The health care industry can benefit greatly from economic analysis, especially microeconomic analysis.

More than many other areas of economics this theory needs to be modified or extended to accommodate institutional features.

In particular health consumers are buying a product they know little about (information) with someone else's money (third-party payment) due to insurance (uncertainty).

The big current issues always include the increasing cost of health care.
A. Overview of U.S. Health Market

Total expenditures in 2013

- $2,800 billion
- $8,900 per capita (Based on population of 316 million)
- 17.9% of GDP (Based on GDP of $15,700 billion).

Use of Funds

- The big three (hospital, physician, drugs&products) are 64% of total.

Source of Funds

- 50% public and 50% private.
- Only 11% is out-of-pocket. Third payment is key feature of health market.
Trends since 1900

- Expenditure risen dramatically and continuously and forecast to continue.
- Dramatic switch away from out-of-pocket payment to insurance.
- Hospital days little changed but costs much larger as more labor-intensive.
- More physician visits but smaller share of pie.
- Drugs decreased but now increasing share of pie.
- Nursing home care and home health care are growth areas.
- Health care expenditures have risen everywhere in the world. The U.S. has the largest expenditures because of higher base and higher growth rates.

Future

- Pressures exist for continued increase. Forecast 20.0% of GDP in 2020.
- At same time U.S. is a real outlier and radical change is possible.
# Use of Funds in 2012

<table>
<thead>
<tr>
<th>Category</th>
<th>% of Total</th>
<th>Trend since 1960</th>
<th>Biggest Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>32</td>
<td>Static</td>
<td>Managed care; technology</td>
</tr>
<tr>
<td>Physician &amp; clinical</td>
<td>19</td>
<td>Static</td>
<td>Managed care; physician income</td>
</tr>
<tr>
<td>Drugs &amp; Supplies</td>
<td>13</td>
<td>Up</td>
<td>Formularies; technology</td>
</tr>
<tr>
<td>Other professional</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing Home</td>
<td>5</td>
<td>Up</td>
<td>Government; aging and switch to</td>
</tr>
<tr>
<td>Home Health</td>
<td>3</td>
<td>Up</td>
<td>Government; aging and switch to</td>
</tr>
<tr>
<td>Administration costs</td>
<td>7</td>
<td>Up</td>
<td>Standardization</td>
</tr>
<tr>
<td>Public Health</td>
<td>3</td>
<td>Up</td>
<td>Unsure</td>
</tr>
<tr>
<td>Research</td>
<td>2</td>
<td>Down</td>
<td>Switch from government to private</td>
</tr>
<tr>
<td>Construction</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Source of Funds in 2012

<table>
<thead>
<tr>
<th>Category</th>
<th>% of Total</th>
<th>Biggest Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public (50%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>20</td>
<td>Insolvency; consumer choice; drugs</td>
</tr>
<tr>
<td>Medicaid</td>
<td>16</td>
<td>States; managed care; elderly poor; children</td>
</tr>
<tr>
<td>Other public</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Private (50%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private insurance</td>
<td>31</td>
<td>Employers providing less; reaching uninsured.</td>
</tr>
<tr>
<td>Out-of-pocket</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Other private</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
B. Health Insurance

General Principles

• Risk-pooling is the reason insurance works.
• Risk-aversion is the reason consumers purchase insurance.
• Adverse-selection can lead to failure of insurance markets
• Moral hazard can lead to welfare loss due to excess consumption of health services (Paully, and Manning et al RAND study).

Health Insurance Coverage

• Much insurance is employment-related or government provided.
• 49 million in 2011 or 16% were not covered by insurance.
• Adults 19-64 more likely uninsured than the young or old (27% of 19-34 are uninsured, as are 18% of 45-64).
  Related to socio-economic characteristics.
• Even many (15%) full-time year-around workers are not covered.
Recent Trends in Health Insurance

- Switch from indemnity FFS to managed care (PPO and HMO).
- Percentage uninsured up in early 1990’s, down in late 1990’s, rising again.
- Employer costs rose little in mid to late 1990’s, now rising fast again.
- Obama’s Affordable Care Act to take effect in 2014, including insurance exchanges, individual mandates, no pre-existing conditions exclusions.

Future

- Insurance is a key choice variable of consumers and is price-responsive.
- Movement to encourage insurance with higher copays and use of medical savings accounts to permit tax deductibility of out-of-pocket payments.
- Great concern about increasing uninsured despite government efforts to encourage markets for uninsured, e.g. by pooling over employers and recent Children's Health Insurance program.
- Currently big concern to move towards more universal health insurance cover, though not necessarily single payer.
Key Economic Concepts

- Risk pooling: For the average $E[\bar{x}] = \mu$
  standard deviation is $S.D.[\bar{x}] = \sigma / \sqrt{n}$
  and 95% of time average claim is in range $E[\bar{x}] \pm 2 \times S.D.[\bar{x}]$

- Risk-aversion:

```
Utility
U(x)

U(150)=200
U(E[x])=U(100)=170
E[U(x)]
=5*U(50)+5*U(150) = 150
U(50)=100

50 E[x]=100 150
Pr=0.5 Pr=0.5
X = Outcome
```
Key Economic Concepts (continued)

- Rand HIS provided estimate of price elasticity of demand.
- Moral hazard in simplest case (Rand more complicated)
C. Managed Care (PPOs, POS and HMO)

Quality and Quantity
- Very fast growth with indemnity insurance essentially eliminated.
- Recent anecdotal criticisms of access to care (quality and quantity) have led to actual reduction in HMO, so PPO is now dominant in much of U.S.
- Studies indicate much of the care in managed care is good (Miller and Luft).

