

## LEGISLATIVE COUNCIL PANEL ON HEALTH SERVICES

### **Proposal for Injection into the Health and Medical Research Fund**

#### **PURPOSE**

This paper consults Members on the increase in the approved commitment for the Health and Medical Research Fund (HMRF) by \$1,308 million (from \$2,915 million to \$4,223 million) to sustain the operation of the HMRF.

#### **HMRF AND ITS CURRENT PROGRAMMES**

2. The HMRF aims to build research capacity and to encourage, facilitate and support health and medical research to inform health policies, improve population health, strengthen the health system, enhance healthcare practices, advance standard and quality of care, and promote clinical excellence, through generation and application of evidence-based scientific knowledge derived from local research in health and medicine. It also provides funding support to evidence-based health promotion projects that help people adopt healthier lifestyles by enhancing awareness, changing adverse health behaviours or creating a conducive environment that supports good health practices. The Government submits progress report of the HMRF to the Legislative Council (LegCo) Panel on Health Services annually.

#### **Operation of HMRF**

3. The HMRF was established in 2011 by consolidating the former *Health and Health Services Research Fund* (HHSRF) and the former *Research Fund for the Control of Infectious Diseases* (RFCID), expanding the funding scope to cover more areas of health and medical research and injecting an additional \$1,000 million<sup>1</sup>. In 2016, the total commitment of the HMRF was

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<sup>1</sup> The total approved commitment for HMRF was \$1,415 million including the unexpended balances of the former Health and Health Services Research Fund (\$190.8 million) and the former Research Fund for the

increased by \$1,500 million and its scope expanded to incorporate the functions of the former *Health Care and Promotion Fund* (HCPF) to create synergy and provide more flexibility in the support of health and medical research and health care and promotion efforts as well as streamline procedures.

4. The HMRF is governed by the Research Council (RC), which is chaired by the Secretary for Food and Health (SFH) and comprises representatives from public institutes and members with experience and expertise in health and medical research appointed by SFH. The RC is supported by two arms – (a) the Expert Advisory Panels (EAPs)<sup>2</sup> which advise the RC on research policy and foci and make recommendations to the RC on the thematic priorities for the investigator-initiated projects; and (b) the Grant Review Board (GRB), the GRB Executive (GRBE) and the Referee Panel which provide independent two-tier peer review. Their work and the day-to-day administration of research funds are supported by the Research Fund Secretariat (RFS) of the Research Office (RO) established under the Food and Health Bureau (FHB).

5. The RC provides strategic steer for funding health and medical research projects and health promotion projects, and oversees the administration of the HMRF including the allocation of funds to the following categories for approved grants -

- (a) **Investigator-initiated projects:** funding for individual grant proposals submitted in response to “HMRF Open Call” invitation for grant applications, with reference to the thematic priorities of the HMRF;
- (b) **Commissioned programmes:** specific programmes commissioned to, *inter alia*, build research capacity, fill knowledge gaps, support policy formulation, address specific issues, assess needs and threats, etc., identified on the advice of relevant experts in the field; and
- (c) **Research fellowships:** to enhance research capability and build research capacity to facilitate the translation of knowledge into clinical practice.

6. For investigator-initiated projects, all eligible grant applications undergo stringent two-tier peer review to ensure that funded projects are of

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Control of Infectious Diseases (\$224.2 million). Of which, \$334 million was committed for projects supported by these two former funds.

<sup>2</sup> There are five Expert Advisory Panels under the broad themes of infectious diseases, non-communicable diseases and primary healthcare, mental health, cancer and implementation science.

appropriate scientific design and high merit. The first tier of peer review is performed by a Referee Panel comprising non-local experts in relevant areas. The second tier is conducted by the GRB comprising senior local academics, clinical experts, Government and private sector healthcare professionals. Together they assess the scientific merit of the research projects, such as originality, significance of the research questions, quality of scientific content, credibility of design and methods, translational potential and applicability to the local context; and the feasibility of the health promotion projects, such as scientific evidence of effectiveness of the proposed health promotion activities, innovation, evaluation plan of programme effectiveness, impact and sustainability of the programme, cross-sector collaboration, and potential to build community capacity in health promotion. Other objective assessment criteria including research ethics, justification of budget and track record of grant applicants are also considered. Priority will be given to projects addressing the thematic priorities advised by the EAPs. The GRB makes funding recommendations for consideration and endorsement by the RC.

