Lessons from Case Studies in Value-based Healthcare
Bonaire, 26 October 2016
Agenda

• The Value of Value Based Healthcare

• Value Based Healthcare in developing health systems

• The Road towards Value Based Healthcare
What is Value Based Healthcare?

Value = \frac{Outcomes}{Costs}
Conventional cost controls have failed to rein in healthcare expenditures
Focus should be on value rather than costs alone

• **Costs keep rising** despite constant focus on costs
  – Demographic factors, lifestyle and technological developments
  – Costs are not caused by costs, but by diseases driving care demand and consumption

• **Remarkably little attention is paid to what society is getting for its investment**
  – What do we expect from our health systems?
  – What are the actual benefits delivered by our health systems?

• **Putting the improvement of health outcomes at the center of health reforms** has the benefit of **engaging HC providers in a positive approach to health care reform**

• **Making value the centerpiece of changes in the health system** has the potential to **reorient clinical practice**
  – Providers are not seen as costs, but as investments to achieve the desired outcomes
  – And they do not only strive to deliver the most procedures or to sell the most drugs but rather compete on the basis of who delivers the best value (= best health outcomes)

Source: BCG – Health reform should focus on outcomes
We have to source funds rather than cut costs on healthcare. Budget should be considered an investment rather than cost to society.

**Balance between affordability of care and funding for exploitation of care practices and institutes.**

**Balance between care needs and quantity and quality of care.**

**Balance between what care providers are paid and the care products they deliver.**

**COSTS TO SOCIETY**

**VALUE FOR SOCIETY**

**POPULATION:**
- Why do we have to pay that much?

**PROVIDERS:**
- We need more money.

**IMPROVED OUTCOMES**

**BURDEN AND COSTS OF DISEASE AVOIDED**

**ACSION**
There is little correlation between costs and outcomes for AMI in the US
We have to identify the drivers for optimal outcomes

Sources: Department of Health & Human Services, Hospital Compare Database, Centers for Medicare & Medicaid Services, BCG
There is significant variation in outcomes for many conditions

<table>
<thead>
<tr>
<th>Outcome variation rate (multiple)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>30-day mortality from heart attack (U.S.)</td>
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<tr>
<td>4</td>
<td>Bypass surgery mortality (UK)</td>
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<td>9</td>
<td>Complications after radical prostatectomies (Netherlands)</td>
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<td>18</td>
<td>Reoperations after hip surgery (Germany)</td>
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<td>20</td>
<td>Mortality after colon cancer surgery (Sweden)</td>
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<tr>
<td>36</td>
<td>Complications after cataract surgery (Sweden)</td>
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</tbody>
</table>

Sources: Medicare Hospital Compare; Myocardial Ischaemia National Audit Project; Inspectie voor de Gezondheidszorg; Gemeinsamer Bundesausschuss; Svenska Kolorektalcancerregistret; Svenska Nationella Kataraktregistret; BCG analysis.
Outcomes transparency will deliver improved health value
Disease registries are the cornerstone for Value Based Healthcare

Definition

- An organized system that uses observational study methods to collect uniform data (clinical and other) to evaluate specified outcomes for a population defined by a particular disease or condition\(^1\)
- It is not only the collection and analysis of data on health outcomes, but also the culture of improving outcomes continuously using the registries as a catalyst for this purpose

Sweden has been an international pacesetter since the 1970s

- Nowadays nearly 90 registries which cover more than 25% of total national health expenditures
- Sweden invests yearly $70 million in disease registries, data analysis resources and IT infrastructure → more than $7 billion reduction in direct healthcare costs in 10 years\(^2\)

Sources: 1. US Agency for healthcare research and Quality
2. BCG – From concept to reality: Putting Value Based Healthcare to practice in Sweden, 2010
By promoting adherence to clinical guidelines, Sweden’s Coronary-Care registry has helped improve outcomes.

Sources: R. Carlhod et al., “Improved adherence to Swedish national guidelines for acute myocardial infarction: the Quality Improvement in Coronary Care (QUICC) study,” *American Heart Journal*, 2006, 152(6); RIKS-HIA interviews, data, and annual reports; BCG analysis.
Sweden’s National Cataract Register (NCR) helps minimize the incidence of postoperative endophthalmitis

- Established in 1992

- More than 1 million records representing 95.6% of all cataract extractions performed in Sweden since 1992

- Owned by Swedish Ophthalmological Society

- Endophthalmitis is rare (1-2/1000 operations), but 30-50% of patients become extremely disabled (blind)

- Single hospitals collect too little data. From 1997 risk factors as well as practices associated with endophthalmitis were identified (antibiotic prophylaxis | thin or compromised lenses) and guidelines adjusted.

