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Shorter Resident After Hour Shift Times Are Associated With Decreased Number of Discrepancies: A Pilot Study

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No disclosures

Purpose

- Primary aim: Decrease the rate of **discrepancies** in after-hours preliminary resident reports.

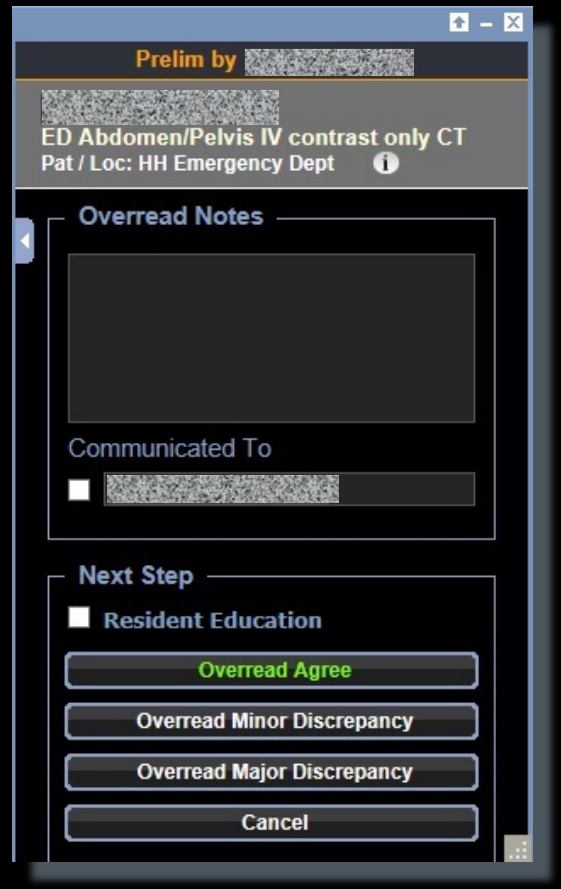
- Secondary aim: Alleviate residents' feelings of **fatigue**.

Background

- Radiology residents at our institution read more than **half** of all overnight studies on a busy Level 1 trauma and medical emergency department, adding to more than **35,000 yearly resident reports**.

- Attending radiologists provide feedback for the resident's preliminary reports using a tool from our workstation software, "Primordial" (Primordial Inc., San Mateo, CA, USA).

- Reports are categorized into: "Major Discrepancy", "Minor Discrepancy", and "Agree".
  - A **major** discrepancy refers to a discrepancy that has an impact on patient management, and the delayed reporting may result in **increased morbidity or mortality**.
  - A **minor** discrepancy refers to a discrepancy that has an impact on management, but the delayed reporting is **not expected to change the clinical outcome**.



Background

- In order to decrease the resident discrepancy rates, our department instituted a **review committee** on August 2017, consisting of resident and attending radiologists that review data from our feedback software.
- Since September 2017, data from our feedback software has been regularly reviewed by our committee and discussed with residents at morbidity and mortality (**M&M**) conference.
- Based on the patterns of discrepancies and resident comments, we hypothesized that **a change in the night float system would help decrease resident fatigue and discrepancy rates**.

Methods

- At the beginning of the 2019-2020 academic year, a change in the resident night float system was implemented.
  - **Previous** night float system
    - 14-hour shifts every second night with 5 pm-7 am coverage
    - Rotation was 2 or 4 weeks in duration, depending on the schedule.
  - **New** night float system
    - 7-hour evening shifts with 5 am-12 am coverage for six consecutive evenings, followed by one off-day
    - 7-hour night shift (second resident) with 12 am-7 am coverage for six consecutive evenings, followed by one off-day
    - Rotation duration was decreased to 2 weeks.

