Medical Education and the “Science” of Health Care Delivery

Harvard Medical School Board of Fellows
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Redefining Health Care Delivery

- Universal coverage and access to care are **essential, but not enough**
- The core issue in health care is the **value of health care delivered**

\[
\text{Value} = \text{Patient health outcomes per dollar spent}
\]

- How to design a health care system that **dramatically improves value**
  - Ownership of entities is secondary (e.g. non-profit vs. for profit vs. government)
- How to create a **dynamic system** that keeps rapidly improving
Creating a Value-Based Health Care System

• Significant improvement in value will require fundamental restructuring of health care delivery, not incremental improvements

Today, 21st century medical technology is delivered with 19th century organization structures, management practices, and pricing models

- TQM, process improvements, safety initiatives, pharmacy management, and disease management overlays are beneficial but not sufficient to substantially improve value

- Consumers cannot fix the dysfunctional structure of the current system
Restructuring Care Delivery
Migraine Care in Germany

Existing Model:
Organize by Specialty and Discrete Services

New Model:
Organize into Integrated Practice Units (IPUs)

- Imaging Centers
- Outpatient Physical Therapists
- Outpatient Neurologists
- Primary Care Physicians
- Inpatient Treatment and Detox Units

- Imaging Unit
- Primary Care Physicians
- West German Headache Center
  Neurologists
  Psychologists
  Physical Therapists
  Day Hospital

- Essen Univ. Hospital Inpatient Unit

- Network Neurologists

• The health plan was crucial to this transformation

## The Cycle of Care

### Breast Cancer

#### ENGAGING
- Advice on self screening
- Consultation on risk factors

#### MEASURING
- Self exams
- Mammograms
  - Mammograms
  - Ultrasound
  - MRI
  - Biopsy
  - BRACA 1, 2...

#### ACCESSING
- Office visits
- Mammography lab visits
  - Office visits
  - Lab visits
  - Hospital visits
  - High-risk clinic visits

#### MONITORING/PREVENTING
- Medical history
- Control of risk factors (obesity, high fat diet)
- Genetic screening
- Clinical exams
- Monitoring for lumps

#### DIAGNOSING
- Medical history
- Determining the specific nature of the disease
- Genetic evaluation
- Choosing a treatment plan

#### PREPARING
- Surgery prep (anesthetic risk assessment, EKG)

#### INTERVENCING
- Plastic or oncoplastic surgery evaluation
- Adjuvant therapies (hormonal medication, radiation, and/or chemotherapy)

#### RECOVERING/REHABING
- Surgery (breast preservation or mastectomy, oncoplastic alternative)
- Physical therapy
- In-hospital and outpatient wound healing
- Treatment of side effects (e.g., skin damage, cardiac complications, nausea, lymphodema and chronic fatigue)

#### MONITORING/MANAGING
- Periodic mammography
- Other imaging
- Follow-up clinical exams
- Treatment for any continued side effects

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**Breast Cancer Specialist**

**Other Provider Entities**
The virtuous circle extends across geography when care for a medical condition is integrated across locations.
## Fragmentation of Hospital Services
### Sweden

<table>
<thead>
<tr>
<th>DRG</th>
<th>Total admissions per year nationwide</th>
<th>Number of admitting providers</th>
<th>Average admissions / provider / year</th>
<th>Average admissions / provider / week</th>
<th>Average percent of total national admissions per provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes age &gt; 35</td>
<td>7,649</td>
<td>80</td>
<td>96</td>
<td>2</td>
<td>1.3%</td>
</tr>
<tr>
<td>Kidney failure</td>
<td>7,742</td>
<td>80</td>
<td>97</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>Multiple sclerosis and cerebellar ataxia</td>
<td>2,218</td>
<td>78</td>
<td>28</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>4,816</td>
<td>73</td>
<td>66</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Implantation of cardiac pacemaker</td>
<td>6,324</td>
<td>51</td>
<td>124</td>
<td>2</td>
<td>2.0%</td>
</tr>
<tr>
<td>Splenectomy age &gt; 17</td>
<td>129</td>
<td>37</td>
<td>3</td>
<td>&lt;1</td>
<td>2.6%</td>
</tr>
<tr>
<td>Cleft lip &amp; palate repair</td>
<td>583</td>
<td>7</td>
<td>83</td>
<td>2</td>
<td>14.2%</td>
</tr>
<tr>
<td>Heart transplant</td>
<td>74</td>
<td>6</td>
<td>12</td>
<td>&lt;1</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

