Outcomes Measurement

Professor Michael E. Porter
Harvard Business School
www.isc.hbs.edu

January 24, 2013

Creating a Value-Based Health Care Delivery System
<u>The Strategic Agenda</u>

1. Organize Care into Integrated Practice Units (IPUs) around Patient Medical Conditions

    – Organize primary and preventive care to serve distinct patient segments

2. Measure Outcomes and Cost for Every Patient

3. Reimburse through Bundled Prices for Care Cycles

4. Integrate Care Delivery Across Separate Facilities

5. Expand Geographic Coverage by Excellent Providers

6. Build an Enabling Information Technology Platform

2. Measuring Outcomes and Cost for Every Patient
The Measurement Landscape

Patient Adherence

Patient Initial Conditions → Processes → Indicators → (Health) Outcomes

Structure

Protocols/ Guidelines

E.g., Hemoglobin A1c levels for diabetics

E.g., Staff certification, facilities standards
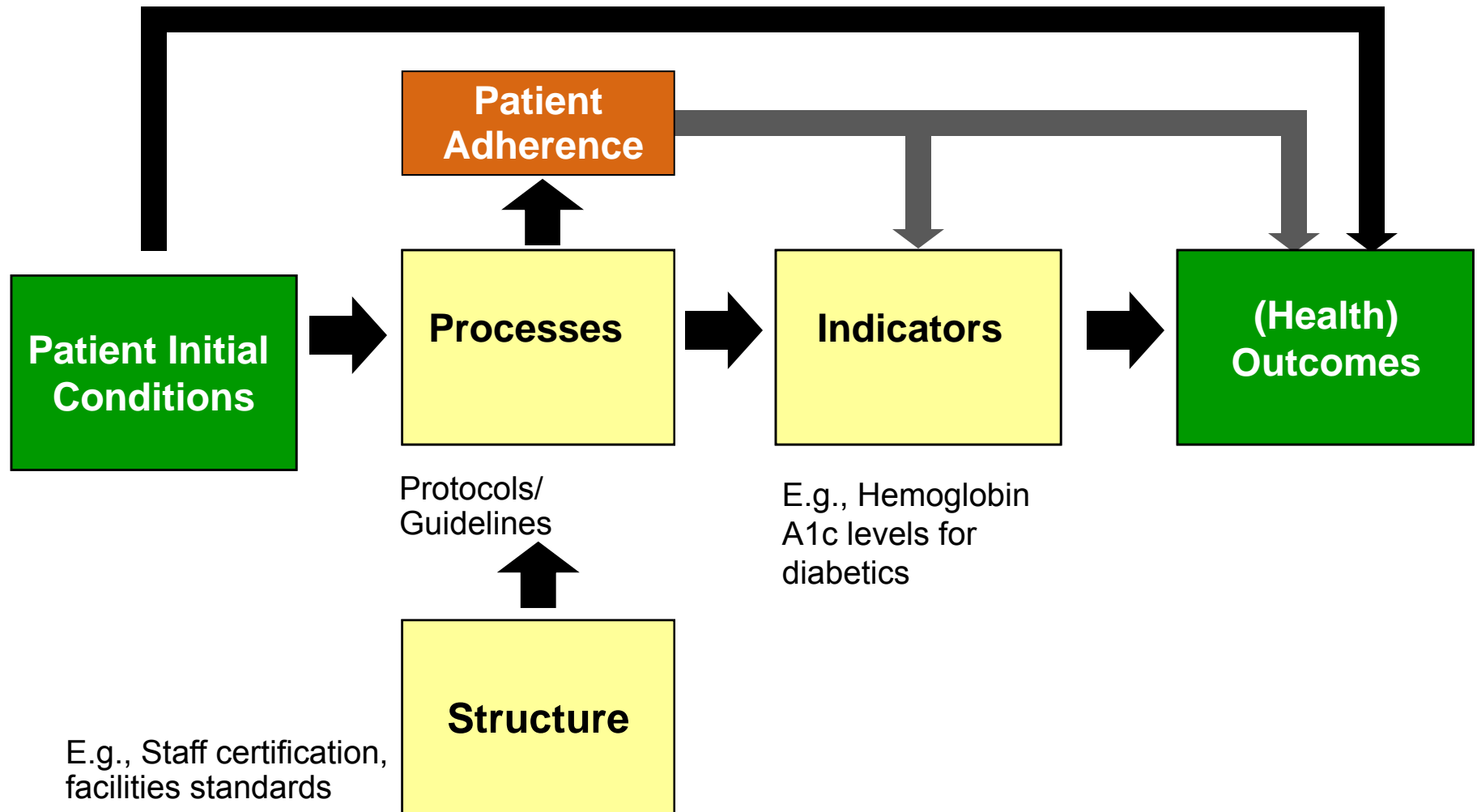
Process Measurement is Not Enough

Overall survival time (95% CI) free of signals for updating.

Median Survival
(95% CI)
5.5 (4.6–7.6)
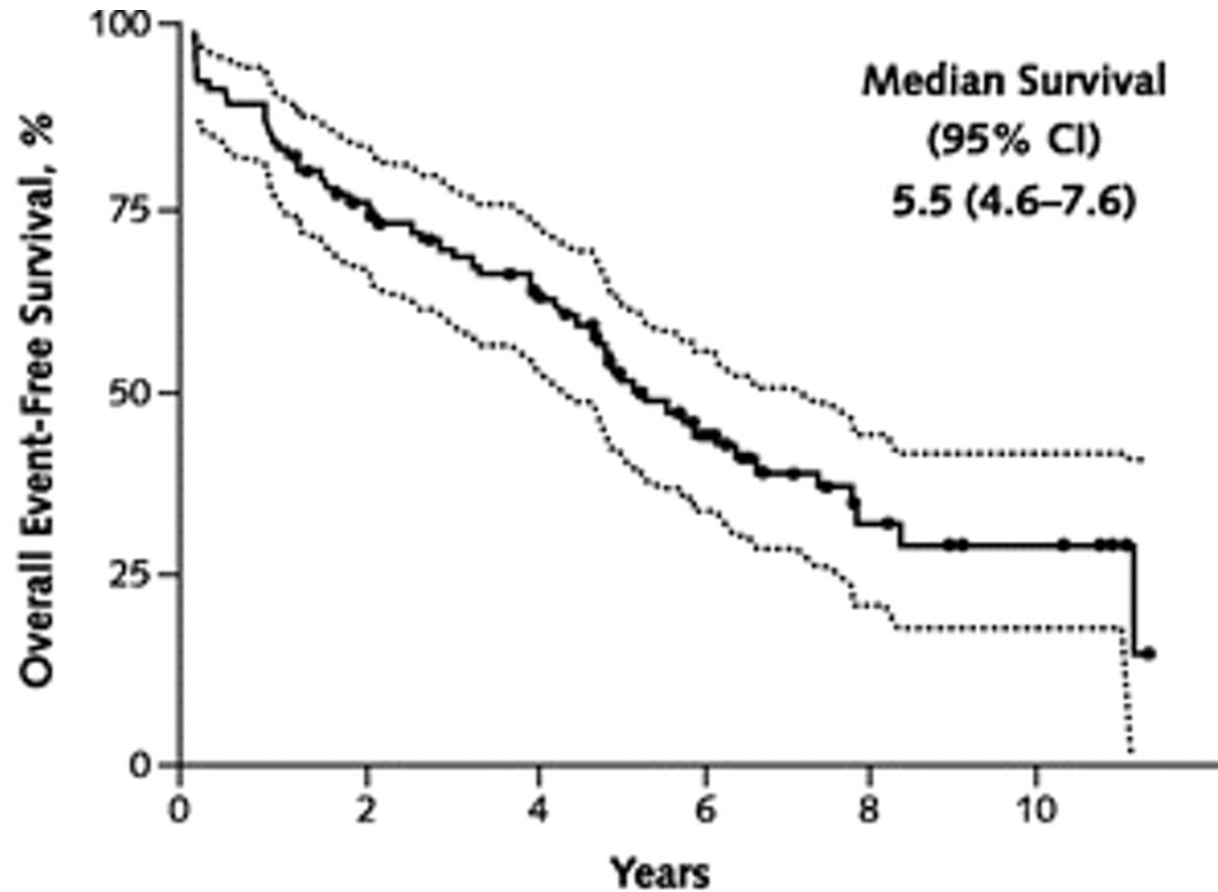
Systematic reviews at risk, *n*: 100 73 59 34 14 6

