Part A. Project Particulars

1. Beneficiary Eligibility

Women aged 25 to 38 years residing in Hong Kong. Must be non-pregnant at the time of recruitment and have no history of pregnancy. Recruitment and screening will be conducted by The Fertility Foundation at the Prince of Wales Hospital, adhering to CityUHK research criteria.

2. Project Period

Duration: November 2025 to July 2026 (9 months)

3. Key Dates

Milestone	**Date**
Discussion and Proposal Finalization	November 2025
Kick-off Meeting	6 January 2026
Research & AMH Testing Phase	January 2026 – June 2026
Preliminary Results Announcement	May 8, 2026
Publications & Policy Roundtables	July 2026

4. Particulars of Research Units

4.1 Principal Investigator

Principal Investigator	**Date**
Professor MING Wai-kit	The City University of Hong Kong
Professor Jacqueline Chun	The Chinese University of Hong Kong
Professor David Chan	The Chinese University of Hong Kong

5. **Research Responsibilities**

Organization	**Responsibilities**
Institute of Global Governance and Innovation (IGGI) City University of Hong Kong	•Designing and executing the research study •Applying for ethical approval •Authoring and publishing journals • Hosting roundtable meetings

The Fertility Foundation Prince of Wales Hospital	•Conducting AMH tests for 330 women • Ensuring clinical excellence and patient confidentiality

6. **Budget Breakdown**

Total Programme Costs: HK$700,025.00

Category	**Amount (HK$)**	**Details**
AMH Testing Costs	HK$200,000.00	330 tests @ HK$606.06/test
Research & Programme Costs	HK$500,000.00	Includes Research & Administrative Assistants, Venues, Refreshments, and Publication Fees

Part B. Project Detail

Abstract

Hong Kong has one of the lowest birth rates in the world, causing a demographic crisis in the region. The Hong Kong Special Administrative Region (HKSAR) Government has introduced various financial incentives to encourage childbirth in the past years. However, many experts have pointed out that these incentives do not address the psychological and medical issue. A major, yet frequently neglected, barrier to fertility is conception anxiety, which arises from uncertainty regarding one's ability to physiologically reproduce. To fill this gap, this project proposal initiates the collaboration with the Public Health team from the City University of Hong Kong (CityU) and the expert medical team from the Chinese University of Hong Kong (CUHK). This joint study of these two institutions aims at understanding the impact of comprehensive preventive screening. Through a quantitative research design employing propensity score matching, the impact of these screening services and the respective efficacy of AI-enabled counseling on fertility concerns will be assessed. The main goal is to publish good science in May 2026 and promote this type of screening as a subsidized territory-wide public health service by the government.

Introduction

The Hong Kong demographic changes are declining with a fertility rate that is among the lowest in the developed world. The city's growth prospect will face serious threats due to the shrinkage of this demographic group. Thus far, the government has primarily focused on offering money, along with tax rebates and childcare incentives. Nevertheless, these things do not take into account the biological and psychological factors which govern a woman’s decision for conception. A major shortcoming of the existing policy framework is the absence of a technical supporting framework from a public health perspective. Women of reproductive age often exhibit increased reproductive anxiety regarding the uncertainty of their biological clock (ovarian reserve). A shortage of trustworthy, accessible, and understood health information heightens this fear.

Current medical literature and public health practice suggest that increasing the transparency of information can change health behaviour. This project suggests that the launch of accessible professional services could reduce such fears. Through a preventive approach similar to the government’s colorectal cancer screening programs, this study believes that informing women of their ovarian reserve (AMH testing) will change reproductive anxiety into informed confidence, thus enhancing fertility intention. Moreover, while healthcare systems worldwide face issues related to resource constraints, this study takes a new dimension, assessing the role of Artificial Intelligence (AI) in fertility counselling where technology offering a scalable and cost-effective alternative to physicians model does not impair psychological outcomes.

