TARTU ÜLIKOOL
1632

Electrolytes and SOFA Score

Kaspar Bachmann

JUNIOR LECTURER, TARTU ÜLIKOOL

DEPARTMENT OF INTENSIVE CARE MEDICINE, INSELSPITAL, UNIVERSITY OF BERN, SWITZERLAND

TARTU ÜLIKOOL
1632

No conflicts of interest relevant to this talk.

TARTU ÜLIKOOL
1632

SOFA Score

SOFA Score

The SOFA score was published in 1996.

Currently, **2330** publications can be found on pubmed.

As the SOFA approaches it‘s 30th anniversary, a revision may be appropriate.

SOFA Score

LETTER

Cardiovascular SOFA score may not reflect current practice

Kaspar F. Bachmann[1*], Yaseen M. Arabi[2,3,4], Adrian Regli[5,6], Joel Starkopf[7,8] and Annika Reintam Blaser[1,7]

SOFA Score

LETTER

Cardiovascular SOFA score may not reflect current practice

Kaspar F. Bachmann[1*], Yaseen M. Arabi[2,3,4], Adrian Regli[5,6], Joel Starkopf[7,8] and Annika Reintam Blaser[1,7]

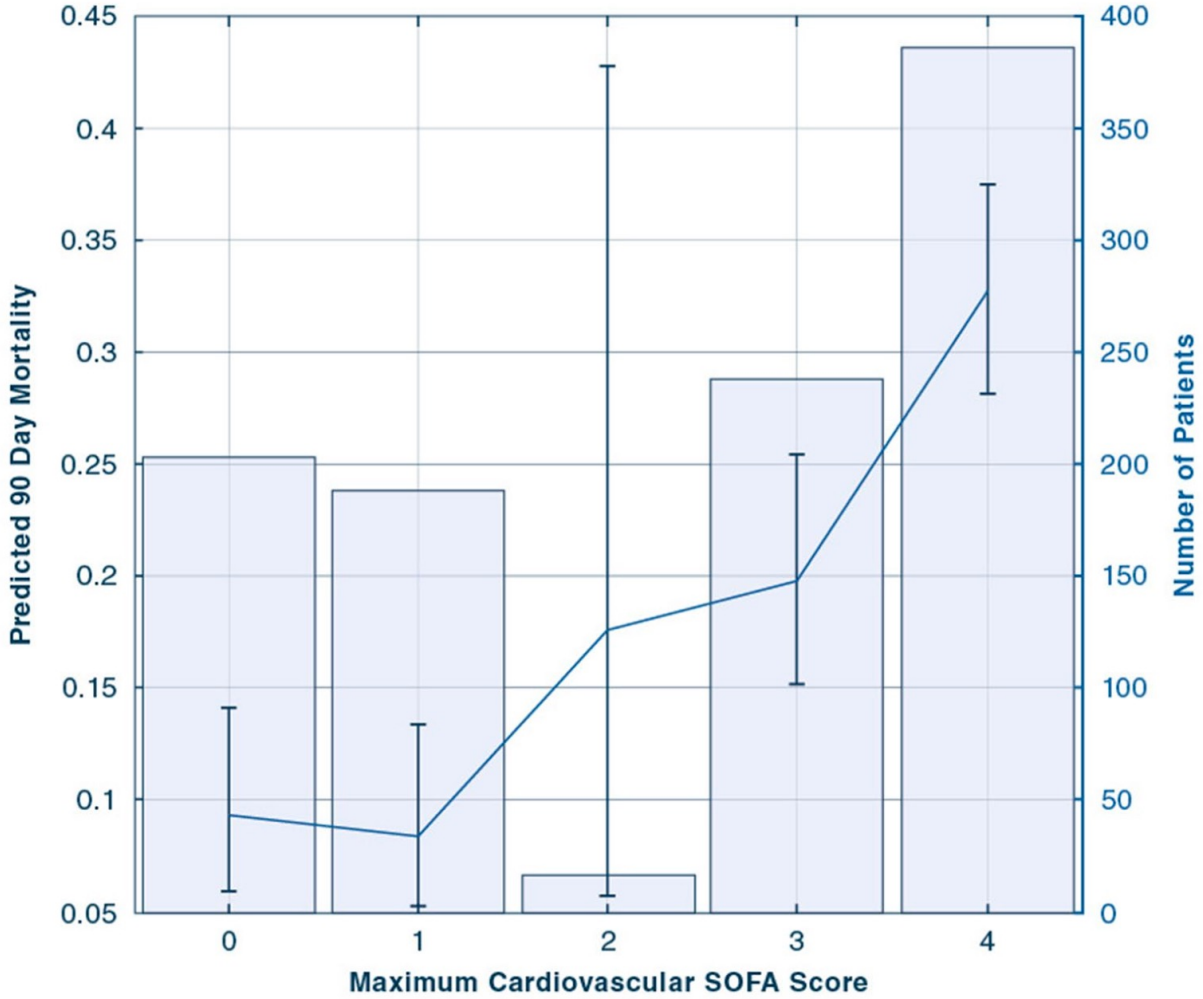


Fig. 1 Univariate logistic regression. Estimation and error bars (primary *y*-axis) with predicted 90-day mortality for different maximum cardiovascular SOFA score and respective histogram (secondary *y*-axis)

SOFA Score

Organ Dysfunction Scores in the Adult ICU

8

A. Reintam Blaser, K. F. Bachmann, and Y. M. Arabi

SOFA Score

A. Reintam Blaser, K. F. Bachmann, and Y. M. Arabi

Table 8.1 Relevant variables for organ dysfunction classification divided into four categories and presented by organ system

Organ system	Bedside signs and measurements	Laboratory variables	Advanced tests and measurements	Organ support
Neurological	**GCS**, **RASS**, **CAM(-ICU)**	NSE	EEG, CT, MRI, ICP, tissue oxygenation, transcranial Doppler, opticus sheath assessment	Delirium medication (e.g., dexmedetomidine or haloperidol), deep sedation? temperature control?
Cardiovascular	**Heart rate**, **blood pressure**, **mottling, capillary refill**	**Troponin**, **NT-proBNP**, **lactate**	**Cardiac output**, pulmonary artery and filling pressures, SvO_2, **echocardiography**	Vasopressors and inotropes, devices
Respiratory	**Respiratory rate, SpO_2**, PEEP, Plateau pressure	**SpO_2/FiO_2**, PaO_2/FiO_2, deadspace indices (e.g. $PaCO_2/etCO_2$)	Esophageal balloon, CT, electrical impedance tomography	Oxygen supplementation, high flow nasal oxygen, NIV, mechanical ventilation, neuromuscular blockade, VV-ECMO
Renal	**Urine output, POC US**	**Creatinine**, cystatin C, albumin/creatinine quotient, urine sediment, non-anion gap acidosis	Doppler, biopsy	Dialysis
Liver	**Ascites, hepatic encephalopathy**, **icterus, jaundice**, variceal bleeding	**Bilirubin**, **transaminases**, **INR**, **glucose, ammonia, gamma-GT, alkaline phosphatase, coagulation factors**	CT, MRI, Doppler, ICG-PDR	**Glucose**, **lactulose/lactitol, rifaximin,** liver support (e.g. MARS; plasmapheresis)
Hematological/coagulation	**Bleeding**, **petechiae**	**Thrombocytes**, **aPTT, anti-factor Xa activity, fibrinogen, neutrophil-to-lymphocyte ratio, neutropenia, mean platelet volume**	Biopsy	Neutrophil stimulation
Abdomen/GI	Gastric residual volumes, **stool passage, bowel sounds, diarrhea, abdominal distension, GI bleeding**, IAP, POC US	**Lactate**, citrulline, I-FABP	CT, MRI, absorption tests (3-O-methyl-D-glucose, paracetamol)	Prokinetic use, laxatives, open abdomen
Metabolism/electrolytes		**Electrolytes**		Electrolyte correction
Physical/muscle function	MRC	?	CT, myography, biopsy, US	Level of assistance needed

SOFA Score

PERSPECTIVE Open Access

The Sequential Organ Failure Assessment (SOFA) Score: has the time come for an update?

