

Underwriting Risk Management

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The Gibraltar Life Insurance Co., Ltd.

Self-introduction

Apr. 1985 Toho Mutual Life

Apr. 1998 GE Edison Life

Aug. 2003 AIG Edison Life

Jan. 2012 Gibraltar Life

Feb. 2020- Appointed Actuary

Jun. 2021- Appointed Actuary at Prudential Gibraltar Financial
Life (PGF Life) (Concurrent)

Statutory Accounting Closing : 16years

Pricing : 3years

US GAAP Closing : 1year

Management Accounting : 5years

Appointed Actuary : 4years

Companies Profile

Both companies are members of Prudential Financial.

Gibraltar Life

Sales Channel : Sales Representative, Agency

Main Product : Single Premium Whole Life, US\$ Whole Life, Variable Life

Established : Apr. 2001 (Formerly known as Kyoei Life)

Prudential Gibraltar Financial Life (PGF Life)

Sales Channel : Bank

Main Product : Single Premium Whole Life, Level Premium Annuity

Established : Apr. 2010 (Formerly known as Yamato Life)

Today's Content

1. Underwriting Risk Overview
2. Risk Selection
3. Product Planning
4. Pricing
5. Monitoring and Post-event Measures
6. Underwriting Risk in Future

1. **Underwriting Risk Overview**
2. Risk Selection
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What is Underwriting Risk ?

Underwriting risk refers to the risk that an insurance company will incur losses due to changes in **economic conditions** or the **incidence of insured events** contrary to the predictions made at the time of setting premiums.

Economic Condition

- Interest Rate – up/down
- Foreign Exchange Rate – up/down
- Recession – Surrender, Suicide

Incidence of Insured Events

- Mortality Rate
- Morbidity Rate
- Surrender Rate
- Renewal Rate
- Operating Expense

Features

- It will have a long-term impact on the management of insurance companies.
- It is difficult to control after the events.