Costs
- One-time cost savings of 10-20% (controlling for favorable selection into HMOs).
- Trend then appears to be same as non-managed care.
- High costs relative to premia has led to failure of managed care companies.
Future

- Much discussion of access to care in managed care (yet little discussion of e.g. thousands of hospital deaths in any system).
- Weakness of employer provision of insurance is employer choice can lead to loss of doctor.
- Problems for the seriously long-term unhealthy in managed care.
- Medicaid will go completely to managed care. But what happens when off Medicaid?
- Medicare would like more managed care but has had problems so far.
- Enthoven favored managed competition. This has not succeeded in lowering costs.
- More measurement of quality. Managed care can collect the data and need this to encourage consumers to but their product.
Key Economic Concepts

- Test Difference between two means (e.g. for FFS versus HMO)

\[
\text{HMO} \quad \bar{x}_1 = 0.75 \quad s_{\bar{x}_1} = 0.02 \\
\text{FFS} \quad \bar{x}_2 = 0.80 \quad s_{\bar{x}_2} = 0.01
\]

Then

\[
t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{s_{\bar{x}_1}^2 + s_{\bar{x}_2}^2}} \\
= \frac{0.75 - 0.80}{\sqrt{0.02^2 + 0.01^2}} \\
= \frac{-0.05}{\sqrt{0.0005}} = \frac{-0.05}{0.02236} \\
= -2.236
\]

Since $|t| = 2.236 > 1.96$ we reject $H_0: \mu_1 = \mu_2$.

Conclude that there is a statistically significant difference at 5%.
D. Economic Evaluation of Health Services

Cost Benefit Analysis

- Tool used by economists.
- Replace demand and supply curves by social marginal benefit and social marginal cost curves.
- Sixth stool GUAIAC test (Neuhauser and Lewicki) shows importance of using marginal analysis.

Cost Effectiveness Analysis

- Avoid putting $ value on benefits by considering costs per unit of benefit.
- Life-years saved is often the unit of benefit.
- Quality-adjusted years of life (QALY) brings in benefit via backdoor.

Future

- Economic evaluation will be used much more in the U.S.
- Pharmaco-economics leading the way.
E. Users (Individual Demand for Health)

Grossman Model of Health Demand

- Utility depends on health stock (H) rather than health services per se.
- Health capital is in turn produced by medical inputs (m).
- Utility: \( U = U(x, H) \) + Health prodn: \( H = H(m) \) + Budget: \( I = x + p_m m \)
Individual Demand

- \( m = f(\text{price, coins. rate, time price, } p_x, \text{ income, health status, age, educn}) \)
- Price elasticity of health is low. E.g. RAND experiment: -0.17 to -0.22.
- Income elasticity of health is low but positive. So health is a normal good.
- Health demand is responsive to the time cost.

Future

- The primary consumer choice is the health insurance policy, not inputs given the policy.
- So health insurance choice is the key part of consumer demand.
F1. Physicians

Physician Quality and Quantity

- Physician quality is viewed as very high (after Flexner 1910 report).
- Physician quantity is viewed as adequate to high

Physician Income

- Very high.
- In 2010 median physician income was $225,000 and range was $200,000 (GP) to $350,000 (general surgery).
- Human capital investment explains part, but high rate of return of 15-20%.
- Third party payment and licensing explains some of this.

Future

- Continued reduction in physician flexibility due to monitoring by others.
- Potential reduction in physician income due to increased competition and substitution to nurse-practitioners.
F2. Hospitals

Quality and Quantity
- Quality viewed as high (big shift from hospice to acute care since 1930.)
- Quantity is adequate with some excess capacity.

Costs
- In real 2009$ costs per patient day up from $100 in 1950 to $330 in 1970 to $1800 in 2009.
- Much of this increase due to higher staffing levels and greater technology.
- Cost-shifting has greatly reduced.

Future
- Reduced cost-shifting problem for research, education, uninsured, complex cases, autopsies.
- Perhaps more for-profit hospitals (currently low %).
- Further consolidation and some down-sizing.
F3. Nursing Homes and Home Health Care

Quality and Quantity

- Nursing home quality viewed as often being high.
- Nursing home quantity adequate in some states and inadequate in others.
- Part of problem is medical system is geared to acute not long-term care.

