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FROM SMART ROOMS TO SMART FLOW

VIRTUAL CARE AS AN ENTERPRISE OPERATING MODEL

A concise executive case for designing virtual care around access, capacity, and throughput, not around isolated devices or use cases.

SMART ROOM	SMART HOSPITAL	SMART FLOW
the endpoint	the operating model	the value

Technology creates capacity when it connects clinical people, defined workflows, established tools, and system-wide decisions, not when it simply adds another device to the room.

Based on the ATA webinar “From Smart Rooms to Smart Flow: Designing Virtual Care for Access and Capacity,” presented with leaders from AvaSure, Equum Medical, Harris Health, Hackensack Meridian Health, and Vital Thread Advisory.

The shift is from technology deployment to care orchestration

Technology becomes strategic only when it changes how care moves. Hospitals have spent years building virtual care one use case at a time: observation, specialty consults, virtual nursing, critical care. Those investments solve real problems, but enterprise value appears when the same infrastructure can bring the right clinician, information, and decision to the patient without requiring the patient, or the clinician, to move first.

A smart room is therefore an access point, not the end state. The larger design question is whether room technology, clinical capacity, workflows, and governance operate as one system.

> **"The smart hospital isn't defined by one application or one device. It's defined on how the technology in the room works together in a single platform, so that every time one of those innovates, the room gets smarter … the room becomes an active participant in patients' care."**
>
> LISBETH VOTRUBA, MSN, RN, FAONL, CAVRN | CHIEF CLINICAL OFFICER, AVASURE

FIVE RULES FOR BUILDING ENTERPRISE VIRTUAL CARE

1 Diagnose the constraint.
Start where patients wait, decisions stall, coverage is thin, or work is waiting for a handoff.

2 Move expertise before moving patients.
Use virtual clinical capacity to answer the next care question before defaulting to transfer, delay, or escalation.

3 Centralize what benefits from shared oversight.
Coordinate scarce expertise, work queues, priorities, and handoffs where enterprise visibility improves response.

4 Design the operating model before scale.
Define triggers, roles, decision rights, coverage, escalation, documentation, training, and ownership before expansion.

5 Define success before go-live.
Measure access, flow, workforce, safety, experience, and economics where value actually lands, not only encounter volume.

PERSPECTIVES BEHIND THE PAPER

Lisbeth Votruba	Mario V. Fusaro	Leslie Ferrell	Stephanie Lahr	Mohamed M. Bakr
Nursing / clinical platform	Physician / virtual operations	Health-system virtual care	Informatics / smart hospital	Hospital medicine / frontline care

CAPACITY IS A SYSTEM PROBLEM

Three symptoms. One operating constraint.

ED boarding, workforce shortages, and specialty access delays look like separate problems. Operationally, they are different expressions of the same constraint: clinical capacity is not reaching the patient who needs it, when it is needed. The issue is not simply the number of beds; it is the system's ability to make and execute the next care decision.

40%

of admitted ED patients boarded more than 4 hours at the January 2022 peak in a national dataset

HEALTH AFFAIRS SCHOLAR, 2026 [2]

60%

of total hospital expenses in 2025 were workforce-related

AHA, 2026 [8]

13.5K to 86K

projected U.S. physician shortfall by 2036

AAMC, 2024 [9]

Federal and academic work increasingly treats ED boarding as a symptom of system-wide overload rather than an emergency-department-only problem. The same systems logic applies to virtual care: a program may be funded in one department, yet create its highest value elsewhere, at the point where a delayed decision is constraining flow. [1][3]

> **“Smart flow is really relieving bottlenecks throughout the entirety of the hospital, whether that be in the ICU, the floors, or the emergency department. What we're trying to do is create seamless patient flow throughout the entire system.”**
>
> MARIO V. FUSARO, MD, MS | EQUUM MEDICAL

That is why virtual care belongs in capacity strategy. Faster specialty input, earlier disposition decisions, virtual discharge, observation, off-hours hospital medicine, and critical-care oversight can change a patient's trajectory before a physical move is required.

FROM SMART ROOMS TO SMART FLOW

Room technology is the access point. Enterprise value comes from the layers behind it.

