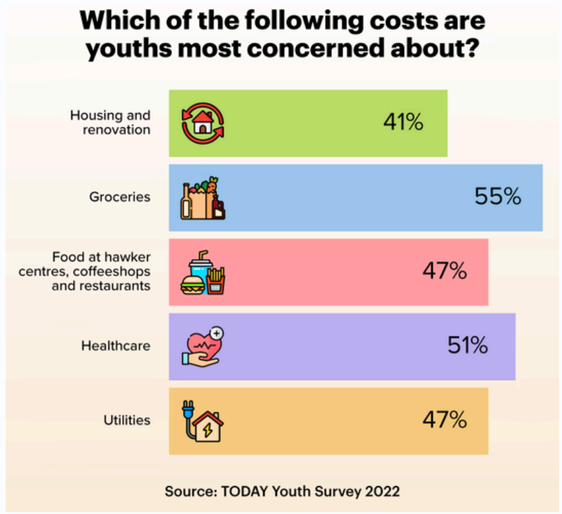
WellSpent

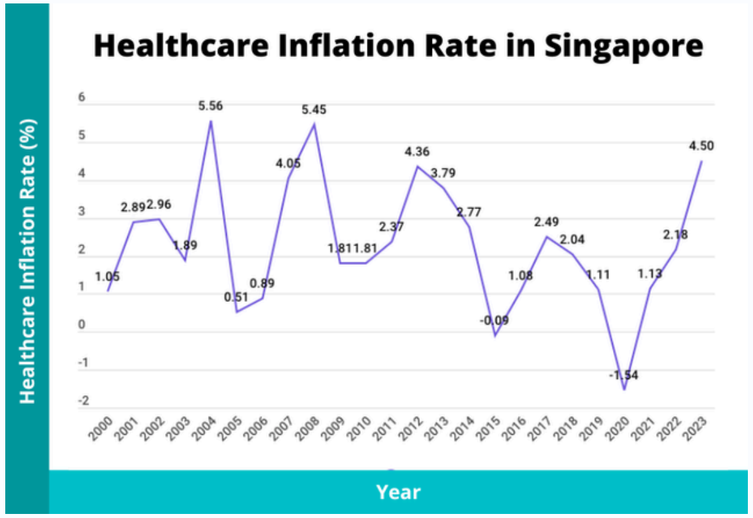
WHERE WELLNESS MEETS WISE SPENDING

PROJECT BY: TECH TITANS

Problem Statement

ACCESSING AND UNDERSTANDING HEALTHCARE COSTS, INSURANCE COVERAGE, AND FINANCIAL PLANNING FOR MEDICAL EXPENSES WHICH IS OFTEN COMPLEX AND OVERWHELMING FOR INDIVIDUALS.





PAIN POINT 1	Uncertainty in Out-of-Pocket Costs
PAIN POINT 2	Confusing mix of public & private insurance options, especially for youths
PAIN POINT 3	Manual tracking of expenses & policies is tedious
PAIN POINT 4	Lack of clear cost predictions for future care

Accessible Web App Solution

01 OUT OF POCKET COST CALCULATOR

Estimates money needed for health related issues right now

02 GRANT & SUBSIDY CHECKER

Based on a dataset on grant and subsidy eligibility criteria, create a oredictive model to predict success rate of application and time frame of reimbursement of monies

03 PREDICTIVE HEALTHCARE EXPENDITURE

Based on a dataset with factors like users' gender, BMI, age, etc, we trained our model to predict the cost one might need in the future

04 INSURANCE POLICY ANALYSIS

Based on the predicted expenditure, we will analyse whether or not users' current insurances are suitable for them

What makes our approach *unique*

01 AI powered cost prediction

Existing tools: Platforms like MediSave & MediShield claims calculator provided by Central Provident Fund (CPF): estimate claims & withdrawals for medical treatment.

Problem: Calculates for only current or past expenses.

Our solution: Utilises advanced AI algorithms to analyze individual medical histories, age, and lifestyle factors to forecast future medical expenses.

02 Policy matching engine

Existing tools: Platforms like Planner Bee provide overviews of finances and insurance assessments.

Problem: Not offer personalised policy recommendations based on comprehensive health data.

Our solution: Integrates a sophisticated engine that analyzes, identifies gaps, and recommends optimal policies tailored to individual health profiles and financial goals.

