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Estimated Glomerular Filtration Rate and Hydronephrosis in Patients with Spina Bifida

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Disclosure

- None

Spina Bifida (SB) and Chronic Kidney Disease (CKD)

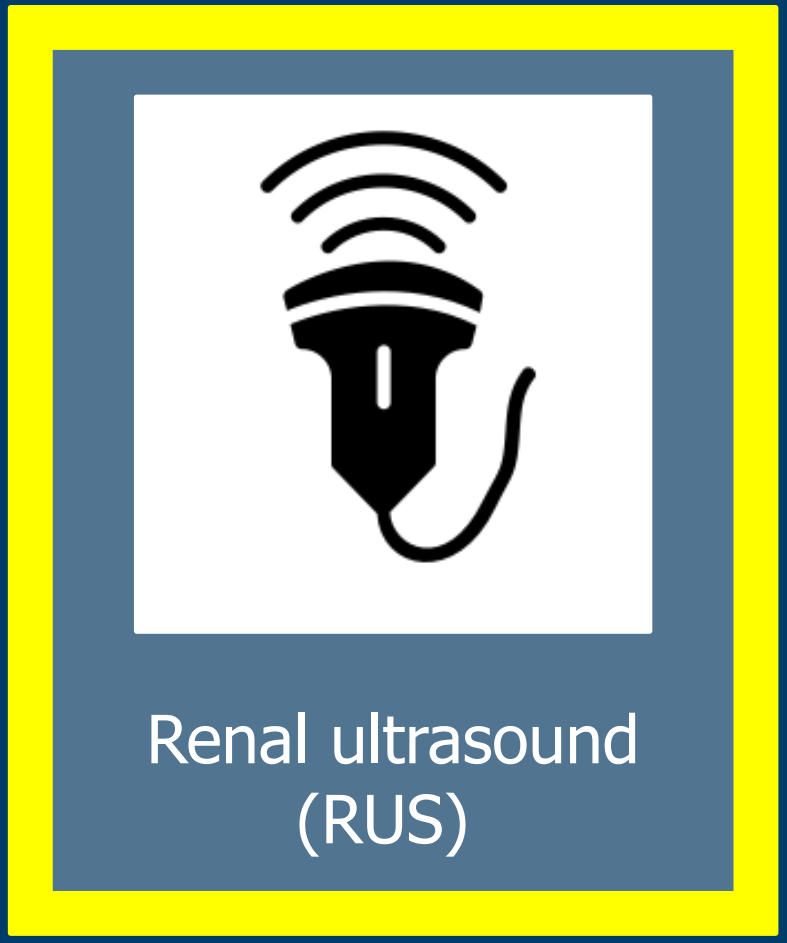
Goal: preserve kidney function

Calculate estimated GFR (eGFR)

Renal ultrasound for hydronephrosis

Blok 2018, Groen 2016, Bauer 2012, Radmyr 2018, Kavanagh 2019, Agrawal 2019

Which kidney function assessment tool to use?



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Chu 2019

Overall Study Goal

To determine association between eGFR and hydronephrosis in young patients with spina bifida.

Hypothesis: Lower eGFR values will be associated with higher odds of hydronephrosis.

Study Design and Participants

Cohort: Lurie Children's Hospital Spina Bifida Clinic
Age range = 0-35 years

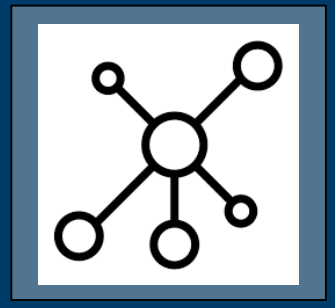
Study Period: 2012-2017

Eligibility: Full eGFR data + RUS within 6 months; 2 kidneys

Variables

Outcome: **Hydronephrosis** (any SFU >0)

Predictor: **eGFR** (calculated from 6 pediatric equations and 5 adult equations)



Covariates: age, gender, myelomeningocele (MM) vs non-MM, ambulatory status, CIC-dependency, prior bladder augmentation

Six Pediatric eGFR Equations (1-18 years old)

Pediatric eGFR equation	Creatinine, Cystatin-C, or both	Height used?
Bedside Schwartz	Creatinine	yes
Cystatin-C Schwartz	Cystatin-C	no
CKiD	Both	yes
Zappitelli	Both	yes
FAS-age	Creatinine	no
FAS-height	Creatinine	yes

