# Monocyte Anisocytosis: The Future of Screening for Sepsis in Children

Lael Yonker, MD
Pediatric Pulmonary
Massachusetts General Hospital
Boston, MA

# Disclosures

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# Background

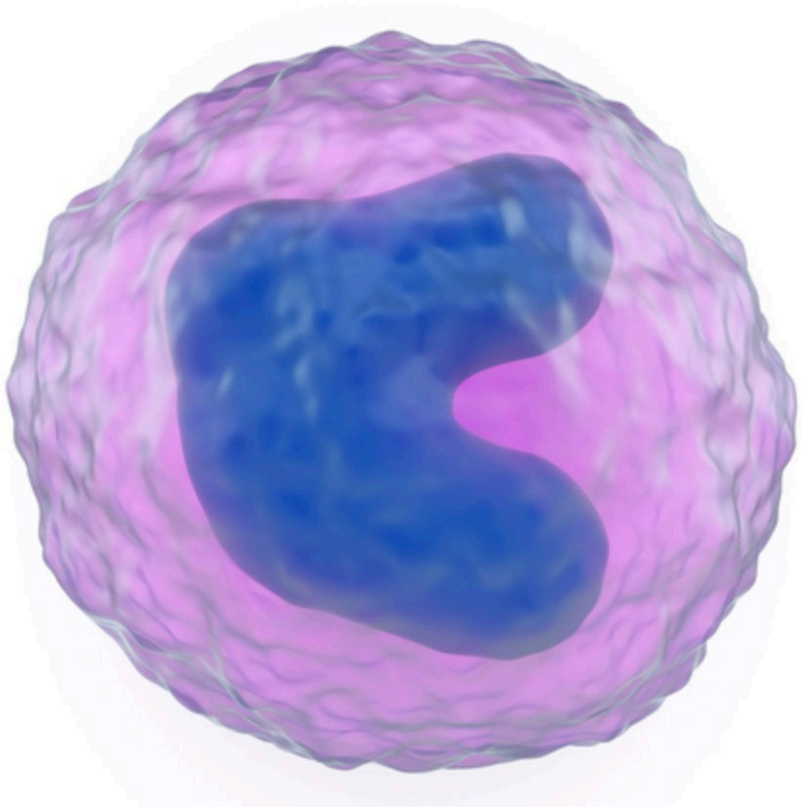
- 30 million children evaluated in the Emergency Department annually
- Top cause: fever/signs of infection
- Sepsis is rare but potentially devastating outcome

# Background

- Clinical evaluations can screen for children at risk of sepsis
- Variability in clinical assessments:
  - Fearful child
  - Provider variability/interpretation
  - Comfort of provider with pediatric patients
- Work up for sepsis/infection is variable
- Reliable biomarkers are needed