Methodological Framework

This research study uses quantitative research design via propensity score matching in order to strike the right balance between scientific rigour necessary for public policy advocacy and practicalities of community-based research. While a Randomized Controlled Trial (RCT) is the gold standard, withholding screening from a control group in a community setting poses logistic and ethical challenges. A quasi-experimental design is more appropriate in this case. The research team will use propensity score matching to create a comparison group that is statistically comparable to the intervention group in relation to key demographic and health variables for the screening intervention on fertility intention.

1. *Sample Recruitment and Target Population*

The targeted sample of the study is 660 women, who are mostly aged between 25-38 years. The principle of horizontal equity has been moderately relaxed in light of Hong Kong's specific circumstances. Recruitment will not use random digit dialing but rather be community-embedded to ensure broad representation of society. The recruitment channels will use the alumni networks of CityU and CUHK, as well as the primary health care system. Also, to achieve grassroots outreach, the project will work with offices of the Legislative Council and District Councillors to attract participants on a larger scale. By utilizing this strategy, it ensures that the data is representative of the Hong Kong society rather than a clinical population.

2. *Study Design and Intervention Arms*

The researchers plan to divide the cohort into two groups for comparison analysis. The Control Group, consisting of 330 participants, will receive the standard of care currently available to the general public. During the study, these subjects will complete the baseline fertilization intentions questionnaire and be provided with basic health educational materials. However, they will not be subject to AMH testing. This group provides a baseline on the natural evolution of fertility intention in the absence of advanced medical technologies.

On the other hand, the Intervention Group will access the full AMH service with 330 participants. The blood samples will be taken from these participants in a specific centre at the Chinese University of Hong Kong. AMH testing is critical as it offers a measurable count of the ovarian reserve. The report will display AMH levels in nanogram per millilitre (ng/ml) and picomoles per litre (pmol/L) to fulfil clinical requirements with different gauges. Most importantly, there will be age-matched comparisons charts in the reports to compare the reproductive potential with the median for their age.

Once the test analysis is done, customized reports will be provided to the candidate. This study importantly presents a second intervention variable for this group: the mode of counseling.

Reports will be followed by counseling for the participants to make sense of the findings. *The Role of Artificial Intelligence in Healthcare Delivery*

A key part of this study is the analysis of AI counseling. The increasing reliance on fertility medicine may result in demand outstripping the supply of fertility specialists. With this in hand, the study aims to overcome this potential hurdle by embedding an AI-driven counseling element in the service delivery model.

It is hypothesized that AI may instantly give information that is standardized, accessible and might reduce anxiety at par with humans. The AI will provide clear explanations of complicated metrics like what specific levels of AMH means in simple language. However, there will always be a "human-in-the-loop" aspect to it for it being safe and accurate. Participants will know when they are interacting with AI and not a human doctor. It is important that the participants maintain trust in the process. The scalability of the intervention is assessed to see if a territory-wide programme could take place without overwhelming the public hospital workforce.

3. *Data Collection and Follow-up Assessments*

The data collection process will be designed to account for longitudinal changes in psychology and intent. Two to four weeks after testing and counseling, the second follow-up will be done after the first recruitment. A second survey will be administered to all participants in the intervention group. This time is chosen so that the participants can process the medical information and their initial emotional reaction settles down, thereby enabling a more accurate estimation of lasting psychological changes and tangible alteration of fertility plans. The analysis will evaluate whether the information provided by the screening encourages a proactive approach to family planning (such as egg freezing or earlier conception), or conversely, induces complex situations that require further support.

AI Tools : "Shelby" (shecare.ai)

The study utilizes a custom-built conversational agent named "Shelby," accessible at https://shecare.ai.

1. **Architecture (RAG):** The agent employs a Retrieval-Augmented Generation (RAG) framework. It retrieves answers exclusively from a curated database of validated information to prevent hallucination.
2. **Personal Engineering ("The HK Bestie"):** The system prompt defines a "Wise Elder Sister" persona using Hong Kong-specific cultural markers (e.g., local slang, emojis) to overcome the "Machine Heuristic" coldness.
3. **Safety Protocols:** Hard-coded constraints strictly forbid the agent from diagnosing diseases, recommending specific clinics, or interpreting raw medical data without a disclaimer.

