

ECMO - ein Update 2017





Extracorporeal Life Support Organization

www.euroelso.net



UniversitätsSpital
Zürich



ECLS Registry Report

International Summary

July, 2016

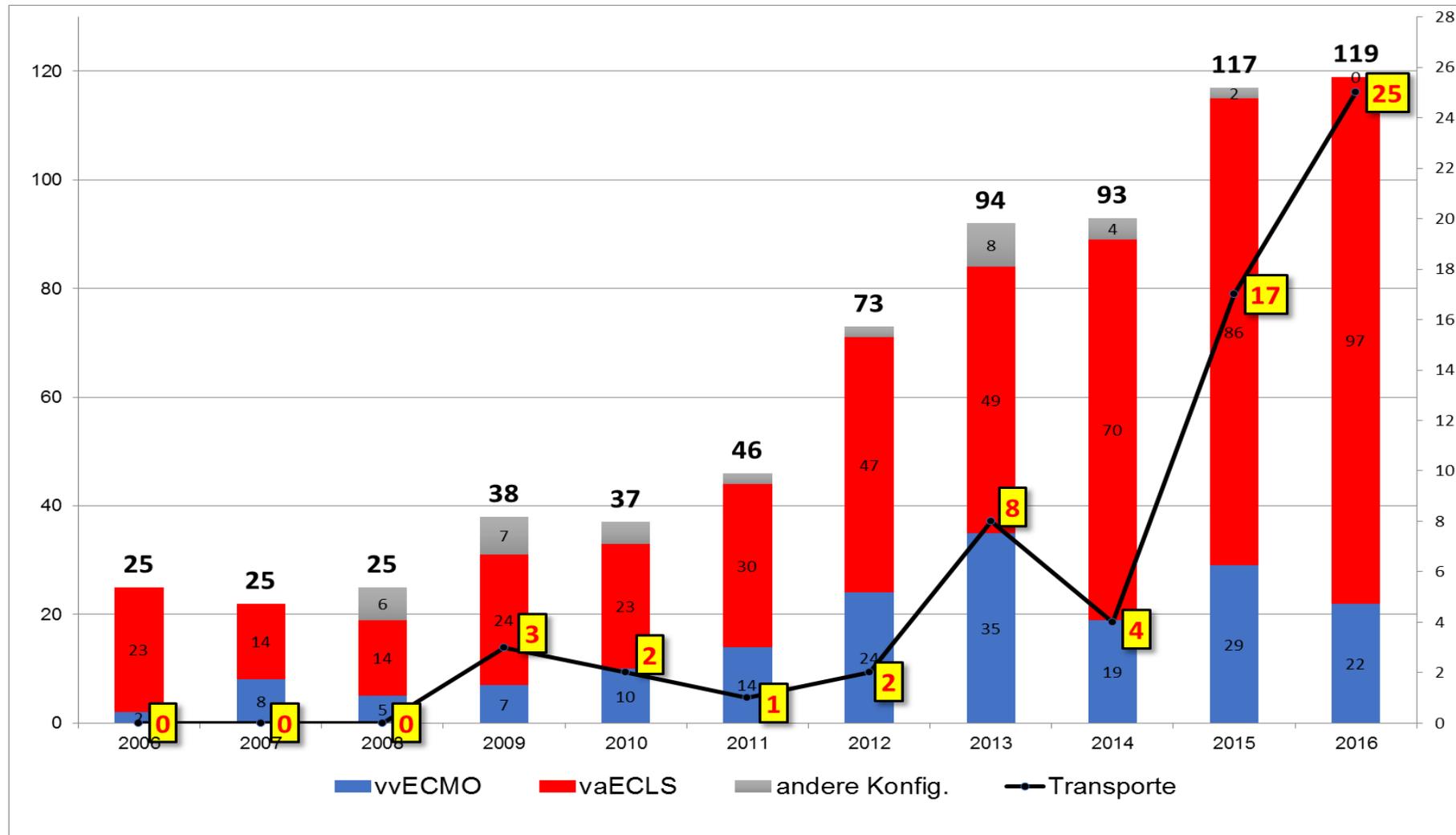


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Ann Arbor, MI 48109

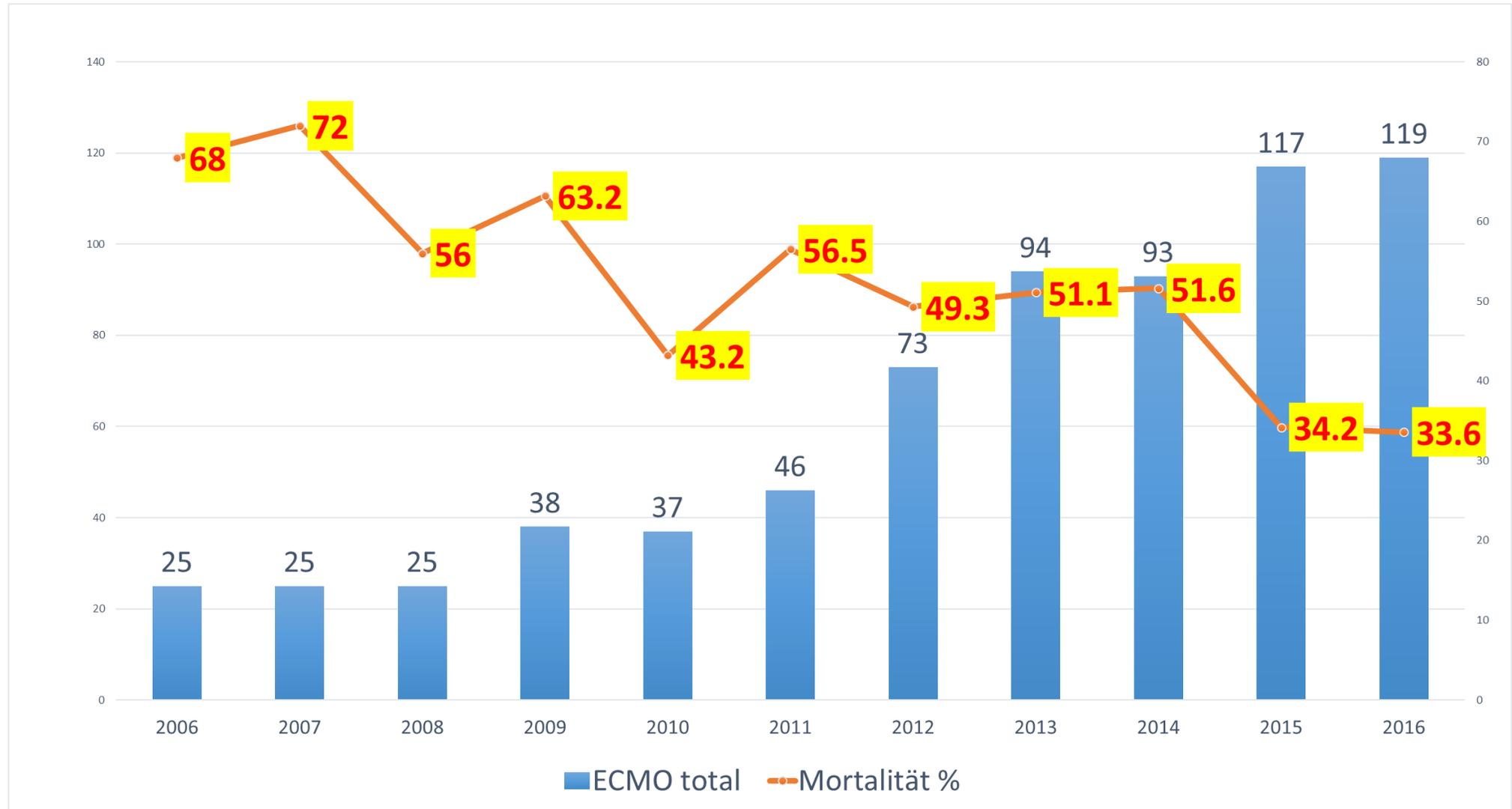
Centers by Year



Introducing the University hospital Zurich



Introducing the University hospital Zurich



Definition

- **ECMO** (Extrakorporale Membran-Extraktion): Dieser Begriff soll verwendet werden, wenn der extrakorporale Kreislauf **ausschliesslich** der Unterstützung der **Lungenfunktion** dient, sprich eine **veno-venöse** Kanülierung vorhanden ist.

