

# What can actuaries possibly know about healthcare?

Institute of Actuaries in India

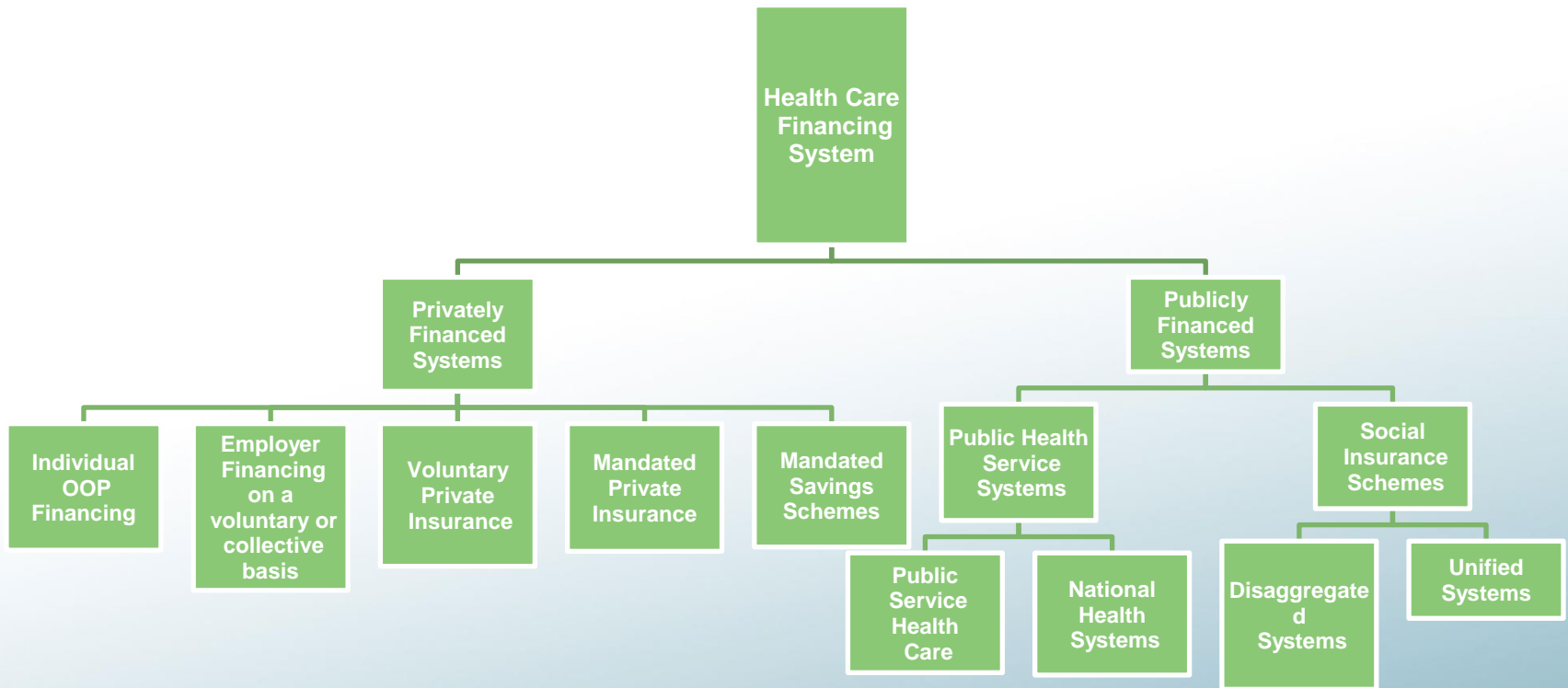
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# AGENDA

- Introduction
- The language of healthcare systems
- Why are healthcare systems inefficient?
- Incentives & why they matter
- Managing healthcare systems
- Actuarial issues in healthcare
- Q & A Session

# Types of healthcare systems



# Who are the stakeholders & what do they want?

- Patients
- Tax payers
- Commercial payers/insurers
- Employers
- Providers, e.g. hospitals, doctors
- Politicians
- Drug companies/biotech companies

# Key characteristics of healthcare markets

- How are they funded? Tax payers directly, tax payers via commercial entities, payroll taxes, premiums....
- How are those funds distributed? Block grants to providers, block grants, capitation rates to private payers, payer/provider split with flow of funds....
- How are doctors paid? Salaries, fee for service, capitation....
- How are hospitals paid? Block grants, activity rates by inpatient day, activity rates by hospital admission/discharge....
- Is there a risk equalisation system operating?
- How are drugs paid for? Risk sharing agreements, fee per prescription, block purchasing....
- All systems create different incentives => different behaviour  
=> different outcomes

# Why are healthcare systems inefficient?

- Almost no market efficiency assumptions hold in healthcare:
  - Patients rarely pay directly or full cost, so don't make choices based on allocation of income for health gain
  - Asymmetric information – patients (and payers) find it hard to judge quality
  - Little price transparency
  - Agency problems – doctors make decisions in “best interests of patients”.
- All these lead to disconnects between supply and demand => economic inefficiency

# Why do inefficient healthcare markets matter?

- Monopolies of supply (by hospitals and doctors) => higher prices for payers
- Lack of price and quality information makes it hard to judge productivity and compare to alternative use of resources
- Poor investment in IT and infrastructure
- Misaligned incentives for doctors, patients and payers
  