Study 1: The Motivator (Pre-Test Cohort)

Objective: To measure if AI drives higher willingness to pay (WTP) than static info.

- **Procedure:**
  - Participants enter their unique code and are diverted to Group 1A (AI Chatbot) or Group 1B (Static Website).
  - **Duration Protocol (Natural Engagement):** Participants must engage for a minimum of 3 minutes, after which they may continue as long as they wish. This allows "Voluntary Dwell Time" to serve as a metric of engagement quality.
  - Group 1A interacts with "Shelby" about the "Goldilocks Window" (Age 25-38).
  - Group 1B reads a standard medical brochure on the same topic.
- **Measures:**
  1. **Purchase Intention (Primary Metric):** "The standard market rate for an AMH test is HK$1,000. Based on the information received, would you book a test at this price?" (Yes/No).
  2. **Barrier Analysis (Secondary Metric):** If "No," participants select a reason: Price Barrier, Value Barrier ("Not useful"), or Fear Barrier ("Afraid of result").
  3. **Valuation:** If "Price Barrier" is selected, participants indicate the maximum price they would pay (e.g., HK$500, HK$800).
  4. **Perceived Empathy (Mediator):** Measured using the modified Consultation and Relational Empathy (CARE) scale (e.g., "Did the agent really listen to you?").
  5. **Persona Manipulation Check:** "To what extent did the agent/text feel like a local Hong Kong resident?" (1-7 Likert).

Study 2: The Interpreter (Post-Test Cohort)

Objective: To measure if AI reduces anxiety and improves understanding of medical results.

- **Procedure:**
  - All 330 participants receive a free AMH test upon entry.
  - Participants enter their unique code and are diverted to Group 2A (AI Explanation) or Group 2B (Static Report).
  - Group 2A: Inputs their result to "Shelby" for an interactive explanation.
  - Group 2B: Receives a standard PDF lab report with reference ranges.
- **Measures:**
  1. **Comprehension Accuracy:** 3 objective True/False questions about their specific result (e.g., "My result indicates immediate infertility") to test understanding.
  2. **Psychological Distress:** State-Trait Anxiety Inventory (STAI-6) measuring immediate anxiety levels post-interaction.
  3. **Patient Enablement:** Patient Enablement Instrument (PEI) assessing capability to cope with the health information.

Operational Data Capture (Behavioral Metrics)

To objectively compare engagement quality, backend metrics will be captured:

- **Interaction Duration:** Total session time (seconds).
- **Conversation Depth (AI Group):** Number of user-bot turns.
- **Sentiment Arc (AI Group):** NLP analysis of user sentiment change from start to finish.
- **Heatmap Analytics (Static Group):** Frequency of clicks and scroll depth on the website.

Data Analysis Plan

Quantitative Analysis

- **Hypothesis Testing:**
  - **Chi-Square Test:** To compare the "Yes" rate (Purchase Intention) at the HK$1,000 price point between AI and Static groups.
  - **Independent Samples t-test:** To compare "Maximum Willingness to Pay" (Valuation) and "Anxiety Scores" (STAI-6) between groups.
- **Mediation Analysis:**
  - Using PROCESS Macro (Model 4) to test if Perceived Empathy mediates the relationship between Modality (AI vs. Static) and Purchase Intention.

Qualitative Analysis (Topic Modeling)

- **Latent Dirichlet Allocation (LDA):** We will perform automated topic modeling on the anonymized chat logs from Group A to identify "Hidden Concerns" (e.g., specific fears about pain or privacy) that users voluntarily raised with the AI, revealing information gaps in the static brochure.

