



Primary Technology-Enhanced Care (PTEC) - Hypertension

Providing Care for Hypertension Closer to Home

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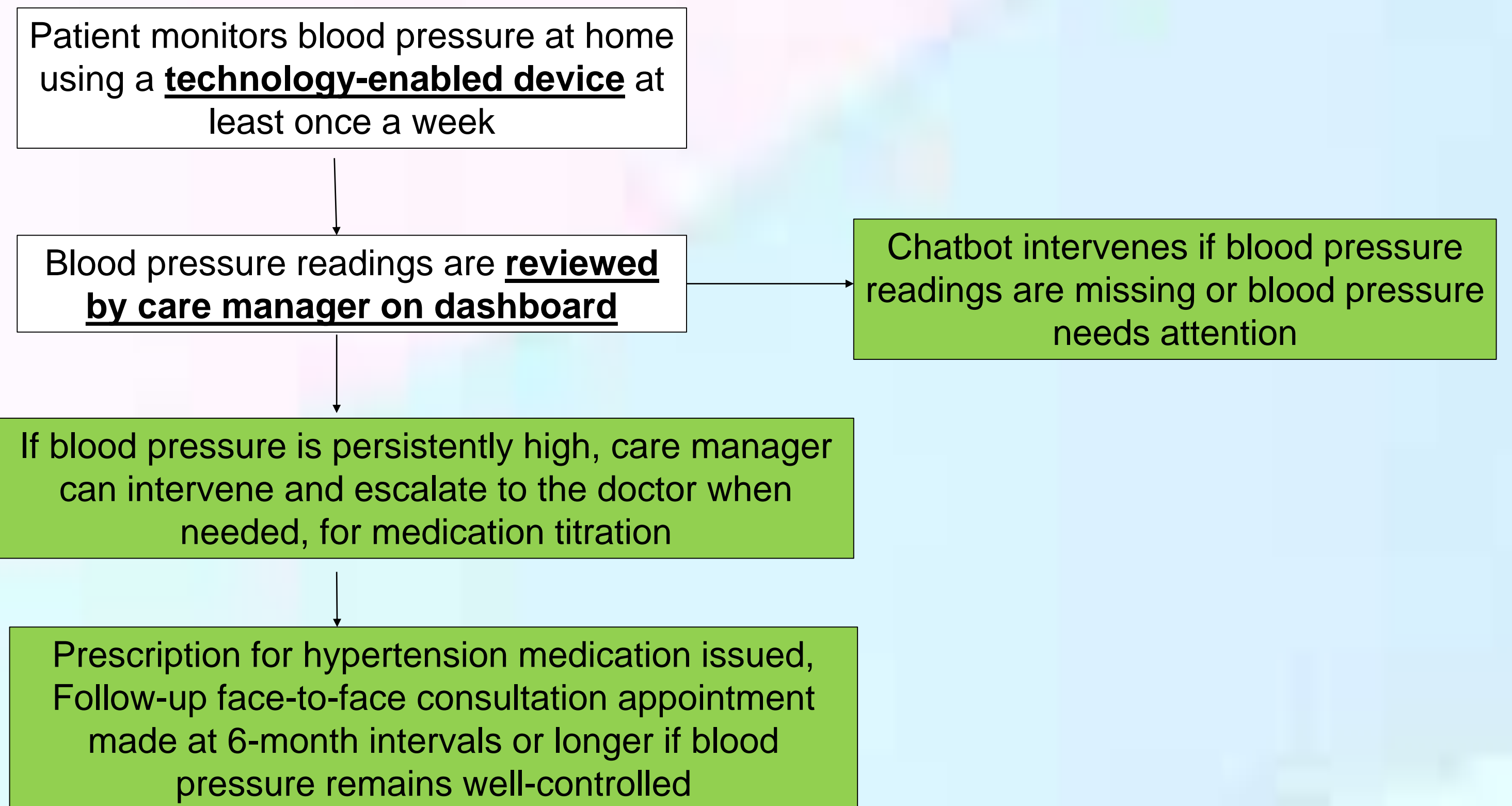
Mission Statement

Currently, most patients with chronic diseases, like hypertension, are managed through face-to-face consultations in the polyclinic. Patients need to come to the polyclinic, get their blood pressure measured, reviewed by a doctor or nurse before they can collect their medications and arrange for subsequent follow-up appointments. With technological advancements, patients with hypertension could get their blood pressure readings taken at home and transmitted to the care team for follow-up.

