

Derivation of clinical phenotypes in critically ill COVID-19 patients

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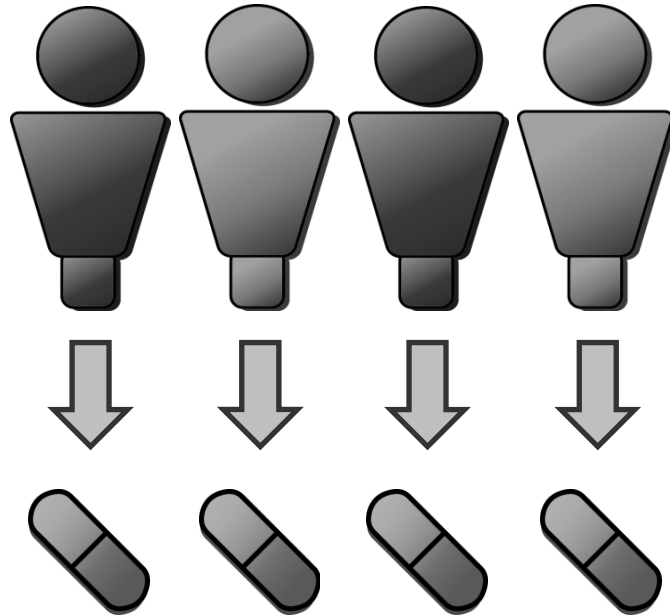
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Radboudumc
Intensive Care

Disclosure belangen spreker	
Geen (potentiële) belangenverstrengeling	Geen
Voor bijeenkomst mogelijk relevante relaties	Geen
<ul style="list-style-type: none">• Sponsoring of onderzoeksgeld• Honorarium of andere (financiële) vergoeding• Aandeelhouder• Andere relatie, namelijk...	Geen