03 Real-time updates

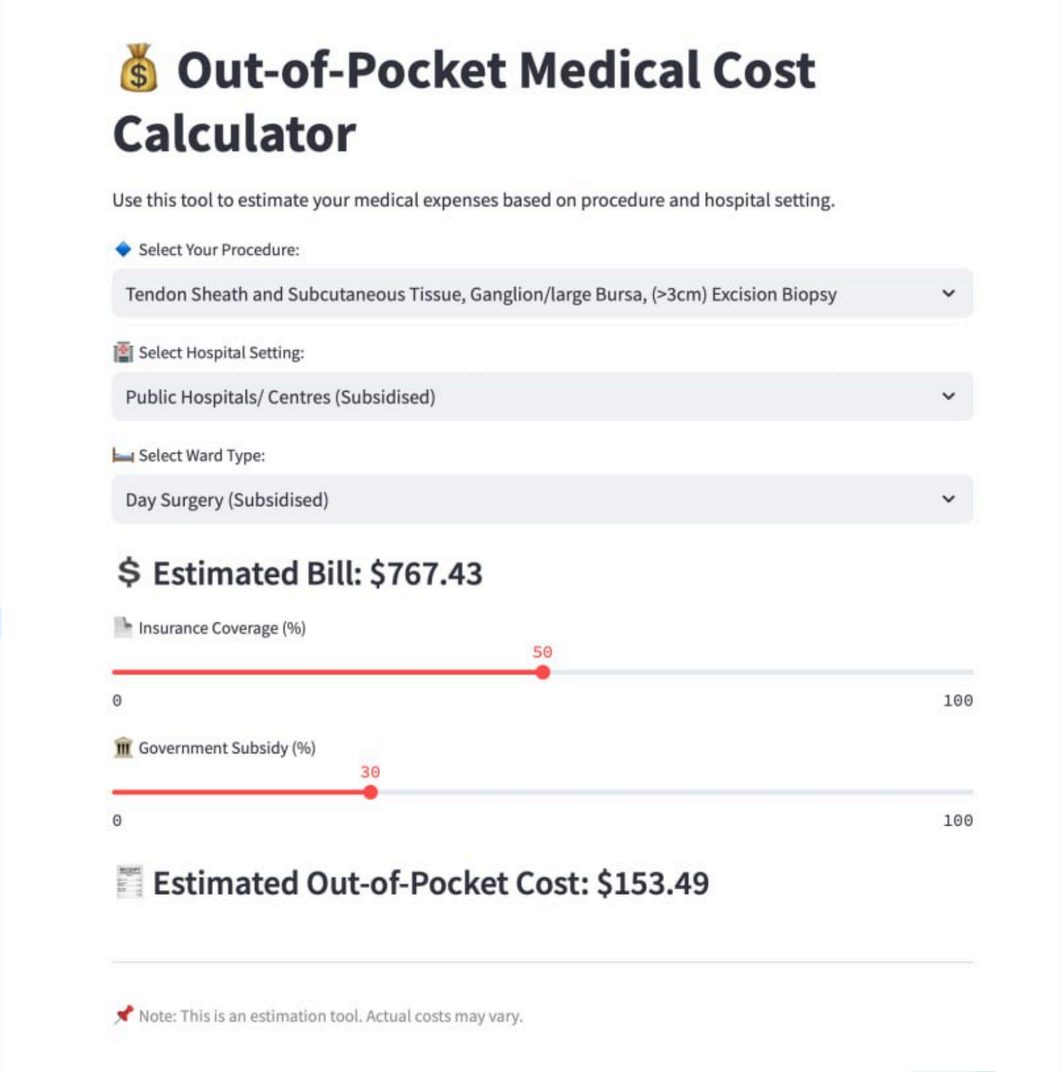
Existing tools: Services like MyMoneySave provide overviews by consolidating data from various sources.

Problem: Doesn't provide real-time updates specific to healthcare expenses.

Our solution: Seamless integration with Singpass to ensure APIs to provide instant access to the latest cost data, policy changes, and personalised notifications.