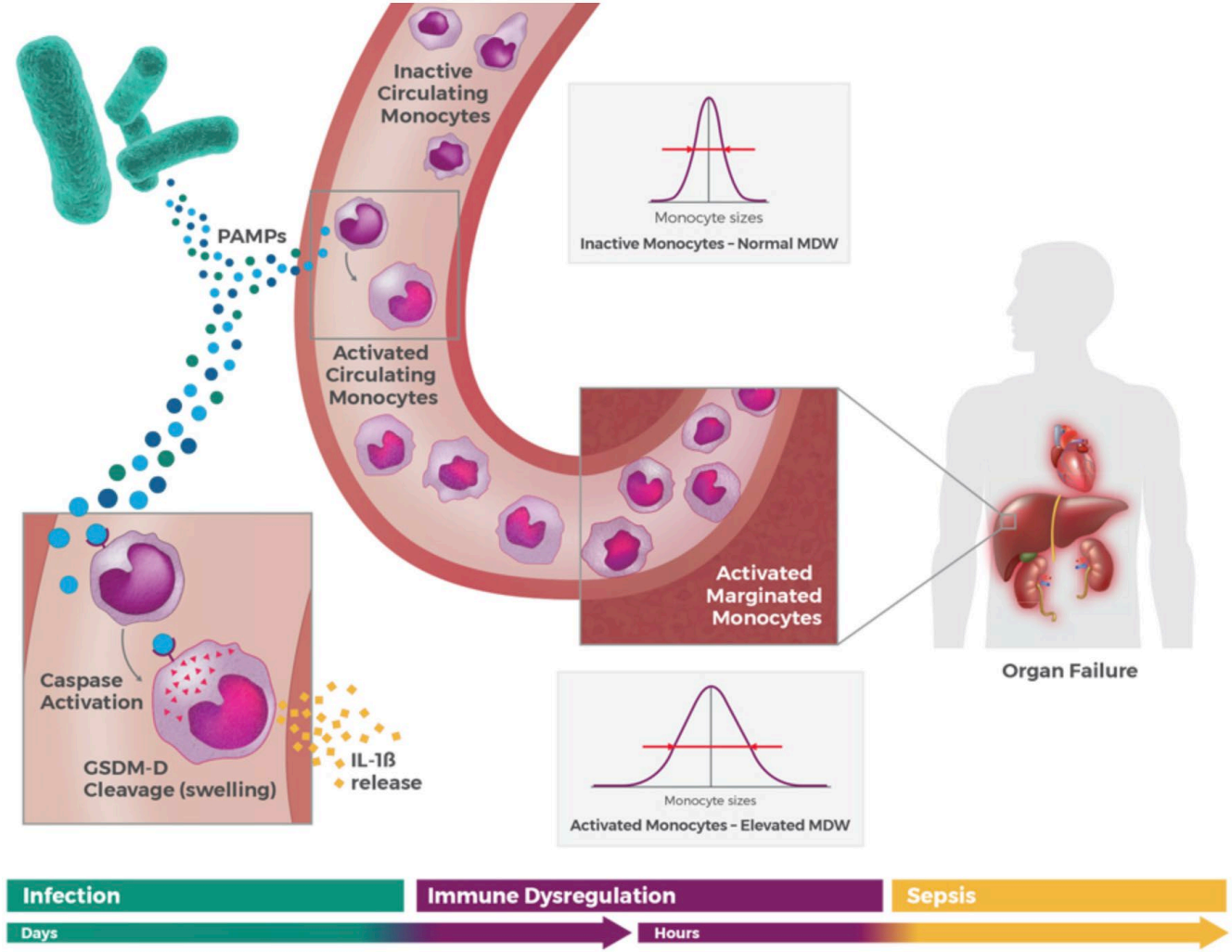
# The Monocyte

- Key role in antigen presentation
- Research shows severe sepsis has a shift in monocyte profiles by flow cytometry / gene expression
- Monocytes release multiple cytokines associated with severe inflammation