7. The administering institution and the principal applicant of successful grant applications are required to sign a contractual agreement, covering the terms and conditions under which the grant is offered. Principal applicants are required to report progress of the projects and the financial position at regular intervals for assessment by the RFS. Payment of grants is tied to satisfactory progress and submission of acceptable deliverables as set out in the contractual agreement.

8. The principal applicants of completed projects are required to submit a final and dissemination report and independent audited account or certified financial statement not more than six months after project completion.

9. Approved projects as well as the final and dissemination reports of completed projects are uploaded to the RFS website (<https://rfs.fhb.gov.hk>) for public access.

## Progress of HMRF

### *Investigator-initiated projects*

10. Since establishment of the HMRF in 2011, seven rounds of HMRF open calls were completed. The funding cap for each project was increased from \$1.0 million to \$1.2 million and from \$1.2 million to \$1.5 million with effect from the 2014 HMRF Open Call and the 2017 HMRF Open Call respectively. As at 30 September 2020, a total of 5,882 grant applications have

been received in response to the seven open calls. After assessing the merits of the applications, 1,310 projects were funded with a total commitment of \$1,268 million.

11. The HCPF was renamed as *Health Care and Promotion Scheme* (HCPS) after consolidation of the HMRF and the HCPF in 2017. Two rounds of open call for HCPS were completed. A total of 221 grant applications were received and 31 projects were funded with a total commitment of \$29 million<sup>3</sup>. To further streamline operation of the HMRF, in December 2018, the annual HMRF Open Call and the annual open call for HCPS were consolidated into one single open call.

### *Commissioned programmes*

12. 24 new programmes have been commissioned with total commitments of \$867 million<sup>4</sup> since the establishment of the HMRF. These commissioned programmes cover a wide range of studies to build research capacity and inform health policies -

- (a) **Infectious diseases** including prevention, control and treatment of infectious diseases such as the Novel Coronavirus Disease (COVID-19) as well as surveillance and evaluation of clinical trials on influenza and vaccination programmes;
- (b) **Non-communicable diseases** including identifying the risk of breast cancer; evaluation of Government's colorectal cancer screening pilot programme; and surveys on mental health morbidity in different age groups;
- (c) **Life-course research** including medical care of children and elderly care such as paediatric research on childhood cancers, hereditary and congenital disorders, and other uncommon disorders at the Hong Kong Children's Hospital; studying barriers for mothers to sustain exclusive breastfeeding in the first six months and nurturing a breastfeeding friendly community; survey on vitamin D status of infants, young children and pregnant women; review of growth charts for Hong Kong children; and review on end-of-life care and service models to improve quality of healthcare for the ageing;

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<sup>3</sup> Of which, \$7 million was absorbed by the remaining balance of the former Health Care and Promotion Fund.

<sup>4</sup> Of which, \$12 million was absorbed by the remaining balance of the former Health Care and Promotion Fund.

- (d) **Clinical trials and cohort studies** including setting up of Phase I Clinical Trials Centres; conducting early phase clinical trials on novel pharmaceutical products; and following up various local cohorts including investigating the effectiveness and cost-effectiveness of multi-disciplinary intervention programmes for hypertension and diabetes patients, determining the prevalence of cardiovascular risk factors in the local population, studying the role of precision medicine in managing diabetes, investigating late-onset dementia, investigating the long-term trajectories of common mental illnesses, identifying how key aspects of the environment (such as pollution) impact health, studying the characteristics of healthy ageing and the “Children of 1997” birth cohort to understand non-communicable diseases;
- (e) **Research on policy issues** including review on healthcare manpower planning; review on the regulatory framework for professional development; evaluating the impact of tobacco control policies in Hong Kong; and mental health promotion through community partnership programmes.

### *Research fellowships*

13. The Research Fellowship Scheme has been launched since August 2015 to support researchers or professionals in their early to mid-career, particularly healthcare professionals to enhance their skills in public health and health services research. Tertiary institutions funded by the University Grants Committee are invited to nominate fellowship applicants annually. The grant ceiling per award is \$1.2 million including up to \$0.4 million for overseas training/attachment relating to health services or public health, in particular public health policy topics. Higher priority is given to applications which address cancer and the modifiable risk factors for non-communicable diseases namely smoking, alcohol drinking, unhealthy diet and physical inactivity. As at 30 September 2020, five application rounds were completed with 61 applications. 36 awards have been approved with a total commitment of \$34 million.

