

Value-Based Health Care Delivery: Integrated Practice Units, and Outcome and Cost Measurement

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*DHCS Health Care Seminar
June 4, 2010*


This presentation draws on Michael E. Porter and Elizabeth Olmsted Teisberg: Redefining Health Care: Creating Value-Based Competition on Results, Harvard Business School Press, May 2006, and “How Physicians Can Change the Future of Health Care,” *Journal of the American Medical Association*, 2007; 297:1103:1111. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means — electronic, mechanical, photocopying, recording, or otherwise — without the permission of Michael E. Porter and Elizabeth Olmsted Teisberg. Further information about these ideas, as well as case studies, can be found on the website of the Institute for Strategy & Competitiveness at <http://www.isc.hbs.edu>.

What is Integrated Care?

Attributes of an Integrated Practice Unit (IPU):

1. Organized around the **patient**
2. Provides the full cycle of care for a **medical condition**, including **patient education, engagement** , and **follow-up**
 - Encompasses **inpatient, outpatient**, and **rehabilitative** care as well as **supporting services** (e.g. nutrition, social work)

What is a Medical Condition

- A medical condition is **an interrelated set of patient medical circumstances best addressed in an integrated way**
 - Defined from the **patient's** perspective
 - **Including** the most common co-occurring conditions and complications
 - Involving **multiple** specialties and services
 - IPU's can address a single medical condition or **groups of closely related medical conditions** involving similar specialties, services, and expertise
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- The patient's medical condition is the **unit of value creation** in health care delivery

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3. Involves a **dedicated team** who devote a significant portion of their time to the medical condition
4. Providers are part of a **common organizational unit**
5. **Co-located** in **dedicated facilities**
6. Utilizing a **single administrative** and **scheduling structure**
7. A **physician team captain** and a **care manager** oversee each patient's care process
8. The team **meets formally and informally as a group** and in subgroups on a regular basis
9. Measures **processes** and **outcomes** as a **team**, not individually
10. Accepts **joint accountability** for outcomes and costs

Integrated Cancer Care

MD Anderson Head and Neck Center

Dedicated	Shared								
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Dedicated MDs</div> <ul style="list-style-type: none"> - 8 Medical Oncologists - 12 Surgical Oncologists - 8 Radiation Oncologists - 5 Dentists - 1 Diagnostic Radiologist - 1 Pathologist - 4 Ophthalmologists <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Skilled Staff</div> <ul style="list-style-type: none"> - 22 Nurses - 3 Social Workers - 4 Speech Pathologists - 1 Nutritionist - 1 Patient Advocate <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Patient Access Center</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Facilities</div> <ul style="list-style-type: none"> -Dedicated Outpatient Unit 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Shared</div> <ul style="list-style-type: none"> -Endocrinologists -Other specialists as needed (cardiologists, plastic surgeons, etc.) <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Skilled Staff</div> <ul style="list-style-type: none"> -Dietician -Inpatient Nutritionists -Radiation Nutritionists -Smoking Cessation Counselors <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Shared Facilities (located nearby)</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">-Radiation Therapy</td> <td style="width: 50%;">-Inpatient Wards</td> </tr> <tr> <td>-Pathology Lab</td> <td>→Medical Wards</td> </tr> <tr> <td>-Ambulatory Chemo Unit</td> <td>→Surgical Wards</td> </tr> <tr> <td colspan="2">-ORs (grouped by needs)</td> </tr> </table>	-Radiation Therapy	-Inpatient Wards	-Pathology Lab	→Medical Wards	-Ambulatory Chemo Unit	→Surgical Wards	-ORs (grouped by needs)	
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-ORs (grouped by needs)									

Source: Jain, Sachin H. and Michael E. Porter, *The University of Texas MD Anderson Cancer Center: Interdisciplinary Cancer Care*, Harvard Business School Case 9-708-487, May 1, 2008

What is Not Integrated Care?

Integrated care is **not** the same as:

- Co-location per se
- Care delivered by the same organization
- A multispecialty group practice
- Freestanding focused factories
- A Clinical Pathway
- An Institute or Center
- A Center of Excellence
- A health plan/provider system (e.g. Kaiser Permanente)
- Medical Homes
- Accountable Care Organizations

Integrated Care Involves the Patient

Breast Cancer

INFORMING AND ENGAGING	Advice on self screening Consultations on risk factors	Counseling patient and family on the diagnostic process and the diagnosis	Explaining patient treatment options/shared decision making Patient and family psychological counseling	Counseling on the treatment process Education on managing side effects and avoiding complications of treatment Achieving compliance	Counseling on rehabilitation options, process Achieving compliance Psychological counseling	Counseling on long term risk management Achieving Compliance
MEASURING	Self exams Mammograms	<ul style="list-style-type: none"> Mammograms Ultrasound MRI Labs (CBC, Blood chems, etc.) 	Labs	Procedure-specific measurements	Range of movement Side effects measurement	MRI, CT Recurring mammograms (every six months for the first 3 years)
ACCESSING	Office visits Mammography lab visits	Office visits	Office visits	Hospital stays	Office visits	Office visits
		Lab visits	Hospital visits Lab visits	Visits to outpatient radiation or chemotherapy units Pharmacy	Rehabilitation facility visits Pharmacy	Lab visits Mammographic labs and imaging center visits
		High risk clinic visits				
MONITORING/PREVENTING	DIAGNOSING	PREPARING	INTERVENING	RECOVERING/REHABING	MONITORING/MANAGING	
Medical history Control of risk factors (obesity, high fat diet) Genetic screening Clinical exams Monitoring for lumps	Medical history Determining the specific nature of the disease (mammograms, pathology, biopsy results) Genetic evaluation Labs	Choosing a treatment plan Surgery prep (anesthetic risk assessment, EKG)	Surgery (breast preservation or mastectomy, oncoplastic alternative)	In-hospital and outpatient wound healing Treatment of side effects (e.g. skin damage, cardiac complications, nausea, lymphedema and chronic fatigue)	Periodic mammography Other imaging	
		Plastic or onco-plastic surgery evaluation Neo-adjuvant chemotherapy	Adjuvant therapies (hormonal medication, radiation, and/or chemotherapy)	Physical therapy	Follow-up clinical exams Treatment for any continued or later onset side effects or complications	

Breast Cancer Specialist
 Other Provider Entities

Integrated Models of Primary Care

- Today's primary care is **fragmented** and attempts to address **overly broad** needs with limited resources