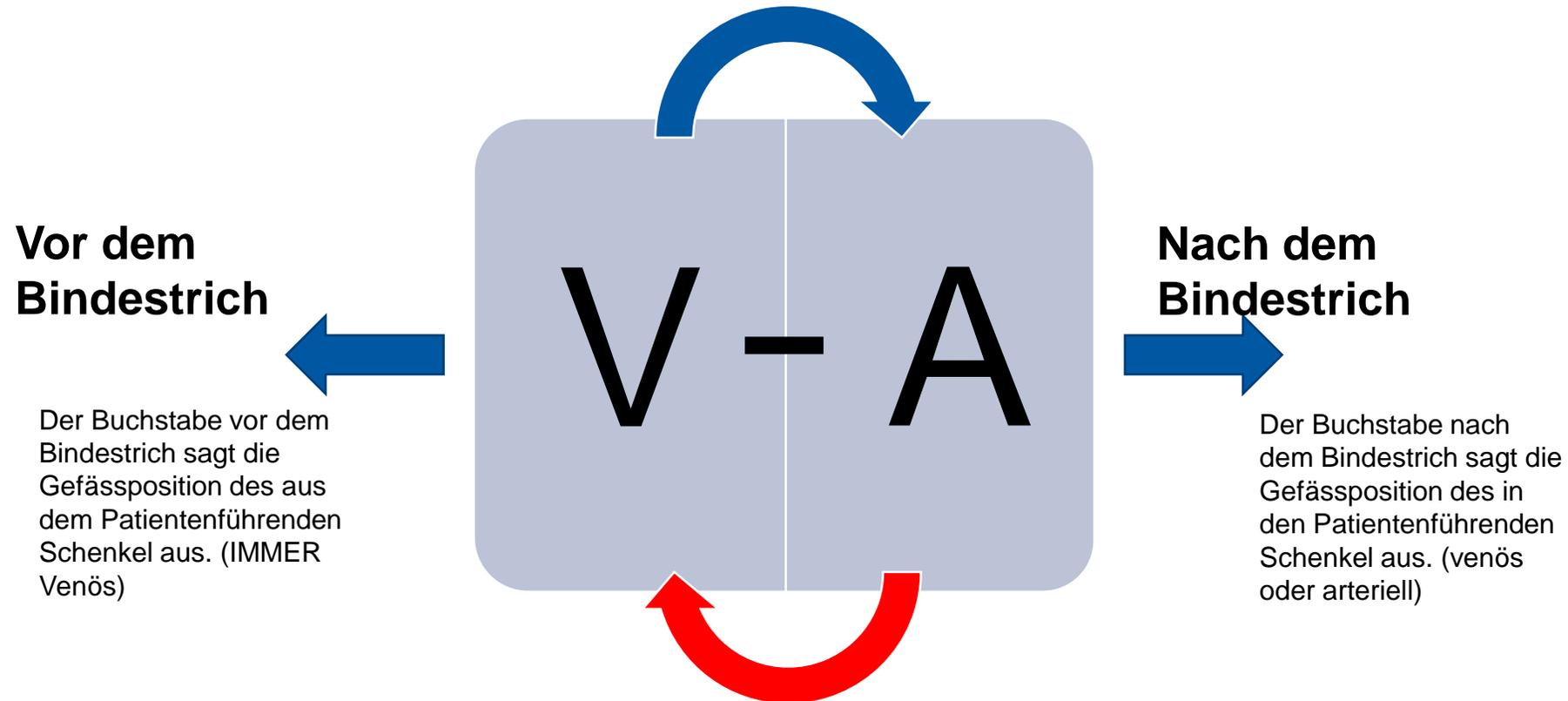
ARDS

- **ECLS** (Extrakorporale Life Support): Dieser Begriff soll verwendet werden, wenn der extrakorporale Kreislauf **auch** der **kardialen** Unterstützung dient, sprich eine **veno-arterielle** Kanülierung erfolgte.