### Contribution of HMRF

14. In order to determine the extent to which the objectives of the HMRF have been attained, i.e. “generation and application of evidence-based scientific knowledge derived from local research in health and medicine” and “help people adopt healthier lifestyles by enhancing awareness, changing

adverse health behaviours or creating a conducive environment that supports good health practices through evidence-based health promotion projects”, the HMRF research studies (both investigator-initiated and commissioned studies) that have been completed for at least two years will be evaluated using an instrument developed by FHB based on the internationally validated Buxton-Hanney research payback questionnaire, while health promotion projects that have been completed for one year will be evaluated using the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework. Results of the outcome evaluation are set out at **Annex**.

15. In overall terms, the evaluation showed that these research studies contributed significantly to informing health policy, changing clinical practice, increasing knowledge production, enhancing capacity building, and wider dissemination of research findings, while the promotion projects are able to reach out to the target population of the community, enhancing their knowledge and awareness of adopting a healthier lifestyle for prevention of illnesses.

16. The HMRF also organises Health Research Symposia from time to time for researchers and health care professionals to share their knowledge and achievements in various research topics, and acknowledge the outstanding research projects funded by the HMRF. The last Health Research Symposium was held in 2019 which attracted around 500 participants.

### Financial Position of HMRF

17. The balance of uncommitted fund as at 30 September 2020 was \$422 million<sup>5</sup>. With an estimated commitment of \$400 million for the 2019 and the 2020 HMRF Open Call, the uncommitted fund would not be enough to support further applications to the 2021 HMRF Open Call to be announced in December 2021 and new commissioned programmes to be initiated in 2021.

## **PROPOSED ENHANCEMENT OF HMRF PROGRAMMES**

### Enhancing Funding Scope of HMRF

18. The proposed injection into the HMRF will also enhance the funding scope of health and health services research by adopting a more systematic approach in formulating the thematic priorities to highlight

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<sup>5</sup> Results of the 2019 HMRF Open Call will be announced in March 2021 and in October 2021 for the 2020 HMRF Open Call.

applications with short and medium term translational value<sup>6</sup> and potential impact on health policy and clinical practice. Furthermore, to better utilise resources of the HMRF, advanced medical research shall focus on clinical studies which apply advanced technologies to facilitate the translation of knowledge generated from health and health services or infectious diseases studies into clinical practice and to inform health policies.

19. In general, the health and medical research/projects to be funded by the HMRF are summarised in the following broad areas –

- (a) public health, human health and health services (e.g. primary care, non-communicable diseases, Chinese medicine, etc.);
- (b) prevention, treatment and control of infectious diseases, in particular emerging and re-emerging infectious diseases;
- (c) advanced medical research which applies advanced technologies including but not limited to biotechnology in medicine, use of drugs and treatments, clinical trials, virtual health such as telemedicine, etc., to facilitate the translation of knowledge generated from health and health services or infectious diseases studies into clinical practice and to inform health policy; and
- (d) health promotion that facilitates mobilisation of local resources to promote good health and prevention of illness in the community.

20. In addition to the current commissioned programmes, to tie in with the launch of “Hong Kong Cancer Strategy 2019” and the establishment of the genome sequencing database by the Hong Kong Genome Institute, the HMRF plans to support novel research on genetics and genomics for personalised medicine. Furthermore, to cope with the trend of setting up smart hospitals and changing of lifestyle in all walks of life induced by the COVID-19 pandemic, the HMRF plans to fund research in virtual health including the use of telemedicine. Through these commissioned programmes, wherever possible, we will encourage inter-sectoral collaboration among different parties such as universities, hospitals and non-governmental organisations with an aim to enhancing social medical care integration.

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<sup>6</sup> Translational research implements a "bench-to-bedside" model, from laboratory experiments through clinical trials to point-of-care patient applications to create improvements in medical practice and meaningful health outcomes. (Source: *What is Translational Science?* Tufts Clinical and Translational Science Institute, Boston, MA, USA. <https://www.tuftsetsi.org/about-us/what-is-translational-science/>)

## Fostering Translation of New Knowledge

21. The mission of the HMRF is to support research that generates new scientific knowledge in health and medicine and seek ways to translate useful research findings to inform health policies, enhance healthcare practices and ultimately improve the health of the population. Embracing the concept of implementation science, we plan to introduce a new Implementation Research Scheme (IRS) to better understand the factors important for successful integration and sustainable uptake, adoption and implementation of evidence-based interventions and thus facilitate the integration of research findings and evidence of completed projects funded by the HMRF or competitive grants funded by other sources, into clinical practice or community settings.