Shojania K G et al. Annals of Internal Medicine. 2007;147:224-233

Principles of Outcome Measurement

1. Outcomes should be measured by **medical condition** or **primary care patient segment**

    - **Not** by **procedure** or **intervention**

Conditions versus Procedures

- Traditional model: Measure by **procedure or specialty**

Outcomes for interventional cardiology

Outcomes for outpatient cardiology

Outcomes for cardiac surgery

- **Hinders comparison** of different interventions on outcomes

- Value-based model: Measuring around the **underlying condition of the patient**

Outcomes for coronary artery disease patients

- Facilitates comparison of interventions and **selection of highest value treatment model**
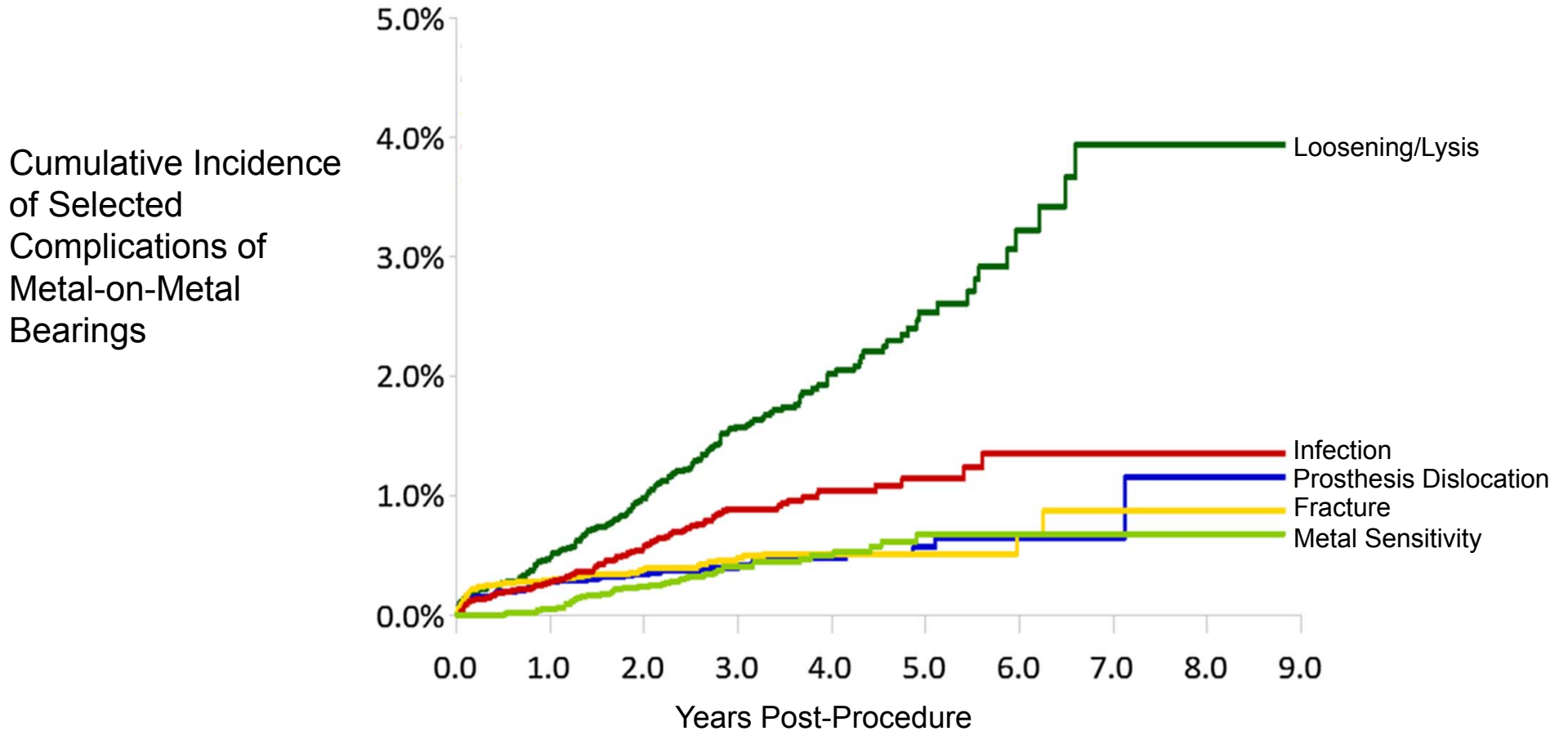
Principles of Outcome Measurement

1. Outcomes should be measured by **medical condition** or **primary care patient segment**

    - **<u>Not</u>** by **procedure** or **intervention**

2. Outcomes should reflect the **full cycle of care**

Outcomes Should Be Measured Across The Full Care Cycle
Knee Osteoarthritis Requiring Replacement

