



# Work Decompression

Reducing the Workday to  $\leq 16$  Hours in Three Residencies

2010 APDIM Spring Meeting  
Workshop 110, Session 1  
Tuesday, 27 April, 2010  
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Virginia Mason Medical Center

## Virginia Mason Medical Center

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# Virginia Mason Medical Center



Virginia Mason is located here



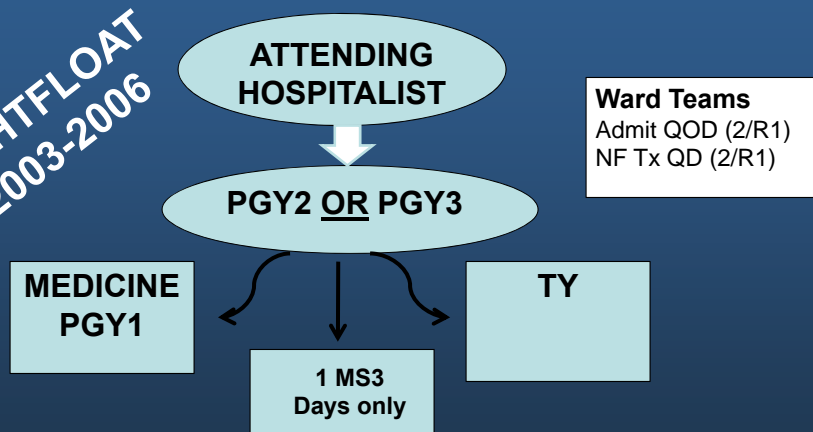
# Virginia Mason Medical Center

- 292 Beds
- 55-120 VM Medicine Inpatients (mean 85)
  - Mean census 67 at 0700
  - Mean admissions 18
  - Ward Cap 16 contacts
  - 75% Teaching
  - 24/7 Hospitalist Faculty
- 41 FTE Internal Medicine Residents (includes ½ of TY)
- 5 Inpatient Teaching Services
  - ICU/CCU, admits daily
  - IMC , admits daily
  - 3 General Medicine, admit QOD, NF transfers daily
  - Manager rotation, admit daily
  - Night Float x 365, 1900-0700
  - 2 Nonteaching Faculty Services



## Night Medicine and Ward Teams

**NIGHTFLOAT  
2003-2006**



## Interruption = Indolence and Sloth?

The habit of sauntering and of indolent careless application, which is naturally, or rather necessarily, acquired by every {Medicine Resident} who is obliged to change his work and his tools every half hour and to apply his hand in twenty different ways almost every day of his life, renders him almost always slothful and lazy and incapable of any vigorous application even on the most pressing occasions. Independent, therefore, of his deficiency in point of dexterity, this cause alone must always reduce considerably the quantity of work which he is capable of performing.



The Wealth of Nations, Adam  
Smith 1776

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## Cost of Interruptions

- Task Saturation
- Resumption timing
- Task Reacquisition



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## Duty Hours Disruptions

- Work Compression
- Disrupted doctor-patient relationships
- Disrupted teams microsystems
- Human Error



