CARDIOLOGY 2023

DECIDING WHO IS A CANDIDATE AND WHEN TO INITIATE MECHANICAL CIRCULATORY SUPPORT

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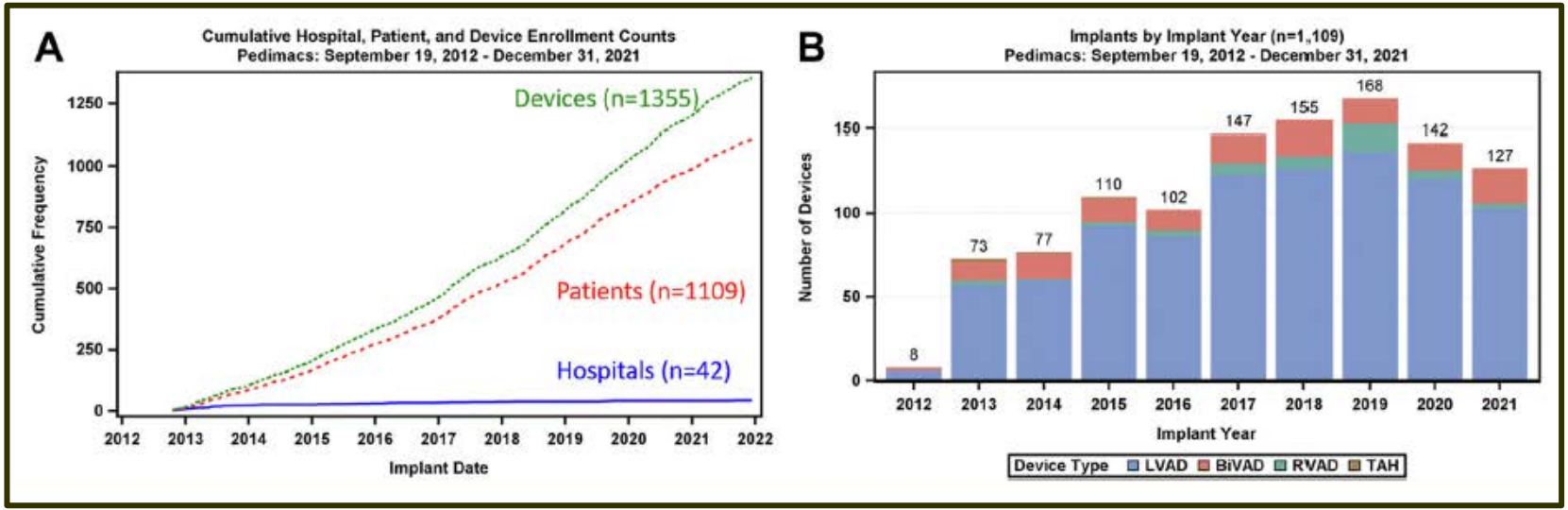
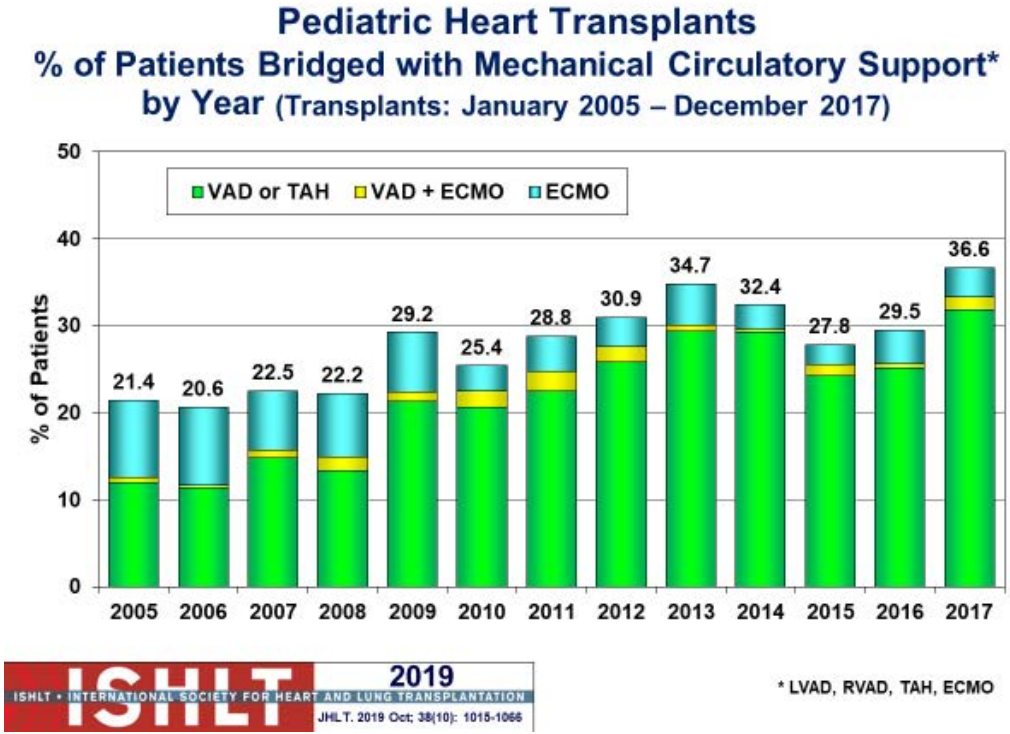
THE EVOLUTION OF MCS IN CHILDREN