Risk Appetite

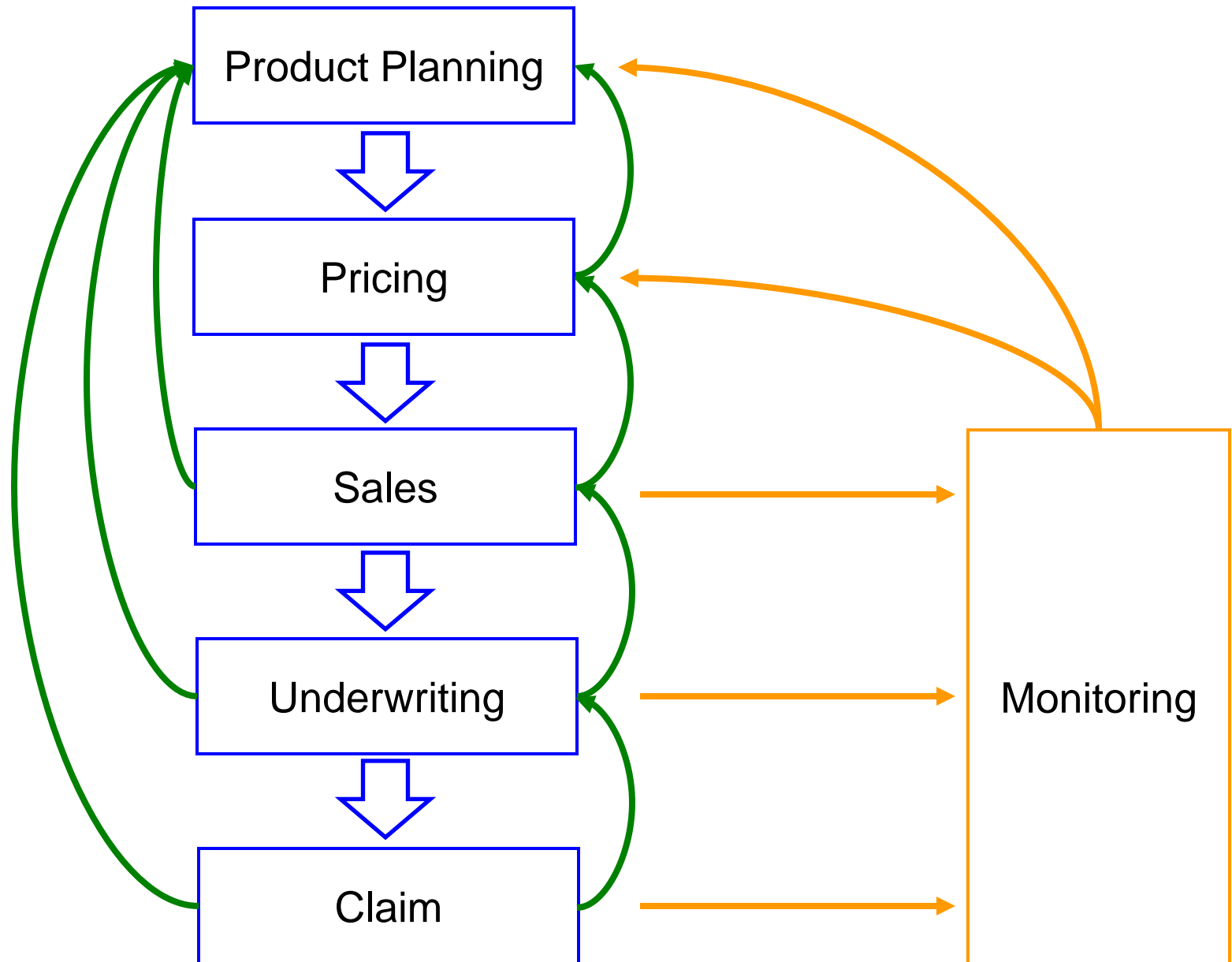
Insurance is a risk-taking business

- Risk is the source of profit.
- Simply avoiding risk will not be enough to run a business.
- Take smart risks.

What risks will you take?

- Death protection risk (Term life, Whole life, etc.)
 - Health protection risk (Hospitalization, Surgery, Serious illness, Care, etc.)
 - Longevity risk (Lifetime annuity)
 - Other risks . . .
-
- Reinsurance ceding policy

Product Development Process and Underwriting Risks



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- 2. Risk Selection**
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Risk Selection

Purpose of risk selection

- Eliminate high-risk applications.
- Set insurance premiums according to the level of risk.

Flow of risk selection

- First Selection ---- Interview, Question and Observation
- Second Selection ---- Declaration and Examination
- Third Selection ---- Underwriting
- Fourth Selection ---- Contract confirmation
- Fifth Selection ---- Payment assessment

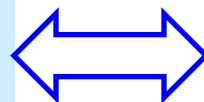
Risk and Selection

- Medical risk → Medical selection
- Environmental risk → Environmental selection

Risk Selection Perspective

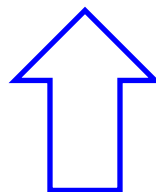
Accept as many applications as possible

- Want to increase the number of policies in force
- Keep sales department motivated.
- Providing protection to those in need



Reject high-risk applications

- Want to eliminate the risk of declining profits
- Want to maintain fairness among contract holders
- Preventing insurance abuse



Balancing costs and benefits

Method of Risk Selection

Method of medical selection

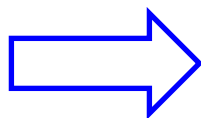
- Medical Examination
- Health check-ups and Medical examinations
- Declaration
- No selection

Medical
Selection Effect



Determining selection method

- Age of insured person
- Face amount
- Coverage



Statement of business procedures
Company regulations, etc.



Customer/Sales requests and Company policy
Costs and Benefits

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What risks are you willing to take?

Points to consider

- Is there a customer need?
- Does it fit your risk appetite?
- Does it fit your sales channels?
- ----

Frequency of incidence and Amount of benefits

		Amount of payment per case	
		Large	Small
Frequency	High	Need is great Insurance premium become higher	What does this mean for insurance?
	Low	Need is great Insurance company is at high risk	Need is small

Payment Conditions

Issues with payment conditions

- Death or survival is clear
- Medical insurance needs to be considered

Public system standards and Our own standards

	Public system standards	Our own standards
Easy to understand payment conditions	Easy to understand	Stipulated in policy conditions
Control of payment conditions	Difficult	Easy

→ When using the requirements of a public system, it is necessary to respond when the payment requirements change.