ADMIT / TRANSFER	ED	CONSULT / DECISION	ICU / MED-SURG	DISCHARGE / HOME
Access block Transfer delay	Boarding Coverage gaps	Wait for expertise Decision latency	Bed mismatch Delayed downgrade	Education delay Late discharge
Remote triage Transfer consult	**Telehospitalist Virtual RN**	**Specialty consult Care coordination**	**Tele-ICU Virtual rounding**	**Virtual discharge Transition support**

Common friction (gray) and virtual care levers (green) across the patient journey. The point is not to virtualize every step; it is to place clinical capacity where a delayed decision is constraining flow.

THE FIVE LAYERS OF A SMART HOSPITAL

5 OPERATING SYSTEM	Governance, workflow ownership, training, adoption, measurement, and continuous improvement.
4 ORCHESTRATION	Prioritization, triggers, task routing, escalation, admission and transfer coordination, and command-center functions.
3 CLINICAL CAPACITY	Virtual nurses, observers, intensivists, hospitalists, specialists, pharmacists, and other remote team members.
2 PLATFORM & DATA	EHR integration, identity, communication, analytics, device management, security, interoperability, and open audio and video interfaces.
1 ROOM / ENDPOINT	Fixed smart-room hardware, mobile carts, cameras, audio, sensors, monitors, patient-facing display, and other endpoints.

> **“A smart room … is where technology is intentionally integrated to extend the capabilities of the care team … with the intention of coming together to create a cohesiveness and an ease of flow … to the point that the technology fades into the background. The emphasis is on connecting the right people, the right information, and workflows at the right time.”**
>
> STEPHANIE LAHR, MD, CHCIO, FACHDM | FOUNDER, VITAL THREAD ADVISORY

HOW THE MODEL HOLDS UP IN PRACTICE

The evidence is strongest when virtual care is tied to a decision, task, or transition

The supporting studies do not test one standardized intervention. They do, however, reinforce the operating thesis from two directions: virtual care can affect capacity when it is embedded in logistics and flow decisions, and its impact must be measured against the workflow being redesigned: transfer, discharge, nursing, or critical care.

1 When telemedicine becomes a logistics function

UMass Memorial compared three operating periods across 51,203 adult ICU patients: pre-Tele-ICU, Tele-ICU, and Tele-ICU with added logistics-center functions. [4]

MEASURE	PRE-TELE-ICU	TELE-ICU	TELE-ICU + LOGISTICS
Annual case volume	4,752	5,735	**6,581**
Mean hospital LOS	10.4 days	9.7 days	**8.8 days**
Direct contribution margin / case	$1,667	$6,568	**$9,206**
Annual direct contribution margin	$7.9M	$37.7M	**$60.6M**

Historical single-center before and after study; financial values were adjusted to 2015 dollars. The authors note reimbursement-era and design limitations. Treat the results as evidence of an operating model, not as a financial forecast.

What changed: central management of ICU admission and discharge; tele-intensivist assignment of teams and beds; transfer coordination with community hospitals; active identification of patients ready to leave critical care; and shared information review to support flow decisions.

2 Current evidence across transfer, discharge, and nursing flow

INTERHOSPITAL TRANSFER

33 studies | 609,188 patients

Telemedicine was commonly associated with lower transfer rates across varied settings; mortality was lower or unchanged in most studies reporting it. [5]

VIRTUAL DISCHARGE

4,662 matched pairs

A nine-hospital study associated virtual-nursing-assisted discharge with lower 30-day ED readmission (3.7% vs. 13.3%). [6]

NURSING FLOW

30 units | 800 beds

Yale New Haven reported virtual nursing supporting 78% of discharges and more than 50% of admissions, with a 30-minute reduction in discharge order-to-departure time and fewer incidental overtime occurrences. [7]

The studies use different populations, designs, interventions, and endpoints. Their results should not be combined into a single ROI claim. The common lesson is narrower and more useful: virtual care can change the timing and location of work when it is connected to a specific decision, task, or transition.

