

EHR-Based Specialty Registries

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HIMSS Davies Enterprise Award Site Visit

Problem

Quality Metrics + Every Department = Enormous Amount of Work

Who we are



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CMIO
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The Problem

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Background

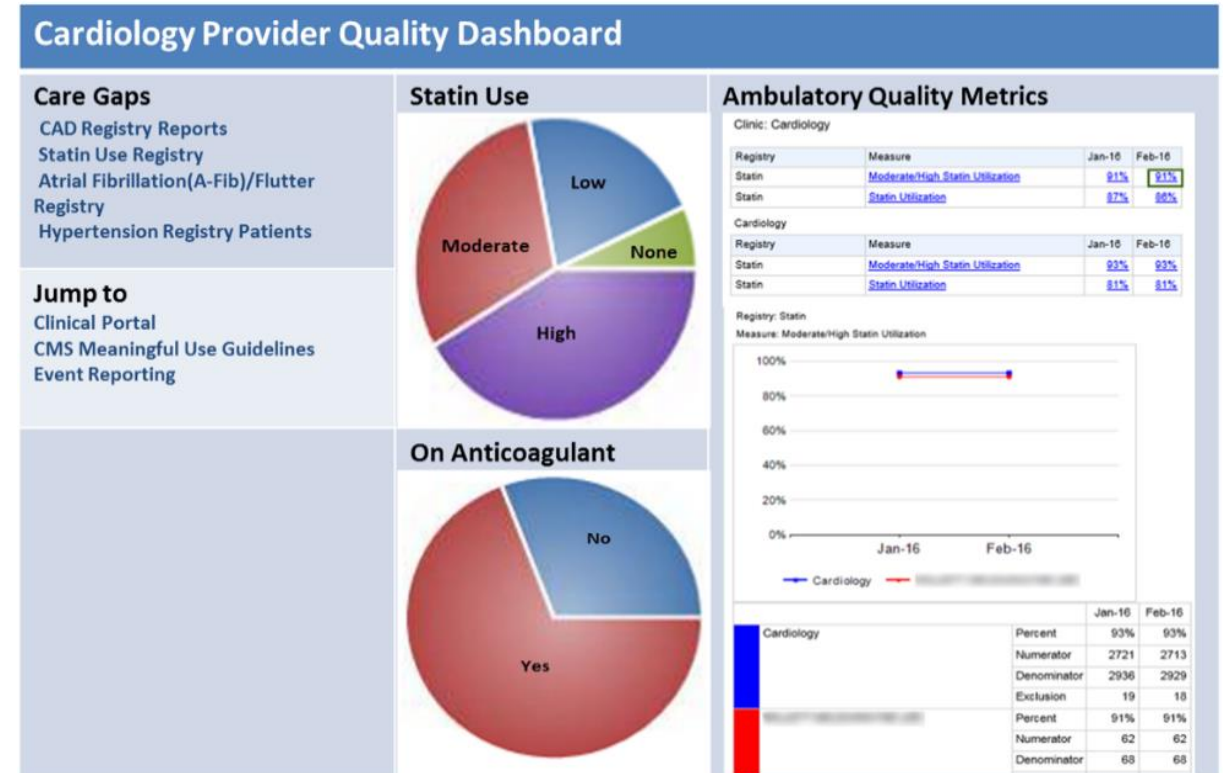
- Migration to value-based care and population health
- Ambulatory quality still focused largely on primary care national programs
 - Accountable Care Organizations
 - Meaningful Use, Stage 2
 - Patient Centered Medical Home



Benefits of Registries also Apply to Specialty Populations

For specialized conditions, deliver data useful for:

- Clinical care (identifying care gaps)
- Clinical Performance Improvement (PI) projects
- Clinical Research
- Demonstrating value externally

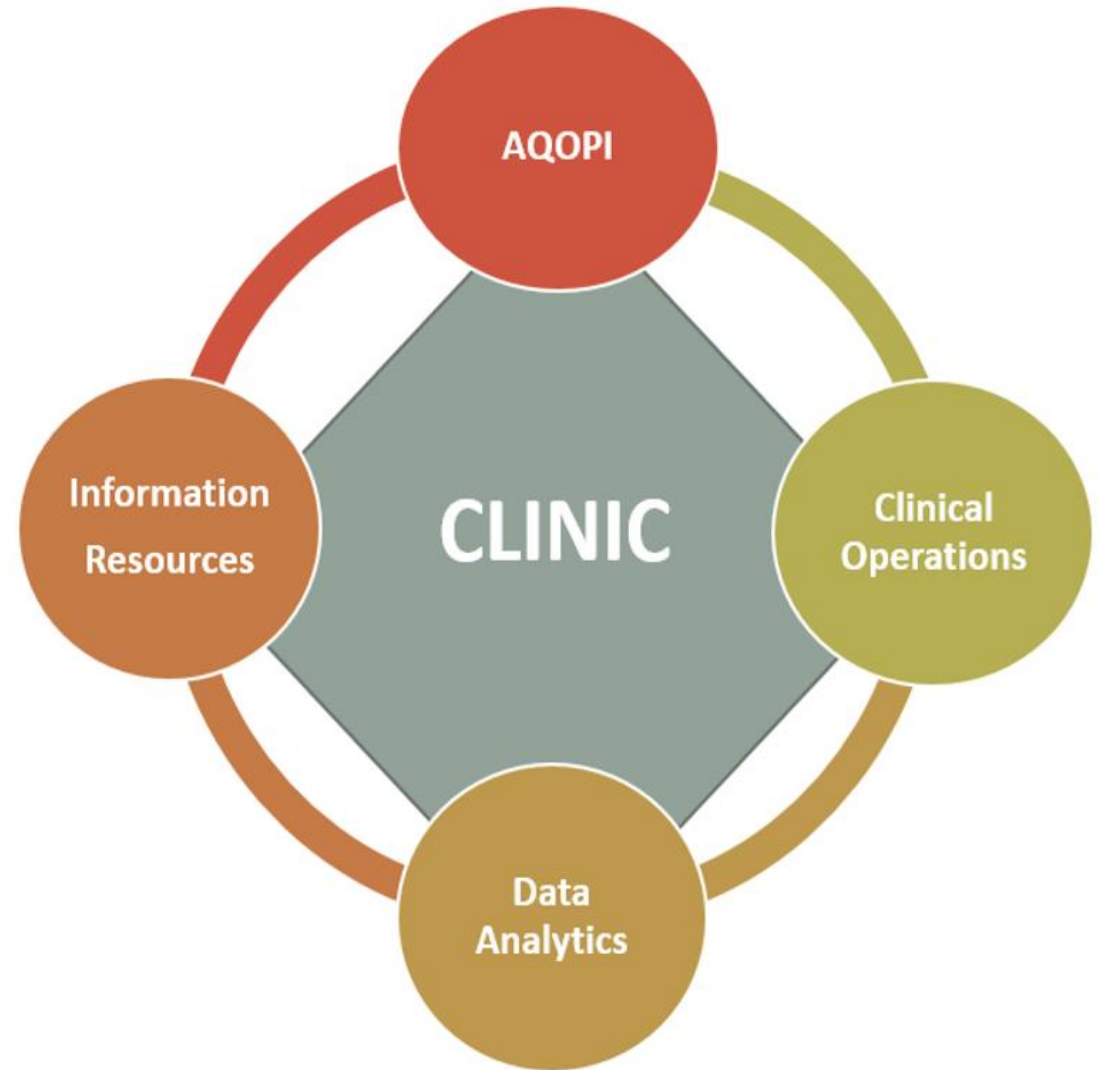


Registry Design Approach

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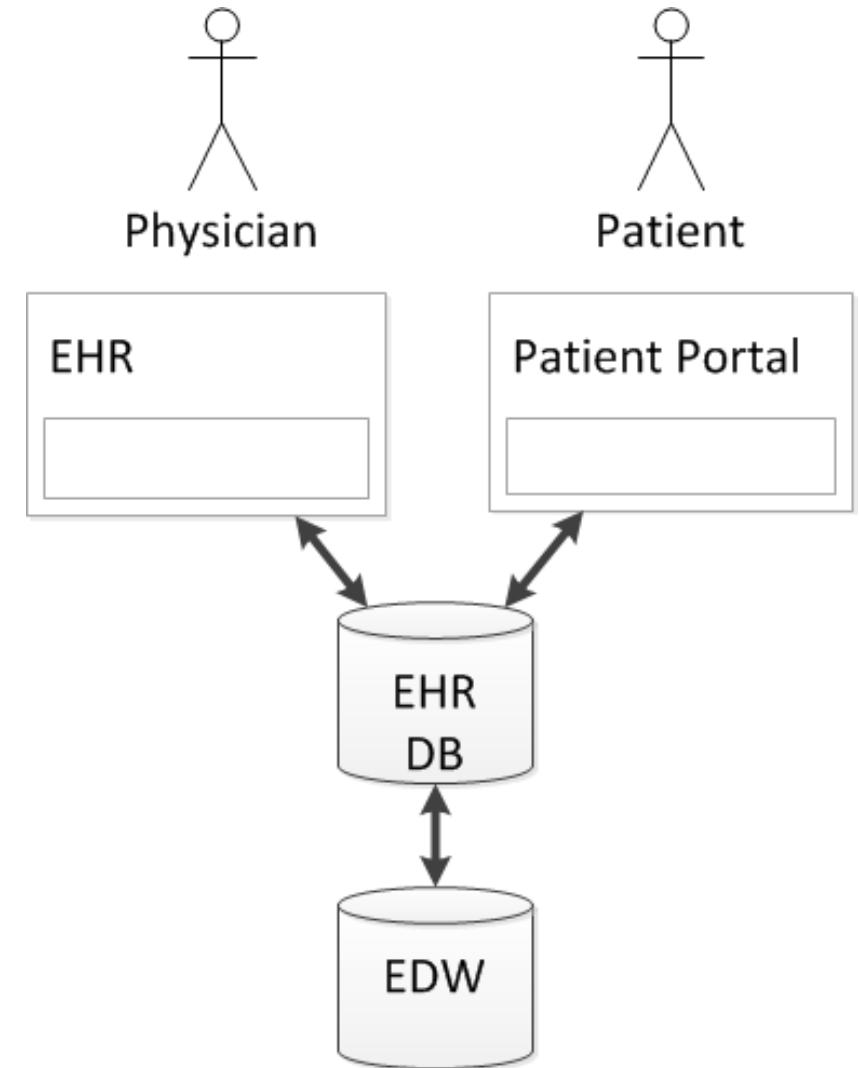
Co-Development and the “Quadrad”

