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The University of Texas
Health Science Center at Houston

School of Public Health
Division of Biostatistics

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Dear Dr. Rasooly:

We intend to submit a proposal in response to RFA-CA-13-015 Cancer Detection, Diagnosis, and Treatment Technologies for Global Health (UH2/UH3). The proposal is tentatively titled "Point-of-Care Screening and diagnosis of liver cancer in Chinese population"

The projected co-principal investigators are

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There are increasingly growth in cancer incidence in low-income and middle-income countries due to rapid industrialization and population growth, environment deterioration and aging. We also observe that the cancer mortality in the developing countries is on the rise due to limited resources for cancer screening or early detection. To address challenges in cancer detection and preventions in the developing countries, as will be detailed in the final proposal, overall objective of this application is to use mobile health (mHealth), biosensors, imaging, and nanopore-sequencing to develop low cost and user-friendly devices or assays for screen and early detection of liver hepatocellular carcinoma in Chinese population and validate their analytical and clinical performance. To accomplish this goal, we tentatively plan to address four interrelated specific aims:

Aim1: Adapt the ultrasound technologies which can plug into smartphones and tablets to develop a new generation of high-performance, low-cost and portable ultrasound scanner for detection and screen of liver hepatocellular carcinoma in Chinese population. The analytical and clinical performance for early detection of living cancer will be validated in large cohort from Chinese populations.

Aim 2: MicroRNAs that regulates gene expression have been investigated as potential biomarkers for detection of cancer. We modify nanopore-sequencing techniques to develop a new generation of low-cost and portable sequencing machine to generate miRNA-seq signatures for early detection of liver hepatocellular carcinoma in Chinese population.

Aim3: Use sparse sufficient dimension reduction techniques, functional data analysis method and low-rank matrix decomposition algorithms to develop a general framework for discovery of clinically significant and actionable miRNA-seq signatures, biomarkers and novel statistical methods for large-scale classification and cluster analysis to combine miRNA-seq, environmental and ultrasound image information for intelligent screen and diagnosis of cancer and clinical decision making.

Currently participating institutions are University of Texas Health Science Center at Houston, Baylor College of Medicine and Fudan University, Shanghai, China.

Projected key personnel are
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We will closely work with University of Texas Health Science Center at Houston, Fudan University in China, The Fifth People's Hospital of Wuxi in China and Baylor College of Medicine. This will provide great opportunities to facilitate developing emerging point of care technologies for detection and diagnosis of liver cancer and achieving our goals.

With best wishes,

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