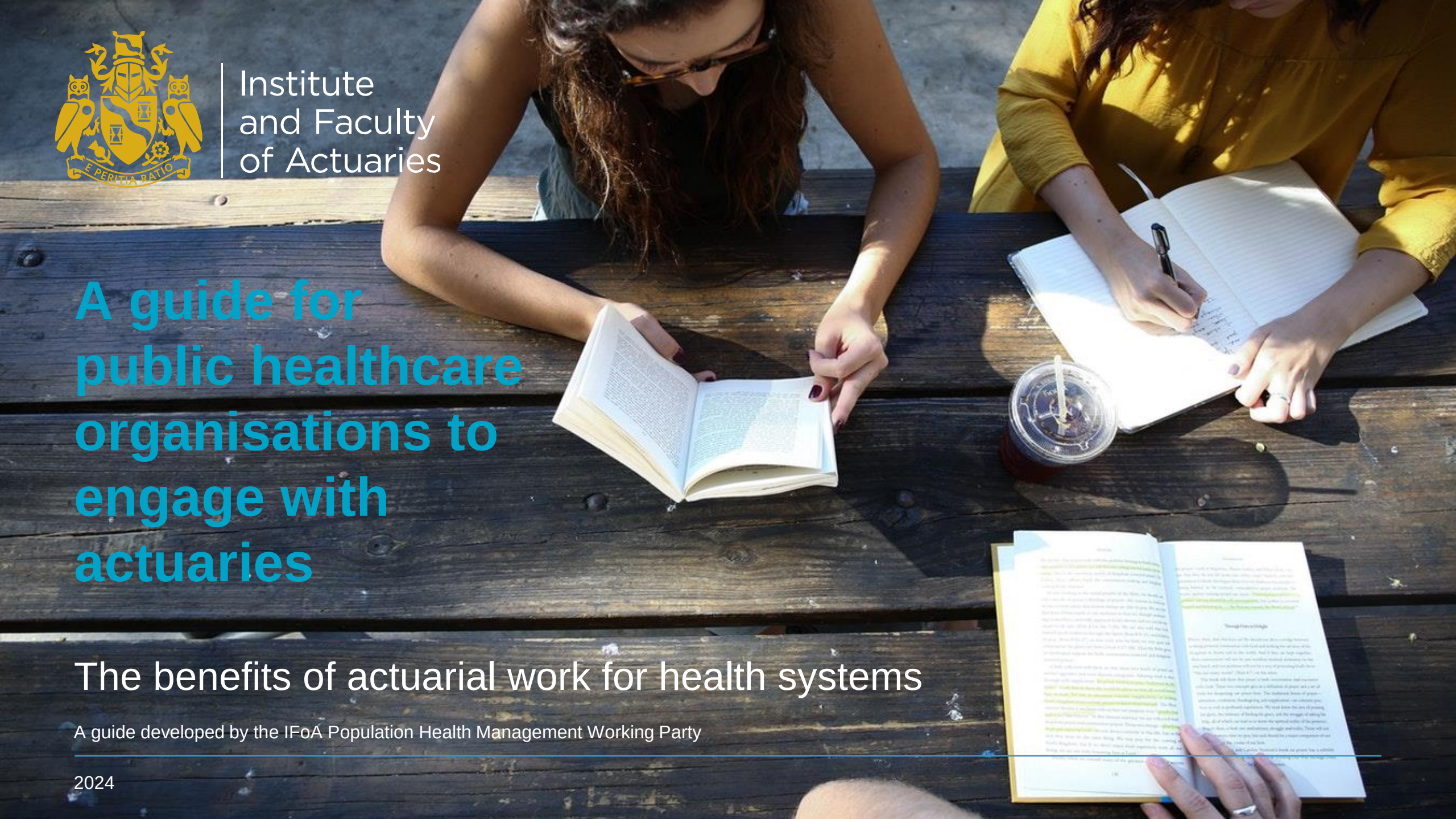

Institute and Faculty of Actuaries

A guide for public healthcare organisations to engage with actuaries

The benefits of actuarial work for health systems

A guide developed by the IFoA Population Health Management Working Party

2024

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Appendix

Glossary of functions and roles

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Table 1. Health Actuaries & Data Scientists

