Worsening renal function and Proenkephalin A 119-156 (penKid) among patients with rSOFA 0 and ≤ 1.

	per SD from mean of log-transformed penKid		penKid > 100pmol/L	
	No eGFR adjustment	eGFR adjusted	No eGFR adjustment	eGFR adjusted
rSOFA = 0				
OR	2.6	1.7	5.5	3.2
(95% CI)	(1.4-4.9)	(0.9-3.2)	(2.2-13.9)	(1.1-9.1)
rSOFA ≤ 1				
OR	3.6	2.1	10.1	3.7
(95% CI)	(1.9-6.8)	(1.0-4.4)	(3.2-31.7)	(1.0-13.1)

Cutoff of 100 pmol/L has been suggested previously as significantly increased risk for renal deterioration. Logistic regression model adjusted for sex & age. Additional adjustment for eGFR, by Modification of Diet in Renal Disease (MDRD) Study formula. Presenting with an rSOFA score = 0 (intact renal function) and being up-classified to a higher rSOFA category within 48 hours. Observed 29 up-classifications among 359 patients. Presenting with an rSOFA score ≤ 1 (intact and moderately impaired) renal function and being up-classified to an rSOFA category of 2 or higher within 48 hours. Observed 17 up-classification among 447 patients. *p<0.05, **p=0.005, ***p=0.001.

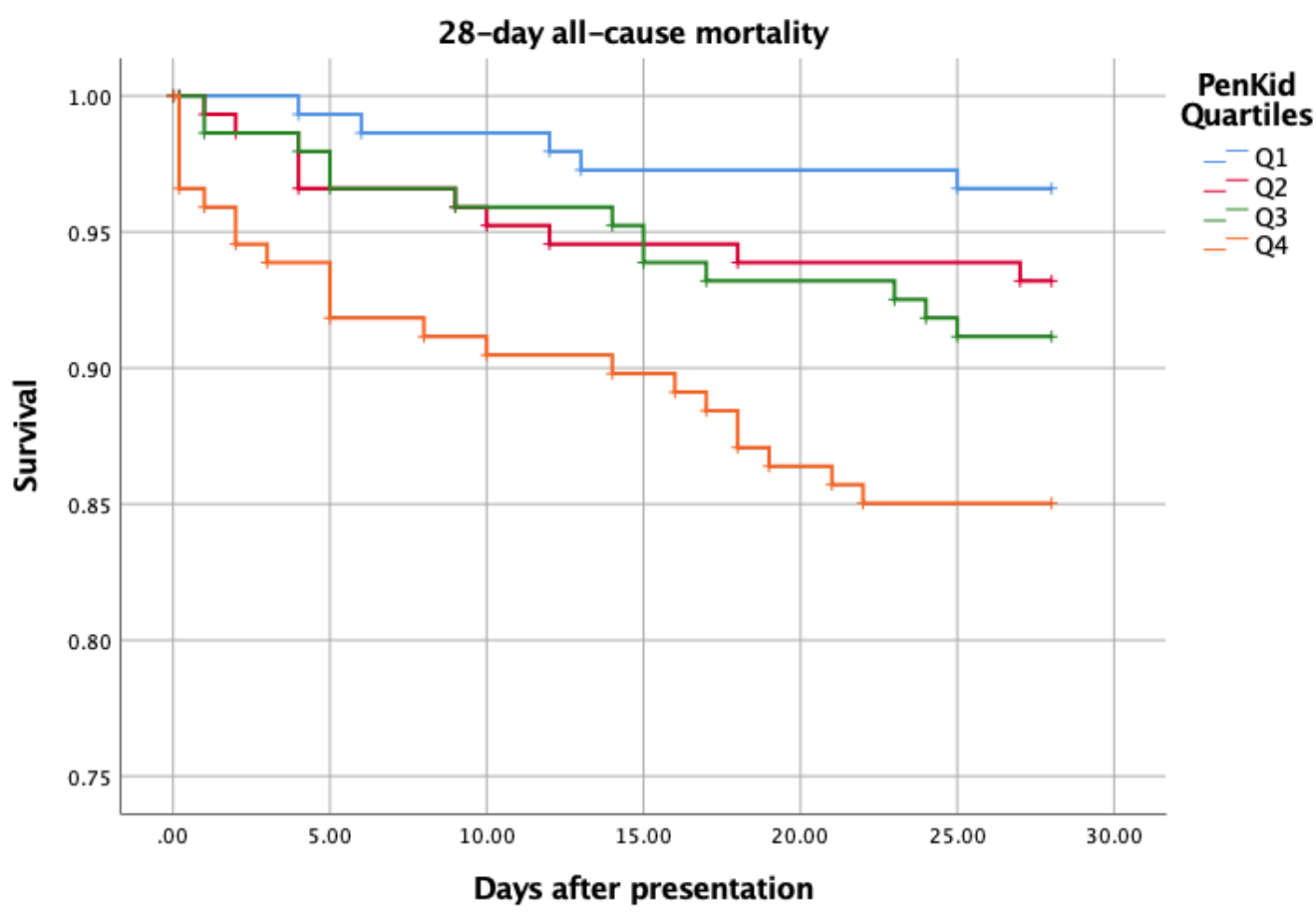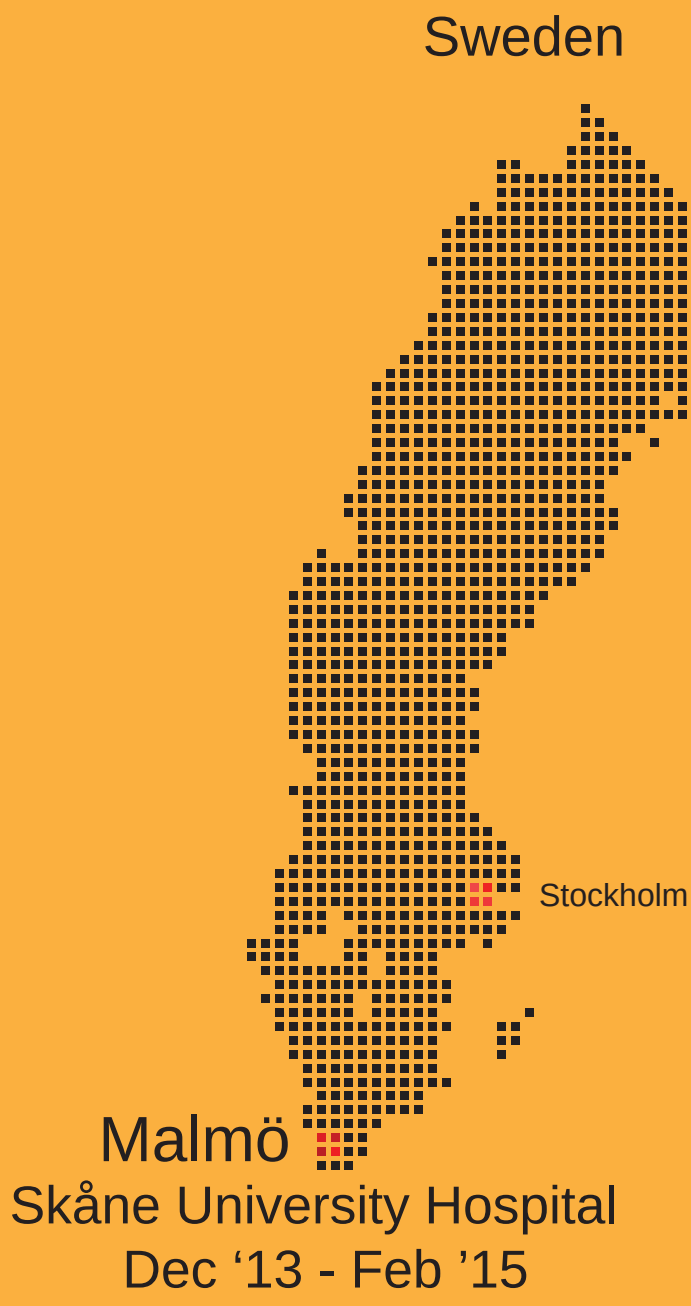**28-day all-cause mortality**

