

# Case Study

**FALL 2024/SPRING 2025**

Life Product Management Exam

EXAM ILALPM

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## Company Overview

TTPD Life is a US based mutual company that sells life and annuity products. The company was founded in 1945 as a life insurance company and later entered the annuity market in the 1989.

The company currently has 300 employees working full time, but it does not have an in-house marketing team. All sales and distribution efforts were outsourced to third-party distributors. In 2005, TTPD entered the Canadian market with its acquisition of a small Canadian life insurance company.

You are given the following income statement and balance sheet information for TTPD:

Values in millions	2019	2020	2021	2022	2023
Gross Premium	1,775	1,456	1,144	1,050	873
Fee income	4	2	2	1	1
Investment Income	1,565	1,694	1,813	1,942	2,037
<b>Total Income</b>	<b>3,344</b>	<b>3,152</b>	<b>2,959</b>	<b>2,993</b>	<b>2,911</b>
Death Benefits	419	498	622	610	502
Surrender Benefits	548	584	622	664	675
LTC Benefits	250	250	200	188	163
Increase in Reserve	1,417	1,347	1,343	945	772
Dividends	4	1	-	2	2
<b>Total Benefits</b>	<b>2,638</b>	<b>2,680</b>	<b>2,787</b>	<b>2,409</b>	<b>2,114</b>
Commissions & Marketing	353	316	280	289	279
Maintenance Expenses	136	140	143	144	147
<b>Total Expenses</b>	<b>489</b>	<b>456</b>	<b>423</b>	<b>433</b>	<b>426</b>
Tax/(Credit)	61	17	(40)	107	88
<b>After Tax Profit</b>	<b>156</b>	<b>(1)</b>	<b>(211)</b>	<b>44</b>	<b>283</b>

Values in millions	2019	2020	2021	2022	2023
Cash	1,603	1,670	1,727	1,777	1,829
Corporate Bond	25,649	26,727	27,633	28,425	29,270
Mortgage Loan	3,847	4,009	4,145	4,264	4,391
Options	962	1,002	1,036	1,066	1,098
<b>Assets</b>	<b>32,061</b>	<b>33,408</b>	<b>34,541</b>	<b>35,532</b>	<b>36,588</b>
Policyholder Reserves	27,486	28,833	30,175	31,121	31,893
Surplus	4,576	4,576	4,366	4,411	4,695
<b>Liabilities and Surplus</b>	<b>32,062</b>	<b>33,409</b>	<b>34,541</b>	<b>35,532</b>	<b>36,588</b>
Target Surplus Level	4,500	4,575	4,600	4,700	4,750

The financial statements above reflect all of TTPD's current inforce business. TTPD does not have any reinsurance coverage on its business. As a US mutual company, TTPD's senior management uses the following profit metrics for financial decision making (at a product level and company level):

- IRR on after-tax profit adjusted for target surplus
- Present value (PV) of after-tax profit as a percentage of PV of premium using the after-tax earned rate
- First year strain from commission and reserve increases
- Return on asset (ROA)
- Loss ratio

The target surplus is an internally defined metric that is well above the company action level of the RBC. TTPD management uses it as a metric in addition to the profit metrics listed above.

## **Distribution and Underwriting**

TTPD outsources all distribution and marketing related efforts to Smith Inc., a company that specializes in insurance marketing and distribution. Smith Inc. offers the following services to TTPD:

- Smith Inc.'s insurance agents sell various TTPD products to the general public.
- Smith Inc. provides TTPD with illustrations for existing and new products. The same illustrations are also used by the agents for marketing.
- Smith Inc. has a retention program intended to improve product persistency for all TTPD products.
- Smith Inc. offers full medical underwriting and underwrites the whole life and indexed universal life (IUL) products from TTPD.

As part of the service agreements between TTPD and Smith Inc., TTPD will pay a commission on a percentage of first year premium and a percentage of renewal premium on all life products sold and a percentage of account value on all annuity products sold. TTPD will also pay a per occurrence underwriting fee to Smith Inc. When a policy lapses, Smith Inc. will refund half a year of commission from the policy to TTPD. Total payments from TTPD to Smith Inc. are reflected in the "Commissions & Marketing" line of the income statement. The service agreement between TTPD and Smith Inc. is renewed every year.