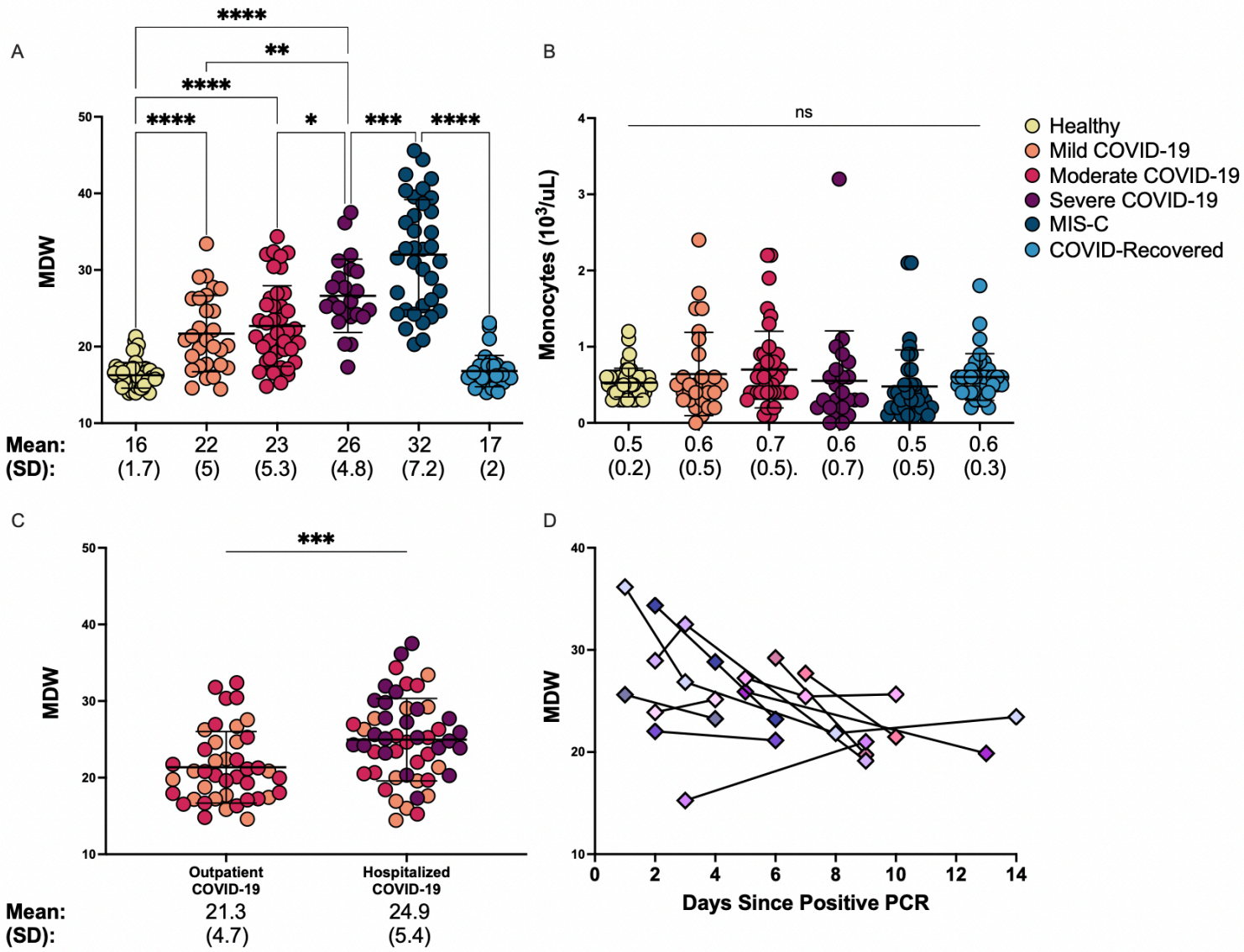
# What is monocyte anisocytosis?

Monocyte distribution width (MDW)



