THE VARIOUS SUPPLIERS OF HEALTH CARE

The big three account for about two-thirds of spending

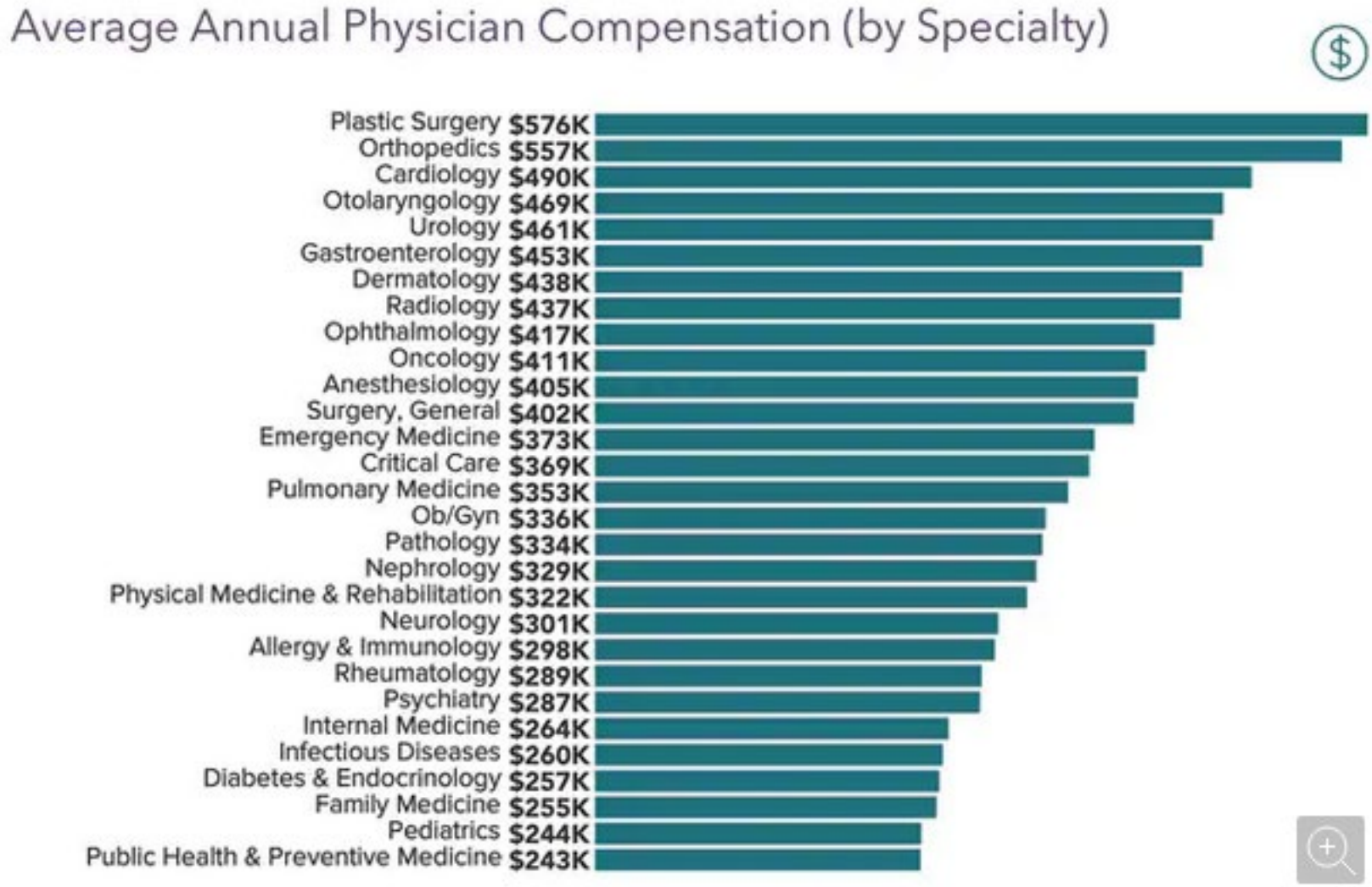
Physicians	20% of spending
Hospitals	31% of spending
Pharmaceutical Drugs	13% of spending

PHYSICIANS (21% of spending)

- Physician income is **very high**.
- It is high in part due to vary **high training time and cost**
  - but even allowing for this the income is high
  - high rate of return on the investment in training.
- The **supply of doctors is restricted** due to need to be certified
  - this was especially the case before 1963
  - also may restrict ability to substitute to other inputs
    (nurse practitioners, competing types of doctors, …)
  - this may increase physician incomes.
- The **benefit of the high training** is to ensure quality
  - people can trust in the physician's ability.