1. Out of Pocket Cost Calculator

Link to App: https://outofpock.streamlit.app/

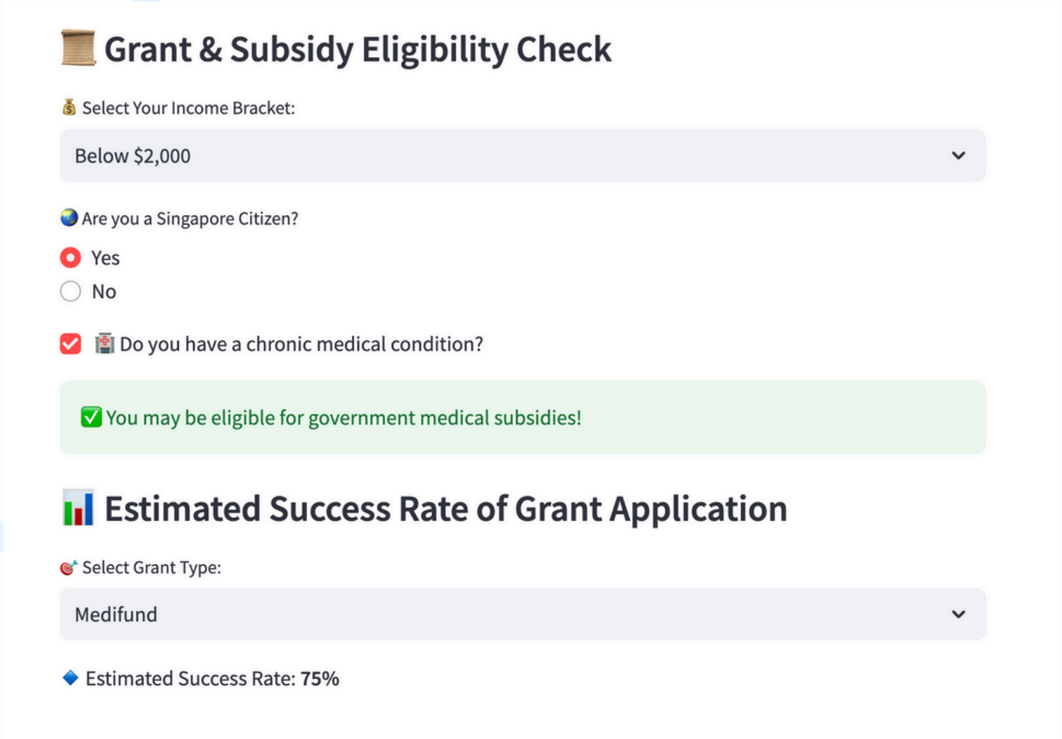


- Use Singpass's APIs with secure OAuth2 flows (and possibly OpenID Connect) to authenticate users and retrieve their CPF data (e.g., MediShield Life and MediSave) reliably (not implemented yet)
- Dropdown menu: Asks user of procedure or diagnosis
- Interactive slider: Asks users to select their current insurance plans and grants they are eligible for
- Calculates the out-of-pocket cost after applying all eligible grants, insurance coverage, and CPF deductions using Ministry of Health's estimated expenditure database

Python Script (outofpock.py):

- What we did: loaded fee-publication-data.xlsx containing real medical procedure costs across different hospitals
- Developed a function to retrieve real cost estimates for specific diseases/treatments from MOH's fee dataset (comparing public vs private hospitals, and general subsidies)

2. Additional Grant & Subsidy Checker



- Problem: Many Singaporeans are unsure if they qualify for MediSave, CHAS, or other government grants, leading to confusion and wasted time on applications.
- Solution: An AI-driven platform that evaluates a user's financial profile and medical condition to predict grant eligibility. It provides a success-rate estimate before they apply, helping users save time and streamline the application process.

IMPACTS:

- Saves time and reduces application hassle
- Increases access to financial assistance
- Empowers informed decision-making

3. Predictive Healthcare Expenditure

By leveraging a dataset that includes factors such as users' gender, BMI, age, and historical healthcare expenditures, we trained our AI model to predict future medical costs with greater accuracy.

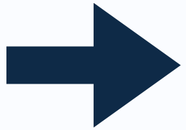
Machine Learning Model (DWL.ipynb):

- Used insurance.csv as training data for AI cost predictions
- Trained multiple machine learning models (logistic regression, XGBoost, Random Forest, etc.) to: predict out-of-pocket costs based on the hospital selection, estimate future medical expenses based on health profile & lifestyle (evaluate models using accuracy, precision, recall, and F1-score)
- The trained model can predict future hospitalization & medication costs, it automatically suggests policy improvements based on AI analysis

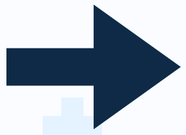
	model	precision	recall	F1	accuracy	auc
1	logistic_regression	0.905046	0.910175	0.906723	0.906187	0.949050
2	xgboost	0.967077	0.870270	0.915665	0.920175	0.944227
0	decision_tree	0.963552	0.860254	0.907482	0.913203	0.940758
3	knn	0.898885	0.714587	0.795872	0.816378	0.878673

XGBoost shows the highest F1 (0.9156) and the highest accuracy (0.9202), meaning it strikes a good balance between precision and recall while also getting the largest share of predictions correct overall.

