THE IAA
Presented to World Health Organisation

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What Is An Actuary?

Actuaries are highly qualified professionals who analyze the financial impact of risk for organizations such as insurers; pensions fund managers, and more.

Governed by rigorous standards of practice, they apply their mathematical expertise to forecast and minimize financial uncertainty.
Health utilization, benchmarking and cost trend forecasts
Health risk status analysis and revenue risk adjustment
Disease management return on investment and predictive modeling
Medical provider reimbursement analysis, including provider capitation, financial incentives and episode payments
Population disease prevalence forecasts
Medical device, pharmacy and new technology efficiency studies
Behaviour change studies related to health issues
Wellness and preventive care impact studies
Evidence based treatment protocols
Introduction

- Founded in 1895 as continuation of the Comité Permanent des Congrès d’Actuaires
- Renamed IAA in 1968
- Restructured in 1998
- Based in Ottawa, Canada – constituted in Switzerland
- Unique international organization dedicated to the research, education and development of the profession and of actuarial associations.
About the IAA

- Worldwide association of professional actuarial associations
  - 68 FMAs*
  - 30 AMAs*
  - representing 63,000+ actuaries in 112+ countries

- 7 special interest Sections for individuals:
  - AFIR-ERM
  - ASTIN
  - AWB
  - IAAHS
  - IACA
  - Life
  - PBSS
  - 5000+ Section members

- 800+ volunteer actuaries
  - Council and committees meet twice a year
  - Sections host colloquia
  - International Congress of Actuaries every 4 years.
  - 300+ conference calls annually

- Constituted in Switzerland
  - based in Canada
  - 11 staff

- Exists to encourage the development of a global profession
  - Acknowledged as technically competent and professionally reliable
  - To ensure the public interest is served

*FMAs: Full Member Associations; AMAs: Associate Member Associations
About the IAA
Vision

The actuarial profession is:

- Recognized worldwide as a major player in the decision-making process within the financial services industry
  - in the area of social protection and in the management of risk
- Contributing to the well-being of society as a whole.
Mission

➢ To represent the actuarial profession and promote its role, reputation and recognition in the international domain

➢ To promote professionalism, develop education standards and encourage research, with the active involvement of its member associations and Sections, in order to address changing needs
Strategic Plan - Six strategic objectives

1. Relationships with key supranational audiences

2. Expansion of scientific knowledge to wider fields to enhance the scope, quality, and availability of actuarial services

3. Establish and promote education standards and principles of professional conduct; promote issuance of standards in Full Members’ jurisdictions, and standards’ global convergence

4. Support the development, organization, and promotion of the actuarial profession

5. Provide a forum for discussion

6. Improve recognition of the actuarial profession (branding)
Health Committee

Purpose

- Represent the IAA in discussions at the international level on matters relating to health systems
- Raise the profile of health actuaries in policy debates and research on health systems
- Support, through IAA member associations, actuaries working in the health systems field, both private and public
Health Committee (cont’d)

Role

- Seek to reflect the views of the worldwide actuarial community in discussions and debates at the international level on health systems issues
- Liaise with relevant supranational organisations on actuarial involvement in health system research
- Promote public interest through developing the role actuaries can play in health systems research and debate
Questions actuaries ask

- What is the current and prospective burden of healthcare in the context of GDP, household income, and other economic indicators?
- What drives disability claims experience?
- What drives healthcare inflation?
- What is the impact of anti-selection on health insurance risks?
- How can costs be managed?
- Can wellness programmes make a real difference to medical inflation?
- How should products be designed to introduce the right incentives?
- What premium should be charged? How to optimise it?
- How do we design and select networks of providers to improve efficiencies and quality?
- Can alternative reimbursement models be designed to control costs without compromising on quality?
- What is the best way to detect and prevent health fraud and abuses in healthcare?
- What are risk-adjusted cost differentials between different service providers?
Questions actuaries ask

- How can private / public partnerships be structured?
- How do we insure low income individuals?
- Are out-of-pocket expenses equitably distributed between different levels of income?
- What are the risk consequences of catastrophic events, such as a pandemic?
- What capital is required to protect against adverse events?
- How will the HIV epidemic affect insurance costs?
- How do we ensure that more people have access to health services and do not suffer financial hardship paying for them?
Medical Inflation, Information Asymmetry, Health Insurance Premiums
Medical Inflation = Health Insurance Premium Inflation

- Health Insurance Premiums
  - Number of claims
  - Cost per claim
  - Management Expenses
  - Margins/Loadings
  - Demographics
  - Propensity to claim
  - Tariffs
  - Level of care
Inflation Components:

**Demand side:**
- Age
- Burden of disease
- Chronicity
- Risk management

**Supply side:**
- Utilisation rates
- Technology
- Availability
- Competition
Information Asymmetry

- Not just market failure in tariff negotiations
- Clinical necessity and treatment options
- Downstream costs
- Anti-selection
- Impact of tariff controls:
  - Influence on demand and frequency
  - Income targeting
Alternatives to Tariff Controls

• Networks
  ▪ Incentives
• Provider profiling
• Efficient risk pools
  ▪ Underwriting / risk management
  ▪ Mandating to promote risk pooling
• Ethical maxima
Mitigating Inflation