Value-Based Primary Care

- Prevention, screening, diagnosis, wellness and health maintenance **service bundles**
- Designed around **specific patient populations** (e.g. healthy adults, frail elderly, type II diabetics) rather than attempting to be all things to all patients
- Services are provided by **multidisciplinary teams, ancillary health professionals, and support staff** in **dedicated facilities**
- Delivered not only in traditional facilities but at the **workplace, community organizations**, and in **other settings** that offer regular patient contact and the ability to develop a group culture of wellness
- With **formal alliances** with specialty IPUs representing prevalent medical conditions among the patient base

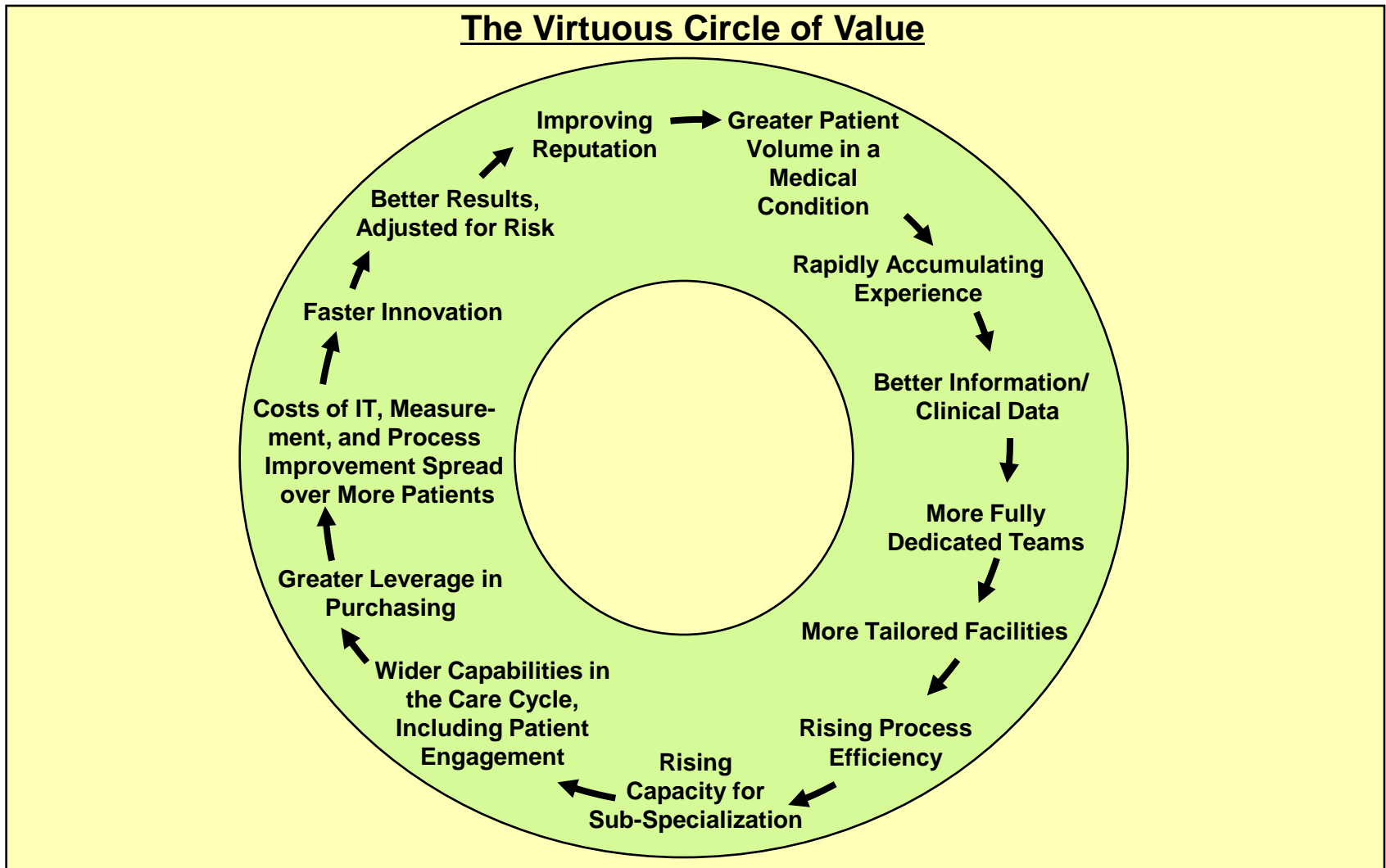
IPUs and Value

Outcomes

Cost

-
- The diagram consists of two overlapping circles. The left circle is light blue and labeled 'Outcomes'. The right circle is light yellow and labeled 'Cost'. The intersection of the two circles is shaded light green and contains a list of benefits. The text in the intersection is as follows:
- **Better decisions in terms of diagnosis and treatment**
 - Specialized experience and expertise
 - Better coordination/peer review
 - Better integration of co-occurrences
 - **Better execution of treatment**
 - Specialized experience and expertise
 - Tailored facilities
 - Seamless management of common co- occurrences
 - **Faster cycle time**
 - **Improved patient compliance and engagement with care**
 - **Full range of support services needed to achieve success for the patient (e.g. nutrition, rehabilitation, counseling, psychological support)**
 - **Vastly greater patient convenience**
- Text in the yellow circle (Cost):
- **Greater provider and team efficiency**
 - **Better utilization of facilities**
 - **Streamlined administrative costs**

Volume and Experience in a Medical Condition Drive Patient Value



- Volume and experience have an **even greater** impact on value in an IPU structure than in the current system

Fragmentation of Hospital Services

Sweden

DRG	Number of admitting providers	Average percent of total national admissions	Average admissions/ provider/ year	Average admissions/ provider/ week
Knee Procedure	68	1.5%	55	1
Diabetes age > 35	80	1.3%	96	2
Kidney failure	80	1.3%	97	2
Multiple sclerosis and cerebellar ataxia	78	1.3%	28	1
Inflammatory bowel disease	73	1.4%	66	1
Implantation of cardiac pacemaker	51	2.0%	124	2
Splenectomy age > 17	37	2.6%	3	<1
Cleft lip & palate repair	7	14.2%	83	2
Heart transplant	6	16.6%	12	<1

Source: Compiled from The National Board of Health and Welfare Statistical Databases – DRG Statistics, Accessed April 2, 2009.