- Age
- Children
- BMI
- Smoking or not
- Medical history (no dataset found yet to account this)

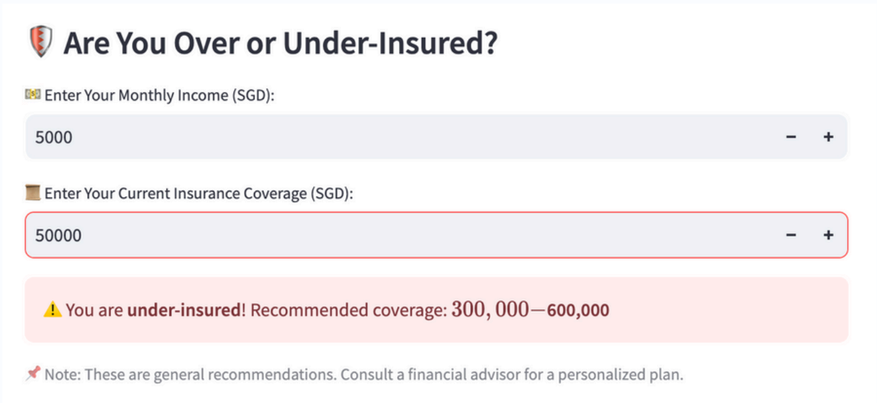


Predicted healthcare costs



Well insured or not? (next feature)

4. Insurance Policy Analysis



Feature	Manual Comparison (Before)	AI Powered Matching (After)
Insurance coverage analysis	User reads policy documents manually	AI scans and automatically detects coverage gaps
Policy optimization	User relies on agent recommendations	AI suggests better plans from multiple insurers
Future cost prediction	User doesn't know if premiums will rise	AI predicts premium increases & cost-saving options

Summary of Technical Work Done

Python Script (outofpock.py): Real hospital cost estimation

- What we did: loaded fee-publication-data.xlsx containing real medical procedure costs across different hospitals
- Developed a function to retrieve real cost estimates for specific diseases/treatments from MOH's fee dataset
- Helps users compare public vs. private hospital expenses before choosing treatment

AI Model (DWL.ipynb): Insurance & cost prediction

- Utilized insurance.csv as the primary training dataset for AI cost predictions
- Trained a variety of machine learning models (e.g., Logistic Regression, XGBoost, Random Forest) to:
- Predict out-of-pocket expenses based on hospital choice
- Estimate future healthcare costs driven by health profile and lifestyle factors
- Evaluated model performance using metrics such as accuracy, precision, recall, and F1-score
- Forecasts future hospitalization and medication costs, while also providing AI-driven policy recommendations based on the analysis

User Journey & Flow

1	2	3	4	5
USER LOGIN & PROFILE SETUP	**DASHBOARD OVERVIEW (PERSONALIZED INSIGHTS)**	**COST PREDICTION & AI ANALYSIS**	**POLICY MATCHING & PERSONALIZED RECOMMENDATIONS**	**FINAL REPORT & REAL-TIME UPDATES**
Users login securely via Singpass, auto-fetches healthcare & insurance data	Users see a snapshot of their current insurance, estimated out-of-pocket costs, and upcoming medical expenses	AI scans medical history, lifestyle factors, and insurance plans to predict future healthcare expenses. Users get a data-driven forecast of their future medical costs	AI compares existing policies vs. optimal plans, filling gaps. Users receive actionable suggestions to optimize coverage & minimize costs	Users can view final recommendations, track reimbursements, and get real-time updates on grants & subsidies

User Benefits & Concluding Notes

Out-of-Pocket Calculator Benefits

- Financial clarity before medical procedures. No more guesswork—AI helps in cost predictions
- Better decision-making when choosing between healthcare options and facilities
- Reduces stress & financial burden by transforming uncertain costs into concrete numbers
- Healthcare accessibility through improved financial preparation and planning

Hospital Cost Estimator & Grant Predictor Benefits

- Time savings by instantly predicting grant eligibility instead of lengthy application processes
- Financial optimization through personalized hospital and treatment plan comparisons
- Informed planning with real-time data from government and insurance databases
- Empowered choices between public vs. private care with clear cost implications

"We are looking for partners in healthcare & insurance to refine and scale our solution.
Let's make healthcare cost planning stress-free for all Singaporeans!"