Austco HEALTHCARE

Digital Transformation of Clinical Workflows in Hospitals

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01.
The Problem of High-Tech Silos

For many years at health IT conferences, the buzzword was interoperability. It was printed in large font on trade show booths, it featured prominently in the programme session titles. It was something that everyone agreed needed to happen. Yet there was no blueprint for how it might proceed.

What in fact happened was hospitals broke the impasse. They selected technologies that solved some of their largest pain points. They took risks. They moved interoperability from a theoretical discussion of *what might be* to a requirement for all technology vendors.

Today's buzzword is *transformation*. Similar to interoperability, all agree it's needed but there is no clear path forward. The digital transformation of workflows is one such path.

It would be tempting to wait until the best vendor is anointed for each of the 30-50 most important systems in a modern hospital, but there will never be consensus and central planning is not well equipped to make decisions for all hospitals. In the US, the joke goes "if you've seen *one* American hospital, you've seen *one* American hospital." That is to say, one size does not fit all; technology vendors must be, above all, adaptable.

Hospital workflows

What does workflow mean, in this context? In the broadest sense, a workflow is a sequence of actions carried out to obtain a certain result. Scanning patient ID bracelets before administering medication, the steps to admit an ER patient, to handoff nursing coverage from shift to shift, to discharge a patient and ready their room for another. It's any repeated process that is followed as part of the day-to-day activities of a healthcare provider.

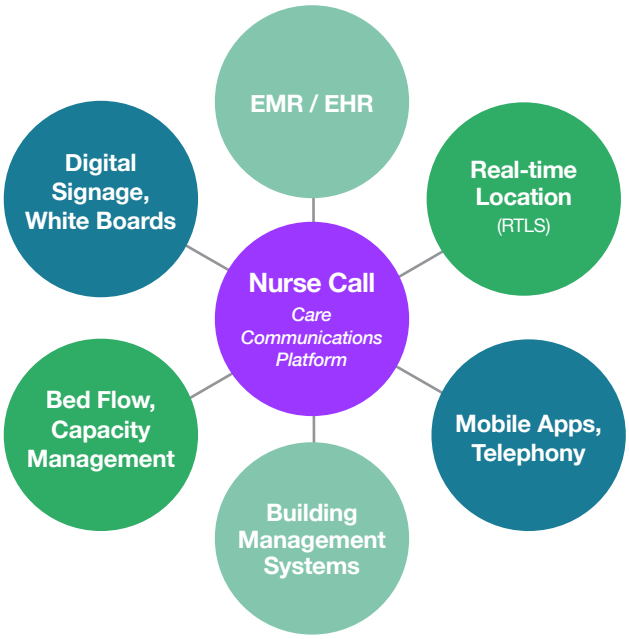
There are thousands of workflows in a modern healthcare system, and vendors muddy the waters when promising "optimised workflows" too broadly. In reality, each vendor may only address those areas within its purview. Population health, for example, has a specific area it can reasonably hope to target, likewise virtual care, or revenue cycle management.

Care communications

The scope of this discussion is in-hospital com-

munications. Staff to staff, staff to patient, and situational awareness, which is the right data in the right context. Within that sphere, the system which stands squarely at the intersection of multiple key data systems is nurse call.

Until recently, nurse call was a simple button to summon help in the event of patient distress, no better than a fire alarm. But with the advent of IP technology, nurse call evolved from simple building system to IT data system. We vendors tend to use the phrase *healthcare communications platform* as the system capabilities have gone well beyond buttons and lights. Because nurse call touches other clinical data systems, it is in a unique position to leverage communication workflows. Nurse call has come a long way from a "call bell" system.



Nurse call systems touch many of the key clinical systems in hospitals.

Nurse call vendors saw the potential in exploiting digital screens' limitless display capabilities and added software buttons to contact ancillary team members. "Don't ask overworked nurses to locate the housekeeping team," was – and still is – the marketing message. Just place a button on the interface that will summon housekeeping, wherever they happen to be. Workflow, as a function of a nurse call system, was simply more efficient communication.

Today, it's communications plus situational awareness. Care communications platforms now bring context-dependent information to touchscreens and other displays.

Digitising workflows is not rocket science or, more aptly, brain surgery. We're talking about using technology to do the work of raising calls and alerts, communicating with all relevant departments, making data visible that was previously hidden inside another vendor's application.

Importantly, it's also not a big bang – we're not proposing an enormous shift in processes, but sustainable, incremental gains, that can adapt with the future needs of the hospital. We're talking about shaving seconds off a task that staff perform many times in a day. Those seconds add up to minutes a day, hours per month, and entire days worth of nurse hours per year. Digitisation of workflows is about working *smarter*.

The reality within hospitals

Today, communication workflows are still done with paper signs and manual phone calls. They're not being measured to gauge their effectiveness. The data that care staff need exists *somewhere*, but it's not available at the exact time and in the exact location that will most benefit them. We're asking nurses, a precious resource, to perform many tasks that have nothing to do with nursing.

