



A Rapid Modeling Hospital Unit Design Study

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Overview

Reducing wasted effort and increasing time available for patient care yields direct benefits in terms of nurse productivity, quality of care, patient safety, improved outcomes, and nurse satisfaction. Recent peer reviewed studies have drawn a correlation between hospital unit layout and achieving improvements in these areas. This correlation is particularly true when hospital design forces nurses to deviate from nursing best practice, which is often the case with documentation and meds policy.

In an effort to ascertain a quantifiable comparison of hospital unit layout options for meds and documentation, a study was performed that included four scenarios using Layout-iQ, Rapid Modeling Corporation's workflow modeling engine. Layout-iQ merges an industrial engineering database of workflow with a CAD drawing of the layout and calculates the total travel distance in feet that nurses will walk in a given design. The study took into account factors such as location of medication, location of documentation equipment and a typical number of medication cycles per day. The study also looked at models in which medication retrieval, preparation and documentation were tied to central nursing stations and pharmacy dispensaries, and then compared the impact of using medication carts, computer carts and wall-mounted workstations containing medication and IT equipment.

Scenarios

Scenario 1: Central Nursing Station and Central Meds Layout

This scenario evaluated a central nursing station and central meds layout, and served as baseline for the study. It considered three processes:

- Patient medications were administered six times per day. It was assumed that 50% of the time the nurse would begin this process from the central station and 50% of the time from a starting point of a patient room. From these starting points, the nurse would travel to the central meds location to retrieve and prepare the patient medication. The nurse would then travel to the patient room to administer the medication and return to the central nursing station to document the medication.
- The unit's medication supply was replenished one time each day with travel to and from a central pharmacy.
- Specific events were documented 12 times each day with travel between the patient's room and the central nursing station.

Scenario 2: Use of Computer Carts (50/50 Cart Storage/Retrieval Factor)

The use of computer carts was evaluated on a conservative basis and required four processes:

- Patient medications were administered six times per day. It was assumed that 50% of the time the nurse would begin this process from the central station and travel to a central cart storage point to retrieve the cart, while 50% of the time the nurse would be moving from patient room to patient room with the cart.
- The cart's medication supply was replenished three times each day with travel to and from the central cart storage and the unit's central medication point.
- The unit's medication supply was replenished one time each day with travel to and from a central pharmacy.
- Specific events were documented 12 times each day. Travel from both patient room to patient room and between the patient room and a central cart storage point for cart retrieval and return were considered on a 50/50 basis.

Scenario 3: Use of Computer Carts (80/20 Cart Storage/Retrieval Factor)

This scenario offered a “best case” evaluation for the use of carts by increasing the frequency with which the four processes described in Scenario 2 could be completed without travel to a central cart storage point. Processes were completed based on room-to-room travel 80% of the time. Travel to and from a central cart storage point was reduced to 20% of the time.

“Best cases” scenario for carts resulted in daily travel distance of 16,796 feet.

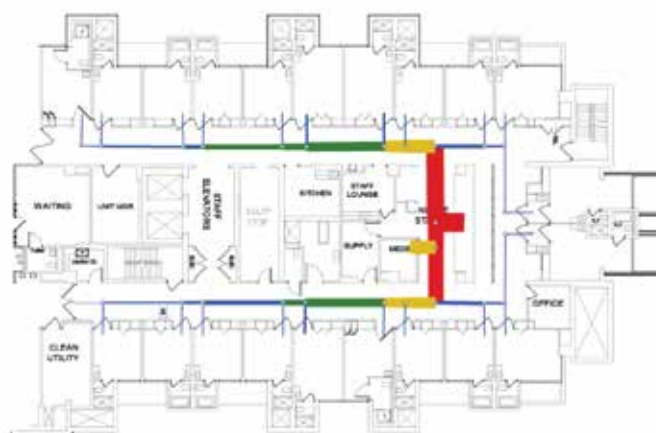


Scenario 4: Use of In-Room Workstations

The workstations evaluated were those designed and manufactured by Proximity Systems, which place computer technology, medical equipment, secured patient medications and supplies at the point of care. This scenario considered four processes:

- Patient medications were administered six times per day. It was assumed that 50% of the time the nurse would begin this process from the central station and 50% of the time from a starting point of a patient room. In a given patient’s room, the nurse would prepare, administer and document the event at the in-room workstation.
- The workstation medication supply was replenished once each day with consideration given to travel from the patient rooms to the unit’s central medication supply and back.
- The unit’s medication supply was replenished one time each day with travel to and from a central pharmacy.
- Specific events were documented 12 times each day, all done at the workstation in the given patient’s room.

Proximity workstations scenario resulted in a daily travel distance of just 8,387 feet.



Results

When compared, the four scenarios yielded the following results:

Scenario	Distance per Day
1: Central Nursing Station and Central Meds Layout	45,406 ft.
2: Use of Computer Carts (50/50 Cart Storage Factor)	37,892 ft.
3: Use of Computer Carts (80/20 Cart Storage Factor)	16,796 ft.
4: Use of Proximity Work Stations	8,387 ft.

- Placing IT equipment and patient medications in wall-mounted workstations, strategically positioned in or near patient rooms, reduced the distance nurses walked between 50% and 80% by allowing per-patient processes to be completed in that patient's room.
- In-room workstations were at least two times more efficient than the most optimistic computer cart scenario.
- In-room workstations were four times more efficient than the conservative computer cart scenario.
- In-room workstations were six times more efficient than the central nursing station (for documentation) and meds station scenario.

Conclusion

Proximity Systems' units enable nursing best practice with respect to documentation and meds, causing significant improvements in the quality of documentation and in the reduction of errors, omissions and mistakes. Limiting physical stress on nurses from excess walking and providing an environment that enables the nurse to follow nursing best practices and provide better patient care can positively impact nurse satisfaction and retention.

The results of this study show that strategically placed, wall-mounted workstations — specifically those with the combination of information, medication and patient care features offered by Proximity Systems — have a greater potential to reduce excess walking, increase productivity, impact the hospital's bottom line and improve the opportunity for improved care in comparison to the other options evaluated.

Rapid Modeling Corporations' full white paper is available for download at rapidmodeling.com.