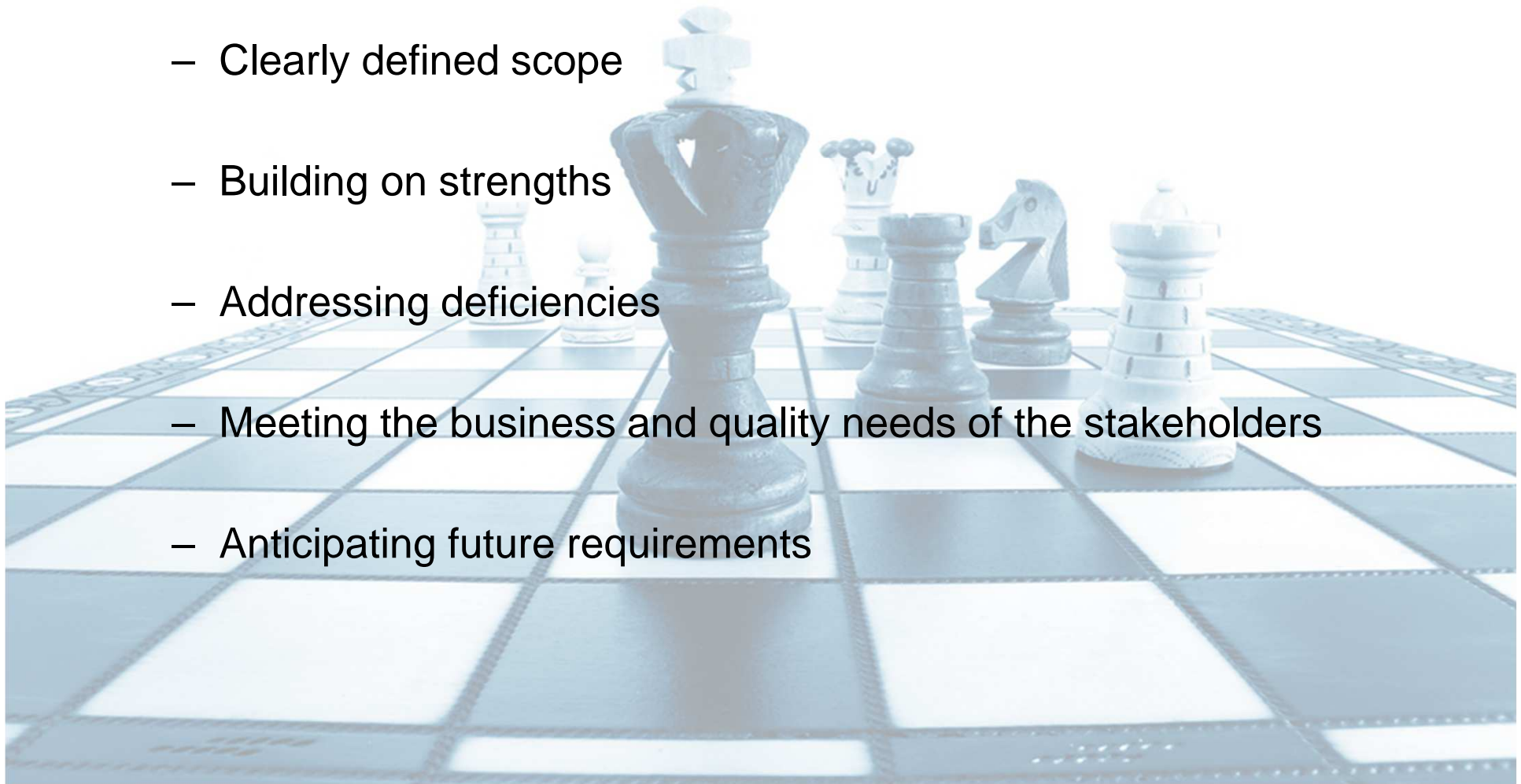
- Identify important gaps between current and future state, what the corrective action(s) will be, who owns the actions, and what the due date for corrective actions is.

Category	Current Situation	Target	Corrective Action	Priority	Owner	Due Date
Business & Quality Context						
Stakeholders & Users						
Data & Processes						
Tools & Techniques						
Team & Training						
Technology & Infrastructure						

Strategy Execution

Execution of Analytics Strategy

- Successful execution of analytics strategy will depend on:
 - Clearly defined scope
 - Building on strengths
 - Addressing deficiencies
 - Meeting the business and quality needs of the stakeholders
 - Anticipating future requirements



Strategy Execution Summary

- It is important to implement and adhere to the analytics strategy
- Plan for and schedule activities to address identified gaps
 - Establish a selection criteria to determine what projects will get emphasis in light of needs of the business and analytics strategy
 - Prioritize activities and desired capabilities to balance resources as new (possibly conflicting) work arises
- Monitor progress towards achieving goals of the analytics strategy
- Ensure that the strategy is a *living document* that serves as a roadmap for guiding action and doesn't become "shelfware"

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