Rui Moreno[1,2], Andrew Rhodes[3], Lise Piquilloud[4], Glenn Hernandez[5], Jukka Takala[6], Hayley B. Gershengorn[7], Miguel Tavares[8], Craig M. Coopersmith[9], Sheila N. Myatra[10], Mervyn Singer[11], Ederlon Rezende[12], Hallie C. Prescott[13,25], Márcio Soares[14], Jean-François Timsit[15], Dylan W. de Lange[16], Christian Jung[17], Jan J. De Waele[18], Greg S. Martin[19], Charlotte Summers[20], Elie Azoulay[21], Tomoko Fujii[22], Anthony S. McLean[23] and Jean-Louis Vincent[24*]

TARTU ÜLIKOOL
1632

Electrolyte disorders

Association with mortality in the ICU

Electrolyte disorders

Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: http://www.elsevier.com/locate/clnu

Meta-analyses

Hypophosphatemia in critically ill adults and children – A systematic review

Annika Reintam Blaser [a, b, *], Jan Gunst [c], Carole Ichai [d], Michael P. Casaer [c], Carina Benstoem [e], Guillaume Besch [f], Stéphane Dauger [g], Sonja M. Fruhwald [h], Michael Hiesmayr [i], Olivier Joannes-Boyau [j], Manu L.N.G. Malbrain [k], Maria-Helena Perez [l], Stefan J. Schaller [m], Angelique de Man [n], Joel Starkopf [o], Kadri Tamme [o], Jan Wernerman [p], Mette M. Berger [q]

CRITICAL CARE

Open Access

of hypocalcemia

ock Toh[3,4] and Ingeborg Welters[1,5*]

spital Intensive

analysis FREE

, , ,

QJM: An International Journal of Medicine, Volume 109, Issue 7, July

Electrolytes and SOFA Score

PubMed®

electrolytes SOFA

Search

Advanced Create alert Create RSS User Guide

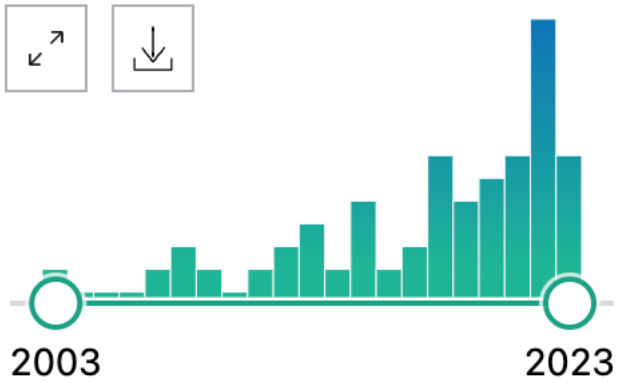
Save Email Send to Sort by: Best match Display options

MY NCBI FILTERS

52 results

Page 1 of 6

RESULTS BY YEAR



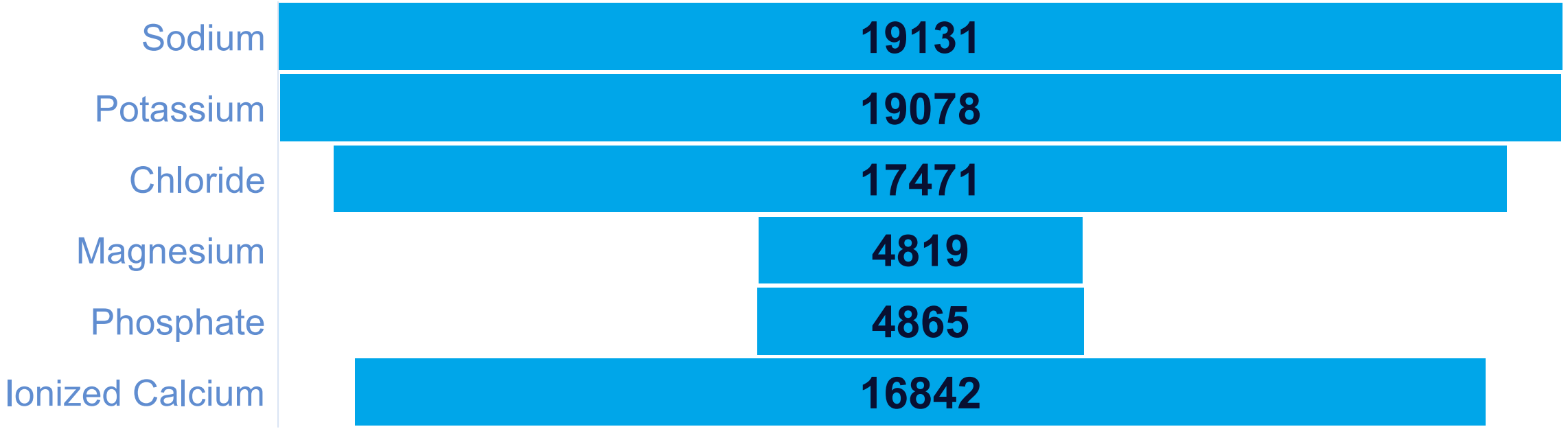
TARTU ÜLIKOOL
1632

Electrolyte disorders and SOFA Score

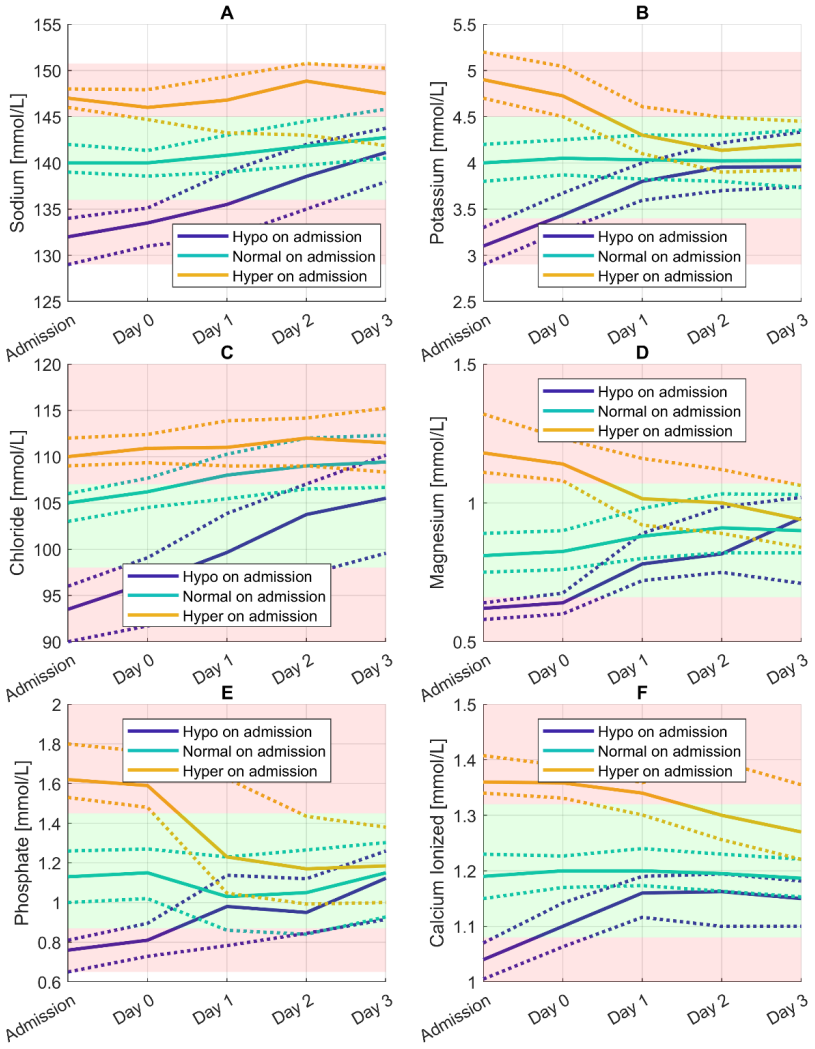
A retrospective single center study at a mixed-cohort ICU in Lucerne, Switzerland