	MONITORING/ PREVENTING	DIAGNOSING	PREPARING	INTERVENING	RECOVERING/ REHABBING	MONITORING/ MANAGING
Informing and engaging	• Importance of exercise, weight reduction, proper nutrition	• Meaning of diagnosis • Prognosis (short- and long-term outcomes) • Drawbacks and benefits of surgery	• Setting expectations • Importance of nutrition, weight loss, vaccinations • Home preparation	• Expectations for recovery • Importance of rehab • Post-surgery risk factors	• Importance of rehab adherence • Longitudinal care plan	• Importance of exercise, maintaining healthy weight
Measuring	• Joint-specific symptoms and function (e.g., WOMAC scale) • Overall health (e.g., SF-12 scale)	• Loss of cartilage • Change in subchondral bone • Joint-specific symptoms and function • Overall health	• Baseline health status • Fitness for surgery (e.g., ASA score)	• Blood loss • Operative time • Complications	• Infections • Joint-specific symptoms and function • Inpatient length of stay • Ability to return to normal activities	• Joint-specific symptoms and function • Weight gain or loss • Missed work • Overall health
Accessing	• PCP office • Health club • Physical therapy clinic	• Specialty office • Imaging facility	• Specialty office • Pre-op evaluation center	• Operating room • Recovery room • Orthopedic floor at hospital/ specialty center	• Nursing facility • Rehab facility • Physical therapy • Home	• Specialty office • Primary care office • Health club

Care delivery	**Monitor**
	• Conduct PCP exam
	• Refer to specialists, if necessary
	
	Prevent
	• Prescribe anti-inflammatory medicines
	• Recommend exercise regimen
	• Set weight loss targets
		Imaging
		• Perform and evaluate MRI and x-ray
		  • Assess cartilage loss
		  • Assess bone alterations
		
		Clinical evaluation
		• Review history and imaging
		• Perform physical exam
		• Recommend treatment plan (surgery or other options)
			Overall prep
			• Conduct home assessment
			• Monitor weight loss
			
			Surgical prep
			• Perform cardiology, pulmonary evaluations
			• Run blood labs
			• Conduct pre-op physical exam
				Anesthesia
				• Administer anesthesia (general, epidural, or regional)
				
				Surgical procedure
				• Determine approach (e.g., minimally invasive)
				• Insert device
				• Cement joint
				
				Pain management
				• Prescribe preemptive multimodal pain meds
					Surgical
					• Immediate return to OR for manipulation, if necessary
					
					Medical
					• Monitor coagulation
					
					Living
					• Provide daily living support
					• Track risk indicators
					
					Physical therapy
					+ Daily or twice daily PT sessions
						Monitor
						• Consult regularly with patient
						
						Manage
						• Prescribe prophylactic antibiotics when needed
						• Set long-term exercise plan
						• Revise joint, if necessary

Measuring the Long-Term Results of Hip Replacement

Cumulative Incidence of Selected Complications of Metal-on-Metal Bearings

- Measurement often stops 30 days, 90 days, or a year post-intervention, but many critical outcomes that matter to patients **are revealed over time**

Principles of Outcome Measurement

1. Outcomes should be measured by **medical condition** or **primary care patient segment**

    - **<u>Not</u>** by **procedure** or **intervention**

2. Outcomes should reflect the **full cycle of care**

3. Outcomes are **multi-dimensional** and should include the health circumstances **most relevant to patients**

The Outcome Measures Hierarchy

Tier 1

Health Status Achieved or Retained

Survival

Degree of health/recovery

Tier 2

Process of Recovery

Time to recovery and return to normal activities

Disutility of the care or treatment process (e.g., diagnostic errors and ineffective care, treatment-related discomfort, complications, or adverse effects, treatment errors and their consequences in terms of additional treatment)

Tier 3

Sustainability of Health

Sustainability of health /recovery and nature of recurrences

Recurrences

Long-term consequences of therapy (e.g., care-induced illnesses)

