

Legislative Council Panel on Health Services

Supplementary Information on Proposal for Injection into the Health and Medical Research Fund

This paper provides supplementary information on the proposal for injection into the Health and Medical Research Fund (HMRF) (LC Paper No. CB(2)552/20-21(01)) following the meeting of the Panel on Health Services on 8 January 2021.

2. Since its establishment in 2011, the HMRF has supported 1,341 Investigator-initiated projects, 24 commissioned programmes and 36 awards of the Research Fellowship Scheme (RFS), with a total commitment of \$2,179 million. The findings of many of these projects have contributed to improving the health of the population and potential economic benefits including for example, through generation of intellectual property including patents.

Potential Economic Impact through Patents

3. Up to 31 March 2020, the HMRF has granted the administering institutions of individual projects to proceed with a total of 19 patent applications developed as a direct result of the HMRF funding. The majority of these patent applications relate to innovation in diagnosis, treatment and prevention. For example, new approaches were developed that may help in the improved diagnosis of Alzheimer's disease, colorectal cancer and influenza; new drug candidates were developed that could provide useful therapeutic approaches for a variety of health conditions including cancer, multidrug-resistant bacterial infections, and neurodegenerative conditions, among others; and potential vaccines against cancer and multidrug-resistant bacteria were also developed. The list of these projects is at **Annex A**.

4. While some patents may lead to economic gains in future, it should be noted that the primary objectives of the HMRF are to build research capacity to inform health policy, improve population health,

strengthen the health system, enhance healthcare practices, advance the standard and quality of care, and promote clinical excellence through generation and application of evidence-based scientific knowledge derived from local research. Patents and subsequent economic benefit are bonuses resulting from HMRF research as the funding ceiling per project is relatively modest by international standards. The HMRF provides a catalyst for research leading to patents, or generating data to further develop patented ideas for clinical application, and supporting commercialisation of patented ideas with input from third parties such as pharmaceutical companies.

Other Contribution of the HMRF

5. In addition to patents, notable examples of the HMRF research and health promotion projects as set out in **Annex B** are able to generate the following benefits -

Inform Policy to Address Health Threats

6. The HMRF has provided support to infectious disease research in terms of building capacity, supporting infrastructure and research into epidemiology and pathogenesis of established and emerging infectious diseases, as well as developing novel treatments and preventive measures such as vaccines. This experience allows local researchers to address emerging threats, such as Middle East Respiratory Syndrome (MERS), multidrug-resistant bacteria, various novel strains of influenza, and more recently COVID-19 promptly. In particular, epidemiological, transmission modelling, waste-water monitoring and genomic studies have provided real-time information for informing the Government's infection control policies during the COVID-19 pandemic.

7. Other studies that have informed policy include a commissioned research on risk of breast cancer that successfully developed a personalised risk stratification model to incorporate a list of risk factors. Based on the latest recommendations of the Cancer Expert Working Group on Cancer Prevention and Screening of the Cancer Co-ordinating

Committee on breast cancer screening, the Government will adopt a risk-based approach for breast cancer screening.

8. To address the health threat from an overburdened healthcare system, the HMRF has commissioned a study on Healthcare Manpower Planning and Projection following the recommendations in the Government's Report on the Strategic Review on Healthcare Manpower Planning and Professional Development in June 2017. The main objective of the study is to conduct baseline projections for doctors, dentists, dental hygienists, registered and enrolled nurses, midwives, Chinese medicine practitioners, pharmacists, occupational therapists, physiotherapists, medical laboratory technologists, radiographers, optometrists and chiropractors for a timeframe of 2017-2047. The study findings will facilitate Government's planning for healthcare manpower recruitment and allocation of resources for university places in relevant health disciplines, among others.

9. According to an outcome evaluation of 1,069 completed investigator-initiated research projects up to 31 March 2020 conducted by the Research Fund Secretariat using a "payback framework", an internationally validated measure of health research activities¹, about 10% of HMRF projects had reported an influence on health policy. This proportion is similar to that reported in the pilot research impact statement of the University of Oxford to the UK's Research Excellence Framework, which 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.² An evaluation of 178 completed health promotion projects using the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework for health promotion projects³ found similar benefits.

¹ 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.

² 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.

³ Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion projects. *Am J Public Health* 1999;89:1322.

Strengthen and Advance Clinical Practice and the Standard and Quality of Care

10. Two recent studies demonstrate the clinical significance of research supported by the HMRF. The findings of these studies suggested the human intestinal tract might be a transmission route of SARS-CoV-2⁴, 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).⁵ Several studies investigating the utility of screening for various genetic markers could help identify breast, ovarian and cervical cancers and may impact clinical practice if implemented more widely. Other studies have investigated the effectiveness of specific drug treatments, surgical approaches, and post-care patient management that may inform clinical practice.