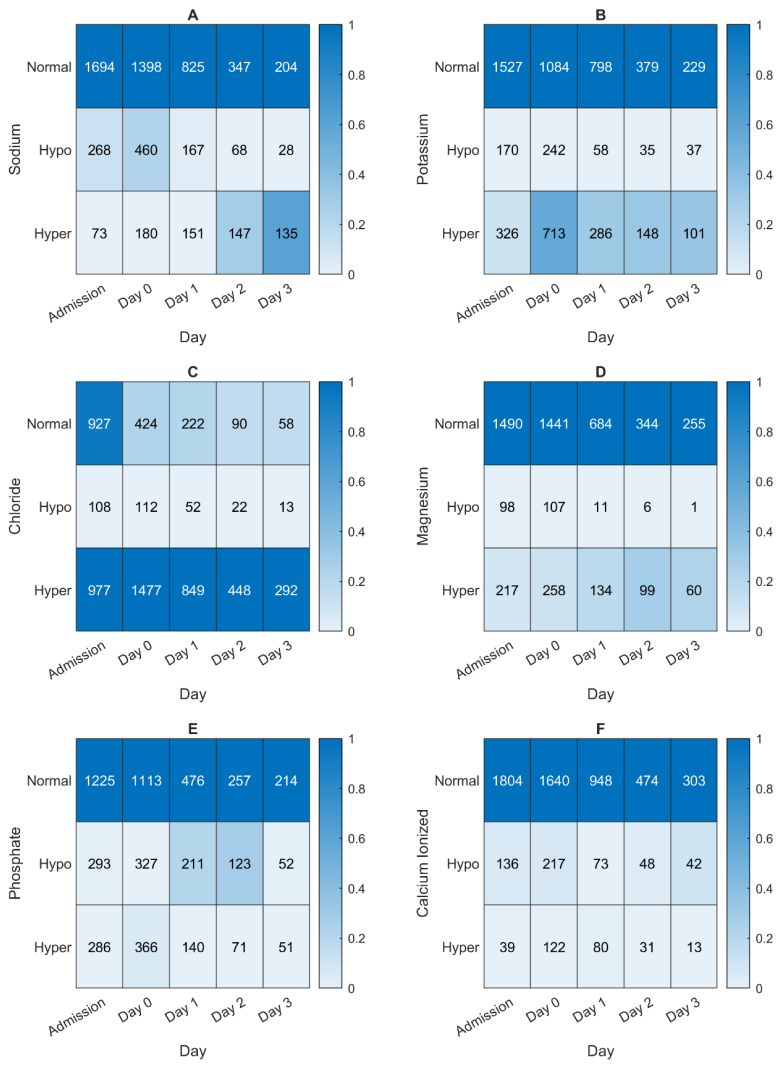
Population and data

- 2’054 patients in final analysis (November 1st 2019 to December 31st 2020).
- Median age was 67 [55 to 77] years and in-hospital mortality was 227 (11.0%)



