

Research Assessment Exercise 2020
Impact Overview Statement

University: The University of Hong Kong (HKU)

Unit of Assessment (UoA): Clinical Dentistry (UoA 4)

Total number of eligible staff of the university in the UoA: 35

(1) Context

As the top-ranked dental school in the world, the Faculty of Dentistry at HKU has a vision to advance oral health and well-being in Hong Kong, China and the rest of the world to serve mankind, make scientific discoveries, innovate to create solutions, lead the profession, and educate those who serve. The Faculty has a longstanding commitment to bridging the translational gaps between the research laboratory and the community. Through clinical studies and community-level applied research, local and international impacts are achieved for the benefit of the oral health of the population.

With a determination to continuously advance oral health and well-being in Hong Kong, China and beyond, the Faculty's future direction is grounded on the University's milestones of **Internationalisation, Innovation and Interdisciplinarity** leading to **Impact** (3Is +I). For example, the SDF study is the Faculty's **pioneering** work that recognises the value of the use of Silver Diamine Fluoride (SDF) to manage dental caries. It has led to a series of laboratory and clinical studies establishing the validity of its use and elucidating the mechanisms that underpin its success as a non-invasive treatment. The SDF study has achieved **international impact** from its research. The Faculty researchers have demonstrated the benefits of SDF as a breakthrough dental agent in preventing and arresting caries in children. Such work has led directly to the adoption of this technique in the large-scale oral health promotion programme in Hong Kong and widespread advocacy of its use both regionally and internationally, including in the USA, Canada, Thailand and Cambodia. The dental age assessment study is another **innovative** research that establishes and validates a database from a Southern Chinese population which has been used to create a new dental age assessment method. On the other hand, the resin-bonded bridges (RBBs) case is an **interdisciplinary** study that integrates expertise from material science, basic science, and clinical practice. The Faculty has successfully conducted evidence-based research to prove the efficiency of two-unit RBBs as a new and improved therapy, with limited biological cost compared to traditional bridges, to replace missing teeth. This achievement has significantly enhanced overall satisfaction and oral health quality of life similar to the considered gold standard of dental implants.

(2) Approach to impact

The Faculty's approach to impact is first to identify important issues for oral health community. Researchers then identify and develop interventions that can yield economic, social, and cultural benefits in terms of enhancing public oral health, informing better healthcare policy, and advancing clinical resources. Finally, the Faculty validates those interventions and disseminates its research findings to achieve global reach. To support translation, the Faculty concentrates its resources in three ways: **Providing the infrastructure to support impact:** The Faculty's Central Research Laboratories and the new Clinical Trials Centre provide up-to-date equipment/facilities to undertake the necessary discovery science for collection of evidence to support its interventions. **Fostering interdisciplinary research:** The Faculty research groups are designed to encourage interdisciplinarity, with regular internal meetings between the groups to allow the translation of concepts developed in the laboratory into the clinical arena. Researchers also work widely across the research centers of HKU to benefit from specific scientific expertise and understanding. **Disseminating our research through Knowledge Exchange (KE):** The Faculty shapes its dissemination strategy so that research is accessible to clinicians, academics, patients, public, and the media. Research findings are disseminated to the academic community via relevant scientific meetings and conferences regionally and internationally, as well as through high-quality scientific journals with high scientific impact. The Faculty also utilizes press interactions (e.g. TV, radio and newspapers) and the Faculty KE Bulletin, participates in oral health festivals (e.g. World Oral Health Day) to maintain its dialogue with patients, policymakers, and the industry.

(3) Strategy and plans

The Faculty's strategy is to enable and support discovery science of the highest quality and then

facilitate the bridging of translational gaps between the laboratory and the community through early clinical adoption to international acceptance. **Research expertise:** To align with the new strategic themes of the University, the Faculty has restructured its research themes. The submitted case studies are initiated by members currently affiliated with the Population Oral Health Research Theme supported by further engagement at a University level. **Communication and dissemination:** Engagement with relevant stakeholders is the Faculty's strategy to achieve impact from its research. The Faculty forges strategic partnerships with communities beyond the University. Examples of stakeholder engagement to assure global impact for the Faculty's research include: **Dental community:** Teaching students how to use SDF will enable dentists-to-be around the world to become early adopters of SDF in arresting dental caries. So far over 300 dentists and forensic practitioners in Hong Kong, China, India and Singapore have been trained to understand the significance of dental age assessment through the Faculty's public awareness program. **Teaching community:** The research relevance of dental age assessment is being extended to rural areas of Guangxi, China, where collaborative teamwork with their teachers of primary schools and orphanages will further promote the use of dental age estimation. A majority of courses from the dental schools in the UK, Australia, Malaysia, Canada, Japan and Germany have included the Faculty's reading materials on RBB designs. **Policymakers:** Research impact will be achieved through communication with policymakers via specialist organizations. For example, the Faculty provides much of the clinical evidence used by the American Academy of Pediatric Dentistry (AAPD) on advocating the use of SDF to manage caries in primary teeth among young children in the USA. The Faculty will maintain a continuous dialogue with the United Nations Refugee Agency (UNHCR) to allow the Faculty's work to be recognized as a valid tool for age estimation. **Global awareness:** The Faculty strives for impact with global reach. It is evidenced by recognition both regionally and internationally that includes the International Association for Dental Research (IADR) Colgate Research in Prevention Award in and the IADR Cariology Research Group Science Award.

(4) Relationship to case studies

All three cases demonstrate that the Faculty's excellence in research has translated into demonstrable impacts and ultimately benefited the oral health of the people. **SDF study:** The Faculty's oral epidemiological data has impacted on the government financing for oral health care, and underpinned the model of evidence-based clinical guidelines adopted by AAPD. This study calls for directly achieving real-life practical benefits, for example, in effectively and innovatively utilizing SDF in management of caries as well as successfully lowering the rate of caries among preschool children in Hong Kong (24,000 decayed primary teeth were treated with SDF a year, with over 70% of the decay becoming inactive). This has led to a yearly saving of HK\$8.4 million (if these decayed teeth were treated by the conventional restorative approach). **Dental age assessment study:** Building on clearly defined criteria of tooth development stages and statistical analyses, this novel research showing the importance of dental development for age assessment has led to enhancements in the accuracy of dental assessment and the facilitation of birth registration processes, enabling 252 undocumented children in rural welfare homes in India to have their ages estimated. The Faculty has established a charitable foundation, the Date of Birth Foundation, to promote accurate birth records. It provides an important starting point for implementing dental age assessment as a future outcome of the UNHCR policy to address the needs of global populations of refugees. **RRBs study:** The research group at HKU have defined a broad area of evidence-based knowledge over two decades of *in vitro* and clinical research. This centre has educated over 50% of dentists in Hong Kong and clinical research evidence has informed undergraduate prosthodontic text books, journals and teaching practice in undergraduate and post-graduate dental schools in Europe, North America and Asia. Long-term clinical data from this centre was pivotal in providing evidence to persuade the national German Social Health Insurance System (GKV) to introduce this conservative treatment for patients in Germany. Also, in Japan, evidence has also been cited on a dental *society* website relating to clinical practice guidelines for dentists. In addition, this society submitted *Clinical Practice Guidelines* on resin-bonded bridges which is used to inform healthcare practitioners and patients about best clinical practice.