Schwartz 2009, Schwartz 2012, Zappitelli 2006, Pottel 2016

Five Adult eGFR Equations (>18 years old)

Adult eGFR equation	Creatinine, Cystatin-C, or both	Height used?
CKD-EPI-Cr	Creatinine	no
CKD-EPI-CysC	Cystatin-C	no
CKD-EPI-both	Both	no
FAS-age	Creatinine	no
FAS-height	Creatinine	yes

Levey 2009, Inker 2012, Pottel 2016

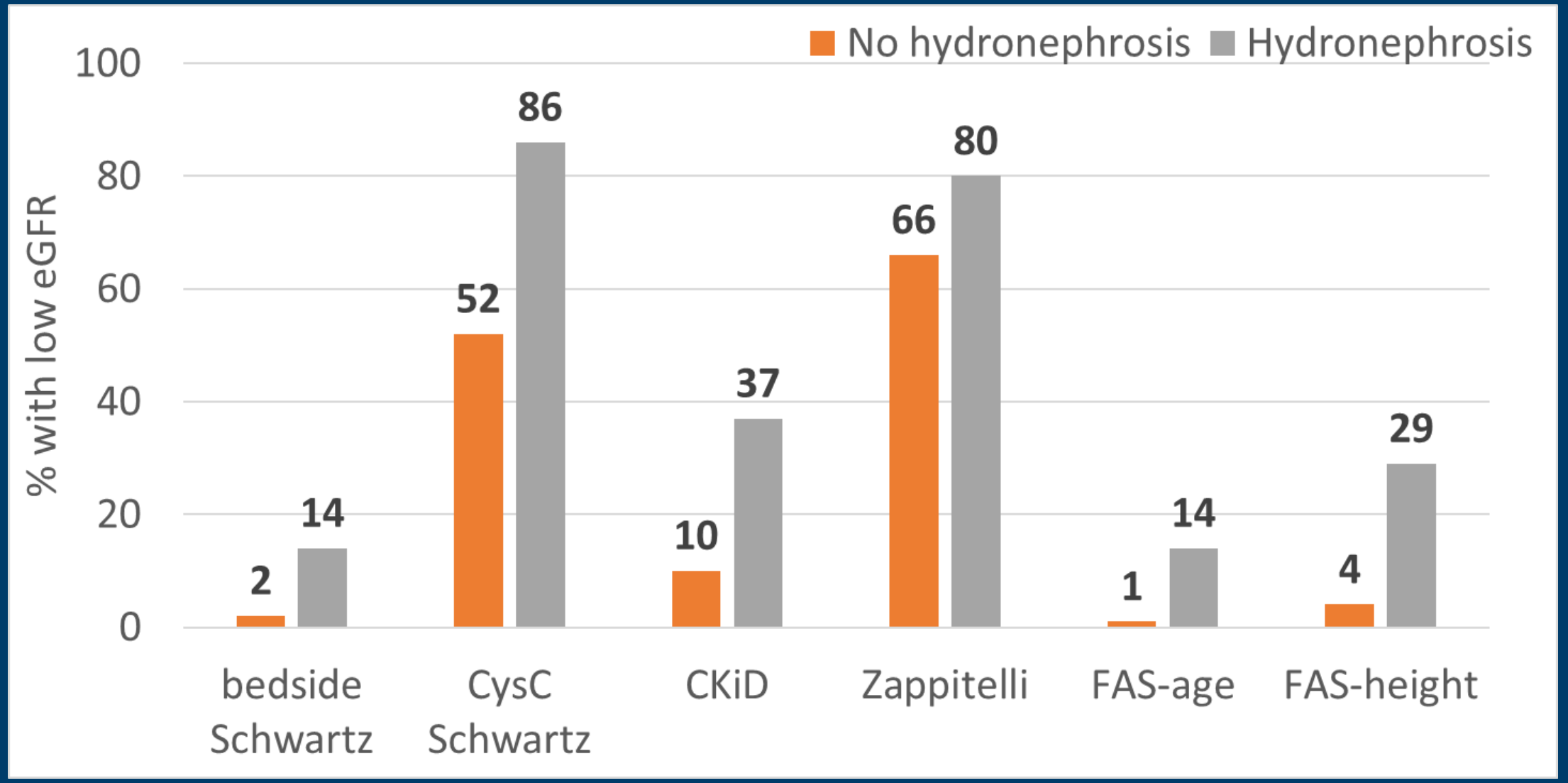
Cohort Characteristics

	Age, years median (IQR)	Female	MM	Non-ambul.	CIC	Bladder aug.
Children **n=177**	10.4 (6.7, 14.1)	58%	80%	32%	81%	19%
Adults **n=71**	21.8 (19.9, 23.6)	56%	83%	32%	89%	14%

