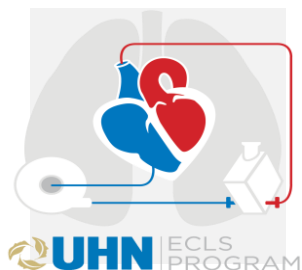


Ten Years Experience with Extra Corporeal Life Support for Adult Respiratory Failure: Evolution of Indications, Techniques and Outcomes

M Cypel, A Paraghamian, M de Perrot, K Yasufuku, A Pierre, C Arce,
S Azad, C Serrick, N Ferguson, TK Waddell, E Fan, S Keshavjee.



Disclosure

- ✓ Novalung has sponsored a clinical trial of interventional lung assist device (iLA)

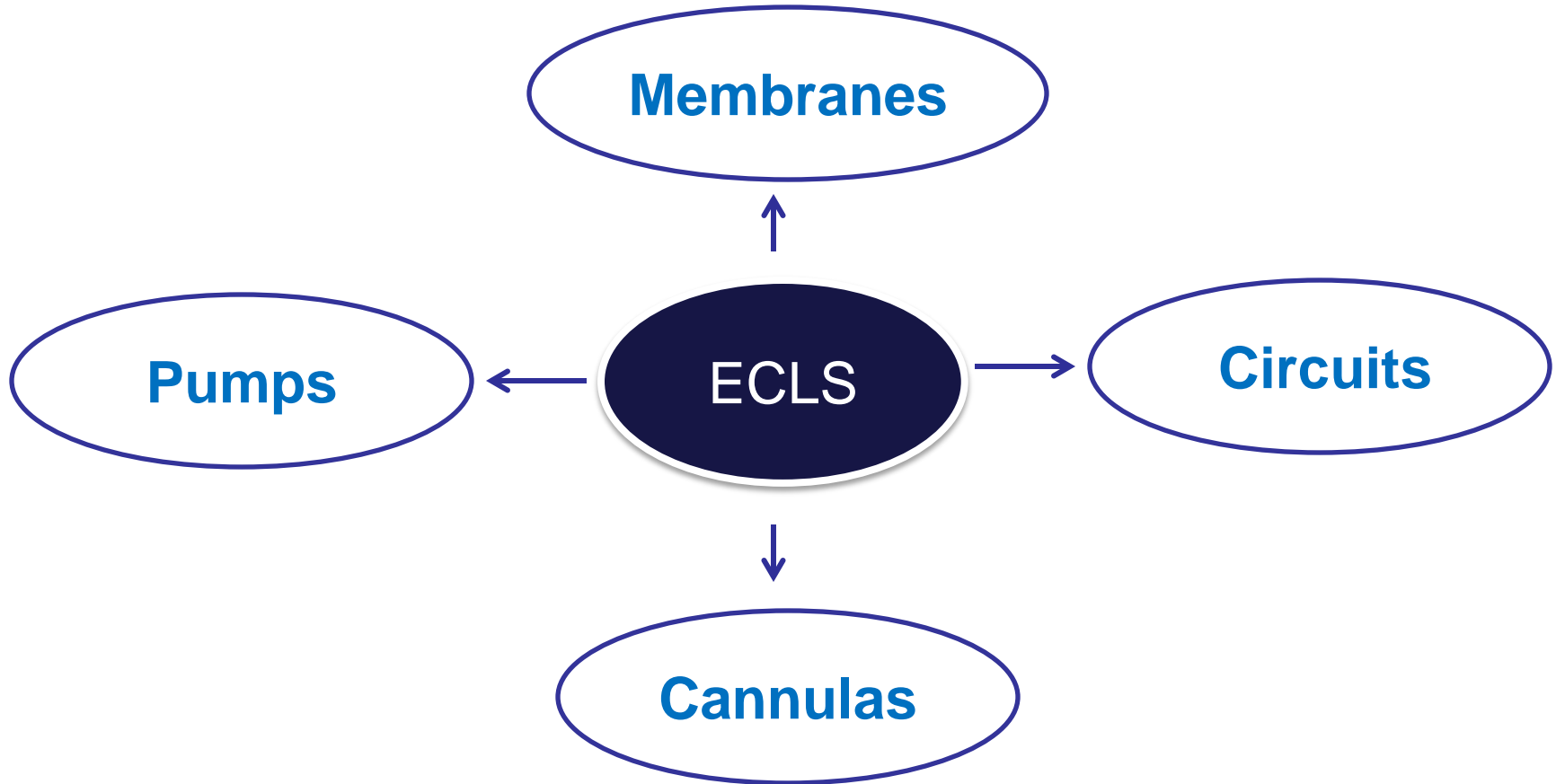


Extracorporeal Life Support (ECLS)