Nurses might have 20 systems they are expected to use; silos are a significant source of burnout. Staff can't be expected to remember that patient allergy

information is on the 4th screen of the EHR desktop application, or the phone extension of the Porter team, or to walk out of their way to the nurse's station to look at a dashboard to find out the patient's doctor or discharge date.

Digital transformation of communication workflows is frustratingly slow. What more can be done? What new technologies and integrations are available that make processes more efficient? How can we take pressure off staff?

It starts with good planning.

02.
Planning For Better Workflows

Let's first talk about system selection. We might start by enumerating a list of the important systems for our digital transformation journey.

Systems in Scope
The following all play a part in digital workflow transformation:

- Electronic health record (EMR, EMH, EPR)
- Bed flow software / capacity management
- Real time location systems (RTLS)
- Nurse call systems
- Clinical communication & collaboration (mobile) apps

However it's difficult to pluck 30 systems from as many different vendors, throw them in a building and hope for the best. We would be *laying the foundation* for technology silos. Therefore we also propose the following ingredients:

- Bi-directional data sharing is paramount. Look deeply at a given vendor's application programming interface (API) and data exchange capabilities. The procurement process can help by specifying baseline interoperability requirements at the outset. We're looking here for vendors to follow principles to ensure scalability, efficiency and ease of communication between systems. We're looking, in other words, for vendors who practice good technology citizenship.
- It can be appealing and cost effective to work with vendors who provide multiple solutions and where some of the integration work has been already done or is not necessary. Beware of a vendor's proprietary walled garden; it's important to verify a standards-based API exists, to ensure long-term interoperability as new requirements emerge in the future.
- It's worth performing a systems audit with interoperability in

mind, to find out what data exchange, if any, is possible for each system. For example, legacy building management systems use a protocol called BACnet. If it's not possible to upgrade the system to use modern APIs, it becomes necessary to write an adaptor that translates BACnet commands to REST-based events. This is where the hidden costs of integrations lie.

- You will want to investigate a vendor's roadmap for investment in R&D. Is the roadmap merely incremental updates to the same functionality, or is it progressive, actively adding features to support hospital 2.0 and beyond?

It is crucial to define what "good" looks like in order to have a measurable target. As well, we are not simply recreating manual processes in digital form, we are using technology's strengths to create a *new* process.

And perhaps most importantly, before setting sail on the voyage with any vendors, be clear - what does good look like for the hospital? Establish concise needs and outcomes for the transformation rather than digitising the status quo. The engineering phrase *garbage in, garbage out* (for UK readers, perhaps it's *rubbish in, rubbish out*?) summarises the danger in unthinkingly doing what has always been done.

Technology silos are frankly easier to break down. With a robust API and a commitment to interoperability from vendors, you're halfway there.

The bigger challenge is organisational silos. *People* must drive this transformation. Technology alone is not the magic spell. If people processes are not also addressed, it will be a frustrating exercise.

Technology silos are easier to break down, but it's people *who must drive this transformation*

Dealing with silos

It's not a stretch to say that hospitals have some of the most complex stakeholder situations. Who should be at the planning table? You will have already drawn up your list, and it will probably include:

- Clinical managers – who know what they want the systems to do at an operational level,
- ICT mangers – networks, infrastructure and data, cybersecurity,
- Information managers – in some regions there is a nursing informatics role charged with measuring the effectiveness of various clinical systems,
- And someone to look after interoperability. If that role doesn't exist, someone must embody it.

And the important question - how do we want these people, who are from quite different parts of the organisation, to work together, to engage? Done well, workflow planning *itself* can help dissolve organisational silos. A workflow comprises multiple teams and departments, and there are often gaps where responsibility is handed off from one team to another. Resolving these gaps delivers easy wins.

The workflow project team

We recommend building a multidisciplinary team. We want to find the people champions who can help unfreeze any silos in the organisation. Good vendors can help facilitate this, indeed we've been privileged to participate in many such sessions. The process takes a good bit of emotional intelligence to set the right tone. In transforming an existing, inefficient workflow, some team members may need to be told their processes require improvement in the most tactful way.

Think about doing this in an environment which stimulates good dialogue. If possible spend some of the time in a working clinical setting. Always remembering the objective is to get to "what does good workflow look like" and not necessarily digitising current manual processes to create an ocean of new data.

Get it right and this team of people will drive a successful transformation.

Documentation

Having done this many times, we can say with certainty: workflows need to be documented. If someone doesn't write down, "We want *these* systems to do *these* things", it is doubtful they will ever do those things. A documented workflow breaks down a process into clear constituent parts. Often a simple spreadsheet is all that's required. No need for it to look flashy but every need for it to be clearly understood, by everybody.

Measuring success

The last bit of planning is knowing how we will track results. A care goal has the *why?* built in. Someone has determined that more time with patients equates to lower incidence of readmission. Or that regular pain assessments correspond to fewer calls and a reduced length of stay.

