E. Demand for Health Care

E.1 Individual Health Demand
E.2 Traditional Consumer Demand
E.3 Grossman Model of Health Demand
E.4 Grossman Model over Lifetime
E.5 Empirical Evidence
E.6 Annual biggest users and costly conditions

How do we model demand for health care?
What variables (especially economic) does it depend on?
Economists emphasize prices.

Bhattacharya, Hyde and Tu
Chapter 2: Demand for Health Care
Chapter 3: Demand for Health: the Grossman Model

E.1 Individual Demand

Health demand function such as:

$M = f(p_m,$	price of health inputs
$r,$	co-insurance rate
$t,$	time price of health inputs
$p_z,$	price of goods other than health inputs
$I,$	income
HS	health status
Age	age
Ed ….)	education.

The first five affect the budget line.

Others in traditional model effect utility.

Here instead they affect health production function.

E.2 Traditional Consumer Demand

Choice between medical goods (m) and other goods (z).

1. Preferences are represented by indifference curves.
2. Income constraint represented by budget line.
3. Consumer equilibrium at tangency.

Utility: $U = U(z, m)$

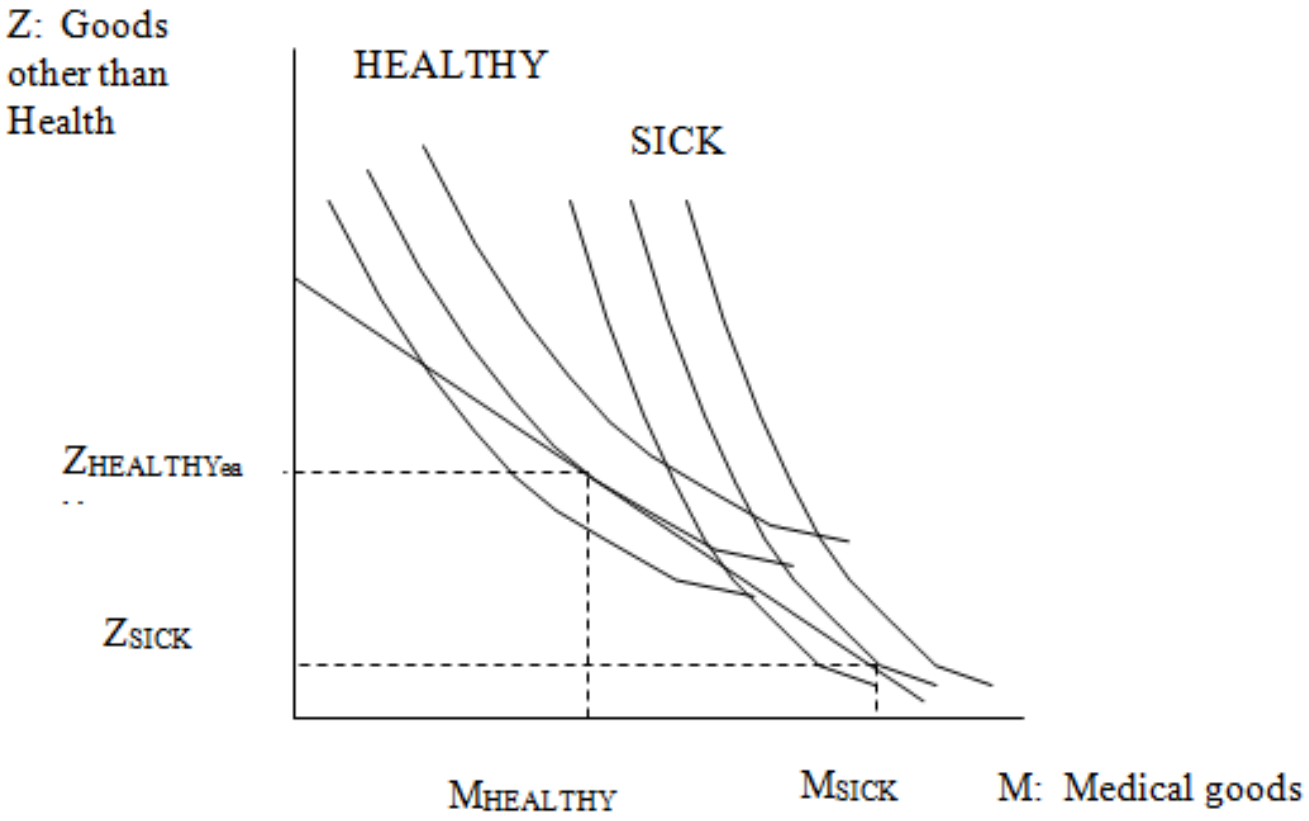
Budget: $I = z + p_m m$ (p_z is normalized to 1 so z is expenditure on other goods).