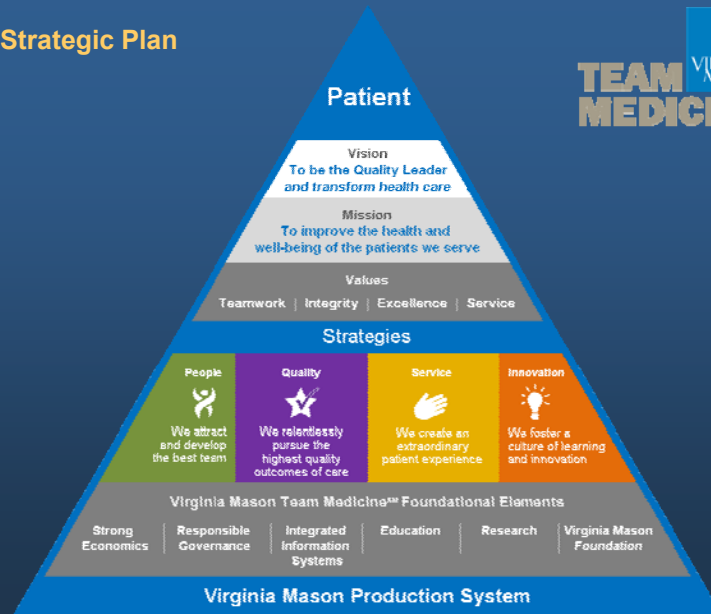
## Human Error Probability Task Type

Familiar, at speed, no idea of outcome	0.55
Shift or restore to new state, no supervision or procedures	0.26
Complex task, performed rapidly	0.16
Routine task, performed rapidly	0.09
Routine task, performed rapidly, low skill	0.02
Shift or restore to new state, <u>with</u> supervision or procedures	0.003
Respond to system command with automated supervision	0.00002

# Human Error Probability Work Conditions

Unfamiliarity	X 17
Shortage of Time	X 11
Low Signal to Noise Ratio	X 10
Ease of Information Suppression	X 9
Ease of Information Assimilation	X 8
Reversing Unintended Actions	X 8
Channel Capacity Overload	X 6
Technique Unlearning	X 6
Transfer of Knowledge	X 5.5
Performance Standard Ambiguity	X 5

## Our Strategic Plan



# Lean Production System Philosophies and Practices

- Customer First
- Highest Quality
- Obsession with safety
- Highest staff satisfaction
- A successful economic enterprise



## The Lean View of Value

- **Value-** A capability provided to a customer at the right time, at an appropriate price, as defined in each case by the customer.
- **Value Stream-** The specific activities required to design, order, and provide a specific product, from concept to launch, order to delivery, and raw materials into the hands of the customer.
- **Work-** Any action within an operation which adds value.



## Lean View of Waste

- Any activity that doesn't serve the valid requirements of customer—usually in seven critical areas: Overproduction, Time on Hand (waiting), Transportation, Processing, Stock on Hand (inventory), Movement, Defective Products.
  - Muda variation in output (mistakes and defects) discovered after the process is in place and dealt with reactively
  - Mura eliminating fluctuations in operations, esp quality and volume
  - Muri planning stage for the next project, using learnings from Muda and Mura



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## Upfront Lean View of Waste

- **Waste** is those system elements (including elements of the final product) which do not bring value to the customer.
- **Value** is what the customer is willing to pay for.
- The **Customer** is the entity which monetarily pays for the final product (includes wholesalers and distributors, but not internal customers, management, or other stakeholders in the production systems).



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## Lean Principles

- Continuous Flow Production (vs Batch and Queue)
- Pull Production
- 5S (Sort, Simplify, Sweep, Standardize, Self-Discipline)
- Visual Controls
- Mistake Proofing (Poka Yoke, Jidoka, Heijunka)
- Value Stream Management
- Five Whys
- Open Book Management



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## Reducing Workflow Interruption

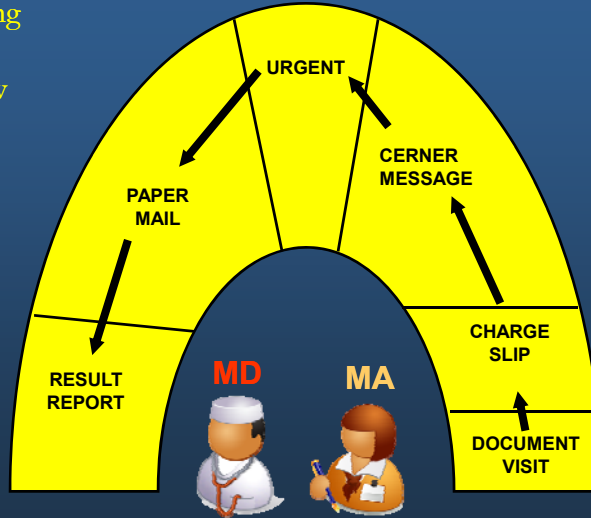
- Rounds as Standard Work
  - Value Stream Mapped
  - By Appointment
  - External Setup
  - Role Definition
  - Transdisciplinary Bedside Rounds
  - One-Piece-Flow (Notes, orders, family, consults)



