

## ECONOMIC ANALYSIS FOR CANCER CARE IN SINGAPORE

### STATEMENT OF RESEARCH PROJECT

Cancer is one of the most prevalent diseases in the world with rising healthcare utilization. Socioeconomic disparities exist in access to cancer screening and cancer treatment with novel cancer drugs like immunotherapy. On 1 Sep 2022, Singapore introduced the Cancer Drug List (CDL) to negotiate favourable prices for cancer drugs and make cancer drugs affordable for the patients.

Specific aim 1: Baseline assessment of Screening and Immunotherapy use by SES: Evaluate the association of socioeconomic status (SES)—specifically area-level housing, insurance coverage and Per Capita Household Income (PCHI)—with cancer screening and immunotherapy receipt among advanced hepatocellular carcinoma (aHCC) and advanced gastric cancer (aGC) patients. The specific hypothesis to be tested are:

H1: The uptake of cancer screening is low among population with low SES.

H2: The utilisation of immunotherapy is low among population with low SES.

Specific aim 2: Increase in Access and Utilisation: Ascertain whether the introduction of CDL has increased the utilisation of drugs on the extensive margin and how much was the increase in utilisation of drugs at the intensive margin? Since, 90% of the drugs are covered under CDL, more income categories can avail subsidies for these drugs, and claims limits have been increased, the patients may use more of the drugs on CDL: either they do not forego their drugs due to higher claim limits, and/or substitute from non-CDL drugs due to lower prices, and/or more patients can now use CDL due to new tier categories. The specific hypotheses to be tested are:

H2: The utilisation of the drugs on the CDL increased after two CDL implementations.

H3: The increase in utilisation of cancer drugs on the CDL was significant after two CDL implementations.

Specific aim 3: Increase in Patient Affordability: Ascertain whether the affordability for the patients increased after the implementation of the CDL. The bulk-purchasing enables the sale-price of drugs to be lowered across the board and accrue savings to the healthcare system. The new tier categories extend subsidies to individuals with monthly PCHI between \$2,800 and \$6,500, hence making it more affordable to them by lowering their out-of-pocket expense. The specific hypotheses to be tested are:

H4: Whether and by how much did the out-of-pocket cost reduce for patients with monthly PCHI between \$2,800 and \$6,500.

H5: Whether the introduction of CDL and higher claim limits increased the percentage of patients with fully covered cancer bills, and how much was the increase in this percentage of fully-covered patients.

Specific aim 4: Productivity Impact: The introduction of CDL is expected to improve patient access to drugs and improve their treatment regime. Secondly, by screening the patients and their families for cancer genetic screening, the physicians will be able to detect cancer at earlier stage and prescribe customised treatments. The specific hypotheses to be tested are:

H6: Whether families that screen for cancer are able to detect cancer earlier than rest of population.

H7: Whether patients that are treated with customised treatment regimes are able to show productivity gains in labor market.

### **SCOPE OF WORK FOR SELECTED PHD STUDENT**

The PhD student will be involved in data collection, data analysis, and building the theoretical and empirical models.

1. Build theoretical models. The student will build theoretical model for determining access to care, utilisation of care, and productivity changes. The student will build upon the Grossman Health Production function and use the current literature from economics including behavioural economics and healthcare to build the theoretical framework.
2. Collect data: The student will be responsible for collecting data from the NCCS. This includes obtaining patient approvals and necessary IRB approvals.
3. Empirical analysis: The student will learn about the various statistical models and apply the techniques to the data at hand.
4. Preparation of manuscripts and publications. The student will write the manuscripts under the supervision of the TAC.