22. Applications to the IRS will be invited on an annual basis. The proposals are required to address the thematic priorities advised by the EAP (Implementation Science) and undergo the normal two-tier peer review process. Collaboration with relevant stakeholders is required. For example, if a study is conducted in hospitals managed by the Hospital Authority (HA), collaboration with HA's clinician(s) is required.

23. For wider dissemination of the findings of completed research projects that could have public or commercial interest, principal applicants of HMRF-funded projects will be encouraged to submit manuscripts for publication in high-ranking open access journals.

## Nurturing Research Talents

24. Currently, young researchers are encouraged to submit pilot studies at a smaller amount to the HMRF Open Call in view of the relatively short research experience of these applicants who might have difficulties in handling complicated research projects, especially those with multiple objectives and complicated study design. In order to enhance early career development of outstanding young researchers, we will encourage submission of larger-scale pilot studies or small-scale researches with achievable objectives for seed grants under the HMRF Open Call so as to strengthen the research skills of young researchers and provide them with a firm foundation for the preparation of large grant applications.

25. In addition, the HMRF will continue to support research fellowships to nurture local manpower and develop talents in health and medical specialties. We plan to increase the quota of awards of the current Research Fellowship



Scheme to provide more training opportunities so that the HMRF could help build the research capacity of Hong Kong to meet future needs and challenges in combating infectious diseases, managing cancers and various chronic diseases, and applying technologies to clinical problems.

26. Furthermore, making reference to the experience and practices of other funding agencies, we also plan to launch new training opportunities, where appropriate, to support principal applicants of HMRF on-going projects to attend short overseas training courses to enhance their research skill sets relevant to their research areas in particular health and health services research and to enhance local researchers' and clinicians' quality and standard in health and health services research as well as grant writing skills.

## **FINANCIAL IMPLICATIONS**

27. We propose a one-off injection of \$1,308 million into the HMRF in 2021-22. Based on past expenditure pattern, the injection is estimated to sustain the operation of the HMRF for approximately a further three years and the annual expenditure is estimated to be about \$436 million including the direct operation cost<sup>7</sup> of about \$4 million per annum. The exact cashflow requirements over the coming years is difficult to estimate as these depend on the number of applications submitted and projects approved each year and the expenditure pattern for individual projects. The actual expenditure will also be subject to the expanded scope of projects to be funded including any urgent needs to commission research projects such as for COVID-19 epidemic control.

## **IMPLEMENTATION PLAN**

28. The RC had been consulted on the proposed enhancement in paragraphs 18 – 26 above. Subject to Members' views, we will seek the necessary approval from the LegCo for increasing the commitment of the HMRF by \$1,308 million (from \$2,915 million to \$4,223 million) in accordance with the established mechanism.

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<sup>7</sup> Direct operation costs cover meeting costs of the Research Council (RC) and its constituent panels, boards and committees for members' technical and advisory input to the HMRF; publication of research dissemination reports; publicity, training workshops and seminars; and expenses for other activities necessary to support HMRF operations under the direction of the RC.

December 2020

**Health and Medical Research Fund**  
**Outcome Evaluation and Research Impact**

As at 31 March 2020, a total of 1,069 completed investigator-initiated research projects have been evaluated using a “payback framework” – an internationally recognised measure of health research activities<sup>1</sup>, and 178 completed health promotion projects have been evaluated using the established Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM)<sup>2</sup> framework. The results are summarised at **Annex (i)**.

2. The results reflect that the impact of investigator-initiated research projects compares well with that of other public health funding agencies with similar objectives, e.g. Medical Research Council (UK), European Commission, and the National Health and Medical Research Council (Australia). The comparison is summarised at **Annex (ii)**.

3. The Food and Health Bureau is committed to supporting health and medical research and nurturing research talents. The knowledge and best practice protocols generated from these researches lead to the following benefits

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**Inform Policy to Address Health Threats**

4. In the recent COVID-19 pandemic, Hong Kong, though with a population of nearly 7.5 million, has demonstrated that its evidence-based public health measures are able to bring the outbreak under control. The Government’s prompt reactions to this public health crisis are, in part, due to its foresight and considerable support to enhance Hong Kong’s preparedness for the control of emerging and re-emerging infectious diseases over many years since the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003 by setting up the Research Fund for the Control of Infectious Diseases (RFCID) with a commitment of \$450 million.

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<sup>1</sup> S Hanney et al. The impact on healthcare, policy and practice from 36 multi-project research programmes: findings from two reviews. *Health Policy Research and Systems* 2017;15:26.

<sup>2</sup> RE-AIM framework is used to evaluate the impact of health promotion projects. (Reference: Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *Am J Public Health*, 1999; 89:1322-7.).