The aim of the pilot therefore, was to assess the feasibility and effectiveness of a redesigned hypertension care model leveraging on technology to enable self-monitoring and self-management with remote support and tele-consultations replacing some polyclinic visits in National Healthcare Group Polyclinics. The pilot was catalysed by MOHT under a series of PTEC initiatives with a vision for more wide-spread home-based self-management and effective care to prevent complications for chronic patients anchored by primary care in the community and closer to home.

Team Members

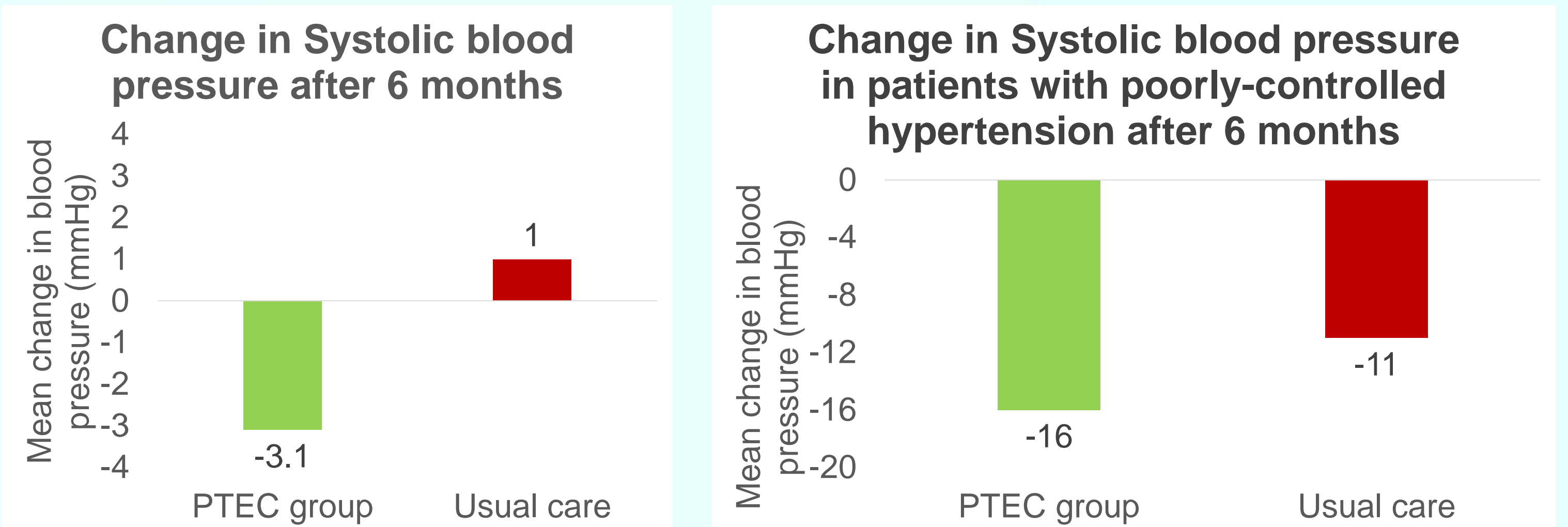
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Problem	Intervention	Implementation Date
New patient journey needs to be created	Design workshop carried out	30 July 2018
Suitable patients need to be recruited for pilot	Eligibility criteria & recruitment strategy for pilot project drawn up by care team Patient recruitment started	17 September 2018
Automation of routine patient care tasks need to be implemented	Chatbot developer appointed and algorithms and workflows mapped out with care team Chatbot deployed for patients	December 2018 November 2019

Results

The 6-month outcomes of patients on the tele-monitoring pilot were evaluated using a cohort study design. 103 PTEC-HT patients were compared with 115 patients with hypertension receiving usual care who were prospectively recruited for this study.



