This work was created in an open classroom environment as part of the Engineering Leadership Professional Program (ELPP) developed and led by Prof. Ikhlaq Sidhu at UC Berkeley. There should be no proprietary information contained in this work. No information contained in this work is intended to affect or influence public relations with any firm affiliated with any of the authors. The views represented are those of the authors alone and do not reflect those of the University of California Berkeley.
1.1.3. Life expectancy at birth and health spending per capita, 2011 (or nearest year)

![Graph showing the relationship between life expectancy and health spending per capita. The data points are plotted on a scatter plot, with a regression line and the R² value of 0.51. The graph includes country codes for various countries.]

![Bar chart showing the total IT budget in hospitals, $ in billions, for the years 2000 and 2010. The bar for 2010 is significantly higher than for 2000.]

<table>
<thead>
<tr>
<th>Spending Category</th>
<th>Annual Spending, $ in Billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician care</td>
<td>541.42</td>
</tr>
<tr>
<td>Hospital care</td>
<td>850.55</td>
</tr>
<tr>
<td>Other providers</td>
<td>887.36</td>
</tr>
<tr>
<td>Private insurance</td>
<td>896.35</td>
</tr>
<tr>
<td>Public programs</td>
<td>1063.75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4239.43</strong></td>
</tr>
</tbody>
</table>
Healthcare Data Breakdowns

- **Insurer Enrollment**:
  - 2003: Top 10 (30%), All others (70%)
  - 2011: Top 10 (10%), All others (90%)

- **Physician Practices**:
  - 2001:
    - 1-5: 40%, 6-99: 50%, ≥100: 10%
  - 2012:
    - 1-5: 20%, 6-99: 40%, ≥100: 40%

- **Population by Age**:
  - 0-18: 20%
  - 19-44: 30%
  - 45-64: 20%
  - 65-74: 20%
  - ≥75: 10%

- **Population by Insurance**:
  - Uninsured: 10%
  - Private:
    - Direct purchase: 30%
    - Conventional: 20%
    - POS: 10%
    - HMO: 10%
    - HDHP/SO: 10%
    - PPO: 20%
  - Government:
    - Military health care: 5%
    - Medicaid: 10%
    - Medicare: 75%

- **Population by Year**:
  - 1990:
    - Military health care: 5%
    - Medicaid: 5%
    - Medicare: 85%
  - 2000:
    - Military health care: 10%
    - Medicaid: 10%
    - Medicare: 80%
  - 2012:
    - Military health care: 5%
    - Medicaid: 5%
    - Medicare: 85%
Figure 1: Breakdown of US healthcare spending (2011)

- Hospital care: 31%
- Physician and clinical services: 21%
- Prescription drugs: 10%
- Other nondurable medical products: 5%
- Research: 2%
- Public health activity: 2%
- Administrative costs of private health insurance: 7%
- Other personal healthcare: 3%
- Nursing home care: 6%
- Durable medical equipment: 1%
- Home healthcare: 3%
- Other professional services: 3%
- Dental: 4%
- Structures: 3%
- Other: 2%

Source: Pfizer, 2012 (http://www.pfizerplus.com/gi/health_care_spending.aspx)
Healthcare Industry Profit Margin (MRQ)

Drug Manufacturers - Major
Medical Instruments & Supplies
Drug Manufacturers - Other
Medical Appliances & Equipment
Medical Laboratories & Research
Drug Related Products
Healthcare Information Services
Drugs - Generic
Biotechnology
Specialized Health Services
Diagnostic Substances
Medical Practitioners
Hospitals
Health Care Plans
Home Health Care
Long-Term Care Facilities
Drug Delivery

Source: fi.yahoo.com, retrieved 10/10/2014
Health Care Cost Decreases
- providers move from horizontal to vertical integration
- small businesses are impacted by integration

Prescription Drug Sales Decrease
- better pre-screening and targeting reduce overall drug sales
An ACO is a network of doctors and hospitals that shares financial and medical responsibility for providing coordinated care to patients in hopes of limiting unnecessary spending.