Analytical Technique	Description
Data Processing	Data processing in healthcare involves the collection, organisation, analysis, and interpretation of data to derive meaningful insights and support decision-making in the healthcare industry. For example, healthcare data can be collected from various sources, including electronic health records (EHRs), medical devices, wearables, administrative systems, patient surveys, and research studies. This data is often in different formats and needs to be integrated and unified into a standardised format for analysis.
Data Exploration & Visualisation	Data exploration and visualisation in healthcare are techniques used to gain insights, discover patterns, and communicate findings from healthcare data. These techniques involve examining and analysing data visually through charts, graphs, and other visual representations to understand the underlying patterns, relationships, and trends.
Data Cleaning	Data cleaning, also known as data cleansing or data wrangling, is the process of identifying and correcting or removing errors, inconsistencies, and inaccuracies in a dataset. It is an essential step in data preprocessing to ensure data quality and reliability for analysis and decision-making.
Big Data Analytics	Big data analytics in healthcare involves the use of advanced analytics techniques to extract insights, patterns, and trends from large and complex healthcare datasets. For example, these techniques include optimising healthcare operations and resource allocation. Analysing data on patient flow, resource utilisation, and operational efficiency supports capacity planning, workforce management, and cost optimisation initiatives.
Predictive Modelling	Data scientists and actuaries utilise predictive modelling and forecasting in healthcare. By analysing historical data, patterns, and risk factors, predictive analytics can help identify individuals at risk of developing certain conditions, predict disease progression, and forecast healthcare utilisation.

Table 2. Health Actuaries, Demographers & Medical Statisticians

Analytical Technique	Description
Health Risk Stratification	Health risk stratification is used in healthcare to categorise individuals into different risk groups based on their likelihood of developing certain health conditions or experiencing adverse health outcomes. Health risk stratification typically involves analysing various factors, such as: • Demographic information • Medical History • Biometric data • Lifestyle factors • Health utilisation patterns
Mortality Analysis	Mortality analysis focuses on the patterns, trends, and factors related to death rates within a population. It involves examining various aspects of mortality, such as causes of death, age-specific mortality rates, life expectancy, and disparities in mortality across different demographic groups
Life Expectancy Analysis	Life expectancy analysis considers the average number of years a person is expected to live within a specific population. It involves examining various factors that influence life expectancy, such as demographic characteristics, socioeconomic status, lifestyle behaviours, and healthcare access.
Population Projections	Population projections are estimates of future population size and characteristics based on assumptions about future fertility rates, mortality rates, and migration patterns. Population projections are crucial for various purposes, including healthcare and social care resource allocation.
Survival Analysis	Survival analysis is a statistical method used to analyse the time until an event of interest occurs. It is commonly used in medical research, epidemiology, and other fields to study the time to an event such as death, disease recurrence, or failure of a particular treatment.

Table 3. Health Actuaries & Health Economists

Analytical Technique	Description
Health Financing	Health financing refers to the mechanisms and strategies used to raise and allocate funds for healthcare services and systems. It involves the collection, pooling, and allocation of financial resources to ensure that individuals and communities have access to affordable and quality healthcare.
Financial Analysis	Financial analysis involves the evaluation of the financial health and performance of an organisation. It involves examining financial statements, ratios, and other financial data to assess the company's profitability, liquidity, solvency, and overall financial stability.
Cost Modelling	Cost modelling in healthcare involves the development and analysis of financial models to estimate and understand the costs associated with healthcare services, interventions, or processes. It helps healthcare organisations, policymakers, and researchers make informed decisions regarding resource allocation, pricing, reimbursement, and cost containment strategies
Cost Benefit Analysis	Cost-benefit analysis (CBA) in healthcare is a systematic approach to evaluating the costs and benefits of healthcare interventions, programmes, or policies. It involves comparing all relevant costs (direct, such as personnel & indirect, i.e. overheads) to the benefits, over various time-horizons, resulting from the healthcare intervention or programme. Benefits can include improvements in health outcomes, quality of life, productivity, or cost savings.
Forecasting & Trend Analysis	Forecasting and trend analysis in healthcare involve the use of historical data and statistical techniques to predict future healthcare trends, patterns, and outcomes. For example, this could include population health forecasting which uses forecasting techniques to predict population health trends and disease burden. By analysing historical health data, risk factors, and demographic information, healthcare organisations can anticipate future healthcare needs and develop targeted interventions.

