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Concepts in MIMIC-III

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Clinical Concepts - Motivations

- Constructed based on experts knowledge
- Timely treatment leads to improve outcomes
- Early prediction of specific patient event
- Better administration of care

Concepts in MIMIC

- Severity of illness scores
- Organ dysfunction scores
- Timing of treatment
- Sepsis
- Comorbidities

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Category	Concept
Severity of illness scores	APS III, SAPS, SAPS II, OASIS
Organ dysfunction scores	SOFA, qSOFA, LODS, SIRS, MELD, KDIGO, AKIN
Treatments	Continuous renal replacement therapy, intermittent hemodialysis, vasopressors, mechanical Ventilation
Sepsis	Suspicion of infection, Angus et al. criteria, Martin et al. criteria, explicit ICD-9 coding of sepsis, CMS sepsis criteria, CDC sepsis criteria
Comorbid burden	Elixhauser et al. (AHRQ), Quan et al., Charlson et al.
First 24 h aggregates	Vital signs, laboratory values, blood gas values, urine output
Diagnosis groups	Certified Coding Specialist groups
Demographics	Weight, height, age, gender, service type
Hourly data	Vasopressor doses, vital signs, laboratory values, blood gas values
Fluid balance	Total fluid intake, total fluid output

Illness Severity Scores – APACHE III

- **Acute Physiology Score (APS)-III or APACHE III**
  - Initial risk stratification for severely ill hospitalized patients
  - Risk estimates for hospital mortality for individual ICU patients
- Simplified Acute Physiology Score (SAPS)
- SAPSII
- Oxford acute severity of illness score (OASIS)

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- **SAPSII, SAPSIII**
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  - Genetic Algorithm

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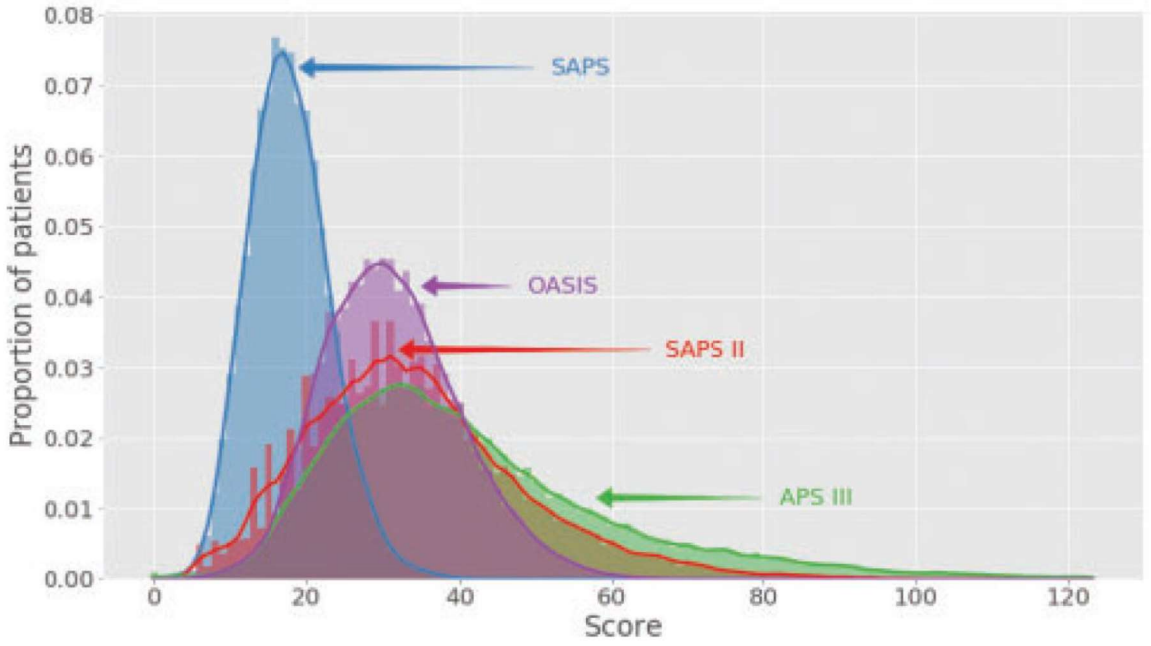

Johnson et al. The MIMIC Code Repository: enabling reproducibility in critical care research, Journal of the American Medical Informatics Association, 2018.

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Organ Failure Scores - Development

- Modified Organ Dysfunction Score (MODS)
- Logistic Organ Dysfunction System (LODS)
- Sequential Organ Failure Assessment (SOFA)

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Limitations

- Early warning systems based on machine learning
- Varying definition of diseases
- Heterogeneity of patient populations

Summary

- Concepts in MIMIC III implement well know scores of illness and organ disfunction
- Concepts in MIMIC III enable reproducibility
- Prognostic power of concepts is limited

References

- Johnson et al. The MIMIC Code Repository: enabling reproducibility in critical care research, Journal of the American Medical Informatics Association, 2018.
- Bulgarelli et al. Prediction on critically ill patients: The role of ‘big data’, Journal of Critical Care, 2020.
- Johnson, Mortality prediction and acuity assessment in critical care, University of Oxford, thesis, 2014.