Guidelines of the Swiss Association of Actuaries on the valuation of technical reserves in health insurance pursuant to the Insurance Policies Act (IPA)

1. Introduction

Insurance companies that provide insurance supplementing mandatory health insurance are obligated under the terms of Art. 16 Insurance Oversight Act (IOA) to accrue sufficient technical reserves.

These guidelines describe the principles that must be observed by actuaries when estimating technical reserves in health insurance. It applies to all technical reserves pursuant to Art. 69(1) Insurance Oversight Ordinance (IOO) for products that belong to the insurance sectors B2 "Illness" and A5 "Health insurance" pursuant to Annex 1 of the IOO on the supervision of private insurance companies. These guidelines do not address the valuation of technical reserves for collective daily allowance insurance.

a. Unearned Premium Reserves:
Health insurance policies generally expire on 1 January; as such, unearned premiums are generally not included in the valuation at year end. Unearned Premiums must be taken into account in any valuations carried out during the year.

b. Loss reserves:
The loss reserves consist of an estimate of future expected pay-outs for already incurred cases. The SAA "Guidelines for loss reserves in nonlife insurance" are relevant for health insurance products; case definition in health insurance must be taken into account.

c. Safety and equalisation reserves
Unlike the other reserves, safety and equalisation reserves are not accrued to cover a specific cases. Their purpose is to cover parameter risks in the determination of reserves for specific cases and random loss fluctuations. While for specific case reserves expected values are evaluated, safety and equalisation reserves are usually determined using risk models or scenarios to assess the deviation from the above mentioned expected values.

d. Ageing reserves:

Certain supplementary health insurance products (typically in inpatient supplementary insurance) involve progression in the cost of benefits with increasing age. For some of these products, premiums are set risk based according to age, such that premiums increase in step with the cost of benefits. For other products, premiums paid at a younger age are set at a level above the risk-based premium in order to pre-finance the deficit that will occur with ageing. This is referred to as a temporal redistribution and is subject to technical valuation.

If a redistribution of this kind is contractually defined in the form of the premium structure, there is a need for ageing reserves. If the premium structure of a product is not contractually defined but there is nevertheless a temporal redistribution due to the current premium structure, other technical reserves can be accrued instead of ageing reserves (see g.).

In both cases, the need for reserves is determined on the basis of the present value assessment of the expected difference between the premiums and the sum of the cost of benefits and administrative costs.

e. Reserves for contractual profit sharing

Health insurance policies generally do not allow for profit sharing. These guidelines do not address reserves for contractual profit sharing.

f. Technical reserves for annuities:

Health insurance policies generally do not contain annuity coverages. These guidelines do not address technical reserves for annuities.

g. Other technical reserves:

The category "Other technical reserves" cover all other technical reserves, in particular reserves for impending losses if as a result of adverse selection or for other reasons such losses must be anticipated. This also includes reserves for products or product groups with temporal redistribution of the age risk factor in the current tariff but without a contractually defined premium structure, where there are no accrued ageing reserves (see d.).

2. General approach to the valuation of ageing reserves

Generally speaking, the collective funding method can be applied to ageing reserves, whereby the reserves are accrued for a (partial) portfolio. The methods and parameters for calculating the ageing reserves are outlined below.

Ageing reserves are estimated, as the present value of the difference between future benefits (including costs) and premiums. The forecasting horizon T is the entire term of the insurance policies (= maximum forecast horizon).
Shorter forecasting horizons may be applied if appropriate, provided that there are no material deviations from the maximum forecasting horizon.

Let AR_x be the requirement for ageing reserves for the insured at age x, then following applies

$$AR_x = \sum_{i=x}^{\min\{x+T;m\}} (S_{i,i-x} + K_{i,i-x} - P_{i,i-x}) \cdot {}_{i-x}p_x \cdot v_{i-x} \tag{1}$$

where

$S_{x,t}$	Benefits of the insured at age x at time t
$K_{x,t}$	Costs of the insured at age x at time t
$P_{x,t}$	Premiums of the insured at age x at the time t
v_t	Discount factor at date t
${}_tp_x$	Probability that an insured aged x will remain insured for t years, derived from the probability of cancellation and mortality
m	Maximum age taken into account based on the probability of mortality applied

The ageing reserves are then calculated as follows across all age groups:
$$AR = \sum_{x=x_0}^{m} n_x \cdot AR_x \tag{2}$$

where
x_0 Age at start of valuation.
n_x Number of insured aged x.

If, for a portfolio the (partial) restitution of ageing reserves pursuant to Art. 155 IOO is intended, the valuation of the ageing reserves is carried out using other suitable parameters and methods, in particular regarding cancellation assumptions. The actuarial approach for the valuation of the ageing reserves can be the same for both, the individual and collective funding methods.

3. Granularity

It may be necessary to use different bases of calculation for different **risk groups** (e.g. women/men, geographical region etc.) depending on the situation. Insufficient differentiation regarding risk groups or inappropriate pooling of portfolios or (partial) products can result in distorted benefits per capita and consequently to the ageing reserves being either too high or too low.

Ageing reserves of different risk groups can be offset in order to take into account existing and expected redistributions within a product.

