

Research Assessment Exercise 2020
Impact Overview Statement

University: The Chinese University of Hong Kong

Unit of Assessment (UoA): 3

Total number of eligible staff of the university in the UoA: 174

(1) Context - context for the individual case study(ies)

The Faculty of Medicine of The Chinese University of Hong Kong (CUHK) is one of the two medical schools in Hong Kong. As a metropolis of some 7.5 million people, in which 90% of the healthcare is provided through the Hospital Authority (HA), the HA system provides a valuable clinical resource for carrying out basic, translation and clinical research. The Faculty of Medicine of CUHK has a close working relationship with the HA. All CUHK clinical academic staff offering clinical service have concurrent honorary appointments in the HA system. The main teaching hospital, the Prince of Wales Hospital (PWH), houses 1700 beds. Six out of the seven impact cases are submitted by staff based at the PWH. The remaining impact case has been submitted by staff based at the Hong Kong Eye Hospital, also under the auspices of the HA. On the PWH site, the Faculty of Medicine runs two research institutes, namely, the Li Ka Shing Institute of Health Sciences (LiHS) and the Sir Y. K. Pao Cancer Centre. The LiHS is a translational biomedical research institute with 300 researchers and houses the State Key Laboratory of Digestive Disease. The Sir Y. K. Pao Cancer Centre is a translational oncology research institute with 160 researchers and houses the State Key Laboratory of Translational Oncology. Three of the impact case studies are submitted by staff based in the LiHS (Dennis Lo, Juliana Chan and Qin Ling). One is submitted from the Sir Y. K. Pao Cancer Centre (Tony Mok). One is from the Hong Kong Eye Hospital (Christopher Leung). The rest are from the clinical departments based at the PWH (James Lau and Henry Chan).

(2) Approach to impact - the unit's approach to impact during the assessment period for impact

Impact creation is one of the core missions of CUHK. CUHK is ranked 22nd in the Reuters's list of the most innovative universities in Asia Pacific. Researchers at the Clinical Medicine UoA conduct research covering the entire spectrum from basic research, translational research to clinical research. The quality of the research from this UoA can be evidenced by the presence of one Academician of the Chinese Academy of Sciences, one Academician of the Chinese Academy of Engineering, two Fellows of the Hong Kong Academy of Sciences, one Fellow of the Royal Society, one Foreign Associate of the US National Academy of Sciences, and one Foreign Associate of the US National Academy of Medicine. The LiHS and Sir Y. K. Pao Cancer Centre possess many state-of-the-art laboratory facilities. Space allocation at the LiHS is based on competitive bidding from researchers and spaces are typically given for up to a 5-year period. One criterion of assessment is impact. Such a competitive bidding system helps to break down departmental barriers. By housing multi-disciplinary groups within two hospital-based research institutes, collaboration between groups are encouraged. State-of-the-art genomics and bioinformatics facilities are present in the LiHS. Hence, translational genomics is one of the key research areas of the LiHS. A Phase 1 Clinical Trial Centre is also housed in the PWH and is supported by comprehensive clinical pathology laboratories.

(3) Strategy and plans - strategy and plans for supporting impact

The strategy and plan for UoA3 are as follows:

Cultivation of an atmosphere for impact creation

The Faculty of Medicine runs a Strategic Workshop every year in which there are sessions devoted to achieving impact, intellectual property protection, commercialization and startup creation. Each of the department heads within the UoA will be interviewed periodically by a committee chaired by

the Associate Dean (Research) in which plans for achieving research impact will be discussed.

Intellectual Property Policy conducive to impact

(i) Sense of ownership of intellectual property

CUHK has an intellectual property policy that attempts to instill a sense of ownership of IPs generated from its staff. Hence, inventors at CUHK can opt to personally pay for part or all of the patent prosecution in exchange for a higher patent-related income. We have found that inventors who pay for the prosecution of their own inventions are generally more engaged in the commercialization process.

(ii) Invention-related income to fund future research and development

For licensing-related income that flows back to the Faculty of Medicine, the Faculty would return 85% back to the Department where the inventors are based, so as to provide resources for further research and development activities. During the assessment period, staff within this UoA had filed 1086 patent applications, with 700 granted.

Through private clinical services provided by clinical departments, a number of such departments have built up a financial resource which can be used for patent filing and prosecution. Departments that opt to support patent filing will be given an increased share of royalty income.

(iii) Pathway for translation into clinical service

The three pathology departments co-run a University Pathology Services (UPS) which provides pathology tests to the private healthcare sector. The UPS has been used to launch cutting edge tests invented by staff within this UoA.