Can consider effect of

- price increase: budget line swings in
- income increase: budget line parallel shifts out
- sickness indifference curves steepen

But the traditional model does not translate well to health care:

- Doctor visits do not give utility (happiness)
- Troubling to have entire indifference map move due to illness.



E.3 Grossman Model of Health Demand

Grossman (1972) introduced the stock of health capital (H).

This gives utility - the higher is H the better.

Health capital (H) is in turn produced by medical inputs (m).

Utility: $U = U(z, H)$

Health production: $H = H(m)$

Budget: $I = z + p_m m$ [Normalize $p_z = 1$].

1. **Preferences** between z and H are represented by indifference curves. These have the usual shape.

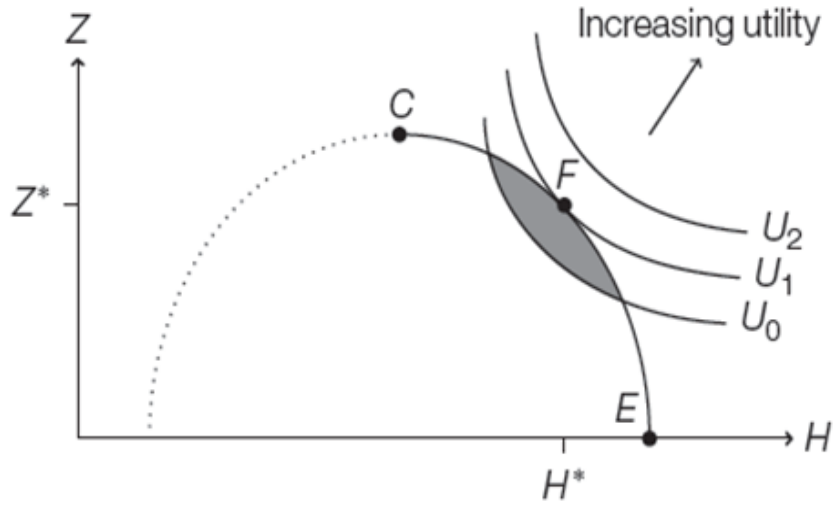
2. **Constraint** between z and H is called a production possibilities curve. It gives possible combinations of z and H that can be obtained given income, prices and ability to produce health. Producing more H requires more m leaving less on other goods (z). Bowed out from the origin due to diminishing returns ($H''(m)<0$) .

3. **Consumer equilibrium** occurs at tangency.

E.3 Grossman Model of Health Demand (continued)

1. Utility: $U = U(z, H)$
2. Production possibilities curve given H(m) and budget constraint
3. Consumer equilibrium: (z^*, H^*)

Implied level of medical inputs: $M^* = (I - z^*)/p_m$



The dashed portion because text introduces time as well, and time is used to produce income. At low levels of health all time goes into being sick and unable to produce income to produce z.

E.3 Grossman Model in action: Effect of Illness

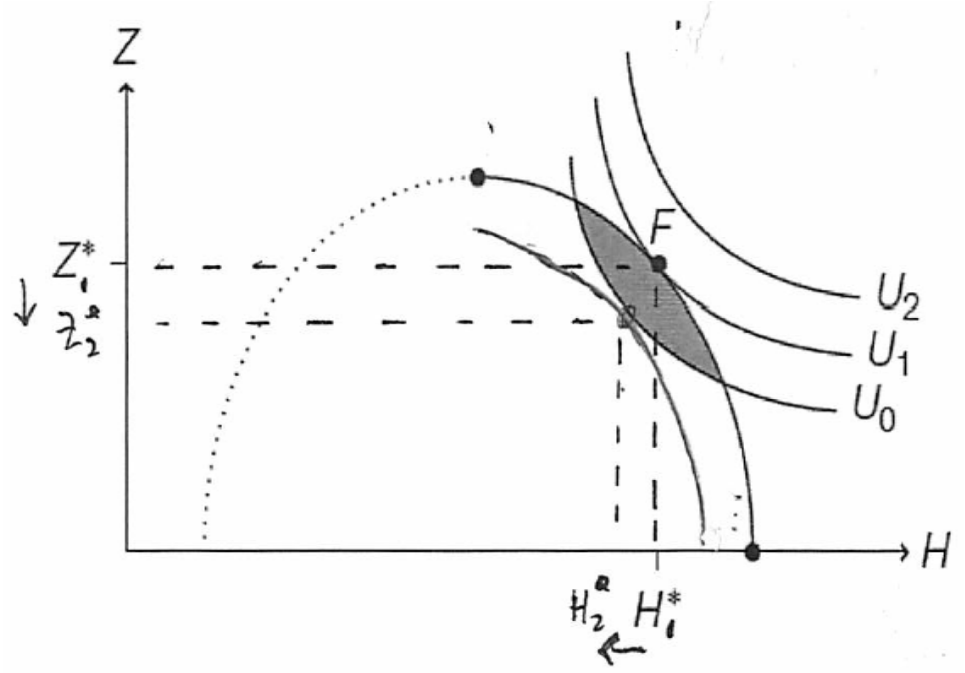
If sick need more M to get same H. So the production possibilities curve moves in (not necessarily parallel shift in)

