

GLOMERULAR HYPERFILTRATION

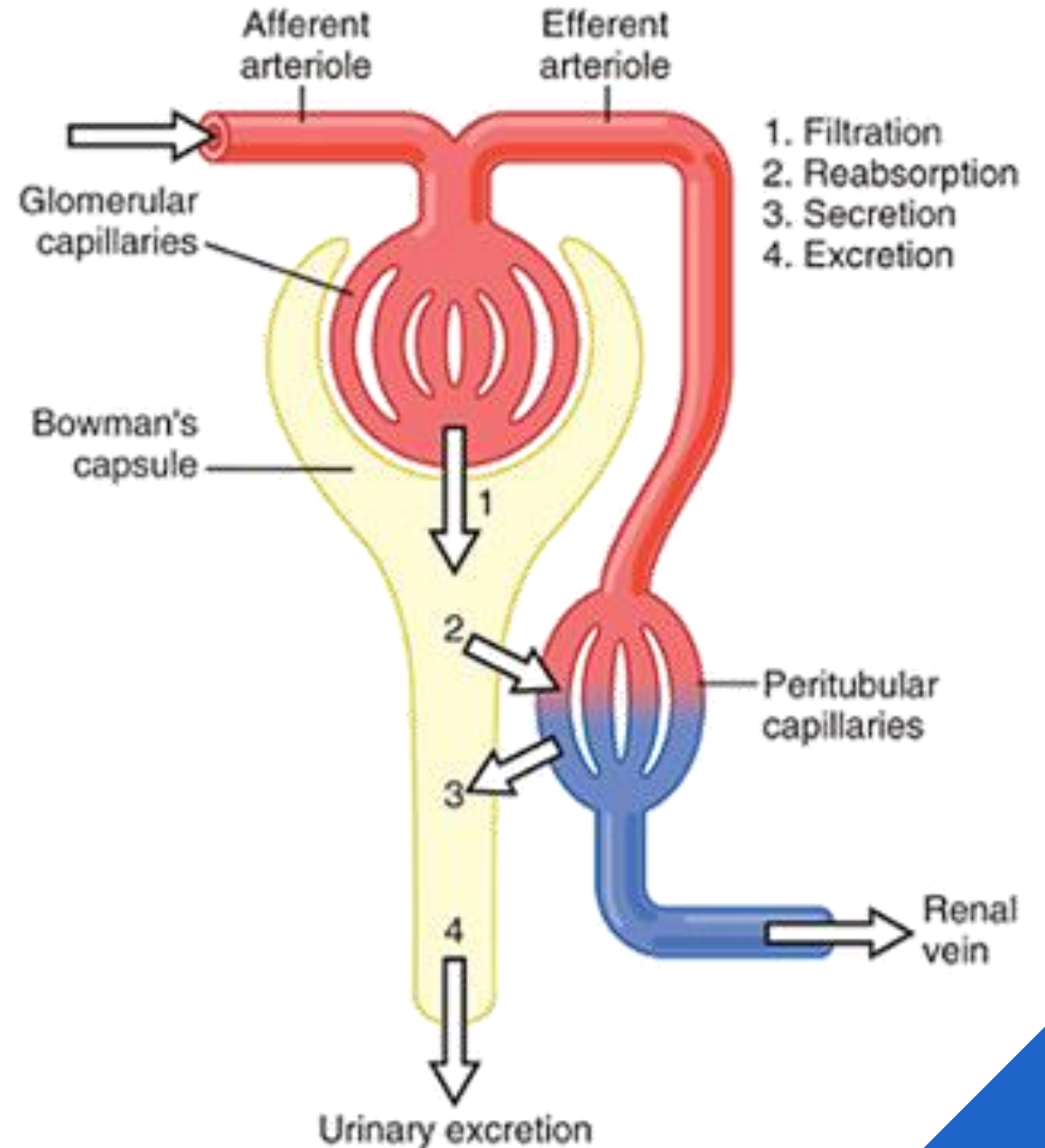
- A new concept in critically ill children -