Example of surgery benefits

Example of advanced medical treatment

Surgery Benefits

Payment conditions for Surgery

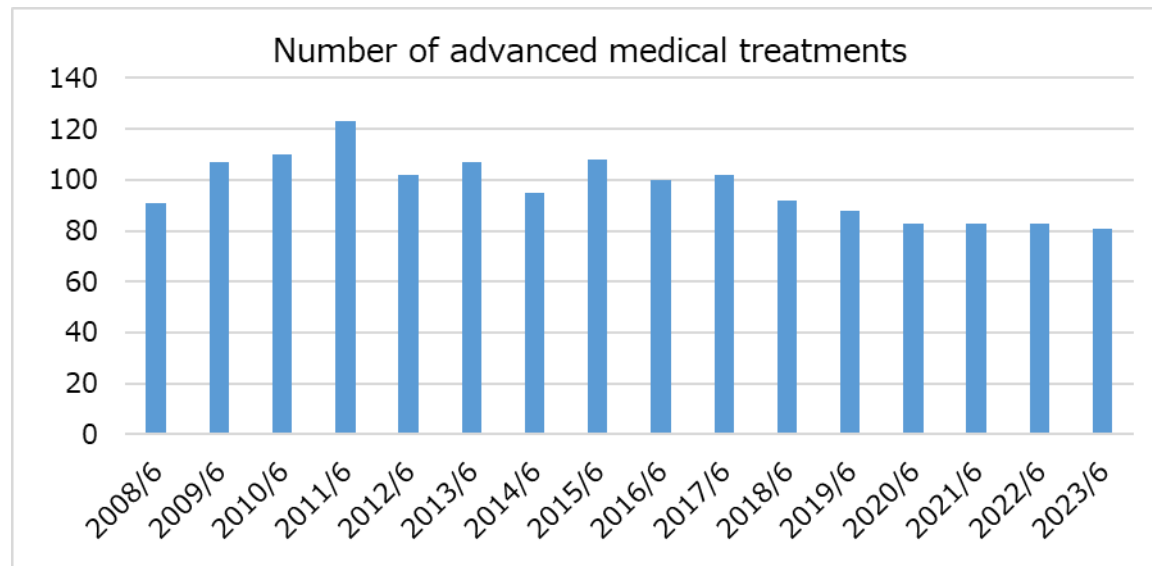
	Previous	Recent
Payment conditions	Our own standards	Public system standards
Benefits standard	Policy conditions list the names of surgeries covered by the policy (89 types). Benefit amount is determined for each surgery.	Surgery that is listed as subject to surgical fees in the medical treatment fee list based on the public health insurance system. Some products offer a flat-rate benefit amount regardless of the type of surgery.
Issues and Features	It is difficult to know whether the conditions for payment apply. Unable to accommodate new surgeries.	Easy to understand. Affected by changes to the public health insurance system.

There are also benefits that combine both.

What is Advanced Medical Treatment?

Treatment using advanced medical technology as specified by the Minister of Health, Labor and Welfare that require evaluation from the perspective of ensuring the efficient provision of appropriate medical care as to whether or not they should be covered by public health insurance.

- Additions and deletions are made as appropriate.



(Created from materials of the Ministry of Health, Labor and Welfare's Advanced Medical Care Conference)

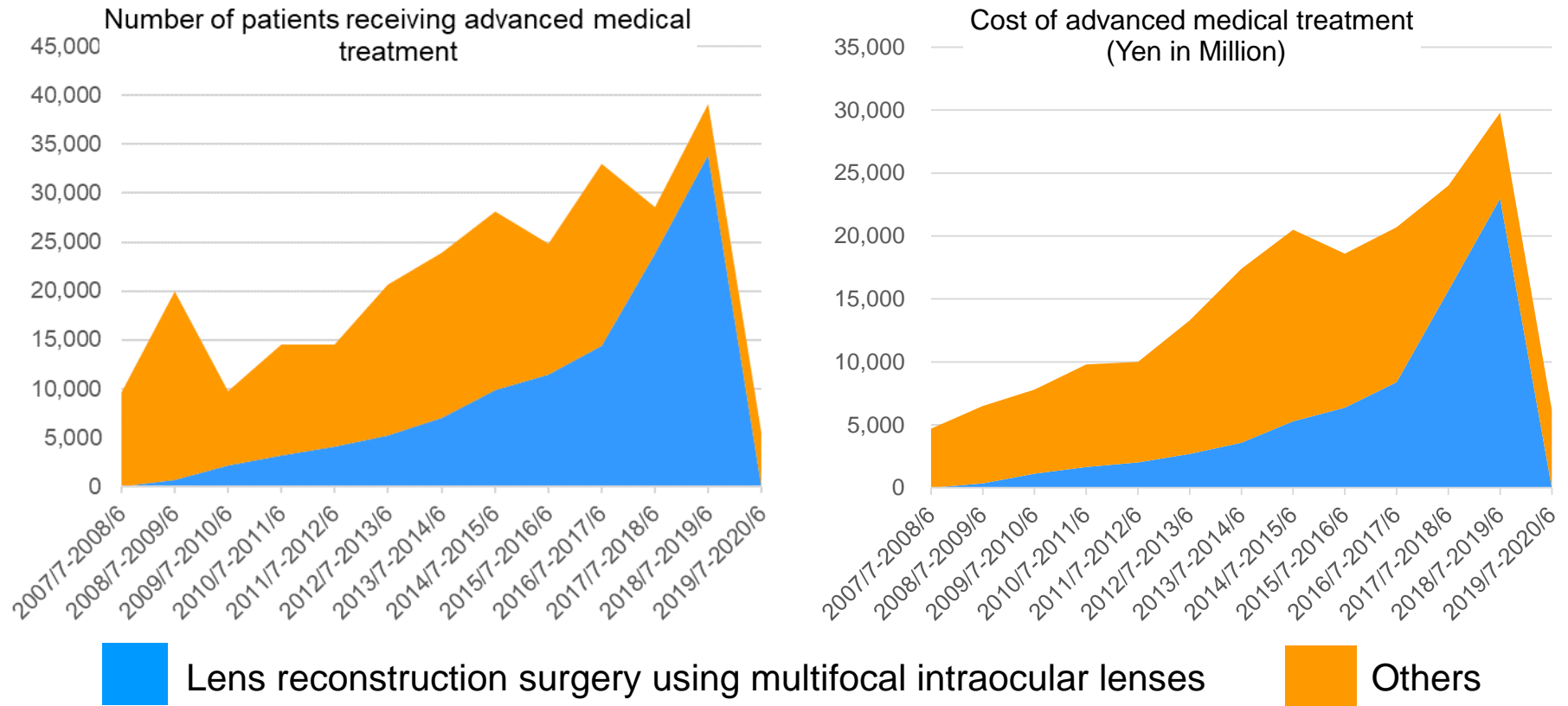
Why do we need insurance?

