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BACKGROUND

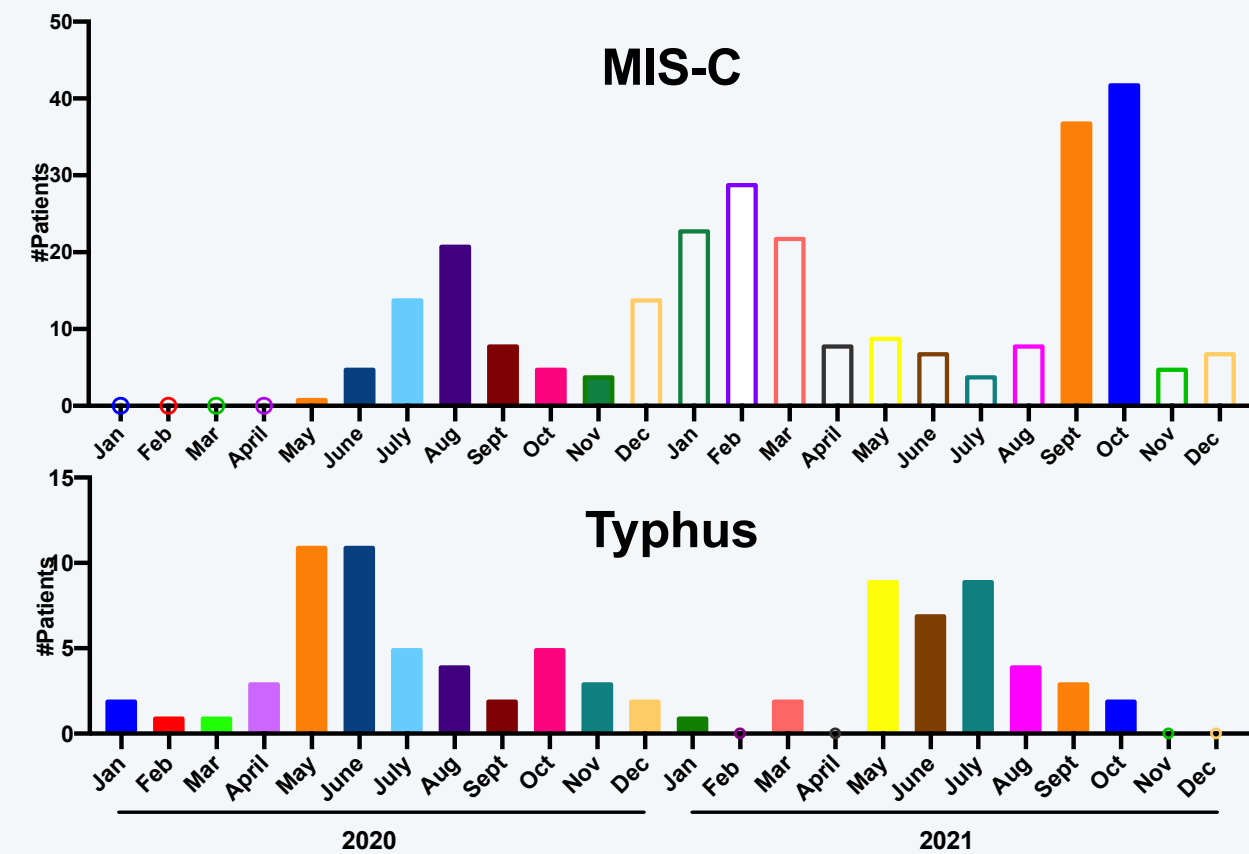
- Murine typhus, a rickettsial disease endemic in Texas, is a known clinical and laboratory mimic of Multi-system Inflammatory Syndrome in Children (MIS-C)
- As the therapeutic approaches differ greatly, and serologic confirmation takes time, it is essential to develop tools to rapidly distinguish between these entities

OBJECTIVE

- Use artificial intelligence to develop an algorithm to timely differentiate typhus from MIS-C