Established clinical trial infrastructure

The PWH, as the flagship teaching hospital of the Faculty of Medicine of CUHK, is a tertiary referral centre and has a rich source of clinical cases that can support many research studies and translational efforts. The Faculty of Medicine at the CUHK has a well-established infrastructure for conducting clinical trials with 16 Clinical Research Units, including the Phase 1 Clinical Trial Centre, accredited by the National Medical Products Administration (NMPA) which is the Chinese agency for regulating drugs and medical devices (formerly the China Food and Drug Administration or CFDA). The ethical oversight is provided by the Joint CUHK-Hospital Authority New Territories East Clinical Research Ethics Committee with the Clinical Research Management Office providing the governance to ensure scientific rigor, human protection and ethical standard. In the last three years, we have on average about 700 clinical research applications and around 150 are clinical trials each year. In addition to the main committee, a Serious Adverse Event (SAE) Subcommittee is responsible to ensure timely assessment of patient's safety and a Phase I Subcommittee with experts in early drug development to review phase I trials. The committee has a total of 27 active members, with scientific and medical experts as well as layperson members from the community. Site inspections are carried out regularly to ensure high data quality and research integrity are being achieved.

Collaboration with groups in Mainland China

Research groups within this UoA have longstanding collaboration with groups based in mainland China. Two State Key Laboratories within this UoA are archetypal examples of such collaborations. With the development of the Guangdong-Hong Kong-Macao Greater Bay Area, we anticipate that such collaboration would further increase.

(4) Relationship to case studies - the relationship between the unit's approach to impact and the submitted case studies

Safer screening for Down syndrome in unborn babies: This case study demonstrates many of the positive effects of our approach, strategy and planning. Hence, the intellectual property policy at CUHK has encouraged the inventors of this technology to create an influential portfolio of patents around the world, which have been licensed or sublicensed to over 40 companies. Indeed, the leading inventor of this technology, Prof. Dennis Lo, has been named by the authoritative journal, Nature Biotechnology, as one of the top 20 translational medical researchers in the world in 2016 (ranked 15th) and 2017 (ranked 5th). Patents granted and patent-related citations are two of the criteria for this ranking. This screening test was also first launched via the UPS.

Making Precision Medicine a New Paradigm in Management of Advanced Stage Lung Cancer: This study is a success story that has transformed the treatment of lung cancer, benefitting over a million of patients every year. This body of work was made possible with the established clinical trial infrastructure at CUHK and our strong track record of working with the pharmaceutical industry. This work was done within the auspices of the State Key Laboratory of Translational Oncology (previously named the State Key Laboratory in Oncology in South China) and underscored the fruits of collaborations with groups based in mainland China.

Acid suppression in the treatment and prevention of peptic ulcer bleeding: This body of work has changed the landscape for the management and prevention of peptic ulcer bleeding, with its results being cited in multiple international guidelines. This case study once again demonstrates the efficiency of the clinical trial infrastructure at CUHK and our close collaboration with the Hospital Authority.

Transforming Diabetes Care: From Research To Practice To Community: This research-driven quality improvement program first initiated by the CUHK using registers, risk stratification, personalized reporting and integrated care in the mid 1990s have provided the framework for the HA territory-wide diabetes risk assessment and management program which has reduced diabetes complication rates by 50% and is cost-saving. This innovative model of using structured assessment and data to drive actions is now included in the Chinese diabetes practice guidelines. By using information and communication technology, the CUHK has translated this care model to over 11 countries in Asia to inform practice and policies.

Seeking Biodegradable Metals for Clinical Use: This body of work covers the spectrum from basic research, translational research, to clinical studies of innovative medical implants. It also demonstrates the strength and depth of our collaboration with institutions based in mainland China, including those in the academia and in the government (e.g. the NMPA).

Improving the detection of glaucoma and its progression with topographic analysis of retinal nerve fiber layer (RNFL) thickness: This case study demonstrates the achievement of a team that works on a common eye disease, namely, glaucoma. The team has developed an algorithm that has been licensed to key companies in the field and contributed towards the development of international clinical management guidelines. This work is supported by policies that facilitate translational work and entrepreneurship within CUHK.

Non-invasive assessment has transformed management of liver fibrosis: This impact case study represents a body of work that has contributed towards a global change in the use of a non-invasive technology to replace a proportion of invasive liver biopsies. This case once again demonstrates the strength of clinical trials at CUHK.