11. As medical advances can make possible earlier diagnosis and more effective treatment, the HMRF provided funding of \$80 million to support the infrastructure of two Phase I Clinical Trials Centres (“CTCs”) for five years at The University of Hong Kong and The Chinese University of Hong Kong to conduct early phase clinical trials. Since 2014, the two Centres have commenced trials on safety, pharmacology and efficacy of various treatments, especially cancer 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 at each Phase I CTC. The findings from these studies are expected to advance clinical practice and the standard and quality of care.

Improve Health of the Population

12. 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. Up to 31 March 2020,

⁴ 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>

⁵ 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)

a total of 1.2 million people have benefited from participating in 178 health promotion projects supported by the HMRF according to the RE-AIM evaluation conducted by the Research Fund Secretariat mentioned in paragraph 9. Encouraging outcome was documented in knowledge gained (78%), changes in behaviours (60%) and improved health status (34%) of the participants. Many of the effective interventions (73%) were incorporated into the core business or became part of the routine practice of the administering institutions to sustain their long-term benefits.

Cultivate Research Talents

13. According to the “research payback” evaluation mentioned in paragraph 9, the HMRF research projects had successfully resulted in cultivating research talents and building capacity as evidenced by gain of higher qualifications by project team members (51%), career advancement of project team members (45.6%), or gain of additional research funding from other funding sources (43.4%).

14. The RFS also cultivates young to mid-career clinician-scientist talents in order to support translational of research findings to clinical practice. The RFS projects have provided insight into a range of health problems, especially modifiable risk factors for non-communicable diseases such as smoking, alcohol use, physical inactivity and poor diet/nutrition. For example, a behavioural intervention combined with free nicotine replacement therapy was developed that effectively helped parents of young children reduce smoking. Another study aims to develop an enhanced digital alcohol screening and intervention tool to reduce alcohol consumption among young adults. The uptake and impact of physical activity guidelines aimed at preschool children in Hong Kong is being investigated in an ongoing study. The acceptability of a sugar-sweetened beverage tax in Hong Kong and its potential health impact on the prevalence of overweight, obesity and type 2 diabetes is being investigated in an integrated epidemiological and health economics study.

Food and Health Bureau
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Projects with patent applications

Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Novel Findings	Area of Invention
02131706	Delineating pathogenic mutations in Epstein-Barr virus genomes of nasopharyngeal carcinoma (NPC) using next generation sequencing technology	Dr Alan CHIANG Kwok-shing	The University of Hong Kong	999,792	The invention relates to a method for detecting the genetic signatures of Epstein-Barr virus for assessing the risk of developing, and/or monitoring the progression or treatment efficacy of NPC.	Diagnosis (cancer)
02160037	Establishing a best panel of stool-based detection for non-invasive colorectal neoplasm screening	Prof Jessie LIANG Qiaoyi	The Chinese University of Hong Kong	1,187,488	The invention provides a novel panel of five miRNAs identified from host cells, a new multiplex assay for convenient and reliable quantification of these markers, and their application for diagnosis and prognosis of colorectal cancer.	Diagnosis (cancer)
02130266	Rapid sample-to-answer smart lab-on-a disc pharmacogenetics testing device for personalised medicine	Prof Aaron HO Ho Pui	The Chinese University of Hong Kong	988,328	This project led to the development of an improvement in the device used in the high sensitivity detection for clinical samples.	Diagnosis (miscellaneous)
01120556	Plaque-binding magnetic nanoparticles for early diagnosis of Alzheimer's disease by magnetic resonance imaging (MRI)	Prof Albert CHOW Hee-lum	The Chinese University of Hong Kong	826,696	A novel nanoparticle (curcumin-iron oxide) that can enter the brain and specifically bind to amyloid plaques or deposits and is therefore useful for early diagnosis of Alzheimer's disease by magnetic resonance imaging.	Diagnosis (neurology)
13120842	Identification of innate immune defect predisposing to severe influenza in a Chinese population	Dr Kelvin TO Kai-wang	The University of Hong Kong	494,892	The findings provide guidance in the pathogenesis, risk stratification and potential treatment strategies of severe influenza.	Diagnosis (virus)

Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Novel Findings	Area of Invention
11121191	Exploring ginsenoside-Rb1 as an anti-cancer therapeutics on cancer stem cells	Prof Alice WONG Sze-tsai	The University of Hong Kong	963,183	This study demonstrated that ginsenoside compound K enhances the sensitivity and specificity of cisplatin to treat ovarian cancer. The invention could potentially improve treatment of ovarian cancer.	Treatment (cancer)
13121482	Development of inhibitors against Signal Transducer and Activation of Transcription (STAT-3) protein for the treatment of hepatitis C	Dr Edmond MA Dik-lung	Hong Kong Baptist University	985,084	This study generated a novel rhodium-containing compound with anti-cancer activity.	Treatment (cancer)
13142271	Functional characterization of the MAP30 protein from bitter melon (<i>Momordica charantia</i>) in combating ovarian cancer oncogenesis and chemoresistance	Dr David CHAN	The University of Hong Kong	1,197,160	This study showed that natural MAP30 protein isolated from dried bitter melon seeds possessed potent anti-cancer and anti-chemoresistant effects on ovarian cancer cells, while exerted no toxicity on normal epithelial cells and health of mice.	Treatment (cancer)
05162606	Gut-derived flagellin ameliorates diet-induced dyslipidemia by upregulating apolipoprotein-A1	Dr Connie WOO Wai-hong	The University of Hong Kong	1,052,696	A novel drug was developed that can help treat patients with atherosclerosis (blocked arteries)	Treatment (heart disease)
HKM-15-M11	Identification of broad-spectrum antivirals against respiratory viruses and novel therapeutic agents for combating antibiotic resistant bacteria	Dr Richard KAO Yi-tsun	The University of Hong Kong	2,400,000	This invention relates to a new concept of anti-bacterial drug delivery.	Treatment (multidrug-resistance bacteria)
13120272	Enhancing antibiotics efficacy by combinations of active ingredients from Traditional Chinese Medicine against	Prof FUNG Kwok-pui	The Chinese University of Hong Kong	999,528	This study demonstrated that the combined use of epicatechin gallate from tea (<i>Camellia sinensis</i>) and kuraridin from <i>Sophorae</i>	Treatment (multidrug-resistance bacteria)

Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Novel Findings	Area of Invention
	methicillin-resistant Staphylococcus aureus				Flavescentis Radiz was efficacious in inhibiting the growth of methicillin-resistant Staphylococcus aureus strains in vitro.	
01120626	An inhibitory peptide approach to simultaneously target RNA and protein toxicities in polyglutamine degeneration	Prof Edwin CHAN	The Chinese University of Hong Kong	999,908	A new synthetic peptide inhibitor to potentially treat incurable neurodegenerative diseases has been developed.	Treatment (neurology)
02130026	Targeted drug discovery for Alzheimer's disease	Prof Andrew CHAN Man-lok	The Chinese University of Hong Kong	726,508	This study proposed a new therapeutic target for β -amyloid-induced memory deficits.	Treatment (neurology)
03144156	Development of arginine deprivation by recombinant human arginase (rhArg) as a safe and effective treatment of obesity and associated metabolic disorders	Prof Thomas LEUNG Yun-chung	The Hong Kong Polytechnic University	1,199,560	This study has shown that recombinant human arginase was effective in treating obesity and associated metabolic disorders in mice.	Treatment (obesity)
14151651	Fatty acid binding protein 4 (FABP-4) causes articular cartilage degeneration through synovial macrophage polarization	Dr YAN Chun-choi	The University of Hong Kong	871,064	The invention relates to methods for treating, preventing, or retarding the progression of osteoarthritis by inhibiting an essential compound in human tissue.	Treatment (osteoarthritis)
HKM-15-M04	Comparative analysis of host transcriptomic and lipidomic profile induction by human enterovirus 71 and human coxsackievirus A16: implications on pathogenesis, diagnosis, and treatment	Prof YUEN Kwok-yung	The University of Hong Kong	2,400,000	A new drug, AM580 was identified as a broad-spectrum antiviral drug against enteroviruses and other viruses with public health significance, which has potential for epidemic control of viral disease and early treatment with better clinical outcome.	Treatment (virus)

Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Novel Findings	Area of Invention
12110822	Dissecting the roles of tryptophanyl-tRNA synthetase and other host factors contributory to Enterovirus 71 replication	Dr YEUNG Man-lung	The University of Hong Kong	998,288	Blocking tryptophanyl-tRNA synthetase at the cell surface can reduce entry of enterovirus 71 into susceptible cells. Such compositions and methods can be useful in the treatment and prevention of infection by enterovirus 71 and other enteroviruses.	Treatment (virus)
14131092	Generation of a replication-incompetent NP-knockout influenza virus that allows expression of galactose-alpha-1,3-galactose (alpha-Gal) in infected cells to enhance adaptive immune response	Prof Leo POON Lit-man	The University of Hong Kong	998,000	An artificial influenza virus was created that allows infected cells to express immune-stimulating substances. The expression of these substances by infected cells could enhance immune responses against influenza, leading to improved immunity, and increased protection caused by a vaccine in vitro and in vivo.	Treatment (virus)
04151266	Combination of dendritic cell-based vaccination and immune checkpoint blockade for malignant mesothelioma immunotherapy	Dr TAN Zhiwu	The University of Hong Kong	1,180,856	A cancer vaccine and a cancer treatment regimen were developed. The treatment regimen comprises a combination use of the cancer vaccine plus anti-cancer drug therapy, which together provide effective treatment in an animal model of malignant mesothelioma – a cancer of the lining of the lungs, chest wall and abdomen	Vaccine (cancer)