- Co-development among 4 groups proved crucial:
 - Quality (AQOPI), Clinical Operations, Information Resources, Analytics
- Built a shared understanding earlier and faster
- Helped improve chances that:
 - Chosen solution will work in practice
 - Data produced can be extracted readily, and will be meaningful



Guiding Principles for Custom Patient Registries

- **Capture data as a byproduct of care of patient**
 - Reinforce optimal use of EHR
- **Repeatable, standard set of tools and data extractions**
 - Providing this capability should be the norm, not the exception
- **Leverage existing technology toolkit:**
 - Electronic Health Record (EHR)
 - Patient Portal
 - Enterprise Data Warehouse (EDW)
- **No manual abstraction**
 - Not scalable



Custom Specialty Patient Registries: EHR Toolkit

	Important Real-world info	Optimal Location
1. Who are "my patients"?	Provider-patient relationships that span > 1 encounter	Care Team

Custom Specialty Patient Registries: EHR Toolkit

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2. Which share Condition X?	A given patient's active health/medical issues	Problem List
or share "exposure" Y? <ul style="list-style-type: none">• to a Procedure• to a Medication	A given patient's prior surgeries & major procedures; prior/current medications	Surgical History; Medication History

Custom Specialty Patient Registries: EHR Toolkit

3. What do I want to know about my registry patients?:

Registry → Measure → Numerator/Denominator/Exclusion Formulas → Data Fields

Type of Data	Examples	Discrete Data Fields
Standard Data: <ul style="list-style-type: none">• <i>Already captured in EHR in standard location</i>	<ul style="list-style-type: none">• Age• Encounters• Medications• Problems• ...	Use EHR-standard fields .

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Custom condition-specific Data: <ul style="list-style-type: none">• <i>Captured by Clinic</i>	<ul style="list-style-type: none">• Clinic actions taken• Clinician assessment (e.g. of response to treatment)	<ol style="list-style-type: none">1. Flowsheets2. Custom Data Elements (SDEs)3. Result Components

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Custom condition-specific Data: <ul style="list-style-type: none"> • <i>Captured by Patient</i> 	<ul style="list-style-type: none"> • Pt-reported outcomes 	<ol style="list-style-type: none"> 4. Patient-entered Questionnaires

- The 4 custom types of discrete data fields are all extracted to the Enterprise Data Warehouse (EDW), along with the most-used EHR-standard field types.
- Most future CQMs can then be calculated without writing new extract-transform-load (ETL) code.

Patient Entered Questionnaire

Rheumatology Assessment

Please review your responses. To finish, click **Submit Questionnaire**. Or, click any question to modify an answer.

Question	Answer	
Dress yourself, including tying shoelaces and doing buttons?	1 - with SOME difficulty	
Get in and out of bed?	0 - without ANY difficulty	
Lift a full cup or glass to your mouth?	0 - without ANY difficulty	
Walk outdoors on flat ground?	1 - with SOME difficulty	
Wash and dry your entire body?	0 - without ANY difficulty	
Bend down to pick up clothing from the floor?	1 - with SOME difficulty	
Turn regular faucets on and off?	0 - without ANY difficulty	
Get in and out of a car, bus, train or airplane?	0 - without ANY difficulty	
Walk two miles or three kilometers, if you wish?	0 - without ANY difficulty	
Participate in recreational activities and sports as you would like, if you wish?	0 - without ANY difficulty	
How much pain have you had because of your condition OVER THE PAST WEEK? Please indicate how severe your pain has been on a scale of 1-10 where 0 = No pain and 10 = Pain as bad as it could be:	1.0	
Considering all the ways in which illness and health conditions may affect you at this time, please indicate how you are doing on a scale of 1-10 where 0 = Very well and 10 = Very poorly:	1.0	

BACK

SUBMIT QUESTIONNAIRE

FINISH LATER

CANCEL

Custom Specialty Data for Rheumatoid Arthritis Registry Project

NoteWriter - New Note

Rheumatology Note

Answers submitted by the patient today have been applied. Clear Answers

Health Assessment Questionnaire

Dress yourself, including tying shoelaces and doing buttons? 0 1 2 3

Get in and out of bed? 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Lift a full cup or glass to your mouth? 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10

Walk outdoors on flat ground? 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Wash and dry your entire body? 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10

Assesment Scores

HAQ-II Average 6.0

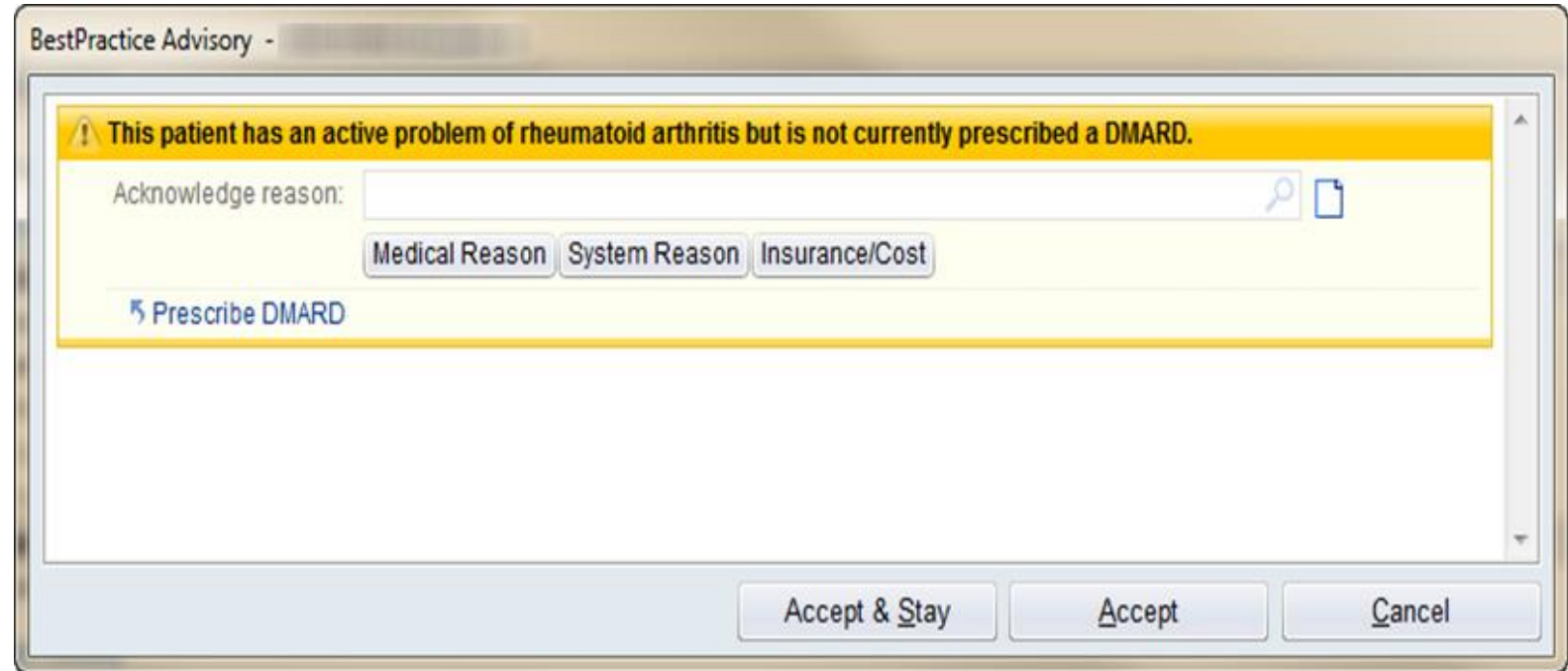
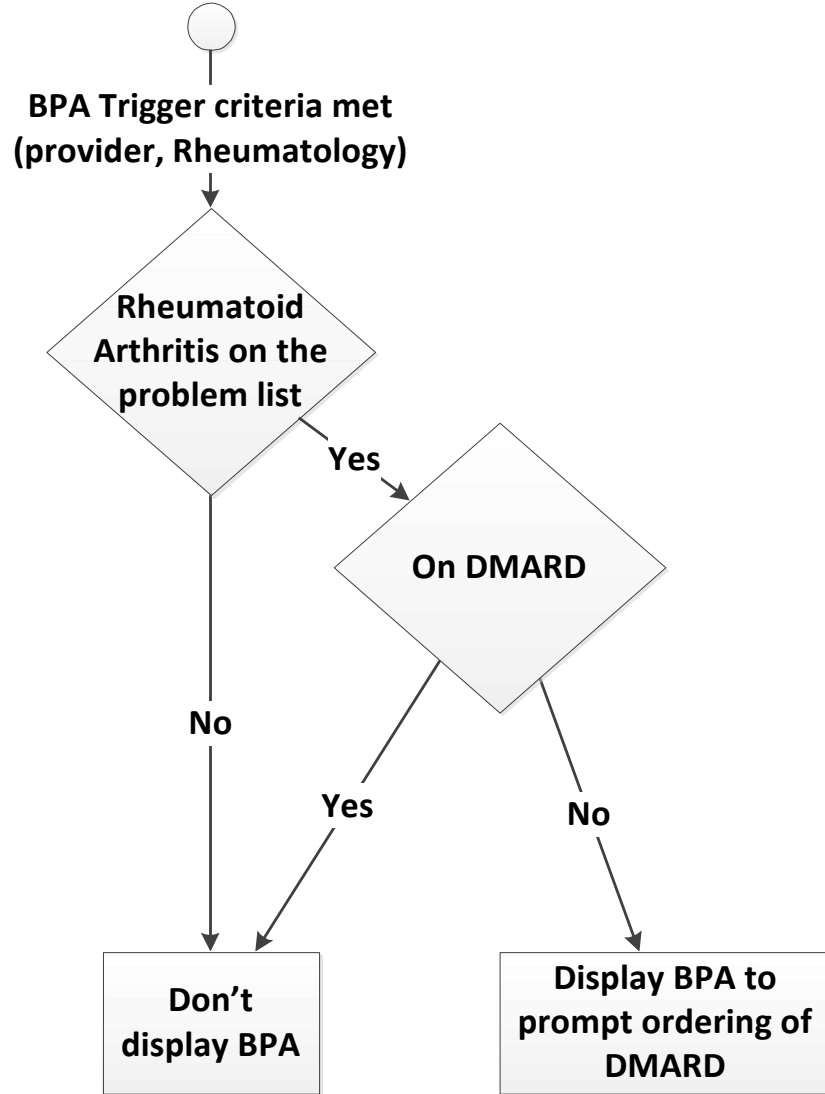
RAPID 3 Score 25.0