- Endophthalmitis declined from 0.11% in 1998 to 0.02% in 2009

- When applying these results to the US market in the same period, $25 mln/year was saved in direct HC costs and $125 mln/year in total medical and social costs (remember – this is a very small group of patients)
The US Cystic Fibrosis Registry has accelerated the rate of decline in *Pseudomonas* infection

- Established in **1966**
- Managed by **patient group**
- Collects data from all **115 certified CF centers** in the US (more than 25,000 patients)
- **Pseudomonas infection** is a common complication: opportunistic infection which is one of the most serious and difficult to treat hospital infections
- Between 1995-1999 the decline was modest (60.3% → 59.3%)
- An extrapolation would yield 57.3% in 2009
- However **Benchmarks made public from 2006 lead to an accelerated decline** so that in 2009 the infection rate reached 51.7%
- Treatment costs for **noninfected** CF patients is $20,000/yr | when infected patients cost $66,000/yr

**Projected versus actual decline in Pseudomonas-positive sputum cultures**

**Sources:** Cystic Fibrosis Foundation website; Cystic Fibrosis Foundation Patient Registry annual reports; BCG analysis.

*Assuming maintenance of the same rate of improvement that occurred between 1995 and 1999.*
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Importance of optimizing CVRM/DM2 care: urgent!

Diabetes population in Suriname: Peak 20 years younger than elsewhere!

Less than 10% of diabetics survives longer than 20 years!

79% of diabetics is not well regulated!

73% of diabetics has overweight
Visualize risk profile

COPD
- COPD exacerbations
- Exercise tolerance
- Pulmonary function / dyspnea
- Retinopathy
- Neuropathy
- Diabetic foot
- Glucose
- Nefropathy
- Blood pressure
- Cholesterol

DIABETES MELLITUS
- Somatisation
- Depression
- Anxiety

LIFESTYLE
- Smoking
- Overweight
- Physical (in)activity
- Nutrition
- Alcohol
- Stress
- Depression
- Anxiety

PSYCHOLOGICAL COMPLAINTS

VASCULAR RISK

T0
T1
Make an individual care plan based on assessment

<table>
<thead>
<tr>
<th>Health issues</th>
<th>Stepped-care modules</th>
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<td><strong>Unhealthy lifestyle</strong></td>
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<td>Smoking</td>
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<td><strong>General wellbeing</strong></td>
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<td><strong>Diabetes mellitus</strong></td>
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Feedback & benchmark every 3 months

Patient recruitment
Intake
Risk and care profiles
Individual care plan
Follow up

Feedback & Benchmark

Characteristics of population
CVD / DM type 2 complications & co-morbidity
Prevalence of Risk Factors
Cardiovascular disease
Clinical outcomes practice Example
Clinical outcomes versus peers
Pilot 2010: Most patients with diabetes are not controlled. Majority of patients have HbA1c \( \geq 9 \).
Pilot 2010: HbA1c in different types of practices
Better results in private practices | more knowledge, time and attention

Number of patients

- stg RGD
- Joshua Medical Center
- Mozes Poli
- MZ Brownsweg
- Poli Telesur
- Poli Ephraim

Legend:
- HbA1c >=9
- HbA1c 7.5 - 9
- HbA1c 6.5 - 7.4
- HbA1c < 6.5
22 February 2013
Patients are in better control
After 3 years of glucose monitoring in the OSS
Patients are in better control
After 3 years of glucose monitoring in the OSS

<table>
<thead>
<tr>
<th>Glucose Range</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose &lt; 6.5</td>
<td>25.74%</td>
<td>15.96%</td>
<td>18.66%</td>
<td>28.26%</td>
</tr>
<tr>
<td>Glucose 6.5 - 7.4</td>
<td>19.04%</td>
<td>21.38%</td>
<td>21.00%</td>
<td>19.04%</td>
</tr>
<tr>
<td>Glucose 7.5 - 9</td>
<td>26.09%</td>
<td>30.80%</td>
<td>34.28%</td>
<td>39.26%</td>
</tr>
<tr>
<td>Glucose 9 - Up</td>
<td>39.26%</td>
<td>30.80%</td>
<td>34.28%</td>
<td>13.04%</td>
</tr>
</tbody>
</table>

**Percentages Glucose op T0, T1, T2, T3**
Patients are in better control after 3 years of blood pressure monitoring in the OSS.
No amputations and no hospitalizations with adequate footcare

• 41 patients with diabetic ulcers were treated in the One Stop Shops in 2015

• None of these ulcers lead to an amputation nor did it lead to a hospitalization
  – In general these patients have hospitalizations of 3 months in average and most of them have amputations

• Only by avoiding the hospitalizations SRD 1,9 million was saved (2/3 of the subsidy for the OSS)
  – The total savings in direct and indirect costs are far more

• Additional savings with renal dialysis, diabetes related admissions and CV events
Healthcare spending in emerging markets is growing fast
Developing countries have to take measures to make more possible for less

Sources: The World Bank; BCG analysis.
Note: Health care expenditures in constant 2005 US dollars are indexed to 2000.
Opportunity for our region with developing health systems
Leapfrogging with state of the art outcomes at a lower cost

Sources: The World Bank; World Health Organization; The Lancet; BCG analysis.
Note: Health-adjusted life expectancy estimates the number of years an individual is expected to live in full health by subtracting the number of years of ill health (weighted according to severity) from overall life expectancy at birth. Health care expenditure per capita is calculated according to purchasing power parity of 2010 US dollars.
What is leapfrogging?

