

EXECUTIVE SUMMARY

1. Cancer is a highly prevalent disease around the world, including in Asia and Singapore. In Singapore, cancer was ranked 2nd based on the burden of disease and injury resulting from premature mortality and disability, after cardiovascular diseases. In particular, lung, breast, and colon and rectum cancers were the leading specific causes of cancer burden locally. There are some Asian prevalent cancers which are common in Singapore and this is an unmet clinical need which is often ignored by major research centres worldwide.

2. Research plays an important role in helping Singapore tackle these challenges. The public sector's research investments have led to the development of basic, translational and clinical research capabilities in the universities, A*STAR research institutes, Academic Medical Centres (AMCs), and the clinical institutions. Together, cancer researchers in Singapore have yielded various achievements in terms of scientific, health and economic outcomes.

3. As part of the planning of the HBMS Integrated Strategy, the HBMS Executive Committee (HBMS EXCO) appointed the Cancer Taskforce (CTF) to develop a national strategy to guide future efforts in cancer research. This includes providing a deeper analysis of the cancer research landscape in Singapore and globally, and recommending cancer research focus areas in which Singapore can be competitive and differentiated. The CTF note that there is a need to have a fine balance between local and international impact, as well as amongst scientific, health and economic impact.

4. The CTF took the approach of mapping the cancer research in Singapore based on the journey of a cancer patient – from early diagnosis of cancer to early management of the disease, and finally post early management, when a patient progresses to the advanced stage. In addition, the CTF took into consideration the latest technology developments which have the potential to disrupt the cancer field, as well as subject matters that might have been traditionally overlooked by the cancer research community but have the potential to impact cancer healthcare.

5. The CTF also conducted a Cancer Workshop to engage the wider cancer research community. The community took into consideration several factors such as the availability of local expertise and capabilities, gaps in scientific knowledge, scientific importance, and potential impact. Additionally, the CTF further sought inputs from the community subsequently via an email survey on the research topics that they would be keen to either participate or lead as part of a large collaborative programme.

6. With these considerations, the CTF recommended the following three themes for the HBMS Open Fund-Large Collaborative Grant (OF-LCG):

a. Precision methods for prevention, disease detection, and treatment stratification

Focus:

To reduce preventable cancers(s) and optimise treatment for cancer patients in Singapore.

Challenge Statement:

To utilise basic, translational, clinical and implementation science approaches to enable the identification of at-risk individuals, early detection of cancer and stratification of cancer treatment (e.g. through the identification of biomarkers). Due consideration should be given to the cost-effectiveness of the approaches, and the attractiveness of such approaches to industry. This is in support of long-term goals of reducing the national incidence of late-stage cancer by 10% by 2025, and increasing the survival rate of cancer patients in Singapore by 20% by 2030.

b. Metastasis and resistance

Focus:

To develop novel understandings of and therapy for Asia-prevalent cancer.

Challenge Statement:

To utilise basic, translational, clinical and implementation science approaches to understand the major factors mediating drug resistance and metastasis, and develop novel therapy to mitigate them so as to improve the survival of cancer patients. Due consideration should be given to the cost-effectiveness of the approaches, and the attractiveness of such approaches to industry. This is in support of the long-term goal of increasing the survival rate of cancer patients in Singapore by 20% by 2030.

c. Enhancing cancer immunotherapy

Focus:

To improve outcomes of Asia-prevalent cancers using immunotherapeutic approaches.

Challenge Statement:

To utilise basic, translational, clinical and implementation science approaches to improve patient selection for immunotherapy, so that patients receive maximum benefit from the therapy (e.g. through the development of new targets for immunotherapy or overcoming resistance). Due consideration should be given to the cost-effectiveness of the approaches, and the attractiveness of such approaches to industry. This is in support of the long-term goal of increasing the survival rate of cancer patients in Singapore by 20% by 2030.

7. In terms of cancer indication prioritisation, the CTF proposed to focus on six cancer types: breast cancers, gastrointestinal cancers, haematological malignancies, liver cancers, lung cancers and nasopharyngeal cancers. Based on considerations such as local and global disease incidence, industry interest, and Singapore's research strengths, these cancer indications were evaluated to be the priority areas in which Singapore's R&D efforts can potentially generate the greatest health and economic outcomes.

8. The CTF also devised a five-year research roadmap, articulating the broad cancer research focus areas, desired goals for cancer research, gaps in the current ecosystem which impeded cancer research, as well as recommendations to address these gaps. The recommendations are briefly as follows:

- a. Provide levers and incentives for researchers to collaborate rather than compete;

- b. Address the impact of the Personal Data Protection Act (PDPA) and Human Biomedical Research Act (HBRA) on cancer research;
- c. Consolidate key national infrastructure and equipment to facilitate sharing and collaborations, and develop principles for the harmonisation, access, and storage of tissue samples and data; and
- d. Ensure that funding for cancer research takes a longer-term perspective, and create platforms to train clinician scientists and develop innovation and commercialisation skills;
- e. Have national programmes for cancer data integration; and
- f. Sync up with Precision Medicine Steering Committee (PMSC) for potential synergies.