Care-induced Illnesses

Source: NEJM Dec 2010

11

The Outcome Measures Hierarchy

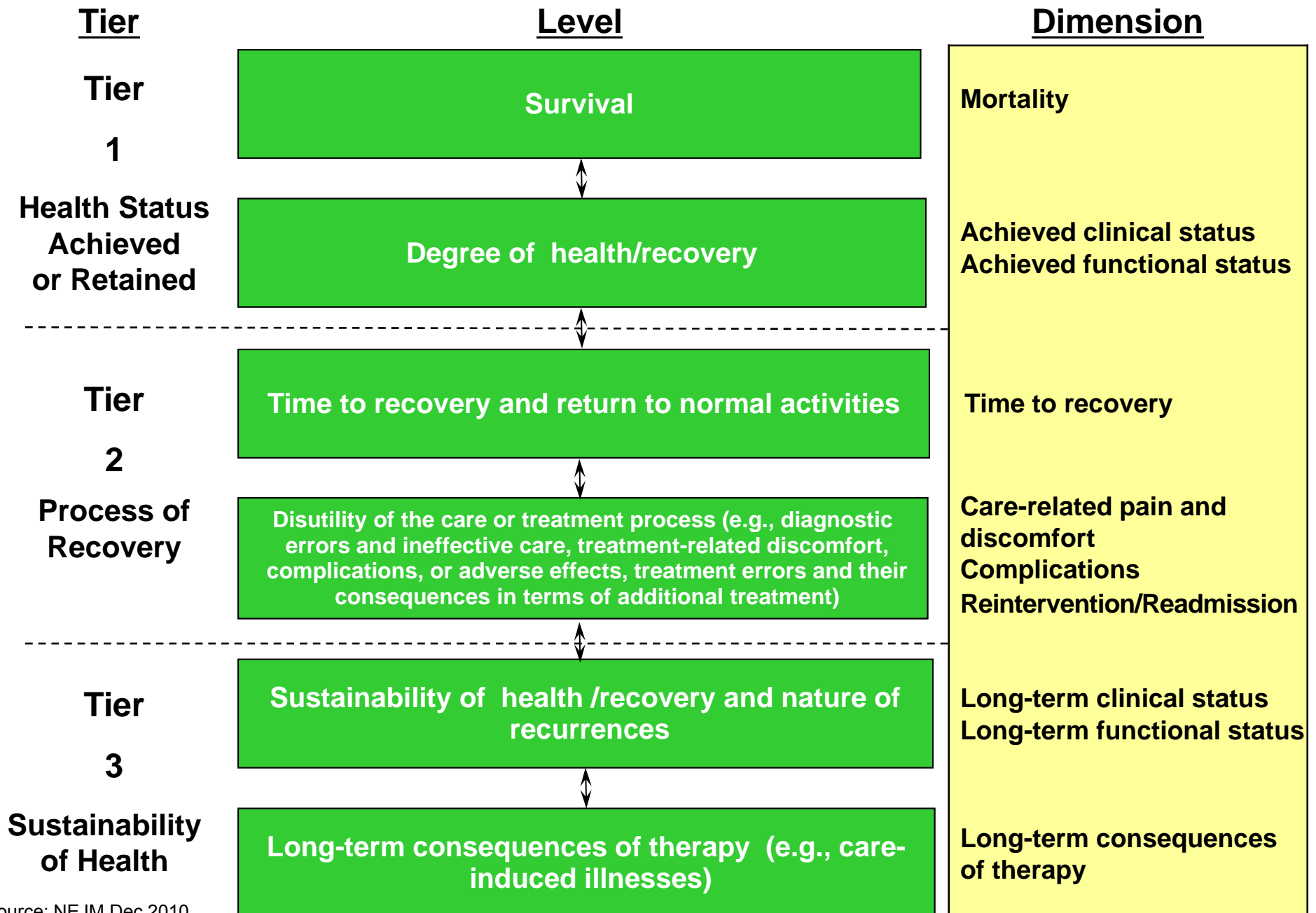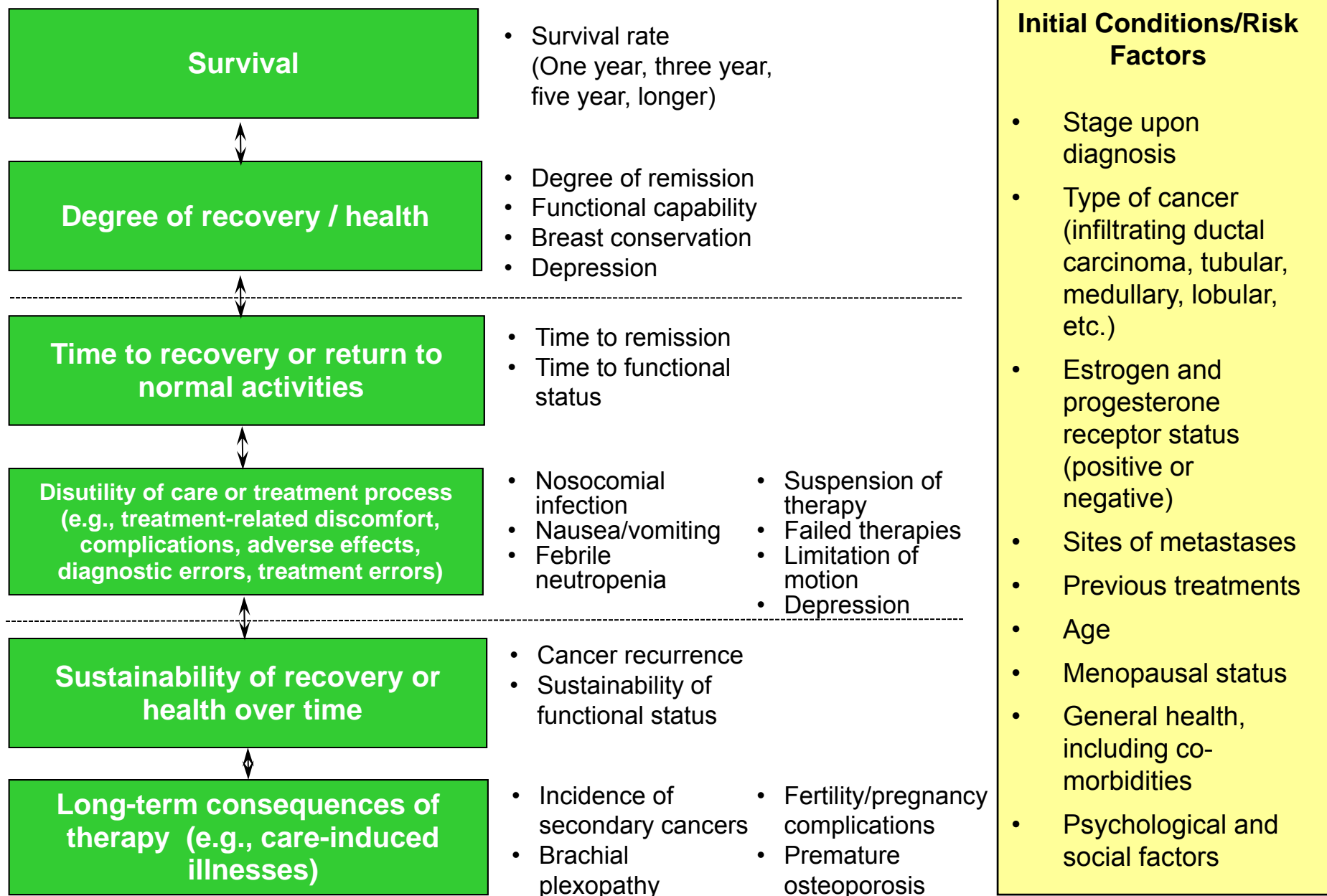| Tier	Level	Dimension
Tier 1 **Health Status Achieved or Retained**	**Survival**	**Mortality**
	Degree of health/recovery	**Achieved clinical status** **Achieved functional status**
Tier 2 **Process of Recovery**	**Time to recovery and return to normal activities**	**Time to recovery**
	Disutility of the care or treatment process (e.g., diagnostic errors and ineffective care, treatment-related discomfort, complications, or adverse effects, treatment errors and their consequences in terms of additional treatment)	**Care-related pain and discomfort** **Complications** **Reintervention/Readmission**
Tier 3 **Sustainability of Health**	**Sustainability of health /recovery and nature of recurrences**	**Long-term clinical status** **Long-term functional status**
	Long-term consequences of therapy (e.g., care-induced illnesses)	**Long-term consequences of therapy**

Source: NEJM Dec 2010

Principles of Outcome Measurement

1. Outcomes should be measured by **medical condition** or **primary care patient segment**

   - **Not** by **procedure** or **intervention**

2. Outcomes should reflect the **full cycle of care**

3. Outcomes are **multi-dimensional** and should include the health circumstances **most relevant to patients**

4. Measurement should include **initial conditions/risk factors** to allow for risk adjustment

The Outcome Measures Hierarchy
Breast Cancer

Survival

- Survival rate (One year, three year, five year, longer)

Degree of recovery / health

- Degree of remission
- Functional capability
- Breast conservation
- Depression

Time to recovery or return to normal activities

- Time to remission
- Time to functional status

Disutility of care or treatment process (e.g., treatment-related discomfort, complications, adverse effects, diagnostic errors, treatment errors)

- Nosocomial infection
- Nausea/vomiting
- Febrile neutropenia
- Suspension of therapy
- Failed therapies
- Limitation of motion
- Depression

Sustainability of recovery or health over time

- Cancer recurrence
- Sustainability of functional status

Long-term consequences of therapy (e.g., care-induced illnesses)

- Incidence of secondary cancers
- Brachial plexopathy
- Fertility/pregnancy complications
- Premature osteoporosis

