JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH

Pharmaceuticals

Health Economics Lecture 12

Outline

- Peculiarities of the Pharmaceutical Industry
- Why have sales grown?
- Pricing
  - Distorted incentives
  - Global need vs. profit
- Accounting for profit

What is different about pharma?

- High profits
- High prices relative to marginal cost
  - But need to account for high overhead
- Rising prices due to rising insurance coverage
- High spending on research and development
- High risk

Pharmaceuticals as a "Knowledge" Product

Pharmaceutical Industry

- Large sunk research and development costs
  - Small marginal costs per pill
  - Markup is 10-100 times marginal cost
- Consumers still think they are buying pills
- They are buying the "R and D"
- Other examples
  - Buying a book is not buying the paper and the ink
  - Buying a painting is not buying the canvas and the paint

Growth of Pharmaceuticals

- In 2002 $565 per person (10% of health expenditure)
- In 2015 $1385 per person (17% of health expenditure)

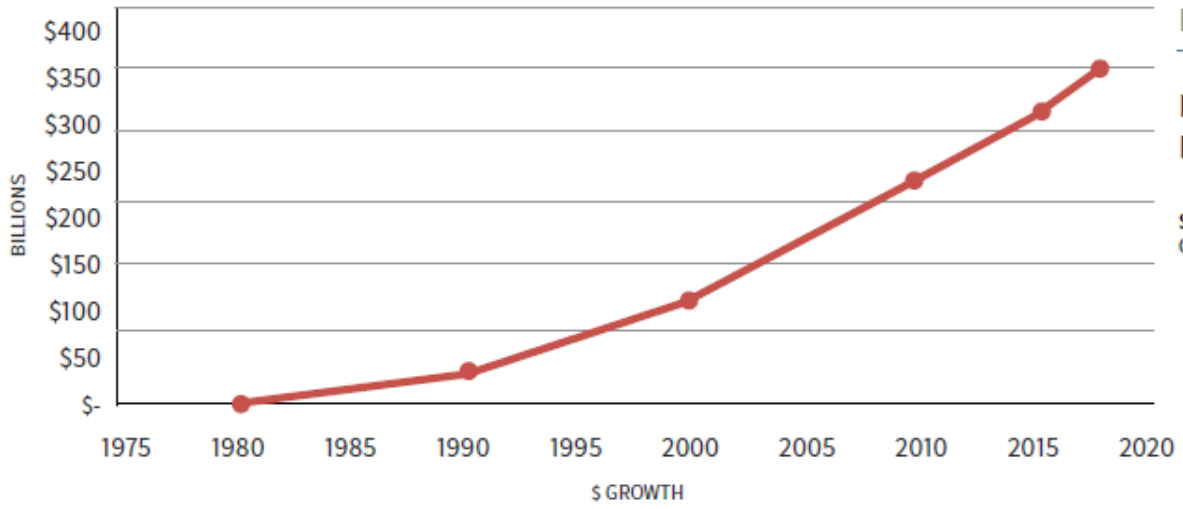


FIGURE 2

Retail Prescription Drug Spend

SOURCE
CMS Office of the Actuary

Source: American Patients First HHS 2019

Two Eras of Drug Cost Rise

- Growth from 1990s to 2010s was mainly volume growth not price growth
- Growth from 2010s to 2020s mainly price growth
  - US prices are 80-150% more than Europe for identical drugs
  - 1 out of 4 US consumers not filling a prescription in 2015 due to cost

Explaining the 1990s Growth in Drug Utilization

- Better insurance coverage for pharmaceuticals
  - Attractive mail order pharmacies (low co-pays)
- Better products with expanded indications
- Substituting chemicals instead of hospital and physician services

Medicare Part D

- Started January 1, 2006
- Deductible of $325
- Donut hole designed in as of 2006
  - Get 25% copay up to about $2970 then
  - 100% co pay from $2971 to $4750 then
  - 0% co pay after $4750
- Donut hole closing under Obamacare
- Drug prices will rise