So move from (H_1*,Z_1*) to (H_2*,Z_2*)

As expected, on a lower indifference curve (less well off).

As drawn H ↓ (do not get back to the initial level of health).

As drawn Z ↓ which implies M ↑ (more is spent on health inputs).

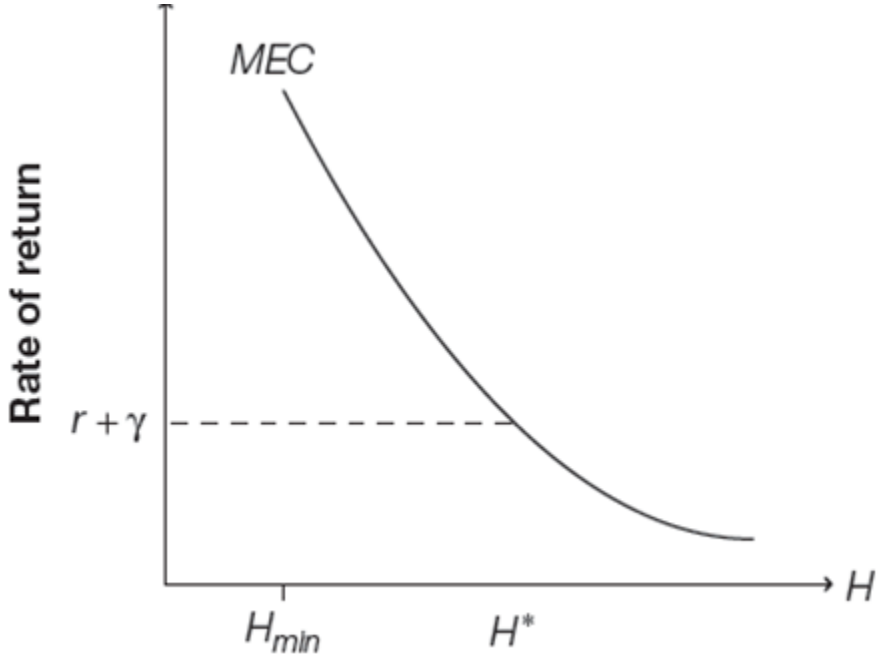


E.4 Grossman Model over Lifetime

- Multiperiod utility function
  $U = U(H_0, Z_0, H_1, Z_1, \ldots, H_T, Z_T)$
  $= \Sigma_{t=0}^{T} \delta^t U(H_t, Z_t)$
- Health depreciates at rate γ (like asset depreciation)
  $H_t = H((1-\gamma)H_{t-1}, M_t)$.
- The model is complicated. So summarize with MEC curve.
- MEC = **marginal efficiency of health capital curve**
  = lifetime return from a marginal health investment in health at any level of health stock H
- For **efficient investment** in health in equilibrium
  return on health investment equals return on market investment
  $MEC = r + \gamma$
  = market investment rate + health depreciation rate

MEC Curve

- Plays the role of demand curve for health.
- E.g. Higher education can lead to higher efficiency in health production pushing MEC curve out so higher H.
- As get older depreciation rate γ increases so invest less in health.