Average Annual full-time Compensation (Medscape Report 2022)

$ 260,000 in primary care and $ 368,000 in specialty care.



HOSPITALS (30% of spending)

Hospital History

- Came of age in the 20th century.

Hospital Characteristics

- Big and funded by third party insurance.

Physicians within Hospitals

- Not traditional firm.

Hospital reimbursement

- very complicated.

Hospitals History

- Originally care for those without potential home care
- Word "hospital" originated in 12th century.
- First U.S. hospital in Pennsylvania in 1751
- Technological advances beginning in late 1800's
  - anesthesia for surgery
  - asceptic techniques to reduce germs
  - x-rays to diagnose.
- Funded in U.S. by philanthropy until 1929.
  - then insurance initially through Blue Cross
    and now MCOs and Medicare/Medicaid.
- 1946 Hill-Burton Act
  - increased # hospitals by paying for construction
  - in return hospitals provide free or low-cost care for the poor.

Hospital Characteristics

- 6,100 hospitals, 920 million beds, 7.4 million workers in 2019. Mostly community hospital; 20% are for profit.
- Average characteristics of a hospital in 2010
  https://www.statista.com/study/11733/hospitals-in-the-us-statista-dossier/
  - $220 million revenue (41% for outpatient care)
  - 150 beds (there are economies of scale)
  - Revenue sources mostly third party (and much from govt.)
    - 35% Private insurance
    - 57% Government (28% Medicare, 20% Medicaid)
    - 3% Patient self-pay (often copay)
    - 5% Philanthropy and other private
  - Uses of Funds
    - 56% Wages and benefits
    - 12% Professional Fees
    - 32% Supplies, other

- Hospitals are much more labor and capital intensive and treat serious case, so utilization is down but is more intensive.
- Utilization
  - 2018 6.7% of popn per year have one or more hospital stays
  - 1980-2018 Ave length of stay down from 7.6 to 5.4 days
  - 66% of beds are occupied (excess capacity)
  - Increased use of substitute outpatient surgery.
- Great change in real cost per patient bed day (2010 $)
  [due mostly to increased labor per bed day]
  - 1950 1960 1970 1980 1990 2000 2010 2019
  - $100 $170 $330 $560 $1000 $1400 $1800 $3,100
- Kaiser Family Foundation: hospital expenses per inpatient day $2,600 in 2019 in current 2019 $
  - ranged from $1,300 in Misissippi to $3,700 in California.

Hospital Competition

- Hospitals do compete
  - most are non-profit which is tax-favored
  - but non-profits behave a lot like profits.
- Hospitals have market power (highly concentrated)
  - Local market concentration is equivalent to three hospitals each with a one-third market share
- Hospitals compete as oligopolies with a differentiated product.
  - price competition is muted by insurance
  - competition is more on quality
    e.g. get the best doctors by having the best equipment (medical arms race)
    e.g. nice hospital amenities for patients.

Hospital Reimbursement

- Historically paid by **retrospective payment**
  - payment for each service provided to the patient.

- Increasingly **prospective payment** where paid for providing a particular treatment regardless treatment intesity
  - e.g. payment by diagnosis related group (DRG)
  - e.g. per diem hospital accommodation per bed day
  and capitation with Casemix adjustment for severity of case.

- Hospitals prices in the U.S. are negotiated with payers.

- The starting point is a menu of prices for different services called the **chargemaster**.

- Bhattacharya et al. Figure 6.3 gives posted prices for seven different California hospitals for several procedures
  e.g. A chest x-ray is listed as $120, $120, $410, $410, $450, $800 and $1,500 at the 7 hospitals!

- There is then much discounting (75% discount is not unusual)
  - Medicare and Medicaid pay the least
  - private insurers pay the next least
  - uninsured pay the most (if they can pay)
  - about 6-7% of hospital care is uncompensated.

Other Methods of Funding Hospitals

- **Philanthropy**
  - The initial funding source for hospitals and still happens.
- **Global Budget** = grant for all costs.
  Military, VA, State mental and also other countries.
- **Cost shifting**
  - revenues from one group of patients subsidizes others
  - pays for uninsured, research, education, autopsies, complex cases, Medicaid (if under-reimburse)
  - possible if profits made elsewhere.