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## Flow Management at Flow Stations

- Eliminate walking
- Continuous flow (no batching)
- Visual control
- Line of sight
- MD and MA side-by-side



Courtesy of Kim Pittenger MD

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## Achieving Flow-Before



MA and MD Office far apart



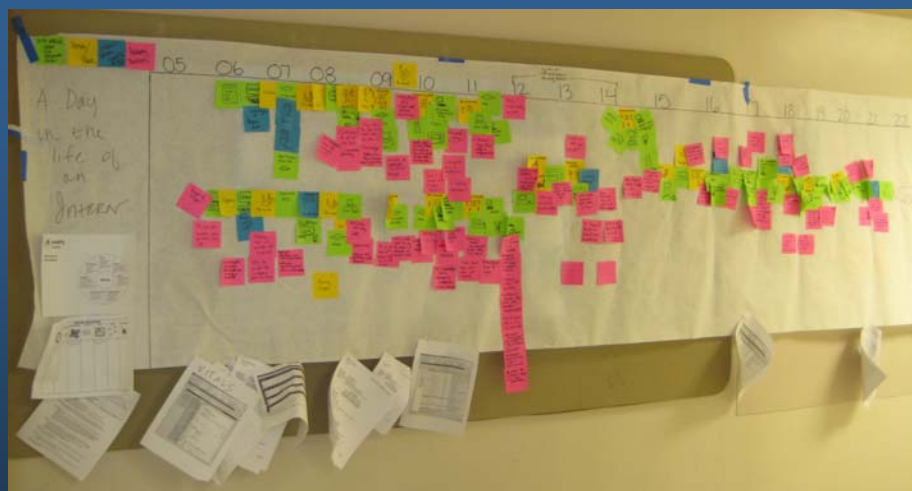
## Achieving Flow - After



- MD/FM side-by-side
- Standardized Flow Stations
- Walking eliminated
- Continuous Flow
- Visual Control



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## Flow mapping an intern's day