E.5 Empirical Evidence (for individual demand)

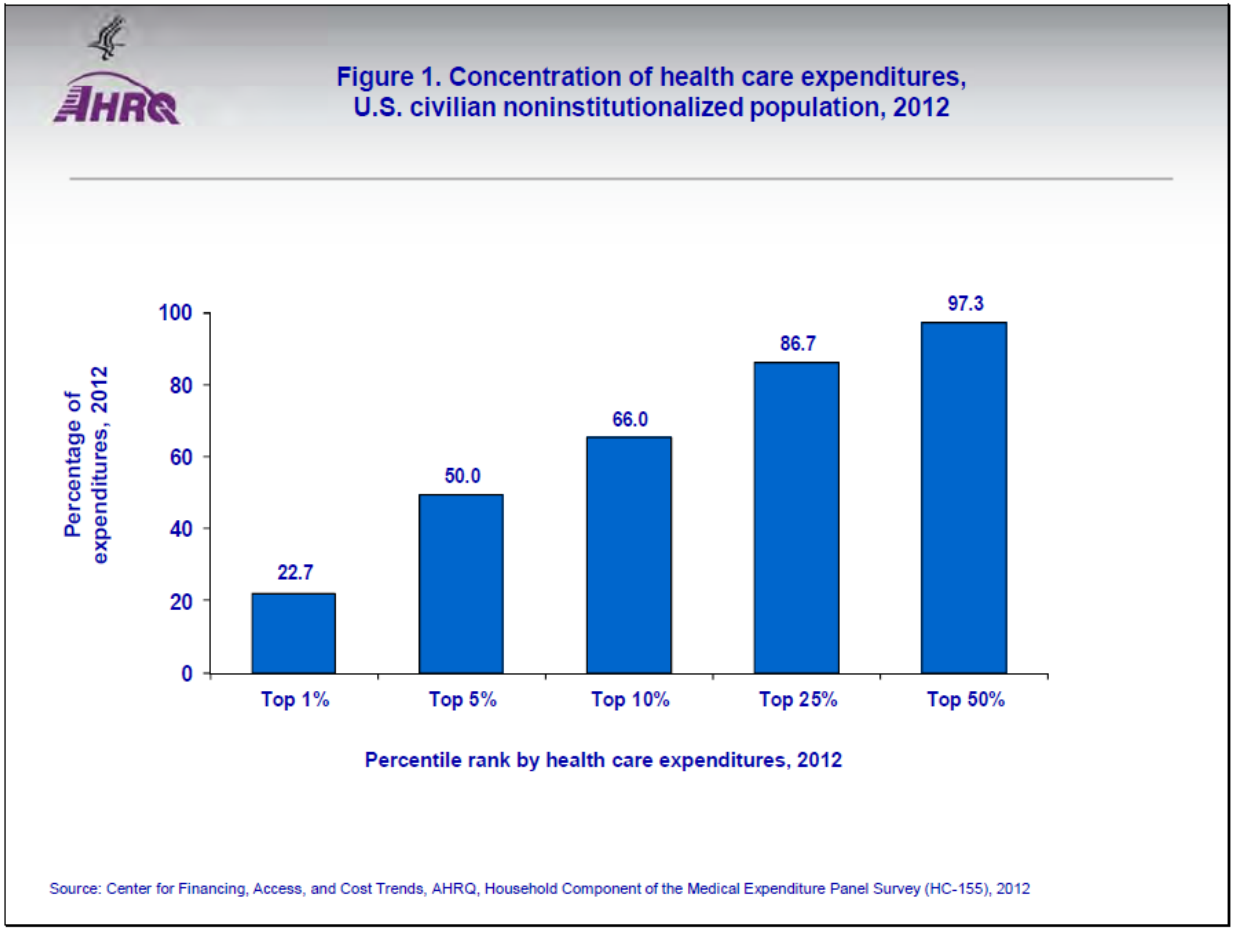
1. Health Capital ↑ as Medical inputs ↑.
   - So health production function is relevant.
   - in developed countries such as U.S. the effect may be small, however, due to eventually diminishing returns.
2. Health demand ↑ as Price ↓
   - e.g. Rand found elasticity -0.1 to -0.2.
   - note: price inelastic. If prices rise ↑ then expenditures ↑.
3. Health demand ↑ as Income ↑
   - elasticity 0.0 to 0.4
   - normal good.
   - the income elasticity of health is low for individuals.
     (it is higher across countries and over time).
4. Health demand ↑ as Time cost ↓