Methods

- We compared the resident **discrepancy rates** before and after the implementation of the new system.
    - We had 18 months of data available for the old system, and 9 months for the new system.
    - We used Chi-square test with Yates correction for statistical analysis and performed power analysis-sample size calculation for power of 0.8 and significance level of 0.05.
- Additionally, we **surveyed** the PGY-4 resident class, the only class who experienced both night float systems, about any change in their fatigue levels with the new night float system.

Results - Data

Major and minor discrepancies

	5 pm - 7 am				5 pm - 12 am				12 am - 7 am			
	Disagree	Agree	Total	Discrepancy Rate	Disagree	Agree	Total	Discrepancy Rate	Disagree	Agree	Total	Discrepancy Rate
Pre	1350	53746	55096	2.5%	663	29492	30155	2.2%	687	24254	24941	2.8%
Post	627	27976	28603	2.2%	276	14861	15137	1.8%	351	13115	13466	2.6%
p-Value				0.02				0.009				0.4

Resident Survey

Reported fatigue	Number of residents
Decreased	11
Unchanged	1
Increased	1

Major discrepancies

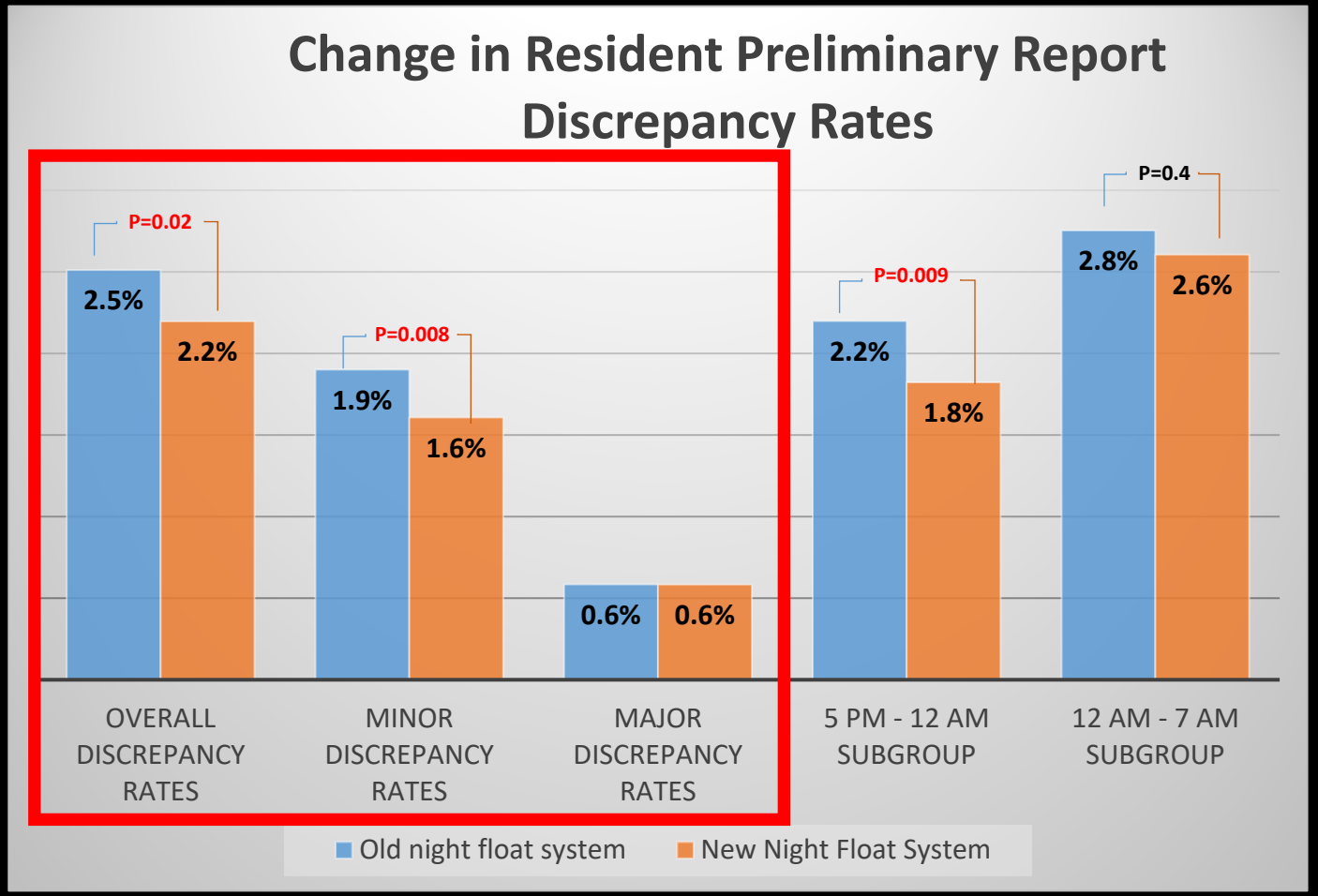
	5 pm - 7 am				5 pm - 12 am				12 am - 7 am			
	Major	Other	Total	Discrepancy Rate	Major	Other	Total	Discrepancy Rate	Major	Other	Total	Discrepancy Rate
Pre	322	54774	55096	0.6%	143	30012	30155	0.5%	179	24762	24941	0.7%
Post	167	28436	28603	0.6%	65	15072	15137	0.4%	102	13364	13466	0.8%
p-Value				1				0.6				0.7