There was greater improvement in systolic blood pressure in patients in the PTEC group compared to the usual care group. Amongst patients with poorly-controlled hypertension at baseline, the PTEC group showed greater improvement in blood pressure compared to the usual care group after 6 months of follow-up.

There were fewer face-to-face consultations for hypertension amongst patients in the PTEC group compared to the usual care group (1.1 vs 1.5 consultations).

Interviews with patients showed that tele-monitoring increased awareness of blood pressure control and reinforced the need for regular blood pressure monitoring. Patients reported improved convenience with the reduction in visits to the polyclinic, and feeling reassured that the care team was monitoring their blood pressure.

The PTEC-HT program is proving beneficial in the current COVID situation. Patients can be monitored and medications titrated through the use of tele-consultations without having to make visits to the polyclinic.

A high level committee comprising cluster senior management has been formed to spread and scale tele-monitoring of blood pressure in primary care. MOH has also been engaged to include this technological solution as part of mainstream care delivery.

Patient Story

When Mr TBP signed up for the PTEC-HT program his blood pressure was poorly controlled at 161/99 mmHg. After onboarding, he was motivated and took his blood pressure daily. The care team was able to monitor his blood pressure regularly without him returning to the clinic for review. He was also empowered to improve his lifestyle. At the end of 2019, his blood pressure improved to 128/86 mmHg without any change in medication.

Cost Savings

The incremental cost-effectiveness ratio (ICER) was \$16,873 / QALY, which meant that PTEC was very cost-effective according to World Health Organization's (WHO) thresholds. If this technology solution were to be deployed to 25% patients in NHGP with hypertension with no co-morbidities, it could potentially save 11,094 man-hours per year, equivalent to 5 doctor / nurse full time equivalent per year.