CDAI Score 21.5

CDAI Interpretation Moderate disease activity

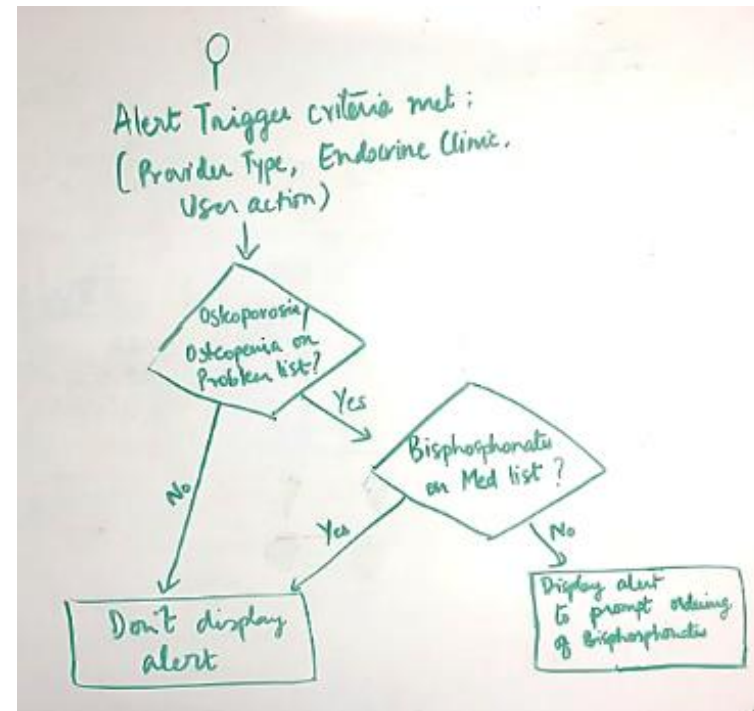
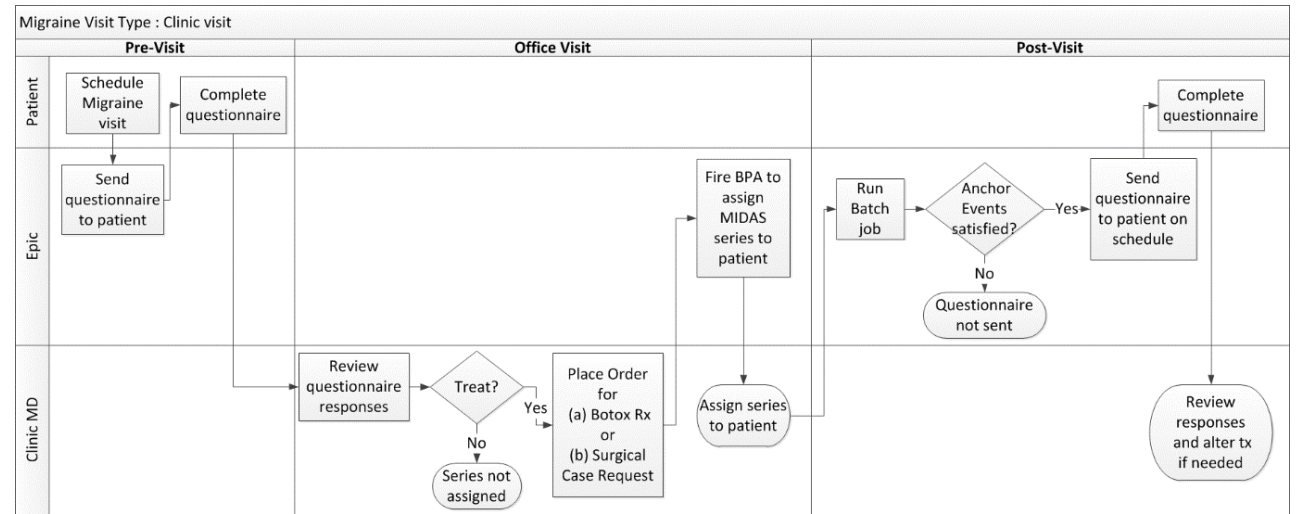
Rheumatology Assessment Scores
HAQ-II Average: 6
RAPID 3 Score: 25
CDAI Score: 21.5
CDAI Interpretation: **Moderate disease activity**

Rheumatoid Arthritis: Clinical Decision Support (Best Practice Advisory)

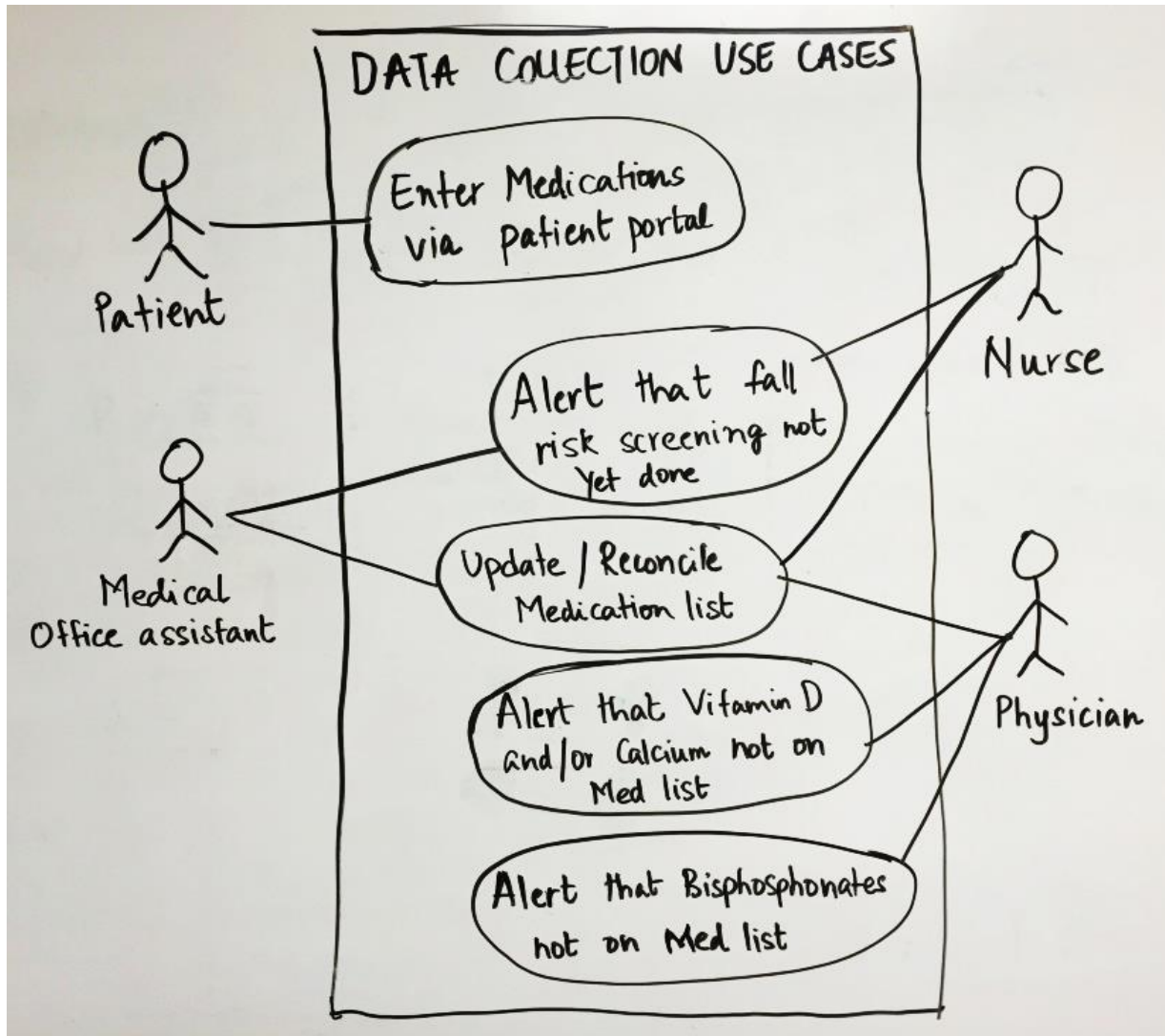


Agile Modeling

- Why Model?
 - To understand
 - To communicate
- 'Agile Modeling' goal:
 - high value for degree of model creation effort expended
- Agile Modeling core practices include:
 - Active Stakeholder Participation
 - Model With Others
 - Apply the Right Artifact(s)
 - Use the Simplest Tools
 - Model in Small Increments
 - Create Simple Content