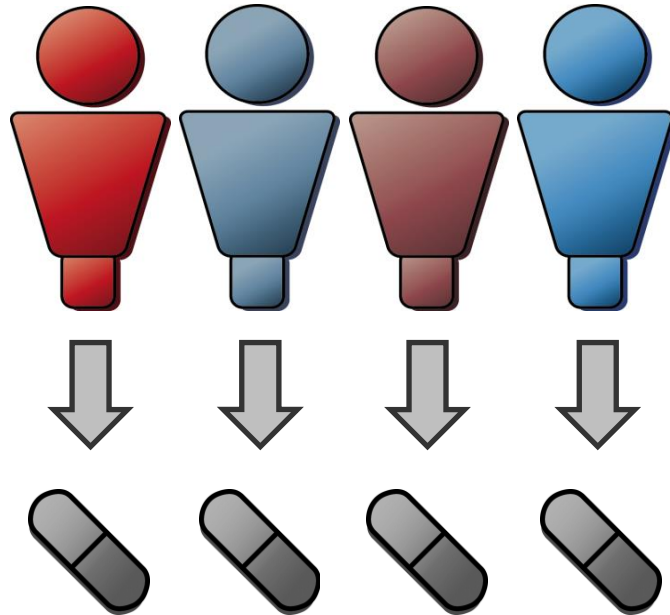
COVID-19 op de IC

- Uniforme behandeling



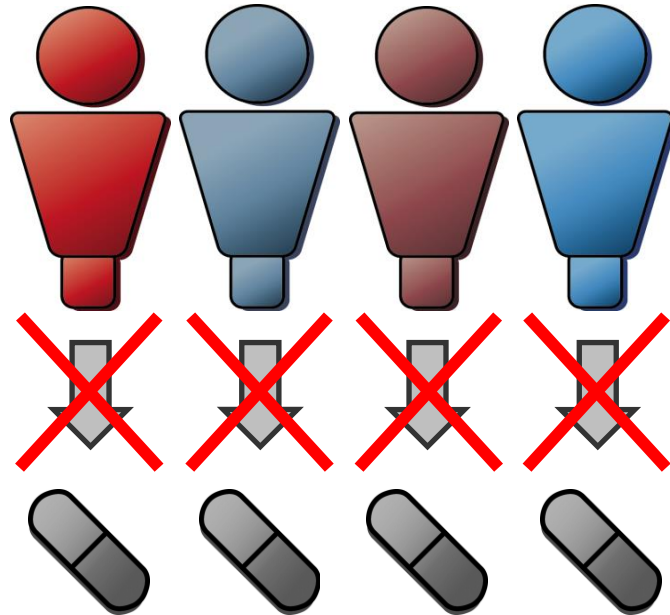
COVID-19 op de IC

- Ziekteheterogeniteit



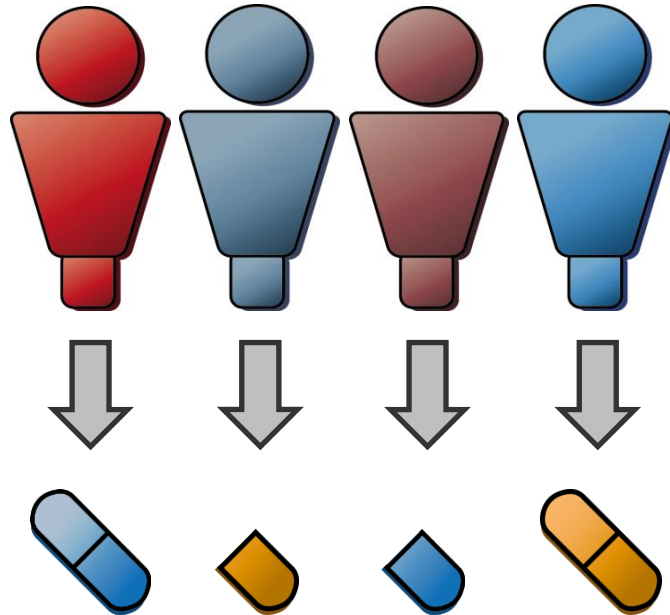
COVID-19 op de IC

- Ziekteheterogeniteit



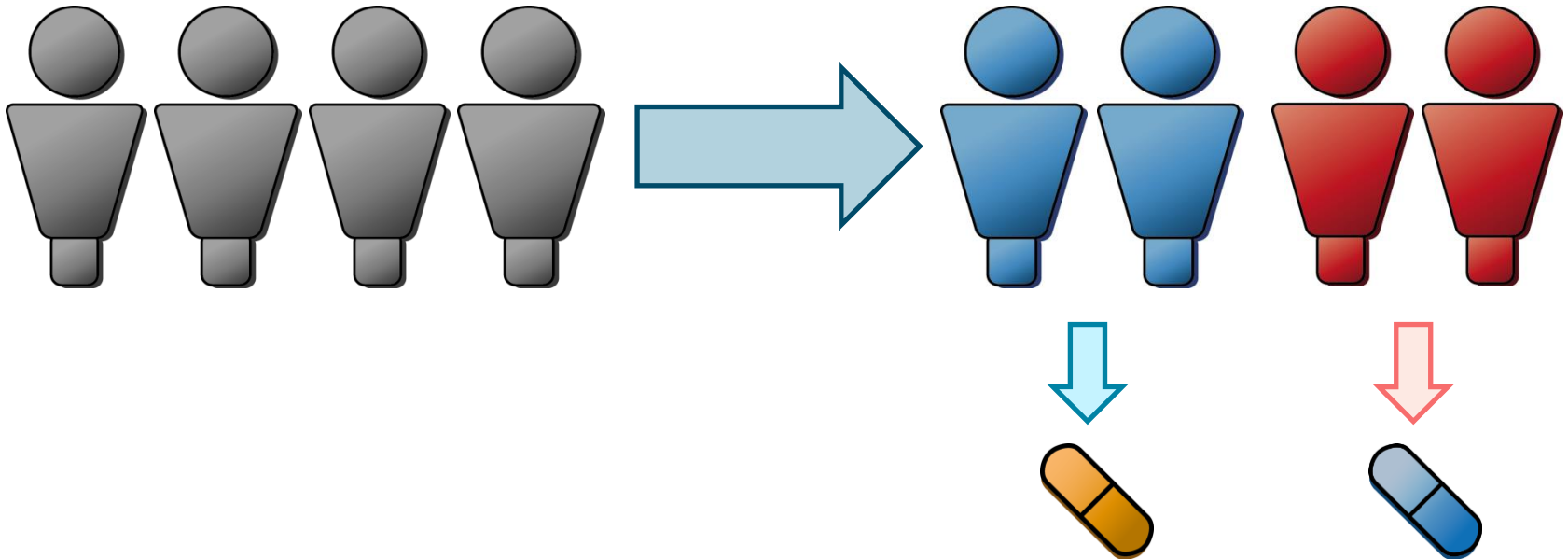
COVID-19 op de IC

- Gepersonaliseerde zorg



COVID-19 op de IC

- Fenotyperen



COVID-19 op de IC

**Klinische fenotypes in COVID-19 IC-patiënten identificeren
en karakteriseren**

Dataset

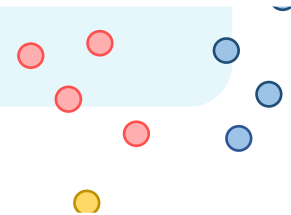
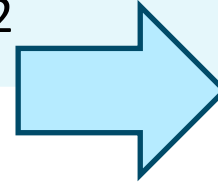
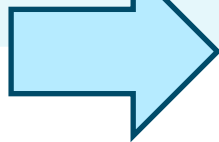
- NICE registratie
 - 13.279 ernstig zieke IC patiënten
- Opname tussen februari 2020 en februari 2022



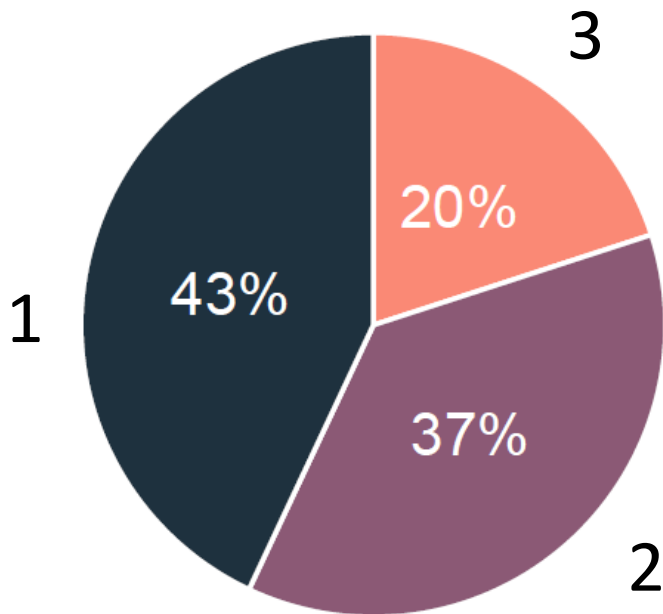
Dataset

- NICE registratie
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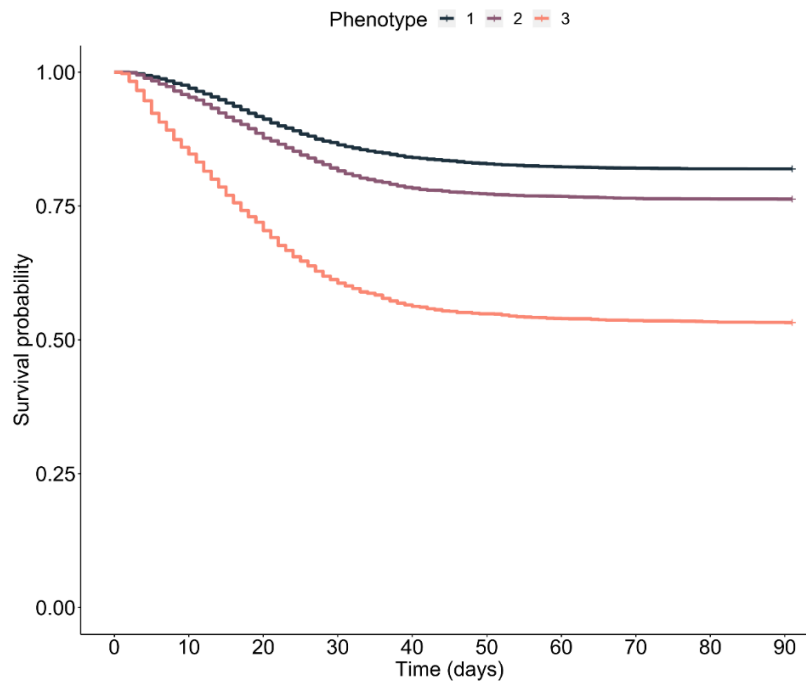
Leeftijd
Albumine
Bicarbonaat
Bilirubine
BMI
Comorbiditeiten
Creatinine
Glucose
Hartrfrequentie
Hematocriet
MAP (max)
MAP (min)
PaO ₂ /FiO ₂ ratio
pH
Kalium
Ademfrequentie
Natrium
Temperatuure
Thrombocyten
Urine output
Leukocyten