Kardiogener Schock

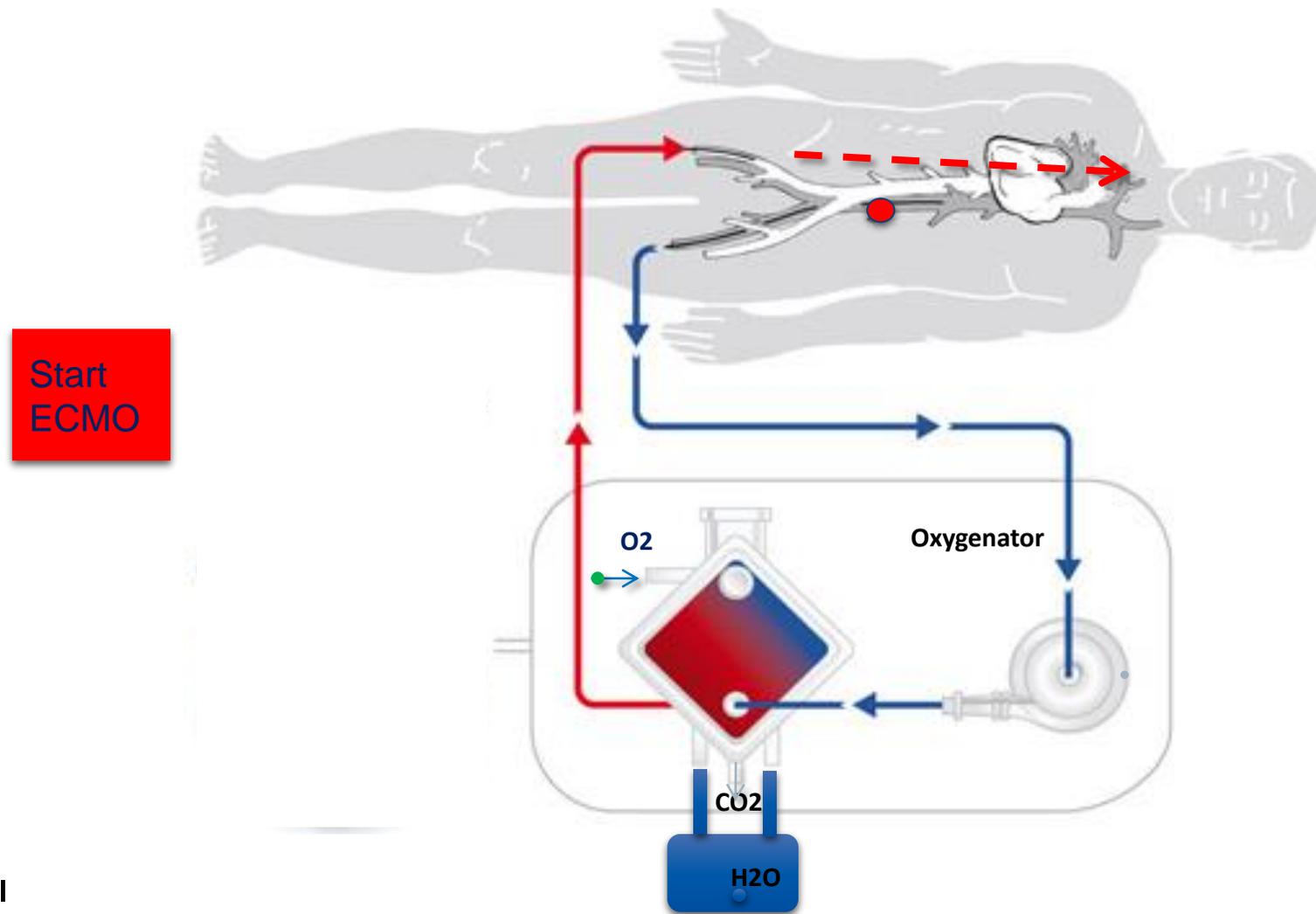


Eine Übersicht der heute gebräuchlichen Abkürzungen in der ECMO Therapie



Der Bindestrich teilt die abführende und die zuführende Seite der ECMO. Es gibt verschiedene Konstellationen bei denen nach dem 2. Buchstaben ein Dritter folgt. Dieser Buchstabe kann V oder A sein. (V-VV; V-AV; VV-VA; usw.)