- The Pediatric Interagency Registry for Mechanical Circulatory Support (Pedimacs) began in 2012



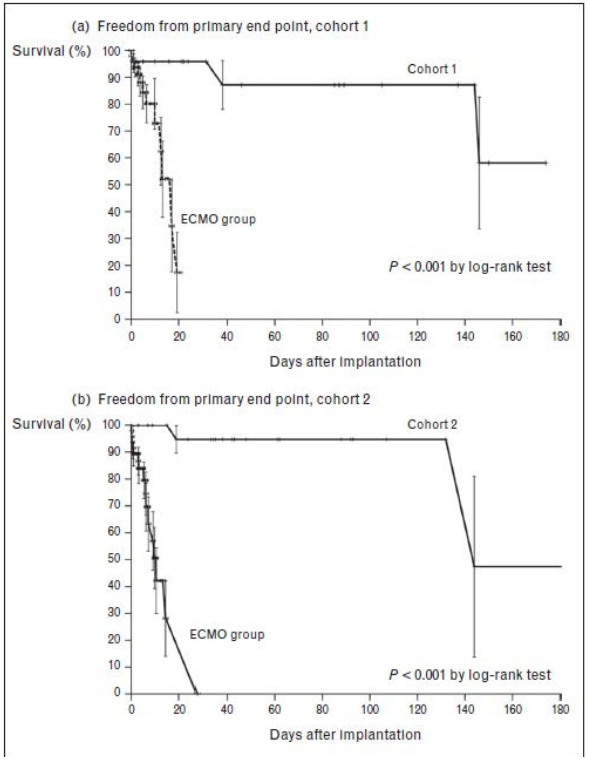
Adachi et al., Pedimacs Sixth Annual Report, 2022

MCS AS A BRIDGE TO TRANSPLANT



WHY HAS VAD USE IN CHILDREN INCREASED?

- **Berlin Heart EXCOR VAD Trial** (Fraser et al., 2012, *NEJM*)
  - Prospective → Berlin vs. ECMO (historical group)
  - 2 cohorts
    - Cohort 1 (N=24) BSA <0.7m^2
    - Cohort 2 (N=24) BSA >0.7 m^2 - <1.5 m^2
  - Combined end-point of death or discontinuation of device because of poor neurologic outcome



WHY HAS VAD USE IN CHILDREN INCREASED?