Last year, Smith Inc. added new service offerings to the service agreement with TTPD. In addition to traditional full medical underwriting, Smith Inc. will use alternative data for underwriting. Instead of using traditional medical underwriting processes, Smith Inc. has partnered with a technology firm that collects and analyzes alternative consumer data such as the following:

- Internet browsing habits
- Dining location preferences
- Weekly physical activities
- Streaming service preferences
- Spending habits
- Social media engagement
- Driving habits
- Criminal history

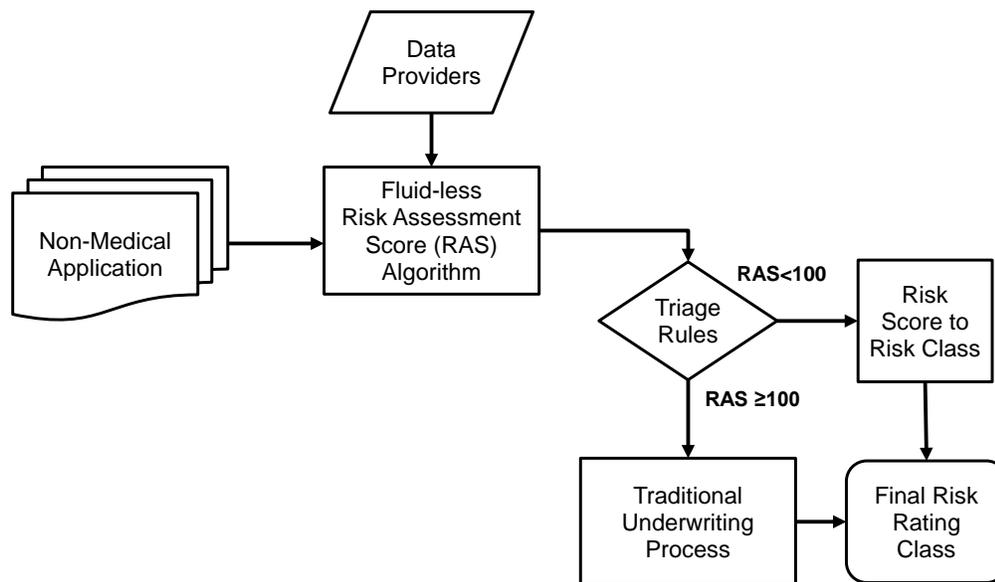
The technology firm provides Smith Inc. with consumer profiles that meet certain predefined standards, and Smith Inc. will then target the identified customers via various communication channels. The processes used to screen and select potential customers are proprietary technology owned by the technology firm.

Once the customer indicates interest in life insurance, full medical underwriting will be bypassed, and the policy can be issued within the same day. This is expected to expedite the

underwriting process and policy issue, which will consequently reduce the not-taken rate and reduce the acquisition cost incurred to TTPD.

At the same time, TTPD is developing its own proprietary algorithm for accelerated underwriting. The end-to-end accelerated underwriting process is expected to increase sales of life insurance, while decreasing costs associated with the full medical underwriting process.

The accelerated underwriting process will utilize a Risk Assessment Score (RAS), which is an algorithm developed to predict the expected mortality of the applicant based on the non-medical application and input from data providers.



Triage Model information:

- RAS scores less than 75 are best preferred.
- RAS scores at least 75 and less than 100 are second best preferred.
- RAS results greater than or equal to 100 are triaged to the traditional underwriting process for assessment of standard or substandard extra risk classes (standard non-tobacco, standard tobacco, substandard non-tobacco, decline).
- The traditional underwriting process uses underwriters to assess final risk classification.
- The traditional underwriting process uses paramedical examination and fluids collected including blood, urine, and saliva tests.

The following inputs were considered for the determination of the RAS score:

- Tobacco in the last twenty-four months
- Hospitalized in the last 45 days
- Alcohol and drug use

- Gym subscriptions
- Driving habits
- MIB for medical information
- Rx records

RAS algorithm can be calibrated to reflect the exclusion of inputs above, or inclusion of additional inputs.

## **Products**

TTPD currently sells the following products:

- Flagship IUL
- Whole Life Insurance
- Term Life Insurance
- Fixed Deferred Annuity

TTPD also has a closed block of Long Term Care from an acquisition.

Please see the accompanying spreadsheets for details on actively sold products of TTPD.

## Reinsurance

TTPD does not currently reinsure any of its products. Recently, TTPD has engaged a number of reinsurers for potential reinsurance coverage on its products.