- Advanced medical treatments are done using cutting-edge technology, so special equipment and environments are required.
- There are few medical institutions where advanced medical treatments can be received, and the costs tend to be high.

		Amount of payment per case	
		Large	Small
Frequency	High		
	Low		

Advanced Medical Benefits

We have no choice but to follow the standards of the public system.



(Created from materials of the Ministry of Health, Labor and Welfare's Advanced Medical Care Conference)

Lens reconstruction surgery using multifocal intraocular lenses was introduced in July 2008 and was removed in April 2020.

Sales Channels and First Selection

Effect of first selection varies depending on the sales channel.

Sales Channel	Effect of First Selection
Sales Representative	Face-to-face sales are the norm, and education and training are also thorough. There are few cases where they sell to customers they meet for the first time.
Agency	Face-to-face sales are the norm, and education and training can also be provided to a certain extent. There is a difference between agencies.
Bancassurance	Face-to-face sales are the norm, and education and training can also be provided to a certain extent. They are not insurance sales experts.
Internet	Non-face-to-face sales are the norm.

→ The type of insurance to be handled and the amount of insurance coverage must be decided based on the characteristics of the sales channel.

Sales Channels and Markets

Each sales channel has a strong market position.

Sales Channel	Main Market
Sales Representative	Use personal relationships to reach customers. In some cases, they may be in charge of worksites (Employee market).
Agency	It differs among agencies. Independent agencies have many corporate contracts. Walk-in shops tend to have young customers.
Bancassurance	The main customers are the elderly and wealthy.
Internet	There are many young customers. Many customers choose to do their own research and comparisons.

→ Select sales channels that match the insurance company's sales strategy.

Insurance Period and Renewal

There are Lifetime and Term (Renewable) types available.

Customer Perspective

	Lifetime type	Term (Renewable) type
Advantages	You can get lifetime coverage. Insurance premium will not change.	Initial premium is low. Coverage can be reviewed at the time of renewal.
Disadvantages	Premium is high. It is difficult to review insurance.	Coverage ends when you reach old age. Premium increases at renewal.

Insurance Company Perspective

	Lifetime type	Term (Renewable) type
Advantages	Prevent surrenders at renewal time.	Premium calculation basis can be reviewed at the time of renewal.
Disadvantages	It is not possible to review premium calculation basis. Little experience with older people.	People in poor health tend to renew.

Insured Age Range

Insured age range is determined based on needs of customers and demands of the sales channels.

When 2 companies sell single premium whole life insurance

	Product Specifications	Insured Age Range
Company A	Somewhat superior.	From 20 to 70 years old
Company B	Somewhat inferior.	From 20 to 80 years old

Customers aged between 20 and 70 : Choose Company A.

Customers aged between 71 and 80 : Choose Company B.

→ Company B's policies are heavily biased towards elderly people.