Principles of Value-Based Health Care Delivery

Care should be integrated across facilities and across regions rather than duplicate services in stand-alone units.

Children’s Hospital of Philadelphia (CHOP) Affiliations

- Grand View Hospital, PA
  Pediatric Inpatient Care
- Abington Memorial Hospital, PA
  Pediatric Inpatient Care
- Chester County Hospital, PA
  Pediatric Inpatient Care
- CHILDREN’S HOSPITAL OF PHILADELPHIA
- Shore Memorial Hospital, NJ
  Pediatric Inpatient Care

- Excellent providers can manage care delivery across multiple geographies
The Outcome Measures Hierarchy

Tier 1
- Survival

Tier 2
- Time to recovery or return to normal activities
- Disutility of care or treatment process (e.g., discomfort, complications, adverse effects, errors, and their consequences)

Tier 3
- Sustainability of health or recovery and nature of recurrences
- Long-term consequences of therapy (e.g., care-induced illnesses)
Gaps in health financing, human resources, and access to care have **fatal consequences** for millions in developing countries.

- **Millions of deaths from preventable & treatable causes**
  - 6.3 million preventable **childhood deaths**
  - ½ million **maternal deaths**
  - 3 million **HIV deaths** – less than 1-in-8 on treatment
  - 2 million **tuberculosis deaths**
  - 1 million **malaria deaths** - mostly children

→ **Over 10 million needless deaths each year**

...from conditions for which safe, effective, affordable prevention & treatment exist
the implementation bottleneck

- Vaccines
- Primary Health Care
- Drug Therapies
- Maternal and Child Health Care
- Basic Surgery
investment

Bill and Melinda Gates Foundation $6.5 B
The Global Fund $8.6 B
President’s Emergency Plan for AIDS $15 B
International Finance Facility $4 B
Multi-Country HIV/AIDS Program $1.1 B
Global Alliance $3 B
Public-private partnerships $1.2 B
Anti-Malaria Initiative in Africa (proposed) $1.2 B
United Nations Fund $360 M
Warren Buffet $37 B
TOTAL $77.7 B

*Funds pledged, committed, or spent. Overlap exists between organizations (e.g., PEPFAR money supports the Global Fund).
the implementation bottleneck

- Vaccines
- Primary Health Care
- Drug therapies
- Maternal Child Health Care
- Basic Surgery

New Developments:
- Microbicides and other preventive tools
- New malaria and TB drugs, diagnostics
- New combination therapies
- Drugs for neglected diseases
- >10 new vaccines
## Global Delivery Failures

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARVs for PMTCT</td>
<td>9% coverage of women overall and 50% of women who test positive in a clinic are given ARVs for PMTCT</td>
</tr>
<tr>
<td>Reduce HIV transmission by 40%</td>
<td></td>
</tr>
<tr>
<td>ITNs for Malaria Prevention</td>
<td>Only 3% of children in endemic areas sleep under nets</td>
</tr>
<tr>
<td>Reduce infant mortality by 23%</td>
<td></td>
</tr>
</tbody>
</table>

Source: WHO
Relationships Between Various Stakeholders in Tanzania

United Nations
Bilateral Aid
Drug-delivery programs
Tanzanian government

Coordinating committees
Plans and programs
IMF/World Bank
Nongovernment organizations