More on Price Responsive

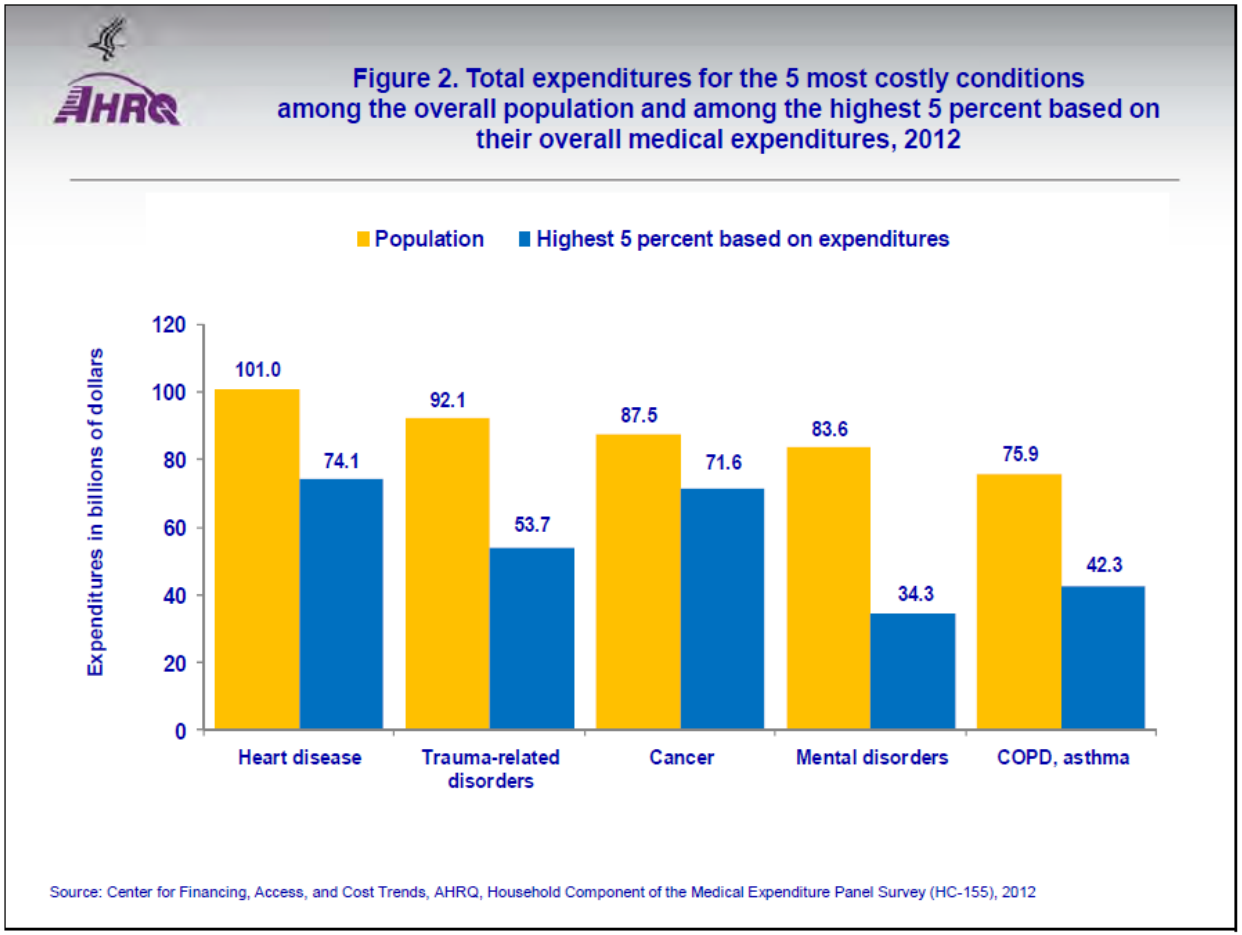
- Cannot just survey individuals and measure how health demand changes as price changes
  - as price is endogenous through insurance choice.
- Instead ideally run a random experiment. Randomly allocate people to two groups – treatment and control.
- Rand Health Insurance experiment did this.
- Oregon Medicaid Experiment did this in 2008
  - lottery winners had increased access to Medicaid (25% more likely to join)
  - outpatient visits were higher for winners.
- These experiments also looked at health outcomes with higher insurance
  - generally little statistically significant improvement
  - except for at-risk groups.