BACK TO BASICS

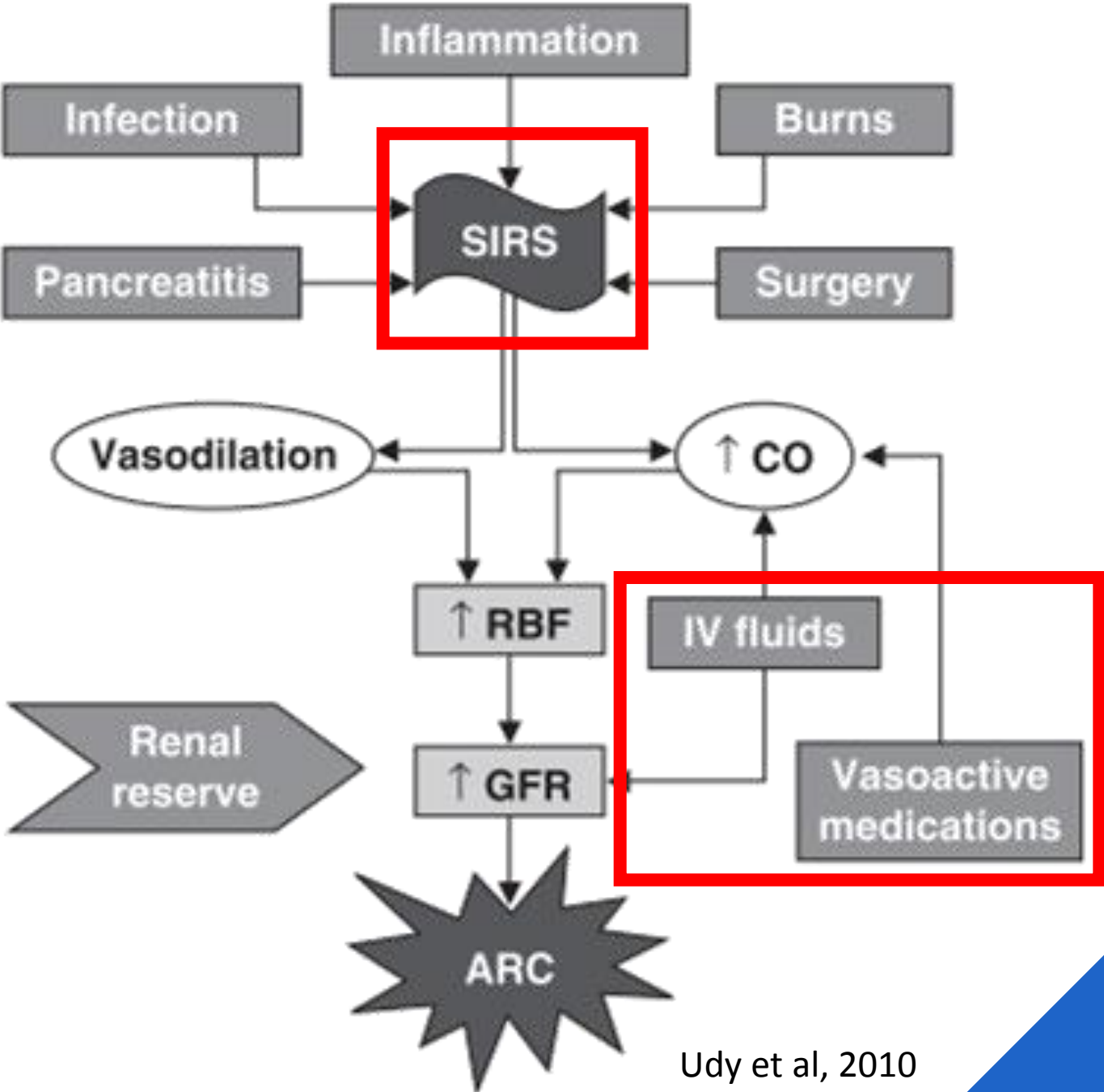
GHF

- ▶ Increase in renal function (GFR)
- ▶ Excretion of circulating solute \uparrow
- ▶ \neq excessive urine production

GHF or Augmented Renal Clearance (ARC)?



