

Achieving comparable BMD results for patients' mobility in NHG Primary Healthcare

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Problem Statement

Before the project, due to inter-machine measurement difference without cross-calibration, clinicians are strongly recommended to refer their patient to the same Dual X-ray Energy Absorptiometry (DXA) scanner for a valid comparison of their scans taken in different time points, leads to:

- Limited patient choice to visit other DXA facility within the healthcare system;
- Uneven appointment waiting time of a single DXA scanner;
- High administrative and operational effort to match a list of available DXA scanners (including mobile Bone Mineral Densitometry (BMD) facility) to patients.

Project Aim

To allow patient mobility in between multiple BMD facility in NHG primary healthcare system by attaining cross-calibrated status of multiple BMD scanners according to The International Society for Clinical Densitometry (ISCD) guidelines.

Lessons Learnt

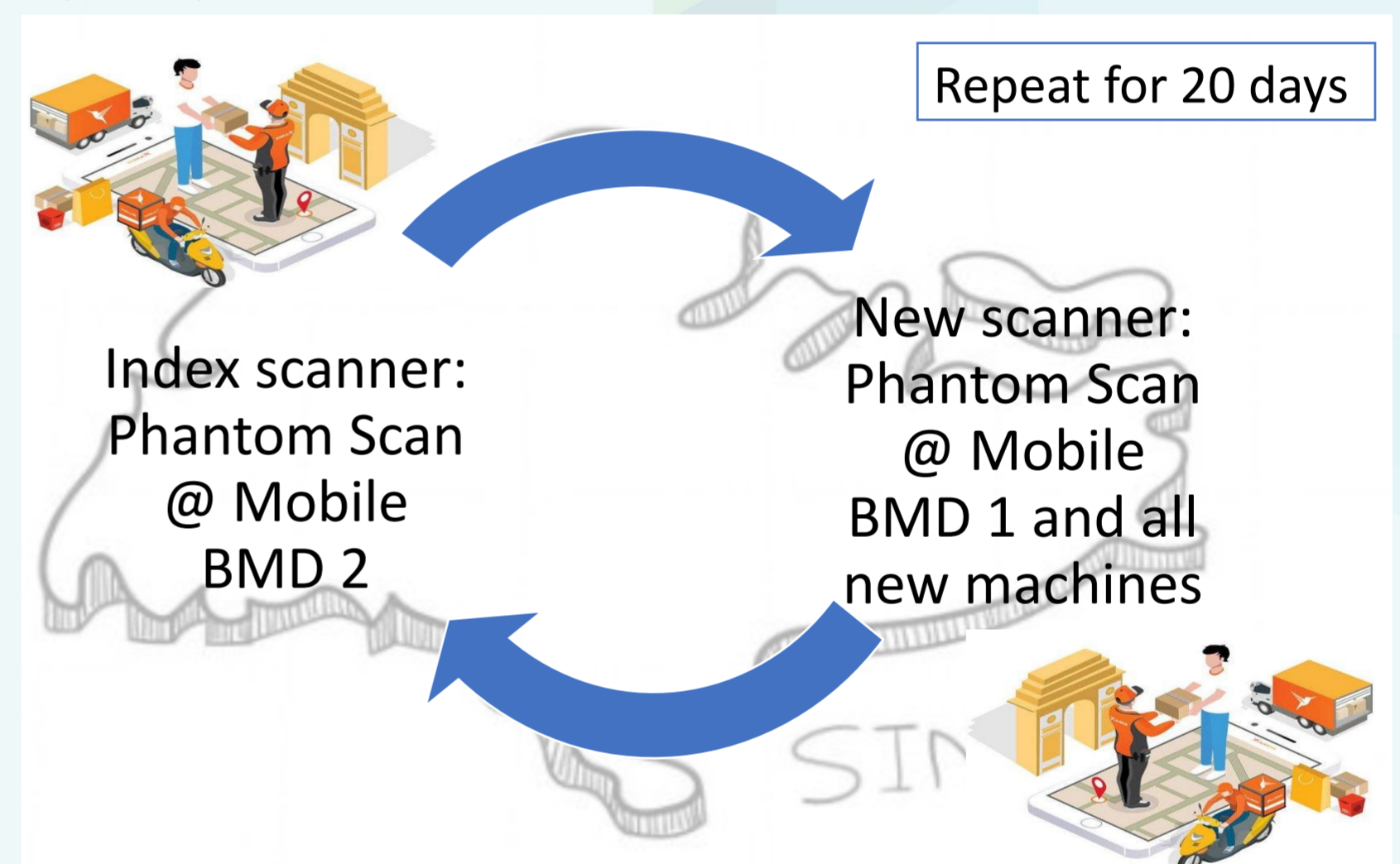
With effort and some innovation, it is possible to completely overcome the long-accepted problem that patients must keep returning to the same machine for every single follow up scans.

Cross-calibration of DXA scanners has been difficult to achieve as there was no known procedural steps for users to carry out a verification test on the long term precision of the DXA scanner.

Potential Solutions

BMD results performed across different DXA scanners can be made comparable by carrying out cross-calibration.

Cross-calibration procedure involves a calibration and monitor process involving repeated scanning of the spine phantom by both the index and the target scanner for 20 different days. To bridge the challenge of BMD machines for being geographically separated, a motorcycle dispatch service was used to transport the spine phantom.



Outcomes & Impacts

% difference of mean BMD against BMD 2 "Index scanner"

BMD 1	BMD 3	BMD 4
0.01%	0.19%	0.11%

Percentage difference of mean BMD of all NHGD DXA scanners against BMD 2 "Index scanner"

All NHGD DXA BMD scanners cross-calibrated within a 0.5% precision tolerance and results can be accurately compared. Clinicians can confidently diagnose skeletal responses to interventions or disease progression even if patients are scanned using different machines. NHGD allows patient choice to choose service location. NHGD can deploy mobile BMDs interchangeably. Estimated 200 hours manpower saving annually from manual rescheduling of patients.

This project paves the way for a cluster or nation wide cross-calibration of BMD scanners to allow patient's mobility throughout all Singapore's public healthcare system.