PenKid Quartiles — Q1, Q2, Q3, Q4

Table. penKid prediction for multiple organ-failure and 28-day all-cause mortality.

	All patients (n=588)	P-value	Quartile 1 (n=147)	Quartile 2 (n=147)	Quartile 3 (n=147)	Quartile 4 (n=147)	P for trend
Severe Multi-Organ Failure							
Events	33		1	2	6	24	
(% of total)	(5.6%)		(0.7%)	(1.4%)	(4.1%)	(16.3%)	
OR	3.6	<0.001	Reference	2.1	6.5	29.9	<0.001
(95% CI)	(2.5-5.3)			(0.2-23.0)	(0.8-55.2)	(3.8-235.3)	
28-Day All-Cause Mortality							
Events	50		5	10	13	22	
(% of total)	(8.5%)		(3.4%)	(6.8%)	(8.8%)	(15.0%)	
OR	1.5	=0.009	Reference	1.3	1.5	2.2	=0.079
(95% CI)	(1.1-2.0)			(0.4-4.0)	(0.5-4.6)	(0.8-6.5)	

Sweden

Stockholm

Malmö
Skåne University Hospital
Dec '13 - Feb '15

ER Setting
≥18 y.o
≥2 SIRS Criteria
Suspected Infection
Observational Study
644 recruited to study cohort
588 included in final analysis