• Demand side
  ▪ Risk pool management
  ▪ Mandatory risk pools
  ▪ Risk equalization
  ▪ Wellness promotion

• Supply side
  ▪ Network management
  ▪ Treatment protocols and formularies
  ▪ Technology assessment
  ▪ Co-ordination of care
Actuarial involvement

- Risk analysis
  - Identify cost drivers
  - Quantify relationships
- Benefit design
- Risk management
- Provider analysis and contracting
- Reserving
- Scenario modelling
- Balancing stakeholders’ interests
HIV Modelling in South Africa
Modelling in Healthcare

- Reduces large amount of data to manageable form
- Can be used directly in calculations
- Quantifies the relationship between parameters
- Represents a more accurate estimate
Modelling HIV/AIDS

- UNAIDS
- ASSA2008 Suite:
  - 1998-2000 ANC data
  - SADHS 1998
  - Mortality data Stats SA
  - Population data Stats SA
  - Data from the 2005 Nelson Mandela/Human Sciences Research Council household survey
- The Reproductive Health Research Unit survey of sexual behaviour and prevalence of youth in South Africa
- PMTCP data
- ART Roll-out
Sources of Data

Calibrating the models to population data

- Main source of calibration data: ANC data (over time and by age)
  - Bias: Pregnant women
  - Fertility, sexual activity varies by age and stage of illness
  - sexually active
  - No men
  - Contraceptive bias
  - Public-Private bias

- Death data (is used for confirmation)
  - Under reporting (in rural areas)
  - Poor reporting on cause of death
Sources of Data (cont’d)

- Total population (census)
  - A good source of data (and a check on the model’s output)
  - Under-reporting in certain age-groups very common

Other Sources of data
- Prevalence studies on samples of lives
- Prevalence studies on blood bank data
- De-tuned ELISA studies
ASSA 2008 Updates

- Distribution of prevalence
  - Age
  - Gender
- AIDS-related deaths
- Access to treatment
- Provincial distribution
ASSA 2008

The ASSA 2008 version includes five interventions

- improved treatment for sexually transmitted infections (STIs);
- information and education campaigns (IEC);
- voluntary counselling and testing (VCT);
- mother-to-child transmission prevention (MTCTP);
- anti-retroviral treatment (ART).
ASSA models available

- ASSA2008 Lite
  - SA population
- ASSA2008 Full
  - 9 provinces, 4 races
- ASSA Select Model
  - Multi state longitudinal projection model
Multi-State Modelling

Non AIDS
Deaths, Disabilities, Withdrawals, Retirements

Clear HIV-

HIV+ Asymptomatic

HIV+ ARC

HIV+ SICK

New Entrants

Anti-Retroviral Therapy Stage 1

Anti-Retroviral Therapy Stage 2

Anti-Retroviral Therapy Stage 3

AIDS Disabilities

AIDS Deaths

Non AIDS
Deaths, Disabilities, Withdrawals, Retirements
How do the ASSA models work?

Epidemiology + Demography

- Probability of becoming infected
  - Risk groups
  - Sexual activity
  - Probability of transmission per sexual contact
  - Mother to child transmission

- Survival once infected
Risk Groups

- **Sexual activity**
  - **PRO**: Individuals with levels of sexual activity similar to that of commercial sex workers and with condom usage and STI levels similar to the STD group;
  - **STD**: Individuals with levels of sexual activity such that they are regularly infected with STIs.
  - **RSK**: Individuals with lower levels of sexual activity but who are still at risk because they have an average of one new sexual partner per annum and sometimes engage in unprotected sex.
  - **NOT**: Individuals not at risk to HIV infection (through sexual transmission).

- **Gender**

- **Age**
  - Young: up to age 13;
  - Adult: 14 to 59;
  - Old: 60 and above
Key Priority Areas

- Prevention
- Treatment, care and support
- Human and legal rights
- Monitoring, research and surveillance
Macro Economic Impacts

- **Government Spending**
  - Health and welfare
  - Revenue impacts from production shifts
  - Impact of population growth

- **Household Effects**
  - Changes in spending priorities
  - Impact on savings
  - Negative effects on housing and education spend
Labour Force Impacts

- Rising labour costs
  - Sourcing skills
  - Management programmes
  - Treatment costs

- Skilled labour effects (nursing and teaching)

- Company level
  - Absenteeism
  - Recruitment and training
  - Employee benefits
  - Workforce morale
Impacts for Employers

➢ Internal Effects
  ▪ Corporate governance
  ▪ Direct vs. indirect costs
  ▪ Disclosure requirements
  ▪ Policy requirements

➢ External Effects
  ▪ Customers
  ▪ Suppliers
The Role of Health Actuaries

Public healthcare
- Budgeting and risk adjustment
- Risk equalisation
- Demographic and financial projections
- Funding sustainability
- Public Private Partnerships
- Analysis of cost drivers

Private healthcare
- Analysis
- Capital
- Disclosure
- Valuation
- Product design
- Pricing
- Risk management & managed care
- Optimisation
- Projections
Thank you!

www.actuaries.org

Moving the profession forward internationally