Time course of disorders

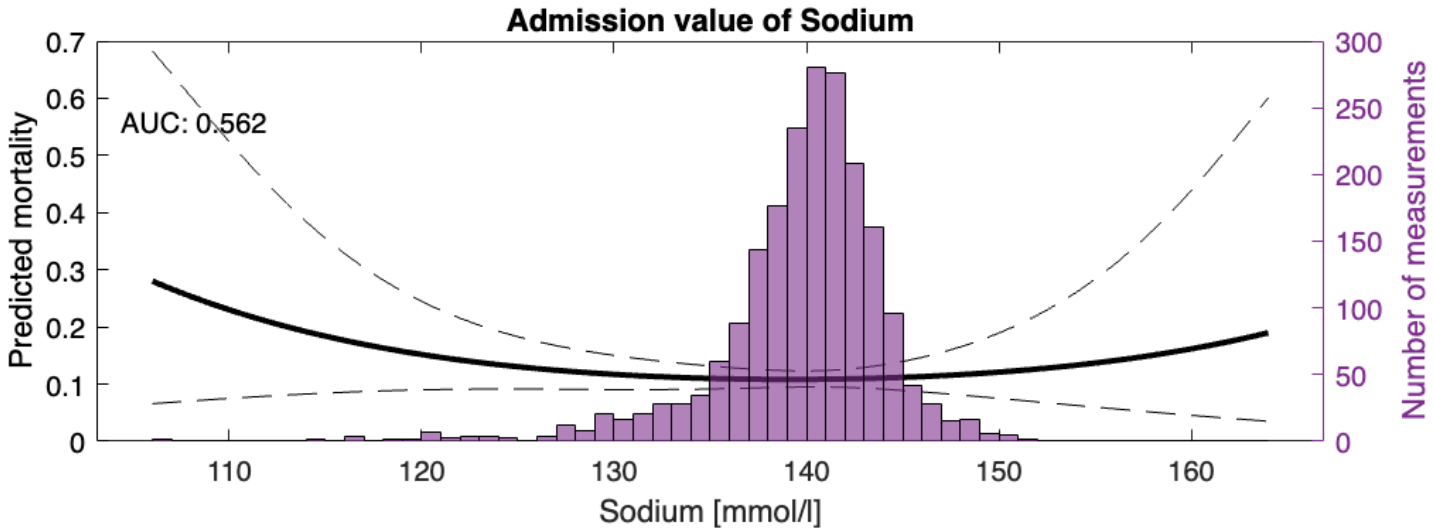


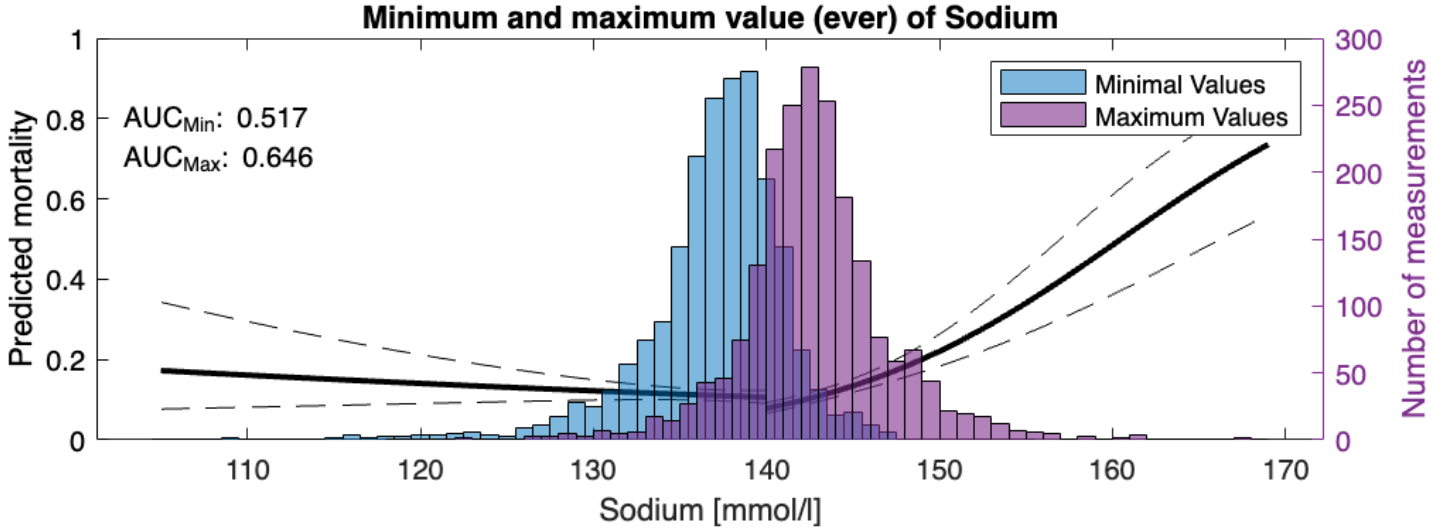


TARTU ÜLIKOOL
1632

Association of individual electrolytes with mortality

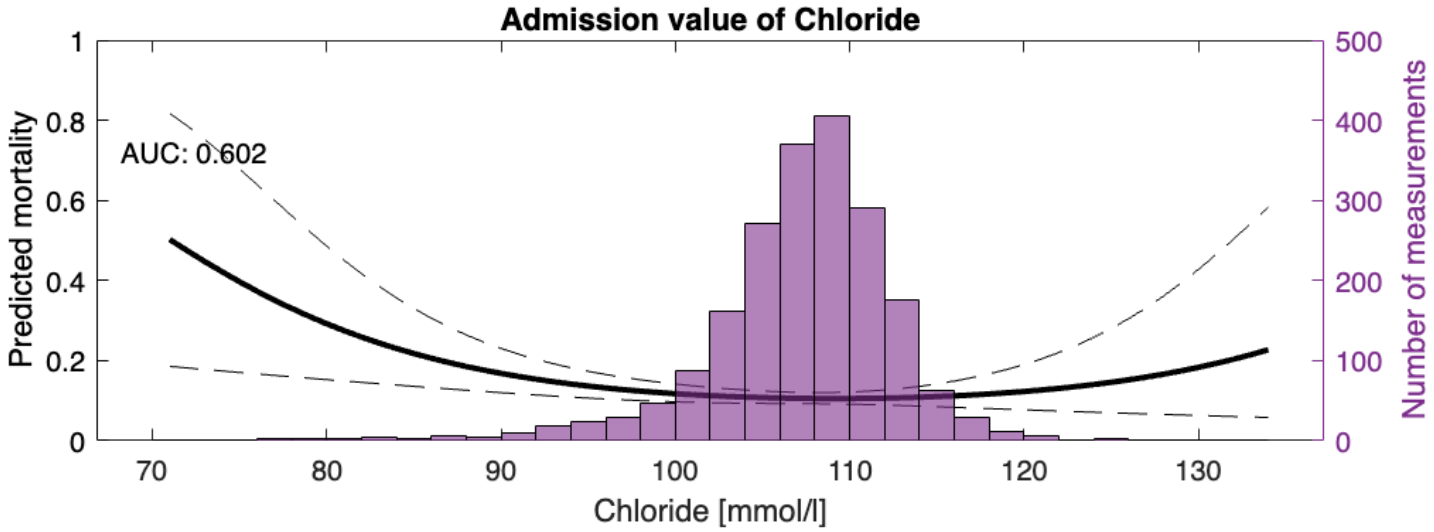
Association with mortality

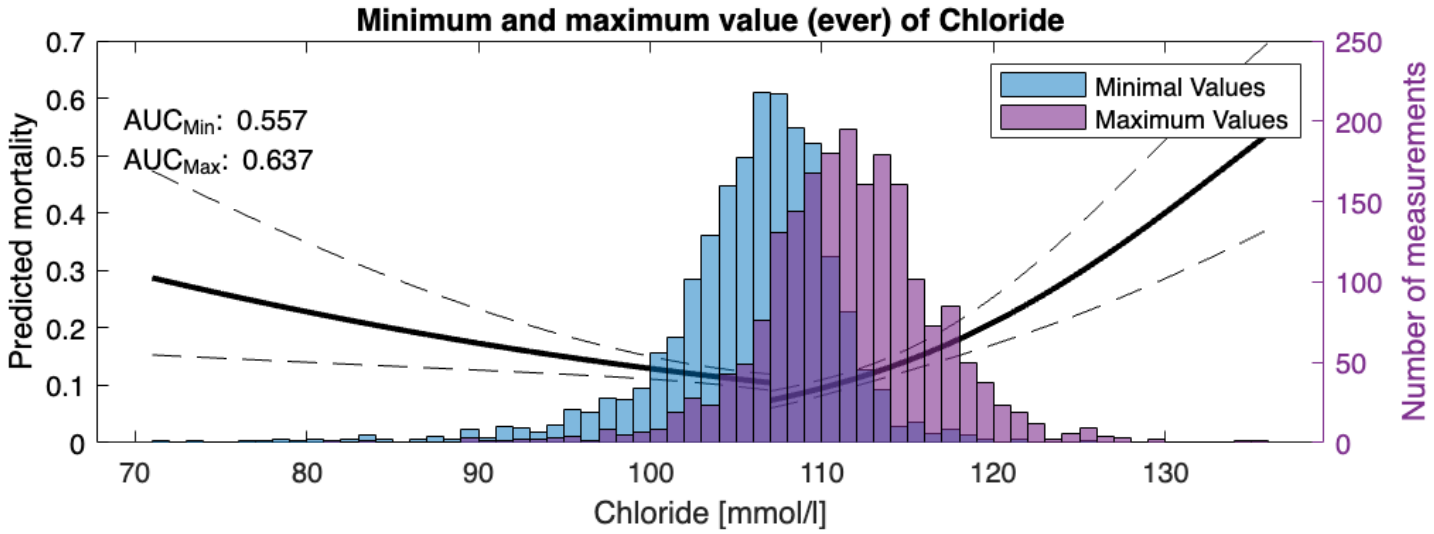




- Quadratic regression for admission value with a binomial distribution.
- Linear regression for minimal value and maximum value (ever).