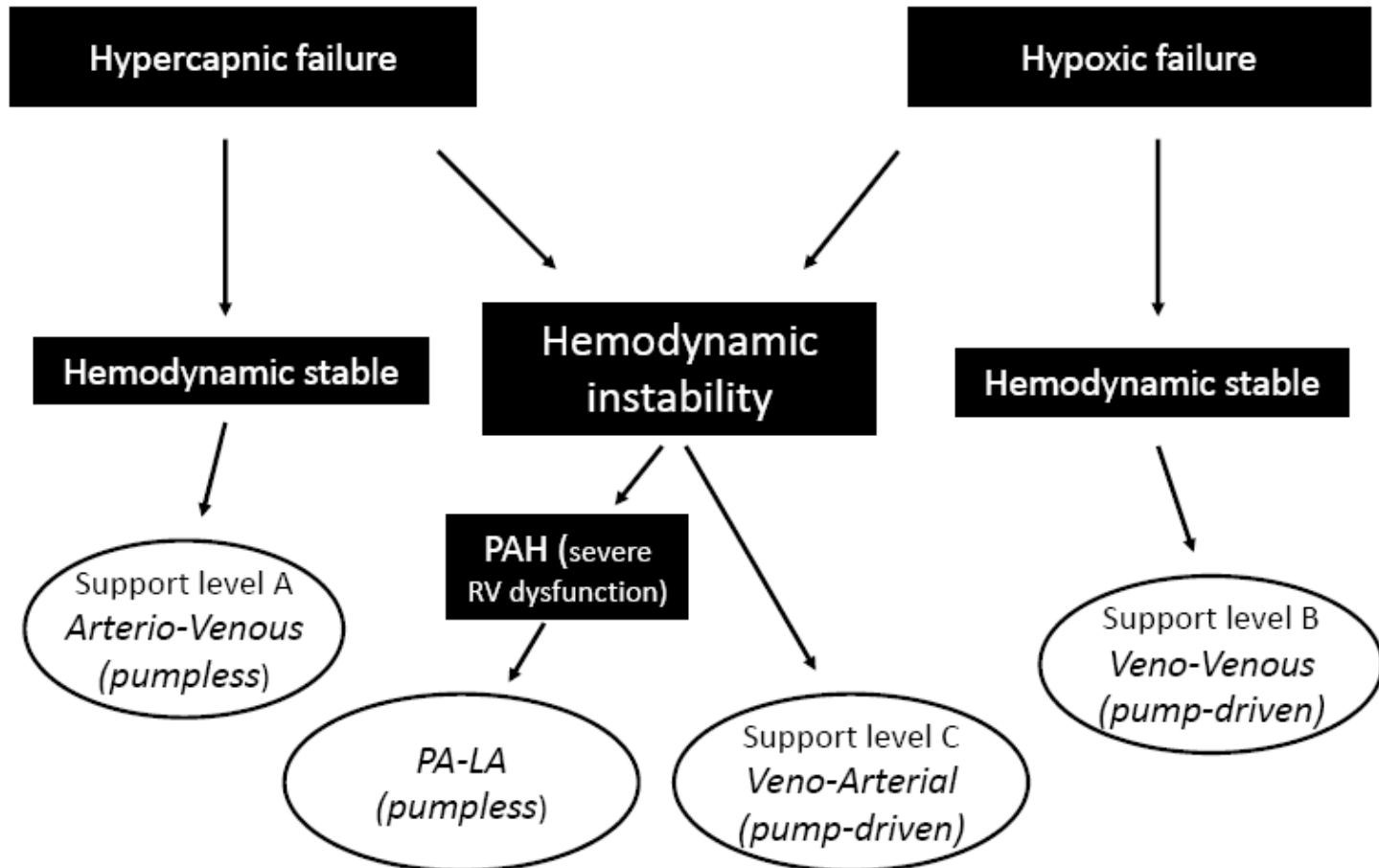
- ✓ The use of ECLS in patients with respiratory failure (RF) has been applied for over 30 years - Hill et al. NEJM 1972
 - ✓ Until more recently, outcomes of ECLS in adults had been generally poor (10% survival) - Zapol et al. JAMA 1979
 - ✓ CESAR trial was the first randomized trial demonstrating benefit of ECLS for ARDS - Peek et al. The Lancet 2009
-



Advancements in ECLS Technology



Not one size fits all



Study Objectives

- ✓ To determine our experience with ECLS in patients with severe respiratory failure in last 10 years
- ✓ To evaluate changes in practice over the years