Notable examples of research and health promotion projects

(A) Inform policy to address health threats

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Cancer	BC-HKU	Commissioned Study on Risk of Breast Cancer in Hong Kong	Prof Gabriel M LEUNG	The University of Hong Kong	19 million	A five-year study on the risk of breast cancer in Hong Kong has successfully developed a personalised risk stratification model which incorporates 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. The study 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.
Health policy	MPP (extended study) - HKU	Commissioned study on healthcare manpower planning and projection (extended study)	Dr Janice M Johnston	The University of Hong Kong	3 Million	The study is to conduct baseline projections for doctors, dentists, dental hygienists, registered and enrolled nurses, midwives, Chinese medicine practitioners, pharmacists, occupational therapists, physiotherapists, medical laboratory technologists, radiographers, optometrists and chiropractors for a timeframe of 2017-2047. The study findings will facilitate Government's planning for healthcare manpower recruitment and allocation of resources

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
						for university places in relevant health disciplines, among others.
Infectious disease	12111272	Increasing uptake of influenza vaccine among pregnant women: A randomized controlled trial	Prof Marie TARRANT	The University of Hong Kong	497,684	Results of this study demonstrated that brief education delivered to pregnant women significantly increased the rate of influenza vaccine uptake during pregnancy. Continued education of health care practitioners on the benefits of vaccinating pregnant women is required.
Infectious disease	13120652	Mother's preferences and willingness to pay for human papillomavirus vaccination for their daughters: a discrete choice experiment in Hong Kong	Esther CHAN Wai-yin	The University of Hong Kong	378,036	This study provided new data on how HPV vaccine features are viewed and valued by mothers. These findings may contribute to policy making to improve HPV vaccine uptake and inform the immunisation service in Hong Kong.
Infectious disease	13121442	Risk assessment of respiratory infectious diseases transmission in typical high-rise residential environments under wind effects	Prof NIU Jian-lei	The Hong Kong Polytechnic University	776,292	Airborne transmission of infectious agents between adjacent flats is more likely to occur through internal corridors than via open windows that are connected to external environment. Wind direction has more profound effect than wind speed to airborne transmission within buildings. Single-sided open windows to closed corridor should be avoided in building design.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Infectious disease	16150852	Determinants of seasonal influenza vaccination and preferences for future vaccination programmes among hospital-based healthcare workers in Hong Kong	Prof Benjamin John COWLING	The University of Hong Kong	983,958	Intention to receive influenza vaccine explains over 60% of actual vaccination uptake among healthcare workers. Vaccine safety is more important than vaccine efficacy in deciding to receive vaccination. Provision of walk-in vaccination can boost uptake rate.
Mental health	MHS	Phase I of the Commissioned Study on Mental Health Survey	<u>Part 1</u> Prof HUNG Se-fong <u>Part 2</u> Prof Eric CHEN Yu-hai <u>Part 3</u> Prof Linda LAM Chiu-wa	<u>Part 1</u> The Chinese University of Hong Kong <u>Part 2</u> The University of Hong Kong <u>Part 3</u> The Chinese University of Hong Kong	49,995,712	Three large-scale mental health surveys in children and adolescents aged 6-17, young people aged 15-24, and older people are being conducted. These studies, which involve assessing over 17,500 subjects, will inform on the disease burden and identify the risk and protective factors for a wide range of mental illnesses, including anxiety, depression, schizophrenia, psychoses and bipolar disorder. Results from this study would help inform the formulation of appropriate prevention strategies and the planning of suitable intervention programmes for those with mental health problems.

(B) Strengthen and advance clinical practices and the standard and quality of care