But suppose we have only a hypothesis, and we want to control the variables to validate it. The two key points are: what metric or metrics are we addressing? And, how do we report on that metric?

For in-hospital communications, the metric is often time. *More* time to care, *less* time spent on data entry or logistics. Time saved for staff. Less time spent waiting for patients. Time is easily measured and easily translated back to costs. We often use the metric "nurse hours" since the value of a nurse hour can be calculated for each customer.

Other aspects can be more difficult to measure but nevertheless important. These include: Patient Experience, Staff Wellbeing and Social Value.

03
Care Communication Workflows

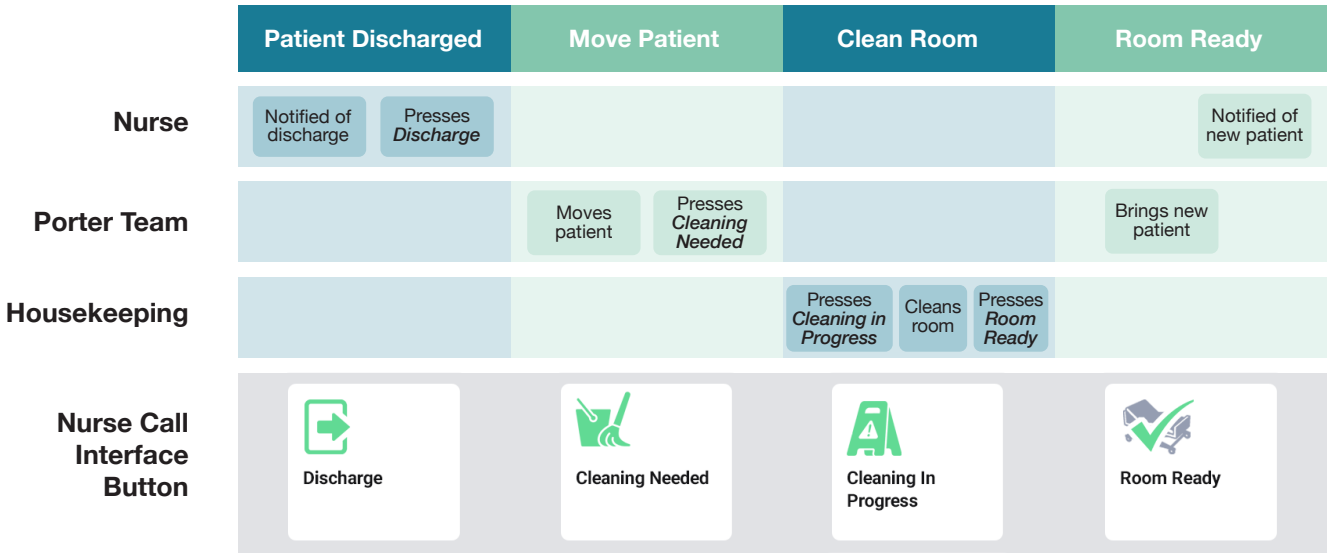
Involve all staff roles

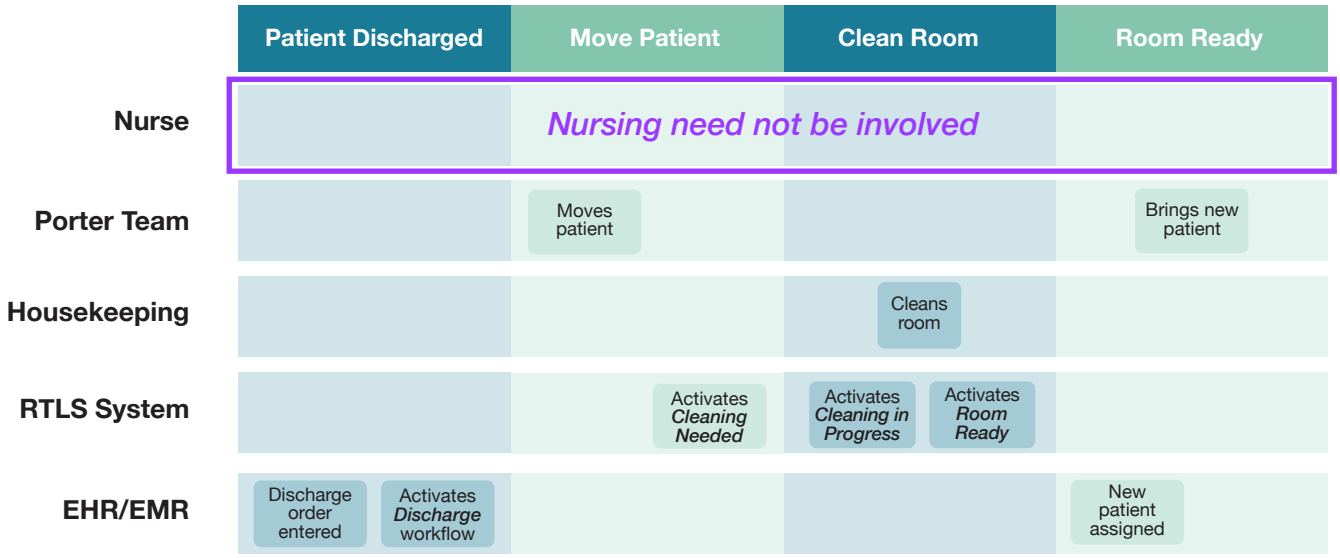
Historically, only nursing staff were considered the "care team" and they had to coordinate with all the ancillary departments. They had to be the logistics manager for dining and transport, track down maintenance to fix issues, and housekeeping for cleaning. Communication workflows provide a way to engage the entire care team.