Initial Conditions/Risk Factors

- Stage upon diagnosis
- Type of cancer (infiltrating ductal carcinoma, tubular, medullary, lobular, etc.)
- Estrogen and progesterone receptor status (positive or negative)
- Sites of metastases
- Previous treatments
- Age
- Menopausal status
- General health, including co-morbidities
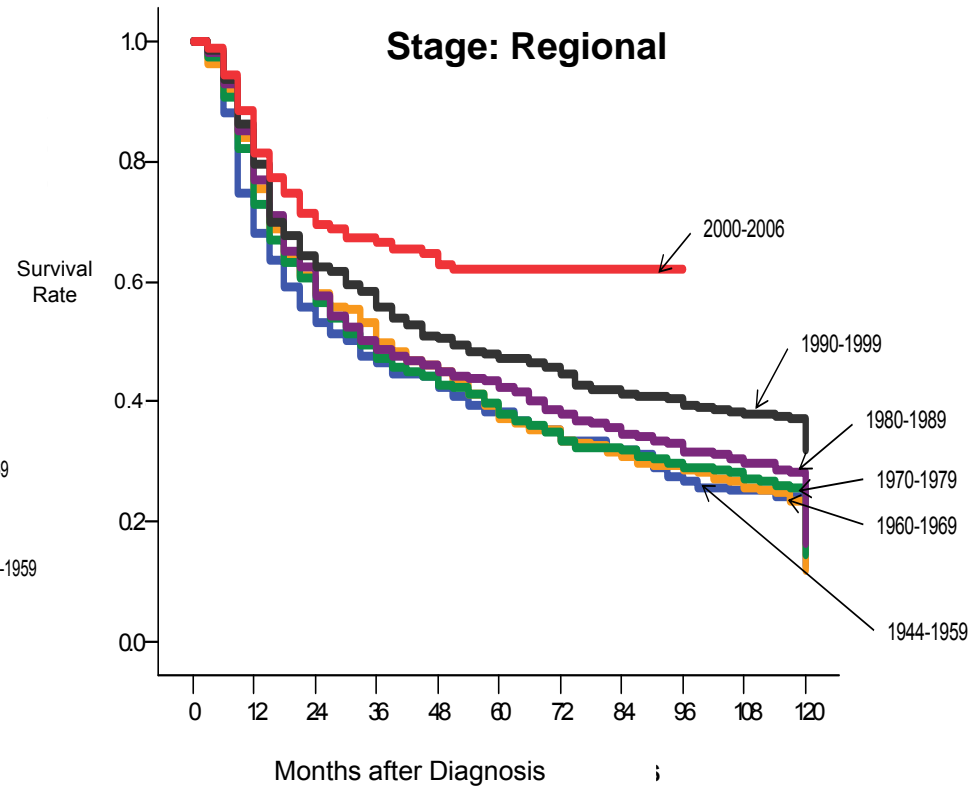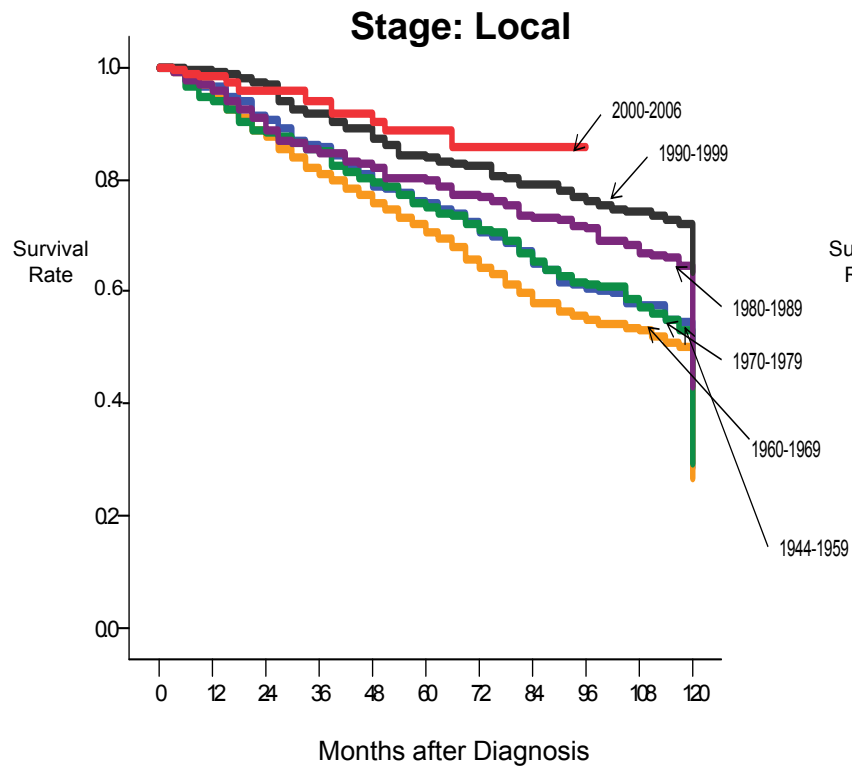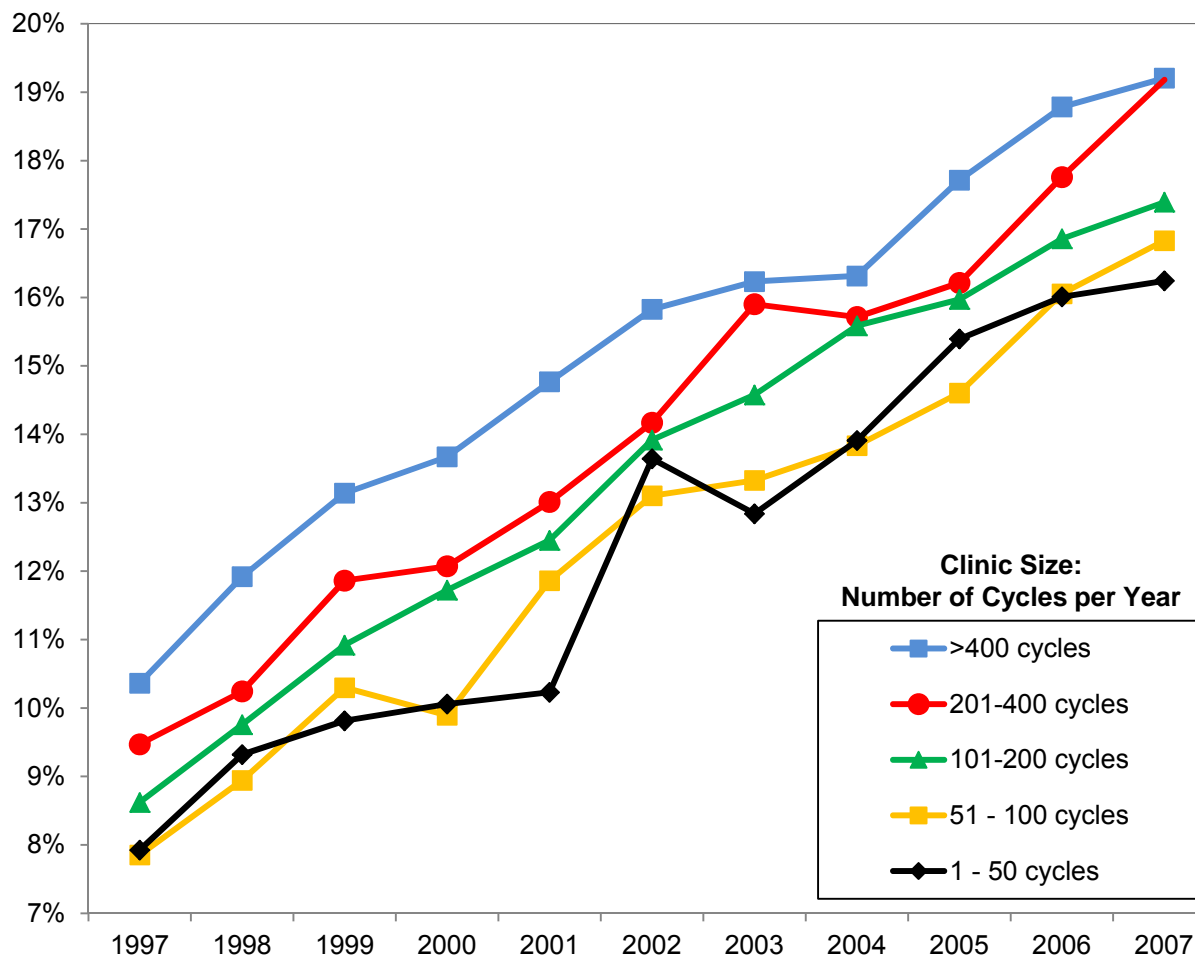- Psychological and social factors