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Cancer	01121366	Cellular functions and potential clinical application of miR-143 in cervical cancer	Dr Oscar WONG Gee-wan	The University of Hong Kong	991,568	This study identified 4 genetic markers that might be useful as potential markers for cervical cancer detection.
Cancer	01121376	Screening of founder and recurrent BRCA mutations in Hong Kong and US Chinese populations	Dr Ava KWONG	The University of Hong Kong	828,359	This study showed that screening for breast cancer gene mutations is feasible in a Hong Kong Chinese population.
Cancer	02131526	A two-arm, randomized, double-blind, placebo-controlled trial to investigate the efficacy and safety of everolimus (mTOR inhibitor) in pediatric patients with tuberous sclerosis and epilepsy requiring anticonvulsant treatments	Prof Godfrey CHAN Chi-fung	The University of Hong Kong	1,008,920	Tuberous sclerosis is a genetic disorder resulting in non-cancerous growths in the brain that may be associated with neurological problems including epilepsy. With 12-months' treatment, everolimus improved seizure control and reduced seizure frequency by 40.8%.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Cancer	03143406	Risk assessment of hereditary breast and ovarian cancer syndrome in Chinese population by multiple-gene sequencing	Dr Ava KWONG	The University of Hong Kong	1,196,160	This study used multigene testing to understand the most important predisposition genes that were linked to breast cancer and to better identify patients for more appropriate clinical management. Several non-BRCA genes were identified that were associated with hereditary breast and ovarian cancer. The implementation of multigene test panel for the genetic screening of high-risk breast and ovarian patients could identify patients with appropriate therapeutic treatments and offer preventive measures for the patients and their family members.
Clinical trial	CTC	Commissioned Programme on Phase 1 Clinical Trial Centres	<u>CUHK</u> Prof Francis CHAN Ka-leung <u>HKU</u> Prof Karen LAM Siu-ling	The Chinese University of Hong Kong The University of Hong Kong	80 million	Support was provided to the two Phase 1 Clinical Trial Centres (CTC) at Queen Mary Hospital and Prince of Wales Hospital to support the development of essential infrastructure and conduct clinical trials on safety, pharmacology and efficacy of various treatments.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Clinical trial	Novel Drugs	Early Phase Clinical Trials on Novel Pharmaceutical Products	<u>CUHK</u> Prof Anthony CHAN Tak-cheung <u>HKU</u> Prof Karen LAM Siu-ling	The Chinese University of Hong Kong The University of Hong Kong	100 million	To benefit patients and promote clinical trial development in Hong Kong, which echo the Government's policies in improving healthcare service and promoting scientific research, additional funding of \$100 million has been provided starting from 2019 for initiating 100 early phase clinical trials on novel therapeutic drugs at each Phase 1 CTC. These studies will benefit patients, consolidate Hong Kong's position as an international hub for clinical trials and support the growth of the local pharmaceutical and biopharmaceutical industries.
Gastroenterology	01120516	Urgent versus early endoscopy in high risk patients with acute upper gastrointestinal bleeding	Prof James LAU Yun-wong	The Chinese University of Hong Kong	829,400	This study compared outcomes between patients with acute upper gastrointestinal bleeding who received endoscopic examination within 6 hours (urgent) versus endoscopy within 24 hours (early). In stable patients with acute upper gastrointestinal bleeding and high risk of further bleeding and deaths, urgent endoscopy was not indicated, which has implications for patient management in a clinical setting.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Health services	11121041	Providing repeat prescriptions for patients with controlled hypertension – a randomized controlled trial	Benjamin YIP Hon-kei	The Chinese University of Hong Kong	684,540	This study aimed to determine if repeated prescription (RP) of medications by nurses without direct doctor consultation could lead to non-inferior disease control in patients with well-controlled hypertension when compared with usual care, and if RP was acceptable and safe to these patients. Nurse-led RP was acceptable, safe, and non-inferior to usual care in hypertension management among controlled hypertensive patients.
Health services	12130701	A randomised controlled trial on perioperative elderly patients undergoing colorectal cancer surgery with enhanced geriatric input	Prof MAK Tony Wing-chung	The Chinese University of Hong Kong	528,302	This study aimed to investigate the effectiveness of enhanced geriatric input in perioperative management of elderly patients undergoing elective colorectal surgery. The results showed that the enhanced combined cologeriatric perioperative care on elderly patients undergoing elective colorectal resection reduced hospital stay. Patients had earlier ambulation, passage of flatus and consumption of diet post operatively compared to the standard care group with lower complications.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Heart disease	12131241	Evaluation of the adoption of the Reference Framework for Hypertension in Primary care: a mixed qualitative and quantitative study	Prof WONG Martin Chi-sang	The Chinese University of Hong Kong	989,733	This study evaluated the adoption level of the RF-HT among primary care physicians (PCPs) in Hong Kong, and explored the factors associated with its adoption. The Reference Framework for Hypertension Care for Adults in Primary Care Settings (RF-HT) was highly adopted by PCPs in Hong Kong during clinical consultation. The enablers of RF-HT adoption were clarity of the RF-HT, use of high-level evidence extracted from international guidelines or literature, the RF-HT being a localized guideline with professional recommendation that could standardize clinical practice in primary care and its detailed instructions on lifestyle modifications. The barriers were its focus on practical details of mercury sphygmomanometer which was too complicated for patients, the lack of its clarity of how the recommendations and suggestions in the RF-HT were synthesized from multiple guidelines, concerns over patient affordability of certain medications and their availability in the clinics, and the presence of competing guidelines from other departments.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Heart disease	12132451	The role of Vitamin D and bone metabolism in cardiovascular events risk, an interaction or mediation? An 11 year follow-up study	Dr CHEUNG Ching-Lung	The University of Hong Kong	999,736	This study examined the prevalence of vitamin D deficiency and insufficiency in Hong Kong population, as well as the relationship between vitamin D and various cardiovascular outcomes in the Hong Kong population. The results showed that vitamin D insufficiency (<75nmol/l) and deficiency (<50nmol/l) was highly prevalent in Hong Kong (~90% of the population). 25(OH)D level has no effect on major adverse cardiac events, and high 25(OH)D might be associated with an increased risk of stroke. Maintaining an optimal 25(OH)D level is important.
Heart disease	13141311	Enhancing the self-care of Chinese patients with chronic heart failure: Does an empowerment based educational model make a difference?	Prof Doris YU Sau-fung	The Chinese University of Hong Kong	1,197,716	Enhancing patient's self-care could reduce morbidity and mortality, improve quality of life and reduce healthcare burden. A 12-week empowerment-based self-care programme was shown to be an effective and feasible approach to improve self-care and reduced hospital service utilisation among community-dwelling patients with chronic heart failure. The self-care programme was more cost-saving than the conventional education approach to produce clinically meaningful changes in self-care and health-related quality of life.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Heart disease	13142471	In-depth study of the cost-effectiveness of the Risk Assessment and Management Programme for Hypertension (RAMP-HT) for patients with uncontrolled hypertension in primary care in Hong Kong	Dr Esther YU Yee-Tak	The University of Hong Kong	1,199,964	This study aimed to evaluate 5-year and lifetime cost-effectiveness of the RAMP-HT on patients with HT without complication or diabetes. The RAMP-HT was effective in preventing HT-related complications and mortality, and saving healthcare cost. The findings supported that integration of RAMP-HT into routine primary care for HT patients could significantly reduce morbidity, mortality as well as healthcare burden.
Immunology	01120496	Vascular effects of achieving minimal disease activity (MDA) in psoriatic arthritis (PsA) - a 2 year prospective cohort study	Prof TAM Lai-shan	The Chinese University of Hong Kong	879,422	It is important to sustain the control of minimal disease activity of psoriatic arthritis in order to reduce the risk of cardiovascular disease.
Infectious disease	COVID 190125	An open-label randomized controlled trial on interferon β -1b and remdesivir combination versus remdesivir as treatment for COVID-19 infection	Prof Ivan HUNG Fan-ngai	The University of Hong Kong	2,999,040	Its preliminary study showed that 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).
Infectious disease	15140282	Comparisons of exhaled air dispersion during high flow nasal cannula oxygen therapy and CPAP	Prof David HUI Shu-cheong	The Chinese University of Hong Kong	606,240	High flow nasal cannula (HFNC) oxygen therapy will generate air leakage when treating patients with respiratory failure in isolation room. Airborne, droplet and contact precautions are recommended.