Each type of room in the hospital may have its own set of functions. For example, an ER room may have radiology, phlebotomy, and labs on call. A labor and delivery room may have audio calling to the nursery. Query the vendors: how easy is it to make a workflow "profile" for an L&D room, a surgery theatre, or PACU? In summary, how easy is a given vendor's solution customised for *my* hospital?

Our goal is to involve more of the care team and take the burden off nurses. For a standard Med-Surg room, you may use the following discharge workflow:

1. The nurse indicates a patient is ready to be discharged.
2. The Porter team arrive to move the patient, they mark the room as ready to be cleaned.
3. Housekeeping arrive and begin cleaning and the room is marked "cleaning in progress".
4. When they are done, housekeeping mark the room as ready for another patient.





Automating events using system APIs frees staff from remembering to press anything. A perfect example of taking advantage of new technologies and capabilities to transform a previously manual process.

Each step requires pressing something on a touchscreen device. Better than paper and phones calls, but still a digital version of a manual process. Let's make it smarter by adding system automation.

Automating workflows takes the burden off nurses, who do not need to be involved in non-clinical matters.

1. This time, the EHR activates the discharge workflow.
2. With a real time location system, the porter and housekeeping team's arrival and exit are used as triggers for the next step.
3. When housekeeping leave, the bed flow system is informed that the room is ready for another patient.

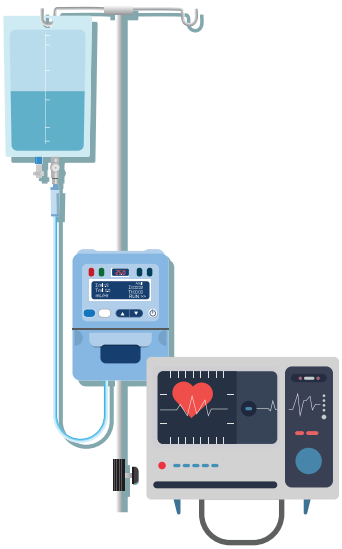
With this automation, based on the interoperable EHR, bed flow, nurse call, and RTLS systems, the nurse need not be involved at all. Automation of this type allows staff to perform *only* the tasks in their job description, not spend time on logistics and bookkeeping.

Direct communications and silent annunciation

If implemented properly, workflow should mean fewer calls of unknown intent. Instead of a generic "patient call", which someone must investigate to determine the actual need, you have "water", "bathroom assistance", "pain" or "order food". No one needs to speak with the patient to find out the intent behind these.

The calls are routable to the correct person, department or team. Water and bathroom assistance typically go to the assistant-level carer. Instead of annunciating "water" or even lighting a light, simply send the notification to a mobile device. In the case of Housekeeping, IT support, or Estates, those departments may have a dedicated screen of incoming calls in their respective office, configured to only show their alerts.

Many hospitals choose to leave the initial call silent and notify via



Telemetry, pumps, and ventilators are the true cause of alarm fatigue. Triage their beeps and alerts with an automatic system that only annunciates the most critical warnings via nurse call.

text or mobile app. Only if no one responds within a predetermined time will something make noise. One hospital group in the US only lights the overdoor light as the initial response to routine calls, with the expectation that any staff walking down the hall will attend.