Ethical Guidelines

This proposal has the strictest ethical guidelines in view of the sensitive nature of reproductive health data. All subjects must provide written informed consent from the relevant institutional review board (IRB) and the ethics committee before any data collection. To ensure that nothing is missed, the consent process will be detailed. It will inform researchers about the specific purpose of testing for which the participants are being informed. They will also notify that it is invasive since blood taking is involved. They will mention the scope of AMH analysis along with the risk. This will include psychological distress from learning of diminished ovarian status. Participants will be guaranteed that they have the right to withdraw from the study at any time without penalty and without any effect on the quality of medical care and entitlements they receive.

Data privacy systems are specifically designed to keep participants anonymous. The data to be analyzed will be fully de-identified, such that clinical data will be separated from personal identifiers using a coding system (e.g., A01, B01). There will be a strict firewall between medical reports and Personally Identifiable Information, which will be stored separately. Only the project coordinator will have access to the decoding key so that no one can connect test results to any

individual. Additionally, it states that information resulting from testing will only be utilized for this research and cannot be used commercially or non-researched at all.

It is important to realize that fertility testing can yield unwelcome news, such as a low ovarian reserve so the study was designed with a mental well-being component. If findings suggest a considerable fertility issue then the scientist should report immediately. The protocol ensures the timely provision of professional psychological counseling and medical referrals to prevent excessive concern or panic. This means the research has a duty of care and does not leave participants to deal with medical realities on their own.

Ethical considerations occupy a central position in this research involving medical information. Beyond the hard guardrails and RAG architecture, the study specifically incorporates a distress protocol in the second study: when the system detects high-intensity negative emotional language following unfavorable test results, such as mentions of suicide or feelings of hopelessness, it automatically triggers a human handover mechanism displaying a support card with contact details for mental health counselors. Regarding data privacy, the study strictly adheres to the Hong Kong Personal Data (Privacy) Ordinance, avoiding any use of personally identifiable information throughout the process. The unique code system ensures complete decoupling of participants' real identities from chat logs and survey data, thereby safeguarding participants' privacy rights while conducting academic research.

Resource Allocation and Institutional Responsibilities

To two partner universities utilize specific strengths for joint collaboration. CityU will take the lead in project management, in charge of developing the AI-assisted counselling technology and complex statistical data analyses for propensity score matching. Additionally, CityU will guide the formulation of government policy recommendations based on the evidence gathered.

The clinical and medical infrastructure will be supplied by The Chinese University of Hong Kong (CUHK). The blood samples are physically collected, then analyzed in the lab with Evolution Assay of AMH levels. After that, medical reports are interpreted, and finally, counseling support by professionals physicians for the non-AI intervention arm. The CUHK team will handle the logistics of sample archiving to ensure the serum samples are stored correctly to allow for re–testing or analysis as permitted by the ethics. Consequently, Data Science and clinical experts collaborate on this endeavour to produce results that are data-driven and clinically sound.