Conclusion

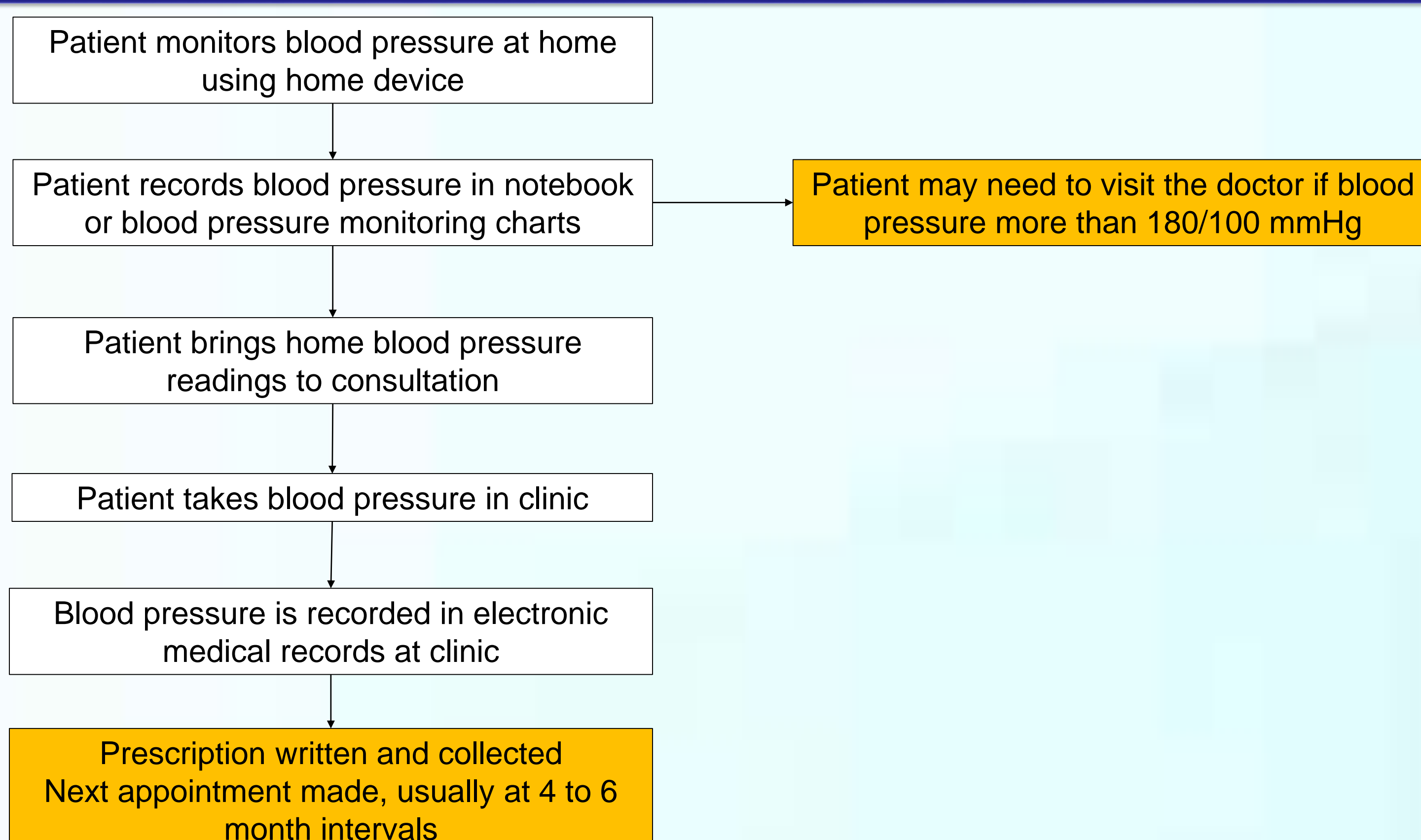
Tele-monitoring of blood pressure for patients led to greater blood pressure control, reduced face-to-face visits for hypertension and was well-received by patients. The pilot is expected to lead to manpower savings and is cost-effective if deployed at scale.

Evidence for a Problem Worth Solving

National Healthcare Group Polyclinics (NHGP) attended to 299,258 patients with chronic medical conditions in 2017. 55,470 of these patients had hypertension without complications or co-morbidities. This large patient population could potentially be managed at home using tele-monitoring, reducing the number of patient visits to the polyclinic whilst optimizing or maintaining good blood pressure control for these patients.

The TASMING2* trial showed that tele-monitoring of blood pressure for patients with hypertension in UK general practice led to a 17.6 mmHg reduction in systolic blood pressure after 12 months of tele-monitoring, compared to a 12.2 mmHg reduction of blood pressure in patients receiving usual care.

Current Process



Implementation

A suitable home blood pressure machine with a 4G gateway was selected as the interim vital sign monitoring technology solution for the pilot to provide the home blood pressure devices, 4G gateway as well as the user interface to start the pilot. A new chatbot was co-developed by NHGP and MOHT, using design thinking and lean management approaches, and deployed in a later phase to automate routine tasks to increase patients' adherence to self-monitoring, provide basic advice and enhanced productivity of the care team (allowing them to optimise their time for more complex tasks in the care delivery). In redesigning the hypertension care model, our workflow was customised to leverage on new technology capabilities brought about by the home blood pressure device and vital sign monitoring system, with processes refined over time.

* McManus RJ, Mant J, Bray EP et al. Telemonitoring and self-management in the control of hypertension (TASMING2): a randomised controlled trial. Lancet. 2010 Jul 17;376(9736):163-72.