TTPD has identified the following blocks of business to be reinsured and has expressed interest in reducing its overall mortality risk. The identified blocks will be reinsured with 100% quota share:

<b>Product</b>	<b>Flagship IUL</b>	<b>LTC</b>	<b>Combined</b>
Statutory Reserve	4,000	3,200	<b>7,200</b>
Book Value of Assets Backing Reserve	4,000	3,200	<b>7,200</b>
Market Value of Assets Backing Reserve	4,400	2,800	<b>7,200</b>
Unrealized Gain/(Loss) on Sale of Assets	400	(400)	-

Cost to set up Funds Withheld Account for TTPD: 1,000

The following US reinsurers were identified to be potential counterparties:

<b>Values in millions</b>	<b>Reinsurer 1</b>	<b>Reinsurer 2</b>	<b>Reinsurer 3</b>
<b>Total Assets</b>	<b>326,700</b>	<b>321,885</b>	<b>284,400</b>
Life Reserves	75,000	45,000	52,500
Annuity Reserves	30,000	45,000	18,000
Health Reserves	1,500	15,000	22,500
Other Liabilities	213,000	210,000	186,000
<b>Total Liabilities</b>	<b>319,500</b>	<b>315,000</b>	<b>279,000</b>
Surplus	7,200	6,885	5,400
400% RBC	5,850	6,840	5,550

The selected reinsurers are all highly rated counterparties that have a proven track record.

## Proposed Projects

TTPD's senior management has been reviewing the following project proposals for the upcoming year:

<b>Project</b>	<b>Description</b>
New product launch	Design and launch a new product based on existing products with updated features and more competitiveness.
In-house distribution system	Develop internal distribution system with its own underwriting, sales, and illustration functions.
Predictive underwriting	Establish a data science division to implement predictive underwriting in addition to full medical underwriting for its life products.
MCEV implementation	Implement Market Consistent Embedded Value (MCEV) as a profit metric for management decisions.
Assumption review	Review and revise company assumptions for all lines of business to reflect the potential long-term impact of the COVID-19 pandemic and rising interest rates.
Dividend review	Review and revise the current dividend methodology on participating blocks of business.
Assumption reinsurance	Assume a block of life business from a small US mutual company to create operational synergy and diversify risk.
Dynamic hedging program	Enhance the current investment function by implementing dynamic hedging on parts of the indexed business.
Post-level term solution	Review post-level term premium structure to manage anti-selection.

TTPD does not have the budget or resources in the upcoming year to implement all of the proposed projects. Management is expected to meet and prioritize projects.

## **Appendix**

See the following pages for a sample life insurance application for TTPD.

# TTPD Life Insurance Company

## Individual Life Insurance Application

<b>PART A - PROPOSED INSURED</b>				
Name	SSN / SIN	Sex	Height	Weight
Home Address	Date of Birth	Annual Income	Driver License State/Province	Driver License Number
US/Canadian Citizen? <input type="checkbox"/> Yes <input type="checkbox"/> No (if no, complete foreign national and travel questionnaire)	In the past 12 months, has the Proposed Insured used any form of tobacco, or any form of nicotine replacement therapy? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Occupation/Duties	Employer			
<b>PLAN INFORMATION</b>				
<input type="checkbox"/> <b>Term Life Insurance</b> – Guaranteed period <input type="checkbox"/> 10 Years <input type="checkbox"/> 15 Years <input type="checkbox"/> 20 Years <input type="checkbox"/> 30 Years		Term Insurance Face Amount Applied For [CAD   USD] _____		
<input type="checkbox"/> <b>Permanent Life Insurance</b> - (select plan below) <input type="checkbox"/> Participating Whole Life <input type="checkbox"/> Universal Life Insurance <input type="checkbox"/> Indexed Universal Life with S&P 500 Index		Permanent Insurance Face Amount Applied For [CAD   USD] _____		
<b>Payment Mode</b> <input type="checkbox"/> Annual <input type="checkbox"/> Semiannual <input type="checkbox"/> Quarterly <input type="checkbox"/> Monthly <input type="checkbox"/> Other _____		Modal Premium [CAD   USD] _____  Collected Premium [CAD   USD] _____		
<b>POLICYOWNER</b> (Please complete if Proposed Insured differs from the Policyowner)				
Name	Relationship to Proposed Insured		Date of Birth	
Address	Social Security Number/Tax ID		Citizenship Country	
<b>BENEFICIARY</b> (Please add additional Beneficiary information in Comments section)				
Primary Beneficiary	% of Proceeds	Relationship to Insured	Date of Birth	
Contingent Beneficiary	% of Proceeds	Relationship to Insured	Date of Birth	
<b>OTHER COVERAGE INFORMATION</b>				
1. List below all life insurance policies and annuity contracts on Proposed Insured that are now pending or in force. If None, check the following box. <input type="checkbox"/> None 2. Has Proposed Insured had or intend to have any life insurance policies or annuity contracts replaced, converted, reduced, reissued, sold, borrowed against, or discontinued because of this application for insurance? <input type="checkbox"/> Yes <input type="checkbox"/> No 3. In the past ten (10) years, has Proposed Insured been declined for Life Insurance? <input type="checkbox"/> Yes <input type="checkbox"/> No 4. Has Proposed Insured been offered cash or consideration for obtaining this policy? <input type="checkbox"/> Yes <input type="checkbox"/> No 5. Are you planning to enter into a finance arrangement to pay any premium payments? <input type="checkbox"/> Yes <input type="checkbox"/> No 6. Do you intend to sell or transfer ownership to a third party in the next five years, or have you sold or transferred ownership of a policy to a third party in the last 10 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				



