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The Patient Room 2020 :Next Generation In-Patient Care

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We are moving towards patient-centred healthcare, and where better to make some positive changes but the patient room. Patients are increasingly demanding more from their healthcare providers. They are better informed and willing to speak their mind. This new situation calls for improved patient rooms; rooms that improve patient experience and even improve the quality of care. The NXT Health Patient Room 2020 is a collaborative design project which aims to both improve patient experience and optimise caregiver performance.

The project was developed in NXT Health's multidisciplinary Fellowship Programme, and expands upon the more than 6 years of design and research into inpatient care environments sponsored by the organisation. The main idea is to foster collaboration to drive innovation. It is a platform for design professionals to collaborate with industry partners, healthcare providers and thought leaders to create solutions.

So why is this innovation needed? Well, the project addresses some of the current challenges faced by patients and caregivers in healthcare institutions including unsafe surroundings, misunderstanding of care and inefficient work processes.

Unsafe surroundings are a major issue for healthcare institutions. In the U.S. an estimated 1.7 million Hospital Acquired Infections (HAIs) occur each year in hospitals, leading to about 100,000 deaths and \$28-\$33 billion in excess costs. Many of these infections are preventable, and the new patient room design could have a positive effect on hygiene and infection control. Misunderstanding of care is another obstacle to overcome. High readmissions rates occur in healthcare due to lack of comprehension and fragmentation of the care process, resulting in unnecessary cost burdens.

The project also addresses unsafe work environments. Clinical caregivers work in an extremely stressful and sometimes harmful environment, resulting in high incidences of musculoskeletal disease (41%) and burn- out rates. Inefficient work processes are also targeted as caregivers spend approximately 7% of their time on 'wasted activities' such as hunting and gathering supplies.

The Concept

NXT Health assembled a diverse team of more than 40 Industry partners around the concept in order to execute a full-scale installation. These industry partners provided product contributions, services and technical assistance to the design and fabrication team. The 400 square feet, fullscale prototype of the concept was constructed and tested at the DuPont™ Corian® Design Studio in New York City, a hybrid idea incubation/showroom space that aligns with the experimental and forward-thinking nature of the installation. The studio is a three way partnership between DuPont™, Solid surface fabricator Evans & Paul and distributor Dolan & Traynor.

There are five key components to the Patient Room 2020:

- The Patient Ribbon collects many of the disparate elements commonly found in healthcare environments into a single, streamlined, patient-centred design response that encompasses headwall to footwall.
- The Patient Companion combines two ubiquitous elements: an over-bed table and a touchscreen tablet, to form a single piece of mobile furniture that can be utilised in a wide range of healthcare settings.
- The Open Bathroom is an adaptable bathroom concept that features a sliding door system which can be reconfigured based on care needs.
- The Caregiver Station is an entry workstation featuring integrated hand-washing indicator lights, concealed accessories and RFID enclosure.
- The Caregiver Hub is a deployable bedside work area with embedded technology, simulated UV light sanitisation and wireless device charging stations.

Enhancing Patient Experiences

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Many elements of the Patient Room 2020 aim to enhance patient experience in terms of safety, comfort and control and promoting patient/family engagement.

Safety

In terms of safety, the Patient Room 2020 design features improved “cleanability” in a bid to reduce HAIs. The DuPont Corian solid surface is non-porous and this is optimised via architectural casework and fixture details such as clean cove wall base detail. There is a seamless transition from solid surface walls to the floor and corners are minimised to improve the cleaning process. Anti-microbial fabric solutions that eliminate germs on contact, such as Milliken Biosmart, were used to combat infection on soft surfaces.

Fall prevention and injury reduction are also addressed. A direct path of travel was created between the patient bed and the bathroom, minimising transfer distance and obstructions. In order to provide safe passage, continuous grab bars extend from the bedside to the toilet and shower, with potential obstructions (such as charting equipment) embedded into wall surfaces to clear the pathway. Other elements include rubber flooring to cushion patient falls, ambient lighting, a patient lift system and a shower tray with a special drain to reduce slippage.

Comfort and Control

The bedside control centre is designed to improve patient comfort and control. The Patient Companion with hybrid table top provides a traditional eating surface on one side and rotates to reveal an integrated tablet on the other. The touchscreen facility empowers the patient to adjust lighting and temperature and a power mat is available so patients can charge their personal devices.