Fragmentation of Hospital Services

Japan

Procedure	Number of hospitals performing the procedure	Average number of procedures per provider per year	Average number of procedures per provider per week
Craniotomy	1,098	71	1.4
Operation for gastric cancer	2,336	72	1.4
Operation for lung cancer	710	46	0.9
Joint replacement	1,680	50	1.0
Pacemaker implantation	1,248	40	0.8
Laparoscopic procedure	2,004	72	1.4
Endoscopic procedure	2,482	202	3.9
Percutaneous transluminal coronary angioplasty	1,013	133	2.6

Source: Porter, Michael E. and Yuji Yamamoto, *The Japanese Health Care System: A Value-Based Competition Perspective*, Unpublished White Paper, September 1, 2007

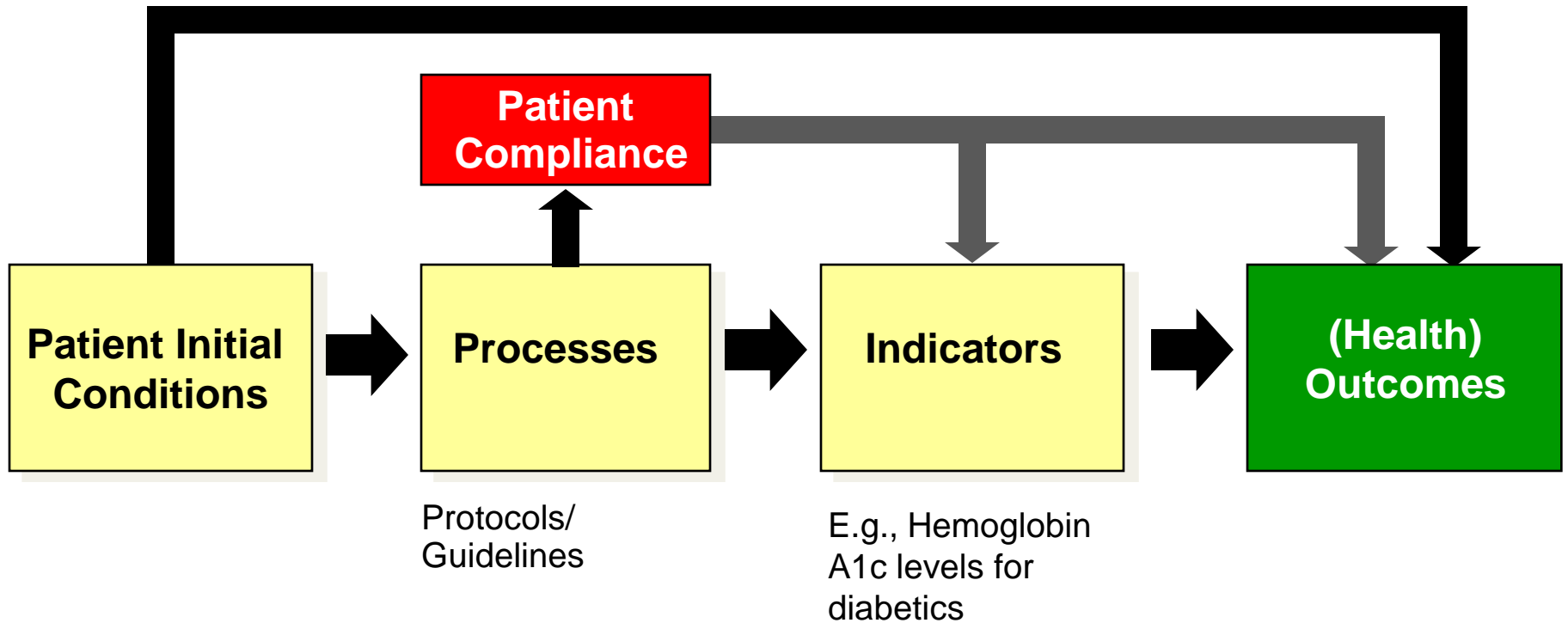
2. Measure Outcomes and Cost for Every Patient

- **For** medical conditions
- **Real time** and “**on-line**” in care delivery, not just retrospective
- **Not** for interventions or short episodes
- **Not** separately for types of service (e.g. inpatient, outpatient, tests, rehabilitation)
- **Not** for practices, departments, clinics, or entire hospitals

