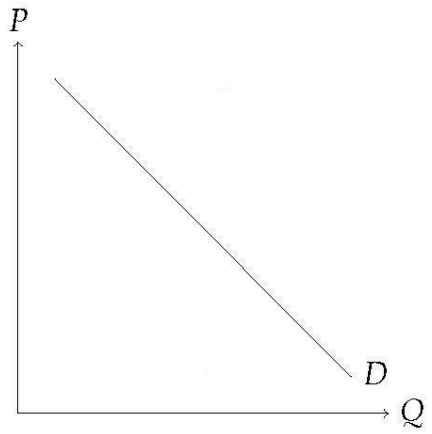
# CHAPTER 2
# DEMAND FOR HEALTH CARE

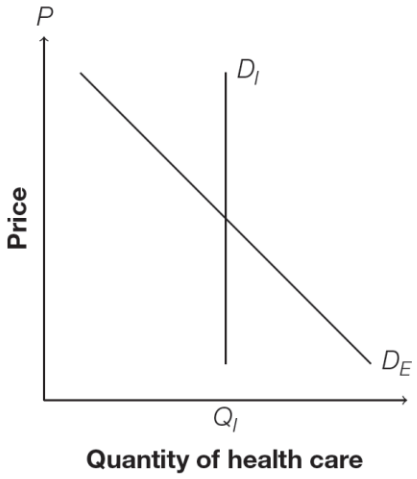
## Standard economic demand curves are downward sloping

- As price (P) *decreases*, quantity (Q) demanded *increases*
  - Example:
    - P=$3, Q=4 lollipops
    - P=$1, Q=8 lollipops
    - P=$0.50, Q=9 lollipops



## Elasticity measures the degree of downward-sloping

- **Elastic demand $D_E$**
  - **price sensitive:** changes in price greatly affect the quantity demanded
- **Inelastic demand $D_I$**
  - **Price insensitive:** changes in price do *not* significantly change the quantity demanded

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## Does the demand curve for health care slope downward?

- Are people sensitive to the price of health care?
  - Is demand for vaccines such that…
    - P = $100, Q=1,000
    - P = $1, Q=1,000
    - i.e. demand is inelastic?
  - Is demand for band-aids such that…
    - P = $100, Q = 1
    - P = $1, Q = 30
    - i.e. demand is elastic?
- If people *always* obey their doctors, then demand should be ***inelastic***!

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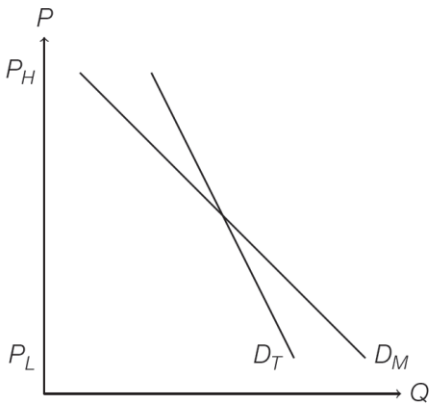
## Need randomized experiments

- **Randomized experiments:**
  - Definition: a study that assigns treatments randomly to different groups of study participants
  - Includes:
    - A control group (no treatment)
    - Placebo group
  - Helps generate experimental groups that are statistically similar to each other



## Non-randomized experiments can be biased

- Measured demand curve $D_M$ is biased compared to true demand $D_T$
- People generally choose the amount of insurance they receive
- Sicker people will choose more insurance because they know they will need more care



## Evidence from Randomized Experiments

## Two Randomized Experiments

- RAND Health Insurance Experiment (HIE)
- Oregon Medicaid Experiment

## RAND HIE

- Randomly assigned 2,000 families from six US cities to different insurance coverage plans
  - Copayments groups:
    - Free, 25%, 50%, and 95%
- Tracked utilization of health care (Q) in each copayment plan (P)
  - Copayment acts as the marginal cost that each family faces when buying care



## Oregon Medicaid Experiment

- Compared two groups of low-income adults
  - Medicaid lottery winners vs. lottery losers
- Lottery winners got to apply for public health insurance through Medicaid
  - So they faced lower out-of-pocket prices for care
- Lottery losers could not get Medicaid (but might have purchased outside insurance)

## Results?

- Health care demand curves are downward sloping (economic theory prevails!)
  - Price changes affected demand for health care



## Different measures of care

- **Outpatient Care**
  - Def: any medical care that does not involve an overnight hospital stay
    - E.g. runny noses, twisted ankles, minor broken bones
- **Inpatient Care**
  - Def: medical care requiring overnight stays
    - E.g. More serious surgeries or conditions that require overnight recovery or monitoring
- **ER Care**
  - Def: care involving the emergency room
    - E.g. heart attacks, strokes