The design allows for an immersive therapeutic experience for patients. The Patient Ribbon, which encompasses the headwall, ceiling and footwall surrounding the patient, contains audio and visual elements organised to create an immersive, therapeutic experience for patients. They can avail of light therapy and an audio cocoon is created around the patient’s head, which can block out unwanted noise and minimise noise transmission to other spaces.

The Patient Room 2020 features a streamlined, minimalist environment for the comfort of the patient. The Patient Ribbon collects disparate elements commonly found in healthcare environments, including glove boxes, trash, sharps container, headwall gases, electrical outlets, supply storage, patient lift system, lighting, diffusers, audio/visual equipment and sprinklers, into one unified element in order to provide a clutter free, organised environment.

Promoting Patient/Family Engagement in Care Delivery

The design supports collaborative medicine. The Patient Companion provides access to information on telemedicine and apps for use after discharge and also facilitates collaborative medicine presentations via a footwall smart display. Medical peripherals can be plugged into the Patient Companion for assessment and training during the hospital stay, and then sent home with patients upon discharge to promote ongoing wellness monitoring.

Heightening Caregiver Performance

The Patient Room 2020 also features design elements to improve caregiver performance. Safety is improved, operational costs can be lowered and workflow is optimised.

Safety

Safety in the hospital does not stop at the patient, indeed safety is of paramount importance for caregivers. The Patient Room 2020 design concept aims to prevent workplace related injuries. The Patient Ribbon features an integrated lift system to minimise physical exertion and the headwall provides mounting locations for medical tube organisers to minimise trip hazards. The rubber flooring increases staff comfort during periods of extensive standing.

Smart awareness systems are integrated into the Caregiver Station, including sensors to ensure proper hand-washing and a personal dashboard assesses staff hand-washing practice, displaying data such as sanitisation efficacy, steps taken and distances travelled. Intelligent bed technology communicates wirelessly with the bedside charting station to display key diagnostics.

Adaptable environments such as the sliding doors in the Open Bathroom allow for different configurations dependent on the number of staff needed. There is also an override button to immediately convert the room back to a clinical setting if need be.

Lower Operational Costs

Patient Room 2020 designers claim that their concept can actually lower operational costs in the hospital. The prototype has been designed for ease of maintenance and durability. This includes the use of solid surface material in high traffic areas that can be easily renewed and LED light fixtures provide long lamp life. The Patient Ribbon is designed to provide convenient access to electrical, technology and medical gas components that may require maintenance over the life of the room.

The concept is also sustainable. Materials with no off-gassing are used to eliminate volatile organic compounds (VOCs) and fixtures with lower energy requirements are used if available. Energy usage is reduced via sensors for lights and technologies and naturally based materials which require less embodied energy to produce were used to minimise the concept's carbon footprint.

Optimising Workflow

Workflow is optimised with an emphasis on the point of care. When used together the Patient Ribbon and the Caregiver Hub create a point of care triangle between patients, charting technology and support infrastructure. The Patient Ribbon features integrated storage for quick access to supplies, such as lift harnesses and headwall accessories, to minimise caregiver time spent seeking materials. The Patient Ribbon includes a deployable waste management compartment embedded in the base of the headwall, complete with sharps container and trash can. The Patient Ribbon also has deployable 'wings' for staging medical supplies directly at the bedside, providing an alternative to discourage misappropriate use of the over-bed table or patient bed.

The inclusion of technology touch points are another key facet of workflow optimisation. The wall mounted tablet at entry Caregiver Station allows for rapid personal data assessment and tracking while the demountable tablet station at the bedside Caregiver Hub facilitates mobile workflow within the entire space. The touch points also allow for the remote operation of the toilet and shower and the wall mounted articulating all in one computer display facilitates in place bedside charting and assessment with concealed storage in the Caregiver Hub. Finally the concept features an interoperable digital platform with a common operating system for universal control of systems.

Conclusion

The Patient Room 2020 concept is an inspiring project, which seems to improve patient experience while also optimising caregiver performance. Whether the concept is a viable option in terms of costs remains to be seen but it definitely gives food for thought as a truly patient centred environment. In the meantime hospitals could endeavour to implement some of the key features of the project to improve safety, patient satisfaction or indeed workflow.

NXT Health has partnered with the Center for Health Design, a non-profit research organisation, to evaluate, test and refine prototype concepts post-construction, with the ultimate goal of adoption in a live hospital setting. To learn more about the project, please visit: <http://nxthealth.org>

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