COVID-19 phenotypes

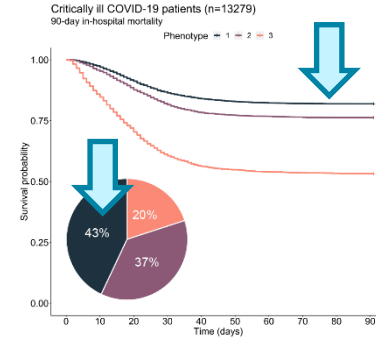
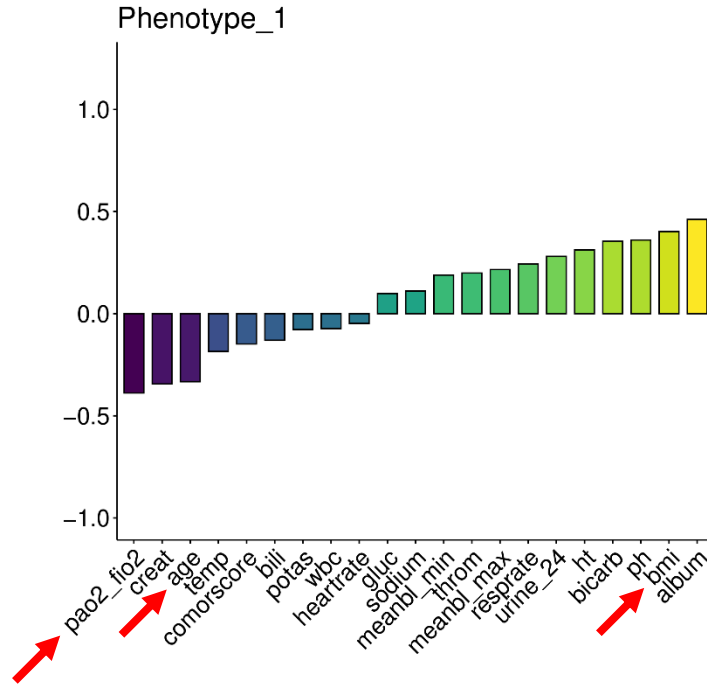


Critically ill COVID-19 patients (n=13279)
90-day in-hospital mortality



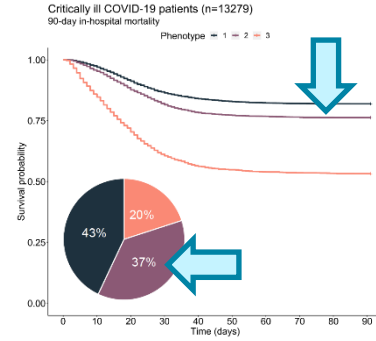
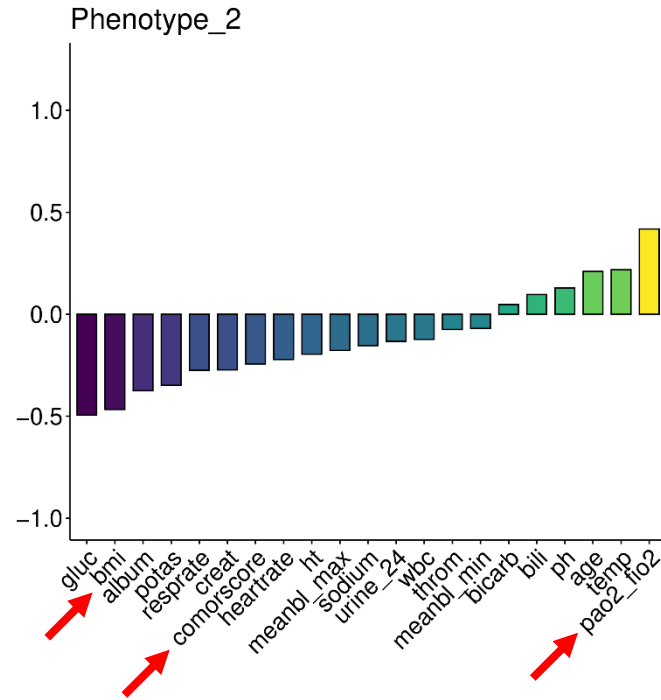
Fenotype 1

- Jonger
- Hoger BMI
- Lagere PaO₂/FiO₂ ratio
- **Laagste mortaliteit**



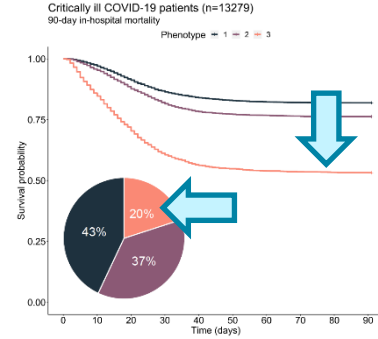
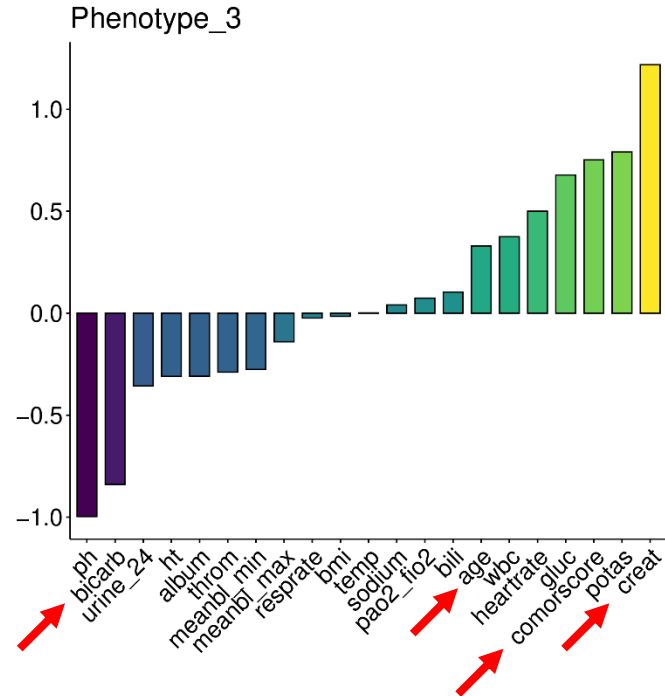
Fenotype 2