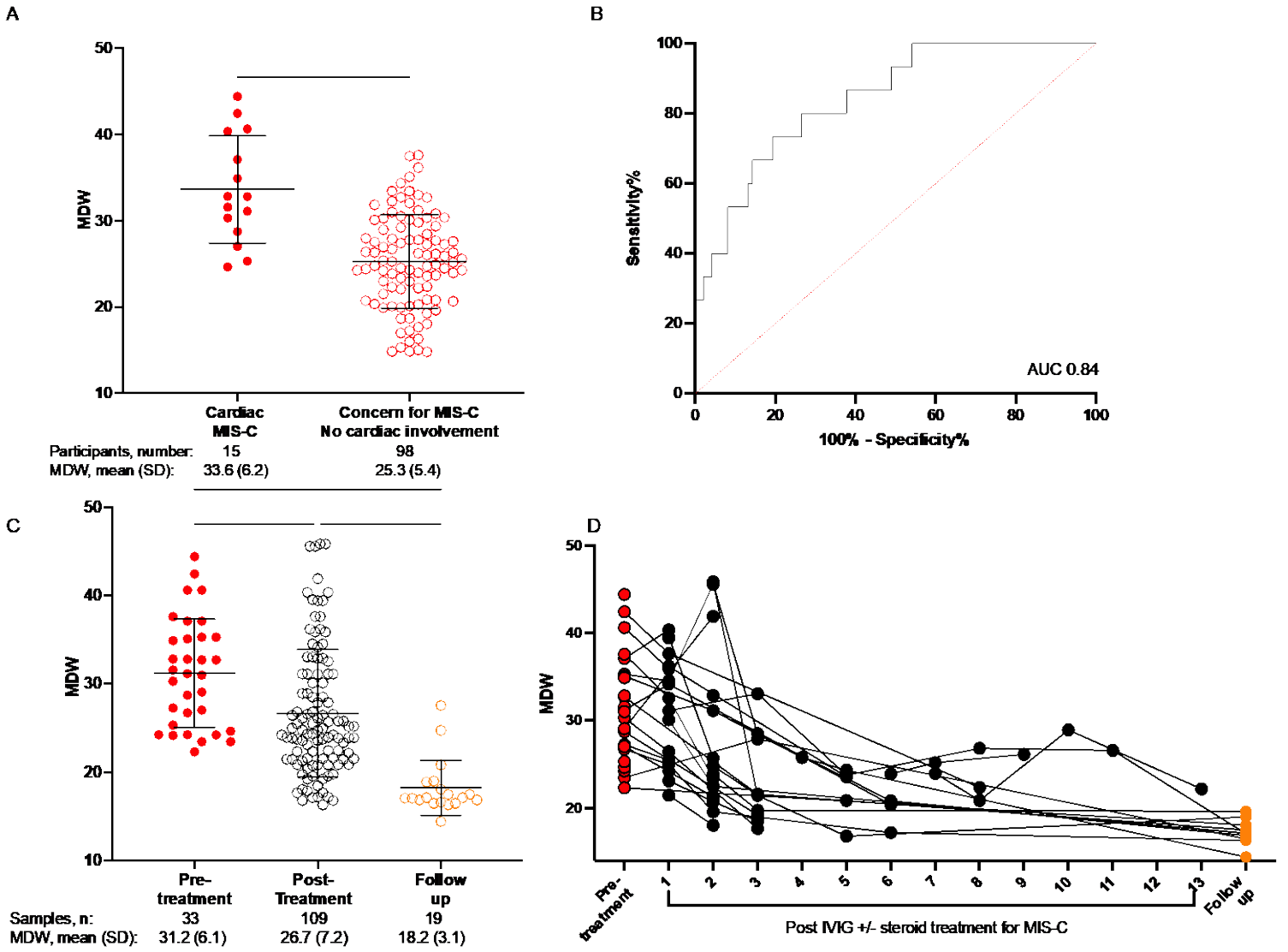

https://www.beckmancoulter.com/en/blog/diagnostics/monocyte-distribution-width

# Monocyte anisocytosis is increased with severity of COVID-19 in children



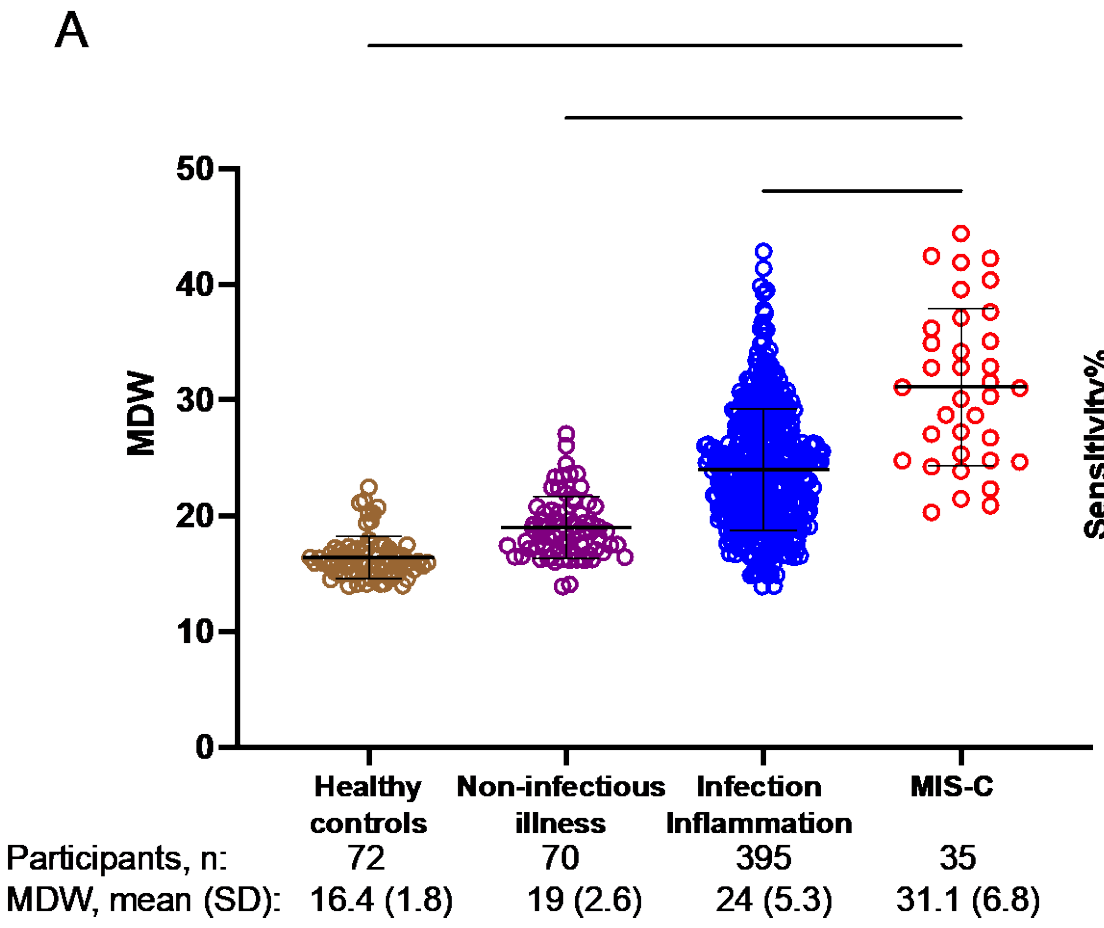