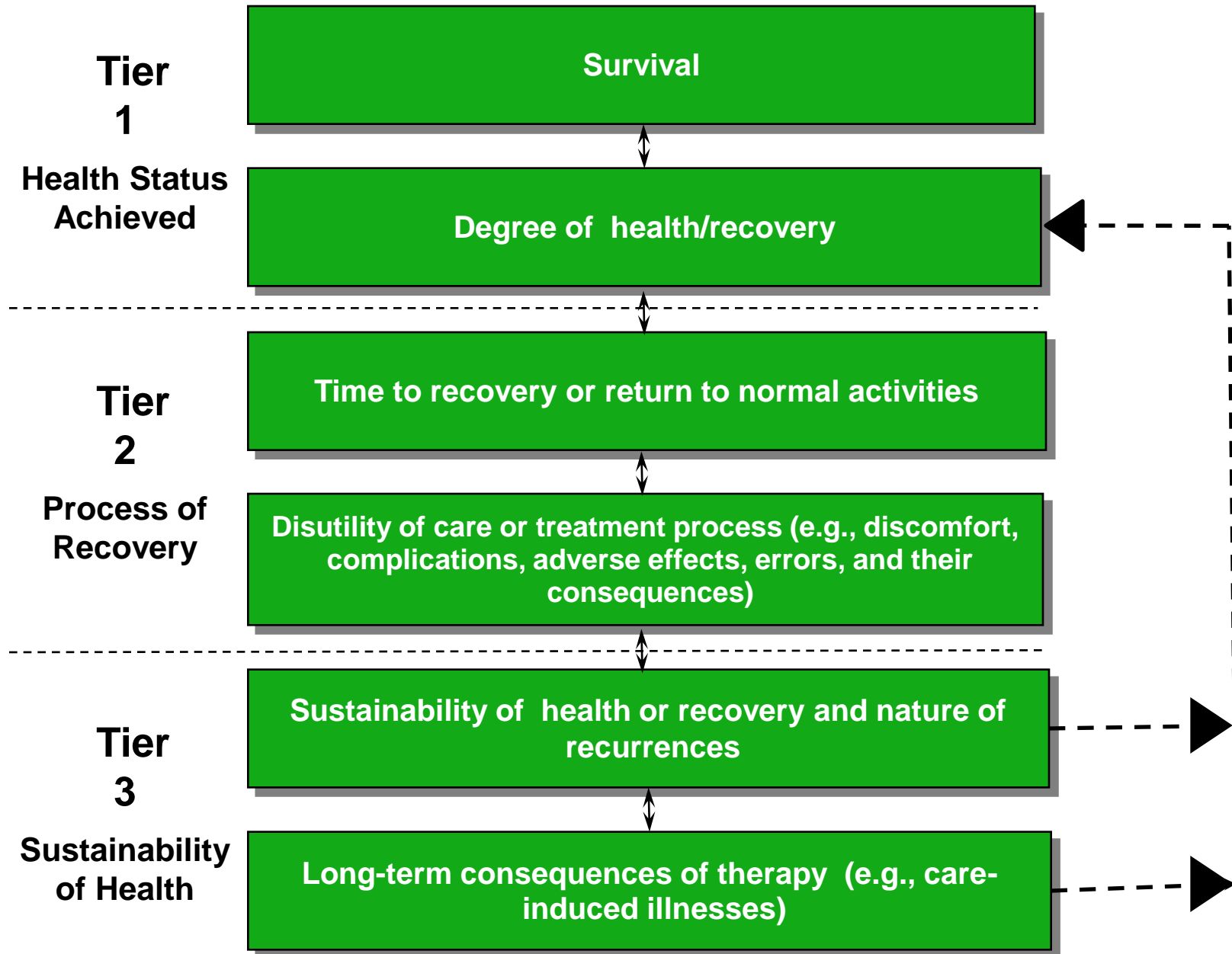


Volume measurement and reporting by medical condition is an interim first step

Dimensions of Measurement



The Outcome Measures Hierarchy



The Outcomes Measures Hierarchy

Head and Neck Cancer

Survival

- Survival
- Cancer free survival

Degree of recovery / health

- Achieved remission
- Ability to speak
- Ability to eat normally
- Maintenance of facial appearance
- Pain status
- Mental health status

Time to recovery or return to normal activities

- Time to remission
- Time to completion of treatment plan
- Time to normal speech
- Time to feeding tube removal
- Time to best pain status
- Days of work missed

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

- Nosocomial infection
- Nausea
- Vomiting
- Fatigue
- Febrile neutropenia
- Thrombocytopenia
- Radiation dermatitis
- Depression
- Pain
- Loss of speech
- Need for feeding tube
- Unnecessary facial disfigurement

Sustainability of recovery or health over time

- Cancer recurrence
- Sustainability of functional status

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

- Secondary cancer related to radiation exposure
- Premature osteoporosis
- Permanent facial disfigurement
- Dysphasia
- Lymphoma
- Long-term depression due to treatment
- Hormone imbalance/replacement dependence

Head and Neck Outcome Measures: MD Anderson

	<u>Dimension</u>	<u>Measure</u>
Survival	<ul style="list-style-type: none"> Survival rate 	<ul style="list-style-type: none"> Two-year, five-year
Degree of recovery / health	<ul style="list-style-type: none"> Degree of remission Functional status 	<ul style="list-style-type: none"> Disease free survival Can the patient swallow normally Can the patient talk normally
Time to recovery or return to normal activities	<ul style="list-style-type: none"> Time of care process 	<ul style="list-style-type: none"> Percent of all treatments completed within 100 days
Disutility of care or treatment process (e.g., treatment-related discomfort, complications, adverse effects, diagnostic errors, treatment errors)	<ul style="list-style-type: none"> Inconvenience of care process Complications of care process 	<ul style="list-style-type: none"> “Time-tos” (referral, appt., treatment, etc) Count of postoperative complications Count of readmissions
Sustainability of recovery or health over time	<ul style="list-style-type: none"> Cancer recurrence 	<ul style="list-style-type: none"> Disease-free survival
Long-term consequences of therapy (e.g., care-induced illnesses)	<ul style="list-style-type: none"> Incidence of secondary cancers 	

The Outcome Measures Hierarchy

Breast Cancer

Survival

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

Degree of recovery / health

- Degree of remission
- Functional status
- 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)

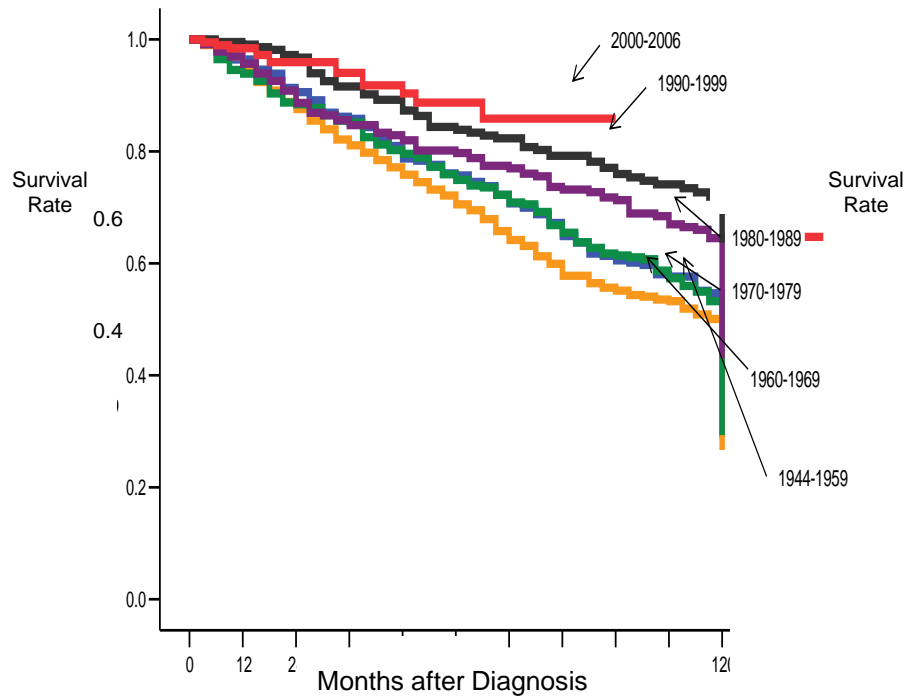
- Incidence of secondary cancers
- Brachial plexopathy
- Fertility/pregnancy complications
- Premature osteoporosis