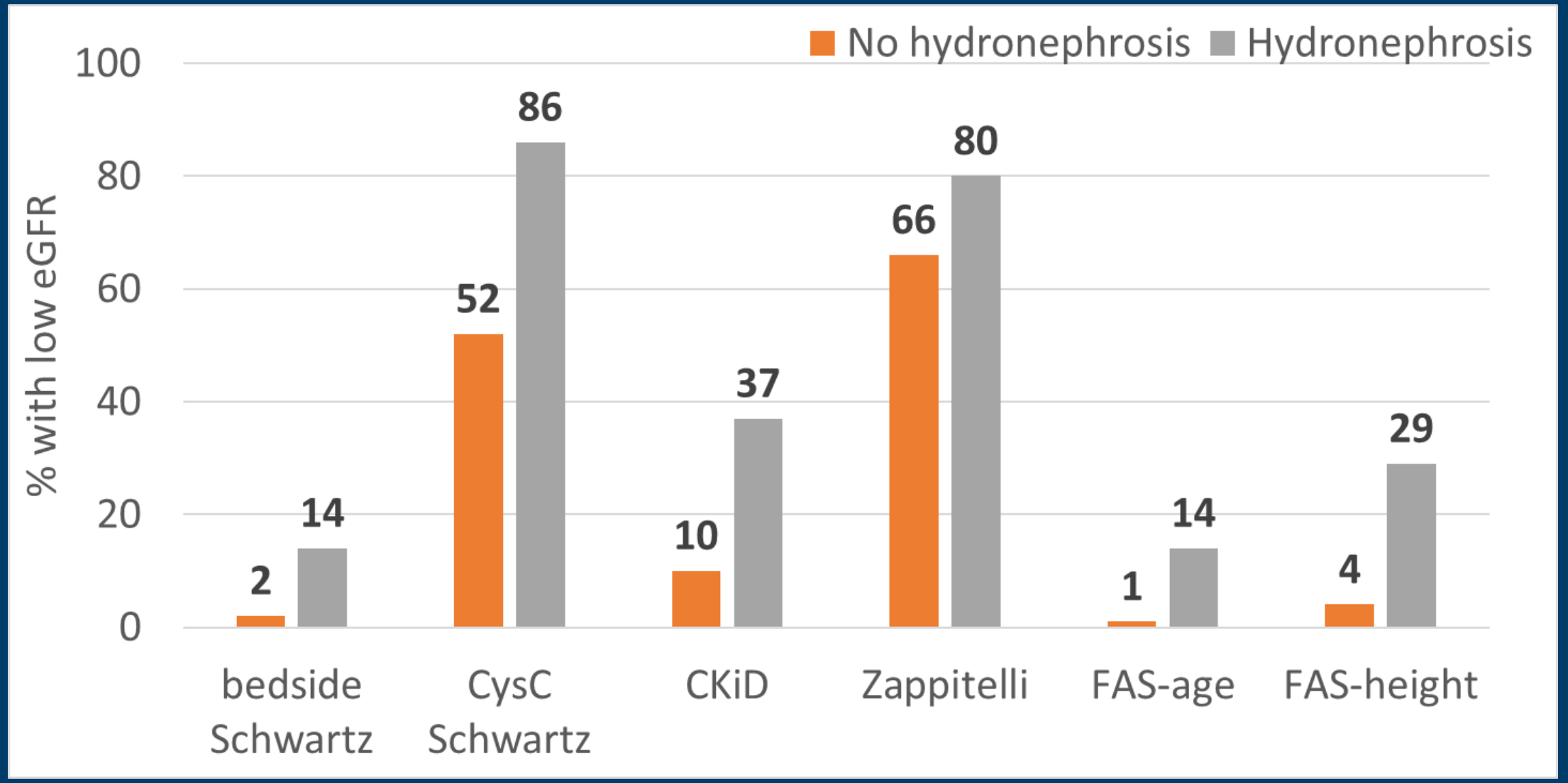
Cohort Characteristics

	Age, years median (IQR)	Female	MM	Non-ambul.	CIC	Bladder aug.	Hydro?
Children **n=177**	10.4 (6.7, 14.1)	58%	80%	32%	81%	19%	**20%**
Adults **n=71**	21.8 (19.9, 23.6)	56%	83%	32%	89%	14%	**25%**