E.6 Annual biggest users and costly conditions

- U.S. Health Expenses 2012 $1.5 trillion
  https://meps.ahrq.gov/data_files/publications/st455/stat455.pdf



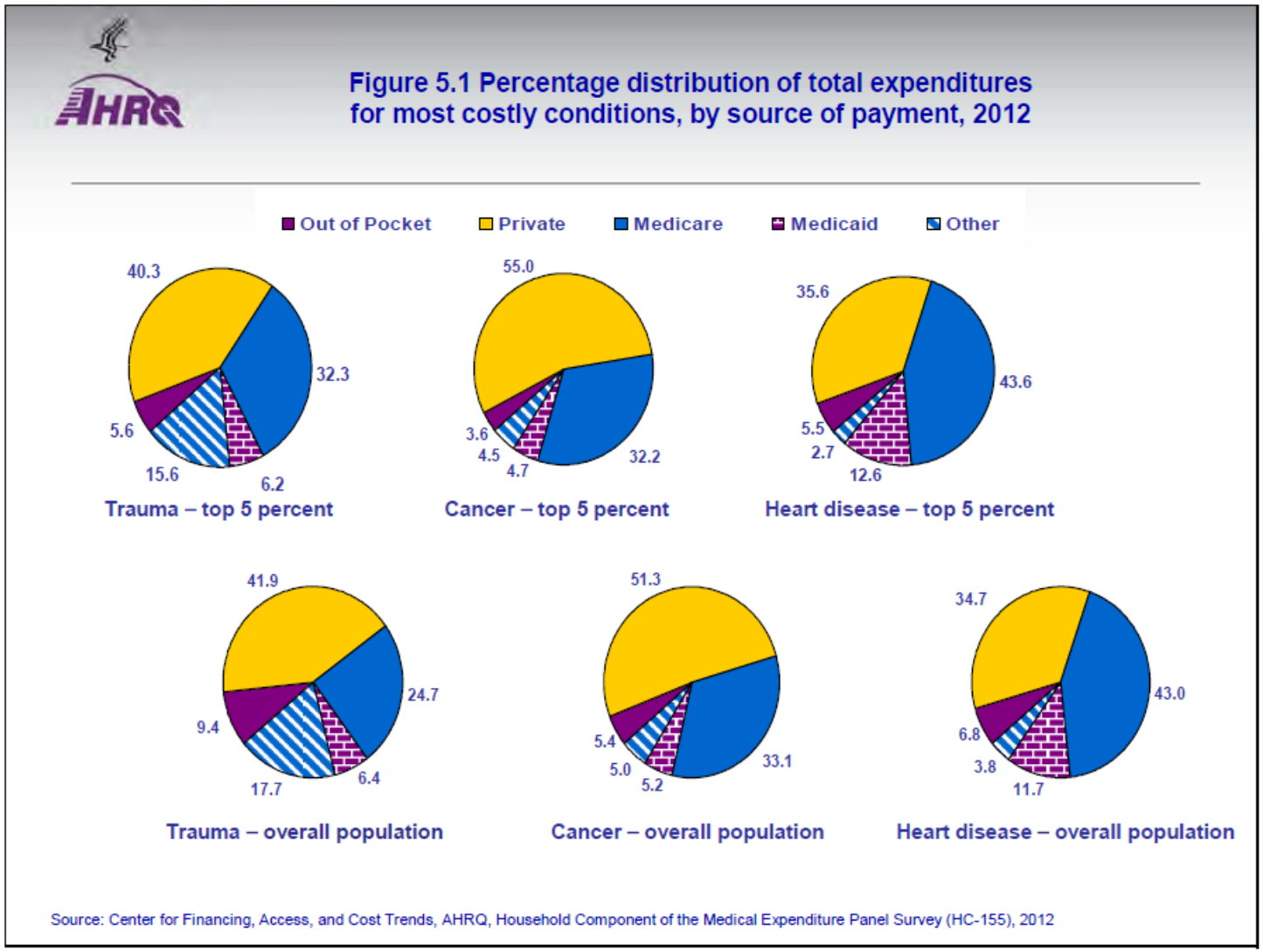
- Five most costly conditions cost $440 billion
  - roughly 50% inpatient, 30% outpatient, 10% drugs



Statistical Brief #455: The Concentration of Health Care Expenditures and Related Expenses for Costly Medical Conditions, 2012