Combatting alarm fatigue

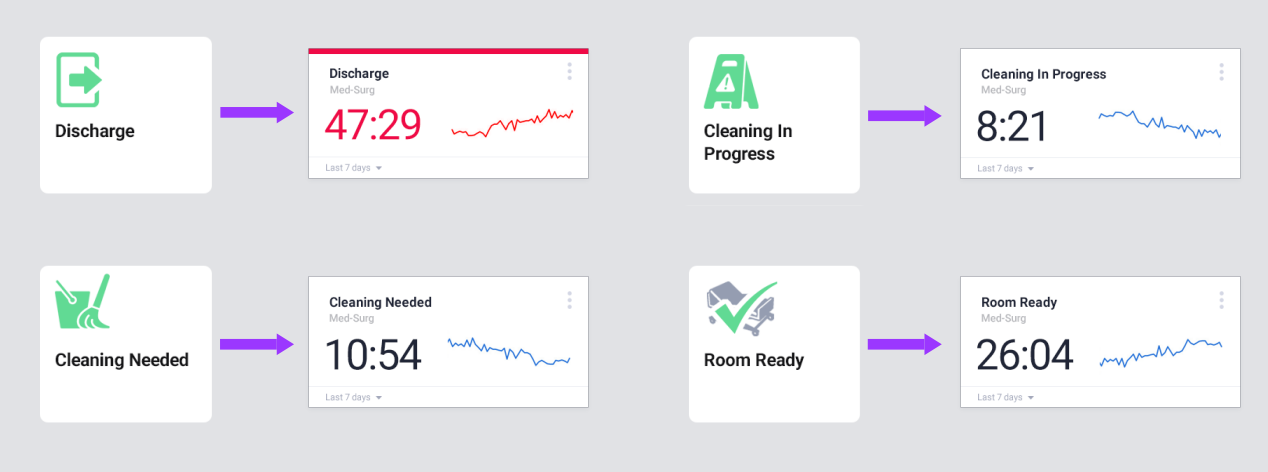
To address the stressor of alarm overload, none of the notifications need make any sound. Your alert buttons may do nothing more than send a text message to a mobile device. We want to support a silent ward. Not everything goes to the nurse. In fact, if we've done our planning correctly, very few alerts should go to the primary nurse. The result is the nursing team receive fewer alarms overall, and only the urgent ones. Non-urgent notifications are handled by others.

Another option to reduce the number of alarms making noise is to use technology that recognises and triages all the beeps and alerts generated by telemetry equipment. Studies have shown these to be the true cause of alarm fatigue, where a stat like heart rate may fall outside acceptable ranges frequently, beeping each time.

At a recent deployment, of the 1800 or so alarms generated by monitors, only 95 – about 5% – were worth notifying a nurse about. The hospital decided that these particular alarm types would be escalated to staff, the other 1700 were not critical.

Identify bottlenecks

One of the best reasons to implement digital workflows is to find where there are hidden delays in hospital processes. If we look at the reporting for the discharge workflow example, we see how long each step took to complete. We're able to see exactly where the delays occur. Why is it taking so long, from the time the discharge order



is placed, to the time when a patient is actually moved? We will return to that topic.

If the data instead reported that the “cleaning needed” step was taking too long, we know to look at our housekeeping team’s process. It could be something as simple as their supplies are in a closet that is inconvenient to the patient rooms. Or it may be a significant issue: if it takes 10 minutes per room and they are seeing too many calls come in at once, they simply cannot get to every room in a timely manner. Either way, the reason for the delay can be discovered and addressed.

If the data reported that the “room clean” duration is too long, we can look at two areas: the bed flow system is not correctly notified when the room can accommodate a new patient (a systems integration problem). Or it *is* and the patient is not being moved in a timely manner (a process issue involving the Porter team). The data paint a picture of what’s going on with a process, and gives hospitals a good indication of where the problems lie.

Enforce protocols

For management, breaking down individual workflows into steps means that you have more assurance that staff are following protocol.

For example, let’s say it is a requirement that every patient be seen by a nurse at least once per hour. At a ward level, it’s possible to set timers for each patient and then determine what kinds of staff visits justify the restart of the timer. A visit from housekeeping may not count, but that of an assistant level carer may. Making the visit status visible in a way that makes sense to staff is the corollary requirement. Census boards and/or engagement screens can easily show “last staff visit” and either a timestamp, a running counter, or a colour-coded light system.

If you have care initiatives around pain management, you may make use of timers to prompt staff to return to the room at some interval. For example, a 30-minute re-assessment after medication is administered. You have the reports to prove it was done and the patient’s call history to show any correlation in pain calls. If you have an engagement system, the patient themselves may indicate their pain level. If your nurse call integrates with the EHR, the regular staff visits may be pushed to the patient’s record.

The value of real-time location

It’s worth noting the benefits of the RTLS system, where every care team member carries a location badge which passively registers their presence in patient rooms. It eliminates both the need for people to remember to press buttons, and the skewed data that might result from a forgotten badge in/badge out. It also provides a way to know which staff role is present in a room. For example, only a member of housekeeping may start and cancel the “cleaning in progress” timer; only the primary and assistant nurses may cancel a "pain" call or unlock the in-room touchscreen to access patient information.

04

Situational Awareness: The New Standard

The preceding examples – more efficient communications, protocol enforcement, finding bottlenecks – have been part of nurse call vendors' playbook for at least a decade. Recently, customers have been asking about data display capabilities.

Situational awareness is using *carefully curated* data in the right context, to save nurses' time and mental attention.

Making patient data available at the point of care

A common use of EHR integration is displaying data about a patient in a way that is helpful to staff. Staff shouldn't have to find a workstation and log into a patient's EHR record to learn their diagnosis or length of stay or even their name. This data can be easily displayed outside or inside the room.

Patient and room data

During COVID, it became common for healthcare facilities to deploy screens outside the room that would give staff a comprehensive view of the patient, their statuses, and any special requirements for people wishing to enter the room. Often these were iPads or some device that would allow for video chat with the patient.

