Medication Regimen Complexity Predicts Fluid Balance in the Medical ICU

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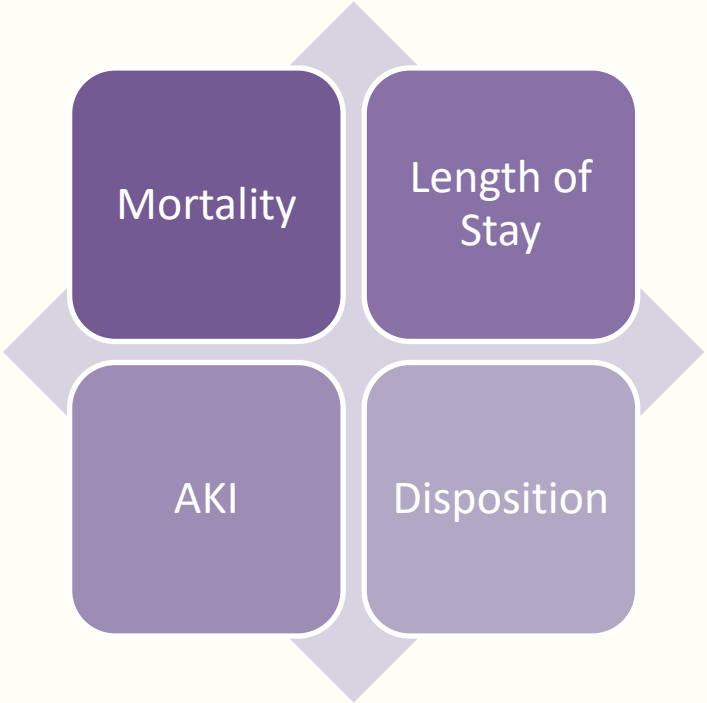
Fluid Overload in Critically Ill Patients



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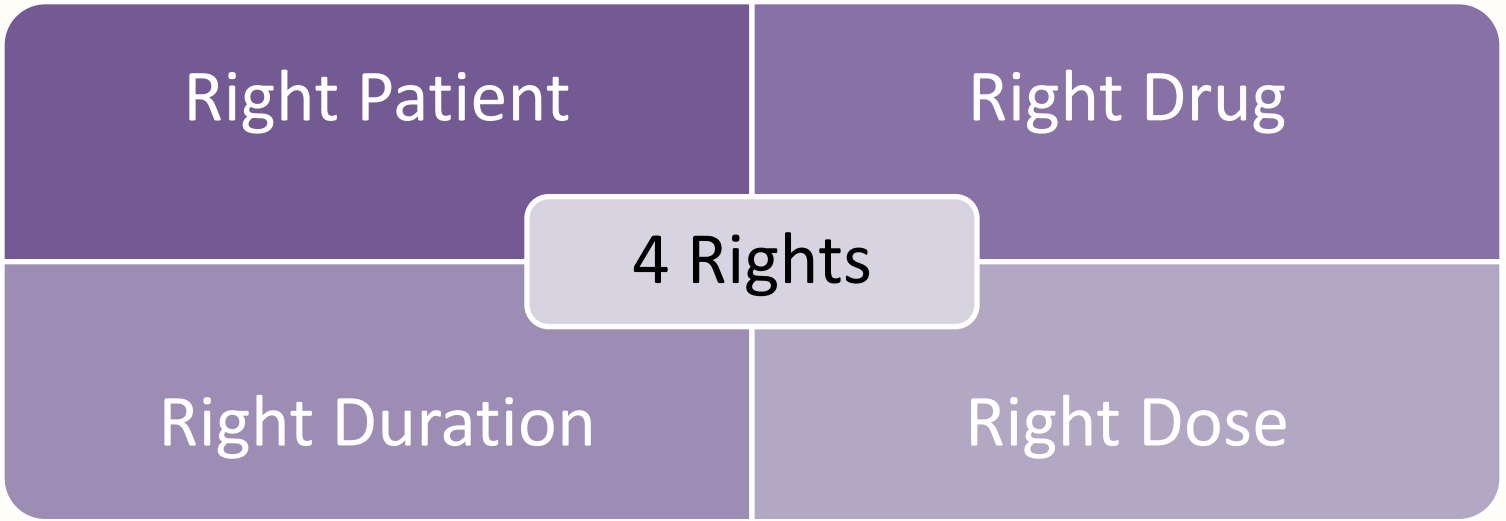
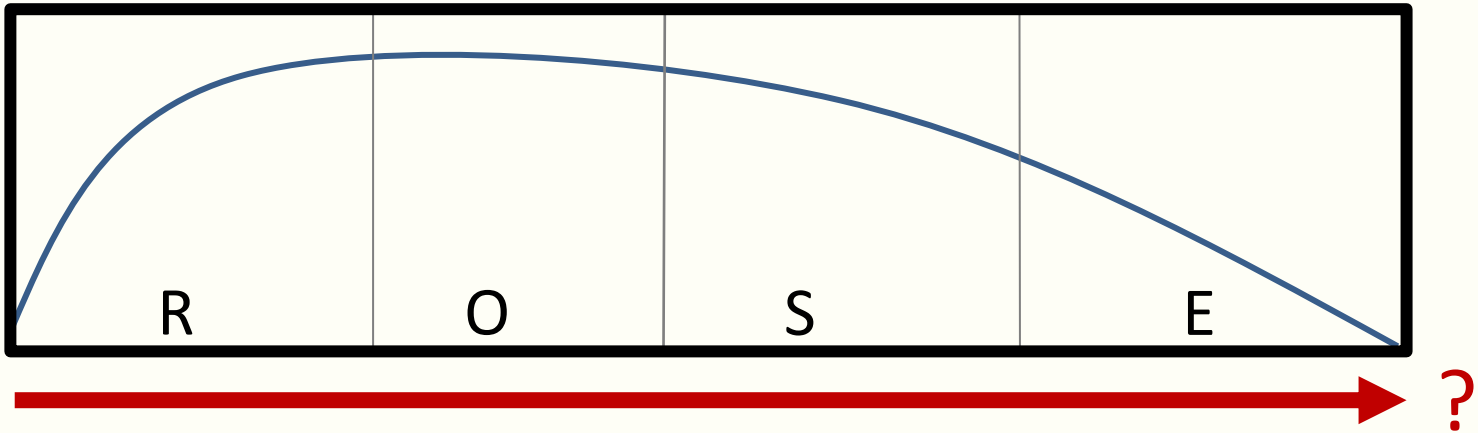
Fluid Stewardship