Financial Logistics and Sustainability

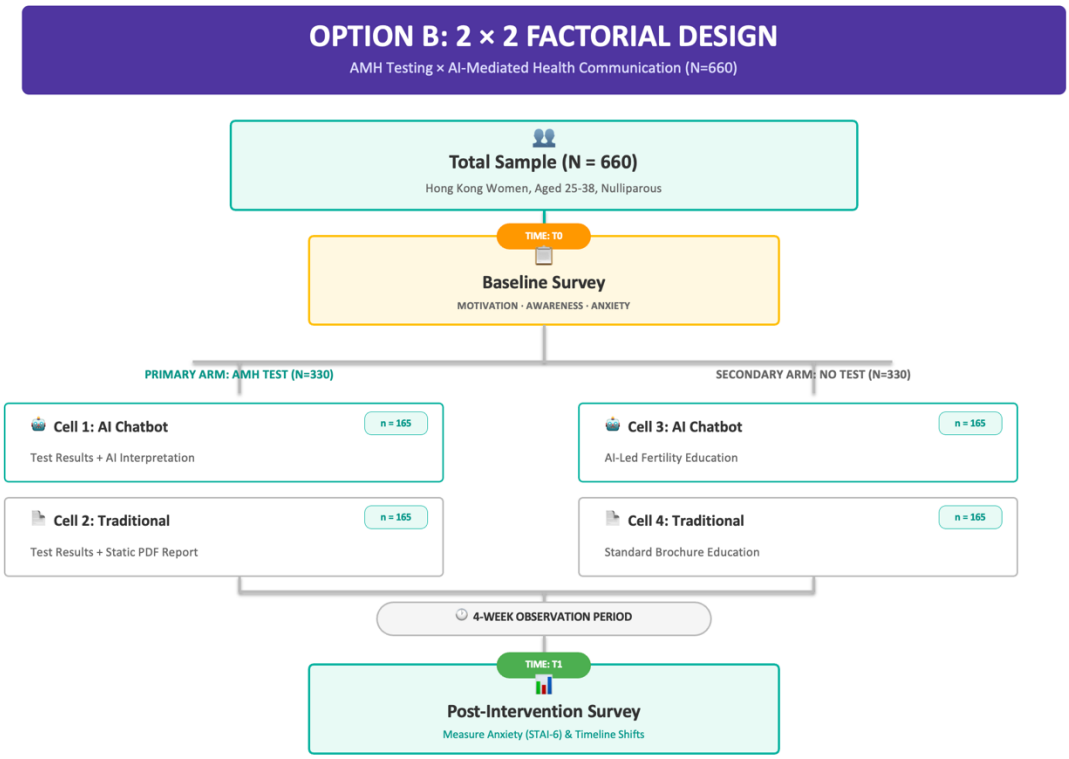
A financial structure will be established to make the project viable. The project will operate as a “lump sum” to reduce administrative overheads. The money, which will come from a pharmaceutical partner like Merck or an NGO donation, will go towards the lab and recruiting participants. Regulatory and licensing fees can burden the project, therefore every effort will be made to contain costs so that the screening services would be offered at a subsidized “friendship price” to be well below the market rate of HKD 800-1000. This aims to ensure that participants can join in the screenings without much financial burden. This cost-effectiveness analysis is the critical content for the next policy recommendation, which shows that a territory-wide program is financially feasible for the government.

Expected Impact and Social Benefits

The outcomes of this project are not only contributing to academia but also bring about social change. The team undertakes to complete the study and disseminate the findings by May 2026. They will end the study with a press conference where they will invite as many people as they can. In addition to academic publications, a key output will be evidence-based policy recommendations submitted to the HKSAR Government. The proposal aims at providing the required data to lobby for the inclusion of fertility screening into public health system making it a standard preventative service instead of a niche luxury.

This project aims to address the root causes of reproductive health problems in women of reproductive age to provide a scientific and structural solution to support the long-term population development of Hong Kong. This means that if the idea is successful, it can the model for other places with low fertility intentions like Hong Kong. In this way, the place will be successful in public health. The implementation of AI validation further enhances this study's advancement in the Health Economics area. Subsequently, it could allow future resource funding in light of the cost-effectiveness of technology-driven public health interventions. This proposal represents a necessary shift away from incentives that are simply financial in nature to one that empowers families in Hong Kong in a health-based manner.

Appendix A. Graph for flowchart


OPTION B: 2 × 2 FACTORIAL DESIGN
AMH Testing × AI-Mediated Health Communication (N=660)
Total Sample (N = 660)
Hong Kong Women, Aged 25-38, Nulliparous
TIME: T0
Baseline Survey
MOTIVATION · AWARENESS · ANXIETY
PRIMARY ARM: AMH TEST (N=330)
SECONDARY ARM: NO TEST (N=330)
Cell 1: AI Chatbot
n = 165
Test Results + AI Interpretation
Cell 2: Traditional
n = 165
Test Results + Static PDF Report
Cell 3: AI Chatbot
n = 165
AI-Led Fertility Education
Cell 4: Traditional
n = 165
Standard Brochure Education
4-WEEK OBSERVATION PERIOD
TIME: T1
Post-Intervention Survey
Measure Anxiety (STAI-6) & Timeline Shifts