Insurance Coverage for Drugs Increased

- Three tier insurance
  - Generics lowest co-insurance (19%)
  - Preferred name brand with co-insurance (21%)
  - Non-preferred name brand with co-insurance (42%)
- Preferred brands indicate
  - Monopsony buying power of largest insurers
  - Negotiate preferred rates for inclusion on formulary

New Drugs

- Expenditures on new drugs=42% of spending growth
  - Lots of “me-too” drugs get released
    - Levofloxacin is the levo-isomer of ciprofloxacin
    - Lopinavir is ritonavir + a methyl group
  - With good marketing “me-too” drugs can acquire market share
- New categories of drugs
  - New categories of
    - AIDS drugs (Protease Inhibitors, Fusion Inhibitors)
    - Ulcer drugs (Proton Pump Inhibitors)
    - Depression drugs (Serotonin Reuptake Inhibitors)
    - Diabetes drugs (Metformin)
    - Erectile dysfunction drugs (Viagra, Cialis)

Why there are no new malaria drugs

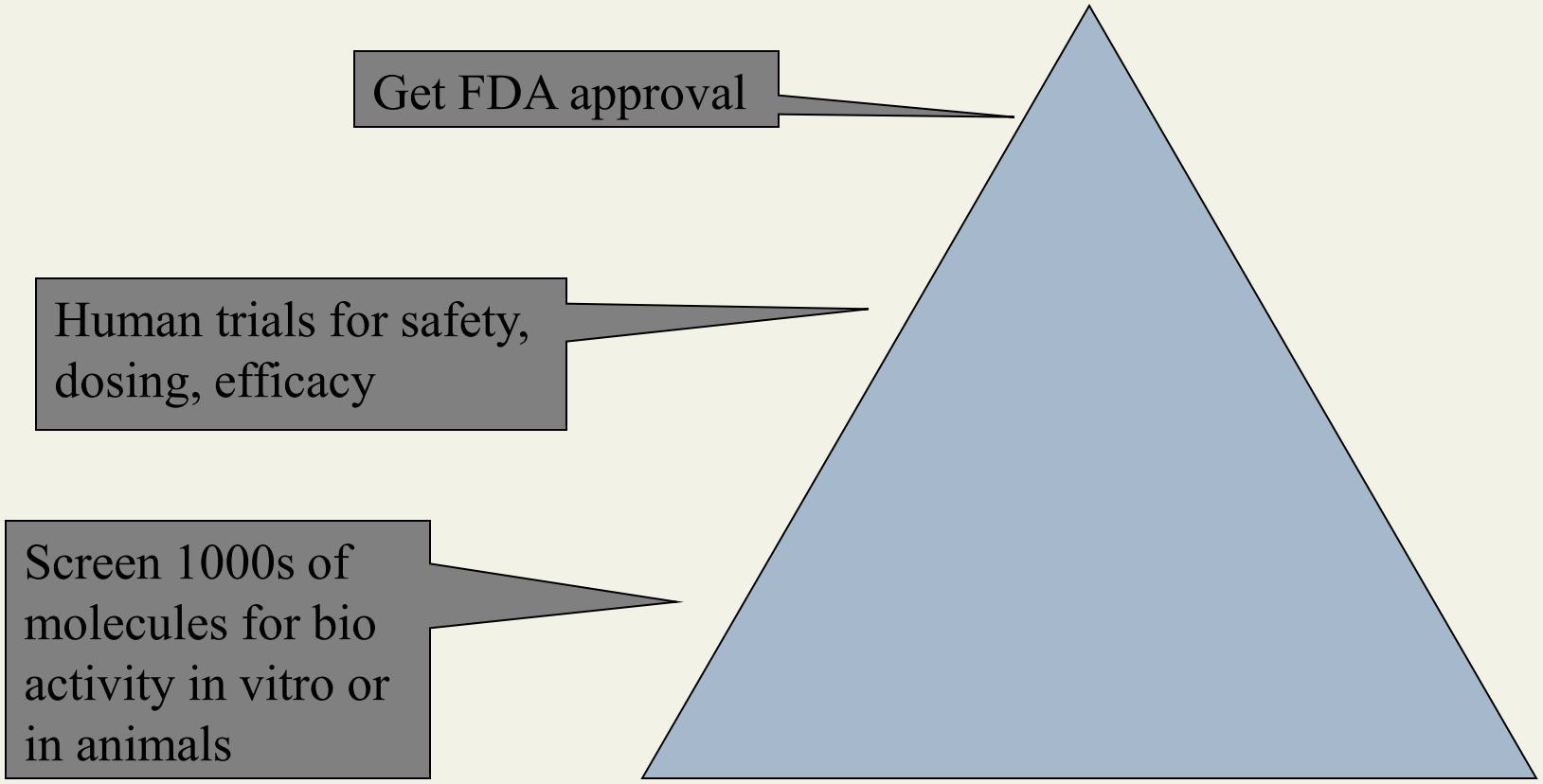
- Ability to pay is low
- Spend precious R & D on high profit drugs for chronic diseases of rich people
  - No financial incentive to spend on acute diseases or tropical diseases
    - Antibiotics only get used in 10 day courses
    - Vaccines once every 10 years
    - Insulin gets uses every day for life