- **Outcomes of Children Bridged to Heart Transplant with VAD** (Blume et al., 2006, *Circulation*)
  - Analysis of PHTS database
- VAD support in children successfully bridged 77% of patients to transplant
  - Post-transplant outcomes comparable to those not requiring VAD

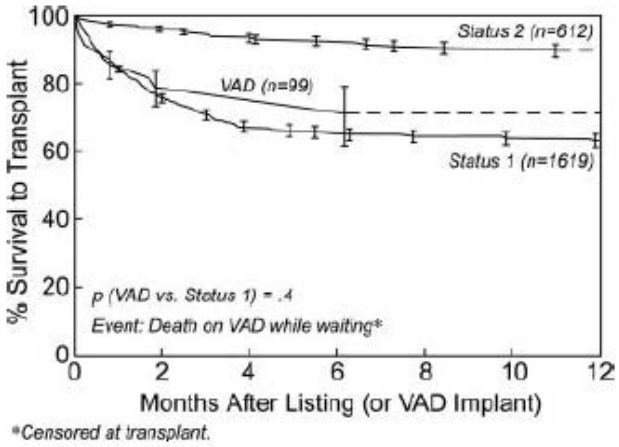


Figure 4. Survival to transplantation of patients bridged to transplantation with VAD support versus other status 1 patients is not significantly different. Survival for status 2 patients also is shown.

THE PATH TO MCS

Patient in heart failure

Poor perfusion despite inotropic support

Inability to tolerate enteral feeds

End organ dysfunction

Need for increasing respiratory support

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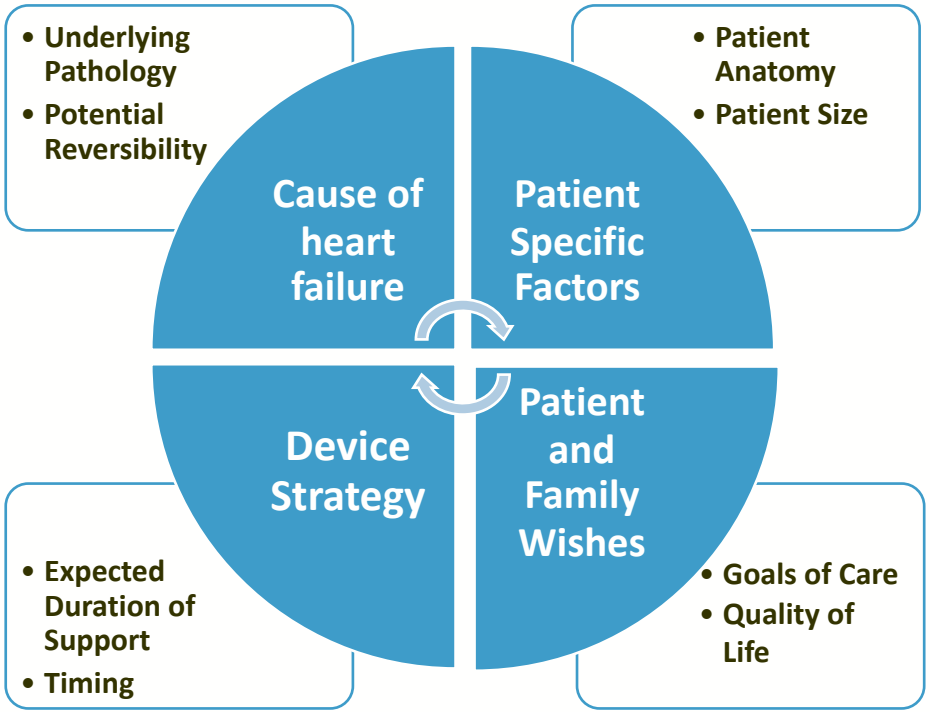
WHAT DO WE FACTOR INTO THE DISCUSSION REGARDING MCS?