MECHANISM OF ARC



WHY IS ARC IMPORTANT ?

INCREASED ELIMINATION OF RENALLY CLEARED DRUGS

- ▶ Frequently used antibiotics
 - ▶ β -lactams, amikacin, vancomycin
- ▶ **Subtherapeutic plasma levels**
- ▶ Worse clinical outcome (?)

- ▶ **PATIENTS WITH ARC MIGHT REQUIRE HIGHER DOSES!**

ARC IN THE CRITICALLY ILL – What do we know?

	ADULTS	CHILDREN
Definition	GFR \geq 130 ml/min/1.73m ²	?
Incidence	18-80 %	?
Risk factors	<ul style="list-style-type: none">■ Younger age (< 50 y)■ Male■ Lower illness severity scores■ Trauma, burns, sepsis	?
Impact on outcome	Unclear	?

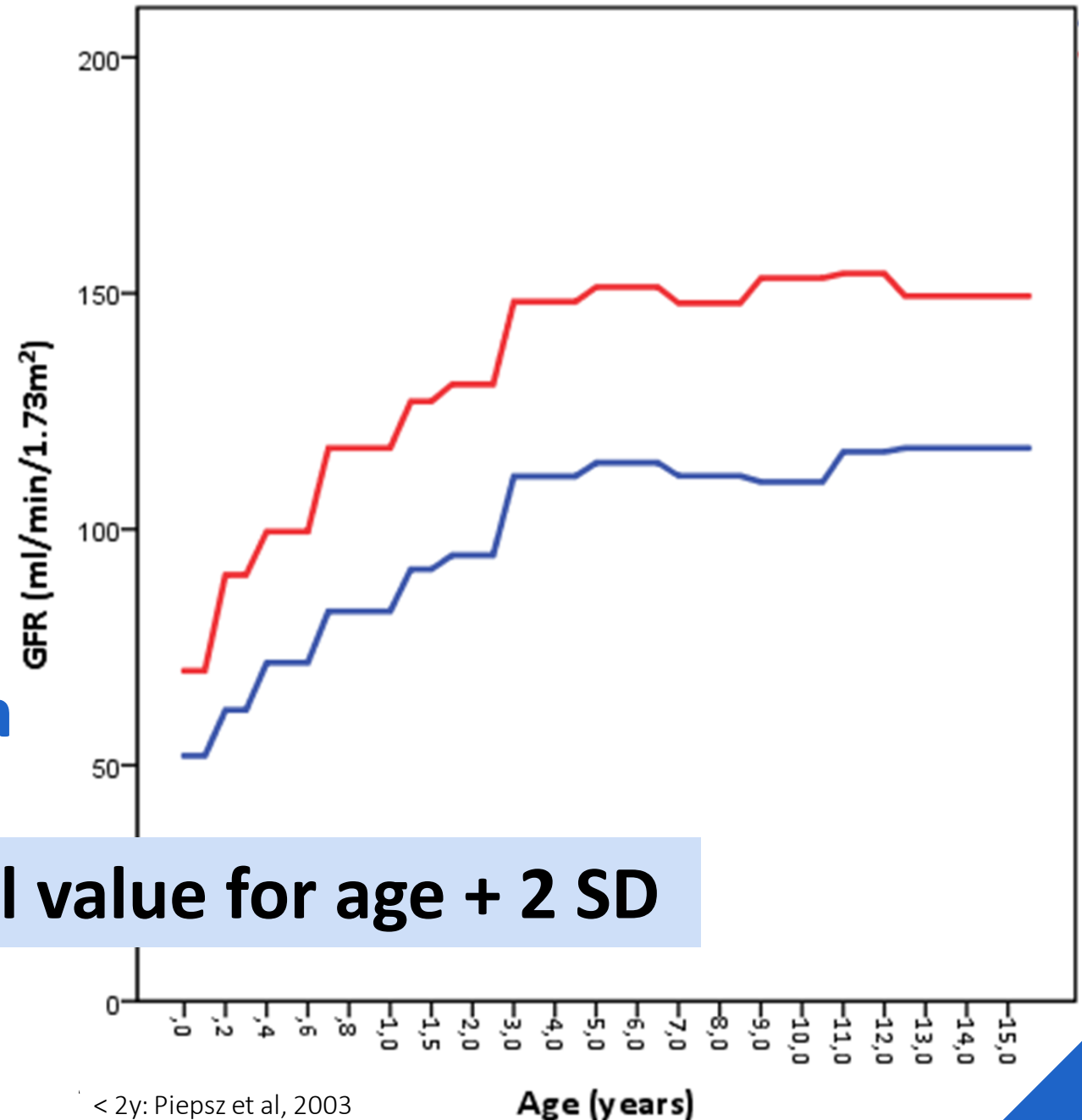
DEFINITION OF ARC

IMMATURE KIDNEYS

- ▶ Morphological development
- ▶ Maturation of renal function
- ▶ Lower GFR \leq 2 years of age

- ▶ **Age dependent definition**

GFR \geq normal value for age + 2 SD



STUDY OBJECTIVES

PRIMARY OBJECTIVE

- ▶ Investigation of the **incidence of ARC** in critically ill children

SECONDARY OBJECTIVE

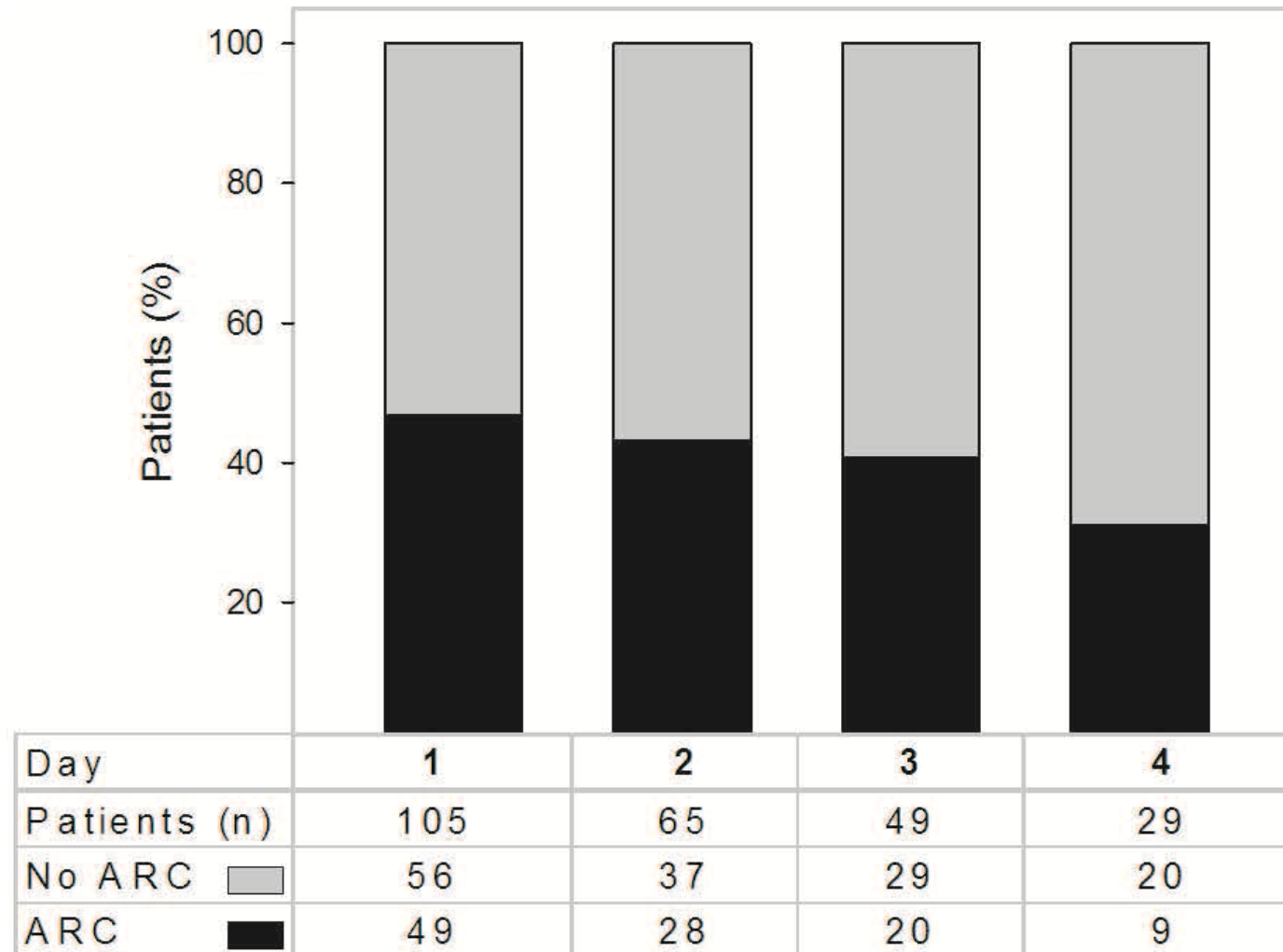
- ▶ Evaluation of **risk factors** for ARC