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

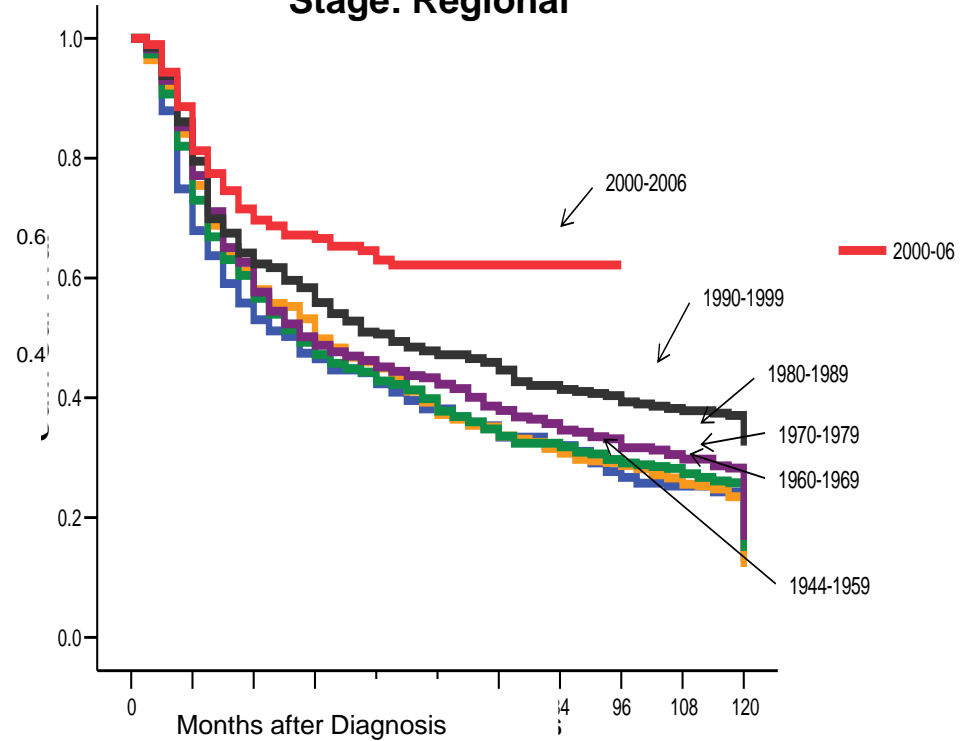
MD Anderson Oral Cavity Cancer Survival by Registration Year

Stage: Local



staer = REGIONAL

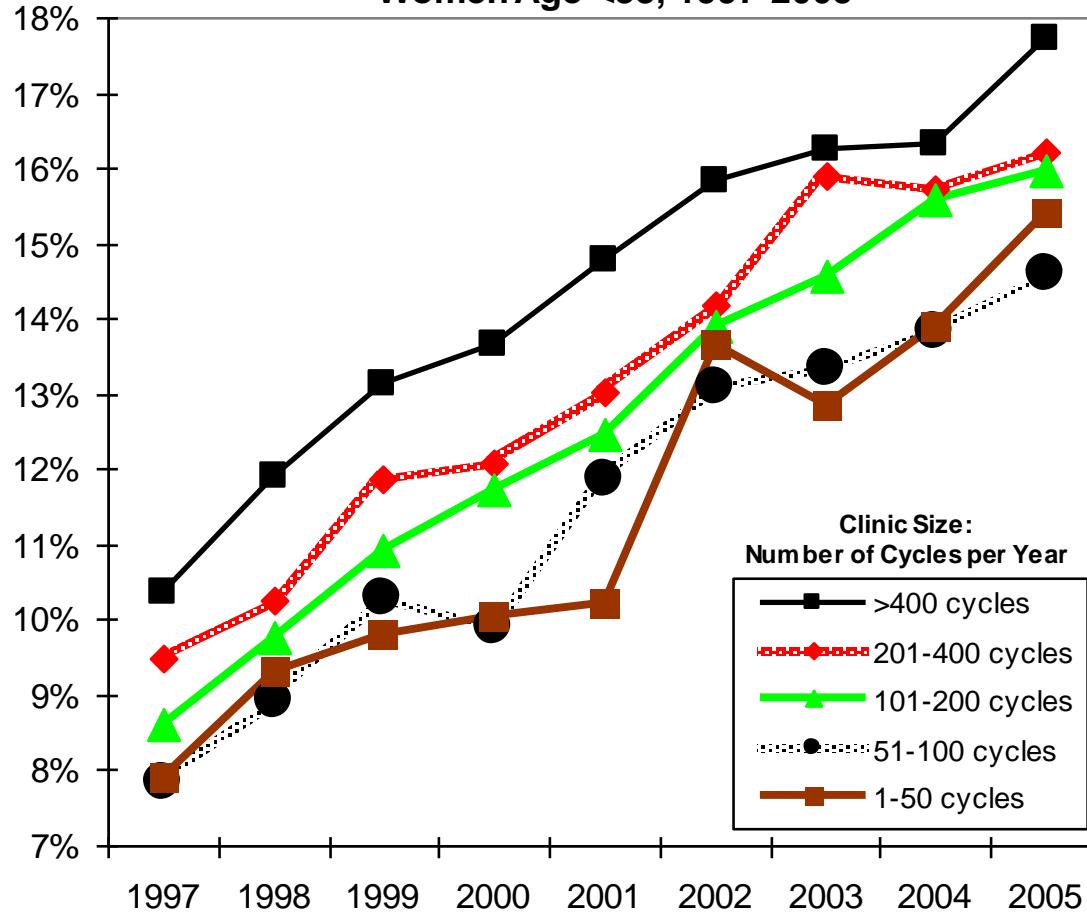
Stage: Regional



Source: MD Anderson Cancer Center

In-vitro Fertilization Success Rates Over Time

**Percent Live Births per Fresh, Non-Donor Embryo Transferred by Clinic Size
Women Age <38, 1997-2005**



Source: Michael Porter, Saquib Rahim, Benjamin Tsai, *In-vitro Fertilization: Outcomes Measurement*. Harvard Business School Press, 2008

Swedish National Quality Registers, 2007*

Respiratory Diseases

- Respiratory Failure Register (Swedevox)
- Swedish Quality Register of Otorhinolaryngology

Childhood and Adolescence

- The Swedish Childhood Diabetes Registry (SWEDIABKIDS)
- Childhood Obesity Registry in Sweden (BORIS)
- Perinatal Quality Registry/Neonatology (PNQn)
- National Registry of Suspected/Confirmed Sexual Abuse in Children and Adolescents (SÖK)

Circulatory Diseases

- Swedish Coronary Angiography and Angioplasty Registry (SCAAR)
- Registry on Cardiac Intensive Care (RIKS-HIA)
- Registry on Secondary Prevention in Cardiac Intensive Care (SEPHIA)
- Swedish Heart Surgery Registry
- Grown-Up Congenital Heart Disease Registry (GUCH)
- National Registry on Out-of-Hospital Cardiac Arrest
- Heart Failure Registry (RiksSvikt)
- National Catheter Ablation Registry
- Vascular Registry in Sweden (Swedvasc)

- National Quality Registry for Stroke (Riks-Stroke)
- National Registry of Atrial Fibrillation and Anticoagulation (Auricula)

Endocrine Diseases

- National Diabetes Registry (NDR)
- Swedish Obesity Surgery Registry (SOReg)
- Scandinavian Quality Register for Thyroid and Parathyroid Surgery

Gastrointestinal Disorders

- Swedish Hernia Registry
- Swedish Quality Registry on Gallstone Surgery (GallRiks)
- Swedish Quality Registry for Vertical Hernia