Children: More eGFR<90 if +hydro compared to -hydro



1-66% of children without hydronephrosis had low eGFR



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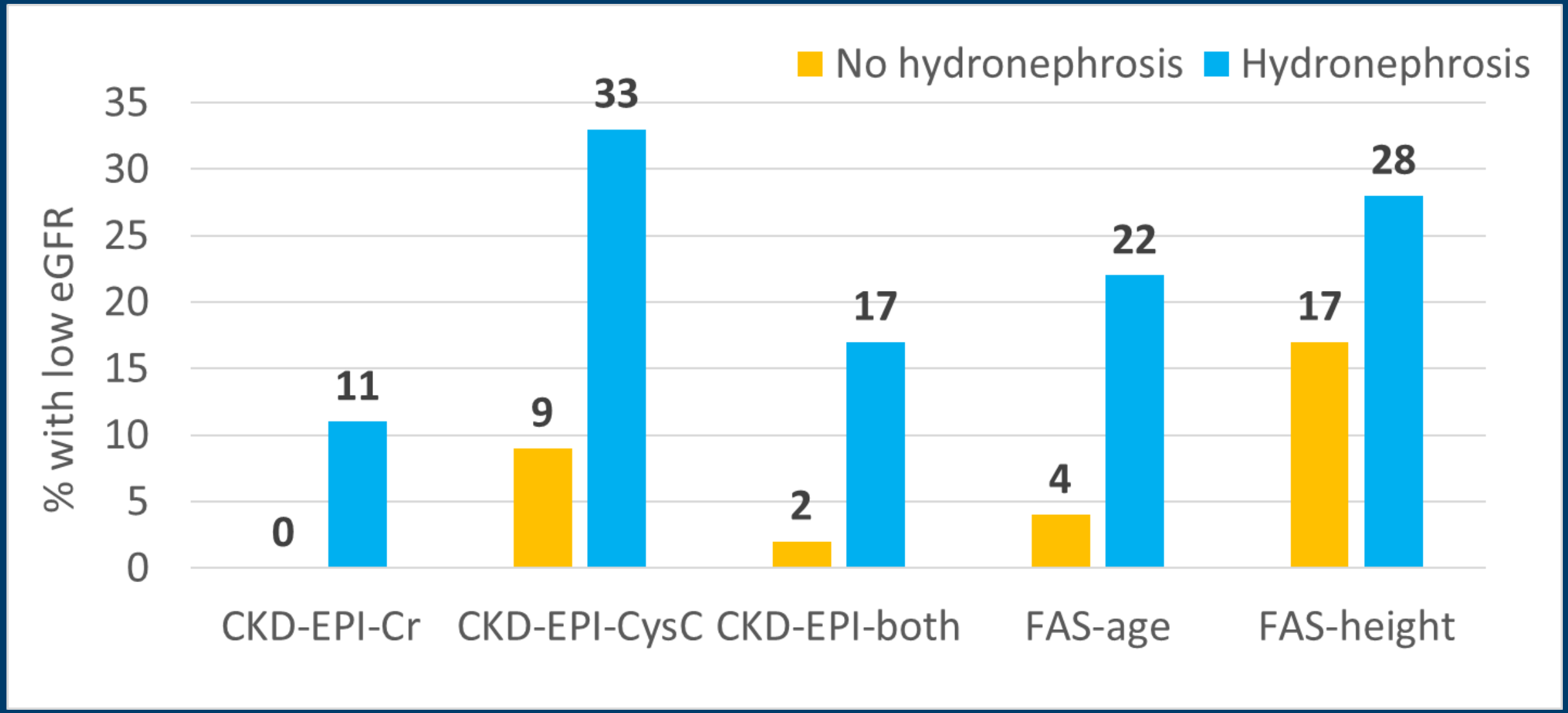
