Actuarial cost projection model

Our population cost projection model creates standardised measures and projections of cost and utilisation across all services and populations under consideration

Population cost model (PCM)

Using our proprietary Health Cost Guidelines (HCGs) grouper, Milliman's population cost model (PCM) helps you standardise measures of cost and utilisation across services and populations.

Population cost model

- Our PCM creates standardised views of unit costs, utilisation rates and per patient per month (PPPM) costs and provides a solid foundation for demand/intervention/impact modelling.

- This can be used to model demand for healthcare services within a system, evaluate past experience and establish the interrelationships between uses of various services.

- The PCM provides a whole-system view of healthcare services and brings focus to PPPM measures which can be used to highlight system variations and guide investigation.

- In particular, it is useful when comparing/analysing:
  - Systems or sub-systems to each other;
  - Systems over time;
  - The impact on the whole system of changes in the population or particular areas of the cost model.

Service category mapping

- We develop proprietary methodologies to map healthcare data from a variety of systems and PCMs relevant to the system under consideration.

- These methodologies build on tried and tested frameworks in many parts of the world, including 50 years of US experience.

- The standardised PCM metrics should ideally be constructed from granular service and person-level datasets in order to support full segmentation and detailed analysis into the drivers of utilisation and cost. However, if sufficient granularity of data is not currently available for all services, the same framework can be populated with aggregate feeds in the shorter term.

Projection model

- Using the PCM as a starting point, our actuarial projection model develops whole-system cost and utilisation experience over a defined time period taking into account expected demographic changes (age/sex mix and population growth/decline) and cost/utilisation trends under various scenarios.

- We develop scenarios to help our clients understand the sensitivity of their cost and utilisation profile to key assumptions.

- The projection model also uses the output from our International Best Practice Benchmarks[1] to give an idea of system performance at benchmark levels.
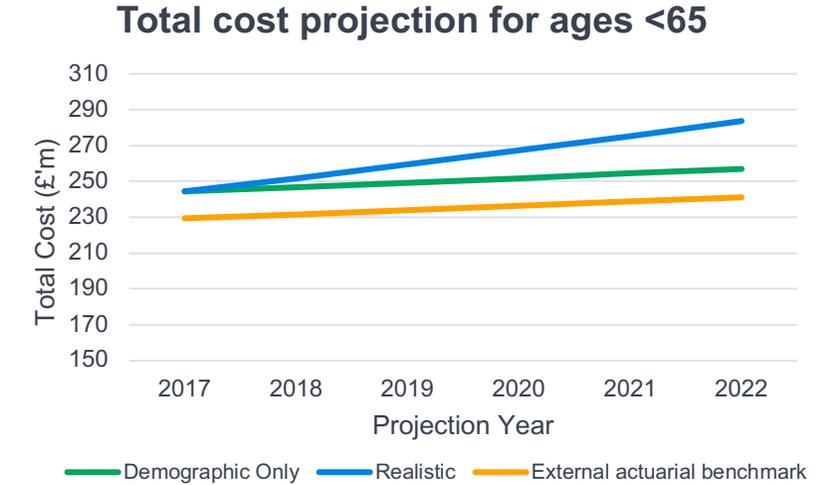
1. http://www.milliman.com/insight/2018/International-best-practice-benchmarks/?lng=2067

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PCM and projection model example using illustrative figures and not showing all available service categories

The projection model projects the starting cost and utilisation from the PCM by service category to arrive at a total cost projection using specified cost, utilisation and population trends.

| Financial year | 2017 ▼ |
| Age band | <65 ▼ |

PCM service category	Admissions per 1,000 lives		Average length of stay (days)	Utilisation per 1,000 lives		Average cost per service (GBP*)	Per Patient Per Month costs (PPPM) (GBP)
I. Hospital Acute Inpatient							
1. Medical	52.1	admissions	3.5	182.35	days	1432	6.22
2. Surgical	14.3	admissions	4.7	67.21	days	3256	3.88
3. Maternity	12.1	admissions	2.4	29.04	days	2240	2.26
4. Psychiatric	1.5	admissions	3.1	4.65	days	1436	0.18
Subtotal Hospital Acute Inpatient							**12.54**
II. Hospital Outpatient							
1. A&E				365.4	attendances	82.5	2.51
2. Ambulatory surgery				132.3	attendances	143.2	1.58
3. Consultations				719.8	attendances	128.9	7.73
4. Rehabilitation				0.5	attendances	1.4	0.00
5. Pathology				4,730.5	tests	2.7	1.06
6. Radiology				5.2	tests	236.1	0.10
7. Other Hospital Outpatient							0.67
Subtotal Hospital Outpatient							**13.66**
III. Primary & Community Care							
1. GP visits				425.0	visits	45.0	1.59
2. Physiotherapy				43.8	visits	132.5	0.48
3. Speech and Language				35.2	visits	215.7	0.63
4. Community nursing				1,034.2	visits	39.5	3.40
5. Prescription drugs				8,184.6	visits	8.8	6.00
6. Other Primary & Community Care							0.05
Subtotal Primary & Community Care							**12.17**
Total							**38.36**

*GBP – Great British Pound

Total cost projection for ages <65

Legend: Demographic Only — Realistic — External actuarial benchmark

Projection scenario	Assumed annual cost and utilisation trend	Population trend	Starting costs
Demographic Only	0%	Accounts for anticipated change in population size and structure (age/sex mix)	Reflects actual experience in starting year
Realistic	Trend cost and utilisation separately		
External actuarial benchmark	0%		Reflects external actuarial benchmark activity levels for acute inpatient activity based on external actuarial benchmark and actual experience for all other service categories

Global reach, local knowledge

Thanks to the vision of our founders, and innovations by succeeding generations of principals, Milliman remains a driving force in the industry we helped define more than 70 years ago.

Why Milliman?

- We are one of the largest actuarial consulting firms in the world and the global market leader in actuarial consulting.

- We combine global expertise and market-leading technical skills with local market presence, leveraging our in-depth knowledge of the regulations and markets in which we operate.

- We offer an active research program to supplement and support our consulting activities.

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