- Hoge PaO₂/FiO₂ ratio
- Laag BMI
- Minste comorbiditeiten
- **Mortaliteit tussen 1 en 2 in**

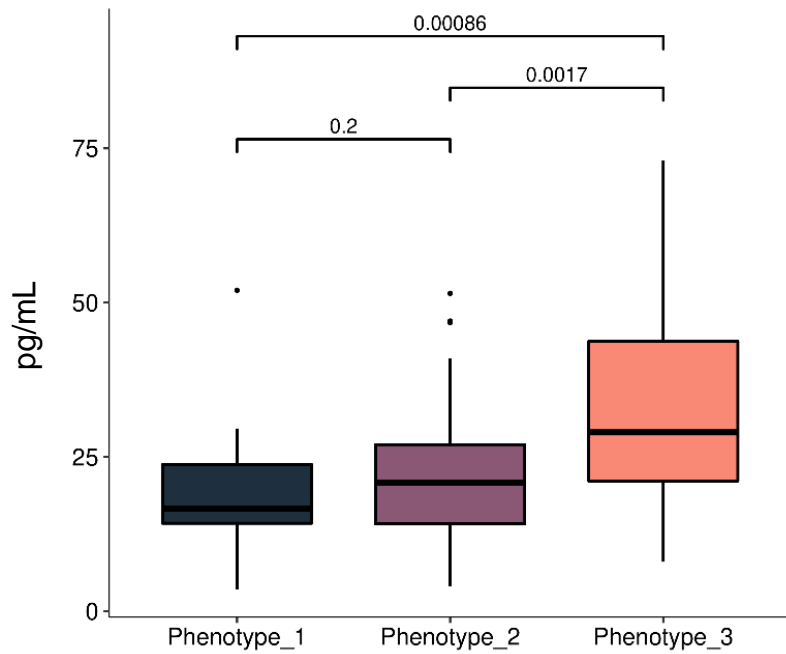


Fenotype 3

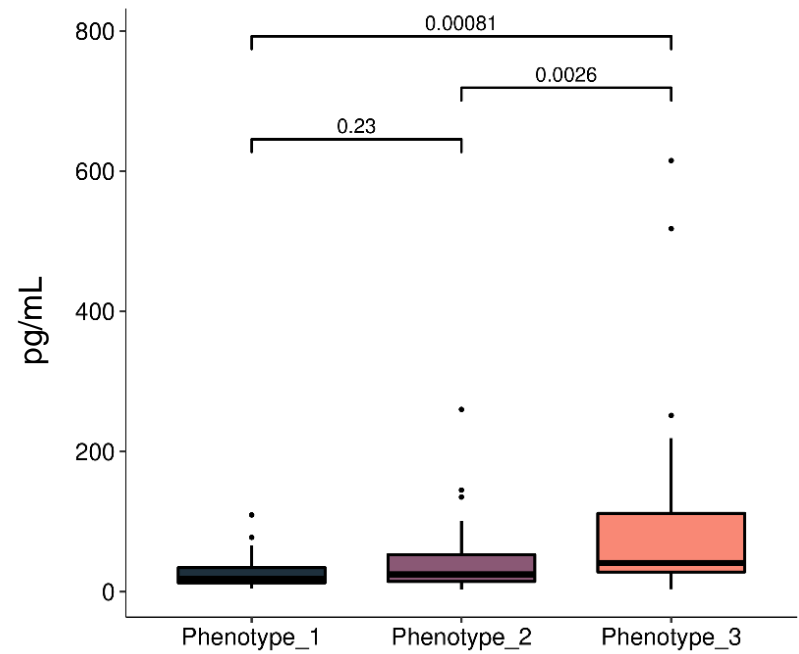
- Ouder
- Hoogste APACHE IV score
- Meer comorbiditeiten
- Nierdisfunctie
- **Hoogste mortaliteit**