Surrender Value Reduction Type

By incorporating expected surrender rate into calculation of premiums, the product can be offered with a low or no surrender value.

- By reducing surrender values, we can offer lower premiums.
- It will be possible to reduce surrenders.

The expected surrender rate will be set based on insurance companies' experience, but careful consideration will be required in anticipation of suppressing surrenders.

Traditional Products

Surrender Rate=0	No surrender gain occurs.
Surrender Rate>0	Surrender gain occurs.

Surrender Value Reduction Type Products

Surrender Rate=Expected Surrender Rate	No surrender gain or loss occurs.
Surrender Rate>Expected Surrender Rate	Surrender gain occurs.
Surrender Rate<Expected Surrender Rate	Surrender loss occurs.

Initial Benefit Suppression Type

Risk selection is mitigated by limiting the amount of benefits paid in the early stages of the policy.

→ Selection standard can be more relaxed than for traditional products.

↔ Relationship with selection effect

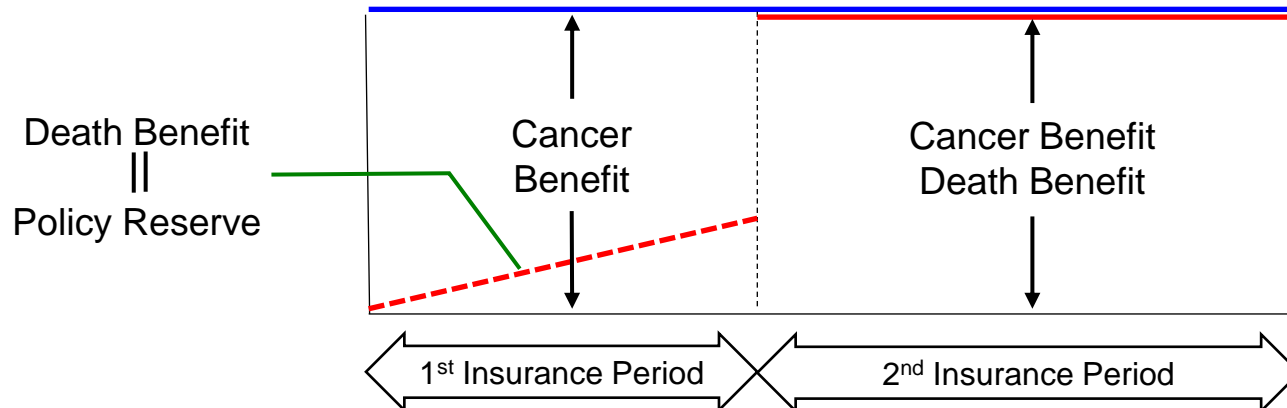
Policyholder : There is no need for bothersome medical examinations.

Sales Channel : Sales can be made with simpler procedures.

Insurance Company : Selection costs can be reduced.

Efficacy verification is required

Example of initial benefit suppression type insurance



Relaxed Underwriting Standards Type

By relaxing underwriting standards, we will accept applications from customers with chronic illnesses or health concerns.

- Since it insures high-risk customers, premiums are high.
 - Since underwriting standards are relaxed, declaration items are also limited. (About 3 items)
 - No strict appraisal as with special condition entities. → Cost reduction
 - There are many low-amount death and medical insurance products.
- It includes customers in poor health as well as those who can purchase regular insurance.

Examples of Declaration Items

1. Within the last 3 months, have you been recommended by a doctor to be hospitalized or undergo surgery?
2. Within the past 2 years, have you been hospitalized or had surgery due to illness or injury?
3. Within the past 5 years, have you consulted a doctor, received tests, treatment, or been prescribed medication for cancer, cirrhosis of the liver, dementia, or alcoholism?

Use of reinsurance

Benefits of Reinsurance

- High-amount coverage → Provides coverage that exceeds the company's holding limits.
 - High-risk policies → Leverage experience of reinsurers.
 - Ceding risks that you have no experience of.
 - Utilizing knowledge of reinsurance companies → Calculation basis and Selection standards.
- The risks are transferred, but so are the revenues.
It is important to note that counterpart risk will emerge as a new risk.

Policyholder Dividends

Participating policies or Non-participating policies

	Participating policies	Non-participating policies
Customers	Premiums are high, but you can expect a return in the form of dividends.	Premiums are low.
Insurance Company	Large buffer for premiums. It can absorb fluctuations in income and expenditure.	Small buffer for premiums. Even if profits are made, there is no need to pay dividends.

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Collection of Basic Data

In order to generate calculation basis, it is necessary to collect basic data.