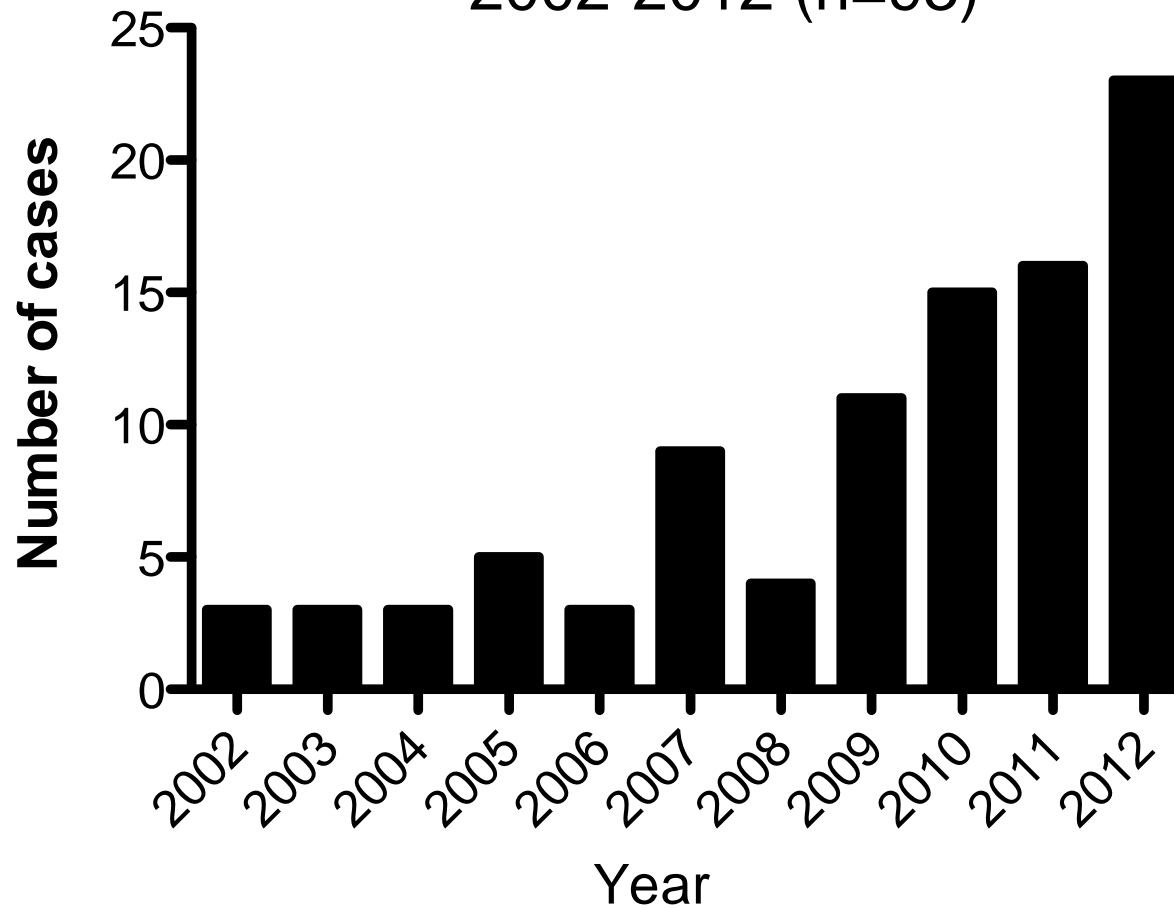
Methods

- ✓ Retrospective review of ECLS experience from a single centre (2002 to 2012).
 - ✓ General indications for ECLS: severe hypercapnic and/or hypoxemic RF, or hemodynamic failure due to severe pulmonary hypertension.
 - ✓ Patients were divided in 3 cohorts: Era 1: 2002-2005
Era 2: 2006-2009
Era 3: 2010-2012
 - ✓ Excluded ECLS for primary cardiac conditions
-