TNF

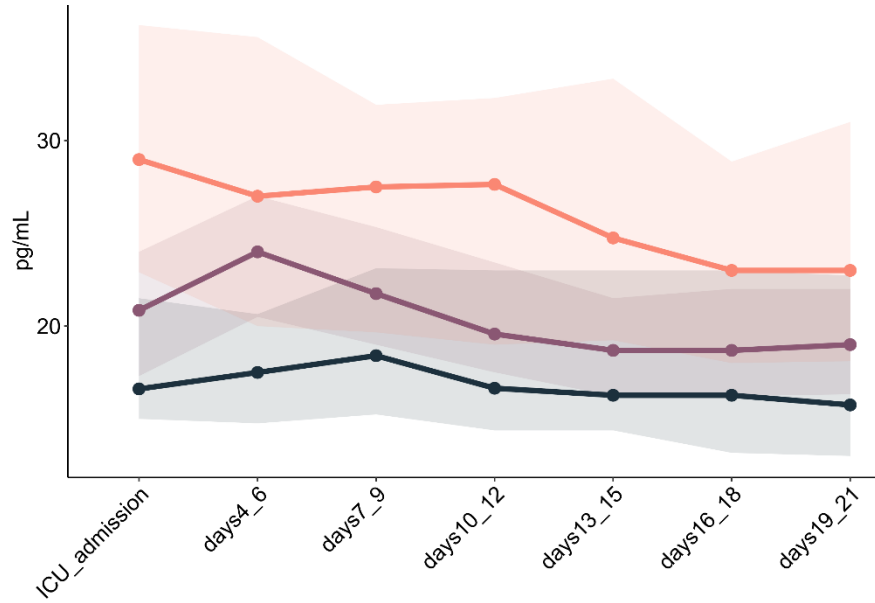


IL-10

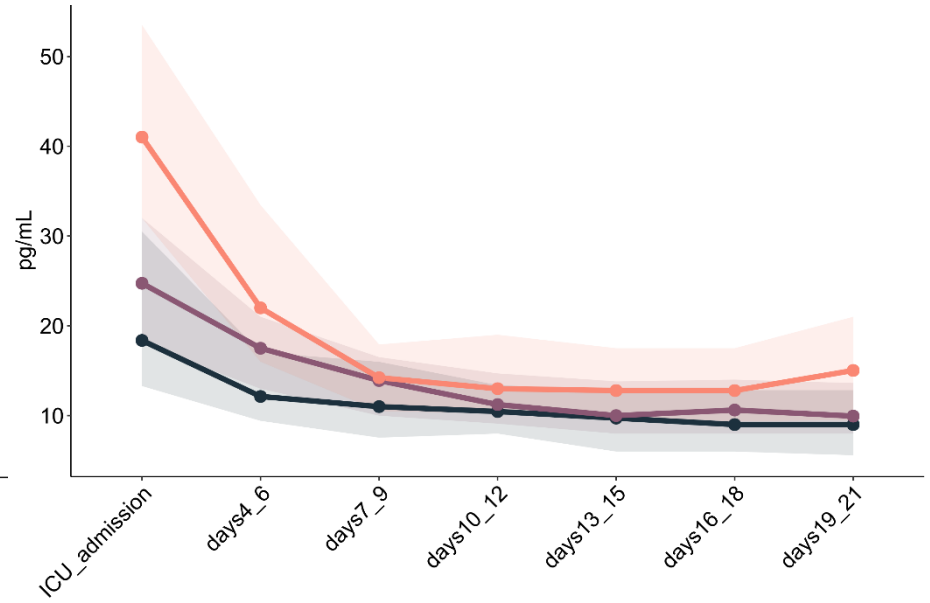


Phenotype_1
 Phenotype_2
 Phenotype_3

TNF



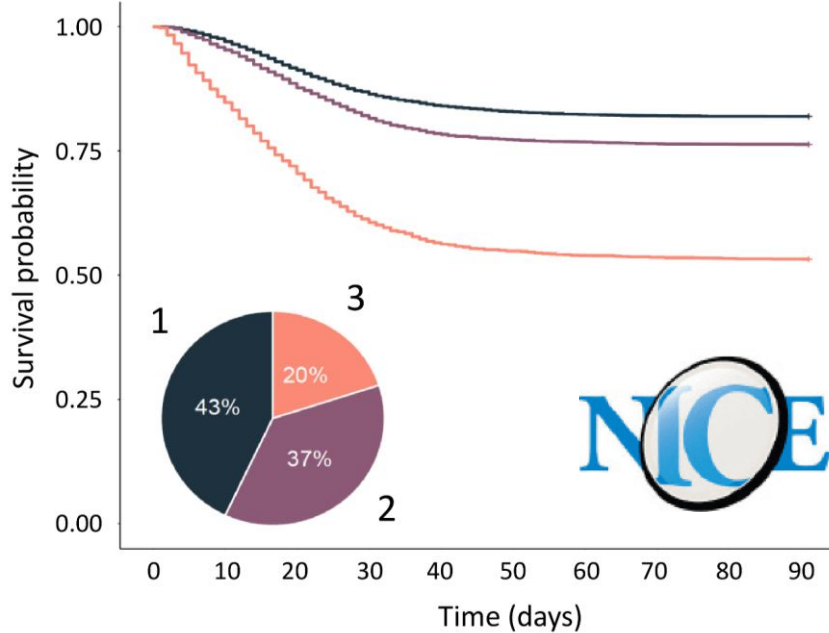
IL-10



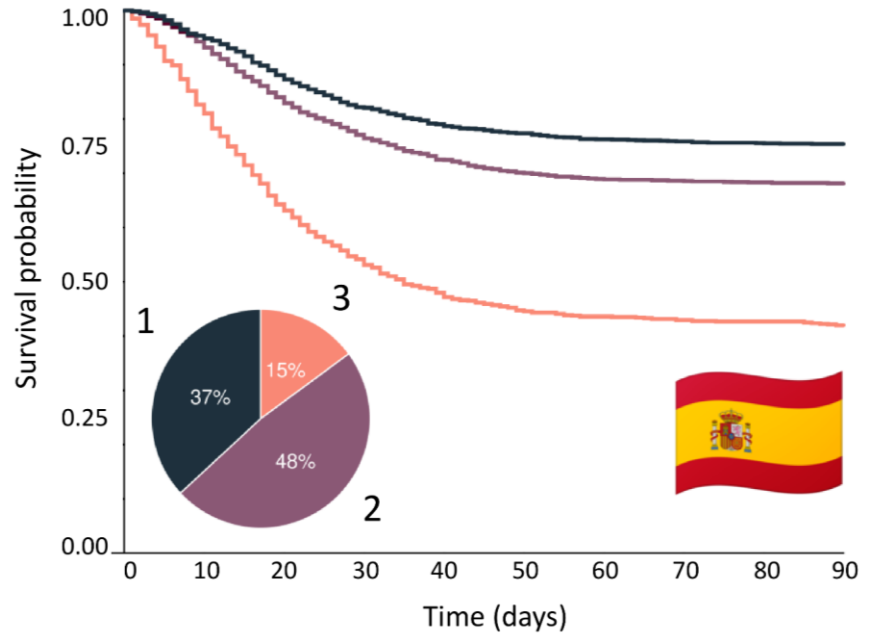
Validatie

● Phenotype_1 ● Phenotype_2 ● Phenotype_3

Critically ill COVID-19 patients (n=13.279)
90-day in-hospital mortality



Critically ill COVID-19 patients (n=6225)
90-day in-hospital mortality



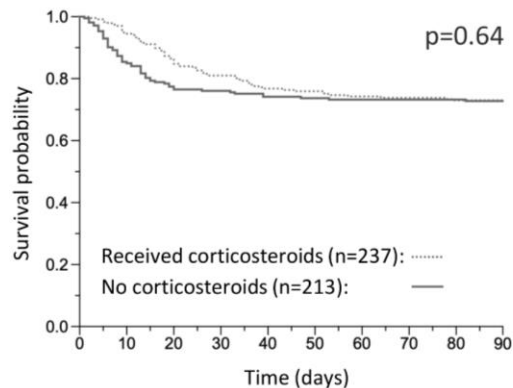


Corticosteroiden

Critically ill COVID-19 patients by corticosteroids treatment (n=1752)