14

Principles of Outcome Measurement

1. Outcomes should be measured by **medical condition** or **primary care patient segment**

   - **Not** by **procedure** or **intervention**

2. Outcomes should reflect the **full cycle of care**

3. Outcomes are **multi-dimensional** and should include the health circumstances **most relevant to patients**

4. Measurement should include **initial conditions/risk factors** to allow for risk adjustment

5. Outcome measures should be **standardized** to enable comparison and learning

   - Across **time**

Comparing Outcomes over Time

MD Anderson Oral Cavity Cancer Survival by Patient Registration Year

Stage: Local

Survival Rate

2000-2006
1990-1999
1980-1989
1970-1979
1960-1969
1944-1959

Months after Diagnosis

Stage: Regional

Survival Rate

2000-2006
1990-1999
1980-1989
1970-1979
1960-1969
1944-1959

Months after Diagnosis

Source: MD Anderson Cancer Center

16

Principles of Outcome Measurement

1. Outcomes should be measured by **medical condition** or **primary care patient segment**

    - **Not** by **procedure** or **intervention**

2. Outcomes should reflect the **full cycle of care**

3. Outcomes are **multi-dimensional** and should include the health circumstances **most relevant to patients**

4. Measurement should include **initial conditions/risk factors** to allow for risk adjustment

5. Outcome measures should be **standardized** to enable comparison and learning

    - Across **time**

    - Across **institutions**

Comparing Outcomes across Centers
In-vitro Fertilization

Percent Live Births per Fresh, Non-Donor Embryo Transferred by Clinic Size
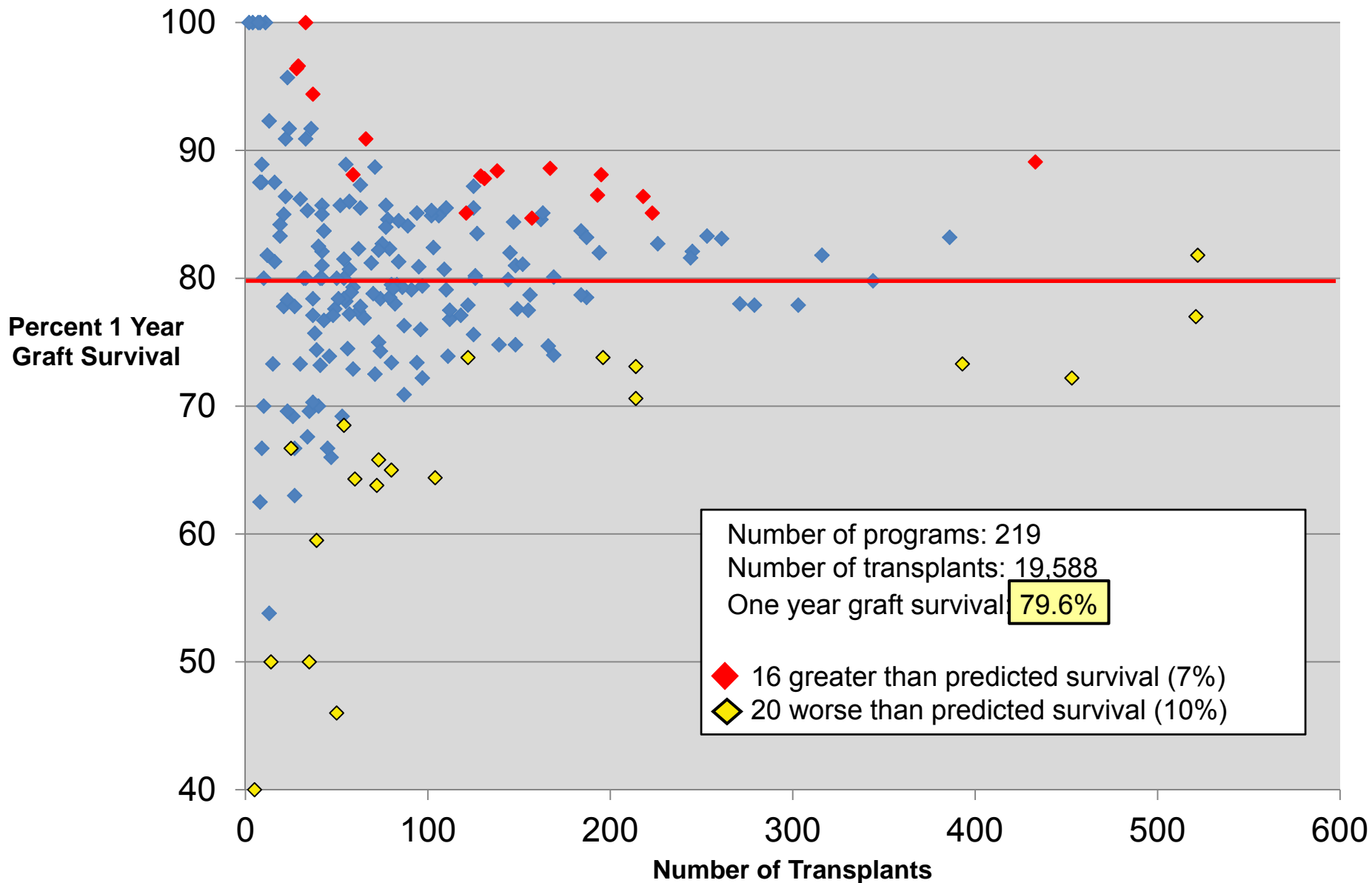**Women Under 38 Years of Age, 1997-2007**