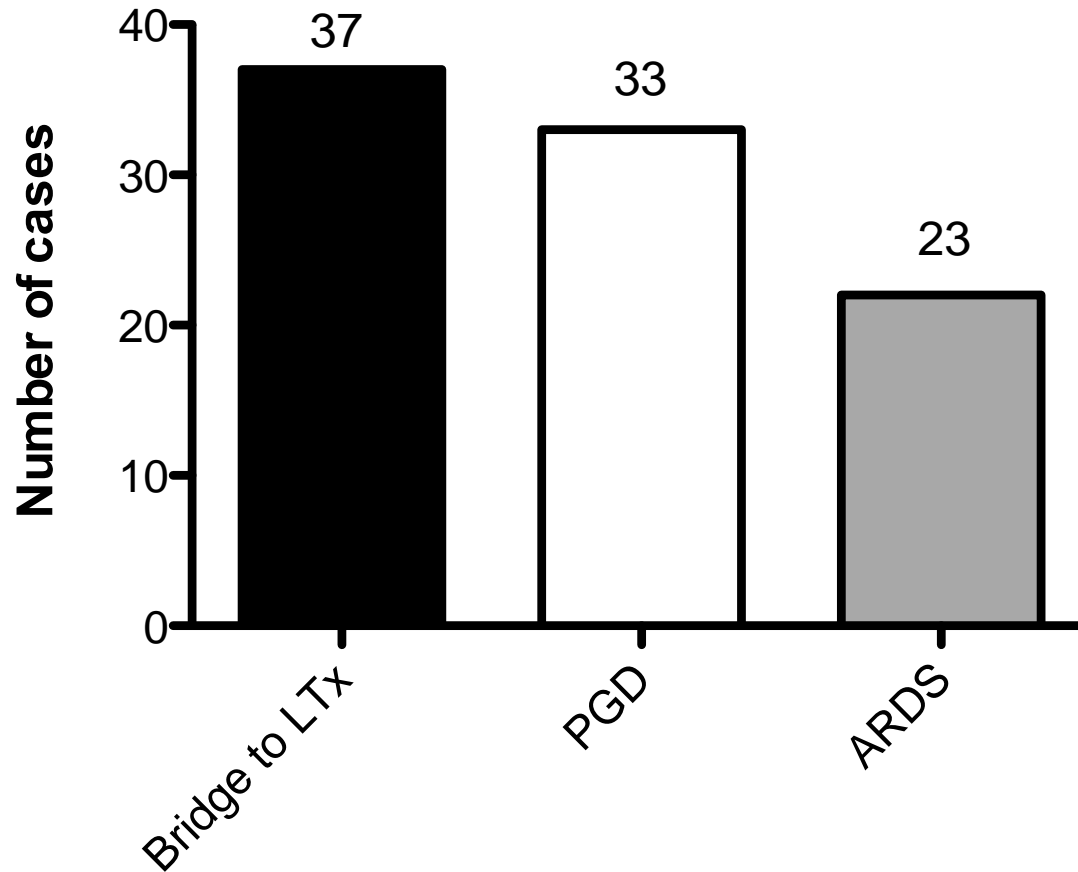


TGH ECLS for Respiratory Failure 2002-2012 (n=93)



