

## Factors related to good outcome in children in cardiac arrest

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**Problem!!** Lack of evidence in paediatric CA (very low incidence).

### TEACHING.

- We teach CPR a) guessing what may work or b) with adult's evidences.

**REPORTING PROGNOSIS.** Parents and physicians need early information about prognosis of children in CA.

- We don't have enough information. We try to guess.

## Factors possibly related to good outcome in children in cardiac arrest

- Witnesses and bystanders in paediatric OHCA.
- 1st rhythm of cardiac arrest.
- 1st pH measurement after CA.
- 1st lactate measurement after CA.
- Multiorgan scale (PELOD) at 24 h.

## Materials and methods

- Prospective study
- Multicentre (65 hospitals, 6 countries)
- OHCA admitted to ED and EDCA
- 1<sup>st</sup> June 2014 - 31<sup>st</sup> March 2016
- Survival and POPC at HD/6 months

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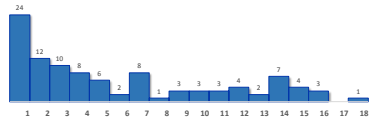
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- Survival and POPC at HD/6 months
  - 1-2: good overall outcome
  - 3-6: bad overall outcome

**Results**

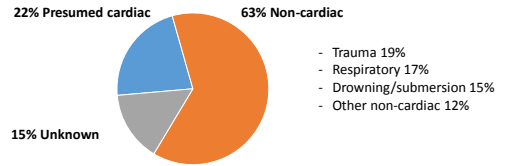
**101 CA (7 <6m /missed)**

- 14.9 % EDCA
- 62.4% male
- Median age 3.6 years (0-17.2)



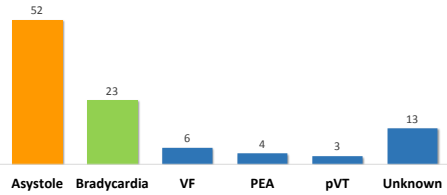
**Results**

**Ethiology**



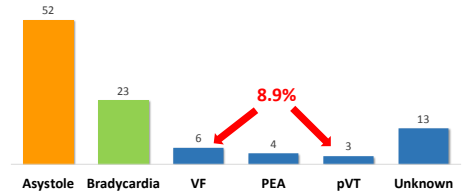
**Results**

**Initial rhythm**

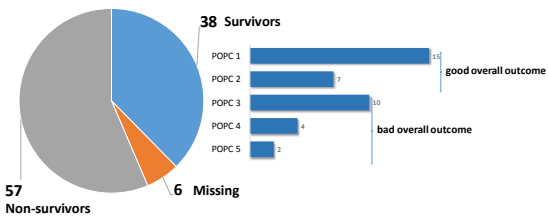


**Results**

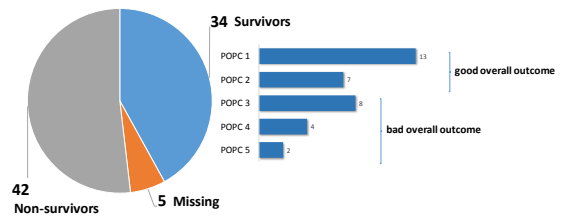
**Initial rhythm**



**101 CA Outcome at HD**



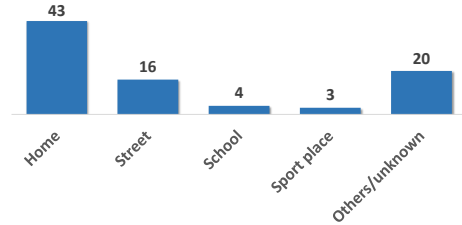
**86 OHCA Outcome at HD**



### Factors possibly related to good outcome in children in CA

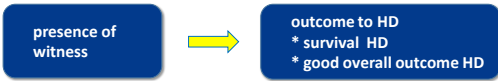
- **Witnesses and bystanders in paediatric OHCA.**
- 1<sup>st</sup> rhythm of CA.
- 1<sup>st</sup> pH.
- 1<sup>st</sup> lactate.
- Multiorgan scale (PELOD) at 24 h.