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Infectious disease	17161272	Establishing functional human lung organoids to recapitulate and study viral growth and virus-host interaction of avian influenza A viruses	Dr ZHOU Jie	The University of Hong Kong	1,200,000	The study in part suggested that the human intestinal tract might be a transmission route of SARS-CoV-2.
Mental health	11120501	The effectiveness of group behavioural activation in the treatment of subthreshold depression in primary care in Hong Kong	Prof Samuel WONG Yeung-shan	The Chinese University of Hong Kong	975,912	This study aimed to assess the effectiveness of group behavioural activation for reducing subthreshold depression in primary care in Hong Kong. Group behavioural activation treatment appears to be beneficial in decreasing depressive symptoms and reducing the incidence of major depression among people with subthreshold depression in primary care.
Mental health	12130711	Internet-based mindfulness and rumination-focused cognitive behavioural therapy as selective prevention of anxiety and depression: a randomised controlled trial	Prof Winnie MAK Wing-sze	The Chinese University of Hong Kong	999,692	This study showed that Internet-based interventions were effective in preventing anxiety and depression. Relative to traditional face-to-face interventions, Internet-based interventions are easily accessible and scalable to provide evidence-based psychological interventions to at-risk populations.
Mental health	12131641	An evaluation of the effectiveness of a mindfulness-based illness management program for Chinese patients with schizophrenia: A randomized controlled trial	Prof CHIEN Wai-tong	The Hong Kong Polytechnic University	653,270	Compared to psychoeducation and usual care groups, Mindfulness-Based Care for Schizophrenia Programme participants had significant greater improvements at 6-month and 12-month follow-ups in symptom severity, insight, functioning, and length of re-hospitalisations, as well as in recovery at 12 months. The mindfulness-based care for schizophrenia programme can be adopted as an adjunct to the current community and outpatient