5. Capacity building in manpower and expertise was initiated in the post-SARS period and continued with the support of the Health and Medical Research Fund (HMRF) after consolidating the RFCID and the Health and Health Services Research Fund. In particular, research on epidemiology, risk communication and mathematical modelling has been developed. As a result, timely analysis of epidemiological data such as basic reproduction number ( $R_0$ ), incubation period, and case fatality ratios could be generated and relayed on a regular basis to the Government for policy formulation on infection control measures for the COVID-19 outbreak. Riding on the experience of SARS to conduct comprehensive analysis and application of a clinical database<sup>3</sup> developed by the Hospital Authority (HA), an integrated database of HA and Department of Health data was developed during COVID-19 for researchers to provide regular updates to the Government on the development of the epidemic and to inform on optimal therapy and the effectiveness of control measures.

6. An ongoing study supported by the HMRF suggests that the package of public health interventions (including border entry restrictions, quarantine and isolation of cases and contacts, and population behaviour changes such as social distancing and personal protective measures) that Hong Kong has implemented since late January 2020 is associated with reduced spread of COVID-19. In addition to the identification of cases with isolation, contact tracing and quarantine, social distancing has also played an important role in suppressing transmission. The control measures and changes in population behaviour coincided with a substantial reduction in influenza transmission since early February 2020. Because of Hong Kong's relatively small size and stringent border controls, the measures implemented are probably more feasible here than in many other locations worldwide. If these measures and population responses can be sustained, avoiding fatigue among the general population, they could meaningfully mitigate the impact of a local epidemic of COVID-19.<sup>4</sup>

7. In April and August 2020, the HMRF approved a total funding of \$170 million to support the local universities to conduct 49 medical research studies on COVID-19 to address important research areas in transmissibility and infectability of the virus, effective detection and surveillance and prevention

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<sup>3</sup> Comprising basic demographic profile, almost 1 million daily records on clinical readings, 640,000+ records on laboratory readings, 52,000+ records of serological and virology readings and about 7,000 radiological records of all 1,755 SARS patients.

<sup>4</sup> BJ Cowling et al. Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: an observational study. *Lancet* 2020;5:e279.

strategies of the disease and development of treatments and therapies. These studies cover a wide range of topics including development of vaccines and novel antiviral drug candidates; sero-epidemiological studies of COVID-19 in the community; investigation of the properties, characteristics, spread, infection and effective therapeutic interventions of SARS-CoV-2; waste water and genomic surveillance to track SARS-CoV-2 transmission; zoonotic risk in companion animals; the effect of smoking and pre-exposure of influenza viruses; screening of traditional Chinese medicine for antiviral compounds; rehabilitation management for COVID-19 survivors; estimation of psychological burden; investigation on Hong Kong's system of early detection, assessment and response to the COVID-19 outbreak; and identification of facilitators and barriers to public compliance with infection control measures.

8. These COVID-19 studies last for 12 to 24 months while some of them will be able to provide early results. For example, the real-time population-based sero-epidemiological studies of COVID-19 in the community will help identify the number of asymptomatic people with COVID-19, map the emergence of population immunity, define the duration of immune responses, and develop a transmission model of COVID-19; the waste water surveillance from sewage treatment facilities, quarantine centres and housing estates can provide a complementary system to monitor virus activity at the population level and to detect a resurgence of COVID-19 at an early stage; and genomic surveillance using whole virus sequence data from local COVID-19 cases with no known epidemiological links can help identify the source of infection and untangle silent virus transmission in the community when combined with epidemiological investigations. A research project will conduct a Phase I clinical trial on the safety of a nasal spray new coronavirus vaccine developed in collaboration with the Mainland in Hong Kong in December 2020. It is planned to recruit about 100 adult healthy volunteers to participate. The vaccine is the first nasal spray COVID-19 vaccine to be tested on humans.