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# MORNING ROUNDS

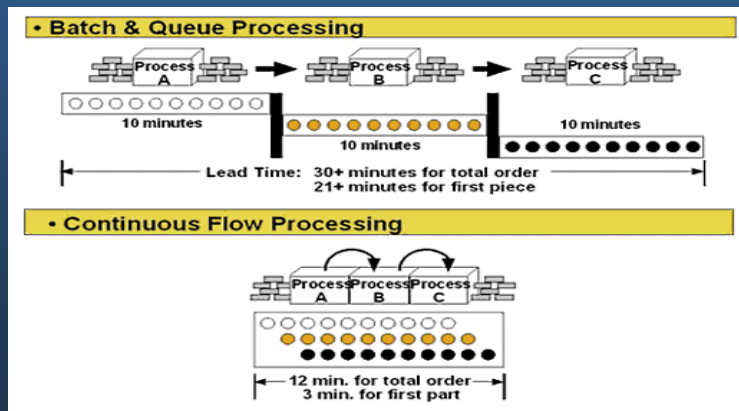
## ROUNDING ORDER PRIORITIES

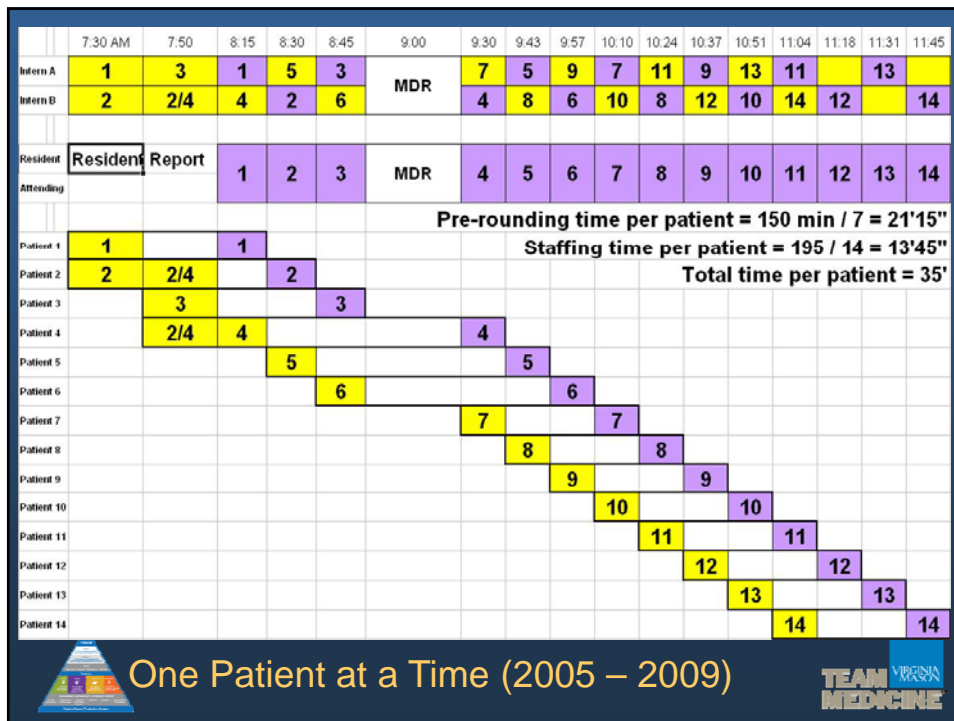
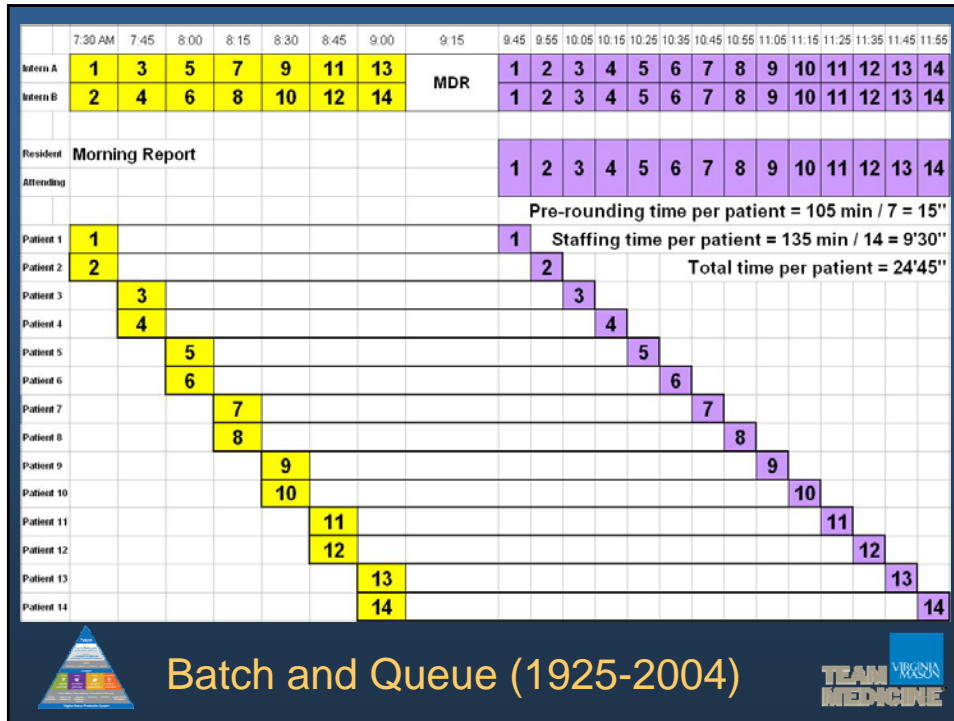
- Discharges
- Sick Patients
- New Patients
- Continuity Patients
- Complex Discharges
- Patients Being Discharged Tomorrow