Kane AS, et al, Monocyte anisocytosis corresponds with increasing severity in COVID-19 in children, *Frontiers in Pediatrics*, 6/2023

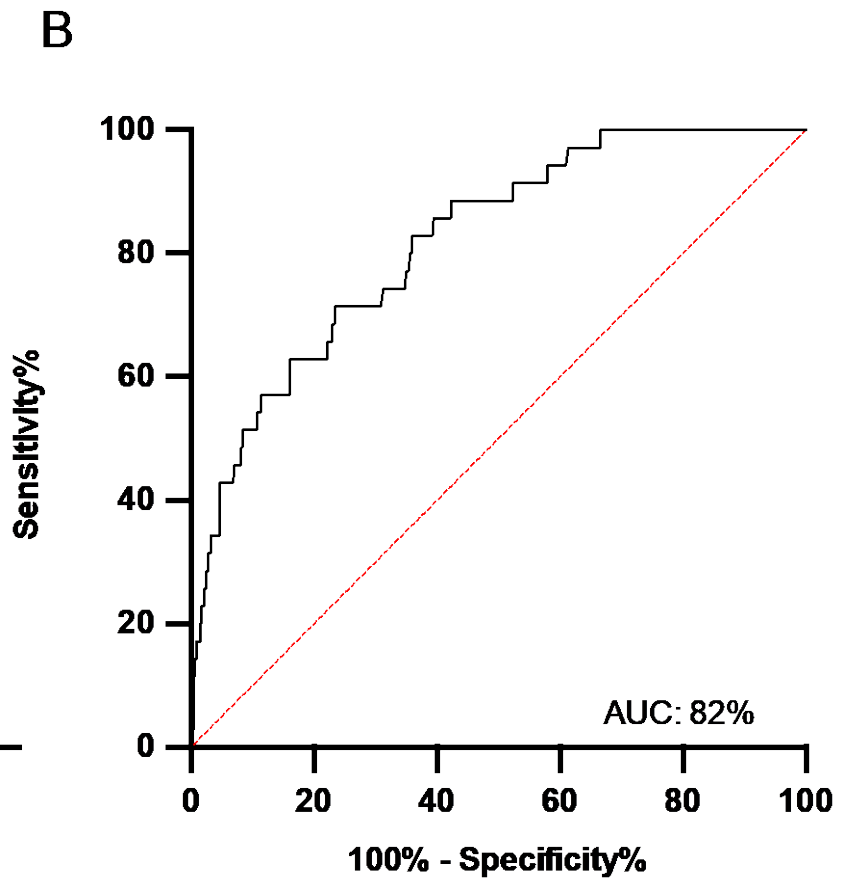
# Monocyte anisocytosis is increased in MIS-C, especially with cardiac involvement