# Outpatient care

- RAND HIE
  - As patient cost-sharing (P) increases, number of episodes (Q) of outpatient care decreases
  - Holds for both acute and chronic conditions

| (a) Data from Keeler et al. (1988) | | | |
|---|---|---|---|
| | Avg # of annual episodes by condition | | |
| Plan | Total | Acute | Chronic |
| Free | 2.99 | 2.29 | 0.70 |
| 25% | 2.32 | 1.78 | 0.54 |
| 50% | 2.11 | 1.60 | 0.51 |
| 95% | 1.90 | 1.44 | 0.46 |

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# Outpatient care

- Oregon Medicaid Study
  - Lottery winners have more outpatient visits than lottery losers

**Both the RAND HIE and the Oregon Medicaid Study find downward-sloping demand for outpatient care!**

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# Inpatient care

- **RAND HIE**

(a) (Data from Keeler, 1988)

| Plan | Avg # of Annual Visits |
|---|---|
| Free | 0.133 |
| 25% | 0.109 |
| 50% | 0.099 |
| 95% | 0.098 |

* Indicates significantly different from the free plan at the $p = 5\%$ level.
** Indicates significantly different from the free plan at the $p = 1\%$ level.

- **Oregon Medicaid Study**

No significant difference in usage rates between lottery winners and lottery losers

Demand is still downward-sloping but *less* elastic than demand for outpatient care



# ER care

- **RAND HIE**

(a) (Data from Newhouse, 1993)

| Plan | Probability of ER use |
|---|---|
| Free | 22% |
| 25% | 19%* |
| 50% | 20% |
| 95% | 15%** |

* Indicates significantly different from the free plan at the $p = 5\%$ level.
** Indicates significantly different from the free plan at the $p = 1\%$ level.

- **Oregon Medicaid Study**

No significant difference in ER care for lottery winners *vs.* lottery losers

Even for emergency room care – likely the most urgent kind – those on the highest copayment plan in the RAND HIE were *less* likely to buy care!

# Pediatric care

- Pediatric care
  - Def: care for infants or children usually paid for by a parent or guardian
- Data from RAND HIE:

**Table 2.5.** *Percentage with preventative pediatric care over three years, by age and care type.*

| | 0–6 years | | 7–16 years | |
|---|---|---|---|---|
| | Immunization | Any preventative | Immunization | Any preventative |
| Free | 58.9 | 82.5 | 21.2 | 64.8 |
| Copayment | 48.7* | 73.7* | 21.7 | 59.6 |

* Statistically significant discrepancy from free plan.

*Source:* Newhouse (1993). With permission from RAND.



# Mental health & dental Care (RAND HIE)

**Table 2.6.** *Per-capita mental health expenditures, by plan type.*

| Plan | Mean expense ($) | Percentage of free plan |
|---|---|---|
| Free | 42.2 | – |
| 25% | 28.4 | 67% |
| 50% | 13.1 | 33% |
| 95% | 18.1 | 43% |

*Source:* Newhouse (1993). With permission from RAND.

**Table 2.7.** *Dental care utilization by income level.*

| | Low-income group† | | High-income group† | |
|---|---|---|---|---|
| | Percentage with any use | Average expenditures ($) | Percentage with any use | Average expenditures ($) |
| Free | 57.8 | 317 | 74.7 | 339 |
| 95% | 39.8* | 216* | 61.3* | 234* |

* Statistically significant discrepancy from free plan.
† The low-income group comprises the third of households with the lowest incomes. The high-income group comprises the third of households with the highest incomes.

*Source:* Newhouse (1993). With permission from RAND.

## Prescription drugs

- Data from RAND HIE

**Table 2.8.** *Antibiotic use in the RAND HIE.*

| | No. of antibiotics per person | |
|---|---|---|
| Plan | Bacterial conditions | Viral conditions |
| Free | 0.47 | 0.17 |
| Copay | 0.24** | 0.08** |

** Statistically significant discrepancy from the free plan.

*Source:* Keeler et al. (1988). With permission from RAND.