Comparing Outcomes across Centers

Adult Kidney Transplants, US Centers, 1987-1989

Percent 1 Year Graft Survival (y-axis)

Number of Transplants (x-axis)

Number of programs: 219
Number of transplants: 19,588
One year graft survival: 79.6%

◆ 16 greater than predicted survival (7%)
◇ 20 worse than predicted survival (10%)

Comparing Outcomes across Centers

Adult Kidney Transplants, US Centers, 2008-2010

Percent 1-year Graft Survival (y-axis, 40 to 100)

Number of Transplants (x-axis, 0 to 800)

Number of programs included: 236
Number of transplants: 38,535
1-year graft survival: 93.55%

◆ 8 greater than expected graft survival (3.4%)
◆ 14 worse than expected graft survival (5.9%)
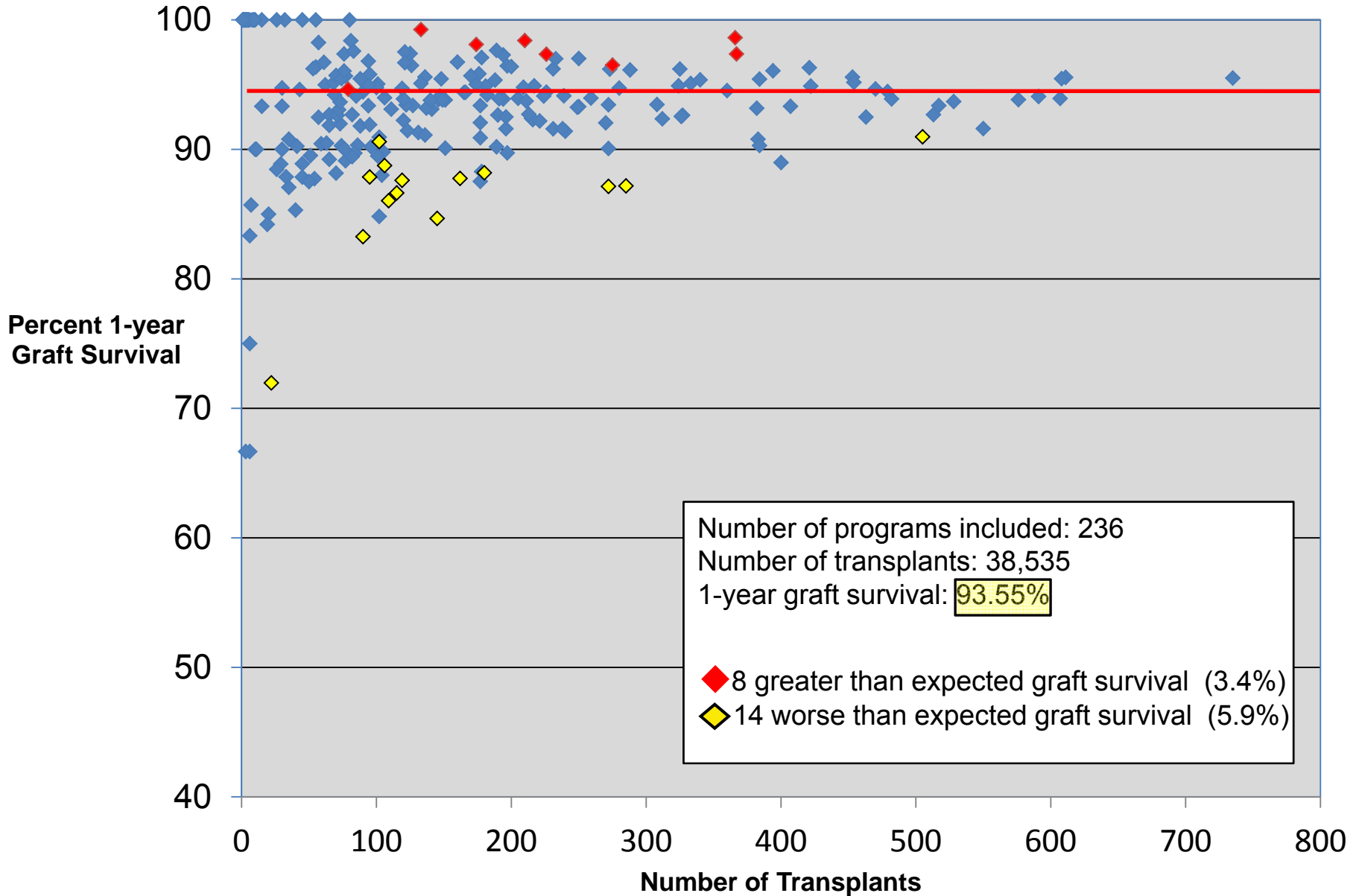
Creating an Outcomes Measurement System

Steps to Creating an Outcomes Measurement System

1. Designing outcome measures

2. Collecting outcome data

3. Compiling and analyzing outcomes

4. Reporting

5. Driving improvement

1. Designing Outcome Measures

- Define the **medical condition**

- Establish an **outcome measures team** including physicians, nurses and skilled staff involved in the care cycle

- Create a **care delivery value chain** (CDVC) for the condition

- Use the **outcome hierarchy** to define a comprehensive set of **outcome dimensions**, and **specific measures**

  – Engage patients to understand the outcomes **that matter to them**

- Tie the **outcome measures to the CDVC** to check for completeness and start to identify the causal connections between activities and each outcome