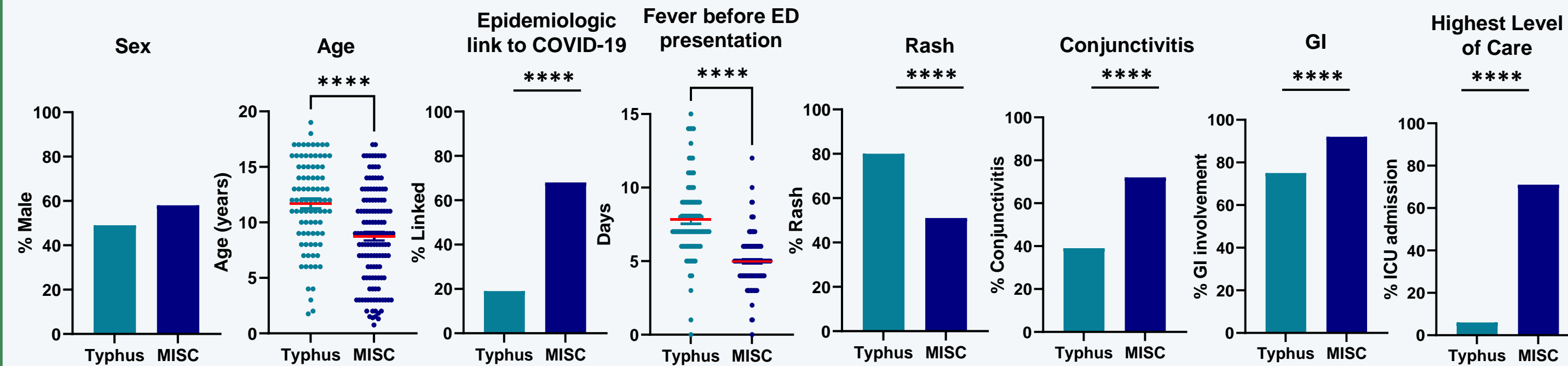
METHODS

- Retrospective chart review of 133 MIS-C and 87 typhus patients admitted to TCH

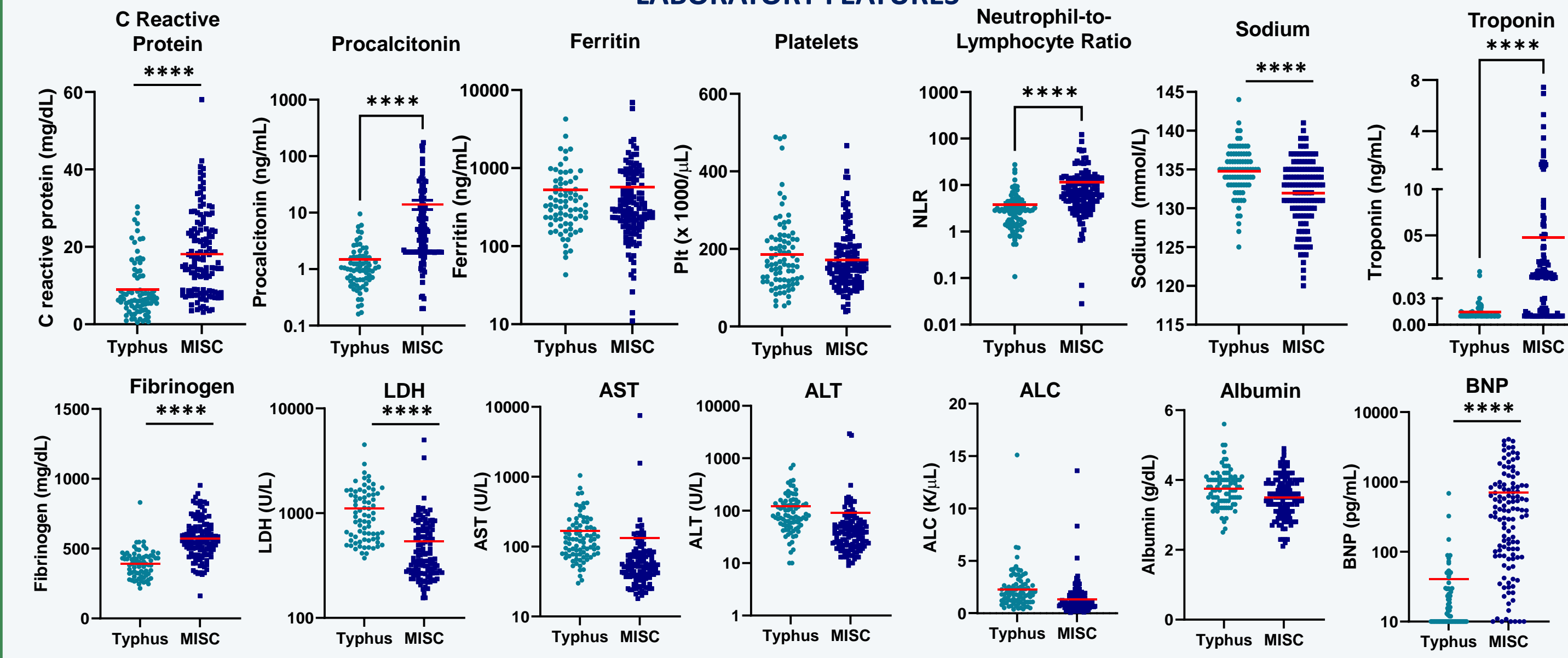


- 46 demographic, clinical, and laboratory features available within 6 hours of presentation
- 33 features → 44 inputs passed through an attention module to compute their importance, then entered into a long, short-term memory (LSTM) network as MIS-C or typhus
- Patients divided evenly into training and test cohorts