ECMO - Kreislauf



ECMO = therapy of last resort

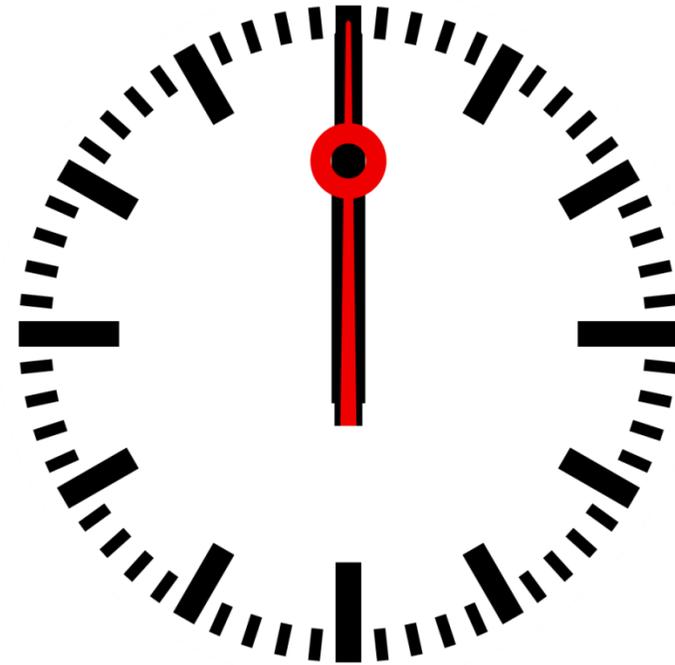
"when everything else isn't working,
try **ECMO**"

Initial Goal = **Survival**

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Bridge - Therapy

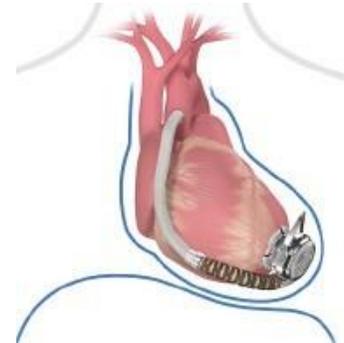
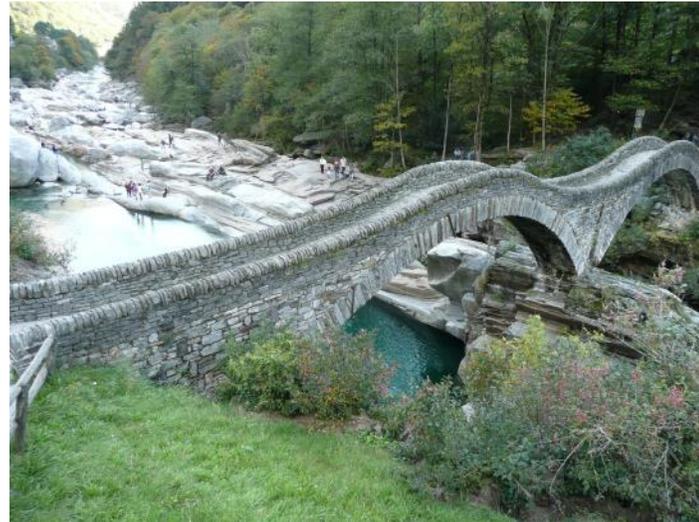
- bridge to decision
- bridge to transplant
- bridge to recovery
- bridge to bridge



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VON ECMO auf VAD

Bridge to ...



V – V ECMO

- Akutes, reversibles respiratorisches Versagen (e.g. ARDS, Lungen-/Thorax-Trauma) als „**bridge to recovery**“
- Acute on chronic bei bekannter Lungenerkrankung und bereits erfolgter Abklärung für eine LTPL als „**bridge to LTPL**“
- Post LTPL bei **primärem Graftversagen**



V – V ECMO

Quantifizierung des Schweregrades eines ARDS

- Murray-Score (siehe Anhang, e.g. Einschlusskriterium gemäss CESAR-Trial Score ≥ 3 Punkte)
- **Horowitz-Index (< 100 mmHg Verlegung in ein ECMO-Zentrum, < 50-70 mmHg Indikation zur ECMO-Einlage)**

Outcome-Abschätzung für schweres ARDS + vvECMO

RESP-Score (Respiratory extracorporeal membrane oxygenation survival prediction)

- Voraussage des Spital-Überlebens
- PRESERVE-Score (Predicting death for severe ARDS on V-V ECMO)
- Voraussage der 6-Monate-Mortalität



V – A ECMO

EDITOR'S CHOICE GUIDELINES

2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC 

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION



Part 6: Alternative Techniques and Ancillary Devices for Cardiopulmonary Resuscitation: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

Steven C. Brooks, Monique L. Anderson, Eric Bruder, Mohamud R. Daya, Alan Gaffney, Charles W. Otto, Adam J. Singer, Ravi R. Thiagarajan and Andrew H. Travers