Yonker LM, et al, Monocyte anisocytosis increased during Multisystem Inflammatory Syndrome in Children, *BMC Infectious Diseases*, 2022

# Monocyte anisocytosis is increased in MIS-C *but* MDW is broadly elevated in infection and inflammation



# Does MDW correspond more broadly with sepsis?

- Retrospective data
- 2 clinical sites (Johns Hopkins and MGH)
- Assigned sepsis 2 scores (Goldstein 2005)
- Assigned pSOFA scores

| Total enrolled (N=394) | Pediatric Sepsis (n=110) | Non-septic pediatric patients (n=284) |
|---|---|---|
| Age, years: mean (SD) | 7.5 (5.5) | 8.7 (5.6) |
| Sex at birth | | |
| Female, n (%) | 54 (49) | 131 (46) |
| Male, n (%) | 56 (51) | 153 (54) |
| Race | | |
| White | 48 (43) | 142 (50) |
| Black | 23 (21) | 55 (19) |
| Asian | 7 (6) | 11 (4) |
| Other | 34 (31) | 80 (28) |
| Ethnicity | | |
| Hispanic | 30 (27) | 85 (30) |
| Non-Hispanic/Unknown | 80 (72) | 199 (70) |

*Manuscript in preparation*

# Conclusion

- MDW is a biomarker that is clinically accessible on hematology analyzers
- Monocyte anisocytosis is strongly associated with sepsis in children
- MDW may serve as a useful, objective tool in screening for children at risk of sepsis

# Thank you!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Collaborators:
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Kent Lewandrowski
John Higgins

Lab Alumni
Denis De la Flor
Eva Farkas
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Jameson Davis
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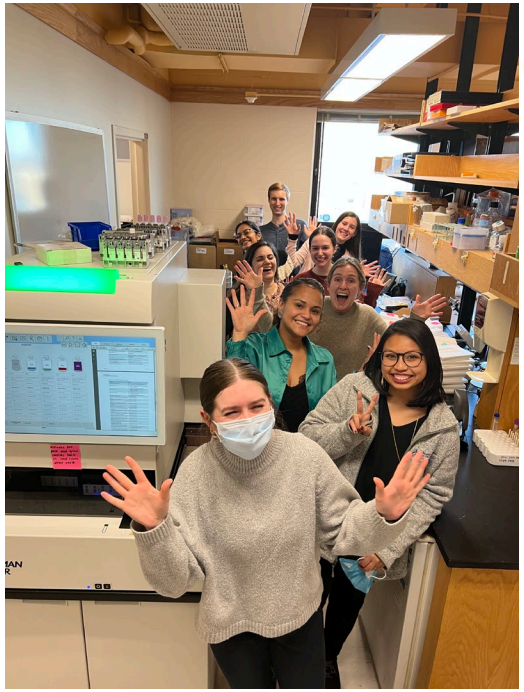


**X/Twitter: @LaelYonker**
**Email: lyonker@mgh.harvard.edu**