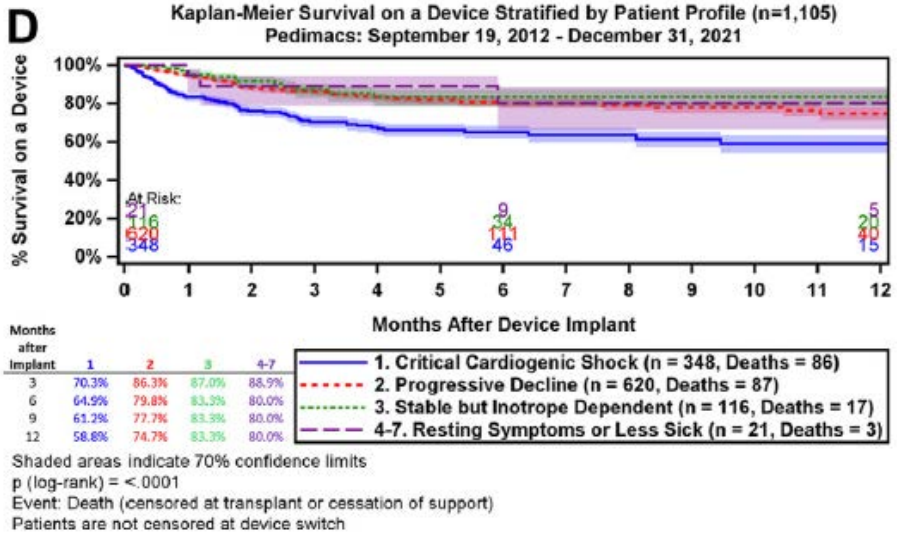


‘WHEN’ IS THE RIGHT TIME FOR MCS?

Table 4: INTERMACS Profiles

Profiles	Brief Description	Details
INTERMACS 1	Critical cardiogenic shock (Crash and burn)	Life-threatening hypotension despite rapidly escalating inotropic support.
INTERMACS 2	Progressive decline (Sliding fast on inotropes)	Declining function despite intravenous inotropic support
INTERMACS 3	Stable but inotrope dependent (Dependent stability)	Stable on continuous intravenous inotropic support.
INTERMACS 4	Resting symptoms on oral therapy at home	Patient experiences daily symptoms of congestion at rest or during activities of daily living.
INTERMACS 5	Exertion intolerant	Patient is comfortable at rest and with activities of daily living but unable to engage in any other activity.
INTERMACS 6	Exertion limited (Walking wounded)	Patient has fatigue after the first few minutes of any meaningful activity.
INTERMACS 7	Advanced NYHA class III (Placeholder)	Patients living comfortably with meaningful activity limited to mild physical exertion.

INTERMACS: Interagency Registry for Mechanically Assisted Circulatory Support; NYHA = New York Heart Association. Adapted from: Stevenson LW, et al.[25]



WHO IS A CANDIDATE FOR MCS?

- There are few **absolute** contraindications to VAD support
  - Irreversible end-organ dysfunction
  - Recent stroke or significant life-limiting neurologic disability
  - Active systemic infection
  - Incurable cancer

Rosenthal et al., analyzed adverse events in children implanted with VAD in the US (Pedimacs, 2016)