4. Bases of calculation for benefits, costs and premiums

Benefits
Calculation of the present value of the benefits over the term of a product is based on the benefit curves (≈ benefits per capita, average benefits by age or age group, after deductible of the insured), which appropriately reflect the development of the benefits of an average insured by age according to the coverage of the product in question.

For the preparation of benefit curves, the two points below must be given particular consideration:

    a) Random fluctuations must be offset where necessary. This is especially true for sparsely populated age groups (e.g. in very old age).

    b) Systematic fluctuations should be adequately reflected in the benefit curves and, with a) in mind, should not be wrongfully eliminated by overcompensating random fluctuations.

Care must be taken when selecting an appropriate method for smoothing fluctuations as referred to in a) and b). Various statistical smoothing methods are available (e.g. combining multiple age groups, Whittaker-Henderson, GLM).
The benefit curves can also be derived from the data of multiple historical years; in this case, inflation trends must be taken into account, e.g. by applying appropriate scaling to a specific reference year.
It is always necessary to ensure that a plausible average benefit on the benefits curve is assumed for each age, even if there are no empirical values available for the age in question.

If there is insufficient data (e.g. if the product is new or in limited use), it makes sense to use the data of a comparable product. It can be useful to use a profile, i.e. a scaled benefit curve (to a specific age) of the comparable product. In this case, the profile describes the development with respect to age; the level of the benefit curve must then be adjusted to the benefit level of the product in question using appropriate scaling (i.e. such that the correct overall benefit is determined for the product). In the case of a new product, calculation of the ageing reserves can be based on the same benefit curves that are considered for setting tariffs.

Benefits are subject to inflation. It is assumed that future benefit trends can be offset through corresponding premium adjustments (i.e. they have no effect on present value trends). Consequently, when calculating the ageing reserves it is generally not necessary to reflect future inflation in the benefit curves (and likewise in premium adjustments).

Costs
Like benefits, administrative costs must also be included in the present value of expenses over the term of a product.

There are two types of costs: general administrative costs and acquisition costs (including commissions and distribution costs).

Acquisition costs are generally not included in the calculations. The costs taken into account can be lower than the general administrative costs observed in a going-concern approach but must at least cover cautiously estimated runoff costs.

The costs taken into account are distributed proportionally to the benefit costs, premiums or number of insured. In addition, a separate surcharge for fixed costs can be applied.

Premiums

Assuming that the mix of tariff characteristics in the partial portfolio remains constant over the forecasting horizon, the average premiums per capita of insured persons by age can be used in a simplified approach. Alternatively, the individual premiums per capita can be extrapolated.

A planned profit margin can be taken into account when deriving premiums per capita (e.g. to finance the cost of capital).

One special feature of age-at-entry tariffs is that it should be ensured that the premium does not increase in the extrapolation. The same applies to products for which the tariff changes from an age-linked tariff to an age-at-entry tariff at a certain age (transition from the age-linked premium to the age-at-entry premium).

Basically, everything that has been stated for the benefit curves applies analogously to the premiums per capita. In particular, attention must be paid to ensuring that premiums per capita are defined without gaps for each age.

For (partial) portfolios that pay a premium with discounts or surcharges rather than a basic tariff, it must be carefully clarified how this is taken into account in the valuation. In particular, it is necessary to take into account what portfolio and/or discount and surcharge structures are to be expected not only currently but also in the future, and how the discount and surcharge trends (including the corresponding portfolio structure) can be taken into account correctly in the premiums per capita.

5. Bases of calculation for mortality and cancellation

The probability of cancellation and mortality should be selected according to age.

If possible, they are derived from the portfolio in question. If the portfolios do not allow this, alternative sources should be used.

The probabilities of cancellation and mortality can be determined on the basis of product groups with a comparable structure, e.g. such as those found in the SST.

Common mortality tables such as the individual capital tables for men and women and the SST mortality tables can be used as alternative sources for mortality rates. The SST cancellation probabilities can be used for the cancellation probabilities. In these cases, a plausibility check must be carried out to ensure adequacy.

It is assumed that a longevity trend can be compensated through corresponding premium adjustments (i.e this has no effect on present value trends). As a result, period mortality tables can usually be used to calculate the ageing reserves. Similar assumptions can be applied for the cancellation probabilities.

6. Calculation methods for discounting

Basically, both a yield curve and a fixed technical interest rate can be used for discounting. The selection must be justified and adequately substantiated. Justification must be based on long-term observed or expected returns (e.g. risk-free yield curve, Accident Insurance Act (AIA) discount rate, historical or long-term expected return on investments).

7. Documentation

The actuary must document the methodology used to estimate the technical reserves such that it can be verified in the future by another actuary. In particular, the determination and selection of the parameters for the various approaches and the changes made to methods and parameters since the previous period must be documented.
Sensitivity analyses must be carried out and documented for the basis of calculation used.

When selecting parameters making assumptions for reserve estimation, actuaries should consider the potential influence of new and emerging risks (such as climate change, sustainability, technological advancements, economic fluctuations, political developments, and legislative changes).

The consultation period with members is 9 May to 3 June 2023
Approved by the Board on 9 June 2023
ESG addendum approved by the Board on 1st of December 2023

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