Basic data can be public data, in-house data, or anything in between (Data in the Middle).

Comparison of Public data and In-house data

	Public data	In-house data
Advantage	The data is highly reliable due to large number of items. There is some data that cannot be obtained in-house.	The conditions for insurance coverage can be met. It meets our selection standards.
Disadvantage	The conditions for insurance coverage may not be met. Search criteria may change.	Number of data items is limited. There is no data available for new benefits.

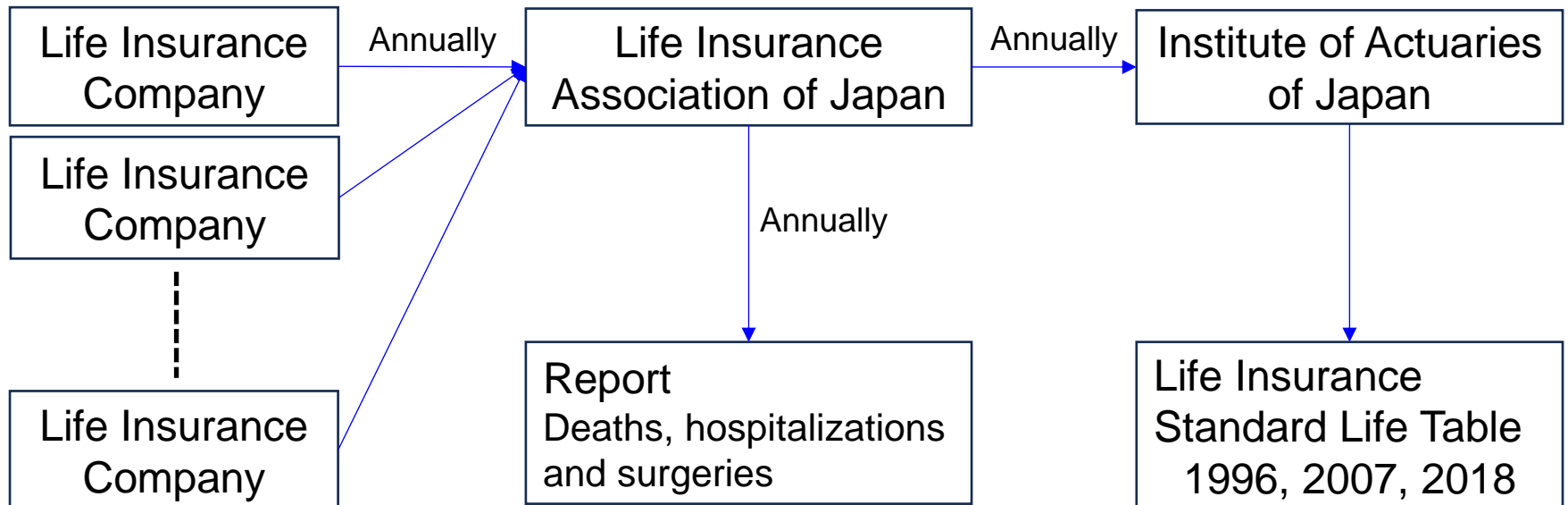
→ Choose basic data according to the benefit content and conditions.

Data in the Middle

There are also data that are broader in scope than in-house data, but does not cover the entire population.

- Health insurance association prescription data
- Data collected by the Life Insurance Association of Japan
- ----

Data collection by the Life Insurance Association of Japan



Life Insurance Standard Life Table

The following 3 types of life tables have been created and have been verified by the Commissioner of the Financial Services Agency.

- Life Insurance Standard Life Table 2018 (For life insurance)
- Life Insurance Standard Life Table 2018 (For the 3rd sector insurance)
- Life Insurance Standard Life Table 2007 (For pensioner)

(All of the latest versions are listed.)

Since these are the basis for calculating policy reserves, it would be difficult from a profitability perspective to set premiums based on life tables that deviate significantly from these.

→ These act as brakes to maintain soundness.

Life Insurance Standard Life Table 2018 (For life insurance)

- Observation data from FY2008, FY2009, and FY2011 were used.
- Cutoff period: 10 years → Remove Selection Effects
- Mortality rate improvement estimated by FY2018
- Safety margin (adjusted towards mortality risk) and smoothing

Creation of Mortality and Morbidity Tables

Mortality and morbidity tables are calculated based on basic data.

- Age group subdivision (5-year increments → Each age)
- Smoothing
- Extrapolation for older and younger generations
- Removal of cohort effects
- Considering selection effects
- Reflecting future trends
- Safety margin (Depending on reliability of the basic data)

Checking Profitability

Once premium rates are set, profitability is verified.