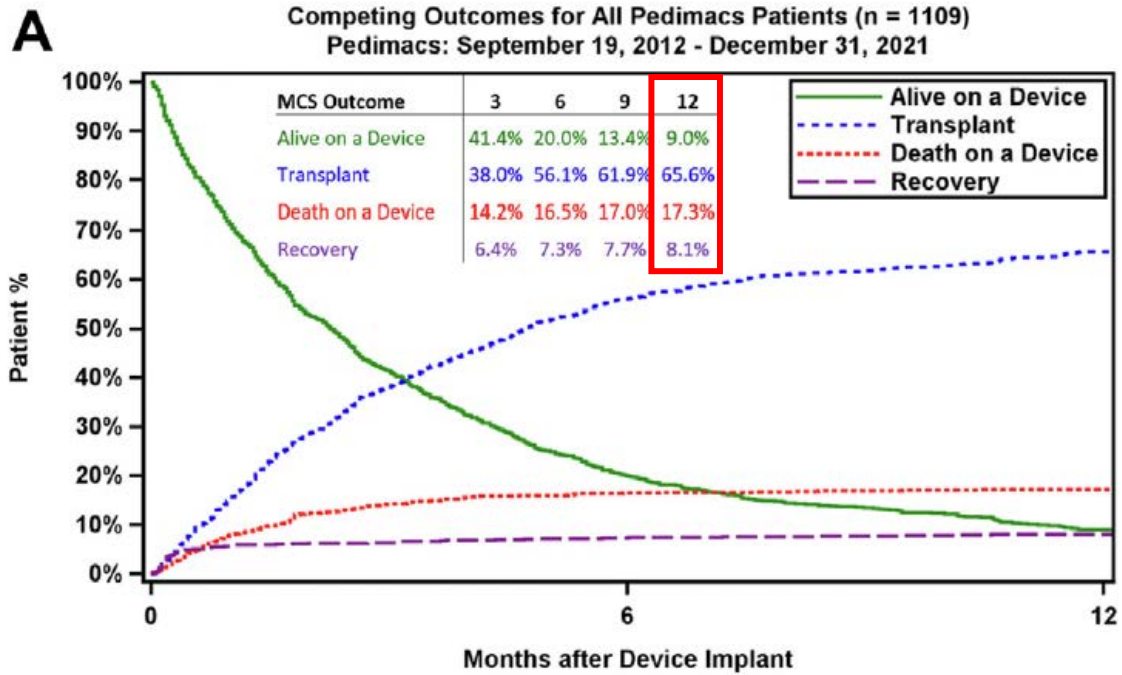
- **70%** of patients with pulsatile-flow devices and **55%** of patients with continuous flow devices had adverse events
  - *Infection, device malfunction, major bleeding, and neurologic dysfunction*

A BRIDGE TO…

- Transplant (50%)
- Candidacy, ie ‘decision’ (36%)
- Recovery/Explant (9%)
- Destination (1.8%)

Adachi et al., Pedimacs Sixth Annual Report. 2022

A BRIDGE TO...



Adachi et al., Pedimacs Sixth Annual Report. 2022

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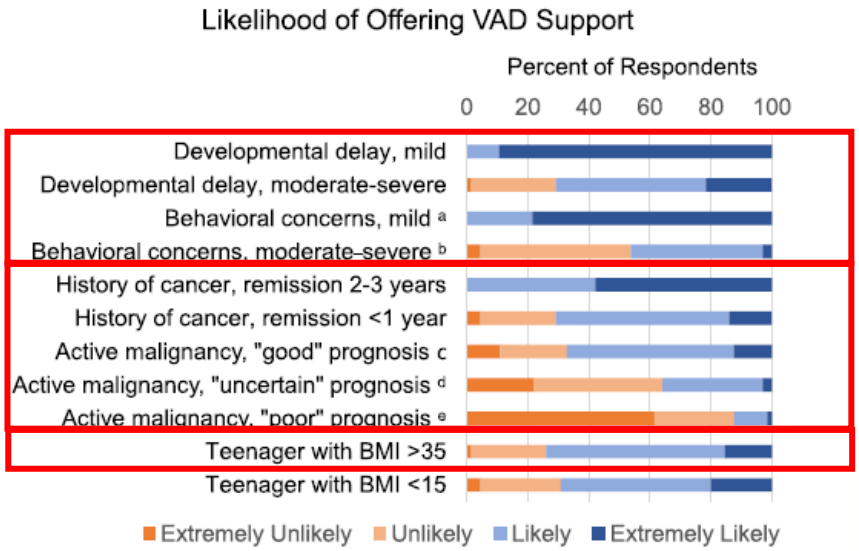
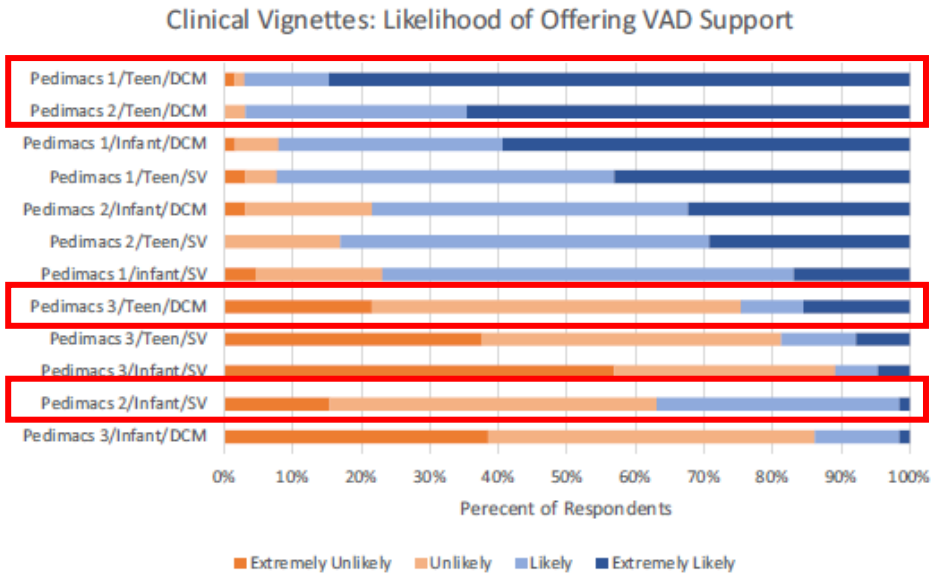
Variability in clinical decision-making for ventricular assist device implantation in pediatrics