Costs

- Not viewed as being excessive as much labor is nurses and lower-skilled.
- Concern that expanding nursing home and home health care will substitute for currently "free" family care.

Future

- Growth in elderly potentially explosive.
- Impacts depend on change in average length of time per person in nursing home.
- Growth pressures Medicaid which pays half nursing home costs (little discussed).
- Home health care appears to be under-utilized to date.
F4. Pharmaceutical Drugs

Quality and Quantity

- Quality is high.
- Quantity is too low for some people as 18% of prescription costs paid out-of-pocket.
- 2006 Medicare Part D expansion to cover prescription drugs for elderly.

Costs

- Viewed as excessive when patented, but patents needed to encourage R & D.
- Viewed as reasonable after patent has run out.
- Formularies are recent attempt to discourage use of high cost drugs.
Future

- Potentially explosive area.
- Consumers may demand access to better drugs due to recent liberalization of advertising to consumers.
- Consumers may be more selective in drug choice, preferring cheaper substitutes. (Currently go along with initial doctor advice and then not take if too expensive).
- Medicaid and other government will surely consider use of formularies.
- Few recent blockbuster drugs.
- Genomic revolution may lead to many discoveries.
- Pharmaco-economics will increasingly evaluate cost-effectiveness of alternative drugs.
Key Economic Concepts

DEMAND AND SUPPLY OF DOCTORS UNDER LICENSURE

Shaded area is monopoly rent to doctor’s due to license

Number of Doctors
Key Economic Concepts (continued)

**MARKET 1**

- MC = AC
- $ per service
- $P_1$
- $Q_1$
- $D_1$
- $MR_1$

**MARKET 2**

- $P_2$
- $MR_2$
G. Government

General Principles

- Major reasons for government involvement in economy are
  - public goods: e.g. information (NIH)
  - externatilities: e.g. infectious diseases
  - monopoly
  - market failure: e.g. Medicare as insurance market for > 65’s would fail
  - equity: e.g. Medicaid

Quality and Quantity

- Despite preference for private provision, government pays for half of health care.
- Medicare viewed as good quality and good quantity aside from drugs.
- Medicaid is viewed as low quality and quantity due to low reimbursement rates and failure to include the working poor.
Costs

- Medicaid very aggressive on costs with low reimbursements and managed care.
- And Medicaid also tight on nursing homes (half of Medicaid costs).
- But big problem for state budgets.
- Medicare less aggressive but leader in DRGs etc. and does not provide drugs.
- Medicare predicted to run out trust fund within ten years.

Future

- Medicaid managed care and more help to those leaving welfare.
- Obama reforms will extend Medicaid to more low-income people.
- Medicare is the big problem down the line.
Key Economic Concepts

Demand = Social Marginal Benefit
= vertical sum of A’s MB and B’s

\[ S = P_A + P_A \]
\[ P_B \]
\[ P_A \]

\[ Q^* \]
\[ Q \]

Social MB

\[ D_B = MB_B \]
\[ D_A = MB_A \]
Key Economic Concepts (continued)

Immunizations: Positive externality
Social MB > Private MB

$ \quad Q_{\text{private}} \quad Q_{\text{optimal}} \quad Q$

Supply = MC

Social MB

Private MB
H1. Medical Technology

- Big reason for increased health expenditures is doctors can do more.
- Cutler and McClellan (2001) consider five medical innovations (treatments for heart attack, low birthweight infant, depression, cataracts and breast cancer) and find all but last clearly have MB > MC.
- Will be a big reason (the biggest?) for further increased expenditures.
H2. Obesity

- Example of unhealthy habits.
- More recent phenomenon than smoking and excess drinking.
- Obesity doubled from 15% in 1980 to 30% today.
- Associated especially with increased diabetes.
- Sturm (2002) compares to other risk factors and finds obesity has health impact similar to aging from 30 to 50 years and more than smoking and drinking.
- Chou, Grossman and Saffer (2004) use data on individuals over time and suggest that a big reason for increase in obesity / BMI is more restaurants.
H3. International Comparisons

Quality and Quantity

- Most wealthy countries viewed as having reasonable quality and quantity.
- U.S. viewed as best quality and quantity for all but poorest individuals.
- Yet measured outcomes - life expectancy and infant mortality - poor for the U.S. compared to other developed countries
- The real action is in poor countries versus developed countries.

Costs

- All countries feel pressure.
- But only the U.S. has experienced such high growth rates.

Future

- Health will creep up as fraction of GDP since health is superior good.
- Other developed countries’ systems are radically different from U.S. This suggests radical change is possible here.
Sources

- *Health Affairs* is best current accessible journal for health economics.
- *NEJM* and *JAMA* have some good material but for economic policy it can be slanted towards government intervention.
- *NEJM* in early 1999 had excellent eight-part series on The American Health Care System.
- State of the art economics best source is NBER working papers ([www.nber.org](http://www.nber.org)).