### Strengthen and Advance Clinical Practices

9. After SARS, capacity building to engage in advanced research on infectious diseases was enabled by setting up a Biosafety Level 3 laboratory in The University of Hong Kong (HKU) to handle infectious pathogens. This facility, subsequently supported in part by HMRF funding, has been instrumental in studying pathogens of direct relevance to Hong Kong including SARS-coronavirus, Middle East Respiratory Syndrome coronavirus, influenza A

viruses H5N1, H7N9 and SARS-CoV-2 (the causative virus for COVID-19). Two studies supported by the HMRF in part suggest that the human intestinal tract might be a transmission route of SARS-CoV-2<sup>5</sup>, and a combination of three antiviral drugs suppresses virus faster and results in patients testing negative for the SARS-CoV-2 after an average of seven days (vs twelve days when taking Lopinavir/Ritonavir alone).<sup>6</sup>

10. Physical infrastructure improvements have also been developed as a result of research into infectious diseases. For example, research on infectious aerosols in hospital ward settings not only informed hospital policy and clinical practice with respect to infection control practices around patients suspected of having respiratory infections, but also led to the development of local exhaust delivery systems to confine respiratory pathogens during aerosol-generating procedures. In addition, these researches informed the design of ventilation systems at Hong Kong's public hospitals, and were included in the WHO guideline on natural ventilation for infection control in health care settings adopted during the 2009 influenza A (H1N1) pandemic.

11. Capacity to engage in infectious disease research to guide health policy was further strengthened in August 2020 when support to three portfolios each comprising between 10 and 24 individual research studies worth in total up to \$84 million over five years was approved to be conducted at HKU (under the School of Public Health and Department of Microbiology) and The Chinese University of Hong Kong (CUHK) (under the Jockey Club School of Public Health and Primary Care).

### Advance Standard and Quality of Care

12. Cancer is the top killer in Hong Kong. With a growing and ageing population, the number of new cancer cases and related healthcare burden is set to rise. As medical advances can make possible earlier diagnosis and more effective treatment, the HMRF provided funding of \$80 million to support the infrastructure of the two Phase I Clinical Trials Centres ("CTCs") for five years at HKU and CUHK to conduct early phase clinical trials. Since 2014, the two Centres have commenced trials on safety, pharmacology and efficacy of various

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<sup>5</sup> J Zhou et al. Infection of bat and human intestinal organoids by SARS-CoV-2. *Nature Medicine* 2020. <https://doi.org/10.1038/s41591-020-0912-6>

<sup>6</sup> IFN Hung et al. Triple combination of interferon beta-1b, lopinavir-ritonavir, and ribavirin in the treatment of patients admitted to hospital with COVID-19: an open-label, randomised, phase 2 trial. *Lancet* 2020. [https://doi.org/10.1016/S0140-6736\(20\)31042-4](https://doi.org/10.1016/S0140-6736(20)31042-4)

treatments for a range of cancers including liver, lung, breast, colorectum, kidney and other solid tumours. Additional funding of \$100 million has been provided starting from 2019 for initiating a total of 200 clinical trials on novel therapeutic drugs including those treating different cancers at each Phase I CTC.

13. In addition, the HMRF has commissioned HKU to conduct a five-year study on the risk of breast cancer in Hong Kong in 2015 with a funding support of \$19 million. The study has successfully developed a personalised risk stratification model to incorporate a list of risk factors such as family history of breast cancer in first-degree relatives, age, age of menarche, age of first live birth, prior benign breast diseases, body mass index and physical inactivity. It concluded that while the relative reduction in breast cancer mortality among screenees provided by risk-based and conventional age-based breast cancer screening were similar, the risk-based approach would be far more cost-effective due to the reduction of unnecessary mammography and tissue biopsy among low-risk women. These findings are currently under review by the Government for developing a pilot programme for breast cancer screening.

14. Apart from commissioned studies, the HMRF has supported 277 investigator-initiated cancer-related research projects from the 2012 to 2018 application rounds. They account for 19.4 % of all funded projects. These researches focused on liver cancer (27.4%), nasopharyngeal carcinoma (12.6%), breast cancer (9.6%), colorectal cancer (9.6%), lung cancer (7.6%), leukemia (6.5%) and ovarian cancer (4.3%). A large proportion of the studies (39.0%) investigated the prevalence, risk factors, and mechanisms for causing cancer. The HMRF seeks to support about 300 investigator-initiated research and health promotion projects (around \$360 million) within six years<sup>7</sup> for better prevention and control of cancer.

15. The HMRF is also providing funding to research on uncommon disorders, especially those affecting young children. Numerous investigator-initiated research projects have been supported that examine the genetic origin of a variety of diseases including Hirschsprung disease, biliary atresia, severe combined immunodeficiency, congenital myelin disorders, and Niemann-Pick disease, among others. A commissioned programme of paediatric research at the Hong Kong Children's Hospital with funding support of \$60 million, aiming to support a wide range of clinical studies in children focusing on other uncommon disorders such as mitochondrial disorders and

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<sup>7</sup> Six years after the launch of the Hong Kong Cancer Strategy 2019 in July 2019.

skeletal dysplasia was approved in August 2020.