### Results

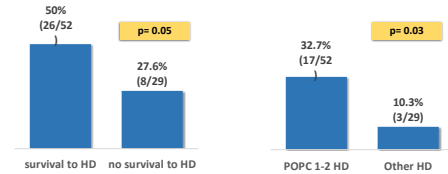


### Results : witness

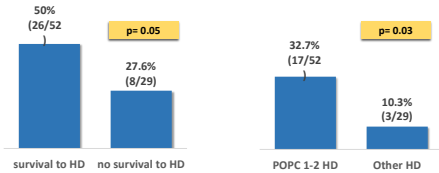
There was a **witness** (who may deliver or not CPR) in 49/86 (57%) OHCA. We didn't find an association between:



### Results : bystander



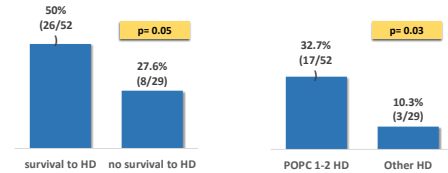
### Results : bystander



x 2

x 3

### Results : bystander



- We didn't find significantly better outcome whether
  - a) the bystander was a **health professional** or whether
  - b) the bystander was **no health professional but received phone instructions**.

### Conclusion

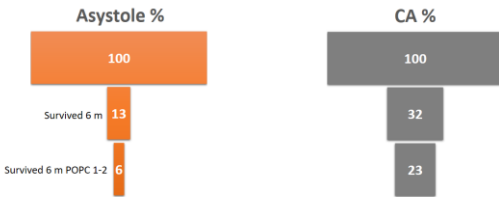
The presence of a bystander immediately starting BLS seems to be a clear factor of **better outcome** to HD in case of OHCA in children

→ Act!!

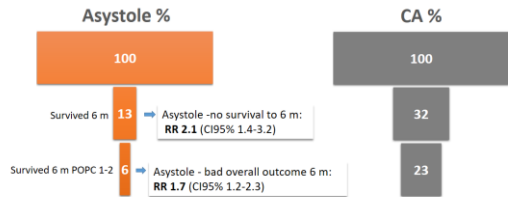
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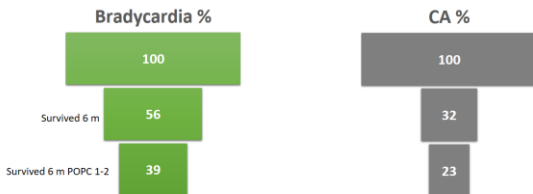
#### Asystole: outcome 6 m



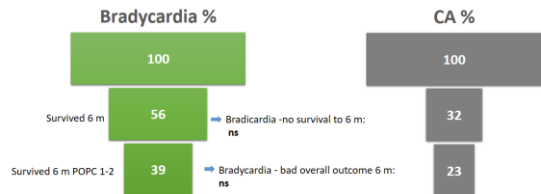
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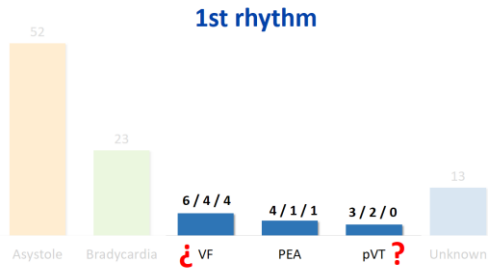


#### Bradycardia: outcome 6 m

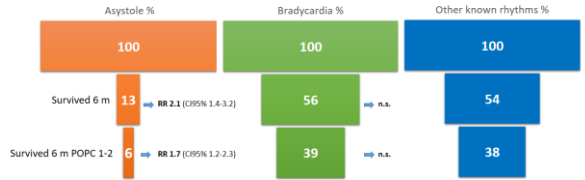


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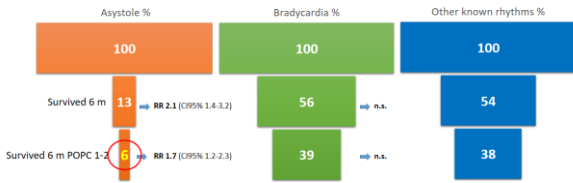




### 1st rhythm: outcome 6 months



### 1st rhythm: outcome 6 months



### Conclusions

Paediatric OHCA admitted to ED/EDCA with **asystole** as 1st rhythm of CA have a **lower survival and overall outcome** at 6 months than other groups such as bradycardia.

→ For prognosis, asystole shouldn't be identified with bradycardia.

Several important questions remain to be answered.

*Why some asystole-patients have good overall outcome?*

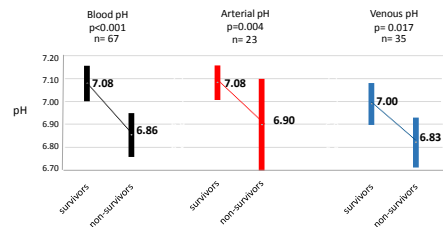
*What are the outcomes in other rhythms?*

→ Paediatric CA= orphan disease. Registries are needed!