90-day in-hospital mortality

Phenotype 1



Conclusies

Drie verschillende klinische COVID-19 fenotypes

Conclusies

- Drie verschillende klinische COVID-19 fenotypes

Fenotype 1:

- Slechtste ventilatieparameters
- Beste uitkomst
- Jong, hoge BMI → beademingsmoeilijkheden, geen comorbiditeit

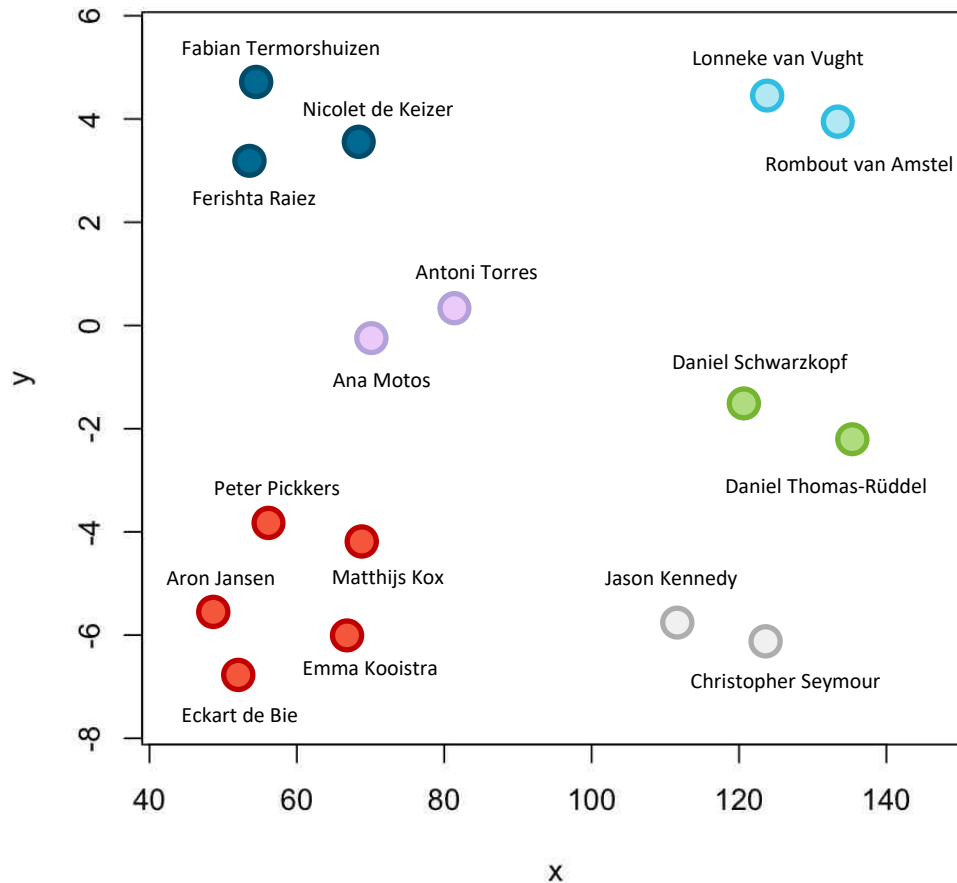
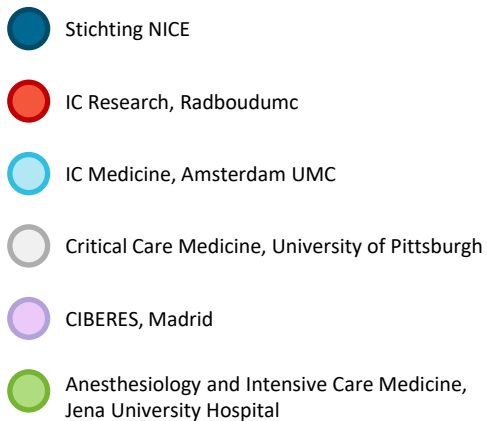
Conclusies