Calculation assumptions are required to calculate profitability.

How to determine calculation assumptions (example)

Assumption	How to determine
Sales volume and Policy distribution	Discuss with sales department to make a decision.
Mortality rate	Use the company's experience with similar products.
Morbidity rate	Use the company's experience with similar products. If there are no similar products, set based on basic data.
Surrender rate	Use the company's experience with similar products.
Operating expense	Use the company's experience with similar products. Future projections can also be used.
Investment yield	It is set based on the company's actual results and future market forecasts.

Checking Profitability (Continued)

Typical examples of profitability indicators include IRR (Internal Rate of Return), Profit Margin, and VoNB (Value of New Business).

In addition to base cases, we also conduct sensitivity analyses to understand the characteristics of insurance products.

Scenarios		IRR
Base case		11%
Mortality rate	10%	8%
	-10%	13%
Surrender rate	20%	8%
	-20%	12%
Investment yield	0.50%	13%
	-0.50%	9%
Operating expense	20%	9%
	-20%	12%

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Monitoring

Short-term monitoring (6 months to 1 year)

- Sales volume
- Policy Distribution

Long-term monitoring (3 years, 5years, 10years, ----)

- Mortality rate
- Morbidity rate
- Surrender rate
- Reinsurance income and expenditure, financial condition of reinsurer

It is important to decide in advance the timing and method of implementation.

Post-event Measures

If there is a large deviation from expectations, post-event action will be necessary, but the measures that can be taken are limited.

- Change handling regulations
- Revise commissions
- Change underwriting standards

- Revise premium rates
- Suspend new sales

- Accumulate liability reserves

Standard Policy Reserves

Most individual insurance and individual annuity are required accumulation of standard policy reserves.

- Applied Products : Individual insurance and individual annuity denominated in Yen, US dollar, and Australian dollar (as of April 2024)
(Exceptions : Policies that allow changes to expected interest rate, policies with an insurance period of 1 year or less, etc.)
- Accumulation method : Level net premium formula
- Expected mortality rate : Standard mortality rates (For Life insurance, For the 3rd sector insurance and For pensioner)
- Expected interest rate : The calculation method is stipulated in a notification by FSA, and the base interest rates and timing of changes are as follows.

Currency	Base interest rate	Premium mode	Timing
Yen	Government bonds (10 and 20 years)	Installment	Yearly
		Single	Quarterly
US dollar, Australian dollar	A-rated corporate bonds (10 and 20 years)	Installment	Yearly
		Single	Monthly

Stress Test for the 3rd Sector Insurance

Since the 3rd sector insurances have no standard morbidity rate, stress tests are used to check whether the expected morbidity rate sufficiently covers risks.

- Carried out for each policy category that has the same basic rate.
- Predict cumulative payments over the next 10 years.