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V – A ECMO

Bridge to decision (BTD)/ Bridge to bridge (BTB)	Use of short-term MCS (e.g. ECLS or ECMO) in patients with cardiogenic shock until haemodynamics and end-organ perfusion are stabilized, contra-indications for long-term MCS are excluded (brain damage after resuscitation) and additional therapeutic options including long-term VAD therapy or heart transplant can be evaluated.
Bridge to candidacy (BTC)	Use of MCS (usually LVAD) to improve end-organ function in order to make an ineligible patient eligible for heart transplantation.
Bridge to transplantation (BTT)	Use of MCS (LVAD or BiVAD) to keep patient alive who is otherwise at high risk of death before transplantation until a donor organ becomes available.
Bridge to recovery (BTR)	Use of MCS (typically LVAD) to keep patient alive until cardiac function recovers sufficiently to remove MCS.
Destination therapy (DT)	Long-term use of MCS (LVAD) as an alternative to transplantation in patients with end-stage HF ineligible for transplantation or long-term waiting for heart transplantation.

SAVE
Survival After Veno-arterial ECMO

The SAVE Score has been developed by [ELSO](#) and [The Department of Intensive Care at The Alfred Hospital, Melbourne](#). It is designed to assist prediction of survival for adult patients undergoing Extra-Corporeal Membrane Oxygenation for refractory cardiogenic shock. It should not be considered a substitute for clinical assessment.

For more information see: [Predicting survival after ECMO for refractory cardiogenic shock: the survival after veno-arterial-ECMO \(SAVE\)-score](#)

The patient's SAVE Score is

Diagnosis:

- Myocarditis
- Refractory VT/VF
- Post heart or lung transplantation
- Congenital heart disease
- Other diagnoses

Age (years):

- 18-38
- 39-52
- 53-62
- ≥63
- <65
- 65-89
- ≥90

Renal:

- Acute renal failure
- Chronic renal failure
- HCO₃ pre ECMO ≤15 mmol/L

Other organ failures pre ECMO:

- Central nervous system dysfunction
- Liver failure

Estimated survival graph:

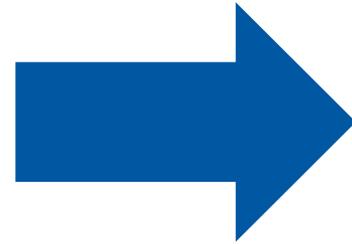
The graph shows Estimated survival (%) on the y-axis (0% to 100%) and a score on the x-axis (-15 to 15). A diagonal line represents the estimated survival, which increases from approximately 10% at a score of -15 to 100% at a score of 15. A yellow banner with the text 'www.save-score.com' is overlaid on the graph.



V – A ECMO

Kardiogener Schock

LowOutput



Cardiac **I**ndex < **2.0**



Overall – Indication

several applications

Type of ECMO:

v – a ECLS

v – v ECMO

w – v ECMO

v – va ECMO

w – va ECMO

Indications

-  Hypothermia
-  Lung failure
-  Heart failure
-  HeartLung failure

cardiac

- after ECC
- Graft failure after HTPL
- Bridge to
- BLS (decision < 20 min)
- CI < 2.0

