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Buckle up for better healthcare: How autonomous vehicles will shape hospital design

by Mark Vaughan and Rubin Pillay

Hospitals face a future of increased demand, aging infrastructure, and evolving patient needs. But a quiet revolution is brewing on the streets: autonomous vehicles (AVs). The dawn of AVs is not just transforming transportation; it's poised to radically alter the landscape of healthcare infrastructure and hospital design. As AVs transition from the drawing boards of sci-fi imaginations to the roads of our cities, the implications for healthcare facilities are profound and multifaceted. Buckle up because these self-driving cars are about to reshape the hospital experience in fascinating ways, promising to enhance accessibility, efficiency, and patient care.

No more parking woes

Imagine pulling up to the hospital, not for a frustrating parking hunt, but to be greeted by a friendly, virtual valet. The AV seamlessly finds a spot, freeing patients to focus on what matters – their health. This reduces stress, improves accessibility, and optimizes hospital parking lot usage. With their precision navigation and scheduling capabilities, AVs can streamline patient arrivals and departures, increasing the overall efficiency of time and motion involved in the care experience and reducing the congestion often seen around healthcare facilities. This allows for the redesign of hospital drop-off and pick-up zones, which can be smaller than current designs that accommodate a high volume of manual vehicles and parking.

Furthermore, hospitals can leverage AV technology to facilitate remote parking solutions, where vehicles autonomously park themselves in designated areas away from the main facility, freeing up valuable space near hospital entrances for emergency and accessibility needs. This shift not only

improves patient and visitor access but also allows for a more patient-centric design focus within the hospital’s immediate vicinity.

Redefining emergency response

Time is of the essence in emergencies. AVs can act as first responders, equipped with medical supplies and AI-powered triage systems to shorten response times and even provide initial diagnostics while en route to the hospital. Inside hospitals, the design of emergency departments can shift to accommodate these advanced vehicles, incorporating automation in patient offloading and immediate care processes. This evolution could lead to the development of specialized docking stations where AVs seamlessly integrate into the hospital's emergency network, ensuring a swift, coordinated response to patient needs.

Clinics on the move

AVs open up exciting possibilities for mobile health units, extending the reach of hospital services directly into communities. These mobile units can be designed as self-contained healthcare pods, equipped with telemedicine capabilities and diagnostic tools, allowing for preventative care, screenings, and follow-up visits in underserved areas. Consider consulting a specialist across the country from the comfort of your driveway. AVs can become mobile telepresence units, facilitating remote consultations and reducing the need for patient travel. This is especially relevant for rural areas or patients with mobility limitations. Hospitals will need to incorporate infrastructure for these mobile units, including docking stations for maintenance, data upload/download, and supply restocking. This expansion beyond traditional hospital boundaries will necessitate a rethinking of hospital design, focusing on flexibility and integration with external services.

Logistics reimagined

Forget the internal maze of deliveries and patient transfers. AVs can handle internal logistics, transporting supplies, medications, and even patients within the hospital grounds efficiently and autonomously. This frees up staff for more critical tasks and minimizes disruptions.

Smart infrastructure and data integration

The future hospital will not only accommodate AVs but will also be part of a larger smart infrastructure ecosystem. Hospitals will need to incorporate advanced data exchange systems as well as tactical operations centers to communicate with AVs regarding patient healthcare information, schedule patient arrivals, manage emergency services, and coordinate with mobile health units. This level of integration requires hospitals to design with a focus on connectivity, incorporating data

centers and advanced communication networks that can handle real-time data exchanges with a fleet of AVs.

Sustainability and green spaces

As AV use increases with less dependency on ownership, there will be an opportunity to reduce the need over time for on-site parking and large parking structures. Hospitals will have an opportunity to repurpose these spaces into green areas, promoting sustainability and well-being. Future hospital

designs can incorporate healing gardens, outdoor therapy spaces, and pedestrian-friendly pathways, supported by the reduced footprint of vehicle infrastructure. This shift towards greener, more sustainable hospital campuses not only benefits the environment but also contributes to patient recovery and community well-being.

The road ahead

The advent of AVs heralds a new era in healthcare, driving significant changes in hospital design and infrastructure. With AVs handling parking, logistics, and even some emergency transportation, hospitals can free up valuable space. This opens doors for redesigning hospital layouts, prioritizing patient comfort, green spaces, and collaborative care environments. As we move towards this future, it is crucial for architects, healthcare professionals, and city planners to collaborate closely, ensuring that the transition not only accommodates technological advancements but also enhances patient care, accessibility, and sustainability. The integration of AVs into healthcare is not just about adapting to new transportation methods; it's about reimagining the possibilities of healthcare delivery and the role of hospital design in creating a healthier, more connected world.

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