STOP missing elevated blood pressures (BP): Using QI methodology to improve BP identification & management in a pediatric nephrology clinic

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Introduction
Recently published data demonstrates that the prevalence of elevated blood pressure (BP) and hypertension in childhood is increasing, and untreated hypertension accelerates the deterioration of kidney function in pediatric patients.

There are significant gaps in identification and management of elevated BP in the pediatric population. A barrier to recognizing hypertension in children is the need for detailed charts or calculations requiring gender, age, and height to derive BP percentiles. This is a stark contrast to identifying elevated BP in adults, which simply requires a single number. Our current EMR does not automatically calculate BP percentile, thus requiring a separate workflow process to compute the BP percentile and identify those children with elevated BP.

Current studies show that pediatric provider identification of elevated BP is universally poor. Even in a nephrology practice, which pays more attention to that vital sign than more general nephrology practices, numerous patients were not identified and subsequently treated. In a pilot survey, only 50% of patients with true hypertension, 90% required interventions. There was a 40% increase in orders for BP medications, and BP calculator in EMR

Goal
To improve the health of pediatric patients, aged 2 to 18 years, in a pediatric nephrology clinic, 90% of patients with elevated BP will be identified and 90% of those patients identified will receive an intervention.

Process
Using the Model for Improvement, this QI project was conducted from January 2017 through the present. A multidisciplinary team encompassed all stakeholders, a gap analysis was performed, a key driver diagram created, and numerous change ideas tested with multiple PDSA cycles. All front-line staff took part in testing. Providers reached consensus on how to use the problem list to better communicate with other care teams. Data was collected daily, with constant feedback to the team. Run charts were posted in the clinical area so all members could view current results.

Key Driver Diagram
- Nonstandard methods to obtain BP and room patients by nurses & clinical staff
- Different methods for repeating BP measurement
- Variable methods to analyze BP and communicate elevated BP to provider
- Busy clinic flow and layout hampers staff communication
- No decision support tool readily available to identify patients with elevated BP
- No standard area for EMR documentation of elevated BP
- Lack of understanding of elevated BP based on age, weight, height, and sex by clinic staff

The present state was flow mapped, and this flow map was revised and reviewed with each subsequent PDSA cycle. This resulted in a final cross functional swim lane diagram to represent the current state.

Results/Outcomes
After 6 months, the goal was obtained and sustained; 100% of patients with hypertension were identified, and those identified received an intervention.

After modifying the STOP form, the reliability of identification of patients with elevated BP and subsequent intervention improved. The most common intervention was repeat measurement, for 55% of patients this placed them in normal category. The remaining 45% received a variety of interventions. There was a 40% increase in orders for ambulatory BP monitors, but only 35% of monitor tracings demonstrated white coat hypertension, while 65% had true hypertension. Of patients with true hypertension, 90% required addition or adjustment of medications and lifestyle changes.

The outcome measure, intervention for children with elevated BP, is shown by an annotated control chart. As noted, education alone did not change behavior. More meaningful interventions included changing the color of the form, providing pink laminated cards at all work stations as decision support, and meeting with individual providers to reengage.

Next Steps
- New guidelines are now being recommended for hypertension in children, and adjustments will be made in the calculator while the process remains the same.
- We are beginning to spread. Providers in Rhematology and Genetics (shared clinic space in the Specialty Center) want to incorporate our process for BP assessment as their patients are also at high risk due to the use of steroids and the presence of genetic syndromes.
- The STOP form has also been trialed in another nephrology clinic at the University of Michigan.
- Patients in primary care can benefit from this decision support tool once the process has been adapted.
- Key pieces of the process can be packaged for easy adaptation to a much broader spectrum of pediatric providers.

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