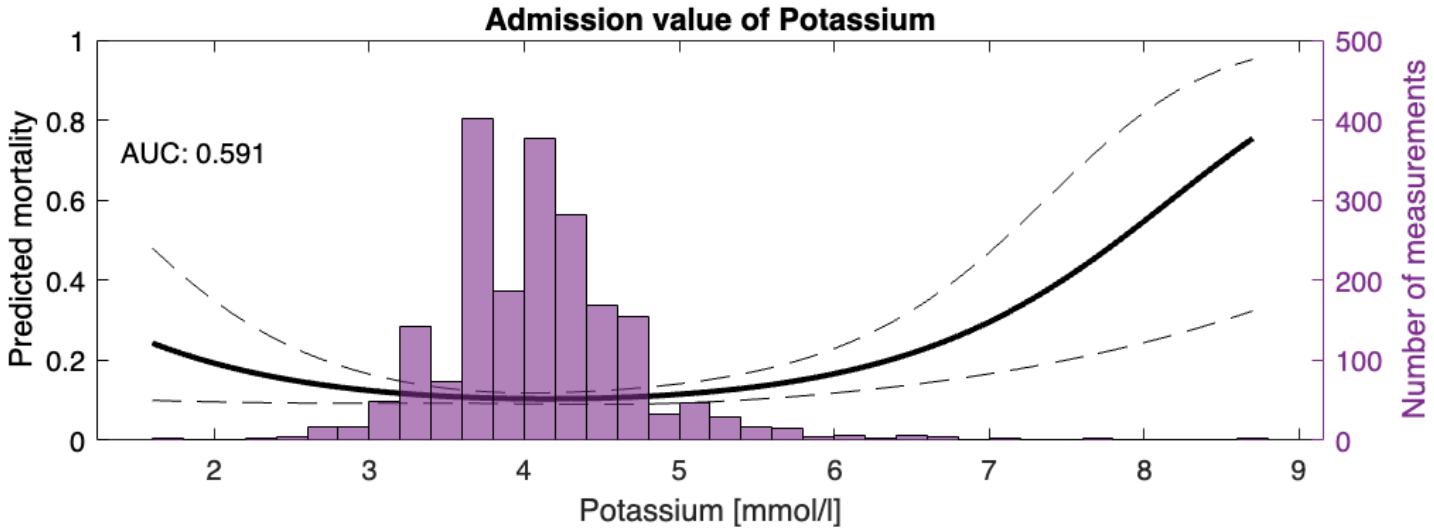
Association with mortality

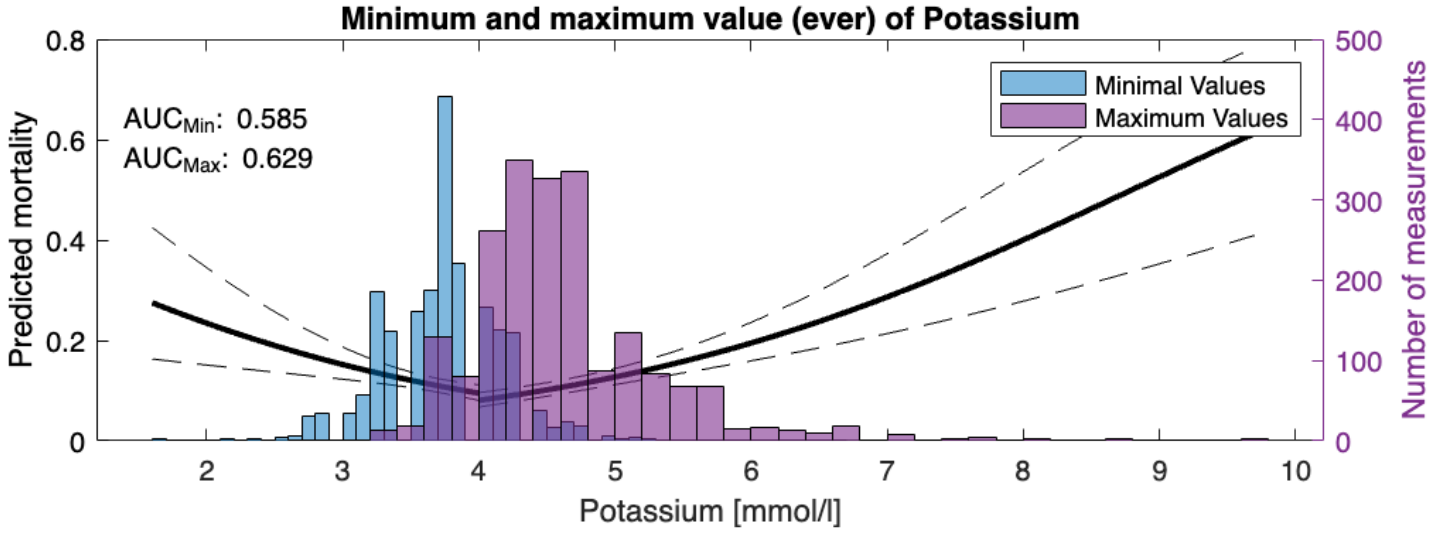




- Quadratic regression for admission value with a binomial distribution.
- Linear regression for minimal value and maximum value (ever).

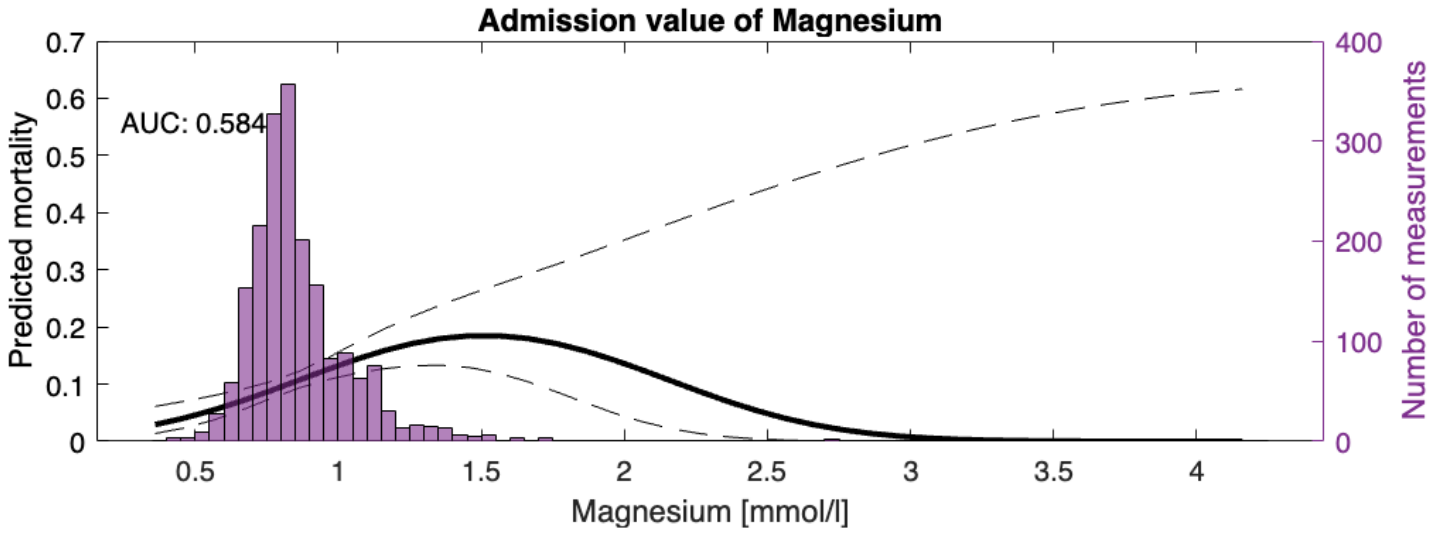
Association with mortality

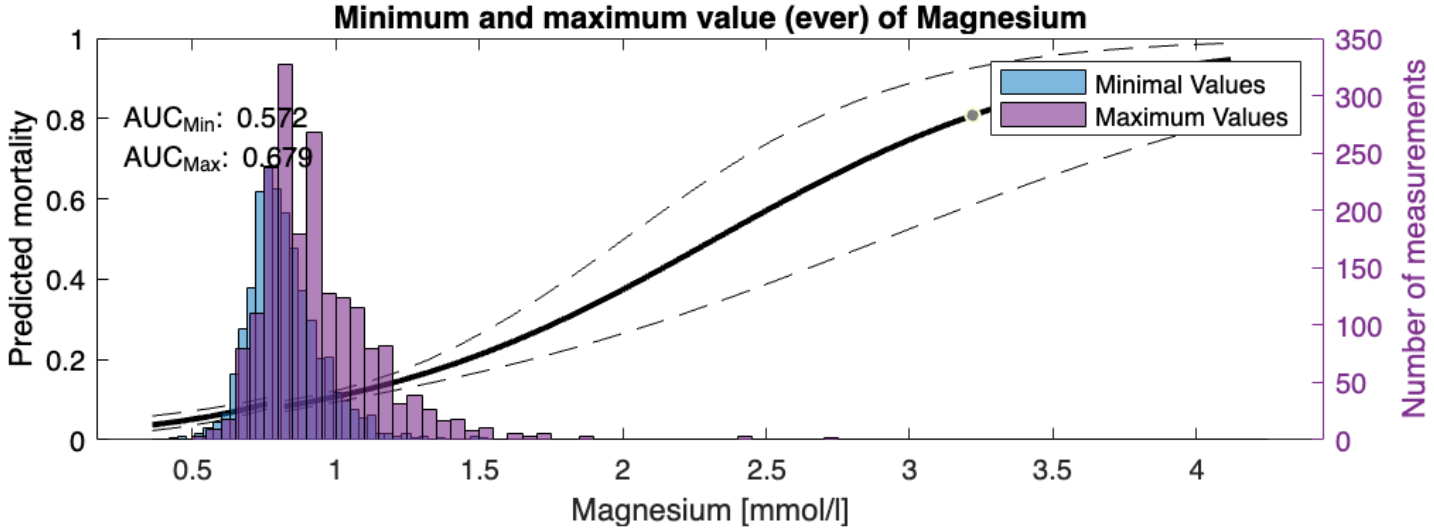




- Quadratic regression for admission value with a binomial distribution.
- Linear regression for minimal value and maximum value (ever).