### Cultivate Research Talents

16. Further initiatives to enhance capacity building supported by the HMRF include commissioned research on healthcare manpower planning and projection and the Research Fellowship Scheme. The manpower planning and projection study informs policy makers on the expected supply and demand gap over a 30-year period (up to 2047) for a range of healthcare professions including doctors, nurses, dentists and other allied healthcare professionals. These data are useful for informing other Government bureaux and departments on the projected university student intake for relevant professions.

17. The Research Fellowship Scheme has enabled local researchers in their early- to mid-career to train at internationally renowned institutions including The Mayo Clinic (USA), London School of Economics (UK), Massachusetts Institute of Technology (USA) and Harvard University (USA) among others. Research projects have provided insight into a range of health problems, especially risk factors for non-communicable diseases such as smoking, alcohol use, physical inactivity and poor diet/nutrition.

### Improve Health of the Population

18. Promotion of healthy lifestyles is a major approach in improving population health. The HMRF has supported many health promotion projects that help people adopt healthier lifestyles by enhancing awareness, changing adverse health behaviours or creating a conducive environment that supports good health practices. Many of these projects address modifiable risk factors such as poor diet and nutrition, lack of physical exercise and use of tobacco and alcohol. As a further step to improving the health of the next generation of people in Hong Kong, commissioned research is underway on ways to nurture a breastfeeding friendly community by empowering and engaging key stakeholders (i.e. nursing mothers, public, staff and management of public venues) in cultivating a breastfeeding friendly culture and environment in the community. Further commissioned research supported by HMRF on the barriers experienced by mothers in starting and sustaining breastfeeding was approved in June 2020.



19. Stress and anxiety are common for people who live in high-tempo and action-packed cities like Hong Kong. Knowing how to maintain good mental wellbeing and deal with daily stress enables people to enjoy life and maintain good relationships. In order to provide the Government with the latest information on the mental health status of the population in Hong Kong, three large-scale mental health surveys on children and adolescents aged 6-17, young people aged 15-24, and the elderly aged 60 or above are being conducted by HKU and CUHK. The findings of these studies will serve as useful references that facilitate relevant Government bureaux/departments to formulate long-term strategies for the development of mental health services.

20. The Government has been launching different programmes to help people quit smoking as it is a major risk factor for development of cancer. A three-year study was commissioned to HKU in 2019 to evaluate the impact of tobacco control policies in Hong Kong. The study aims to establish a systematic survey to determine the effectiveness of the existing tobacco control measures and to recommend new measures in line with the research findings.

Food and Health Bureau  
December 2020

**Outcome Evaluation  
(as at 31 March 2020)**

**Investigator-initiated Research Projects**

The research payback analysis is conducted two years after project completion so that any research findings generated have had time to exert an influence. The data are self-reported by the principal applicants and collected using a standardised questionnaire. These data include responses from 1,069 investigator-initiated research projects with end date up to 31 March 2018 (including 677 completed projects supported under the former Health and Health Services Research Fund and Research Fund for the Control of Infectious Diseases).

<b>Outcome</b>	<b>Indicator</b>
<b>Knowledge generation</b>	
Published peer reviewed article / book	76.4%
(a) No. of articles / books	1,553
(b) No. of citations by other researchers	28,670
<b>Capacity building</b>	
(a) Projects with gain of qualification by project team members	51.0%
(b) Projects with career advancement by project team members	45.6%
(c) Projects gained additional research funding	43.4%
<b>Policy impact</b>	9.4%
<b>Behaviour change</b>	12.0%
<b>Dissemination of research findings to end users</b>	87.9%

**Health Promotion Projects**

2. Outcome evaluation using the established RE-AIM framework is carried out regularly to evaluate the impact of completed projects on five dimensions. A total of 178 projects supported under the former Health Care and Promotion Fund since 2004 and completed for over 12 months or longer were evaluated.

3. Over 1.2 million people have benefitted from participating in the 178 projects. Encouraging outcomes were documented in knowledge gained (78%), changes in behaviours (60%), improved health status (34%) of the participants joining the health promotion programmes. 73% of completed projects had been incorporated into the core business or had become part of the routine practices in the administering institutions to sustain the long term benefits of effective health promotion interventions. Overall, the funded projects were able to reach out to the target population of the community to enhance their knowledge and awareness of adopting a healthier lifestyle for prevention of illnesses.