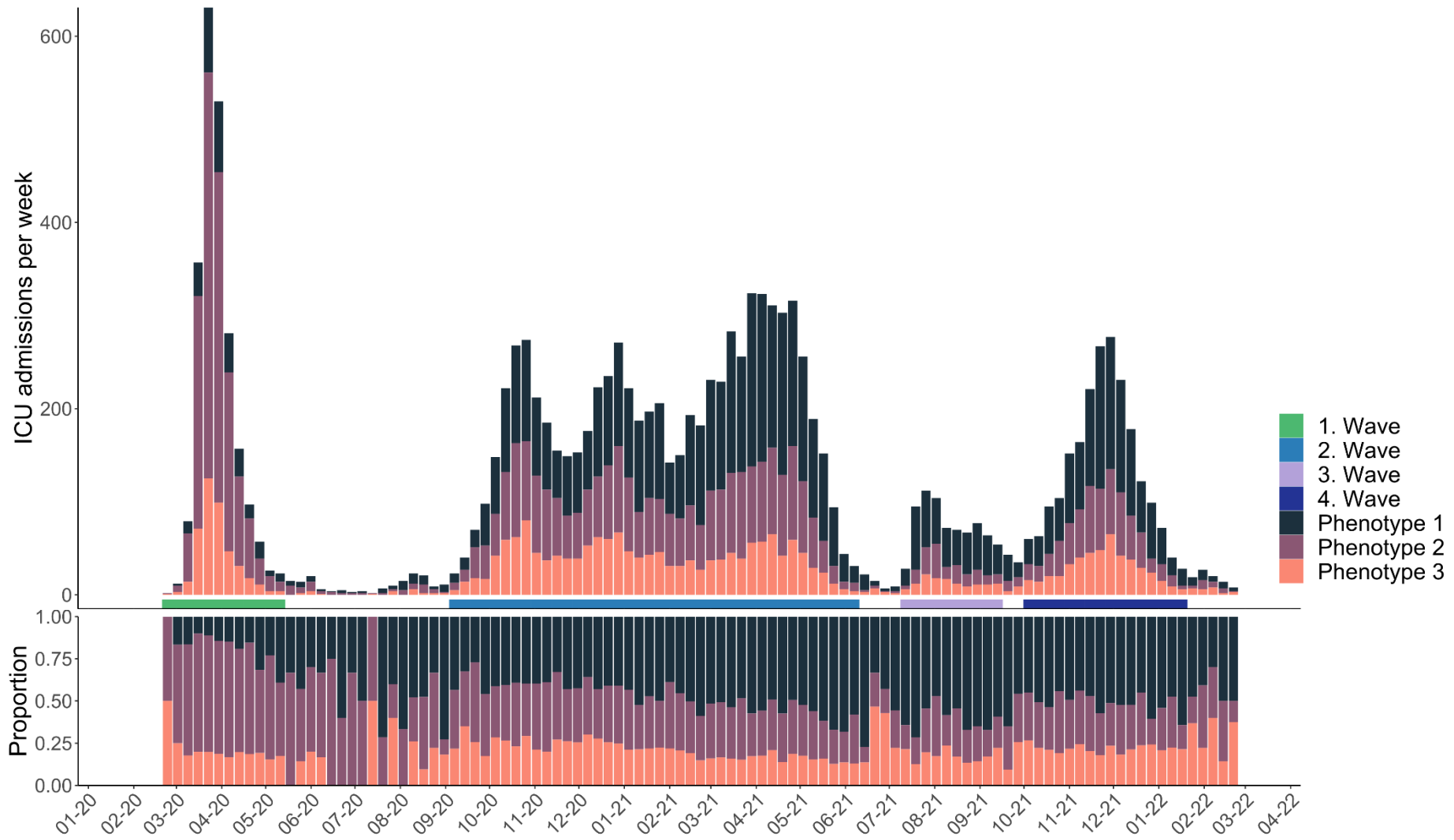
- Drie verschillende klinische COVID-19 fenotypes
- Fenotype 1: jong, hoge BMI, laagste mortaliteit

Fenotype 3:

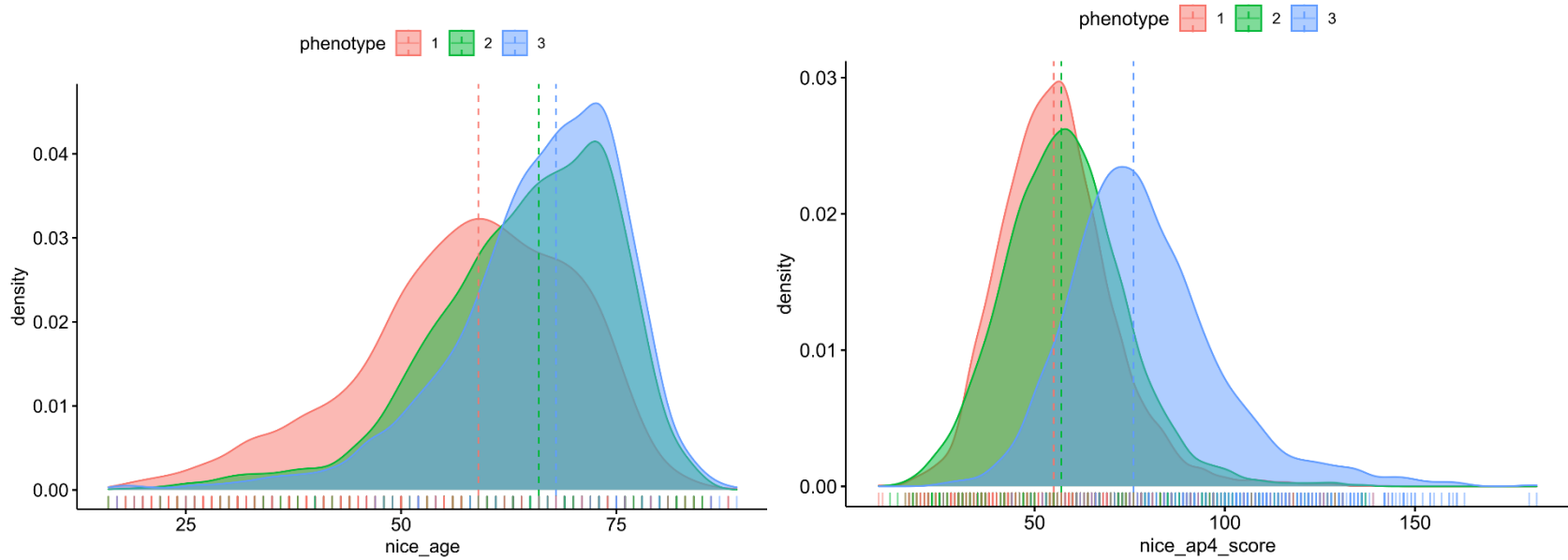
- Nierfunctiestoornis
- De meeste comorbiditeiten
- Slechtste uitkomst
- Hogere inflammatie → meeste voordeel door corticosteroiden