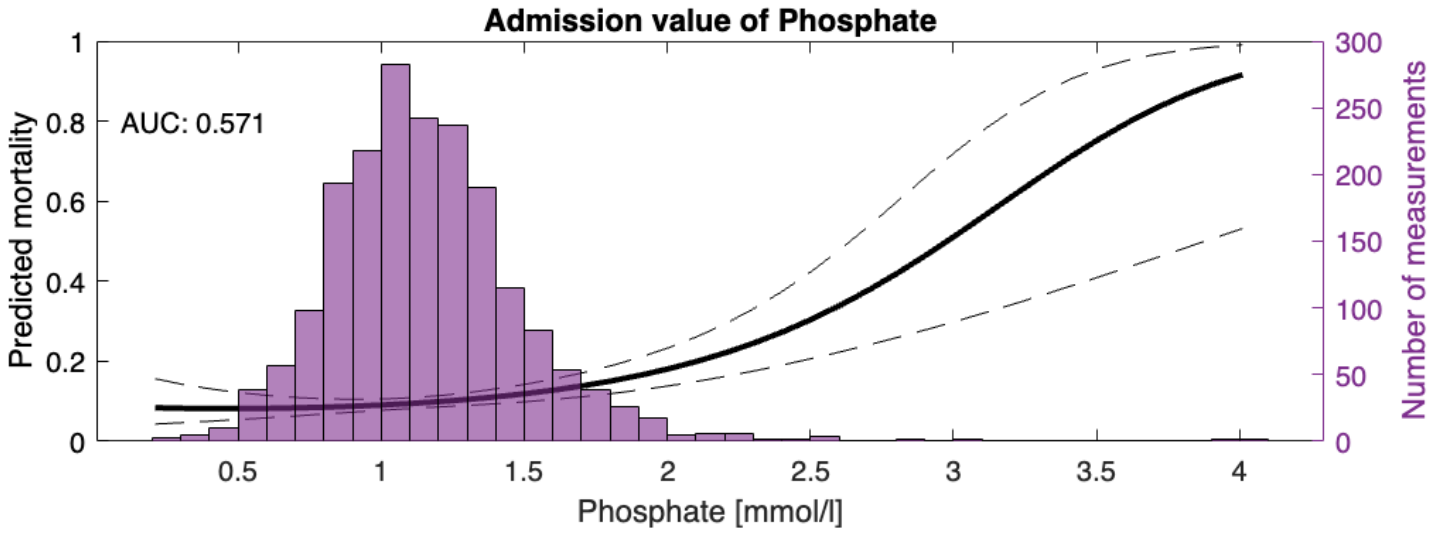
Association with mortality

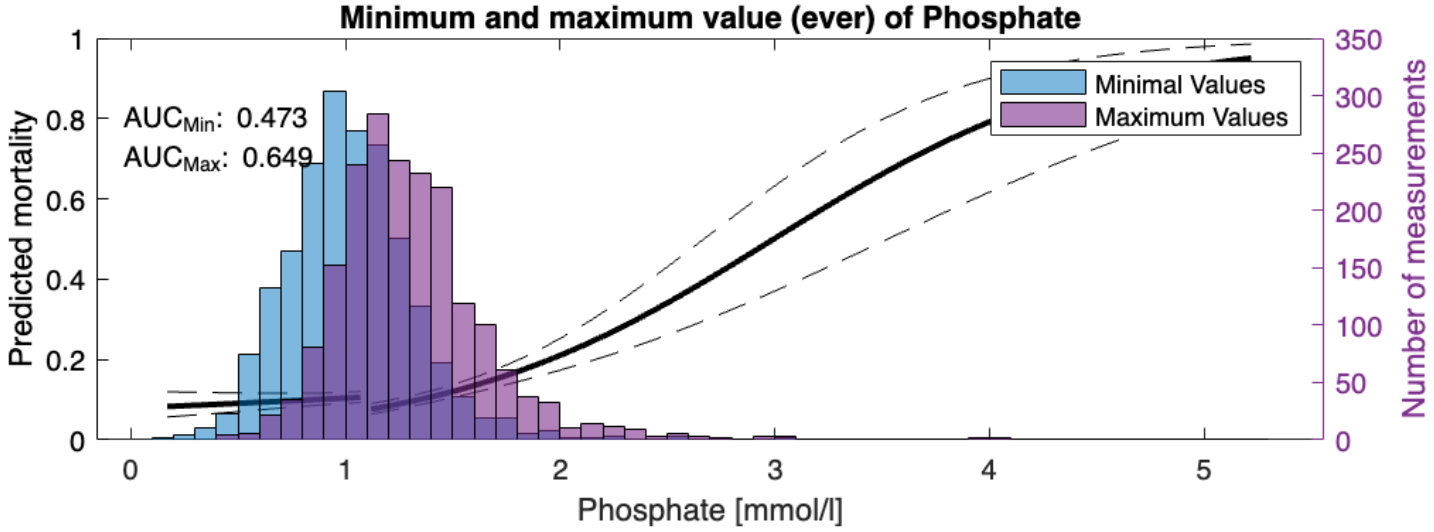




- Quadratic regression for admission value with a binomial distribution.
- Linear regression for minimal value and maximum value (ever).