Use Case Diagram for an Osteoporosis Registry: Data Collection

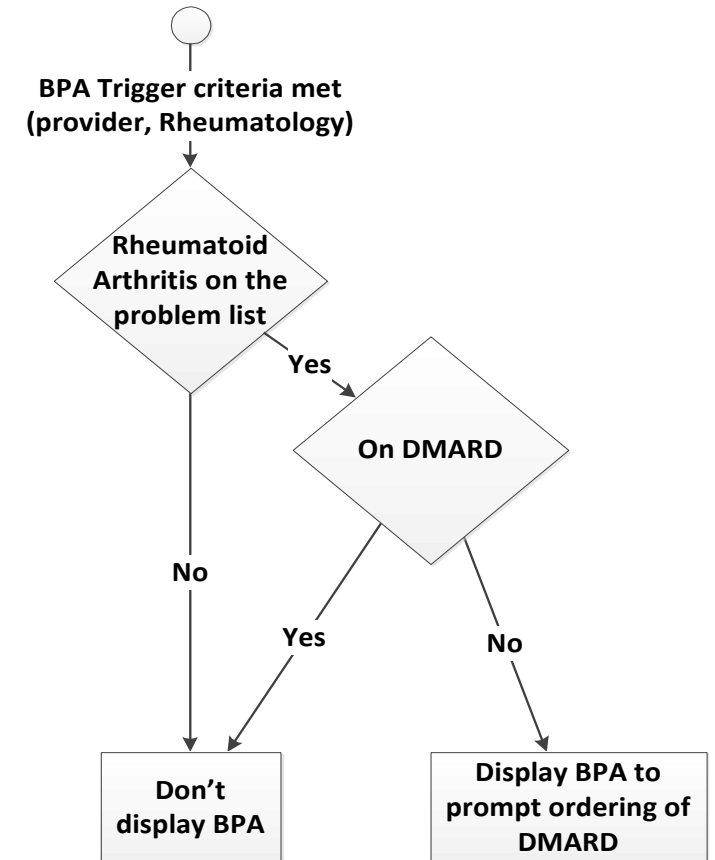


Purpose:

- Show “verbs” (uses) of the system, organized by role.
- No sequence or timing implied.
- A graphical table-of-contents of Use Cases.

Types of Models/Diagrams Employed

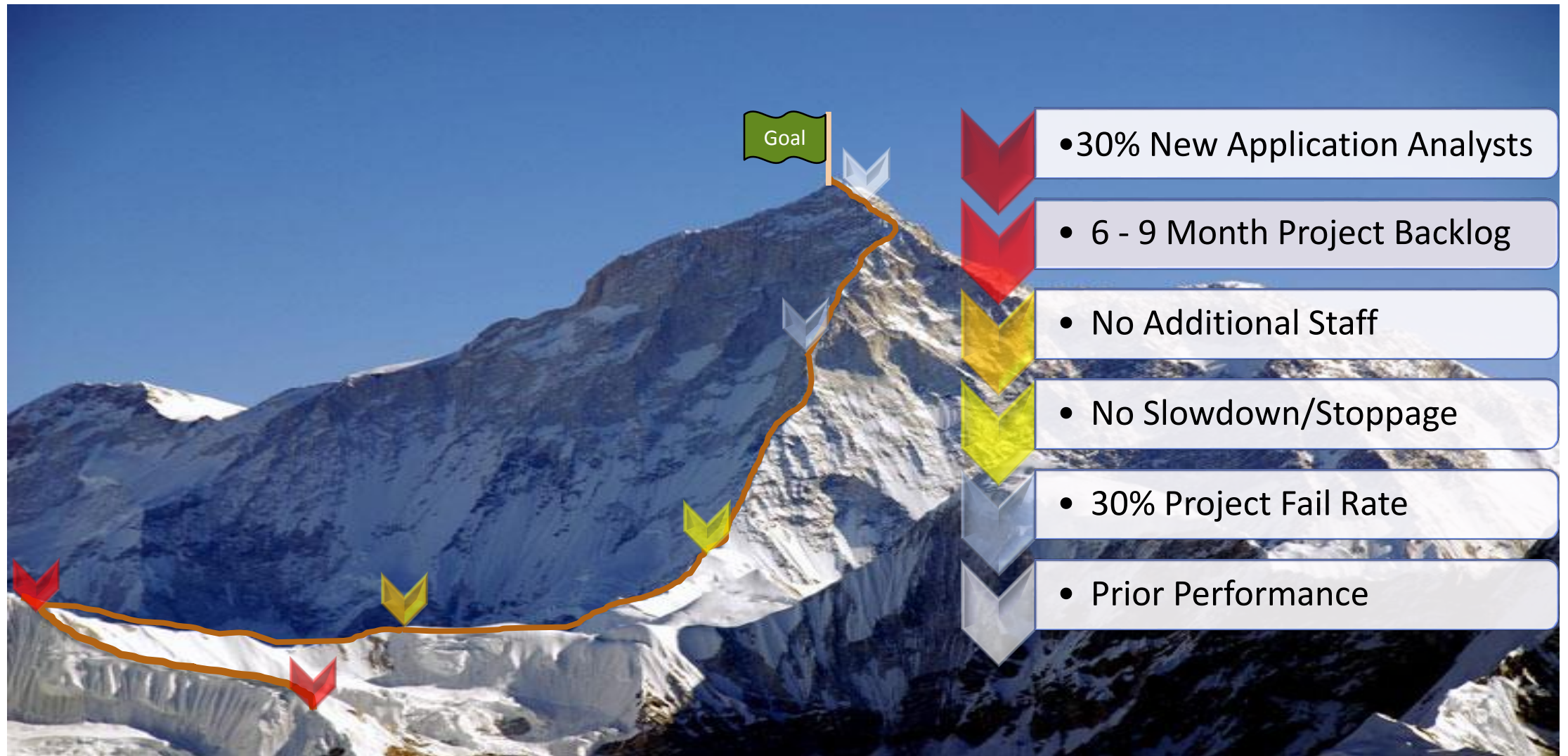
Technique	Purpose
Swimlane Workflow Diagram	Show the complete flow of work for a given process, in sequence from an initiating event to the final deliverable, including who's responsible for each step.
Use Case Diagram	Show uses of the system, organized by role. No sequence or timing implied. A graphical "table-of-contents" of Use Cases.
User Story	Describe desired new functionality in the language of a User, with the benefit they anticipate.
Decision Tree	Show exactly how the system (or person) will make a specific decision at a given point in a process.
User Interface Storyboard	Mockup the user interface for design validation; Use in conjunction with Use Case Text.
Use Case Text	Show the interaction of a user with a system: "When user does this, system does that". Use in conjunction with the User Interface Storyboard.
Object (Class) Diagram	(1) Domain model: depict the classes of objects in the subject area (Medication, Provider, etc.) and their relationships. (2) Solution model: depict the objects in the build, and how they are related.



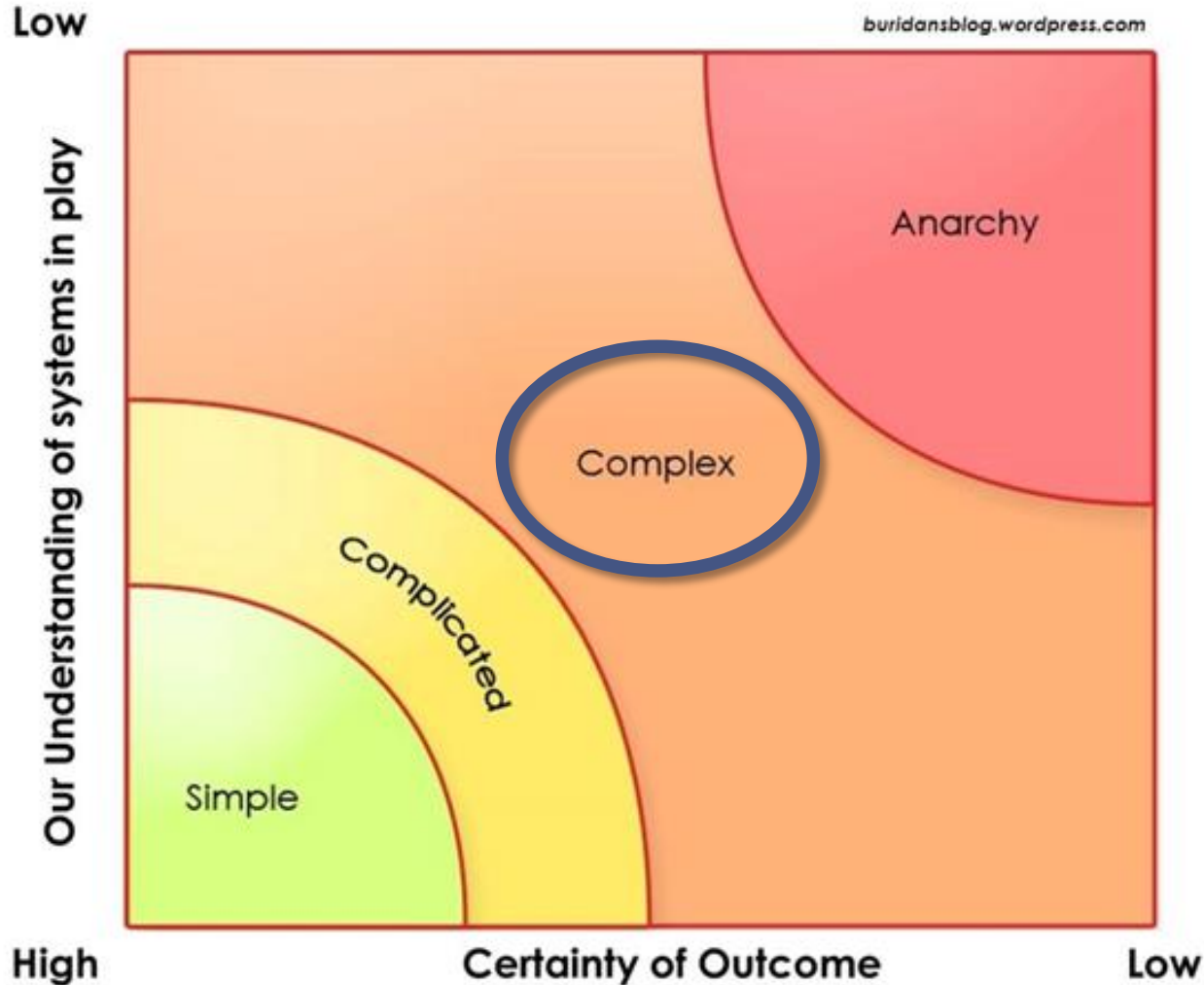
Agile Methods

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The Challenge



Sweet Spot for Agile Methods



Project Zones:

- **Simple:** known and easily addressed
- **Complicated:** knowable and solution is applied in the same way every time (i.e. making an existing car)
- **Complex:** relationship between cause and effect is not fully understood nor knowable, but principles can be applied to meet goals within a given context (i.e. raising a child, designing a completely new car)
- **Anarchy:** unknown unknowns in a complex, unpredictable system

Agile Guiding Principles

The Agile Manifesto

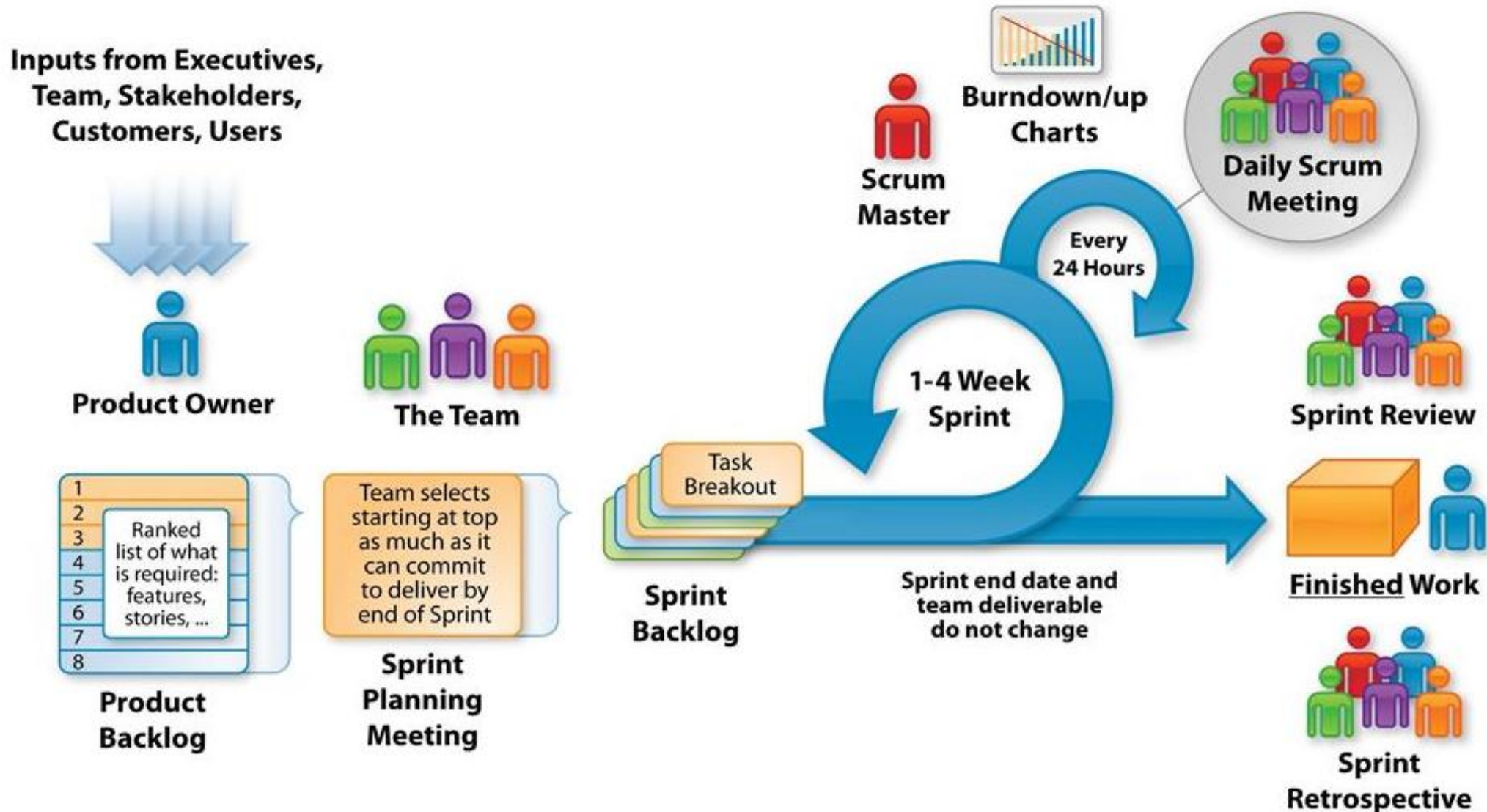
Individuals and interactions	over	Processes and Tools
Working Product	over	Comprehensive Documentation
Customer Collaboration	over	Contract Negotiation
Responding to change	over	Following a plan

That is, while there is value in the items on the right, we value the items on the left more.

www.agilemanifesto.org

- Agile movement arose b/c of documented high failure rate of traditional methods for product development
- Agile approaches more effective when:
 - Requirements likely to change
 - Novel undertaking
 - Product is malleable (software vs. a football stadium)

Agile Scrum Framework



Lightweight Requirements with User Stories

Story Title:	<short name>
As a	<role>
I want	<something>
so that	<a benefit can be achieved>

Some advantages:

- Short, easy to read
- Understandable to developers, stakeholders, and users
- Focuses on customer and value to be delivered: “who”, “what”, and “why” in one sentence.



Example:

As a rheumatologist,

I want to be advised if my patient with rheumatoid arthritis (RA) is not on a Disease Modifying Anti-Rheumatic Drug (DMARD),

so that my patient receives optimal therapy for their RA, and can experience the best possible improvement in their symptoms and quality of life.

Note: the “so that” section leads naturally to designing measures of effectiveness

User Story and Acceptance Criteria

Characteristics of a good User Story: INVEST

Letter	Meaning	Description
I	Independent	The user story should be self-contained, in a way that there is no inherent dependency on another user story.
N	Negotiable	User stories, up until they are part of an iteration, can always be changed and rewritten.
V	Valuable	A user story must deliver value to the stakeholder.
E	Estimatable	You must always be able to estimate the size of the user story.
S	Small	User stories should not be so big that they become impossible to plan/task/prioritize with a certain level of accuracy.
T	Testable	The user story or its related description must provide the necessary information to make test development possible.

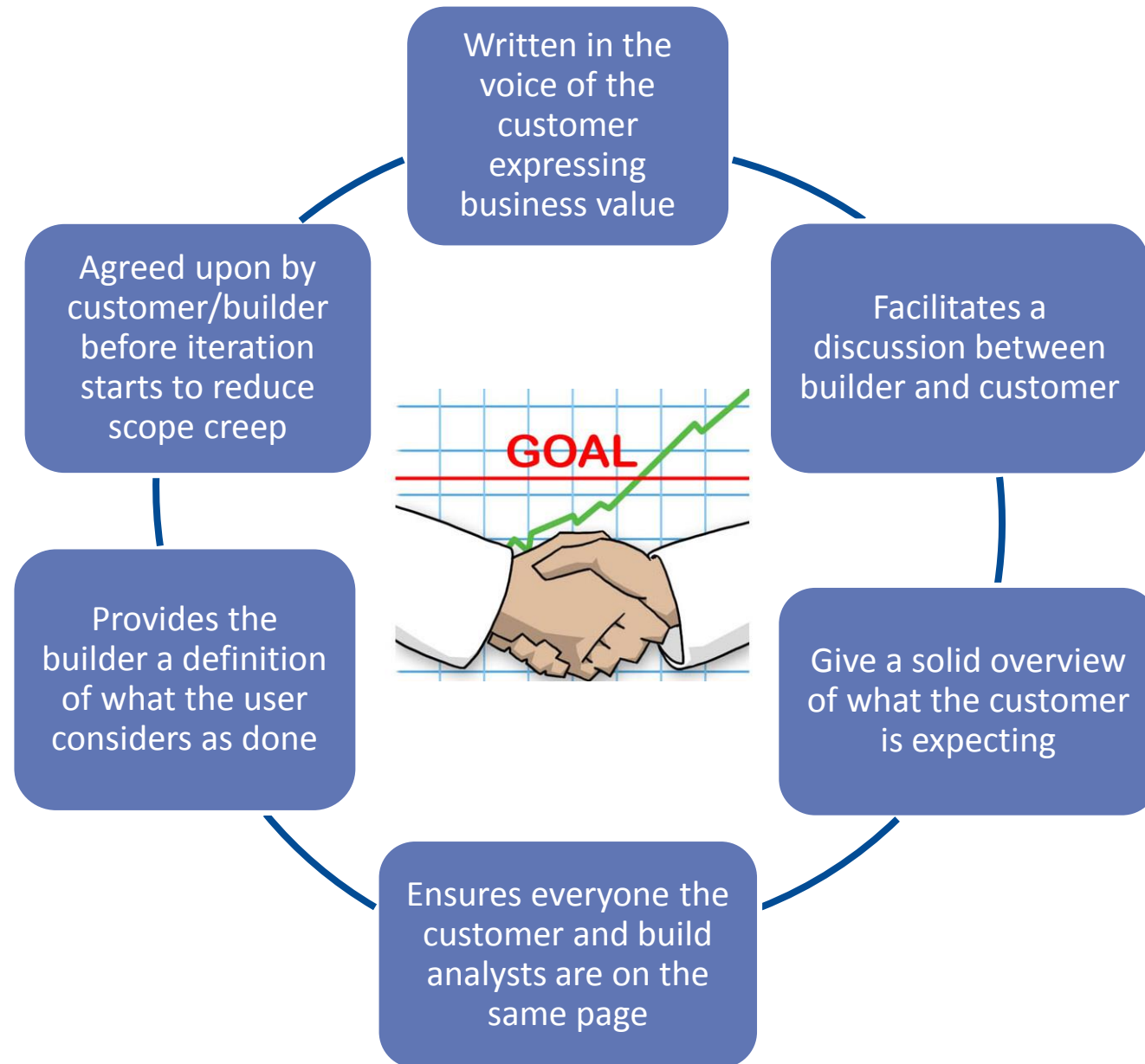
Adapted from: [https://en.wikipedia.org/wiki/INVEST_\(mnemonic\)](https://en.wikipedia.org/wiki/INVEST_(mnemonic))