STUDY DESIGN

- ▶ Prospective, observational study (2012-2013 + 2017)
- ▶ Single center: Ghent University Hospital, PICU
- ▶ **Inclusion criteria**
 - ▶ Children from 1 month to 15 years of age
 - ▶ Bladder catheter in situ
- ▶ **Exclusion criteria**
 - ▶ Extracorporeal circuits
- ▶ GFR measurement: **24h creatinine clearance** (max 4 days)

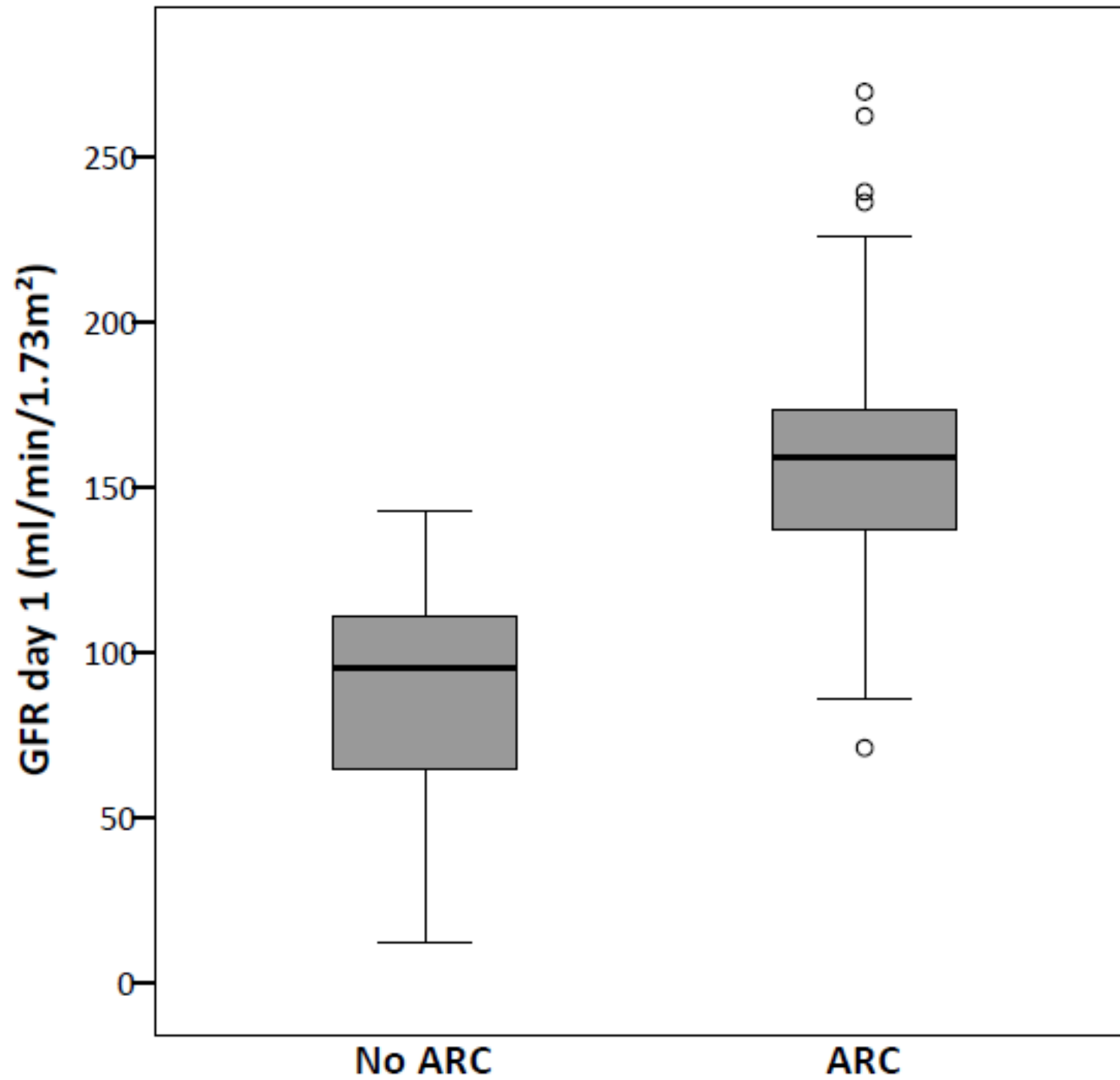
RESULTS

► Investigation of the **incidence of ARC**



Overall incidence
59%

RESULTS



RESULTS


► Evaluation of **risk factors** for ARC

	Variable	ARC (n=62)	No ARC (n=43)	B	Odds ratio	P-value
+	Male gender	49 (79.0%)	25 (30.3%)	1.120	3.064	0.020
+	Antibiotic treatment	49 (75.4%)	25 (33.8%)	1.120	3.064	0.020
-	Cardiac surgery	1 (1.6%)	7 (16.2%)	-2.247	0.106	0.106

ARC IN THE CRITICALLY ILL – What do we know?

	ADULTS	CHILDREN
Definition	GFR \geq 130 ml/min/1.73m ²	GFR \geq normal value for age + 2 SD
Incidence	18-80 %	59 %
Risk factors	<ul style="list-style-type: none">■ Younger age (< 50 y)■ Male■ Lower illness severity scores■ Trauma, burns, sepsis	<ul style="list-style-type: none">■ Male■ Antibiotic treatment \approx SIRS
Impact on outcome	Unclear	?

CONCLUSION

- ▶ ARC = an **increase in renal function**
- ▶ ARC is a **common condition** in critically ill children 
 - Boys
 - Antibiotic treatment
- ▶ Patients with ARC are **at risk for subtherapeutic treatment** with renally cleared drugs
 - ▶ Evaluation of renal function → identification of patients at risk
 - ▶ Further research: impact of ARC on clinical outcome



Thank you !