Musculoskeletal Diseases

- Swedish Shoulder Arthroplasty Registry
- National Hip Fracture Registry (RIKSHÖFT)
- Swedish National Hip Arthroplasty Register
- Swedish Knee Arthroplasty Register
- Swedish Rheumatoid Arthritis Registry
- National Pain Rehabilitation Registry
- Follow-Up in Back Surgery
- Swedish Cruciate Ligament Registry – X-Base
- Swedish National Elbow Arthroplasty Register (SAAR)

* Registers Receiving Funding from the Executive Committee for National Quality Registries in 2007

Swedish National Quality Registers*, continued

Diseases of the Nervous System

- Swedish Multiple Sclerosis Registry (SMS)
- Quality Registry for Children with Cerebral Palsy (CPUP)
- Quality Registry in Rehabilitation Medicine (WebRehab Sweden)
- Swedish Dementia Registry (SveDem)

Genitourinary Disorders

- National Quality Registry for Gynecological Surgery (GYNOP)
- Swedish Renal Registry (SRR)

Cancer

- National Breast Cancer Registry
- National Quality Registry for Esophageal and Stomach Cancer (NREV)
- National Prostate Cancer Registry
- Swedish Rectal Cancer Registry
- Swedish Gyn-Oncology Registry
- Swedish Colon Cancer Registry

Eye Diseases

- Swedish Corneal Transplant Register
- Swedish National Cataract Register
- Macula Register

Other Areas

- National Quality Registry for Specialized Treatment for Eating Disorders (RIKSÄT)
- Swedish Intensive Care Registry (SIR)
- Swedish Psoriasis Registry (PsoReg)
- InfCare HIV
- Swedish Therapeutic Apheresis Registry
- Swedish Quality Register in Caries and Periodontitis
- Swedish National Registry of Palliative Care
- National Registry on Nutrition, Fall Prevention, and Pressure Sores (Senior Alert)
- Quality Registry for Emergent Care

* Registers Receiving Funding from the Executive Committee for National Quality Registries in 2007

Swedish National Quality Registers, continued

Other Registries**

- National Quality Registry for Bladder Cancer
- National Gynecological Cell Testing Register (preventive examinations for uterine cancer)
- National Register of Treatment Follow-up for Severe ADHD (BUSA)
- National Quality Register for Bipolar Affective Disorder (Bipolär)
- Schizophrenia
- Swedish Anesthesiology Registry
- Swedish Dental Implant Register
- Swedish Quality Register for General Thoracic Surgery
- National Register for In-Hospital Cardiac Arrest
- National Quality Register for IVF
- Enhanced Recovery After Surgery (ERAS)
- Drug-Assisted Rehabilitation of Opiate Dependence (LAROS)
- Metabolic Effects of Antipsychotic Drug Treatment
- National Primary Care Database
- National Quality Registry for Primary Care

** Register applicants that did not receive funding from the Executive Committee for National Quality Registries in 2007

Creating an Outcome Measurement System

1. Designing Outcome Measures: Part I

- Establish an **outcome measures team** including all physicians, nurses and skilled staff involved in the care cycle
 - Ensure that some **research oriented** clinicians are active participants
- Define the **medical condition**
 - Set of interrelated medical problems
 - Co-occurring conditions included
- Create a **Care Delivery Value Chain** for the condition
 - Also essential for activity-based cost analysis

The Care Delivery Value Chain

Acute Knee-Osteoarthritis Requiring Replacement

INFORMING AND ENGAGING

<ul style="list-style-type: none"> Education and promotion of exercise, weight reduction, proper nutrition 	<ul style="list-style-type: none"> Education on meaning of diagnosis and prognosis of disease – short and long term outcomes Expectation setting 	<ul style="list-style-type: none"> Counseling on benefits/drawbacks of surgery Shared Decision Making Educating and calibrating expectations timeline/location for recovery Weight loss, nutrition, vaccination counsel Home preparation Rehab considerations 	<ul style="list-style-type: none"> Maintenance and reassurance of expectations and the importance of rehab Set expectations for surgery recovery and immediate steps Team consistency 	<ul style="list-style-type: none"> Counseling on necessity of rehab, rehab exercises, and compliance Monitoring compliance 	<ul style="list-style-type: none"> Counsel to maintain exercise and healthy weight
<ul style="list-style-type: none"> Self reported loss of function Pain level WOMAC, SF-36 	<ul style="list-style-type: none"> MRI, X-Ray results <ul style="list-style-type: none"> Kellgran Lawrence scale- level of osteoarthritis Assess loss of cartilage/ alterations in subchondral bone Mental state(Gestalt) Pain level WOMAC, SF-36 	<ul style="list-style-type: none"> WOMAC, SF 36 Range of motion Pain level Blood pressure Blood labs 	<ul style="list-style-type: none"> Heart rate Temperature Blood pressure Blood loss Complications 	<ul style="list-style-type: none"> Range of motion Ability to walk, live independently, work: WOMAC, SF-36 Pain level Infections (i.e. UTI) Post-op X-ray Weight gain/loss Mental state (gestalt) 	<ul style="list-style-type: none"> Range of motion Activities Pain level Missed work WOMAC, SF-36 Mental state
<ul style="list-style-type: none"> PCP office visits Health club Physical therapy office 	<ul style="list-style-type: none"> Specialty office Imaging facility 	<ul style="list-style-type: none"> Specialty office Surgical prep room (hospital of surgical center) 	<ul style="list-style-type: none"> Operating room, recovery, orthopedic floor (arthroplasty specific ward) at hospital or specialty surgery center 	<ul style="list-style-type: none"> Home, Skilled Nursing Facility, or Rehab Facility PT at home or at PT office <i>Operating Room</i> 	<ul style="list-style-type: none"> Specialty office Primary care office Health club

MEASURING

ACCESSING

MONITORING/ PREVENTING	DIAGNOSING	PREPARING	INTERVENING	RECOVERING/ REHABING	MONITORING/ MANAGING
<p>Monitor</p> <ul style="list-style-type: none"> PCP medical exam Referral to specialist if problem persists <p>Prevent</p> <ul style="list-style-type: none"> Prescription of anti-inflammatory medicines* Exercise Weight loss 	<ul style="list-style-type: none"> Review MRI, X-Ray results <ul style="list-style-type: none"> Assess loss of cartilage Assess alterations in subchondral bone Orthopedic/Rheumatologic Evaluation 	<p>Overall Prep</p> <ul style="list-style-type: none"> Home assessment Weight-loss Exercise/Strength building <p>Surgical Prep</p> <ul style="list-style-type: none"> Cardiology, pulmonary consults Blood labs Preoperative physical examination 	<p>Anesthesia Options</p> <ul style="list-style-type: none"> General Epidural Regional blocks -1 or 2 day <p>Surgical Procedure Options</p> <ul style="list-style-type: none"> Device Cement Minimally Invasive Computer assisted <p>Pain Management</p> <ul style="list-style-type: none"> Multimodal Preemptive 	<p>Living</p> <ul style="list-style-type: none"> Daily living support (e.g. showering, dressing) Contact provider for specific set of risk indicators (e.g. fever, increased swelling, increased pain, breathing difficulties, other) <p>Physical Therapy</p> <ul style="list-style-type: none"> Extensive daily or twice daily PT sessions to build up lost muscle and assure range of motion Education on exercises to perform between PT sessions Continuous motion machine Possible return to OR for manipulation (1% of cases) 	<ul style="list-style-type: none"> Regular consultations with orthopedic specialist (6 weeks, 6 months, 1 year, 3-4 years as needed (MORE?)) Long term exercise Revision if necessary Prophylactic antibiotics