A hospital in Canada wanted to use this pattern to prevent staff having to walk into the room unless absolutely required. To achieve this, we used both standard patient information and custom HL7 segments from the EHR. In the context of care staff walking down the hall, it's an at-a-glance view of the situation within the room. These include patient restrictions, warnings, allergies, specialty equipment, room-level precautions, and guidelines for visitors.

Usually deployed outside patient rooms, this view is intended to give staff an idea of the situation in the room without having to enter. This includes information about the patient, requirements for the room, and status updates from various connected systems like RTLS and smart hospital beds.

Post COVID, this might be noting a piece of equipment present in the room, or a certain medication that is hazardous for staff to handle. To enter the room, staff and visitors might need to don gowns, use masks, or eye protection, or dedicate certain equipment to the patient and/or disinfect before using with another patient.

In-room whiteboard

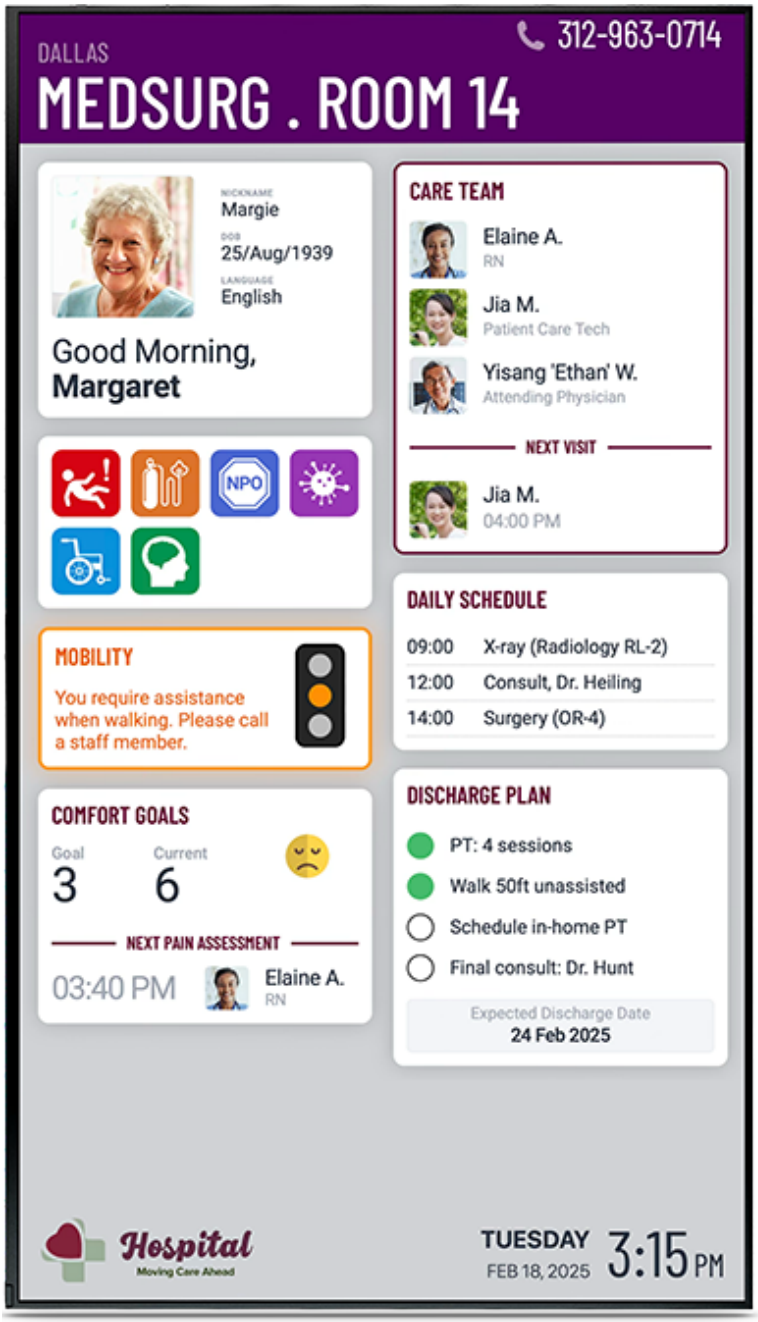
Another way to reclaim staff time and affect the patient experience is with a new understanding of the in-room dry erase board. In addition to the cost of printing and replacing physical boards with specific data for each ward or unit, it costs staff time to stop and manually write the information each day, each shift. One of the areas of most interest and growth around the globe has been a digital version of this dry erase board. It has two uses:

For patients, it provides information intended to prevent nuisance calls to staff. Data about their stay, their care team, their daily schedule, and warnings for mobility. When they activate any type of call, the screen changes to acknowledge their call was received, providing valuable feedback. It may include the phone number of the room, the date, time, weather, the Wifi network and password, or any other piece of data available.