5

- Mostly Private insurance and Medicare pays
  - little out of pocket except me



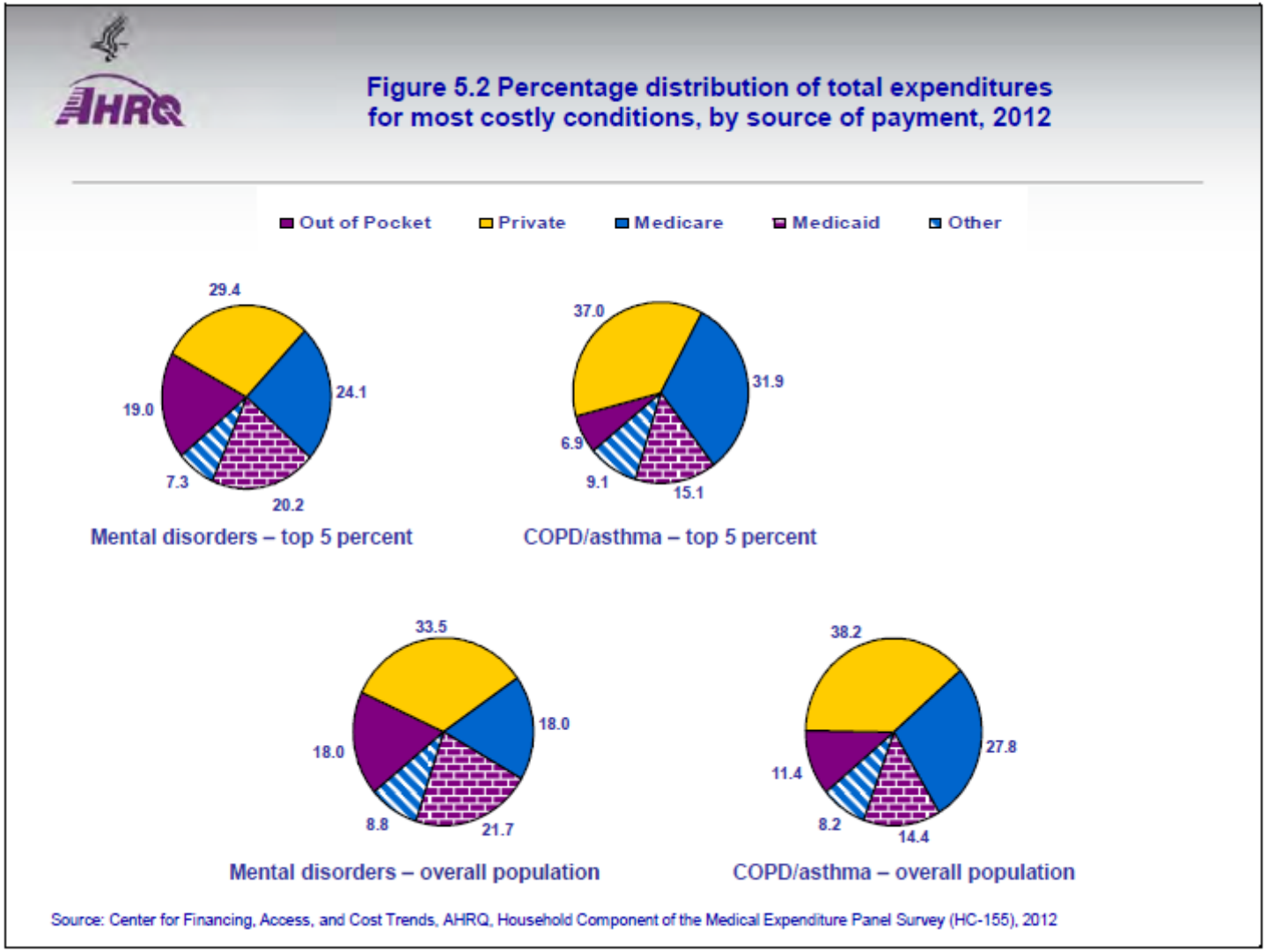


Figure 5.2 Percentage distribution of total expenditures for most costly conditions, by source of payment, 2012
Out of Pocket
Private
Medicare
Medicaid
Other
29.4
24.1
19.0
7.3
20.2
Mental disorders – top 5 percent
37.0
31.9
6.9
9.1
15.1
COPD/asthma – top 5 percent
33.5
18.0
18.0
8.8
21.7
Mental disorders – overall population
38.2
27.8
11.4
8.2
14.4
COPD/asthma – overall population
Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey (HC-155), 2012