Substitution Effects

- Health production technology shifts from hospitals and doctors to drugs
- AIDS and Highly Active Antiretroviral Therapy (HAART)
  - Discoveries in 1996
    - Triple therapy→AIDS kept in check for decades
  - Drugs keep patients out of hospital
  - Outcomes vastly improved
- Mental Health
  - Costly counseling and inpatient hospitalization
  - Insurance companies offer generous drug benefits but restricted coverage for inpatient care

PRICES

Pharmaceutical Discovery



Pricing

- It costs $802 million and takes 12 years to get a drug to market
  - Up from $350 million in 1991
  - Spend some of patent time doing trials
    - Phase 1 (Is it safe?) N=10
    - Phase 2 (What is a good dose?) N=100
    - Phase 3 (Does it work?) N=1000
- After spending $802 million, can often produce the pills for less than 10 cents a pill
- Isoniazide pills cheaper to produce than mud pills.

Profit maximizing price

- Given market power how should drug company price a patented pharmaceutical that they just sunk $800 million in?
- Example Ritonavir
  - Protease inhibitor (PI) for AIDS
    - When released dose 400 mg twice a day.
    - Priced at ~$10 per pill or $600 per month
  - Discovery
    - Ritonavir at 400mg had side effects
    - But at 100mg twice a day it boosted the efficacy of other drugs
    - Standard regimen is 100mg ritonavir + Some other PI
      - Everybody using ¼ as much ritonavir as before
  - Abbott Labs raised the price to $40 per pill
  - Pandemonium! Boycotts and demonstrations!