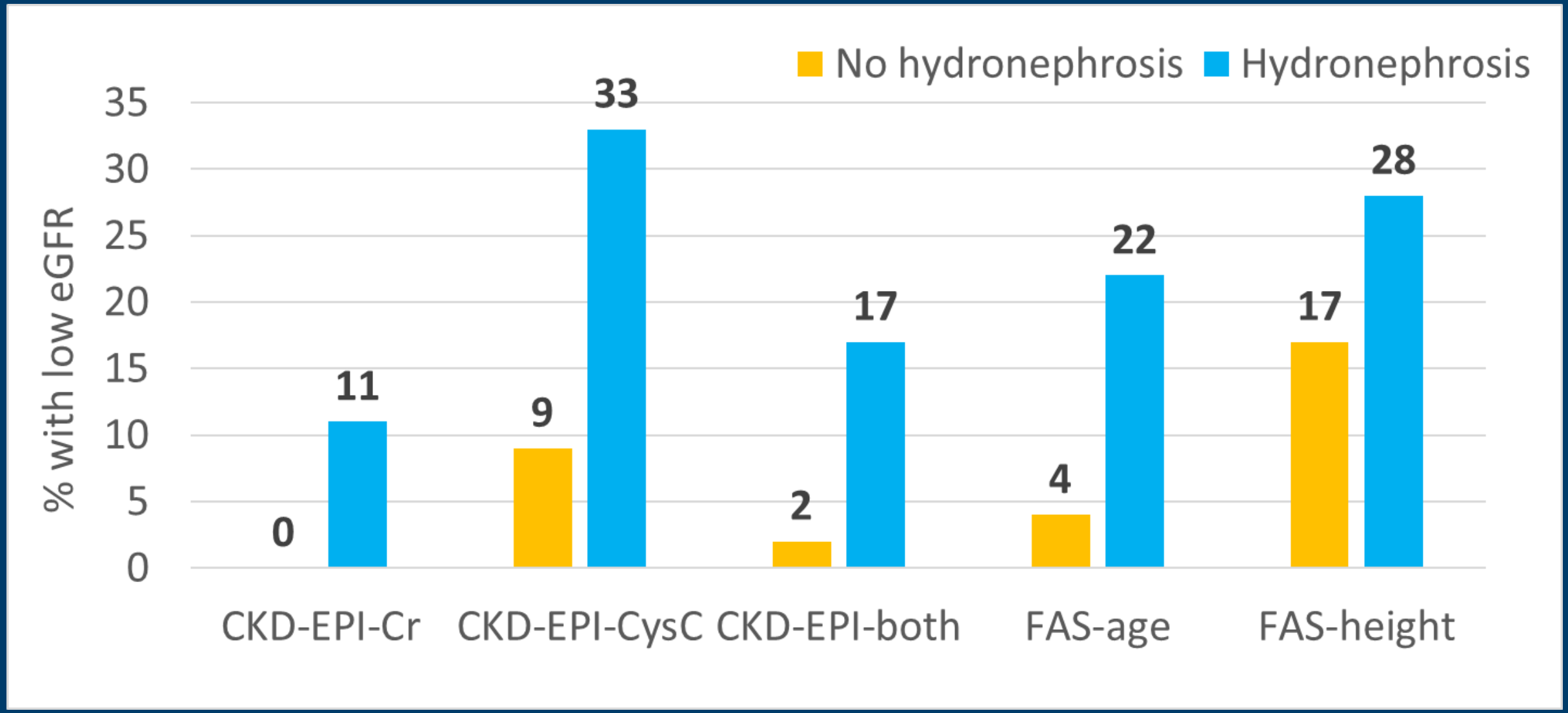
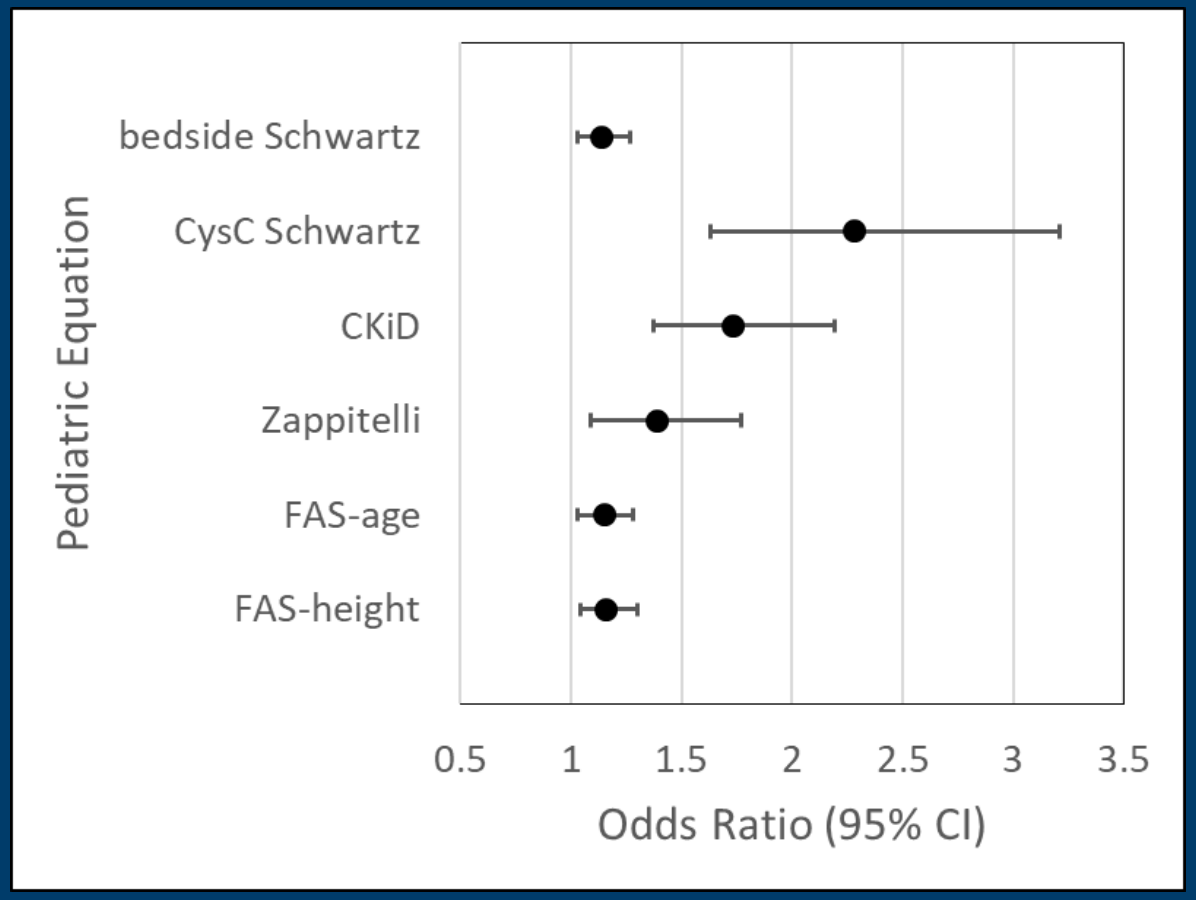


