

## Background

- A diagnostic path is the series of diagnostic steps (i.e. clinical encounters, tests, referrals, procedures, etc.) from first presentation of a symptom or sign to establishment of a diagnosis.<sup>1</sup>
- Guidelines for the diagnosis and management of pediatric hypertension have been available for forty years.
- Unfortunately, for a variety of reasons, including the complexity of diagnostic standards, errors in blood pressure measurement technique, and unfamiliarity among clinicians with current guidelines, the diagnosis is missed in the majority of cases.

## Learning Objective

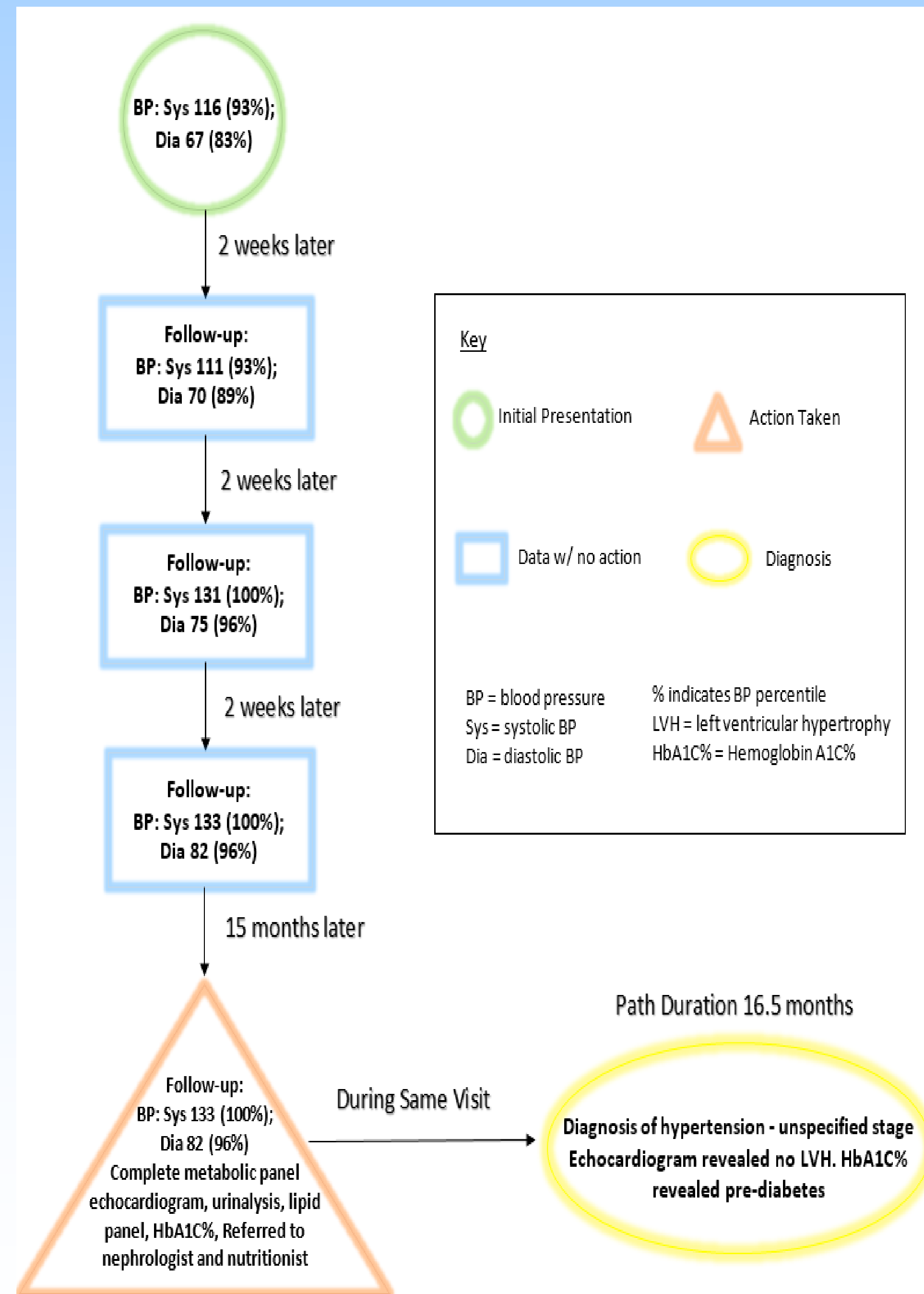
- To better understand the patterns through which physicians make a diagnosis of hypertension in children

## Methods

- Using a computable phenotype based on the measurement of 3 blood pressure readings  $\geq 95^{\text{th}}$  percentile within 12 months, we identified children ages  $\geq 3$  and  $\leq 18$  who met National Institutes of Health standards for hypertension from EHR data from 6 community practices.
- We calculated diagnostic rates based on recording of a diagnosis of hypertension as an encounter or problem-list diagnosis in the EHR.
- Univariate and multivariate logistic regression was used to identify characteristics associated with diagnosis.
- We completed 20 detailed manual chart reviews of diagnosed children to extract diagnostic paths.
- Visualizations of diagnostic paths were created.

## Results

**Figure 1. Sample Diagnostic Path: Mexican-American Female – Age 6 at Time of First Elevated Blood Pressure**



## Results (cont'd)

- We identified a total of 1478 children with hypertension, only 85 (6.1%) of whom received a correct diagnosis.
- Univariate logistic regression revealed that three characteristics- age  $\geq 12$ , obesity, and a past diagnosis of chronic renal disease were associated with a higher likelihood of correct diagnosis.
- In the multivariate analysis, age  $\geq 12$  compared with a reference age category of  $\leq 6$ , was associated with a higher likelihood of correct diagnosis with an odds ratio (OR) of 1.96, 95% CI(1.16, 3.32).
- Diagnostic paths varied greatly with diagnosis made in some cases through careful measurement of blood pressure over time, in others based on specialist referral, and in others, incorrectly (over-diagnosis).

## Conclusions and Future Directions

- Hypertension is missed in the vast majority of children regardless of demographic and other characteristics.
- Diagnostic paths vary greatly. More systematic approaches to diagnosis are badly needed.

### References

<sup>1</sup>Rao G, Epner P, Bauer V, Solomonides A, Newman-Toker DE. Identifying and analyzing diagnostic paths: A new approach for studying diagnostic practices. *Diagnosis* 2017;4(2): 67-72.

### Disclosure

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