Incentives for R&D

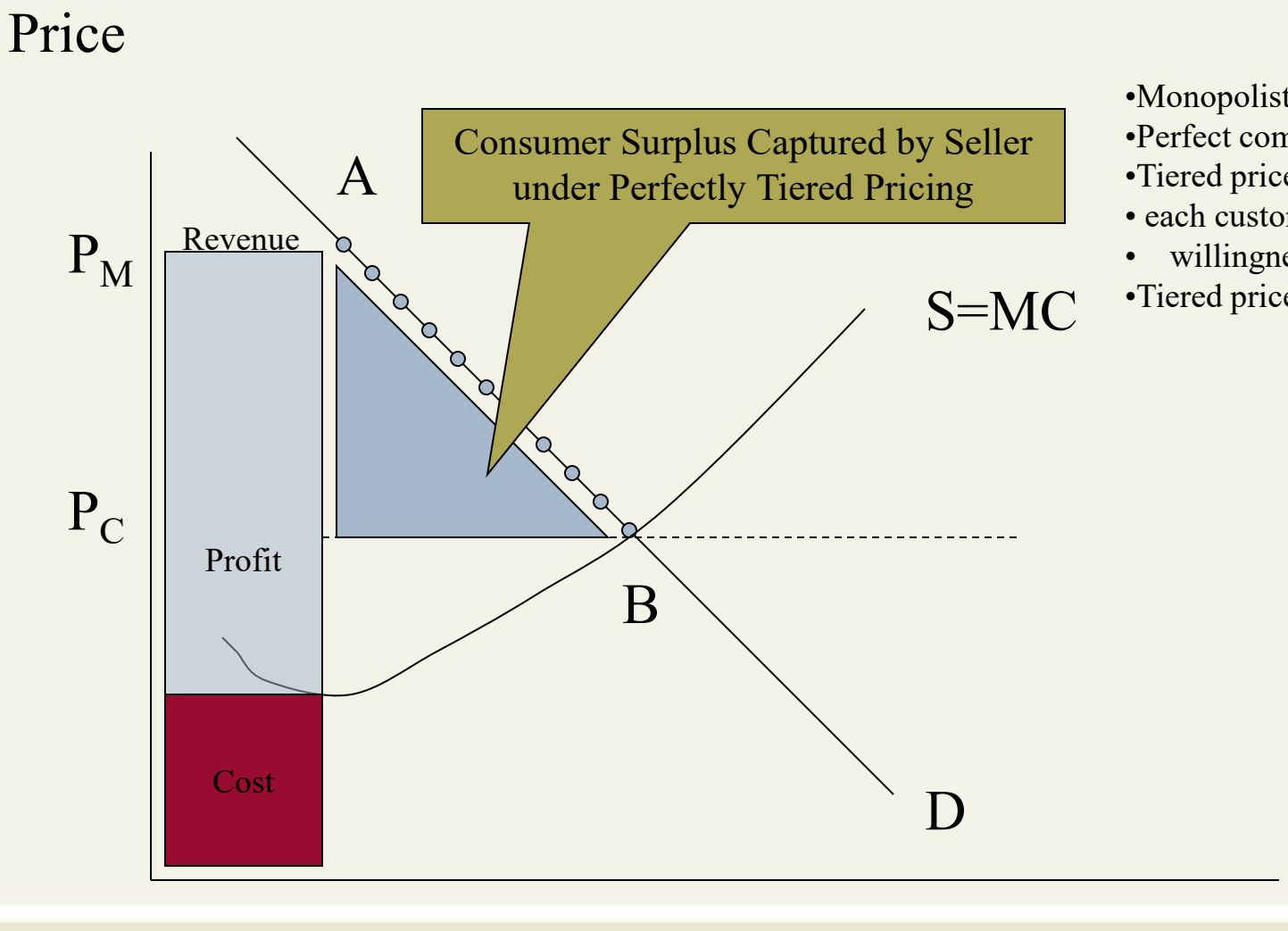
- Patents and Copyrights
  - Reward innovation by giving monopoly pricing power
  - Up to patent holder to use this power
- Other options:
  - Contests
  - Guaranteed purchase agreements

Monopoly Pricing vs. Tiered Pricing

- If no ability to resell product
- If consumer's have heterogenous demand
- Segmenting market offers larger profits than monopoly pricing
  - Need to limit resale opportunities

- Tiered pricing is the rule in international pricing
  - US pays highest tier
  - Northern Europe and Japan second highest
  - Southern Europe
  - Brazil Thailand
  - Africa and South Asia (not in system)

Tiered Pricing



- Monopolist prices at point A.
- Perfect competition prices at point B
- Tiered price monopolist charges
- each customer their maximum
- willingness to pay.
- Tiered price profits are highest

Pharmaceuticals Price Crisis

- Price hikes in US in last five years especially on new specialty drugs
- Explanations
  - Higher demand x Monopolists
  - Austerity measures in Europe after 2008