PHARMACEUTICAL DRUGS 13% of spending

Pharmaceutical history

- Really established in 1940's.

Pharmaceutical industry characteristics

- Now mostly funded by third party
- High prices under patent encourages R&D and new drugs.

Pharmaceutical reimbursement

- When patent in effect monopoly pricing
- Generics possible once off patent and formularies are used.

Drug Research and Development Process

- Very expensive and takes a long time to bring drug to market.

Current concerns

- Chasing money rather than most beneficial drugs.

Pharmaceutical History

- Late 1800's: Help symptoms but no cure.
- Mid 1890's: Diphtheria anti-toxin.
- 1902: Biologics Control Act (federal govt. gets involved)
- 1906: Pure Food and Drug Act (labeling)
- 1931: FDA established (Food and Drug Administration)
- 1940's: Growth of modern pharmaceutical firms
  - new techniques
  - patent process, not just product
  - licensing to other firms ceased.
- 1950's-60's: Wonder drugs created e.g. aspirin.
- 2010's: Biologics (complex mixtures such as vaccines, rather than single chemical entity) being developed.

Pharmaceutical history (continued)

- 1962: Thalidomide anti-nausea drug led to birth defects
- 1962: Drug approval requirements ↑ (safe and effective).
- 1984: Can extend patent up to 5 years (beyond 20) if long delays in approval. Also much easier to approve generics.
- 1997: Speed up drug approval. Allow more advertising.
- 2007: Monitor drugs after approval (e.g. Vioxx, stents).
- Recent large increase in brand name drug prices, especially biologics (not simply a chemical).
- 2020: Rapid development and approval of Covid-19 vaccines including messenger ribonucleic acid (mRNA).

Pharmaceutical Industry Characteristics

- $378 billion in 2021 on retail prescription drugs.
- Current detailed data is difficult to find.
- **Revenue Sources**
  - 45% Private Insurance
  - 15% Out of pocket (versus 82% in 1970)
  - 28% Medicare (versus 2% before Part D)
  - 8% Medicaid
  - 4% Other Public
- Big changes are switch from self-pay and introduction of Medicare Part D Prescription in 2006.
- Prescription drug average prices from Getzen (2010) p.249
  - All prescriptions $72
  - Brand name $138 [35% of prescriptions]
  - Generic $35 [65% of prescriptions]
  - Generics were 20% of dollars spent.

Pharmaceutical Industry Characteristics (continued)

- Use of funds (old 2003 data)
  - 30% Cost of Drugs
  - 31% Sales, Marketing, Advertising, Administration
  - 13% R & D (Research and Development)
  - 6% Taxes
  - 20% Profits
- High profit rate
- R&D is high but not as high as one might think
  - PhRMA survey says 20% of sales in 2019.
- Big risk as it is calculated that each new chemical entity costs as much as $500 million (questionable) to bring to market.
- Patent can be extended extra five years beyond 20 years if approval delay, provided <= 14 years effective patent life.

Pharmaceutical Reimbursement

- Many drugs must be provided by insurers regardless of price and cost-effectiveness!
- Medicare by law cannot directly negotiate with drug manufacturers over price for Part B (which covers physician-administered intravenous drugs) or Part D (oral cancer drugs) and cannot consider cost or cost-effectiveness in coverage decisions.
- Medicare Part D plans must cover all drugs in six protected classes (anticonvulsants, antidepressants, antineoplastic, antipsychotics, antiretrovirals and immunosuppressants) which includes anticancer drugs.
- Three-quarter of states require insurers to cover anticancer drugs for off-label uses.
- Even without these requirements insurers face great pressure from doctors and advocacy groups if they restrict access.
- Some discounting to 340B-qualified buyers and to Medicaid.

Pharmaceutical Reimbursement (continued)

- To encourage competition from substitute drugs
  - MCO's use formularies (lists of preferred drugs)
  - These attempt to discourage use of high cost drugs
  - And often tiered pricing
    e.g. $15 generic
    $35 brand name on formulary
  - Brand name drugs try to get around this by giving coupons that reduce the copay (to even below that for the generic).

- Also competition from other forms of health care
  - pharmaceutical substitute with other forms of health care
  - different countries have greatly different use of drugs.