# TTPD Life Insurance Company

## Individual Life Insurance Application

4. Has Proposed Insured In the past twelve (12) months consulted a physician for chronic cough, unexplained weight loss greater than ten (10) pounds, fatigue or unexplained gastrointestinal bleeding?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Has Proposed Insured In the past five (5) years: a. Used alcohol to a degree that required treatment by a medical professional? b. State number of drinks per week _____ c. Used unlawful drugs or used prescription drugs other than prescribed? d. Been convicted of or currently awaiting trial for a felony? e. Been hospitalized for high blood pressure or any mental or nervous disorder?	<input type="checkbox"/> Yes <input type="checkbox"/> No  <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
6. Has Proposed Insured In the past five (5) years been convicted of driving under the influence of drugs or alcohol, been convicted of reckless driving, or been convicted of four or more moving violations?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Has Proposed Insured ever (a) received care for, or (b) been advised by a physician or health care provider to seek treatment for: a. Diabetes b. Diabetes before age 50 other than Gestational Diabetes c. Diabetes at any age with complications of eye, kidney, nerve or Peripheral Vascular Disease (PVD)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
8. Has Proposed Insured in the last forty-five (45) days been hospitalized for any reason?	<input type="checkbox"/> Yes <input type="checkbox"/> No

### PART C – AUTHORIZATION AND AGREEMENT

**Authorization:** I, Proposed Insured, authorize any medical provider, hospital, clinic, pharmacy, or medical care facility, MIB, state department of motor vehicles (DMV) and other entities processing motor vehicle records, insurance companies or consumer reporting agencies to release information about me or my health, such as, medical history, including the presence of HIV or AIDS, mental or physical condition, prescription drug records, drug or alcohol use, driving record or insurance claims information, to TTPD Insurance Company. The information will be used to determine my eligibility for insurance or to resolve or contest any issues of incomplete or incorrect information on the application that may arise. I also authorize TTPD Insurance Company to disclose information to MIB. I understand that my information received by MIB may be disclosed, upon request, to another MIB member company with whom I apply for life insurance or health insurance or to whom I may submit a claim for benefits. This authorization is valid for twenty-four (24) months from the date signed. I may refuse to sign this authorization, but if I refuse, the insurance I am applying for will not be issued. I may revoke this authorization at any time by written notice. I will receive a copy of this authorization.

**Agreement:** I represent the information above is true and complete. Any incomplete or misleading answers may void this application and any issued policy effective on the effective date. You must immediately notify TTPD Insurance Company of any change in Proposed Insured's health or habits that will change any response to any question in the application as of the delivery date of the policy.

**Fraud Warning:** Any person who knowingly presents a false statement in an application for insurance may be guilty of a criminal offense and subject to penalties under state/province law.

Signed at: \_\_\_\_\_, \_\_\_\_\_ Date \_\_\_\_\_  
City, State Month Day  
Year

\_\_\_\_\_  
Signature of Proposed Insured

\_\_\_\_\_  
Signature of Applicant/Policyowner