Journal of Pharmacy Practice 2019. 1-11.
British Journal of Anaesthesia 2014; 113(5): 740–7.

Fluid Stewardship



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British Journal of Anaesthesia 2014; 113(5): 740–7.

Intensive Care Unit Medication Regimen Complexity Score	
Parameter	**Point Value**
High Priority Medications	
Aminoglycosides (amikacin, gentamicin, tobramycin)	3x
Amphotericin B and Liposomal Amphotericin B	1
Antiarrhythmics (amiodarone, dofetilide, sotalol)	1x
Anticoagulants (NOAC's/DOAC's, fondaparinux)	1x
Anticonvulsants (carbamazepine, phenobarbital, phenytoin, valproic acid)	3x
Argatroban	2
Azole antifungals (posaconazole, voriconazole)	2x
Blood Products (Factor products, Antithrombin III)	2x
Chemotherapy (active inpatient)	3x
Clozapine	3
Digoxin	3
Ganciclovir/valganciclovir	1x
Hyperosmolar fluids (hypertonic saline (1.5%, 3%, 23.4%), mannitol)	1x
Immunosuppressants (cyclosporine, sirolimus, tacrolimus)	3x
Lidocaine (continuous infusion)	2
Lithium	3
Prostacyclins (epoprostenol, iloprost, treprostinil)	2x
Theophylline	3
Therapeutic heparins (enoxaparin, heparin infusion)	2x
Vancomycin (IV)	3
Warfarin	3
ICU Medications	
Neuromuscular Blockade	2
Continuous infusions (exclude those listed elsewhere)	1x
Total Parenteral Nutrition	
Managed by non-pharmacist service	1
Managed by clinical specialist pharmacist	3
ICU Prophylaxis and FAST HUGS BID	
Thromboembolic prophylaxis (exclude heparin infusion, therapeutic enoxaparin)	1
Stress ulcer prophylaxis (exclude pantoprazole infusion)	1
Glycemic control (subcutaneous insulin; exclude IV insulin)	1
Bowel regimen	1
Chlorhexidine	1
Analgesia and Sedation	
Opioids and sedatives (scheduled and PRN)	1x
Continuous infusion opioids and sedatives (propofol, fentanyl, dexmedetomidine, ketamine, benzodiazepines)	2x
Antimicrobial Agents	
Antimicrobials (include HIV medications, exclude those listed elsewhere)	1x
Restricted antimicrobials	2x
Devices	
Dialysis	2
Extracorporeal membrane oxygenation (ECMO)	2
Intra-aortic balloon pump (IABP)	1
Left ventricular assist device (LVAD)	1
Mechanical ventilation	2