Acceptance Criteria – The definition of done, to a user, customer, or other stakeholder

- Can be a simple bulleted list

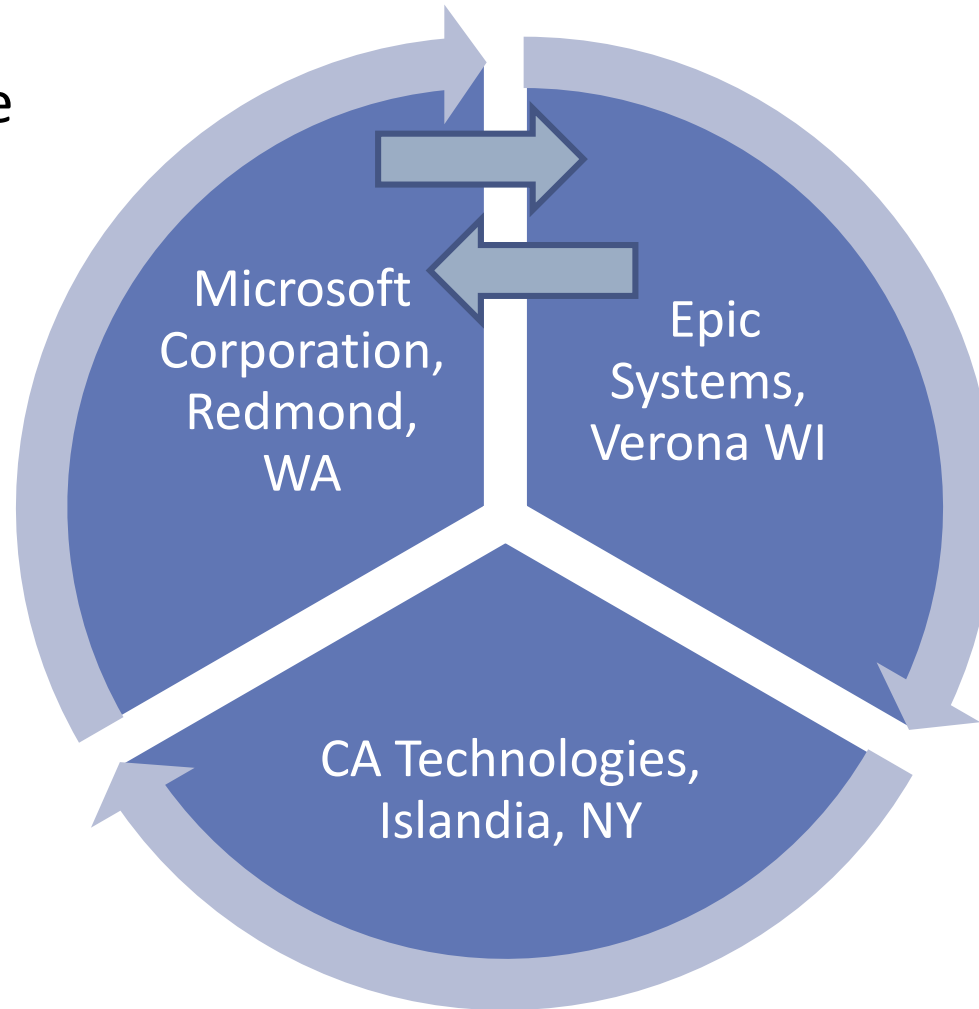
<https://softwareengineering.stackexchange.com/>

Benefits of User Stories & Acceptance Criteria



IT Infrastructure

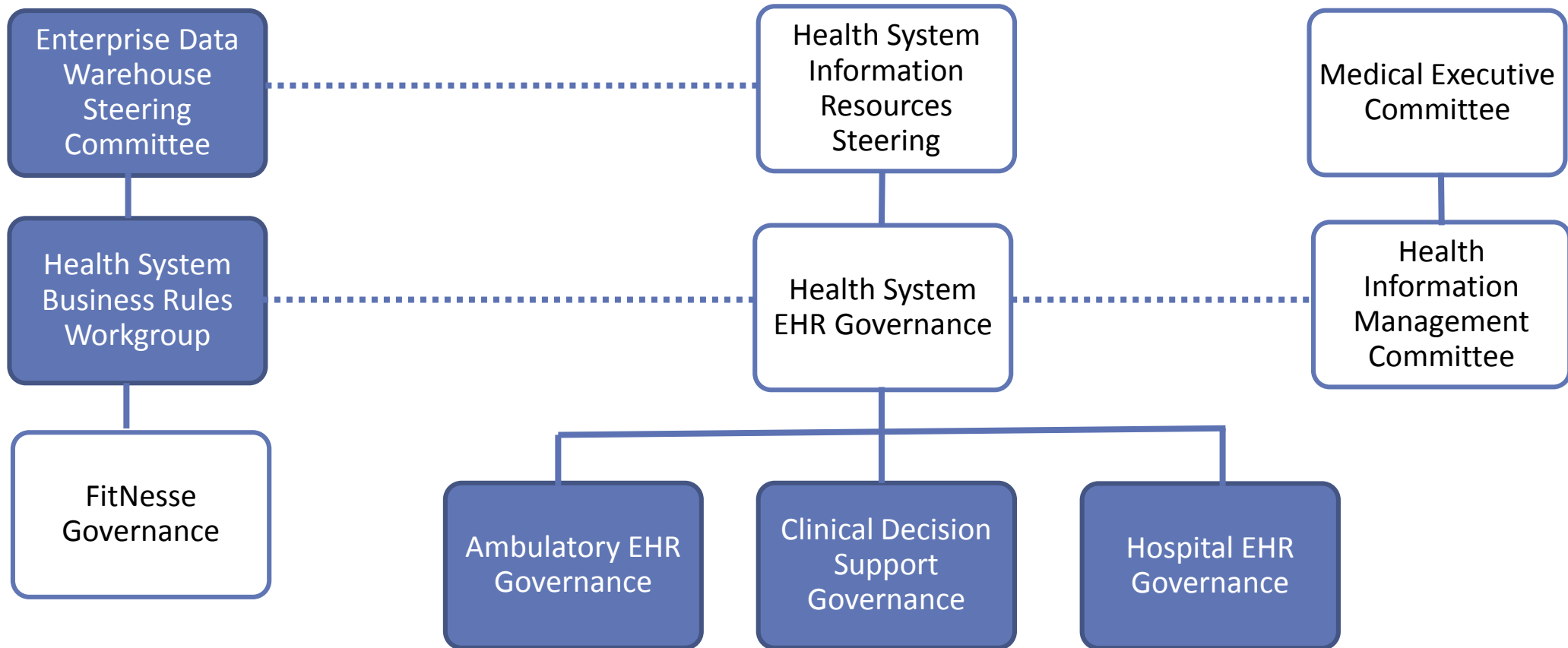
Enterprise data warehouse (EDW) and Business intelligence (BI) tools:
Microsoft SQL Server, SQL Server Reporting Services, SQL Server Analysis Services, Power BI



Enterprise EHR, reporting, and population health modules.

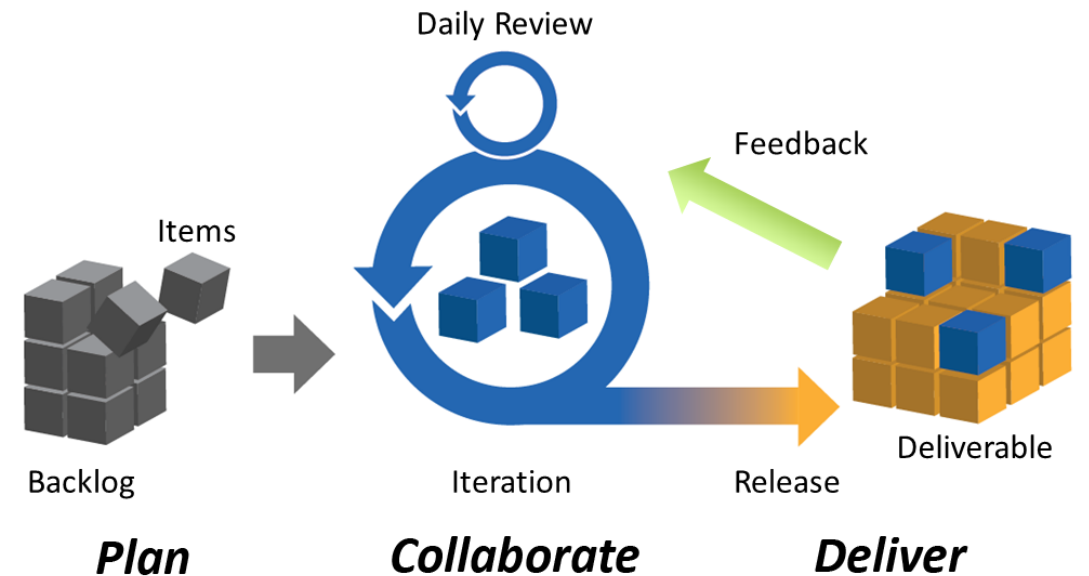
CA Agile Central, a Web-based Agile development software

EHR Governance



Benefits of Agile Development

- Promote shared understanding among multiple stakeholders
- Support rapid-cycle time-boxed development of EHR tools
- Adapt to evolving requirements as stakeholders interact with delivered EHR-based tools
- Improve clinical collaboration