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
						psychiatric care services to improve Chinese patients' mental condition, functioning and illness insight, thus reducing their re-hospitalisations and medical costs.
Neurology	11121441	A randomised controlled trial of home-based exercise intervention for caregivers of persons with dementia	Dr CHAN Wai-chi	The University of Hong Kong	998,160	As a culturally relevant, traditional mind-body exercise that is widely practiced by local older adults, sitting Tai Chi offers a low-cost, safe and feasible treatment option for mild depressive symptoms.
Obstetrics and gynaecology	03141266	A randomised control trial of three-dimensional versus two-dimensional ultrasound guided embryo transfer in women undergoing Artificial Reproductive Technology treatment	Prof LI Tin-chiu	The Chinese University of Hong Kong	1,083,008	As there is no significant difference in pregnancy rates and live birth rates between women receiving three-dimensional and two-dimensional ultrasound-guided embryo transfer, three-dimensional ultrasound may be an alternative method for embryo transfer.
Smoking	12133111	Effectiveness of a brief, self-determination intervention for smoking cessation (immediate or progressive) among people attending emergency departments: a randomised controlled trial	Dr William LI Ho-cheung	The University of Hong Kong	1,000,000	A brief, self-determination intervention on smoking cessation was effective for people attending Accident & Emergency Departments to quit smoking. This intervention was cost-effective and sustainable in its ability to improve the quality of life of smokers, and provided evidence for the development of clinical practice guidelines.

(C) Improve health of the population

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Cancer	28140304	Development of multimedia interventions to promote breast cancer prevention among South Asian women in Hong Kong	Prof Winnie SO Kwok-wei	The Chinese University of Hong Kong	293,514	A multi-media intervention to promote breast health among South Asian women of 3 ethnic groups (Indian, Pakistani, and Nepalese) was developed. Health talks were organised for over 1,000 South Asian women. Majority of participants increased their awareness of breast health, improved knowledge of prevention of breast cancer and information about screening services.
Diabetes	07140235	A multi-centre peer support program for type 2 diabetes patients in Hong Kong	Ms Rebecca WONG Yee-man	Prince of Wales Hospital	374,581	A multi-centre peer support programme was implemented with over 300 diabetic patients recruited from the 7 Diabetes Centres of the Hospital Authority. Each patient was assigned to a peer supporter who contacted them regularly for 12 months. Health outcomes of the patients such as glycated haemoglobin and low-density lipoprotein cholesterol improved, especially in those with poor glycaemic control and frequent contact with peer supporters.
Healthy ageing	07140105	Baby boomers at the gate: creating a path to healthy and productive aging using information and communication technology (ICT)	Prof Doris YU Sau-fung	The Chinese University of Hong Kong	499,913	An information and communication platform, "Path to Vitality and Vibrancy" (Path VV), was designed to prepare the late middle-age adults for healthy and productive aging. The platform, administered by registered nurses, covered 15 health topics

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						such as Coping with menopause and andropause, Effective pain management and Effective retirement planning. Sixteen workshops with 524 registered members of the Path VV were conducted to deliver information on pain management, family caregiving, insomnia management, healthy diet to prevent metabolic syndrome, prevention of frailty and medication safety. Significant improvement in knowledge towards aging and better mental health among the participants were noted at 6 months after the workshops.
Health technology	29150314	I Safe—學童健康使用互聯網及電子屏幕產品教育計劃	Ms NG Kam-kuen	The Hong Kong Federation of Youth Groups Media Counselling Center	298,822	The project promoted healthy use of internet and electronic screen products in 11 primary schools and the community reaching over 5,000 attendees, including primary school students, teachers and parents through school health talks, workshops and education booths in the community. Participants became more aware of the consequences of improper use of internet and electronic screen products and had enhanced knowledge on the appropriate use of these products. Teachers and parents also reported increased confidence in managing internet crisis of their students and children respectively.

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Health technology	29150794	Changing the way we prevent diabetes: the use of mobile application	Dr Angela LEUNG Yee-man	The Hong Kong Polytechnic University	281,720	The project promoted self-assessment of diabetes risk and lifestyle modification with the use of mobile app and telephone counselling. Over 2,000 persons downloaded the app to assess the risk of developing diabetes. Results showed that participants were confident to use the mobile app for monitoring their lifestyles. Their engagement in physical activities and vegetable intake were increased.
Infectious disease	15141522	Development and evaluation of a smartphone apps-based school absenteeism reporting system for infectious disease surveillance among local schools in Hong Kong	Prof Dennis IP Kai-ming	The University Of Hong Kong	608,018	A surveillance system was developed riding on a smartphone application platform of an electronic school administration system for the regular and prospective capturing of the nature, cause, and symptom details of sickness absence in local schools. In a trial involving over 7,700 students in 13 schools, teachers and parents generally found the surveillance system stable, simple and easy to use, and useful for monitoring absenteeism, understanding increased influenza activity, and detecting influenza outbreaks among students.