pulmonary

- ARDS
- Bridge to LTPL
- Bridge to recovery
- Quantification of ARDS

expected mortality

maximizes the use of therapy

50%

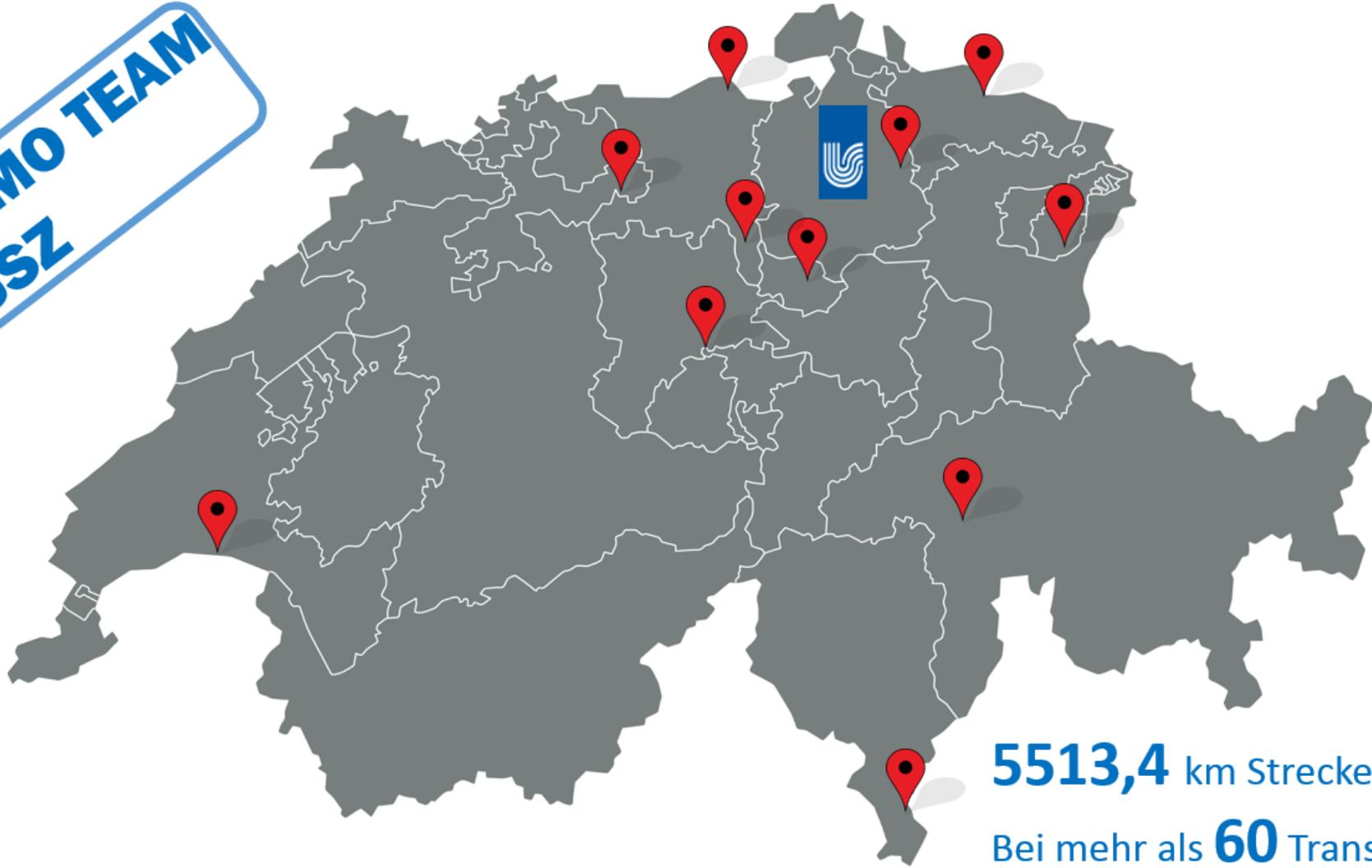
80%



Contraindications

- Age > 75y.
- pH < 6.8
- Kalium > 10 mmol/L
- CPR > 20 min
- MOV (without cardiac or pulmonary failure)
- metastatic tumor diseases
- aortic dissection
- cerebral hemorrhage

**ECMO TEAM
USZ**



5513,4 km Strecke

Bei mehr als **60** Transporten in
den letzten **5 Jahren**



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Vorstellung USZ – Herzchirurgie

ECMO - TEAM





Telefonische Indikationsstellung

SPOC - Erfahrener Oberarzt



V – A ECMO

Timeline:

- Restore the circulation
 - Reduce, wean inotropes and/or pressors
 - Eliminate Cytokines (CRR, ect.)
- Day 1 and 2
- Enhance and monitor myocardial recovery
 - Manage end-organ failure
 - Screen and assess for advanced HF therapy
- Day 2 till 7
- Wean from TCS
 - Consider long-term support
 - End of life decision
- Day 7 till 14



Take Home Message

- use ECMO as a **bridge** and you will win time
- The bridge therapy is teamwork, means:
 - › Involve every player in your **TEAM**



TEAM Technology of Extracorporeal Assist Meeting

Friday 03.11.2017 - Sunday 05.11.2017



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Technology of Extracorporeal Assist Meeting

Friday 03.11.2017 - Sunday 05.11.2017



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ECMO USZ SPOC

24/7

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TEAM

Technology of Extracorporeal Assist Meeting

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