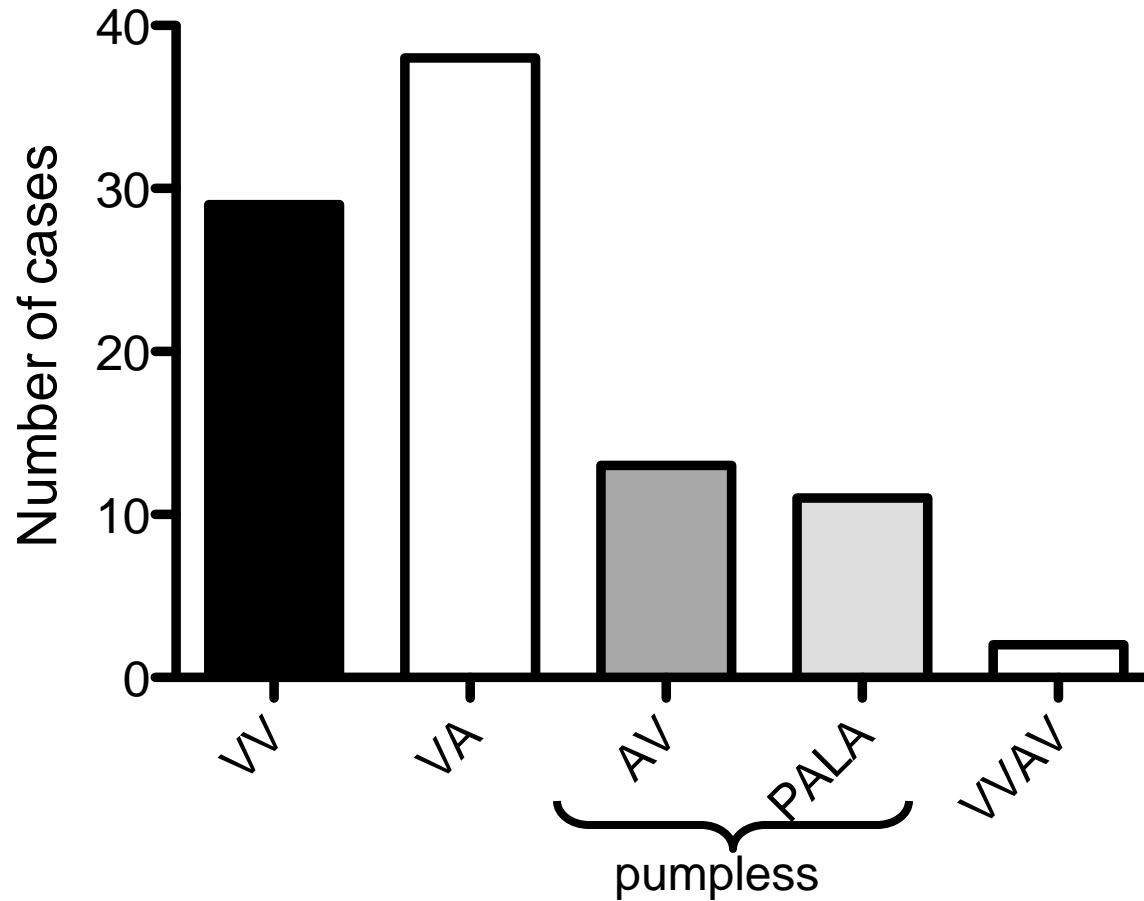


Indication

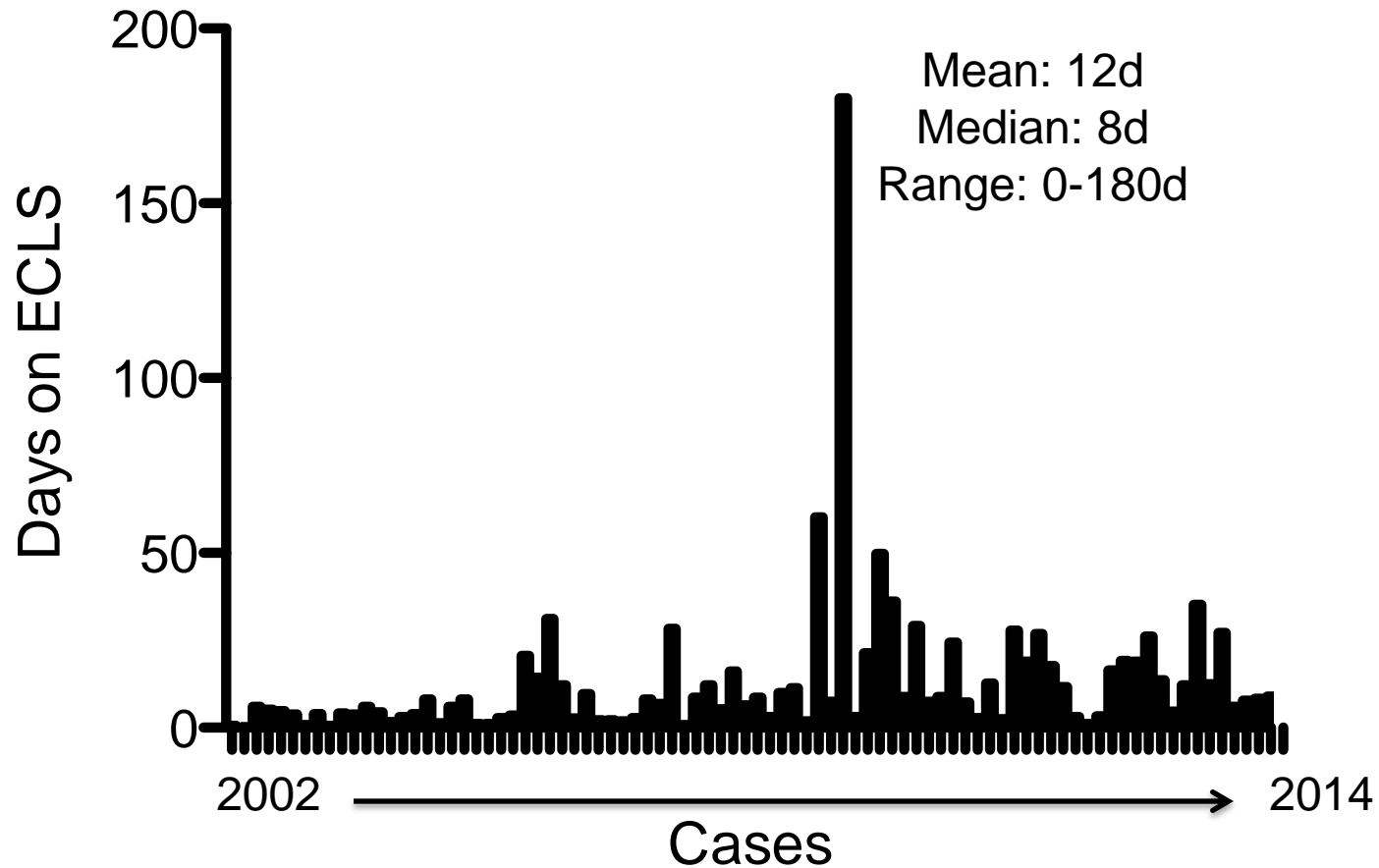




Initial ECLS Configuration



Days on ECLS





Patient Characteristics and Outcomes

Age (median years)	41 (15-67)
Male sex	47%
Number of days (median)	8 (1-180)
VA ECLS	40%
VV ECLS	31%
Extubation	17%
Dialysis/hemofiltration	45%
Survival to Decannulation	65%
Survival to Hospital Discharge	50%