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Mental health	08150145	A psychological intervention to enhance resilience in Mainland new immigrants to Hong Kong	Dr Nancy YU Xiaonan	City University of Hong Kong	500,000	The project assessed the effectiveness of a programme on resilience and adaptation to new environment among 168 new arrivals from the Mainland. Fifty-seven social workers from 12 non-governmental organisations attended the train-the-trainer workshop on the delivery of the resilience and information intervention. The intervention enhanced resilience by 11.9%, decreased depressive symptoms by 19.2% and adaptation difficulties by 9.8% in the participants. Over 70% of social workers would apply the knowledge and skills gained in the workshop in their daily work.
Mental health	26120214	FitMind Exercise for Improving Cognition: A Train-the-trainer Program for Mental Health Caregivers in the Community	Dr Edwin Ho-ming Lee	The University of Hong Kong	299,940	The project promoted exercise in people with psychosis by training caregivers and improved understanding of psychosis and social integration in the community. Exercise classes were organised for 796 persons with psychosis and their caregivers. All participants reported that they practiced more exercise after joining the FitMind classes and 62% of them had developed and would continue the habit of exercise. Improvement in physical health and cognitive functioning were also observed. The FitMind exercise program has been adopted in 5 psychiatric inpatient units in Hong Kong (Queen Mary Hospital, Pamela Youde Nethersole Eastern Hospital, Tai Po

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
						Hospital, United Christian Hospital and Shatin Hospital).
Organ donation	29150574	Community-driven social media campaigns for promoting organ donation registration in Hong Kong	Prof Joseph LAU Tak-fai	The Chinese University of Hong Kong	291,603	The project aimed to encourage people to visit the Centralised Organ Donation Register set up by the Department of Health, HKSAR Government and register for organ donation through visit to Facebook page or website developed by the project team. These platforms were visited by over 3,000 persons. Compared to the Facebook page, post-intervention evaluation showed that the website was more successful in getting people to register as an organ donor but the Facebook page resulted in more people reporting an intention to register.
Women's health	09160055	Menopause education and support: Building capacity and training to improve vasomotor, psychological and somatic symptoms in the menopause transition	Prof Carmen WONG	The Chinese University of Hong Kong	443,400	An education programme was designed for menopausal women to develop a sustainable training model for menopause ambassadors through public education, health ambassadors training and nurse-led 8-week psychoeducation intervention. A total of 23 health ambassadors were trained and over 5,000 women were reached, 64 menopause women from the community had participated in the psychoeducation intervention. Health information on menopause in the form of booklets, pamphlets, video, e-book and online learning materials were produced.

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Women's health	30160474	「乳妳同盟」母乳餵哺社區支援計劃	Ms YIP Wing-foon	HKSKH Lady MacLehose Centre	299,968	A multi-discipline project including nursing professionals, women with breastfeeding or post-natal care experience to provide support to novice parents and breastfeeding families and deliver knowledge and caring skills to the novice mothers and other family members. A total of 126 breastfeeding mothers with 84 family members were recruited and 30 breastfeeding instructors were connected. Ninety percent of family members agreed that they could learn about the benefits of breastfeeding through the seminar, they also expressed their willingness to support mothers to breastfeed their babies and to assist and encourage them to extend their breastfeeding period.

(D) Cultivate research talents

Research Area	Project No.	Project Title	Principal Applicant	Administering Institution	Funding Amount (HK\$)	Summary of Key Project Results
Health promotion (smoking)	01150077	Smoking reduction intervention for smoking parents of paediatric patients in Hong Kong: a randomised controlled trial	Dr Kate CHAN Ching-ching	The Chinese University of Hong Kong	1,198,144	Parental smoking is a major source of environmental tobacco smoke exposure in children. A total of 210 smoking parents participated in this completed study. A smoking reduction intervention comprising counselling with motivational interviewing technique and free nicotine replacement therapy was effective in reducing smoking for to 6 months.
Health promotion (alcohol)	05190117	Digital alcohol screening and brief intervention with gamification to reduce alcohol consumption in at-risk young adults	Dr Janet WONG Yuen-ha	The University of Hong Kong	1,074,4863	This ongoing project aims to enhance the effectiveness of a digital alcohol screening and brief intervention for reducing consumption of alcohol among young adults by incorporating game-based elements to allow interactivity and responsiveness to the players' input, skills and behaviours.
Health promotion (physical activity)	02160127	Evaluation of uptake and impact of Physical Activity Guidelines for preschool children in Hong Kong	Dr Wendy HUANG Yajun	Hong Kong Baptist University	649,276	The results of this completed study showed that very few preschool children (~15%) met the physical activity guidelines. Awareness and knowledge of the guidelines was low among parents. The guidelines should be supplemented with clear messages catering for local needs and to ensure that precursors to behaviour change could be motivated.

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Health promotion (diet/nutrition)	04180017	Evaluating the impact of sugar-sweetened beverages tax in Hong Kong: An integrated study	Prof CHONG Ka-chun	The Chinese University of Hong Kong	957,830	This ongoing project aims to determine if sugar-sweetened beverage tax policy could work in Hong Kong in terms of public acceptability and the health benefit gained. Using a willingness to pay approach, the rate of price increase / taxation required to bring about a substantial reduction in consumption of sugar-sweetened beverages can be calculated, which would inform policy on such consumption tax in future.