MEASURE THE OUTCOME WHERE THE VALUE LANDS

A program can be small in one department and still create enterprise value elsewhere

Consult counts are useful activity measures. They are not the business case. The scorecard must follow the patient journey and distinguish leading indicators, whether the workflow is being used, from system outcomes, whether care actually changed.

VALUE DOMAIN	LEADING MEASURES	SYSTEM OUTCOMES
Access	Time to virtual response; after-hours coverage; consult completion	Time to treatment; access to expertise; local retention
Capacity & flow	Time to disposition; downgrade timing; discharge task completion	ED boarding; LOS; staffed bed availability; incremental cases
Workforce	Tasks shifted virtually; escalation time; adoption and utilization	Bedside time returned; overtime; vacancy pressure; staff experience
Safety & quality	Protocol adherence; surveillance; escalation and response	Falls and adverse events; mortality; readmission; complications
Experience	Family touchpoints; education completion; response time	Patient and family experience; staff satisfaction
Economics	Program utilization; cost to serve; transfer requests	Avoided transfer cost; retained volume; contribution margin; capacity value

Metric domains synthesize the webinar discussion and supporting literature; individual measures should be selected based on the target workflow. [3][4][5][7]

> **“How many consults you did … isn't really where the value is.”**
>
> STEPHANIE LAHR, MD, CHCIO, FACHDM | VITAL THREAD ADVISORY

> **“Sometimes we get so focused on what is that financial return, that we forget to pay attention to workforce capacity, patient safety, throughput, access to expertise, staff experience, patient experience.”**
>
> LESLIE FERRELL, MHA | HARRIS HEALTH

BUILD FROM A REAL CONSTRAINT, THEN SCALE THE CAPABILITY

The first investment should earn the right to the second

The most practical path is not a hospital-wide technology deployment on day one. It is a disciplined first use case that proves the clinical operating model, establishes reusable infrastructure, and creates a clear scale decision.

01

NAME THE CONSTRAINT

Choose one or two measurable bottlenecks where expertise or a decision is unavailable.

02

PROVE THE MODEL

Define roles, triggers, decision rights, handoffs, adoption, and a small scorecard before launch.

03

REUSE THE CAPABILITY

If the workflow works, apply the same platform, governance, and clinical capacity to the next bottleneck.

QUESTIONS FOR THE EXECUTIVE TEAM

- Where are patients waiting because expertise or a decision is unavailable?
- Which work can move virtually without moving the patient?
- Which existing endpoints or platforms can support more than one clinical workflow?
- Who owns the clinical workflow after the technology is installed?
- Which outcomes will prove enterprise value, and where in the system will that value appear?

> **“The deployments I've seen struggle generally haven't struggled because the technology didn't function. They struggled because we underestimated the operating model that we needed to have around it. We needed a better communication plan. We needed to spend extra time on the change management to make sure everybody understood why we're doing it … before we deploy it, we need to understand the work we're asking people to change.”**
>
> LESLIE FERRELL, MHA | HARRIS HEALTH

CONTINUE THE WORK

COMPANION DESIGN GUIDE

Use the Smart Hospital Design Guide to map the constraint, prioritize a use case, define the operating model, test the architecture, plan adoption, and build the scorecard.

WEBINAR MODERATOR AND PANEL

Five perspectives, one operating thesis

This paper was developed from the August 2026 ATA webinar discussion and supporting market evidence. The panel brought nursing, physician, operational, informatics, and virtual-care perspectives to the same question: how should hospitals turn virtual infrastructure into measurable access and capacity?

NAME	ROLE	AFFILIATION
Lisbeth Votruba, MSN, RN, FAONL, CAVRN	**Moderator**	Chief Clinical Officer, AvaSure
Mario V. Fusaro, MD, MS	Panelist	Equum Medical
Leslie Ferrell, MHA	Panelist	Administrative Director, Virtual Care and Patient Engagement, Harris Health
Stephanie Lahr, MD, CHCIO, FACHDM	Panelist	Founder, Vital Thread Advisory
Mohamed M. Bakr, MD, MBA, FACP, CPE	Panelist	Hospital Medicine, Hackensack Meridian Health / Envision Physician Services

MARKET EVIDENCE AND SUPPORTING SOURCES

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