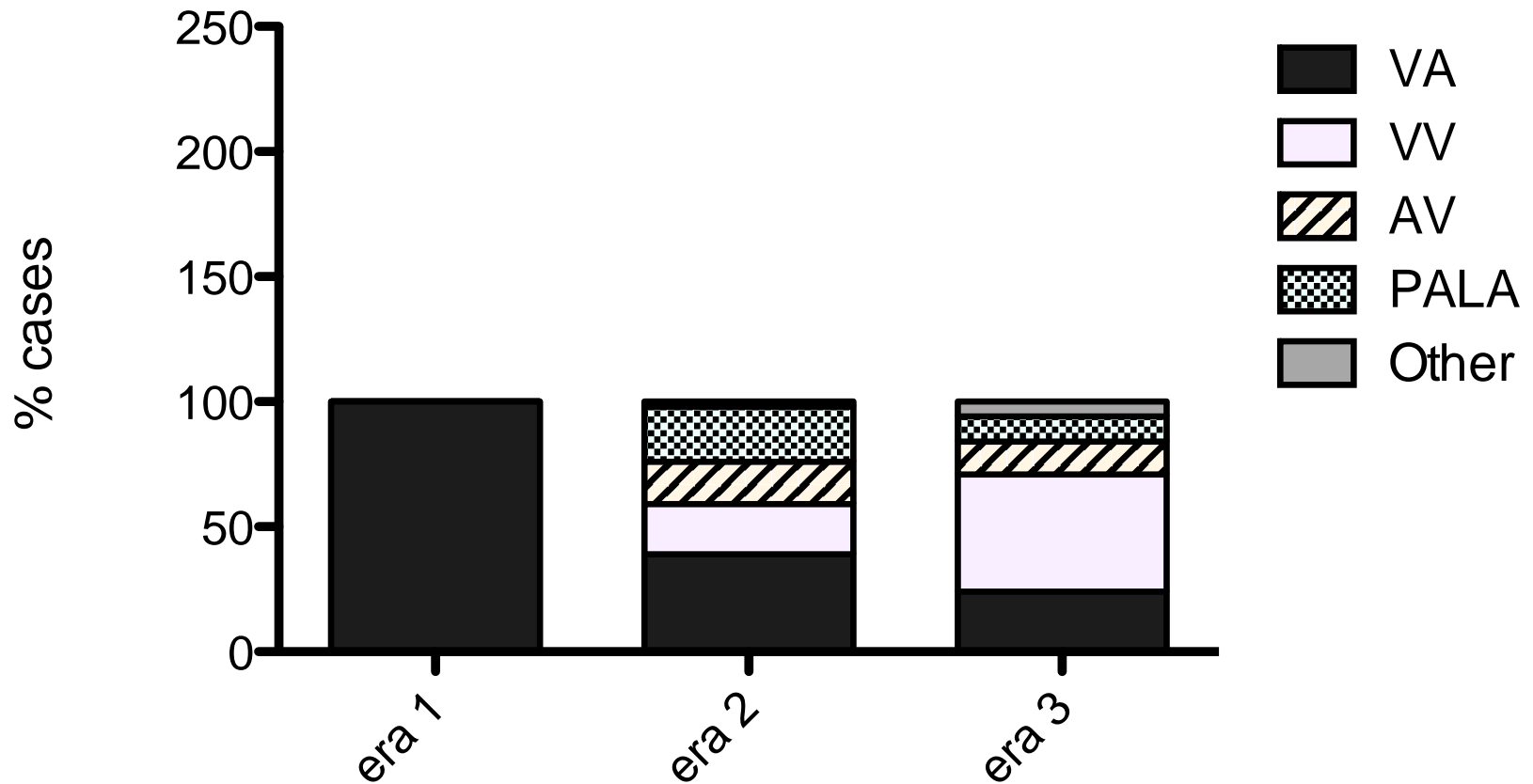
ECLS 2002 -2012 (n=93)

- 2002-2005: pre iLA - Era 1 (n=14)
- 2006-2009: post iLA - Era 2 (n=27)
- 2010-2012: ECLS program - Era 3 (n=52)





ECLS configuration per Era



Patient Characteristics

	Era 1 (n=14)	Era 2 (n=27)	Era 3 (n=52)	P value
Age (median years)	41	45	37	0.59
Male Sex	28%	55%	50%	0.59
VA ECLS	100%	48%	26%	0.001
VV ECLS	0%	15%	46%	0.0005
Days on ECLS (mean days)	2.3	7	17	0.02*

* Era 3 vs Era 1

Outcomes

	Era 1 (n=14)	Era 2 (n=27)	Era 3 (n=52)	P value
Extubation	0%	15%	29%	0.04
Dialysis/hemofiltration	50%	52%	42%	0.68
Survival to decannulation	43%	77%	72%	0.05
Survival do discharge	28%	55%	62%	0.07



Bridge to Lung Transplant

	Era 1 02-05	Era 2 06-09	Era 3 09-12	p value
Number of cases	-	13	24	-
Survival to decannulation	-	92%	75%	0.38
Survival to discharge	-	77%	58%	0.30