P : Benefit amount based on expected morbidity rate

A : Benefit amount based on morbidity rate that covers 99% of risk

B : Benefit amount based on morbidity rate that covers 97.7% of risk

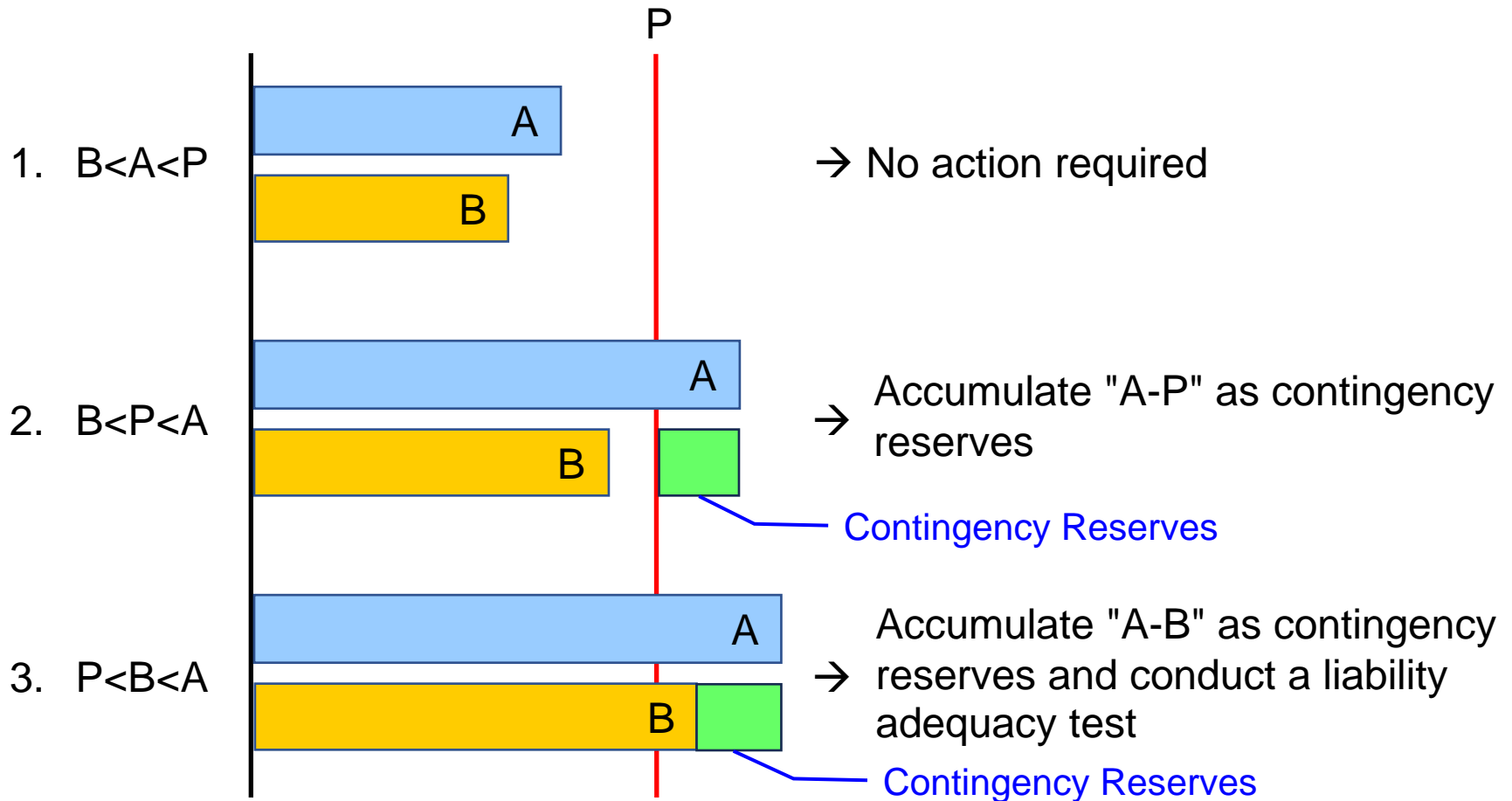
1. $B < A < P \rightarrow$ No action required
2. $B < P < A \rightarrow$ Accumulate "A-P" as contingency reserves
3. $P < B < A \rightarrow$ Accumulate "A-B" as contingency reserves and conduct a liability adequacy test

Stress Test for the 3rd Sector Insurance (Continued)

P : Benefit amount based on expected morbidity rate

A : Benefit amount based on morbidity rate that covers 99% of risk

B : Benefit amount based on morbidity rate that covers 97.7% of risk



Liability Adequacy Test

As a result of the stress tests for the 3rd sector insurance, liability adequacy tests will be conducted on policies that are identified as being particularly risky, to verify adequacy of policy reserves.

- The policy categories to be implemented are determined through stress tests for the 3rd sector insurance.
- Use benefit amounts based on morbidity rates that cover 97.7% of risk.
- Calculate overall income and expenditure including operating expenses and investment income.
- Predict cumulative income and expenditure for each fiscal year over the next 10 years.
- If cumulative balance becomes negative in any fiscal year, the maximum present value of the negative amount will be accumulated as additional policy reserves.

Future Profit Analysis

This is carried out to verify the adequacy of policy reserves.

Ensure that standard policy reserves can be accumulated in the future without recording losses.

- Carried out for each product segment in segment accounting. (Almost all individual insurance and individual annuity are covered.)
- Calculate overall income and expenditure including operating expenses and investment income.
- Predict cumulative income and expenditure for each fiscal year over the next 10 years.
- If cumulative balance becomes negative in any year during the first 5 years, the maximum present value of the negative amount will be accumulated as additional policy reserves.

Change in the calculation basis of policy reserves

- The calculation basis of policy reserves (mortality rate or expected interest rate) are changed to accumulate the policy reserves.

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Underwriting Risk Management in Future

- Development of medical and diagnostic technologies – Increased benefits, New protections
- Longevity – New needs, Unexplored world
- Genetic information – New Information asymmetry
- Data science – New morbidity rates, Refinement of morbidity rates
- AI – Automating and Refining selection
- Pandemic – How can we respond next time?
- Climate change – Warm winters and Hot summers, Floods, Epidemics

Thank you for your attention.