- Recently no blockbuster drugs like e.g. aspirin
  - but that may change with biologics
  - e.g. Humira for arthritis, … $20 billion revenue in 2020

- **Drugs** are chemicals manufactured through chemical synthesis
- **Biologics** are complex mixtures of molecules manufactured in a living system (microorganism or plant or animal cells) often using recombinant DNA.
- **Generic drugs** must have the same, strength, dosage form and administration route as the reference drug and be bioequivalent
- Easy for drug but difficult for biologic
  - "generic" biologic is called a **biosimilar** and needs a drug trial.

- Recent **high prices** of newly-developed drugs/biologics and of existing drugs bought out by other companies.
  - Epipen (Mylan) injectable adrenaline for allergic reactions was $100 in 2008 and is now $650 for a twin pack.
  - Daraprim (Turing – Martin Shkrelli) for toxoplasmosis and cystiososporiasis price rose in 2015 from $13.50 a pill to $750.
  - Kymriah (Novartis) a biologic for cancer (esp. a rare form of leukemia) for cancer will cost $475,000.
  - Insulin around for 100 years though improvements over time.

  In 2018 the average insulin price in the US was $98.70, compared to $6.94 Australia, $12.00 Canada, and $7.52 UK.
  There are many different formulations - see
  https://www.goodrx.com/blog/how-much-does-insulin-cost-compare-brands/

F.3.4 Drug Research and Development Process

- First step
  - Discovery
  - Synthesis
- Second step
  - patent (20 years from time of filing)
  - in vitro research (test tube cultures) and animals
  - often end-of –the-road
- Third step (has three phases)
  - Clinical trials in humans
  - Phases I to III.
- Risky process
  - < 1 in 5,000 new chemical entities make it to market.
  - it costs > $100 million to bring a drug to market
  - patents last 20 years from submission, then others may produce.

Phase I to III Trials

- Phase I:
  - A few people
  - Determine tolerable dose
- Phase II:
  - 30-300 patients studied for 2 years on average
  - safety and efficacy
- Phase III:
  - 1,000's of patients for 3 years on average
  - Double-blind trials
  - better measures efficacy and further ensures safety
- Fourth step
  - FDA approval takes another 2-3 years
  - there may be little time left on patents.

Drug Approval

- FDA requires the drug to be "safe and effective".
- In deciding whether to approve a drug two errors may be made
  - type 1 error: approve bad drug (false positive)
  - type 2 error: not approve good drug (false negative).
- There is a tradeoff between these
  - it is easier for public to see a type 1 error so regulators may be too conservative. So long process.
- Though effectiveness need not be great for approval
  - e.g. 30% improvement on drug versus 20% improvement on placebo is enough if statistically significant at 5%.
- Also for many drugs need physician approval to use
  - in most countries cannot do direct-to-consumer advertising.

LONG-TERM CARE (LTC)

- **Long-term care history:** Big expansion post 1965.
- **LTC revenues:** Mostly from third party.
- **LTC reimbursement mechanisms:**
  - now mostly prospective payment
- **LTC competition:**
  - two-thirds of nursing homes are for-profit
  - prospective payment can lead to low-quality care
  - cost-effective substitutes to nursing home are home health care and informal care (from family)
  - potentially large growing area

LTC revenues and reimbursement

- LTC is for people needing care but not in hospital
  - Skilled nursing homes include post-surgery recovery
  - Intermediate nursing homes are custodial care
  - Hospice care is for terminally ill
  - Home health care for those with acute and long-term needs (cheaper than if in nursing home)
  - Informal health care is stay at home with free family help
- Expenditures in 2021 (Source: NHE Table 1)
  - Nursing home $181 billion and Home health $125 billion.
- Funding sources for nursing home and for home health care
  - Medicaid (30% and 32%) restricted to the very poor
  - Medicare (22% and 39%) for less than 100 days
  - Private health insurance (10% and 15%)
  - Out-of-pocket (26% and 11%).
- Reimbursement - prospective with some case-mix adjustment.

LTC competition

- Two-thirds of nursing homes are for-profit
- Prospective payment may lead to low-quality care
  - > 66% of costs are wages and benefits (mostly aides)
  - most quality studies just use nursing home inputs
- Nursing home is most expensive so encourage
  - home health care
  - informal health care (from family)
- Potentially big area (Source: NHE Fact Sheet)
  - Average health spending on over 65 person in 2014
    = $19,000
    = 3 times that of a working-age person
    = 5 times that of a child.