Orthopedic Specialist
 Other Provider Entities

1. Designing Outcome Measures: Part II

- Use the **outcome hierarchy** to define a comprehensive set of **outcome dimensions**, and **specific measures**
 - There will inevitably be a mix of objective, quantitative values and surveys/scoring
 - Seek the specific measures/metrics which are **validated** or have a **strong suspicion of causality**, and ideally have been internationally tested
 - Seek the most **objective** measures of each outcome possible, but do not fail to measure outcomes whose measures involve surveys or scoring
 - Short term practicality is a concern but should **not be a constraint**
 - The range of outcomes measured can start small but then **expand over time**

The Outcomes Measures Hierarchy

Acute Knee-Osteoarthritis Requiring Replacement

Survival

Degree of recovery / health

- Range of motion achieved
- Pain level achieved
- Functional level achieved
- Degree of independence
- Ability to return to work
- Extent of return to physical activities
- Level of satisfaction with outcome

Time to recovery or return to normal activities

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

- Surgical pain
- Length of hospital stay independent of complications
- Deep vein thrombosis
- Delirium
- Infection rate (Urinary Tract)
- Pneumonia
- Pulmonary embolism
- Myocardial infarction

Sustainability of recovery or health over time

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

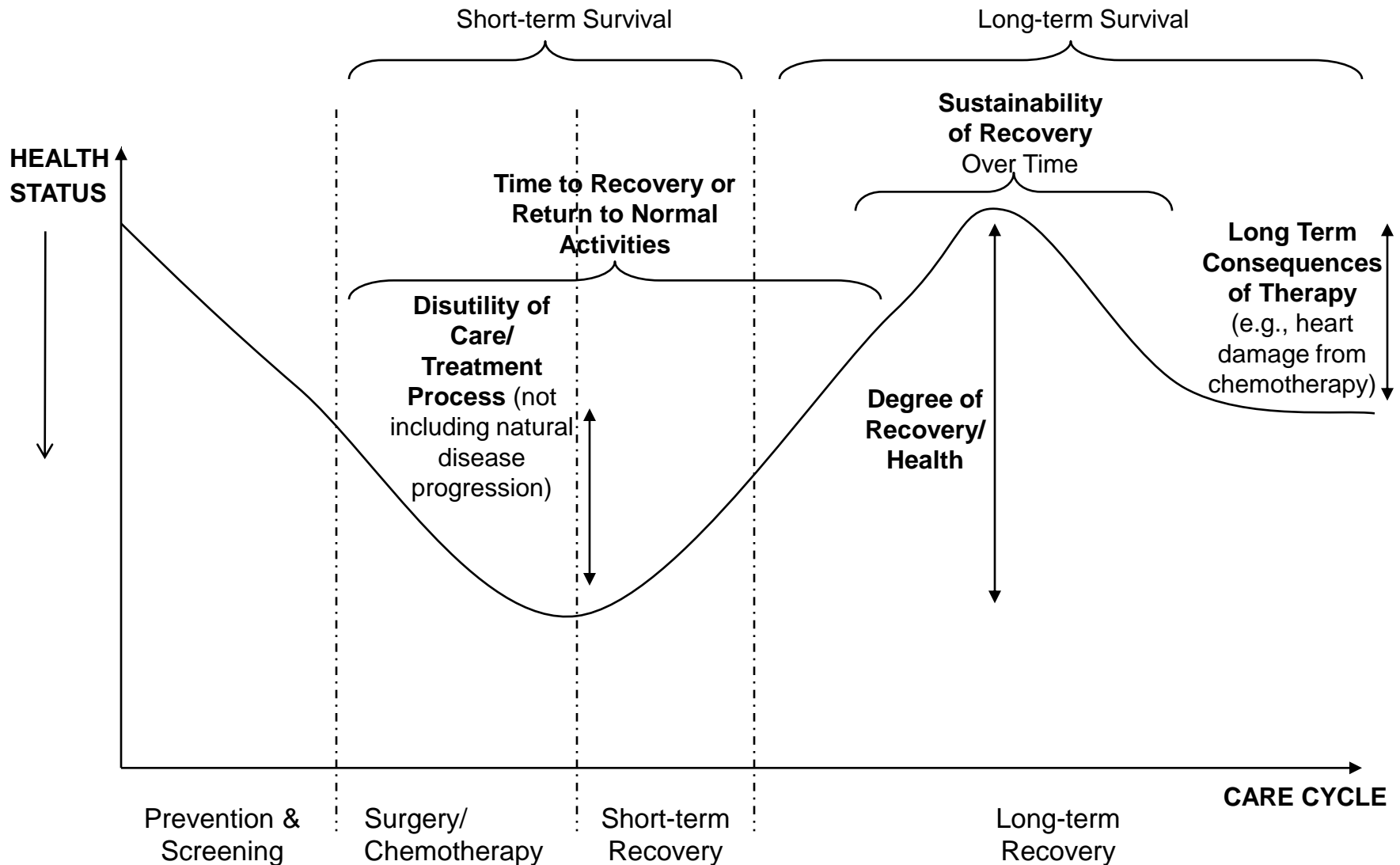
- Loss of mobility due to inadequate rehab
- Complications of cardiac conditions
- Risk of complex fracture
- Susceptibility to infection
- Stiff knee due to unrecognized complication
- Regional pain syndrome

1. Designing Outcome Measures: Part III

- Tie the set of **outcome measures to the CDVC** to check for completeness and start to identify the causal connection between activities and each outcome
 - Outcomes can often be linked to multiple parts of the care cycle (e.g. cycle time, survival risks)

Outcomes Along the Care Cycle

Cancer Care



Diagnosis

1. Designing Outcome Measures: Part IV

- Identify the **set of initial conditions** or **risk factors** necessary to control for patient differences
 - Start with a **broad set** of initial conditions to be explored
 - The list will evolve over time
 - It will **narrow** as some risk factors prove to be controllable, not actually causal, or not important
 - It will **expand** as new insights are gained