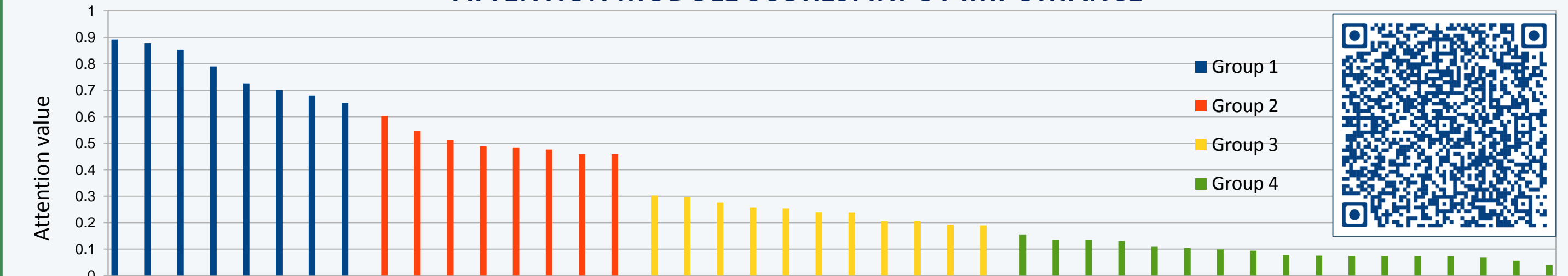
DEMOGRAPHIC FEATURES



LABORATORY FEATURES

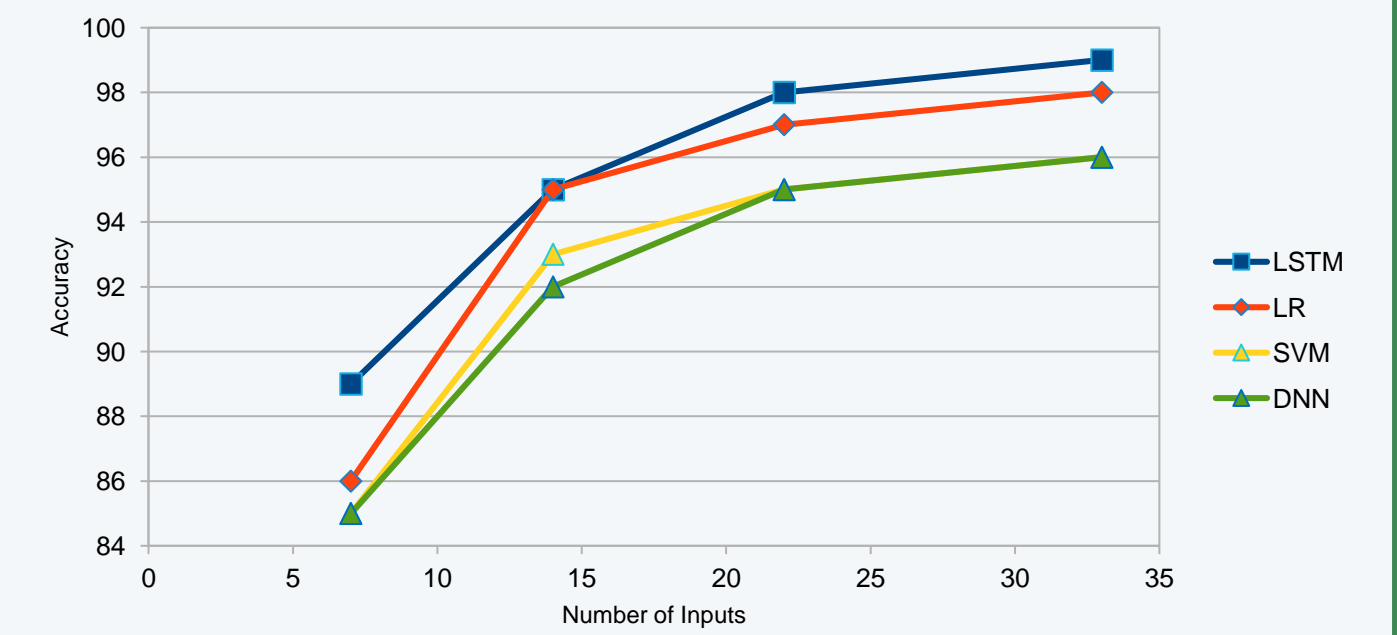


ATTENTION MODULE SCORES: INPUT IMPORTANCE



CLINICAL FEATURES

ACCURACY OF AI MODELS



LR = linear regression, SVM = support-vector machine, DNN = deep neural networks

- Accuracy varies by model and number of inputs utilized
- LSTM achieves 99% accuracy using all groups (44 inputs) and 89% accuracy using group 1 (7 inputs: fibrinogen, troponin, AST, ALT, ALC, BNP, age)

CONCLUSIONS

- Artificial Intelligence can be successfully employed to distinguish MIS-C from typhus
- LSTM model and all 44 inputs are required to maintain 99% accuracy

NEXT STEPS

- Ongoing interprofessional collaboration to refine the diagnostic model into a **set-point scoring system** while maintaining diagnostic accuracy
- Create a **website** accessible to all clinicians to maximize clinical applicability and to collect multi-center data to continuously validate our algorithm

ACKNOWLEDGMENTS