For staff, it functions similarly to the data outside the room, showing an overview of the patient's statuses, requirements, and schedule. It may include metrics like number of calls placed from the room, or average length of staff visits with this patient. Placing it within the patient room, and making it visible without logging into the EHR application, saves staff time.

Acuity-based room function updates

There is a growing movement in some regions to change the room's function on the fly, based on the condition of the occupant. Some EHRs have a scoring system or a kind of MEWS calculator that



The in-room digital whiteboard replaces the dry erase boads commonly found in patient rooms. They update automatically as shifts change and pull data from the patient's health record and other systems to display pertinent data for both patients and staff.

provides a clue to the patient's needs and level of care required.

This is particularly relevant for hospitals who must reuse limited spaces. For example, a block of rooms becomes ED overflow during busy times, or an entire floor is repurposed for COVID patients. The same room might be Medsurg, and its pendants and buttons generate certain calls, play specific tones, and use certain colours and workflows. And with the touch of a button, that room becomes an emergency room, and then its *same* hardware triggers different calls with different behaviours.

One hospital was trying to keep a patient in the same physical space and update the room as the patient's condition improved. The room might need to go through 3 or 4 such profiles over the course of the patient's stay. The goal was to reduce the number of times the patient had to be moved (for the patient's health, for time and staff resources), and to minimise chances of infection by moving sick patients through public spaces. This often is called "smart patient rooms" or similar and is on many healthcare providers' roadmaps.

For nurse call workflow, this means loading a completely different set of software buttons for a stable Medsurg patient than for a surgical recovery, or an emergency room.

Securing patient data with staff role

A word about data privacy. In the name of privacy, some regions have elected to not show any patient data, effectively leaving intact the EHR silo. More sensibly, some hospitals have a privacy team that decides what data is permissible to show. For example, first name only, or first initial plus last name. Or even just the patient ID, no names.

Further, you may wish to obscure portions of the content during normal operations but show it when staff of a certain role are present. Fortunately, this can be done with RTLS integration. A product usability principle says that if users must interact more than necessary to get the data they need, they will decide they don't need it and not bother to look. In other words, the best way to render automatic actions is automatically; don't require PIN entry or

any type of manual interaction if possible.