## **International Comparison of Key Outcome Indicators for Investigator-initiated Research Projects**

In the international arena, it is a practice for public research agencies to derive parameters for assessing research output and outcomes with different metrics. There are however some common assessment criteria including domains of knowledge generation, human capital, policy impact and economic development.

2. The Food and Health Bureau collects information from researchers of the funded projects using a validated questionnaire. Based on the analysis of 1,069 questionnaires of the completed projects in Annex (i), the results reflect that the impact of investigator-initiated research projects compares well with that of other funding agencies with similar objectives, e.g. Medical Research Council (MRC, UK), European Commission, and National Health and Medical Research Council (Australia). The comparison is summarised as follows –

### Knowledge Generation

3. The 1,069 completed HMRF projects reported a total of 1,553 peer reviewed journal articles that had been cited by other researchers a total of 28,670 times (with an average of 18.5 citations per paper). Overall, 76.4% of completed HMRF projects had generated at least one peer reviewed journal article. This analysis excludes manuscripts reported as submitted, under review or in preparation. Some respondents to the research outcome survey noted that further publications were expected in the future, so a subsequent review of outcomes may find a larger proportion of projects with publications. In comparison, 91% of MRC-funded projects resulted in a publication within 5 years,<sup>1</sup> while 56% of European Union research and innovation framework projects resulted in publications.<sup>2</sup>

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<sup>1</sup> Medical Research Council (2017). MRC Economic Impact Report 2015/6.

<sup>2</sup> Review of Public Health Research Projects Financed under the Commission's Framework Programmes for Health Research. April 2013. European Commission.

## Capacity Building

4. Of the HMRF projects included in the analysis, 51.0% resulted in gain of additional qualifications by members of the project team (i.e. PhD, MPhil/MSc, BSc or other professional qualification). In a review of a large Australian cancer research programme, 23% of projects resulted in gain of qualifications.<sup>3</sup> In addition, 43.4% of the HMRF-funded projects generated subsequent research funding compared to 41.3% of projects supported by the Australian funding agency.<sup>4</sup>

## Policy Impact

5. Of the 1,069 HMRF projects included in the analysis, about 10% had influence on health policy. An analysis of the pilot research impact statement of the University of Oxford to the UK's Research Excellence Framework found that 9% of respondents to the impact assessment survey reported influencing changes to legislation, regulations, or government policy on the national, European, or international levels.<sup>4</sup> An analysis of MRC-funded research noted that about 23% of funded projects had influence on policy.<sup>2</sup>

6. It should be noted that this is the self-perception of the principal applicant completing the research payback questionnaire. Translation of research findings to policy is often considerably longer than the two-year timeframe for completing the questionnaire and so this figure does not truly reflect the likely or potential impact of the research findings on health policy. Indeed, it normally takes an average of 17 years for research evidence to reach clinical practice.<sup>5,6</sup> Other studies have identified some of the potential translational lags, which include processes related to ethical approvals, publication, phase I, II, III trials, approvals for drugs, post-marketing testing, guideline preparation and so forth.<sup>6</sup>

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<sup>3</sup> JA Bowden et al. Measuring research impact: a large cancer research funding programme in Australia. *Health Research Policy and Systems*. 2018;16:39.

<sup>4</sup> PV Ovseiko et al. Assessing research impact in academic clinical medicine: a study using Research Excellence Framework pilot impact indicators. *BMC Health Services Research* 2012, 12:478.

<sup>5</sup> Kristensen N, Nymann C, Konradsen H. Implementing research results in clinical practice- the experiences of healthcare professionals. *BMC Health Services Research*. 2016;16:48. Published 2016 Feb 10. doi:10.1186/s12913-016-1292-y

<sup>6</sup> Hanney, S.R., Castle-Clarke, S., Grant, J. et al. How long does biomedical research take? Studying the time taken between biomedical and health research and its translation into products, policy, and practice. *Health Research Policy Systems*. 13, 1 (2015). <https://doi.org/10.1186/1478-4505-13-1>

## Economic Benefit

7. The research supported by the HMRF has led to economic benefit through generation of patent applications. Up to 31 March 2020, a total of 19 patents have been granted as a direct result of HMRF funding. Two out of 70 projects assessed by the European Commission resulted in patents.<sup>3</sup> Projects funded by the much larger MRC have generated 436 patents in the period 2011-2015.<sup>2</sup> Since the grant size of HMRF projects is relatively small compared to overseas funding agencies, the principal applicants of HMRF projects may need to pool data from several different projects before they are able to submit patent applications. This may lead to a delay in attributing a patent to a particular HMRF grant.

Food and Health Bureau  
December 2020