## Non-randomized experiment evidence

- U.S. Medicare
  - Citizens are eligible for health insurance through Medicare when they turn 65 but not before
  - If demand for health care is downward-sloping, we expect a jump in health care usage at age 65
  - This is known as a **discontinuity study**
    - There is a discontinuity in health insurance at age 65

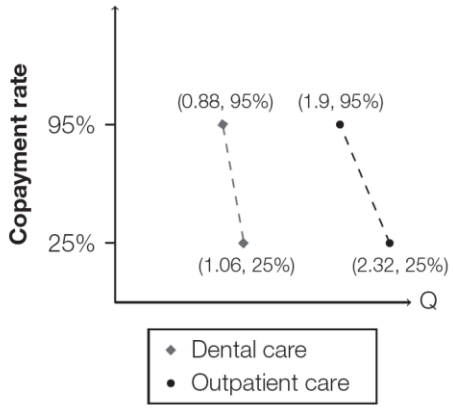
## Card et al. (2009)

- Card et al. have two main findings:
  - **Unplanned** emergency department admissions follow a linear trend around the age of 65
  - Other hospital admissions *jump* up at the age of 65
- There is a discontinuity in medical usage at the same point of discontinuity in Medicare coverage!
- This is further evidence that demand for health care is sensitive to price



## Comparing demand curves

- How can we determine which type of demand is more price sensitive?




Data from Keeler et al. (1988)

# Arc Elasticity

- Need a measure to compare the relative price sensitivity of *different* goods
  - So the measure needs to be unitless (how else would we compare ER visits to sticks of gum?)
- **Arc Elasticity:**

$$\epsilon_{arc} = \frac{\Delta Q/(Q_1 + Q_2)}{\Delta P/(P_1 + P_2)}$$

where $\Delta Q = Q_2 - Q_1$ and $\Delta P = P_2 - P_1$

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# Health care has inelastic demand

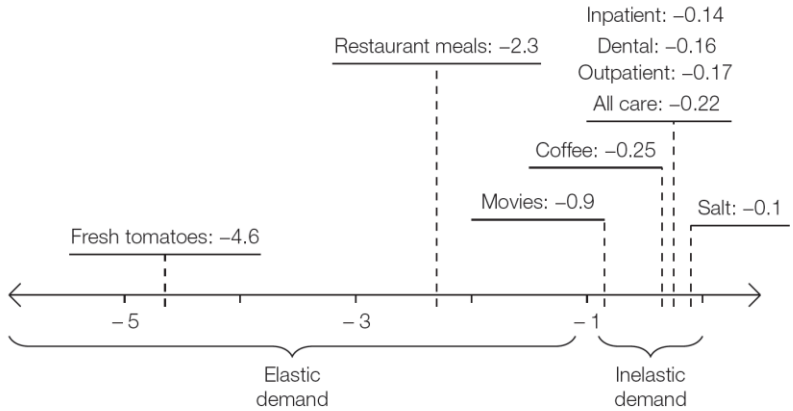


**Figure 2.5.** *Elasticities of various goods.*

*Source:* Developed from Newhouse (1993) and Gwartney et al. (2008).

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## Does price for care affect health?

- **Mortality rates**
  - **RAND HIE:** no difference between treatment groups
    - ** 10% difference of mortality rate between **high-risk** participants on free and cost-sharing plans (people on free plan less likely to die)
  - **Oregon Medicaid:** no difference between lottery winners and losers

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## Does the price of care affect health?

# Does price for care affect health?

- RAND HIE:
  - Generally, no health differences between people on free plan vs. cost-sharing!

**Only statistically significant difference between plans were in blood pressure, myopia, & presbyopia

**Table 2.10.** *Health indicators by insurance plan in the RAND HIE.*

| Condition | Free plan | Copay plan |
|---|---|---|
| $FEV_1^a$ | 95.0 | 94.8 |
| Diastolic blood pressure (mm Hg) | 78.0 | 78.8* |
| Cholesterol (mg/dl) | 203 | 202 |
| Glucose (mg/dl) | 94.7 | 94.2 |
| Abnormal thyroid level (% of sample) | 2.4 | 1.7 |
| Hemoglobin (g/100 ml) | 14.5 | 14.5 |
| Functional far vision (Snellen lines) | 2.4 | 2.5* |
| Functional near vision (Snellen lines) | 2.35 | 2.44* |
| Chronic joint symptoms (% of sample) | 30.0 | 31.6 |

[a] FEV is forced expiratory volume in 1 second.
* Indicates significantly different from the free plan at the $p = 5\%$ level.
*Source:* Newhouse (1993). With permission from RAND.



# Does price for care affect health?

- **Oregon Medicaid Experiment**
  - Lottery winners self-reported better overall health, more healthy days, and lower rates of depression

- Discrepancy with RAND HIE may be because Oregon Medicaid Study worked with the very low-income, while RAND HIE studied a broader cross-section of the U.S.

# Conclusion

- Demand curves for health care are downward sloping
  - Quantity of care demanded is sensitive to price (though not as sensitive as other demands, e.g. for movies)
- **BUT** generally, price of health care does not seem to affect one's health
  - Exception is that price seems to affect the most vulnerable segments of the population (low-income, high blood pressure, etc.)
- Policy and health insurance implications?