Simulation-Based Training Manual for Internal Medicine Residents

Department of Medicine
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Introduction

• Pre-80 hour work restrictions
  – Learn by doing
  – Saw more, worked more, taught more
• Post-80 hour work restrictions
  – Less time with staff
  – Decreased clinical exposure time
  – EMR/computers, paperwork = less time to spend with patients
• Safety and quality measures have made us question the old methods of learning.
• Growth of innovative and time-effective alternatives in education.
• Numerous studies have shown simulation to be an effective and often superior method of learning.
Introduction

• Today, most large medical training centers have medical simulation facilities.

• Medical simulators include a variety of devices from task trainers to full body high fidelity mannequins.

• Studies have shown that simulator trained physicians outperform non-simulator trained counterparts.

• Better, faster, stronger...and safer.
  – Complete procedures faster with fewer complications
  – Greater confidence in dealing with the ‘deteriorating’ patient
Simulation in IM Clerkships/Residencies

- No standardized goals and objectives
- Few resources and guides
- Little research on SIM use in IM scenario-based education
  - Clear benefits in ACLS, procedural skills, and physical exam proficiency
  - Common inpatient scenarios remains as yet largely undefined
Simulation use at MCA

• Chief Medicine Residents (CMR) at Mayo Clinic Arizona (MCA) started to incorporate simulation-based teaching sessions into AM report.

• Since 2011 the repertoire of scenarios has been passed down from CMR to CMR.

• We compiled a series of 20 scenarios with variable learning objectives and levels of complexity.
Simulation use in MCA IM Residency

• Most scenarios involve clinically deteriorating patients that would typically be managed by hospital internists.
• Each scenario follows a standardized format.
• Expectations for resident performance are outlined in the “critical action list” that lends itself to effectively monitor and document trainees’ progress.
MCA Internal Medicine Residency Simulation Manual Contents

• Introduction
• Debriefing Tips
• Mannequin Capabilities
• Acknowledgements
• 20 Scenarios

Outline of Scenarios
• Learning Objectives
• Setting
• Truncated H&P
• Scenario
• Simulator Settings
• Personnel
• Lab & Diagnostic data
• Critical action list / Treatment and Interventions
• Branch points/Simulator Responses to Interventions
MCA Internal Medicine Residency

Simulation Manual - Scenarios

- ACS – NSTEMI
- Acute Abdomen
- Acute Aortic Syndrome
- Acute Hypoxic Resp. Failure
- Acute PE
- Bilateral Severe PE
- AFib with RVR
- Anaphylaxis
- DKA
- GIB from PUD
- Hypercapneic Resp. Failure
- Hypernatremia
- Hypertensive Emergency
- Hyponatremia
- Opioid Overdose
- Seizure
- Sepsis – Pyelonephritis
- Sepsis – Sacral Decub
- Transfusion Reaction (TRALI)
- Variceal Bleed
Simulation in Internal Medicine

**Education Goals**

- Medical Knowledge & Critical Thinking
- Communication & Cognitive skills
- Confidence
- Teamwork
- Procedural skills
- Duty hours dilemma: “hands-on” void
- Patient safety: “practice” on mannequins
- Evaluation & Remediation
MCA Internal Medicine Residency

*Simulation Manual Goals*

- Create a user friendly resource for Mayo Chiefs, Residents, and Consultants.

- Promote use of “standardized” scenarios for resident training & evaluation.

- Use as research tool for evaluating current and developing future SIM education programs.
It works...

• Vucicevic and Webb et al.
  – Evaluated the effect on acquisition of clinical knowledge and confidence in internal medicine residents
    • Simulation-based instruction was added to conventional didactic teaching
  – 2 clinical topics: status epilepticus (SE) and atrial fibrillation with RVR (AF)
    • Core principles were taught in traditional classroom didactic lecture.
    • Lecture was standardized and performed by a content expert.
    • Simulation scenarios were designed and participants were expected to apply core principles in the acute management of SE and AF.
  – Survey on knowledge assessment of core principles and confidence given
    • Prior to didactic
    • After didactic (few days), but before simulation
    • After simulation (simulation was performed 1 week after didactics)
Atrial fibrillation – medical knowledge

Pre-Test: 11.56
Mid-Test: 15.83
Post-Test: 17.61
Status epilepticus – medical knowledge

![Bar chart showing scores for Pre-Test, Mid-Test, and Post-Test. The scores are 8.29, 10.21, and 12.00 respectively.]
Atrial fibrillation – confidence

Score

Pre-Survey: 3.63

Mid-Survey: 4.35

Post-Survey: 4.61
Status epilepticus – confidence

![Bar chart showing scores for Pre-Test, Mid-Test, and Post-Test.]

- Pre-Test: 3.12
- Mid-Test: 3.62
- Post-Test: 4.35
Conclusion

• Work hour restrictions, as well as safety and quality measures have impacted traditional hands-on training for IM residents.
• Simulation-based technology is an effective adjunct to a conventional didactic-based approach to teaching IM residents how to manage common inpatient conditions.
• MCA CMR use medical simulation training sessions to augment traditional didactic morning reports and to provide simulated hands-on experience of managing clinically deteriorating patients.
• A study performed at MCA demonstrates the effectiveness of simulation technology in improving medical knowledge and clinical confidence in managing commonly-encountered inpatient conditions when combined with traditional didactic teaching.
• Our compilation of these scenarios is now in press, for publication in both print and electronic versions, with plans for distribution and use as an educational and research tool.
Thank you
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