

Implementing Provider Scheduling Decision Support Tools in Clinical Practice

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CHEPS

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A prescription
to address
system
complexity
in healthcare

INNOVATING
HEALTHCARE
DELIVERY

FOSTERING
LEARNING

BUILDING
COMMUNITY



POSITIVE IMPACT THROUGH...

**Research
Education
Implementation
Outreach
Dissemination**

CHEPS: OUR MISSION



FOSTER LEARNING

Providing experiential learning opportunities for students, faculty, and practitioners from across the campus and beyond



INNOVATE HEALTHCARE DELIVERY

Bringing together teams from across a wide spectrum of disciplines to make an impact by solving complex real-world healthcare problems



BUILD COMMUNITY

Nurturing a vibrant and diverse community of individuals working, learning, and having fun together



CHEPS: HOW WE DO IT

EDUCATION

A wide-angle photograph of a modern classroom. A male professor in a light blue shirt and tie stands at the front right, gesturing while lecturing. Students are seated at long tables, many with laptops open. A large screen at the front displays a presentation slide titled "Managing Healthcare". The room has white walls, a whiteboard, and a yellow door. The word "EDUCATION" is overlaid in large yellow letters on the top left.

IMPLEMENTATION



CHEPS: HOW WE DO IT

OUTREACH



DISSEMINATION



WHAT IS MEDICAL RESIDENCY?

- Transition period between medical school and fully independent/unsupervised practice
 - Four years of med school
 - First year of residency – “Intern”
 - Two or more years of residency
 - Possibly one or two additional years as “Chief Resident”
 - Possibly more years as a “Fellow”
- During all of this time, providing patient care (albeit with the oversight of a more senior “attending” physician –supervision decreases over time)

WHAT IS MEDICAL RESIDENCY?

- A key issue: Dual role of residency
 - Learning experience: Residency (and Fellowship) are parts of the medical education training process
 - Patient care: Residents/Fellows provide a significant amount of the patient care in teaching hospitals and the associated clinical system
- A month in the life of a typical resident might include:
 - “Block assignment”
 - “Continuity clinics”
 - Seminars, formal educational activities
 - Research

INHERENT TIME CONFLICTS

- How to schedule residents' time
 - Need adequate patient coverage with a limited pool of residents
 - Need adequate training opportunities
 - Need adequate rest – fatigue increases risk of error
 - Need to address resident satisfaction, personal life
- Not just quantity of hours but pattern
 - Continuity of care
 - Sleep issues (especially associated with overnight shifts)
 - Opportunities for different medical experiences

ED SHIFT SCHEDULING

- Assigning residents to shifts at a pediatric emergency department
- Monthly schedules
- Heterogeneous workforce (different levels, different programs)
- Resident-specific needs (education; personal)
- Program-specific needs (patient care)

SHIFT SCHEDULING

- Shift scheduling:
 - Given a time horizon
 - Given a set of shifts per day
 - Given a set of residents (heterogeneous set)
 - Residency program
 - Seniority
 - Assign residents to staff these shifts



WHY IS THIS HARD?

	6		1		4		5	
		8	3		5	6		
2								1
8			4		7			6
		6				3		
7			9		1			4
5								2
		7	2		6	9		
	4		5		8		7	

- The more squares you fill in, the fewer choices you have left for what is valid
- Once you make a mistake, you might not know it for a long time
- Once you realize something is wrong, it can be very hard to back track and correct



HOW SHIFT SCHEDULES ARE TYPICALLY BUILT

- Schedules typically built by Chief Residents
- Limited decision support
- No formal training
- Hard to satisfy all rules
- Unlikely to make everyone happy

ED SHIFT SCHEDULING AT MICHIGAN MEDICINE

- What we've done:
 - Defined problem
 - Built software tool
 - Trained students
 - Work with chief resident to build monthly schedule for the past several years
 - Used as a platform to launch other related projects

KEY OBSERVATIONS

- Importance of collaboration
- Challenges in defining objective function
- Opportunity to engage and provide unique training for students

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