0-17% of adults without hydronephrosis had low eGFR

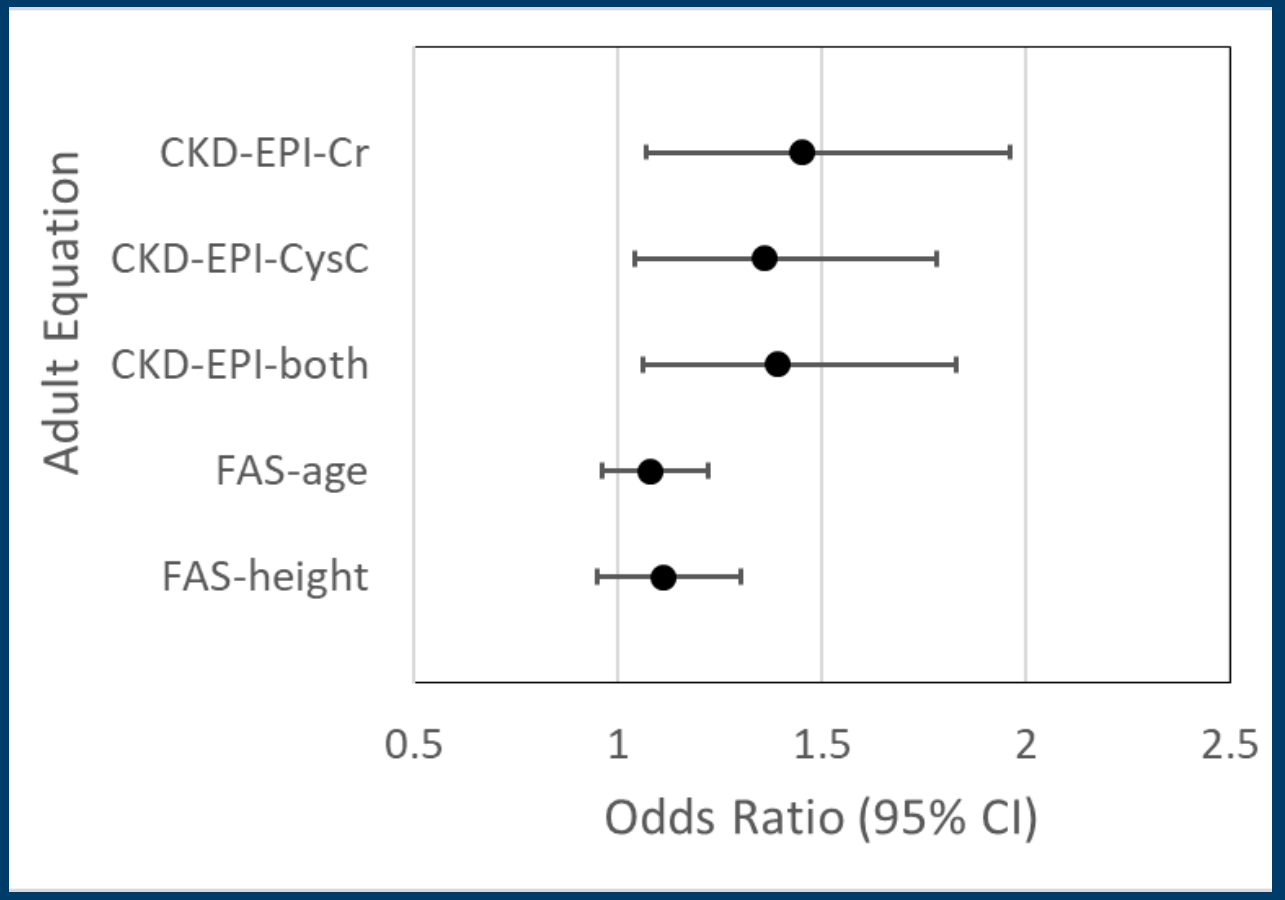


Per 10-unit eGFR decrease, higher odds of hydronephrosis

Children: Odds Ratios 1.2-2.3



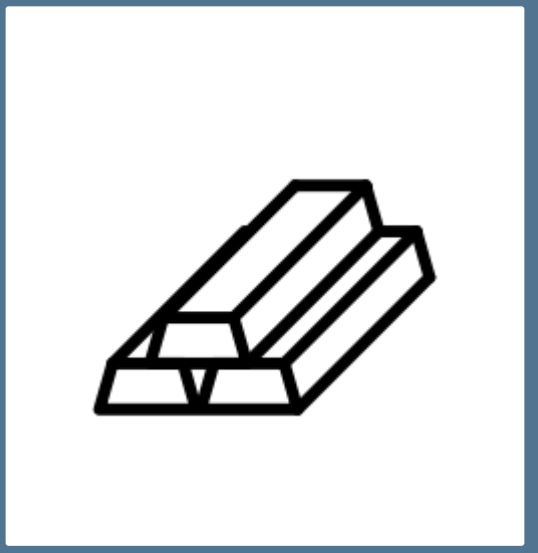
Adults: Odds Ratios 1.1-1.5



Discussion and Limitations

Worse eGFR is associated with hydro

No hydro may miss low eGFR



Limitation: Lacking gold-standard GFR

Conclusion

RUS alone insufficient for CKD surveillance

Check multiple eGFR equations AND RUS

Thank you

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