


## Practical Methods & Technology for Healthcare Efficiency

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## Today's Agenda

- Introduction
- Continuous vs. On-call Services
- Continuous Services PI
- On-call Services PI
- Practical Approaches
- Advanced Tools for PI
  - Data Mining/Analytics Enabled PI
- Questions


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  - MHS/TRICARE
  - DARPA
  - NASA
  - NIST
  - DOE




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## Process Improvement is...

- JCAHO Sentinel Events?
- PDCA?
- FMEA?
- Root Cause Analysis?
- All of the Above??????



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## Process Improvement is...

Alterations to business processes that improve delivered value.




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## MHS/TRICARE Initiative

- 90 Hospitals
- Hundreds of outpatient clinics and ambulatory care facilities
- Twelve Tertiary Care Hospitals
- 8 Million Beneficiaries
- Staff of 180,000
- \$20B Annual Budget
- Terabytes of Clinical and Business Data
- Significant analytical challenges due to its sheer size and diversity


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## PI Conceptual Steps

1. **AS-IS Measurement** => performance baseline
2. **Analysis** => drivers of performance and problems
3. **TO-BE Planning** => proposes, justifies new processes
4. **Process Change** => implementation of new processes
5. **TO-BE Measurement** => assessment of results


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## Fundamental Questions

- Are you a continuous or on-call facility?
- What detractors do you suspect?
- How self-aware are you?

**These questions determine the best PI techniques....**




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## Continuous vs. On-Call Services

	Continuous	On-Call
<b>Delivery of Services</b>	Repetitive	As-Needed
<b>Facilities</b>	Dedicated	Generalized
<b>Performance Drivers</b>	Consistent workload	Inconsistent workload
<b>Work Procedures</b>	Few	Many
<b>Performance Metrics</b>	Production	Readiness


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## Continuous PI: Assumptions

Suspected Cause	Approach	Examples
Variance	Variance Centered	Taguchi Six Sigma IDEF Modeling
Inferior Processes	Model Processes	Deming, Baldrige Benchmarking ISO 9000 Balanced Scorecard
Lack of Self-Awareness	General Methodologies	IDEF Modeling BPR, Lean, DMAIC, PDCA


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## On-Call Services: More Processes

Processes	Function
<b>Readiness</b>	Create & Sustain Readiness
<b>Assessment and Planning</b>	Select and Schedule Services
<b>On-Call Services</b>	Procedure & Medication Delivery
<b>Performance Metrology</b>	Measure Performance for Enhancement

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## On-Call Process Examples

Process Type	Staff Level	Facility Level
<b>Readiness</b>	Licensure, Training, CEU's, Professional Societies	Accreditation, Credentialing, Training, Drills
<b>Assessment and Planning</b>	Diagnosis, Care Plans	Diagnosis, Care Plans, Pathways
<b>On-Call</b>	Personal Skills, Office Capabilities, Procedures	Licensed and Certified Facility Capabilities
<b>Performance Metrology</b>	State and CMS Physician Quality Initiatives, Tort Litigation, Profit/Loss	Sentinel Events, Facility Benchmarks, CMS Quality Initiatives

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### On-Call Facilities: Characteristics (Hospitals, MRO Depots, etc.)

Work Characteristic	Classical Value Detractors
High accountability	Added work requirements Redundant paperwork Out of date documentation
Scarce, highly technical skills	Staff and skill shortages Dispersed work locations
Extensive Assessment, inspection, remediation	Remediation often deferred, neglected Shortcuts to avoid high labor costs
Unusual problems or affected functions	Long lead times on materiel Underfunded demand Poor materiel procurement/status systems
Unpredictable processes & required support	Static plans & schedules Production priority for critical processes
Scarce, highly specialized tooling & facilities	Unpredictable subject arrivals Poor scheduling systems


### On-call PI: Assumptions

Suspected Cause	Approach	Examples
Faulty Process	Sentinel Event/Shortfall Analysis	Root Cause FMEA IDEF Models
Inefficient Processes	Special Process Analysis & Metrics	CMS VHRI Metrics JCAHO Core Measure Set IDEF Models
Weak Selection and Deployment	Planning and Scheduling	Pathway Templates Process-Based Planners Kitting
Lack of Readiness	Deployment Simulations	Driver Simulations ( Drills ) Performance Simulations Discrete Simulation Modeling

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### Getting Practical...