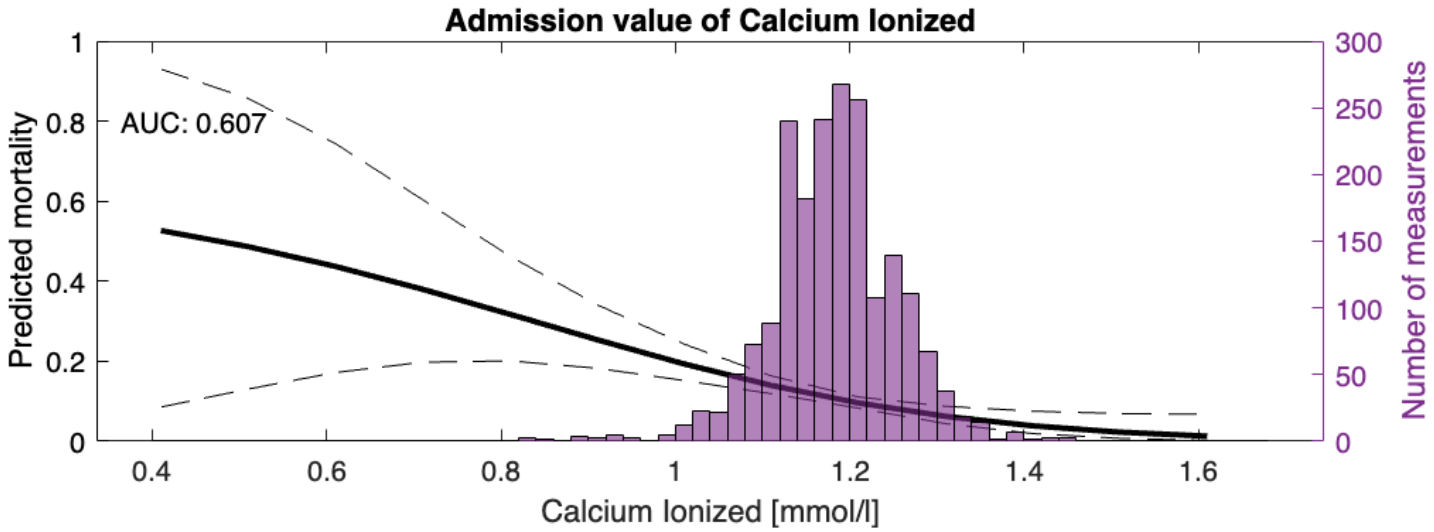
Association with mortality

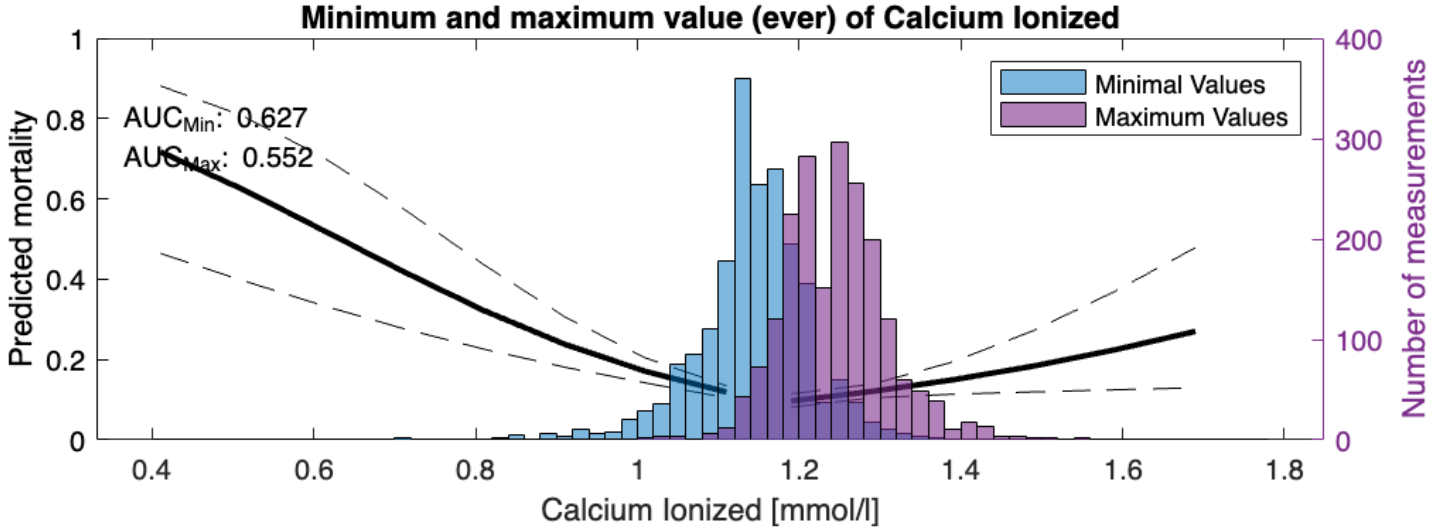




- Quadratic regression for admission value with a binomial distribution.
- Linear regression for minimal value and maximum value (ever).

Association with mortality





- Quadratic regression for admission value with a binomial distribution.
- Linear regression for minimal value and maximum value (ever).

TARTU ÜLIKOOL
1632

Electrolyte disorder score (ELDIS)

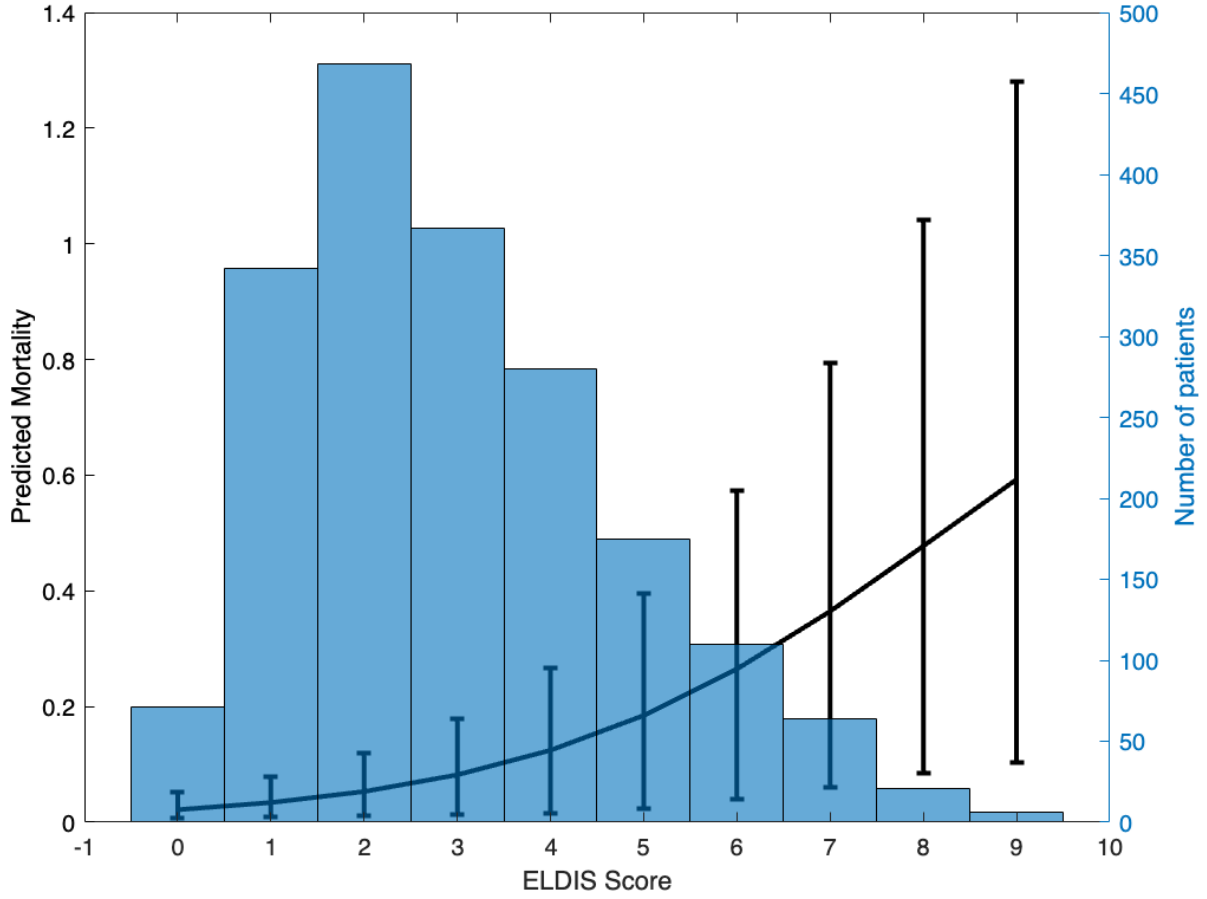
Electrolyte disorder score (ELDIS)

1 point per electrolyte disorder, maximum of 12 points

Mortality prediction using logistic regression.