Initial Conditions/Risk Factors

Total Knee Replacement

Demographic Status

- Age
- Gender
- Weight (Obese?)
- Ethnicity

Primary disease

- WOMAC, SF-36
- Rheumatoid Arthritis vs. Osteoarthritis
- Double/single
- Revision

Rehab related

- Fitness Level
- Ability to live independently

Co-morbidity

- Mental Status (e.g. MM)
- Diabetes
- Stroke
- Cardiac disease
- Other chronic conditions

Exogenous Factors

Patient Circumstances

- Family involvement
- Caregiver presence

Economic

- Insurance Coverage

Creating an Outcome Measurement System

2. Collecting Outcome Data

- Extract **available** information from administrative/billing systems
- Identify the **best placed individual(s)** for **entering new data** and making the **most informed judgment** on each measure
 - E.g. which physicians, nurses, possible dedicated measurement staff
- **Chart review, manual entry, and customized web templates** are starting points to expand the measures tracked



- A **single patient identifier**, designed to protect privacy, will dramatically improve the ability to improve the **efficiency** and **sophistication** of outcome measurement
 - E.g. Ability to utilize existing data from multiple sources versus have to create codes for each provider and medical condition

2. Collecting Outcome Data: Part II

EMR Capture

- Identify modifications to **EMR design** to allow efficient collection/recording of measures for each patient, including **patient input** and **survey**, and avoid duplication of work
 - E.g. Dartmouth Spine Center tablets, web templates
 - Careful privacy controls

Long Term Tracking

- Develop a practical **patient tracking system** to follow patients over extended time periods
 - Web based surveys, follow-up visit information, ties to other data sets (e.g. sick days, social security (deaths)), phone and email contact with patient and/or referring physician
 - An EMR with **secure** patient communication will significantly reduce cost/boost coverage

Auditing

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

Creating an Outcome Measurement System

3. Compiling and Analyzing Outcomes

- Track all outcomes for **every patient**
- Ideally outcome measurement is used **on line** in the care process
- Create reports which **compile** measures for patient cohorts over time

Utilizing Outcome Information Internally

- Convene regular meetings to **analyze variations** and **trends**
 - Over time
 - Stratified by patient types
 - Across providers or locations
 - Etc.
- Create a **blame free** environment to allow open discussion of results with no repercussions for participants willing to make constructive changes and improve
- Utilize outcome learning to investigate **processes, potential care innovations,** and **other improvement approaches**
- Utilize the outcomes hierarchy data to extend and deepen **clinical research**

Measurement Improvement

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


Creating an Outcome Measurement System

4. Reporting

Reporting Choices

- Mean/median only, or full variation
- Overall mean/median versus individual providers
- Degree of stratification/risk adjustment

Reporting Levels


- **Internal** Outcome Reporting
 - Comparison to history, trends over time
 - Variations across patients, teams, sites, and individual providers
 - Providers identified or blinded
 - Outcome reporting to **Referring Providers**
 - Outcome reporting to **Health Plans**
 - Outcome reporting to **Patients**
- 
- **Phasing in** outcome reporting builds confidence and credibility
 - Add a **time delay** to allow correction of errors
 - Ultimately, **wide reporting** will maximize value improvement

Outcome Measurement System

Schön Kliniken

- Schön Kliniken is the seventh largest hospital system in Germany with 15 hospitals focusing on orthopedics, neurology and psychosomatic conditions
- Began tracking health outcomes in 1996
 - Captures health status achieved and process of recovery
 - Few, if any, long-term health outcomes
 - Focused on acute care
- Developed measures by convening groups of relevant physicians and members of Schön's quality improvement team
 - Currently tracks five metrics per medical condition
- Mandates reporting of all metrics for all physician groups
- Physicians and nurses enter data during each patient's stay, and data can be extracted from the EMR
- Captures outcome data for 70% of patients
- Reports results internally at the individual physician level
- Validates accuracy through trend analysis
 - Links physician pay to quality of care delivered
- Annual publically available quality report includes 27 process and outcome measures

Cost Measurement Realities

- Most providers track **charges** not costs
 - High revenue services can be over allocated cost further accentuating the internal cross subsidy
 - Most providers track cost by **billing category**, not for medical conditions
 - Most providers cannot **accumulate total costs** over the care cycle for particular patients
 - Hospital costs and physician costs are separated
 - Systems do not facilitate simple aggregation for one patient across settings
 - Most providers use **arbitrary or average allocations of costs categories**, not patient specific allocations
 - Often based on Medicare RVU reimbursement system
 - Outdated/ not easily updated
 - Not specific to any one provider
 - Flawed rationale misattributes cost (i.e. Physician's time costs more in the office or doing paperwork)
- 
- **Payers** are not confident in the providers ability to understand cost

Cost Measurement Principles

- Cost should be aggregated at the **medical condition level** (which includes common co-occurring conditions), not for services or entire facilities
- Cost should be aggregated **for each patient** across the **full cycle of care**
- The cost of each activity or input attributed to a patient should reflect **that patient's use of resources** (e.g. time, staff, facilities, service), not average allocations or allocations based on charges
- The only way to properly measure cost per patient is to track the **time** or shared resource capacity **devoted to each patient** by providers, facilities, support services, and other shared costs



- **Time-Driven Activity Based Costing**
 - Chart the CDVC
 - Assess capacity cost of each shared resource involved in the care process
 - Assess actual capacity use in transactions with each patient
 - Enable aggregation by patient, by medical condition, etc.

Creating a Cost Measurement System

- Begin around one or a small number of **medical conditions** with a plan to ultimately scale the methodology across the organization
- Establish a **cost measurement team** including representatives from the relevant medical condition care team and staff from accounting/finance and IT
 - A project leader/champion should be designated to bring the costing system to other areas of the organization
- Create a **separate cost analysis system** drawing data from the existing financial system, but keep the financial system intact
- Use an **iterative process** to refine the analysis
 - No need to encompass full complexity on the first try
 - Costing is refined with use and testing
 - Actual degree of variation across patients will determine where average capacity use can be utilized versus direct tracking and observation for individual patients

Cost Measurement System

- Cost measurement should be accompanied by **outcome measurement**
- Bringing costs and outcomes together will **reveal inefficiencies** and opportunities for reallocating resource use
 - E.g. High cost activities which do not correspond to superior outcomes
 - Identify low cost activities delivering high value
- Knowledge of costs and outcomes together creates a different dynamic in **reimbursement discussions**
 - Understanding true costs for a medical condition is essential to constructing bundled payments
 - Better align objective charges and actual cost
 - Objective cost has been a missing link in debates about appropriate charges
 - Cost data is essential to justify the value of services being provided