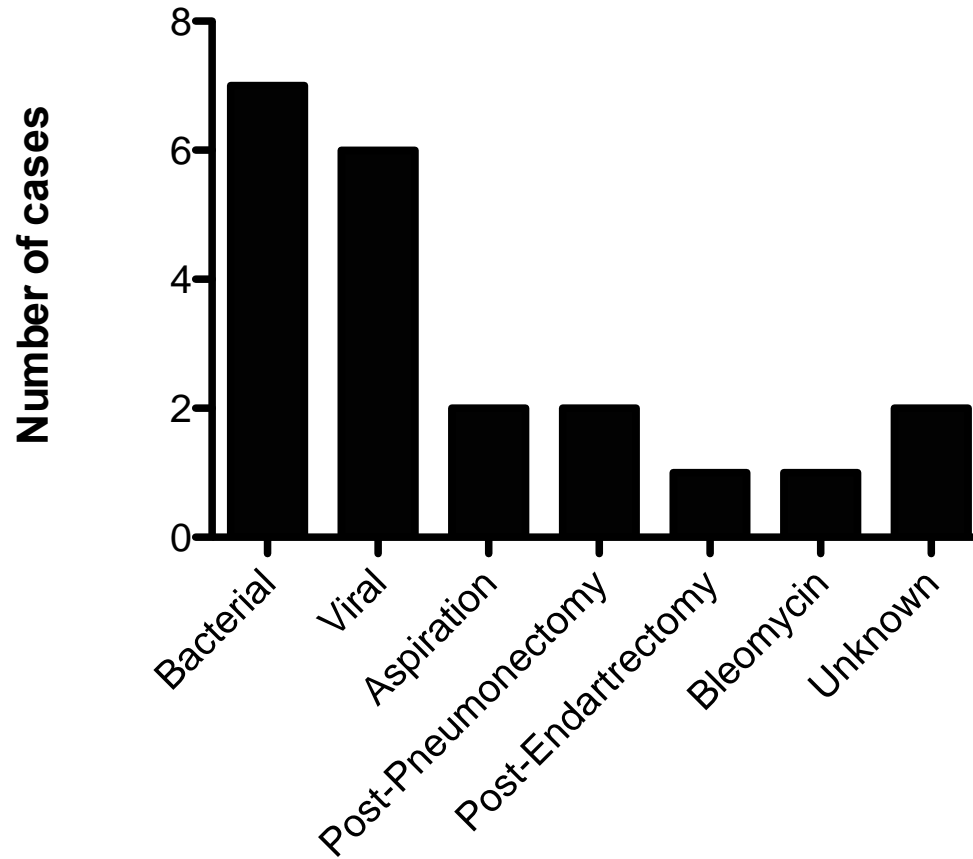
Primary Graft Dysfunction

	Era 1 02-05	Era 2 06-09	Era 3 09-12	p value
Number of cases	14	9	10	-
Survival to decannulation	43%	66%	80%	0.16
Survival to discharge	28%	45%	70%	0.13





ARDS (etiology)