# GME and Lean

Applying techniques of one-piece flow in a traditional batch-and-queue system.





## GME and Lean

Applying techniques of one-piece flow in a traditional batch-and-queue system.

Time for each patient:

Batch: 24:45 minutes per patient

One-patient-at-a-time: 35 minutes per pt.



## GME and Lean

Kaizen Event : Working on the work at the bedside.

Create standards for inpatient encounter

Two day event

Five residents, two attendings

Six simulations

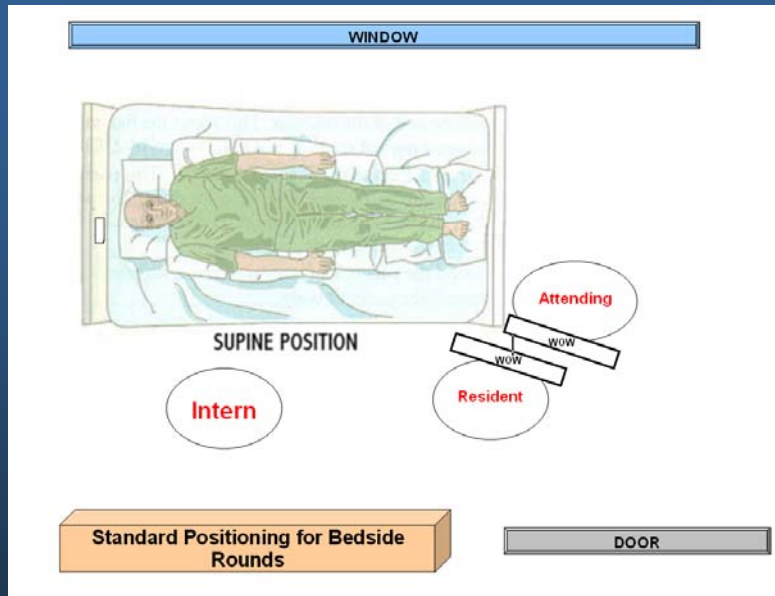


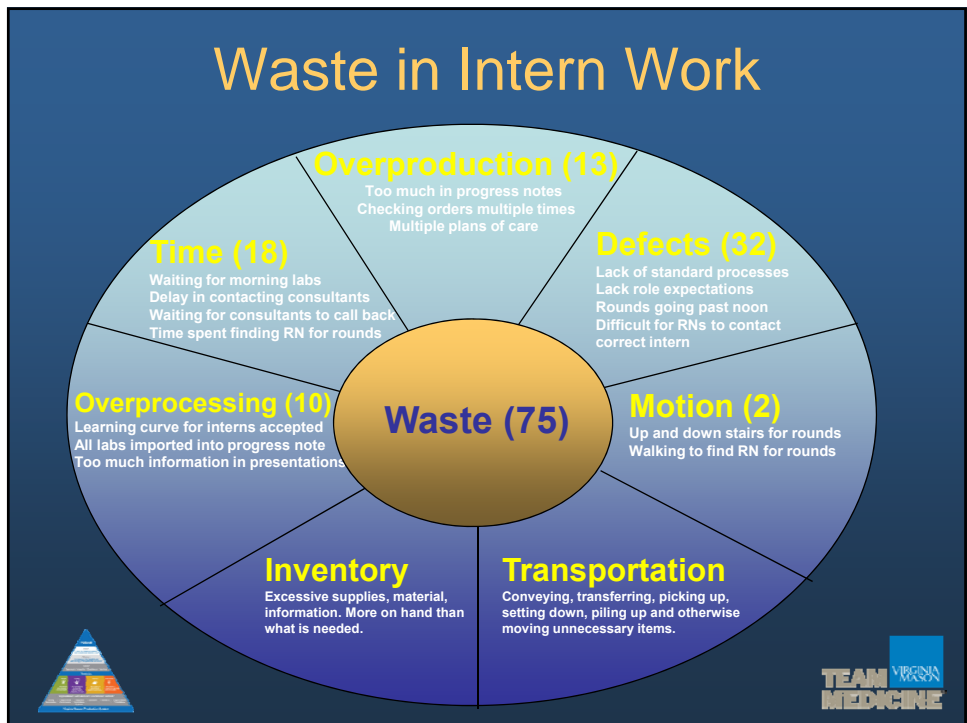
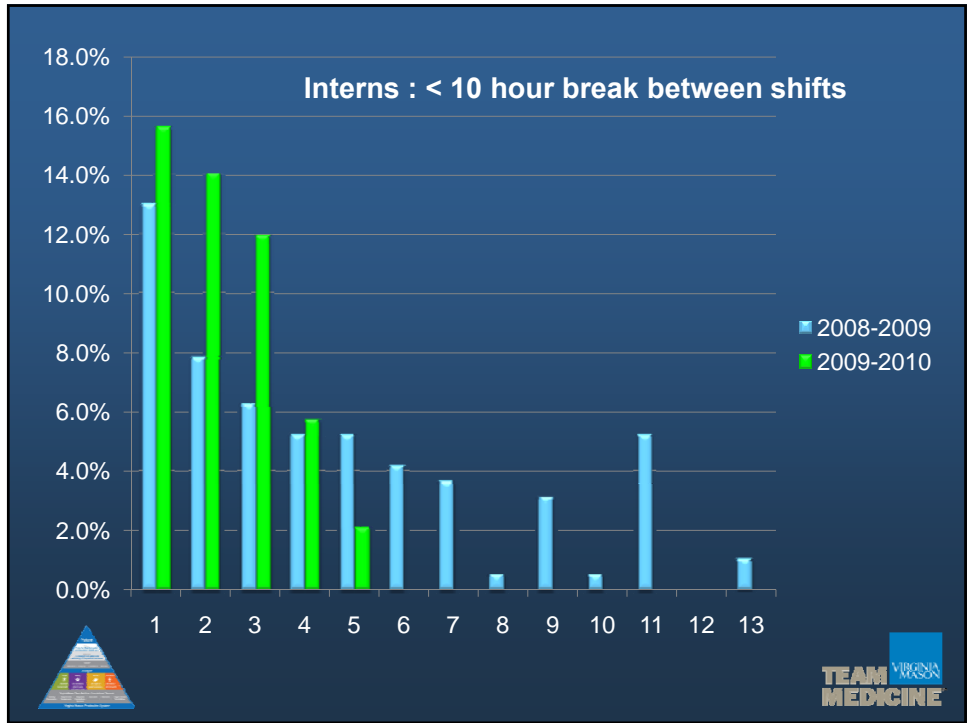


Before



After





## Sequence of Change

- Night Float 5/7 days on Wards 1994
  - RRC-IM Call and Duty Hour limit citations
- 14 H Shifts in ICU July 2005
  - Transitional Year Elective Requirements
  - Resident-patient continuity limits with q3 call
- 14 h Shifts in Wards 7 April, 2007
  - Sleep Science
  - Program Director on Night Shifts



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## Context and Costs

- Resistance is inevitable
- We needed 24-7 Attending Coverage
  - Attendings integrated with teams
- Expert faculty to preserve autonomy
  - Supervision and Autonomy--duality



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## Benefits

- Continuity
- Flexibility
  - Days Off
  - Clinic Days
- Duty Hours Compliance
  - Violations as Special vs Common Cause
    - July, August
    - Individual



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VM Call system:

Our teams have one resident and two interns. They work with a hospitalist, who generally work one week at a time. We have one medical student per team.