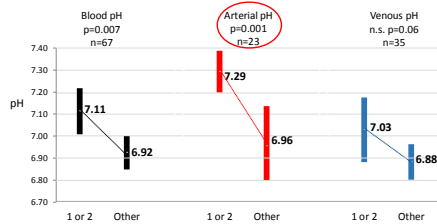
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### Survival and blood pH



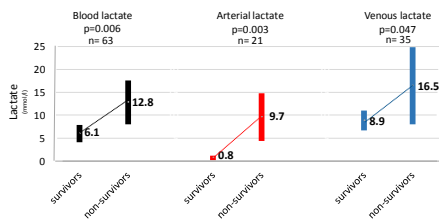
### POPC 1-2 and blood pH



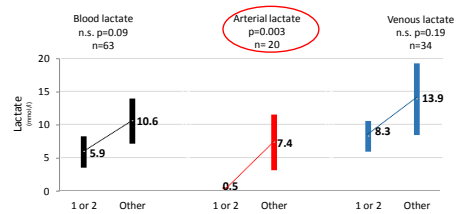
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### Survival and lactate



### POPC 1-2 and lactate



### Conclusions

In children after OHCA admitted to ED and EDCA:

- Blood pH
- Lactate

good predictors of **survival to HD**

- Blood pH
- Arterial lactate

good predictors of **overall outcome to HD**

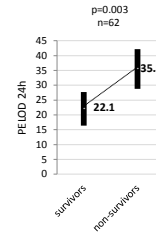
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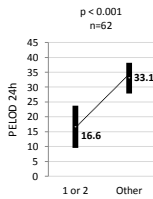
**Pediatric Logistic Organ Dysfunction**  
(Leteurtre et al)

Organ system and variable	Points assigned			
	0	1	10	20
<b>Neurologic*</b>				
Glasgow coma score	13-15	7-11	4-6	3
<b>Respiratory</b>				
Papillary reaction	Both reactive	Both fixed		
<b>Cardiovascular</b>				
Heart rate, beats/min	< 12 years ≥ 150	> 195	> 195	> 195
Systolic blood pressure, mm Hg	< 110	> 95	35-45	< 35
> 110	> 95	25-35	< 35	< 35
> 1 yr = 12 yr	> 95	45-85	< 45	< 45
> 12 yr	> 95	55-95	< 55	< 55
<b>Renal</b>				
Creatinine, μmol/L (mg/dL)	< 140 (< 1.59)	≥ 140 (> 1.59)	> 350 (> 4.02)	> 1000 (> 11.3)
> 7 d	< 150 (< 1.71)	≥ 150 (> 1.71)	> 350 (> 4.02)	> 1000 (> 11.3)
> 7 d = 1 yr	< 180 (< 2.05)	≥ 180 (> 2.05)	> 350 (> 4.02)	> 1000 (> 11.3)
> 1 yr = 12 yr	< 180 (< 2.05)	≥ 180 (> 2.05)	> 350 (> 4.02)	> 1000 (> 11.3)
> 12 yr	< 140 (< 1.59)	≥ 140 (> 1.59)	> 350 (> 4.02)	> 1000 (> 11.3)

**Survival and PELOD24h**



**POPC 1-2 and PELOD24h**



**Conclusion**

In children after OHCA admitted to ED and EDCA:

PELOD in first 24 hours is a good predictor of

- survival to HD and
- overall outcome to HD

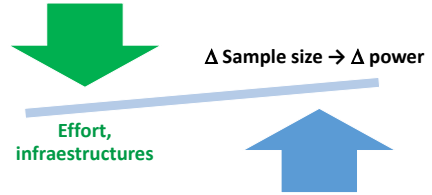
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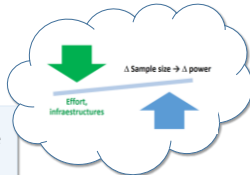


Some reflexions about collaborative studies



Useful when

- ... the calculated **sample size** to answer a question demands more patients than those you can recruit in your hospital.
- ... the participation of **other hospitals** during the time needed to get the required sample is assured.
- ...your **personal effort +/- money** is going to last enough time.



Thanks!

Pediatric Cardiac Arrest Study Group  
(REPEM, RISEUP-SPERG, GERCPYPYN)



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