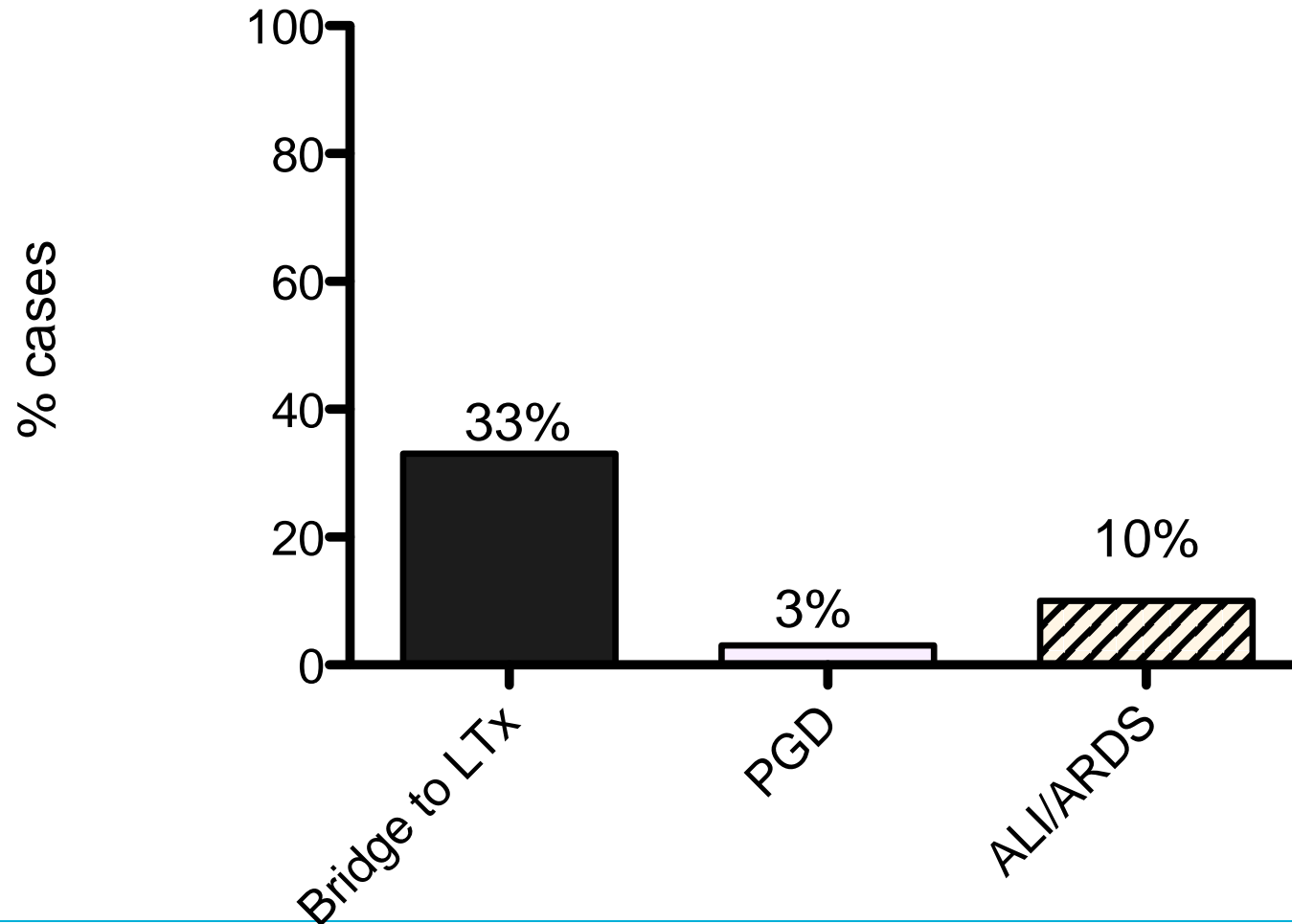
ARDS

	Era 1 02-05	Era 2 06-09	Era 3 09-12	P value
Number of cases	-	4	18	-
Survival to decannulation	-	25%	72%	0.26
Survival to discharge	-	0%	67%	0.02



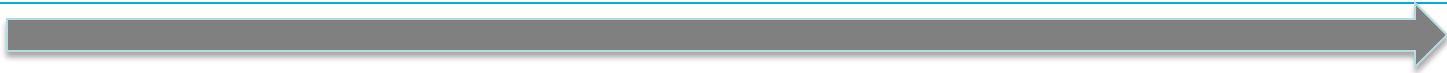


Likelihood of Extubation on ECLS





Evolution in Practice



VV



VV



VV



VA



Current Algorithm

Hypercapnic failure

PAH (severe RV
dysfunction)

Hypoxemic failure

Arterio-Venous iLA
(pumpless)

*Veno-Venous**
(low flow)

Veno-Venous
(high flow)

*PA-LA **
(pumpless)

Veno-Arterial

* preferred



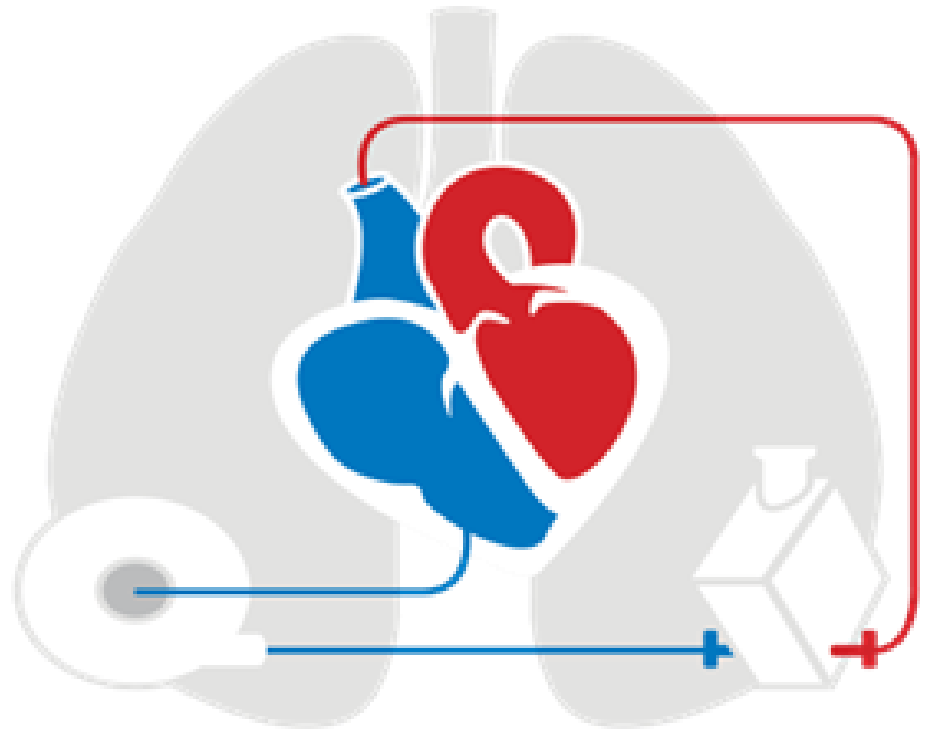
Conclusions

- ✓ We observed a significant increase in the use of ECLS for ARDS and as a bridge to LTx in the past few years
- ✓ VV and pumpless modes have been the main ECLS configurations in more recent years.
- ✓ Changes in practice patterns were associated with an increasing number of patients extubated on ECLS and improved survival.





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