Local Government
Civil Society
Private Sector

GTZ
CIDA
Norad
USAID
RNF
SIDA
GFATM
PEPFAR
CCM
HCTP
UNAIDS
UNICEF
WB
I-MAP
DAC
UNTG
MOF
PRSP
SWAp
DAC
GFCCP
HSSP
TACAIDS
NACP
MoH
PMO
CTU
RNF
SIDA
GTZ
CIDA
Norad
USAID
GFATM
PEPFAR
CCM
HCTP
UNAIDS
UNICEF
WB
I-MAP
DAC
UNTG
MOF
PRSP
SWAp
DAC
GFCCP
HSSP
TACAIDS
NACP
MoH
PMO
CTU
International NGOs

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The Developed World and Resource-Poor Settings Suffer from Similar Delivery Problems

**Current Model**
- The product is **treatment**
- Measure **volume** of services (# tests, treatments)
- Focus on facilities, **specialties** or **types** of practitioners
- Discrete **interventions**
- Individual diseases
- **Fragmented** programs and entities
- **Localized** pilots and demonstration projects

**New Model**
- The product is **health**
- Measure **value** of services (health outcomes per unit of cost)
- **Coordinated** and **integrated** care delivery
- Care cycles
- Sets of prevalent **co-occurrences**
- **Integrated** care delivery systems
- Integrated **systems across communities and regions**

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A Framework for Global Health Delivery

I. Care Delivery Value Chains for Medical Conditions

II. Shared Delivery Infrastructure

III. Aligning Delivery with External Context

IV. Leveraging the Health Care System for Economic and Social Development

Supporting Public Policies
### The Care Delivery Value Chain

**HIV/AIDS**

#### INFORMING & ENGAGING
- Prevention counseling on modes of transmission on risk factors
- HIV testing
- TB, STI screening
- Collecting baseline demographics
- Meeting patients in high-risk settings
- Primary care clinics
- Testing centers

#### ACCESSING
- Primary care clinics
- Clinic labs
- Food centers
- Home visits
- Pharmacy
- Support groups
- Primary care clinics
- Hospitals, hospices

#### MEASURING
- HIV testing for others at risk
- CD4+ count, clinical exam, labs
- Primary care clinics
- Testing centers
- Monitoring CD4+
- Continuously assessing comorbidities
- Primary care clinics
- Food centers
- Home visits
- Pharmacy
- Support groups

#### DIAGONOSING & STAGING
- Formal diagnosis, staging
- Determining method of transmission
- TB, STI screening
- Pregnancy testing, contraceptive counseling
- Creating treatment plans
- Primary care clinics
- Clinic labs
- Food centers
- Home visits
- Pharmacy
- Support groups

#### DELAYING PROGRESSION
- Initiating therapies that can delay onset, including vitamins and food
- Treating comorbidities that affect disease progression, especially TB
- Improving patient awareness of disease progression, prognosis, transmission
- Connecting patient with care team

#### INITIATING ARV THERAPY
- Initiating comprehensive ARV therapy, assessing drug readiness
- Preparing patient for disease progression, treatment side effects
- Managing secondary infections, associated illnesses

#### ONGOING DISEASE MANAGEMENT
- Managing effects of associated illnesses
- Managing side effects
- Determining supporting nutritional modifications
- Preparing patient for end-of-life management
- Primary care, health maintenance

#### MANAGEMENT OF CLINICAL DETERIORATION
- Identifying clinical and laboratory deterioration
- Initiating second- and third-line drug therapies
- Managing acute illnesses and opportunistic infection through aggressive outpatient management or hospitalization
- Providing social support
- Access to hospice care

**Health outcomes per unit of cost**

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Care Delivery Value Chain
Implications for HIV/AIDS Care

- **Early diagnosis** helps in forestalling disease progression

- Intensive evaluation and treatment at time of the diagnosis can forestall disease progression

- **Improving compliance** with first stage drug therapy lowers drug resistance and the need to move to more costly second line therapies
Shared Delivery Infrastructure

- Health Clinics
- District Hospitals
- Tertiary Hospitals

Cross Cutting Issues
- Supply Chain Management
- Human Resource Development
- Insurance and Financing
Integrating “Vertical” and “Horizontal”