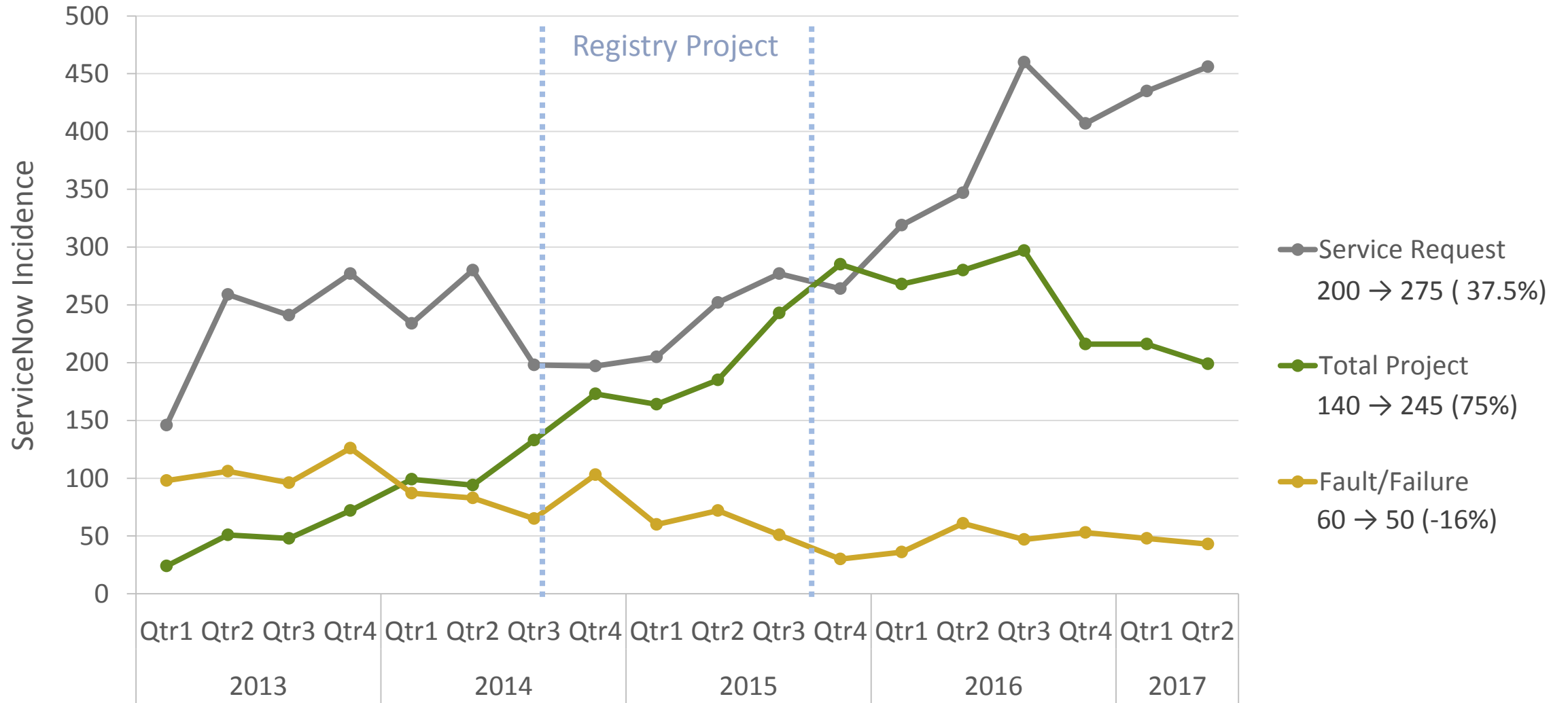


Agile Project Management: Iteration

Return on Investment

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Value of Agile



Financial ROI

Agile

163 projects/quarter

No Increase in Staffing

**Reduced time to deliver
Increased overall quality**

Prior to Agile

163 projects/quarter

**26 Additional FTEs
\$2.8 million dollars**

Operational Benefits



Quality Outcomes

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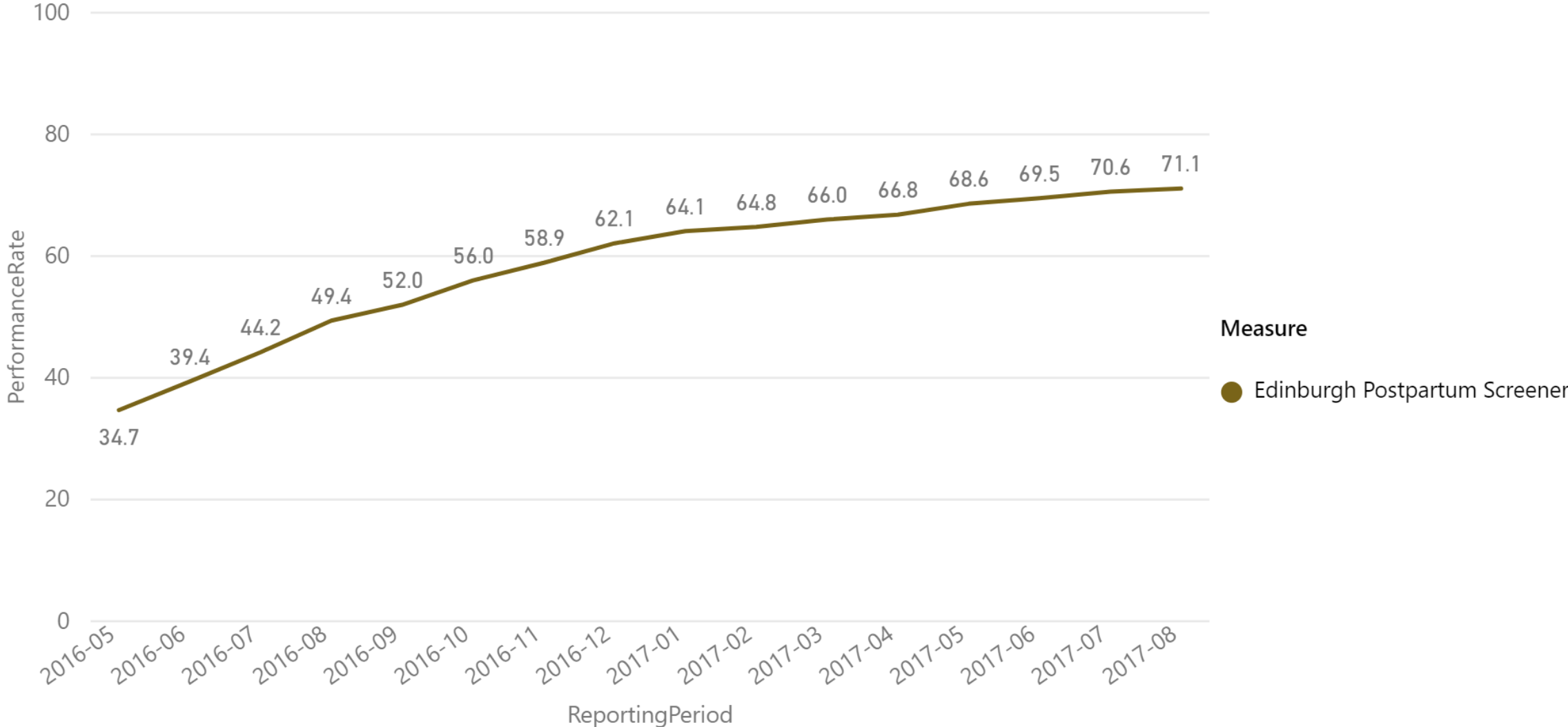
Results:

Item	# 2016
Specialties	30
Registries	43
EHR Tools Built	111
Measures	163
Dashboards	32
Unique patients tracked on registries	>60,000
Patient-reported outcome questionnaires completed	>2,100

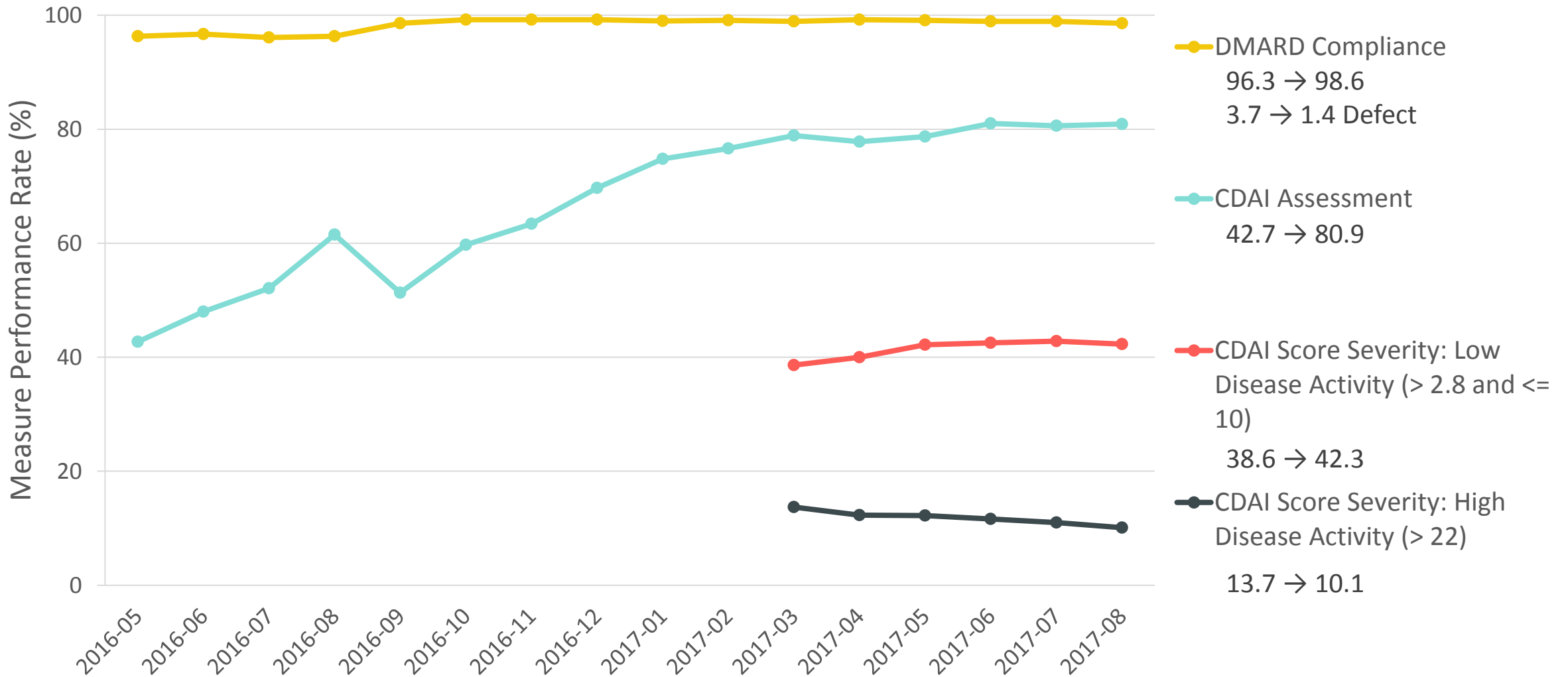
Item	# currently
Registries	52 with CQMs; 81 total
Unique patients	>80,000 actively managed; 222K on a registry
Pt-reported outcome questionnaires	>8,500 (by 3,000 pts)