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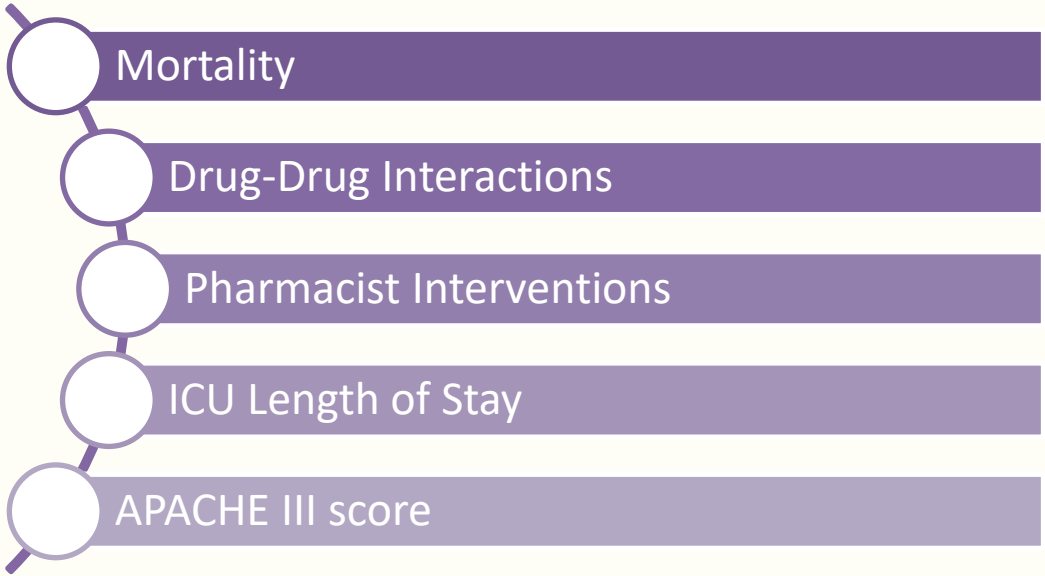
American Journal of Health System Pharmacy 2019. (76). Supplement 4 (92-95).
American Journal of Health-System Pharmacy 2019. (76). Supplement 2 (34-40).

MRC-ICU Correlations



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MRC-ICU

Pharmacists in the ICU setting improve patient outcomes

Patients in the intensive care unit are at increased risk for fluid overload

MRC-ICU is an objective, validated tool in the intensive care

Medication regimen complexity may be a novel method for predicting patients at risk for fluid overload

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Gibson GA. ASHP Best Practices Award in Health-System Pharmacy. 2013.
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What is the relationship between the MRC-ICU score and positive fluid balance in critically ill patients?

Study Design

Design	• Retrospective chart review to capture MRC-ICU score and fluid administration during first 72 hours of admission
Patient Population	• Inclusion: MICU patients between January 1 2017 – April 1 2018 • Exclusion: Length of stay (LOS) was less than 24 hours due to either death, transfer, or hospice orders at 24 hours
Data Analysis	• Demographics included age, sex, weight, ICU LOS, fluid balance • MRC-ICU was scored at 24 hours, 48 hours, and 72 hours

Results

- A total of 50 patients were included. 52% (n=26) female
- Median age was 58 years (interquartile range 51-79), median weight 90kg (interquartile range 69-104)
- MRC-ICU score at 24 hours was 16.3 (interquartile range 12-20)
- MRC-ICU at 24 hours was related to fluid balance at time 72 hours
  - rs= 0.287, p=0.043
- Following linear regression*, the MRC-ICU remained weakly correlated with fluid balance
  - β coefficient 329.173, 95% CI 115.256 – 543.091, p=0.003

Future Directions

- Limitations include single center, retrospective design with small sample size
- Adds fluid balance to growing list of metrics correlated with medication regimen complexity in the critically ill patient population
- Next steps:
  - Larger multicenter trial for external validation
  - Further studies involving other critically ill populations to validate generalizability

Study Team

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Clinical Assistant Professor
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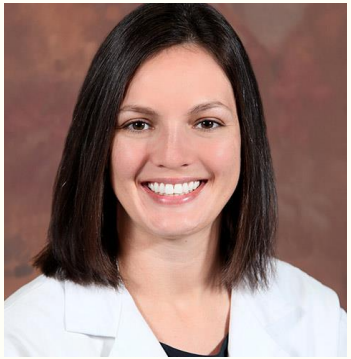

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Questions?

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