As of Jan 2013,
- 4 million Medicare beneficiaries are now in an ACO
- Combined with the private sector, more than 428 provider groups
- An estimated 14 percent of the U.S. population is now being served by an ACO

Sources:
Figure 1: Global Mobile Sensing Health & Fitness Sensor Shipments (2012-2017)

New wave of technology Opportunities

- “Meaningful Use”: smarter EMRs, data sharing, HIE
- Measuring quality, making it actionable
- Next generation health insurance/coverage
- New models for healthcare delivery
- Data-driven healthcare recommendations
- Better preventative care (home monitoring, etc.)
- Big data / analytics

Sources:
http://www.businessweek.com/articles/2012-03-22/health-care-reforms-winners-and-losers
Backup
Potential startup opportunities

- Reduce cost of healthcare by lowering waste/inefficiencies in the system (20-30% of total US healthcare).
  - Digitization reduces administrative costs.
  - Radiology/Dialysis centers etc <50% utilized (most open from 7am - 7pm).
  - Fraud and abuse detection.

- Comparative shopping for health-care in a more open marketplace.
  - Key in a procedure and get a comparative price/performance chart for all providers.
  - Global market. Include international low-cost providers.

- Insurance innovation.
  - More fine-grained healthcare options.
  - Tiered options with more innovation in patient-care experience.
- 125 large U.S. health insurers.
- $713 billion insurance premiums collected in year 2012,
- The top 25, ranked by market share, accounted for nearly \( \frac{2}{3} \) of the total.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Insurer</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Unitedhealth Group</td>
</tr>
<tr>
<td>#2</td>
<td>Wellpoint Inc. Group</td>
</tr>
<tr>
<td>#3</td>
<td>Kaiser Foundation Group</td>
</tr>
<tr>
<td>#4</td>
<td>Humana Group</td>
</tr>
<tr>
<td>#5</td>
<td>Aetna Group</td>
</tr>
<tr>
<td>#6</td>
<td>HCSC Group</td>
</tr>
<tr>
<td>#7</td>
<td>Cigna Health Group</td>
</tr>
<tr>
<td>#8</td>
<td>Highmark Group</td>
</tr>
<tr>
<td>#9</td>
<td>Coventry Corp. Group</td>
</tr>
<tr>
<td>#10</td>
<td>HIP Insurance Group</td>
</tr>
</tbody>
</table>

Sources: National Association of Insurance Commissioners
- 80% of electronic health information is said to be unstructured. Clinical data, to put it mildly is full of holes.
- 30% of US hospitals use a clinical data warehouse/mining solution, according to HIMSS Analytics.
- 33% of healthcare organizations use BI tools

Benefits include:
1. More cost-effective operations
2. Quality improvement
3. Patient satisfaction
4. Labor costs

YEAR 2015
eligible professionals and hospitals

under the Medicare EHR incentive programs will face payment reductions if they do not meet the MU requirements, according to the Federal Health IT Strategic Plan

Beyond 2015:
Transformed Health Care
1. Enhanced ability to study care delivery payment systems
2. Empowered individuals increased transparency

Sources: http://hitconsultant.net/2014/01/31/best-healthcare-technology-infographics-of-2013/3/
US health-care data apps from top innovators,¹ by type of data/analytic capability, 2010–12, %
100% = 132

The apps analyzed cut across all of the US health-care system’s data-related value at stake, estimated at $300 billion.²

Many use proprietary data generated through technologies such as GPS-enabled devices and mobile apps that capture daily activity or patient-reported outcomes.

• Key players
  Crimson
  Explorys
  Health Catalyst
  Lumeris
  Optum/Humedica
  Phytel
  Premier

¹Drawn from top 100 submissions to Health Data Initiative Forum, 2010–11, and health technology companies receiving $2 million or more in venture-capital funding, 2011–12; excludes ideas that did not involve big data.
²See Big data: The next frontier for innovation, competition, and productivity, McKinsey Global Institute (May 2011), on mckinsey.com.

Source: 2010–11 submissions to Health Data Initiative Forum; Rock Health; Standard & Poor’s Capital IQ; McKinsey analysis

Sources: http://www.mckinsey.com/insights/health_systems_and_services/the_big-data_revolution_in_us_health_care
Consumer view
What is right for me?

Priorities
• Prevention and care
• Information and unbiased guidance
• Perceived value

PATIENTS

Professional view
What is best for medicine?
Priorities
• Professionalism
• Autonomy
• Science and technology

HEALTH CARE SERVICES

Societal view
What is best for society?
Priorities
• Measured effectiveness
• Access
• Cost

CLINICIANS

INSURERS AND GOVERNMENT POLICY MAKERS

LP²
UC BERKELEY
ENGINEERING LEADERSHIP PROFESSIONAL PROGRAM