Project recognized with Healthcare Informatics magazine's Innovator Award for 2016, published at:
<http://www.healthcare-informatics.com/article/2016-healthcare-informatics-innovator-awards-first-place-winning-team-ut-southwestern>

Post-Partum Depression Screening



Rheumatoid Arthritis: Quality Measurement & Improvement



Summary



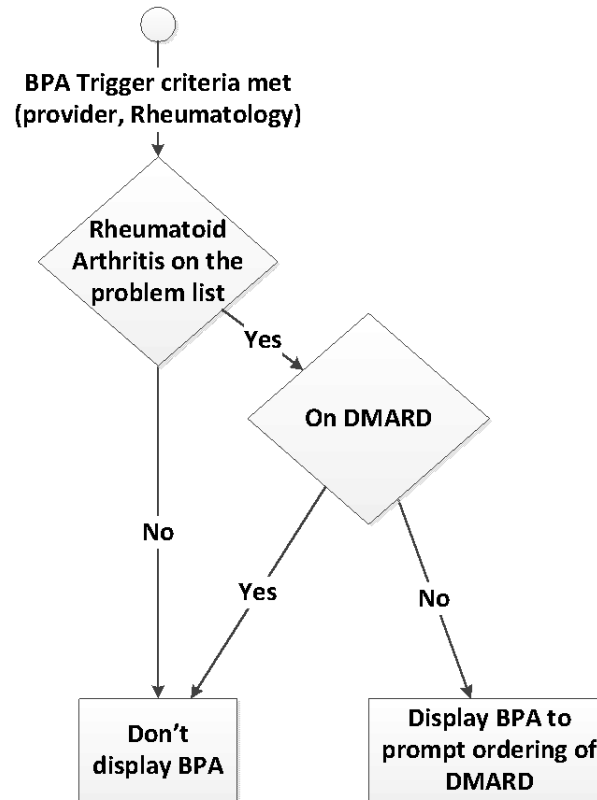
Summary

Agile Modeling

Agile modeling provides high value for effort

Modeling aids:

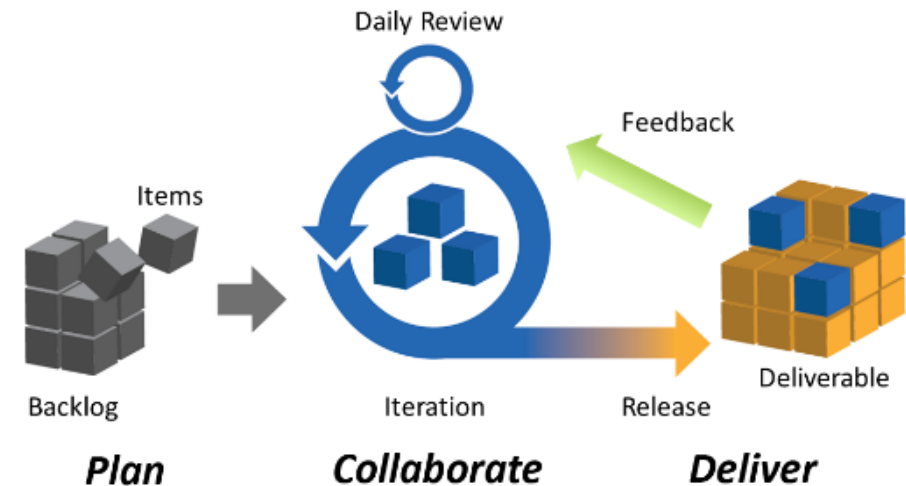
- Understanding
- Communication



Agile Development

Agile principles and practices can help deliver valued, high-quality EHR features early and often

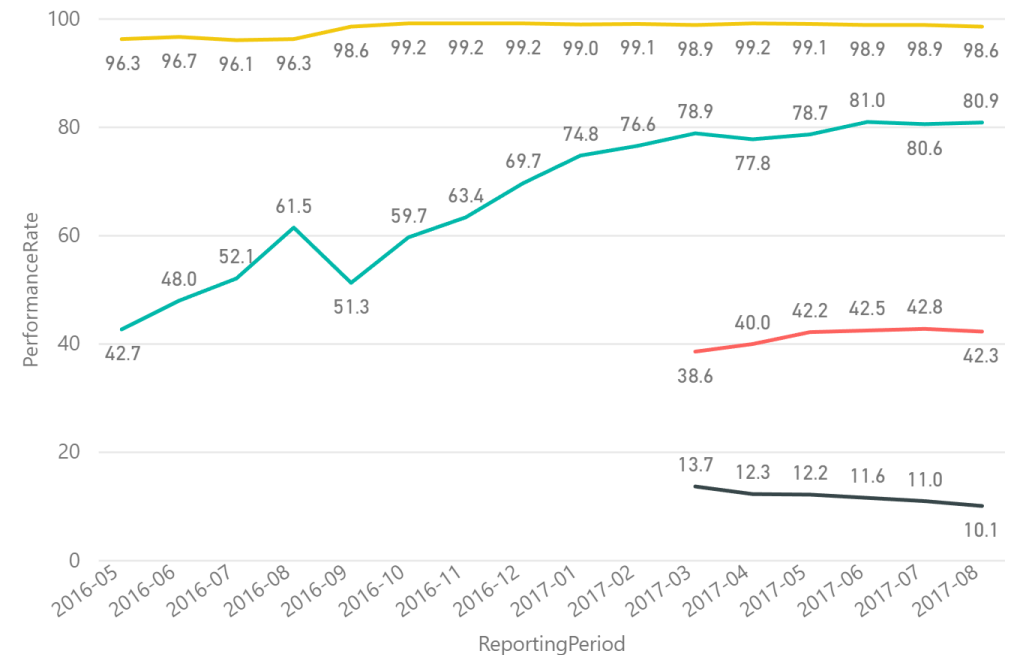
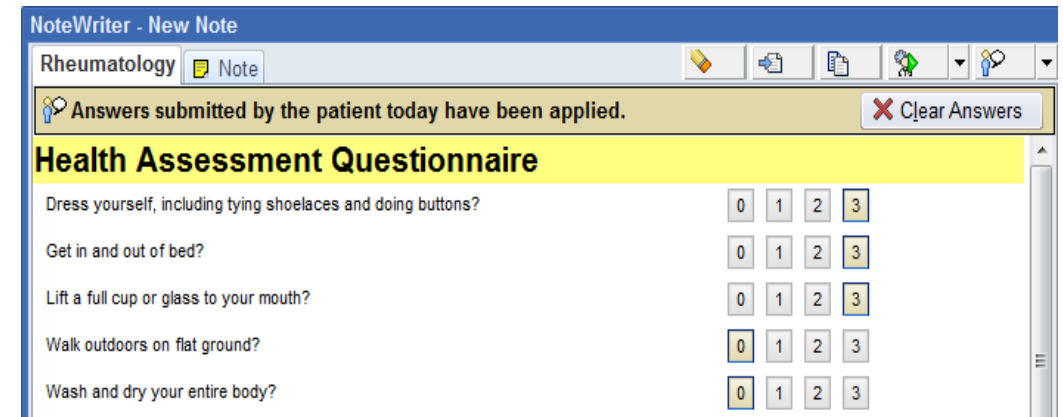
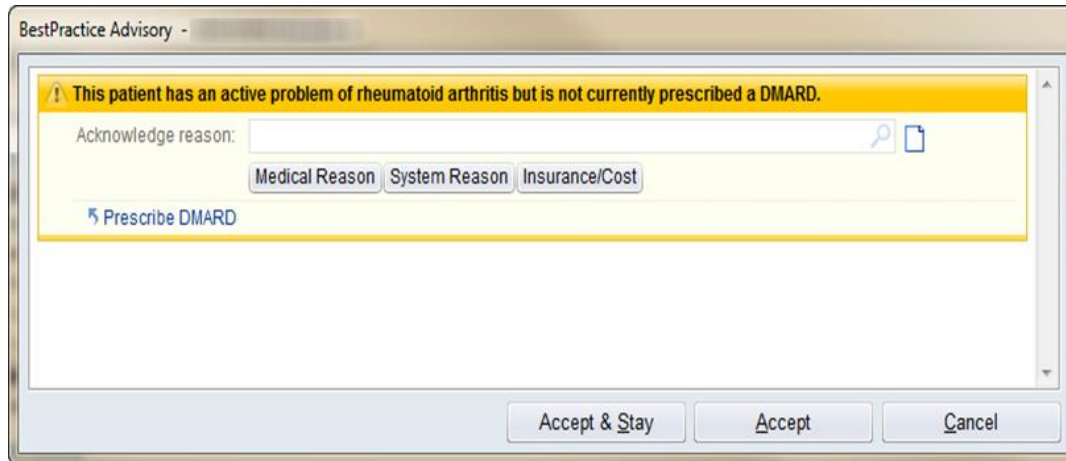
As a ____, I want to ____ so that ____.



Summary

EHR-Based Registries

- Concurrent design of EHR data collection tools and reporting, via common framework
- → data useful for registries and clinical quality measures (eCQMs)
- → improved care processes and outcomes



Questions

- Email us at:
 - Josh.Youngblood@UTSouthwestern.edu
 - Jason.Fish@UTSouthwestern.edu
 - DuWayne.Willett@UTSouthwestern.edu