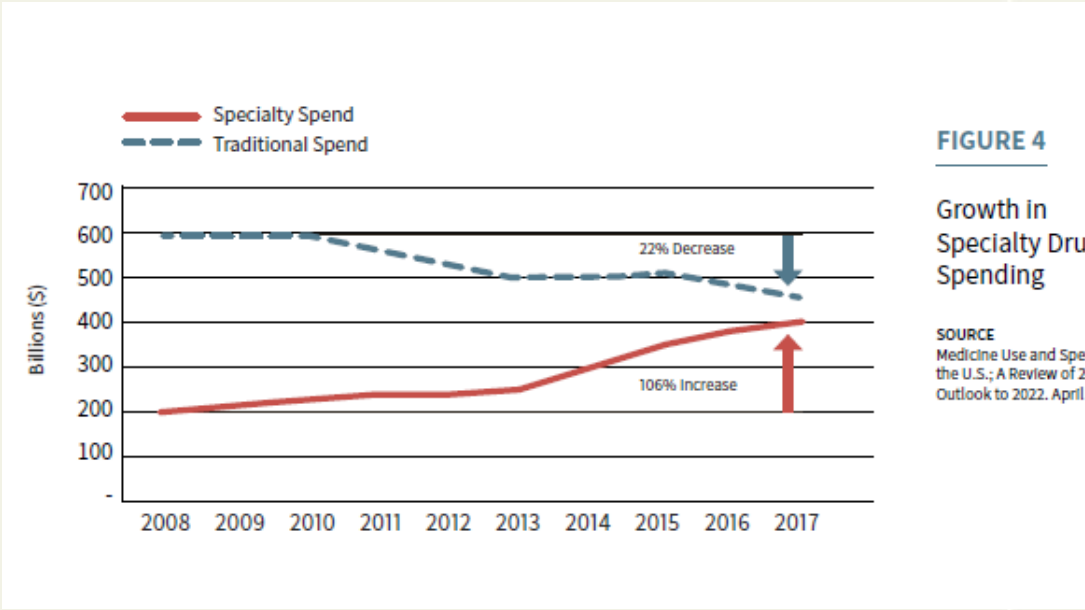


FIGURE 4

Growth in Specialty Dru Spending

SOURCE
Medicine Use and Spe the U.S.; A Review of 2 Outlook to 2022. April

Source: American Patients First HHS 2019

Solutions

- Reference Pricing
  - Tie US prices to prices in other countries
- Monopsony Buying
  - Medicare Part D prohibited from negotiating
  - No industry spends more than US Pharma on lobbying!

Ideas considered by the White House

- Cap drug price growth (an inflation limit) for Medicare part B drugs
- Allow Medicare Part D to negotiate
- Feds to study OECD drug price histories to consider reference pricing
- Award demonstration projects to lower drug prices in state and local health systems

"We're the largest buyer of drugs in the world, and yet we don't bid properly."

– PRESIDENT TRUMP

Market regulation: Politics

- FOR IT
  - Donald Trump
  - Nancy Pelosi
    - Dems
- AGAINST IT
  - Mitch McConnell
    - GNP

Society's Interests

- Generational warfare
  - Profits paid by today's sick and dying used to finance discovery of cure's for tomorrow's sick and dying.
- Tension based on Patent System
  - Treating more people today
  - vs. Curing more people in the future
- In the US it is the old whose diseases fund the drug discovery system
  - How interested are they in financing new drug discovery?

Summary

- Pharmaceuticals growing part of US health care system
  - Better insurance coverage
  - Better products
  - Substitution for more costly hospitalizations
- Pricing is widely misunderstood
  - Drugs are like music
  - What is for sale is the “drug experience” not the pill
- Incentives for R&D
  - Distort investment towards high profit diseases
  - Hold potential benefits for future generations hostage to politics and willingness to pay of the current sick.