penKid

a novel biomarker for acute kidney injury at the ER

Proenkephalin A 119–159

effectively predicts

Acute Kidney Injury
within 48 hours & 7 days

Multiple Organ Failure
4 or more failing organ systems

Mortality
28-day all-cause

Particularly among septic patients
at the ER with seemingly intact renal function.
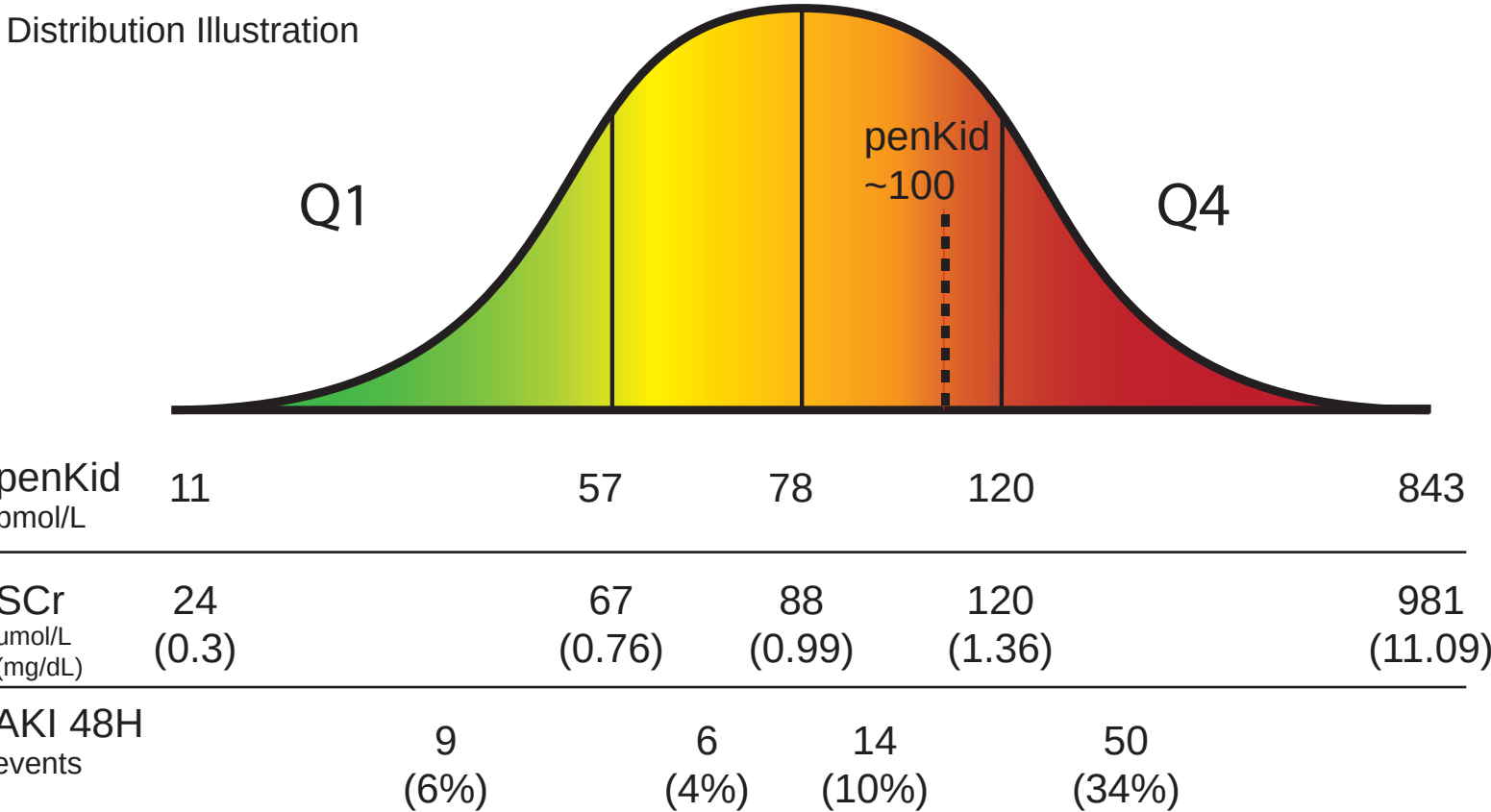
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Questions?
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Distribution Illustration

Q1 — penKid ~100 — Q4

penKid pmol/L	11	57	78	120	843
SCr umol/L (mg/dL)	24 (0.3)	67 (0.76)	88 (0.99)	120 (1.36)	981 (11.09)
AKI 48H events		9 (6%)	6 (4%)	14 (10%)	50 (34%)

Characteristics of Study Population.

Population / Characteristics	All patients (n=588)	No AKI within 7 days (n=494)	AKI within 7 days (n=94)
Female sex	288 (49.0%)	256 (43.5%)	32 (34.0%)
Age	73 (61-82)	73 (59-82)	75 (67-84)
Renal Disease	45 (7.7%)	33 (6.7%)	12 (12.8%)
Limitation of care	149 (25.3%)	110 (22.4%)	39 (41.5%)
Severe Sepsis	316 (54.1%)	231 (47.1%)	85 (91.4%)
Septic Shock	21 (3.7%)	6 (1.2%)	15 (17.7%)
eGFR	66 (46-88)	73 (53-91)	34 (25-48)
SCr, umol/L	88 (68-120)	80 (65-103)	155 (119-212)
SCr, mg/dL	0.99 (0.77-1.36)	0.90 (0.74-1.17)	1.75 (1.35-2.39)
penKid, pmol/L	77.9 (56.9-119.7)	73.9 (53.4-101.2)	129.3 (92.2-177.5)

Figure. Boxplot for penKid distribution across renal SOFA scores.