- Developing economies can use radical innovations to surpass established economies
- Critical innovations: new technologies | new operating models | new behavior patterns
- Examples: mobile financial services in Africa | mHealth

<table>
<thead>
<tr>
<th></th>
<th>Aravind</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>Surgeries per year 350,000 (2010)</td>
<td>~ 60% for subsidized patients</td>
</tr>
<tr>
<td></td>
<td>Full price: up to 1000$ (2010)</td>
<td></td>
</tr>
<tr>
<td>Revenue and Profit</td>
<td>Revenue: $20 million</td>
<td>Staggering numbers for a non-profit network</td>
</tr>
<tr>
<td></td>
<td>Profit: $7.9 million (2009 – 2010)</td>
<td></td>
</tr>
<tr>
<td>Complication Rates</td>
<td>Half the complication rates at UK Hospitals based on National Survey (2001)</td>
<td></td>
</tr>
</tbody>
</table>
Why can Aravind Eye Institute offer top quality for $16?

1. **Differential Pricing for equitable treatment**
   - The full price paid by one well-off patient funds the treatment for several poor patients.
   - The quality of treatment remains the same to ensure that complication rates match global standards.

2. **Lowering fixed costs – infrastructure, equipment and salaries – per patient**
   - Focused on maximizing the utilization of infrastructure and equipment | increasing productivity of workforce.
     - Nurses to take care of several non-surgical tasks.
     - The use of the just-in-time approach to increase the utilization of its operating rooms.
   - High-volume of patients
     - Aravind targets free patients rather than paying patients.
     - Beyond its hospitals, Aravind uses a three-pronged approach – community clinics, tele-medicine centers, eye camps –

3. **Lowering variable costs**
   - Aravind set up Aurolabs in 1992 to manufacture its own lenses:
     - Designed a manufacturing process that reduces the price of lenses to $2 versus $70 before
     - Become a global supplier of intraocular lenses
     - Encouraged other players to produce low-cost, high quality lenses

4. **Training and Research**
   - Training institutes allow Aravind to have a pipeline of well trained doctors and nurses.
   - A strong performance monitoring system and a focus on research ensure that these doctors and nurses continue to innovate and excel.
Cross border: Hip replacement strategies have helped Australia and Denmark drive down their revision rates

- The drop in revision rates in Sweden in the first decade (7,500 revisions avoided) lead to $14 mln per year avoided costs or 8% of all hip replacement costs.
- The revision burden of both countries dropped to near the Swedish level.

Sources: Swedish Hip Arthroplasty Register annual reports; Danish Hip Arthroplasty Register annual reports; Australian National Joint Replacement Registry annual reports.
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Systematic measurement of health outcomes is the cornerstone of Value Based Healthcare

But the change in culture and behavior is the true critical success factor to create value
Support multidisciplinary cooperation and continuity of registration – integral set of requirements
Health Information Management System (HIMS): Episode registration → same data serves multiple purposes

Health Repository Broker

Data stores
- Cell-level secured Personal Data Stores
- Knowledge Graph-based modelling
- Meta-data Stores

GP system

Hospital Information system / EPD

Pharmacies Laboratories

eHi| eGov

Patients

Conceptual Model of the CCR

1. Document Identifying Information
   - From/To info re Provider/Clinician
   - Reason for Referral/Transfer
2. Document Identifying Information
   - Patient Identifying Information
   - Insurance and Financial Info
   - Health Status of Patient
   - Diagnosis/Problems/Conditions
   - Adverse Reaction/Alerts
   - Current Medications
   - Immunizations
   - Vital Signs
   - Lab Results
   - Procedures/Assessments
3. Optional Extension
   - Eligibility, Co-payment, etc.
   - Med. Specialty-specific Info
4. Optional Extension
   - Personal Health Record Info
   - Documented by the Patient
5. Care Documentation
   - Med. Specialty-specific Info
   - Disease Management-specific Info
   - Institution specific Information
   - Care Documented for Parent (Attachments)
6. Optional Extension
   - Personal Health Record Info
   - Documented by the Patient

Mandated Core Elements of the CCR

Version 6 – 10/31/03

Hospital Information System / EPD

eHI| eGov

Types of reports
- Care product definitions
- Reimbursement and Tariff system
- National Health Accounts
- Performance improvement
- Premiums and packages
Principles to jumpstart Value Based Healthcare

1. Identify the diagnoses with the biggest room for improvement
   – Care demand analysis based on episode registration in GP systems

2. Determine metrics to assess outcomes and drivers for these outcomes
   – Existing disease registries
   – ICHOM

3. Leverage leapfrogging technology
   – mHealth applications

4. Integrate data collection along the care pathway

5. Create transparency for all stakeholders and ignite a cultural change
   – Comprehensive, high-quality data (if you can’t beat them join them)
   – Internal benchmarks made public in course of time
   – Active engagement with clinical community
   – Cross-Border collaboration

6. Implement practice-improvement routines
   – Free up physician time through task shifting
   – Lower fixed costs per patient | procedure
   – Have regular meetings to analyze outcomes and reasons for variations → disseminate best practices

To be continued: How to implement in care procurement