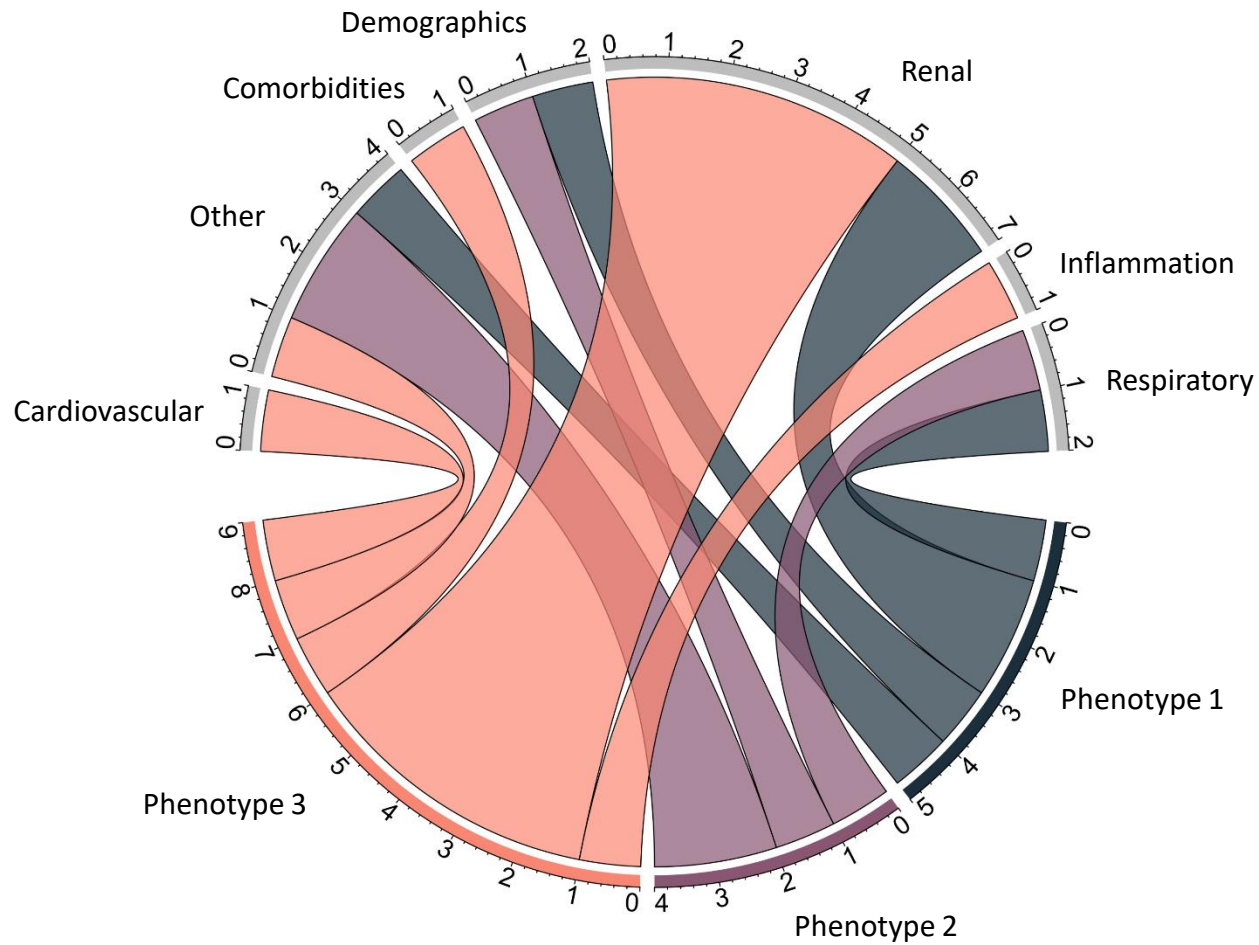
Bedankt!





Density





	Pheno3 no steroids (n=120)	Pheno3 steroids (n=123)
Gender, male	89 (74.17%)	95 (77.24%)
<u>BMI, kg/m²</u>	28[25.47 - 31.25]	28.71[26.3 - 33.92]
<u>Age, years</u>	68.5[61 - 75]	66[57 - 71]
APACHE II	18[14 - 23]	17[14 - 24]
SOFA score	8[7 - 9]	8[7 - 9]
<u>Comorbidity score</u>	1[1 - 2]	1[1 - 2]
<u>PaO₂/FiO₂ ratio</u>	115.7[81.67 - 156.3]	121.1[86.9 - 188]
No ARDS (>300 mmHg)	1 (1.01%)	6 (5.41%)
Mild ARDS (>200 - ≤300 mmHg)	16 (16.16%)	17 (15.32%)
Moderate ARDS (>100 - ≤200 mmHg)	44 (44.44%)	44 (39.64%)
Severe ARDS (≤100 mmHg)	38 (38.38%)	44 (39.64%)
Pa ₂ CO ₂ , mmHg	46.65[37 - 58]	44[35.5 - 56.05]
<u>Respiratory rate (max), breaths/min</u>	24[20.5 - 30]	26[22 - 34]
Vasoactive medication at ICU admission	83 (69.75%)	88 (71.54%)
<u>Hematocrit (min)</u>	0.37[0.33 - 0.41]	0.38[0.34 - 0.43]
<u>Heart rate (max), beats/min</u>	101[78 - 118]	92.5[78 - 115]
<u>Mean arterial pressure (min), mmHg</u>	80[70 - 93.33]	84.83[69.75 - 94.17]
<u>Creatinine, max, μmol/L</u>	126.4[97.26 - 184.8]	133.5[99.03 - 212.2]
Blood urea nitrogen, mg/dL	30.33[22.63 - 49]	32.2[22.4 - 48.42]
<u>Bilirubin, μmol/L</u>	9.92[6.5 - 13.68]	10.26[6.67 - 17.1]
<u>Sodium, max, mmol/L</u>	138.7[136 - 142]	138[135 - 141.8]
<u>Potassium (max), mmol/L</u>	4.5[4 - 5.1]	4.49[4 - 5.013]
<u>Glucose (max), mmol/L</u>	11.1[7.923 - 14.54]	11.41[8.6 - 16.04]
<u>pH (min)</u>	7.25[7.178 - 7.33]	7.28[7.2 - 7.35]
<u>Bicarbonate (max), mmol/L</u>	20[16.15 - 23.85]	20.3[17.4 - 23.2]
<u>Albumin (min), g/L</u>	30[26.4 - 34]	30[26.63 - 32]
<u>White blood cell count (max), x10⁹/L</u>	11.14[7.15 - 16.85]	11.41[7.593 - 17.31]
<u>Thrombocytes (min), x10⁹/L</u>	223.5[157.5 - 313.3]	227[168 - 299]
<u>Temperature, °C</u>	36.8[36.1 - 37.7]	36.7[36 - 37.5]