

## Data and technology driven learning health systems for low and middle income countries

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### Abstract

A Learning Health System describes a health service that learns from every patient that it encounters. This requires continuous learning cycles which can be conceived of in 3 steps: 1) Clinical practice generates data; 2) Data is explored and analysed to produce knowledge; and 3) Knowledge is implemented back into practice. My research has focussed on innovative methodological approach to develop technologies to enable these steps efficiently, in particular to explore and analyse data to produce knowledge (step 2). The technology to enable this second step, named Dexter (Data Extraction for Epidemiological Research) has led to the University of Birmingham gaining an international reputation for being one of the very few universities to have successfully researched and knowledge-engineered epidemiological research study designs into computer executable formats. Using the technology, we have been able to democratise health data research and publish over 100 peer reviewed studies in leading journals and attracted over 20 million pounds worth of grants.

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In the oration I will discuss some of the scientific outputs generated from this technology (Dexter). To implement knowledge into practice (step 3), we are developing open source tools, through a platform called OpenClinical, to produce computable clinical guidelines. Recently in Sri Lanka we have also embarked on researching how data generated during clinical practice could be captured efficiently through electronic health records (step 1).

In my oration I will discuss opportunities for low-middle income countries like Sri Lanka to utilise such technologies (Dexter, Electronic Health Records and OpenClinical) and other emerging technologies (e.g. large language models such as ChatGPT) to implement a world leading learning health system to provide better care. Sri Lanka provides a unique opportunity to introduce a digital learning health system effectively and be a model for dissemination and replication in other LMICs for several key reasons. There is a clear digital health blueprint from the Sri Lanka Ministry of Health with OpenMRS as the primary choice of EHR system. There are supporting policy units such as the WHO Primary Care Policy Unit and funding sources such as that received from Asian Development Bank. Sri Lanka has a history of pioneering electronic health records in primary care and secondary care and is one of the only LMICs with a specialist training programme for clinical informatics, a pathway that is lacking even in the United Kingdom



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