Adjustment for age, chronic disease and **SOFA score**

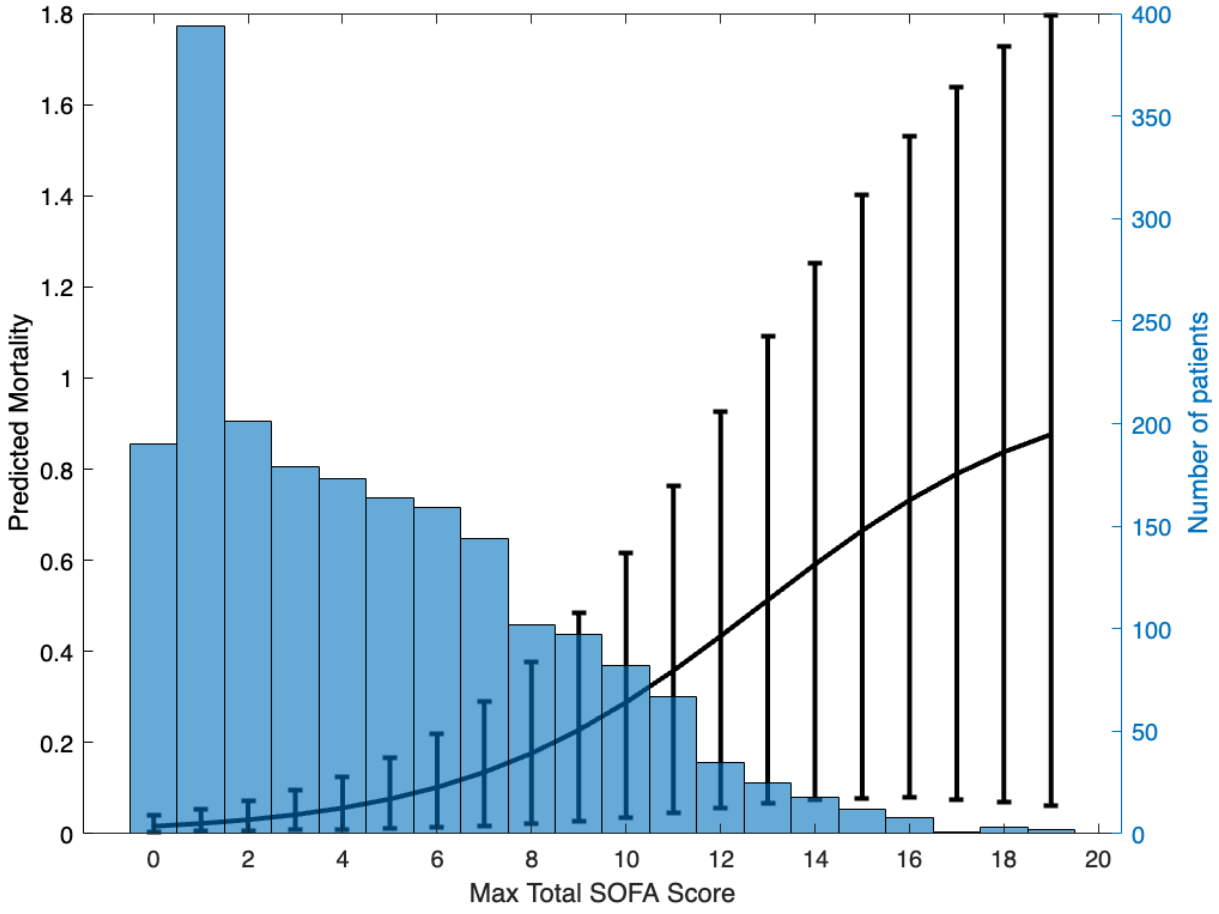
ELDIS (bivariable)



Variable	OR (CI)	P-Value
ELDIS	1.59 (1.47 to 1.72)	< 0.001

AUC-ROC: 0.755 (0.723 to 0.786)

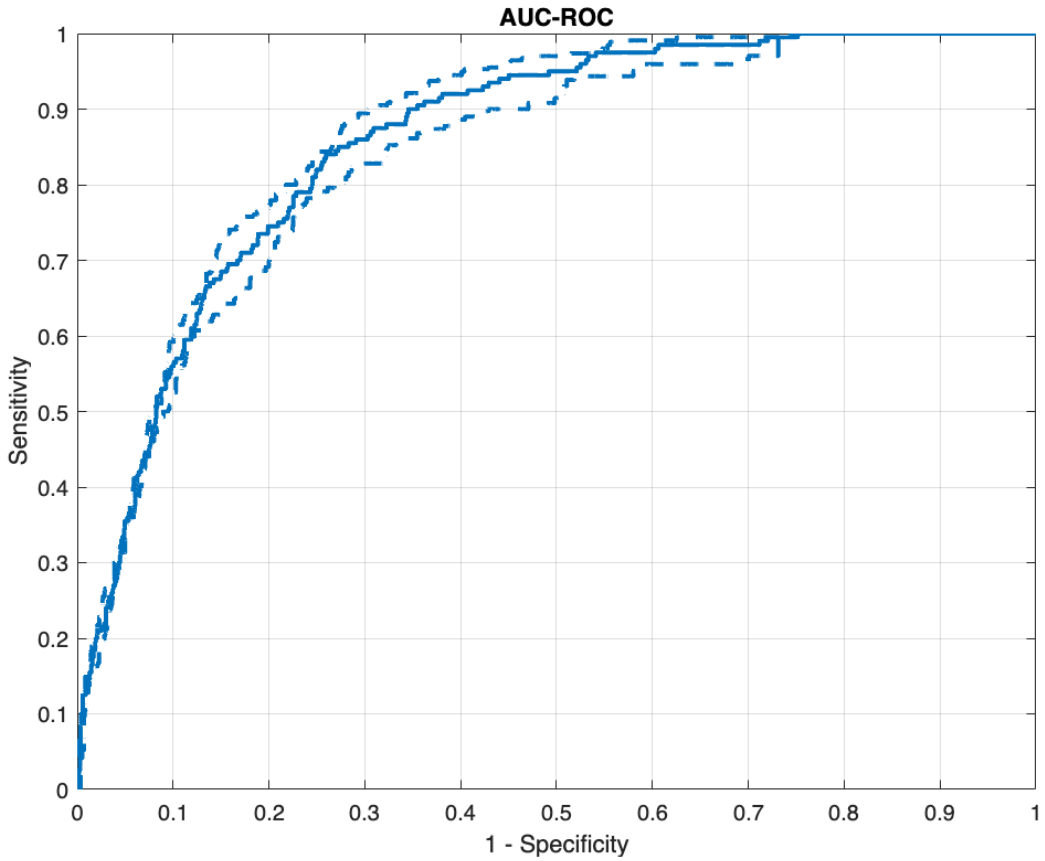
Maximum SOFA Score (bivariable)



Variable	OR (CI)	P-Value
Maximum SOFA Score	1.37 (1.32 to 1.43)	< 0.001

AUC-ROC: 0.826 (0.796 to 0.850)

Maximum SOFA Score (bivariable)



Variable	OR (CI)	P-Value
ELDIS	1.16 (1.05 to 1.28)	0.005
Maximum SOFA Score	1.34 (1.27 to 1.41)	< 0.001
Chronic disease (yes)	1.15 (0.73 to 1.80)	0.541
Age	1.05 (1.03 to 1.06)	< 0.001

AUC-ROC: 0.859 (0.834 to 0.881)

Prediction plot for a patient of 67 years, no chronic diseases and a maximum SOFA score of 4.

Primary or underlying disease

Disorder	Underlying pathology
Hypo Mg^{2+}	Medications, renal disease, GI disease (malabsorption), CRRT, refeeding
Hyper Mg^{2+}	Renal failure, cellular lysis
Hypo Ca^{2+}	Other electrolyte abnomarlity (especially hyperphosphatemia), Vit D, PTH, Lipase
Hyper Ca^{2+}	Malignancy, hyperparathyroidism, medications
Hypo N^{+}	Hyperglycemia / hypertrigliceriemia, water > solute intake, hypo-, euvolemic (AHD), hypervolemic states
Hyper N^{+}	Dehydration (iatrogenic, renal, diabetes insipidus)
Hypo PO_4^{3}	Refeeding, insulin (Ketoacidosis), renal loss
Hyper PO_4^{3}	Renal failure and tissue necrosis / lysis, medications, endocrinopathy
Hypo K^{+}	Potassium shifts, GI losses, renal losses
Hyper K^{+}	Medications, transfusion, lysis, acidosis (hyperchloremic), renal failure

TARTU ÜLIKOOL
1632

Conclusions

Conclusions

Electrolyte disorders are common and associated with mortality.

ELDIS adds predictive power to the adjusted mortality model.

Often, multiple electrolytes are abnormal simultaneously.

First we should treat the underlying disease before aggressively correcting electrolyte disorders.

TARTU ÜLIKOOL
1632

Thank you for your attention