Interns can admit three patients during a 12 hour (7:AM to 7:PM) admission day. Thus the team cap is six admission. We use patient contacts as our hard cap and we limit our interns to 8 patient contacts per day. Thus the team caps at 16 contacts per day.

In general, we split the hospital into the top 4 floors (upstairs) and the bottom 4 floors (downstairs). On any given day, one team admits for the upstairs and one team admits for the downstairs (see table). Over the weekend, one team admits for the whole hospital during the day.

A = Admission Day (7:AM-7:PM)	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
<b>Team A Upstairs</b>	<b>A</b>		<b>A</b>		<b>A</b>		
<b>Team B Upstairs</b>		<b>A</b>		<b>A</b>		<b>A</b>	
<b>Team C Downstairs</b>	<b>A</b>		<b>A</b>		<b>A</b>		<b>A</b>
<b>Team D Downstairs</b>		<b>A</b>		<b>A</b>			

Over the month, every team has 12 admission days. Every team admits on one Saturday and one Sunday during the month. They also have two weekends where they are not the admission team (golden weekends). On these days, they round on the patients, and they go home.

Night Float.

Between 7:00 PM-7:00 AM, we have a night float admission team of who can admit up to 8 patients per 12 hour night shift. Any patient admitted overnight is handed off to a day team. In the morning, we level the total number of patients across the four teams so every team has about the same number of patients. On average, residents admit about half the patients on their panel and get half of their patients from night float handoffs.

To make this work, we've had to work very hard on handoffs. We teach new interns on the important components of handoffs during orientation and during their first ward months. On average, our teams have between 10-14 patient contacts per day (about 5-7 per intern). Residents round for interns when interns have days off. Days off are taken on non-clinic, non-admission days.

Interns/residents still go to clinics. During those days, residents admit for interns. We have a system to electronically forward pagers for clinic days and days off.

Hours per week: Average of ~65-70 depending on the month with an individual intern range of around 55-80 hours per week. We've had three interns work over 80 hours a week averaged over the course of the rotation in the past 3 years.

What works:

Leveling. All the teams share the work. It is rare for a team to have fewer than 8 patients and when it's busy, all the teams are busy. The night float admissions are spread to the teams with capacity. This way, one team doesn't get a ton of work while another team sits idle.

Challenges:

Patients move out of the 4-floor geography. Our patients can switch rooms for many reasons (intermediate care is limited to certain floors, telemetry only available on certain floors, etc), and when teams lose their geographic concentration, then travel between floors and poor communication with RNs can impact timely and coordinated patient care.

10 hour rule. Without overnight call, we don't worry about the 24+6 duty hour rule. We run into challenges with 10 hour breaks. Residents must have at least 10 hours between shifts. Thus, if we expect them to be here by 7:AM, they have to leave by 9:PM. This typically could happen between an admission day and returning the next day. On average, over the year, this happens about once a month per intern. Most of the problems with this duty hour rule occur in the first 4 months of the academic year and generally become infrequent in the second half of the year.

Typical day:

6:30 AM	Arrive, computer review of patient panel
7:00 AM	Sign out with night team. Overnight admissions handed off to day teams with an face-to-face handoff.
7:30 AM	Morning report for seniors, interns begin pre-rounding.
8:15 AM	By this time, some teams start rounding.
9:00 AM	Multidisciplinary rounds (disposition / MSW / Pharmacy)
12:15 PM	Noon Conference
1:00 PM	Teaching rounds
2:00-7:00	Admission time. Non-admit teams can leave after 2:00.
7:00 PM	Night float sign out.