1. Increase self awareness
2. ID customers and contributors
3. Find drivers and profiles
4. Find metrics that count
5. Change for the better



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### Increase Self Awareness


- Information sources
  - Procedures
  - Plans
  - Audits
- Process Capture and Documentation
  - Methodologies Help
  - Example - IDEF Modeling
- Leverage Your Existing Data Assets
  - Methodologies Help
  - Data Mining Analytics



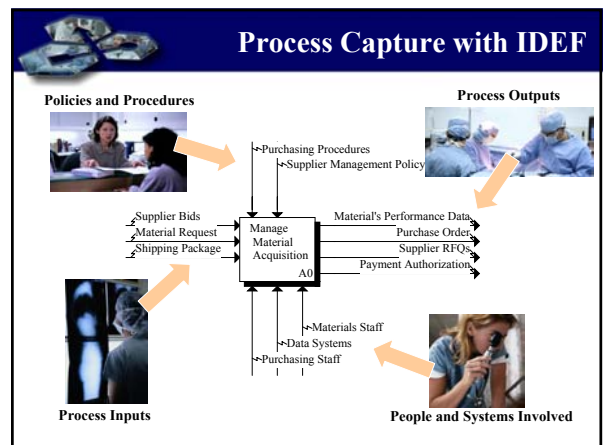
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### Identify Customers & Contributors

- What are my deliverables? Products or services?
- Points of Delivery
  - Admission treatment
  - Treatments
  - Discharge
- Valuation: Thru eyes of customer



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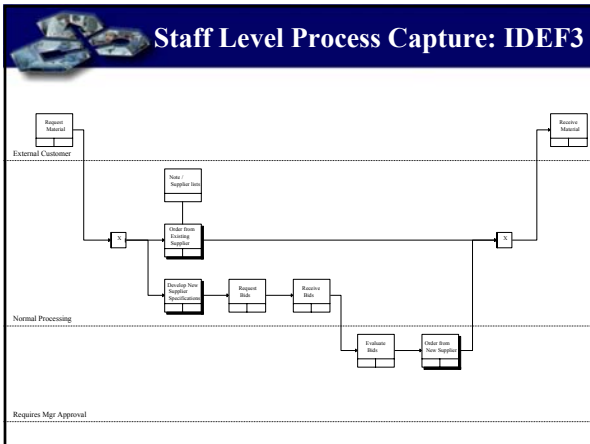
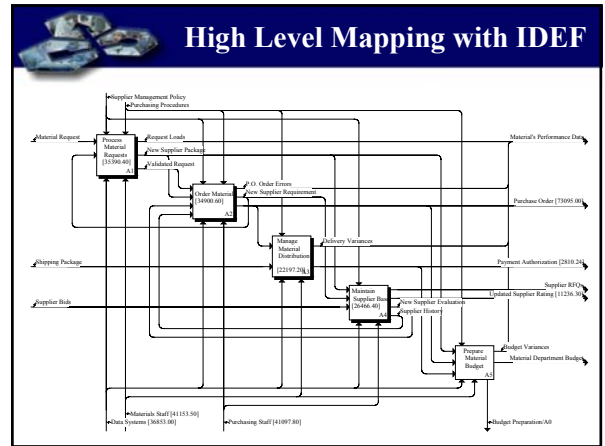
## Model Reuse

**Activity Based Costing Framework**

**Process Ownership Matrix**

**Documenting Material Acquisition**

**Web Accessibility**



## Finding Drivers and Profiles

- Get Quantitative
  - Look for Cause and Effect Relationships
  - Example – If my drivers increase by 10% what happens to my performance?
- IDEAL: Your Metric is Someone Else's Driver
- Tools – Data Mining, OLAP

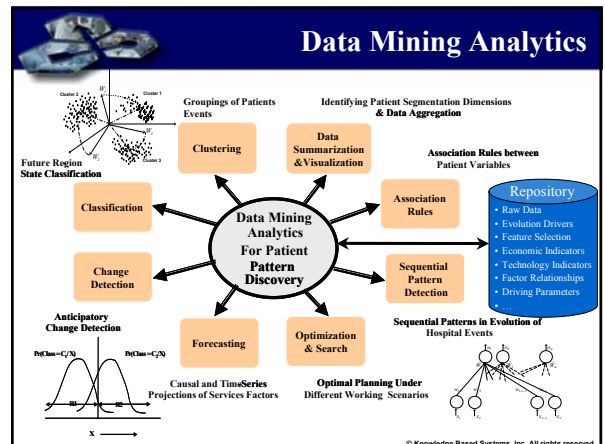
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## Data Mining: Value-Add

Accurate Reporting of Past & Current Events	Understand the Past & Projections of the Future
OLAP	Data Mining
What was the utilization rate of our clinics?	What is the profile of people likely to utilize our clinics?
How many units of Product X did we use for our patients?	Which future patients are likely to need product X?
Who were my ten safest hospitals last year?	Which hospitals have the greatest sentinel event potential?
Which doctors didn't refer patients last month?	Which doctors are likely to switch to the competition in the next six months?
Which customers defaulted on their payment plans?	Is this customer likely to be a credit risk?
What were bed utilizations by region last quarter?	What are expected bed utilizations by region next year?
What percentage of patients acquire nosocomial infections?	What can I do to reduce nosocomial infections?

Reactive Management → Proactive Management

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## What Does Data Mining Do?

- Discover and analyze patterns
- Find relationships driving behavior
- Find emerging trends in ongoing data

"Not in Stock" vs "Prime Vendor Utilization"

Clustering Based on "Not In Stock" Levels

- Find matches to patterns
- Find high interest targets

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## Patient Cluster Analysis

**Question:** Among diabetes patients, are there natural group behaviors based upon secondary diagnoses and symptoms?

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## Clinical Topographies

Topographic Grid

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## Discussion

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