Minor discrepancies

	5 pm - 7 am				5 pm - 12 am				12 am - 7 am			
	Minor	Other	Total	Discrepancy Rate	Minor	Other	Total	Discrepancy Rate	Minor	Other	Total	Discrepancy Rate
Pre	1028	54068	55096	1.9%	520	29635	30155	1.7%	508	24433	24941	2.0%
Post	460	28143	28603	1.6%	211	14926	15137	1.4%	249	13217	13466	1.4%
p-Value				0 .008				0.01				0.2

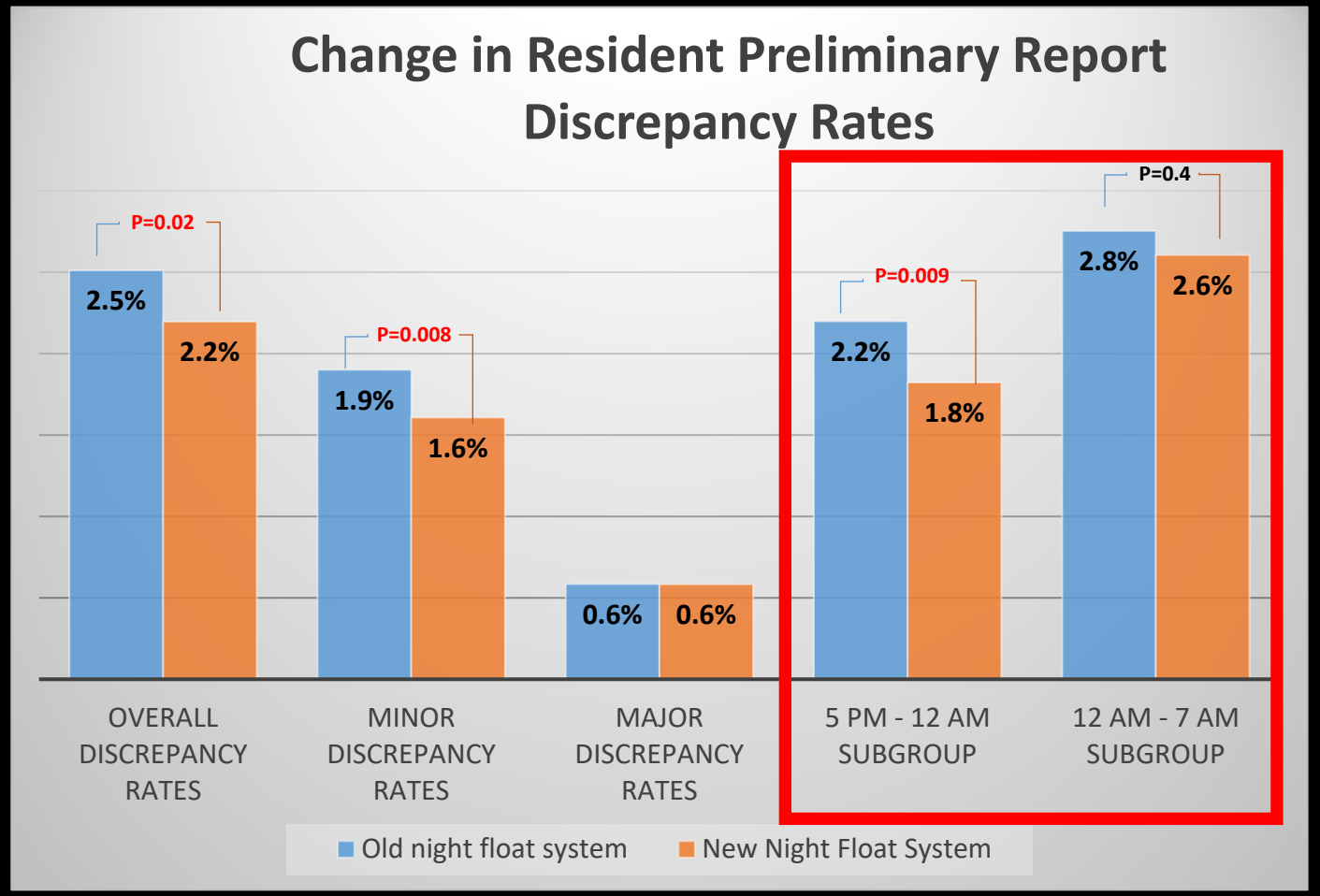
Results

- There was a statistically significant decrease in the **overall** discrepancy rate from 2.5% to 2.2 % (1350/55096 to 627/28603, p=0.02.
- A statistically significant decrease in the **minor** discrepancy rate from 1.9% to 1.6% (1028/55096 to 460/28603, p=0.009) was also found.
- The **major** discrepancy rate was unchanged at 0.6% (322/55096 and 167/28603).



Results

- For the **5 pm-12 am shifts** the discrepancy rates decreased from 2.2% to 1.8% (663/30155 to 276/15137, p=0.009).
- For the **12 am-7 am shifts**, there was a smaller and not statistically significant decrease from 2.8% to 2.6% (687/24941 to 351/13466, p=0.4). Nevertheless, power analysis requires a necessary group size of 103,097 for the 12am-7p shift, meaning that **larger groups are needed** for a more powerful comparison.
- Our **survey** following implementation of the new night float system found that:
  - 84.6% (11/13) of surveyed residents reported **decreased** fatigue levels.
  - 7.7% reported unchanged fatigue.
  - 7.7% reported increased fatigue.



Conclusions

- The rate of minor discrepancies in the preliminary resident reports significantly decreased after the implementation of a new night float system with shorter shift times.
  - While the major discrepancy rate was less than minor discrepancy rate in both groups, no decrease in the major discrepancy rate occurred with the new system. A possible explanation is that the residents may be equally diligent to detect major findings with increasing levels of fatigue, while their ability to detect the minor findings is more susceptible to fatigue.
  - The decrease in the discrepancy rate was more apparent for the early night-shift compared to the late-night shift. The difference remains unproven on account of a small sample size. If the difference is real, however, it could be due to the residents' ability to preserve their natural sleep cycle with the early-night shifts.

- The association of shorter shift times with decreased discrepancy rates may be due to decreased fatigue levels, as supported by the resident survey showing decrease in the reported fatigue levels with the new system.

- This is a preliminary work. We intend to continue our analysis, and implement further interventions based on the data.

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Thank you.

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