Care Delivery Value Chains

- HIV/AIDS
- Malaria
- Perinatal
- Tuberculosis

Shared Delivery Infrastructure

- Health Clinics
- District Hospitals
- Tertiary Hospitals
- Community Health Workers
- Testing Laboratories
Shared Delivery Infrastructure
Implications for HIV/AIDS Care

• Screening is most effective when integrated into a primary health care system

• Providing maternal and child health care services is integral to the HIV/AIDS care cycle by substantially reducing the incidence of new cases of HIV

• Community health workers not only improve compliance with ARV therapy but can simultaneously address other conditions
Integrating Delivery and Context

Broader Influences

External Context for Health

Care Delivery System

Environmental Factors

Nutrition

Family/Community Attitudes and Support

Health Awareness

Access to Care Facilities

Water & Sanitation

Education

Physical Infrastructure

Communication Systems

Transportation

Jobs

Housing
The Relationship Between Health Systems and Economic Development

Better Health Enables Economic Development

- Enables people to work
- Raises productivity

Health System Development Fosters Economic Development

- Direct employment (health sector jobs)
- Local procurement
- Catalyst for infrastructure (e.g. cell towers, internet, and electrification)
Is there a place for a new field in global health?

- Basic Science
  - What is the patho-physiology?

- Clinical Science
  - What is the diagnosis and appropriate intervention?

- Evaluation Science
  - Does the intervention work?
Is there a place for a new field in global health?

- Basic Science
  - What is the patho-physiology?

- Clinical Science
  - What is the diagnosis and appropriate intervention?

- Evaluation Science
  - Does the intervention work?

- Health Care Delivery Science
  - How is the intervention best delivered?
  - How can the overall delivery of care be integrated and optimized over the care cycle?
  - What is the overall value of care (set of outcomes; costs)?
Global Health Delivery Project

- Educate Leaders
- Drive Interdisciplinary Research
- Partner with Centers of Excellence
- Disseminate via GHDonline Communities

High Value Health Care Delivery
Need for an Interdisciplinary Approach
GHD Research: Positive Synergies

- WHO-led initiative for G8, Italy 2009
- 3 consortia: Academic, civil society & implementers
- Fourteen academic partners from Africa, Asia, Europe, and the U.S.
Global Health Delivery Studies

The Academic Model for the Prevention and Treatment of HIV/AIDS

Evaluating AMPATH’s decision to expand the coverage and services offered by its HIV/AIDS treatment program

Avahan: India AIDS Initiative

Developing a strategic framework for scaling up the delivery of HIV prevention

Examining different HIV prevention programs, and determining the steps necessary to successfully bring effective HIV prevention efforts to scale
<table>
<thead>
<tr>
<th>Global Health Delivery</th>
<th>Advanced Economy Delivery</th>
</tr>
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<tbody>
<tr>
<td><strong>Summer 2009</strong> – HSPH/HMS: Global Health Effectiveness Program</td>
<td><strong>January 2009</strong> – Value-Based Health Care Delivery (HBS Immersion Program)</td>
</tr>
<tr>
<td><strong>Fall 2009</strong> - HMS: GHD Seminar (5th round)</td>
<td><strong>April 2009</strong> –The Brigham Leadership Program (HBS Executive Education)</td>
</tr>
<tr>
<td><strong>Fall 2009</strong> - Sloan/HST: G-Lab GHD (2nd round)</td>
<td><strong>May 2009</strong> – Kaiser Permanente Leadership Program (HBS Executive Education)</td>
</tr>
<tr>
<td><strong>January 2010</strong> - HSPH: Introduction to GHD (5th round)</td>
<td><strong>January 2010</strong> – Value-Based Health Care Delivery (HBS Immersion)</td>
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<tr>
<td><strong>Fall 2010</strong> - Harvard: Undergraduate Global Health Course (2nd round)</td>
<td><strong>January 2010</strong>- Strategy For Health Care Delivery: Leadership Workshop</td>
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</tbody>
</table>
“To create and nurture a diverse community of the best people committed to leadership in alleviating human suffering caused by disease.”