Table 4. Health Actuaries & Business Analysts

Analytical Technique	Description
Data Analysis	Data analytics in healthcare involves the use of advanced analytics techniques to analyse and derive insights from healthcare data. It encompasses the collection, processing, analysis, and interpretation of data to improve healthcare outcomes, enhance operational efficiency, and support decision-making. This includes *descriptive analytics techniques* which are used to summarise and visualise healthcare data. It also includes *predictive analytics techniques* which are applied to healthcare data to forecast future events, outcomes, or trends.
Simulation Modelling	Simulation modelling in healthcare involves the creation of computer-based models that simulate real-world healthcare systems, disease outbreaks, processes, or interventions. It allows healthcare organisations, policymakers, and researchers to evaluate the potential impact of different scenarios, test hypotheses, and make decisions.
Risk Analysis	Risk analysis in healthcare involves the identification, assessment, and management of risks that may impact patient safety, healthcare operations, and organisational performance. It aims to proactively identify potential risks, evaluate their likelihood and potential impact, and implement strategies to mitigate or manage those risks.
Time Series Analysis	Time series analysis in healthcare involves the use of statistical techniques to analyse and interpret data collected over time. It focuses on identifying patterns, trends, and relationships within the data to gain insights and make predictions about future healthcare outcomes.
Financial Analysis	Financial analysis in healthcare involves the evaluation and interpretation of financial data to assess the financial performance, stability, and viability of healthcare organisations. It helps stakeholders, such as healthcare administrators, investors, and policymakers, make informed decisions regarding resource allocation, financial planning, and strategic initiatives.

Table 5. Health Actuaries within Multi-Disciplinary Teams

Analytical Technique	Description
Risk Management & Modelling	Risk management & modelling for health involves the identification, assessment, and mitigation of risks in the healthcare industry. It aims to minimise potential harm to patients, healthcare providers, and organisations by implementing strategies to prevent or mitigate adverse events.
Long Term Financial & Health Return On Investment	Long-term financial health and Return on Investment (ROI) are crucial considerations for healthcare organisations. For example: 1. Cost Management: Healthcare organisations need to effectively manage costs to maintain long-term financial health. This includes optimising operational efficiency, controlling expenses, and implementing cost-saving initiatives without compromising patient care. 2. Value-Based Care: Shifting towards value-based care models can contribute to long-term financial health. Value-based care focuses on improving patient outcomes while reducing costs.
Health Insurance Claims Analysis	Health insurance claims analysis involves the examination and evaluation of data related to healthcare claims submitted by insured individuals or healthcare providers to insurance companies. It aims to gain insights into patterns, trends, and anomalies within the claims data to inform decision-making, improve operational efficiency, and mitigate risks.
Capitated Budgeting	In healthcare, capitated budgeting is a financial arrangement where healthcare providers or organisations receive a fixed payment per person per month from a payer or commissioner, such as an insurance company or government department or agency, to cover a defined set of healthcare needs of an enrolled population.
Optimisation of Health Need with Financial Constraints	Optimising health needs within financial constraints involves finding the most efficient and effective ways to allocate limited resources to meet the healthcare needs of a population. This could involve efforts such as prioritising health care interventions and services based on their impact and cost-effectiveness.

Institute and Faculty of Actuaries

About the Institute and Faculty of Actuaries

The Institute and Faculty of Actuaries (IFoA) is a royal chartered, not-for-profit, professional body. We represent and regulate over 32,000 actuaries worldwide, and oversee their education at all stages of qualification and development throughout their careers.

We strive to act in the public interest by speaking out on issues where actuaries have the expertise to provide analysis and insight on public policy issues.

Actuarial science is founded on mathematical and statistical techniques used in insurance, pension fund management and investment. Actuaries provide commercial, financial and prudential advice on the management of assets and liabilities, particularly over the long term. A rigorous examination system, programme of continuous professional development and a professional code of conduct supports high standards and reflects the significant role of the profession in society.

About this guide

This guide has been developed by the IFoA Population Health Management Working Party.

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