- Cross-sectional survey related to clinical decision making in pediatric patients being considered for VAD implant
  - 65 respondents (47 cardiologists/18 surgeons (~50% response rate))



WILEY

Variability in clinical decision-making for ventricular assist device implantation in pediatrics



WILEY

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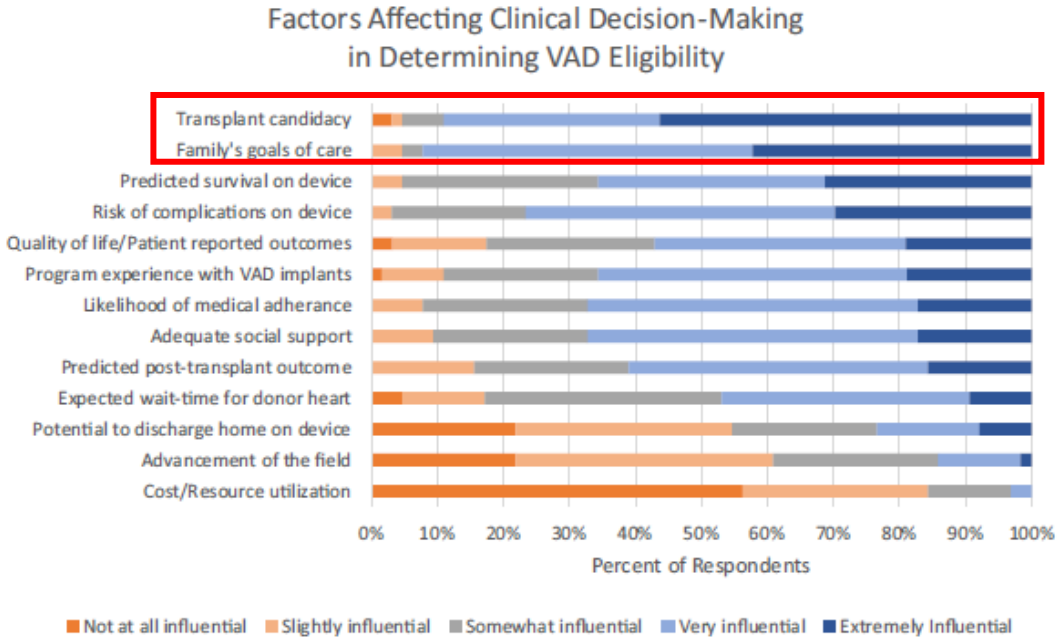

THE IMPORTANCE OF A MULTIDISCIPLINARY TEAM

- Cardiology (Heart Failure/Heart Transplant)
- CT Surgery
- Cardiac ICU
- Social Work
- Palliative Care
- Pharmacy
- Nutrition
- Physical and Occupational Therapy

THANK YOU!

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