- BUT: Do we really want efficient markets? Efficiency does not necessarily imply equity
  - Governments usually concerned with health inequalities

# What incentives are created by different reimbursement mechanisms?

## ■ Example: Doctors

- Fee for Service: paid for every service performed
  - Payer bears all the risk (financially)
  - Patient bears risk of over treatment, but likely to get all possible treatments (with side effects)
- Capitation: set sum for every patient per year
  - Provider bears risk of very sick/unhealthy population
  - Patient likely to be under-treated?
- Can get increasingly sophisticated hybrid systems with quality measure to overcome conflicting incentives, eg capitation with quality/outcome bonuses, pay for performance



# What incentives are created by different reimbursement mechanisms?

## ▪ Example: Hospitals

- Fee for service: paid for every service performed separately
  - Payer bears all the risk (financially)
  - Patient bears risk of over treatment, but likely to get all possible treatments (with side effects)
- Per diem payment: paid for each day in hospital
  - Reduces incentive to provide extra tests, but incentive to keep people in for long time.
- Case rate payments: set sum for per admission depending on diagnosis (HRG / DRG systems)
  - Provider bears risk of complications and long length of stay
  - Patient likely to be under-treated and sent home very quickly?

# ERM for healthcare

- Managing risks in healthcare depends on managing the effects of inefficient markets
  - Aligning incentives between stakeholders
  - Managing quality, which should also manage cost (at the margin higher quality may mean higher cost, but not usually)
  - Long term planning with scenario testing and understanding key dependencies
    - Population changes
    - Changing expectations of consumers
    - Managing new treatments and ensuring they demonstrate value
  - IT investment and infrastructure
  - Educating (empowering?) patients

# Tools/methodologies used by health actuaries

- Similar to other types of actuaries – some borrowed from GI, some from Life actuaries
  - Also from statisticians and health economists
- Traditional actuarial tasks
  - Reserving models and methodologies (but monthly, rather than quarterly or annually). Sometimes stochastic methods
  - Long term multiple decrement models, with morbidity rather than mortality rates
  - Deterministic/stochastic projection models to profit test/price/financial forecasts/capital/solvency modelling

# Tools/methodologies used by health actuaries

- Less “traditional” actuarial tasks
  - Markov models
    - Look at progression of disease and associated costs
    - Often useful to work out when a specific intervention may change costs and benefits
  - Decision Tree Models
    - Looking at costs of treatment under different scenarios where patients can take a number of pathways

*Typically, the maths is trivial. The thought you put into the assumptions is not*

## Skill of the Healthcare Actuary

- Working as a multidisciplinary team to understand clinical and other issues to work out best modelling approach
- Understand the key clinical and financial assumptions to create a robust, yet simple model
- Describing clearly the desired outputs and input
- Finding the right kinds of data for the inputs
- Understanding the model perspective
  - What should and should not be included?

# Methodology versus Data

- One often drives the other
  - Data is rarely available in the right format
- Usually iterative process
  - Determine ideal methodology and data
  - Determine available data and quality of data
  - Modifies ideal methodology based on availability of useful data
  - Tries to strike a balance between theoretical “correctness” and use-ability

# Business Problems modelled by health actuaries

- What is the financing impact of introducing a screening program for cancer?
- What is the financial and care outcome/quality impact of introducing a disease management program?
- What is the cost-benefit impact of introducing regulation for certain healthcare professionals?
- How should an insurance company charge for a case management or disease management program?
- What is the financial impact of changing the way a payer reimburses doctors?

# Current and future role of the healthcare actuary

- Historical origins & cultural context of healthcare system is key determinant of role
  - Lots of private sector involvement – actuarial have a natural (and often reserved) place
  - Newly involved private sector– actuarial skills becoming more important, but still a legacy of “assuming not possible to be left to sink”
  - Socialised systems tend to have explicit statements of social policy and these encourage health economists and political decisions, rather than actuaries making business decisions
    - But recognition of useful skills of actuaries

*Less about numbers & complex models and more about behavioural economics*



# Areas where healthcare actuaries can add value

- Understanding of impact of demographic changes
- Understanding of impact of healthcare reforms (RES etc)
- Understanding and quantifying operational risks
- Benchmarking health systems performance on a risk-adjusted basis
- Quantifying impact of new contracting methods
- Building models to show allocation of risk to stakeholders to ensure all parties understand the risk they are assuming
- Isolating the impact of risk factors on healthcare trends and modelling future utilisation
- Modelling the financial impact of wellness, disease management and preventive care over the medium/long term

# Common Themes

*“all healthcare is local”*

- But the big issues are the same in most systems, with regional and cultural nuances
  - All pivot on individual responses to the same market imperfections/inefficiencies
  - Similar stakeholders with similar issues
  - Cost, quality (outcomes) and access

# Current Issues

- Investment in preventive care and social care to keep older people out of hospital
- Using private providers to drive competition
- Encouraging quality and better outcomes through contracting re-design, particular hospitals, but also pharma companies
- Reducing variation in healthcare utilisation using evidence based medicine and pathways

# Q&A Session