The Care Delivery Value Chain
Knee Osteoarthritis Requiring Replacement

	MONITORING/ PREVENTING	DIAGNOSING	PREPARING	INTERVENING	RECOVERING/ REHABBING	MONITORING/ MANAGING
Informing and engaging	• Importance of exercise, weight reduction, proper nutrition	• Meaning of diagnosis • Prognosis (short- and long-term outcomes) • Drawbacks and benefits of surgery	• Setting expectations • Importance of nutrition, weight loss, vaccinations • Home preparation	• Expectations for recovery • Importance of rehab • Post-surgery risk factors	• Importance of rehab adherence • Longitudinal care plan	• Importance of exercise, maintaining healthy weight
Measuring	• Joint-specific symptoms and function (e.g., WOMAC scale) • Overall health (e.g., SF-12 scale)	• Loss of cartilage • Change in subchondral bone • Joint-specific symptoms and function • Overall health	• Baseline health status • Fitness for surgery (e.g., ASA score)	• Blood loss • Operative time • Complications	• Infections • Joint-specific symptoms and function • Inpatient length of stay • Ability to return to normal activities	• Joint-specific symptoms and function • Weight gain or loss • Missed work • Overall health
Accessing	• PCP office • Health club • Physical therapy clinic	• Specialty office • Imaging facility	• Specialty office • Pre-op evaluation center	• Operating room • Recovery room • Orthopedic floor at hospital/ specialty center	• Nursing facility • Rehab facility • Physical therapy • Home	• Specialty office • Primary care office • Health club
Care delivery	**Monitor** • Conduct PCP exam • Refer to specialists, if necessary **Prevent** • Prescribe anti-inflammatory medicines • Recommend exercise regimen • Set weight loss targets	**Imaging** • Perform and evaluate MRI and x-ray 　• Assess cartilage loss 　• Assess bone alterations **Clinical evaluation** • Review history and imaging • Perform physical exam • Recommend treatment plan (surgery or other options)	**Overall prep** • Conduct home assessment • Monitor weight loss **Surgical prep** • Perform cardiology, pulmonary evaluations • Run blood labs • Conduct pre-op physical exam	**Anesthesia** • Administer anesthesia (general, epidural, or regional) **Surgical procedure** • Determine approach (e.g., minimally invasive) • Insert device • Cement joint **Pain management** • Prescribe preemptive multimodal pain meds	**Surgical** • Immediate return to OR for manipulation, if necessary **Medical** • Monitor coagulation **Living** • Provide daily living support • Track risk indicators **Physical therapy** + Daily or twice daily PT sessions	**Monitor** • Consult regularly with patient **Manage** • Prescribe prophylactic antibiotics when needed • Set long-term exercise plan • Revise joint, if necessary

1. Designing Outcome Measures

- Define the **medical condition**

- Establish an **outcome measures team** including physicians, nurses and skilled staff involved in the care cycle

- Create a **care delivery value chain** (CDVC) for the condition

- Use the **outcome hierarchy** to define a comprehensive set of **outcome dimensions**, and **specific measures**

  – Engage patients to understand the outcomes **that matter to them**

- Tie the **outcome measures to the CDVC** to check for completeness and start to identify the causal connections between activities and each outcome

- Identify the **set of initial conditions** or **risk factors** necessary to control for patient differences

- Utilize ICHOM data on outcome measures and risk adjustment **to identify international best practices**

2. Collecting Outcome Data: Initial Steps

- Collect **baseline circumstances** on all outcome dimensions at the start of care

- Capture already **available** outcome metrics from clinical/administrative systems

- Identify the **best placed individual(s)** for **entering data** and making the **most informed judgment** on each measure

  - E.g. physicians, nurses, patients or dedicated measurement staff

- Exchange data with **other providers** who are part of the care cycle

- Create a processes to **enter measures efficiently**, ideally as part of standard workflow

- Survey patients to measure **patient-reported outcomes**

- Access **payor** information if available to capture care upstream, and longer term

- Create an **auditing system** to eliminate errors, as well as to test the objectivity of qualitative scoring and judgments

- **Chart review** and **paper-based forms** are starting points in initiating and expanding the measures tracked

2. Collecting Outcome Data: Moving to a Real-time System

EMR Capture

- Modify the **EMR** to allow efficient collection of clinician-reported measures
  - E.g. standardized, medical-condition specific templates

Patient-Reported Outcomes

- Create tablet and web-based tools to **gather patient-reported outcomes**
  - E.g. Dartmouth Spine Center tablets, patient portals

Long Term Tracking

- Develop practical **patient tracking** methods to follow patients over extended time periods
  - Links to registries, payor and government databases (e.g., worker's compensation, unemployment, death records)

3. Compiling and Analyzing Outcomes

- Compile outcomes data and initial conditions in a **centralized registry or database**

  – Data should be structured around patients and their **medical conditions**, not visits or episodes

- Report to **external disease registries** if available

- Create reports covering **risk-adjusted patient cohorts** over time

- Compare outcomes **across providers and locations**

- **Refine** the measures, collection methods, and risk-adjustment factors over time

4. Reporting

- Begin with **internal reporting to providers**
  - Comparing outcomes over time, then across locations
  - Move from blinded to unblinded data at the individual provider level

- **Expand reporting** over time to include referring providers, payors, and patients
  - An agreed upon **path to external transparency** of outcomes

- Work with provider peers, payors, and government to **standardize reporting measures and methods,** including
  - Standardized metrics
  - Method of stratification/risk adjustment
  - Unit of analysis (individual physician vs. group practice)
  - Process for improving metrics

- Ultimately, **universal reporting of standardized measures** will be the strongest driver in value improvement

5. Driving Improvement

- Convene **regular meetings** to analyze outcome variations and trends
  - Create an environment that allows **open discussion of results** with no repercussions for participants willing to learn and make constructive changes
- Utilize outcomes analysis to investigate **process improvement and potential care innovations**

- Collaborate with external registries and leading national and international providers to **benchmark performance and compare best practices**
- Combine outcome data with **care cycle costing** data to examine opportunities for value improvement through better efficiency, reducing redundancy, and eliminating activities that do not contribute to outcome improvement

Enabling Universal Outcomes Measurement:
Leverage Points for Government

- **Incentivize** outcomes measurement and reporting

  – Payment incentives for **reporting**

  – **Required** reporting for participation in **new reimbursement models**

  – **Required** reporting for **all** reimbursement

- Incorporate requirements for outcome measurement (and reporting) into **certification** of programs and physicians

- Remove **policy hurdles** that impede outcome measurement and registry development and implementation (e.g., complex privacy rules, lack of definitive patient identifiers)

Enabling Universal Outcomes Measurement:
Leverage Points for Government, Cont

- Provide **seed funding and guidelines** for registry development

- Promulgate a **medical condition taxonomy** to facilitate standardization

- Strengthen **IT standards** to allow easier exchange of consistent information across data sources

  – Rules to require/encourage **payor information sharing with providers** on individual patients to enable longer-term tracking

- **Stimulate or mandate EMR improvements** that enable efficient data-entry workflow and easy extraction of outcome measures

- Recognize **ICHOM standards** for **minimum sets of measures** and **metric definitions** to accelerate outcome measurement adoption and encourage standardization

Enabling Universal Outcomes Measurement:
Leverage Points for Patients, Payors, and Employers

Payors

- Become active **consumers** of outcome data to inform contracting and guide subscriber choices

- Introduce **incentives** for outcome reporting and registry participation

  - Tie pay-for-performance programs initially to **reporting of outcomes**, but eventually to outcomes themselves

Employers

- Use purchasing power to require outcomes reporting by medical condition **as a condition for contracting**

Patients

- Work with providers to define the outcomes that **matter to patients** by medical condition

- Expect **outcomes data** as part of provider selection