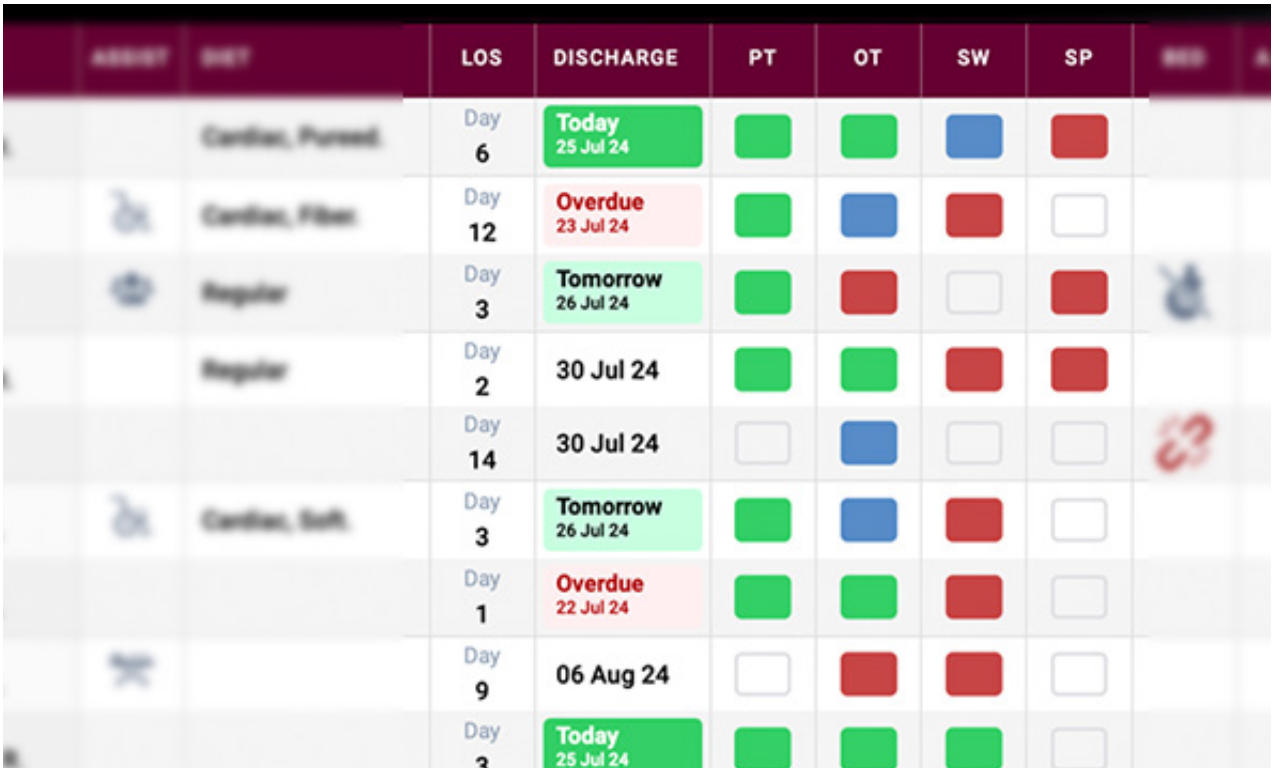
Visualising discharge

Now let's return to the previous example where it's taking too long to move the patient. Across the world, discharge is a messy process involving many touch points. Even after the doctor enters the order, a patient may sit, unhappily waiting, for hours whilst the various departments and staff sign off all the necessary paperwork. Unfortunately, nurses must often drive this process, coordinating with porters, housekeeping, and needing to check patient statuses by returning to a workstation to log into the EHR software.

If we could save just 15 minutes on this process, the ROI justifies itself in extra capacity and throughput. In regions where patient experience is surveyed and the results fed back into hospital funding, it's a major win to let people go home as soon as possible.

At a hospital in Australia, it was found patients hadn't yet completed some necessary step in the process. The porters could not move the patient because they were not ready to be discharged yet. To address this, the hospital mapped out a patient's journey to discharge. Each ward had one or more steps – one or more visits with a specialist, or a therapist – patients had to complete. Not all wards followed the same path, not all patients needed to complete each step. The hospital wanted to make those steps visible in some way.

These discharge steps were added to a census board display near the nurses's station, along with the patient's expected date of discharge and length of stay, so at a glance, staff could tell who was due to be discharged and when, and what steps have been completed. The time saved amounted to weeks' worth of nurse hours per year.



With information added to a census board, staff can see at a glance who is due to be discharged and whether they have completed the necessary steps. The steps are customisable per ward or unit.

05

Implementing Digital Workflows: A Project Plan

If done correctly, successful rollout of new workflows creates a halo effect: staff know they can rely on the information in an interface instead of having to look it up, or use the communication tools to find a doctor or porter or IT when necessary. It should reduce the mental burden, rather than feel like an unwelcome imposition. What does the implementation process look like? Where do we start?

1. Identify Target Areas

First, we must decide in what areas of the hospital are the greatest potential gains. Perhaps elective care settings where patient flow is important: admissions, theatres, recovery, discharge. Those are the workflows to address first. They are also the areas to score significant, measurable gains through improving workflow.

During procurement, you have selected systems with data exchange capabilities and the relevant parties have the API developer's guides. With that done, the area selected, and written workflows to implement, we may proceed to the next phase.

2. Offline Development

Our advanced implementations involving multiple systems have been developed offline in test environments. This is the basic nuts and bolts of authenticating a system, pulling and pushing data, handling errors – all done remotely and certainly well away from any live hospital systems.

3. Onsite Working Sessions

We then move onsite for a series of working sessions with the hospital, depending on the complexity of the project. For a live environment, this must be planned, as there will be disruptions to the data systems. For workflows involving EHRs, we've typically had someone on site watching messages flow into our aggregator and watching the screens' data change in real time. HL7 has a number of challenges and we've found that having someone from the hospital

working on the message customisation, while we're on site, is the most efficient way.

In our experience, it's easier to roll out a new process in a single ward or limited area before bringing it to the rest of the building. This way, disturbance to the clinical team can be kept to a minimum.

4. Re-evaluation

We then facilitate evaluation and lessons learned session with the client team, implement any appropriate improvements and then schedule the wider rollout.

The relationship between hospital and vendor should be mutually beneficial. We vendors are happy to return to see how the hospital is getting on with the system(s). Our best products have been achieved via close collaboration with our clients. If a hospital is willing to pilot a new feature, or take a chance on new technology that hasn't yet reached the mainstream, or allow their staff to participate in focus groups or other information-gathering exercises, it makes for an excellent working relationship. One of the benefits of hospitals doing their own procurement is building these direct relationships with their vendors.

Contrary to common wisdom, vendors *are* able to make updates to the systems after deployment. The issue is one of paperwork; the updates may cause the system to behave in ways that were either not documented in the original specifications or are in direct contradiction to them. In this way, the specifications and vendor contracts can limit post-occupancy changes. If hospitals are happy to amend the specifications to account for the updates, this should not be a stumbling block.

5. Rollout to Entire Facility

You'll want to eventually roll out the new workflows everywhere – the value of a new process increases the more it's used, particularly if you're a part of a group of hospitals and want to implement consistent processes at every location.

If there is staff training to be done, decide who will take it on and what supplementary materials, if any, are required.

Key Drivers to Ensure Success

Engage teams at all levels – their expertise is fundamental to the project.

Nurture a culture where staff contribute to continuous improvement as they live with the system.

06

The Future of Digital Workflows

Where do we see digital workflows going? In many ways, it mirrors the changes in care delivery that seem to be the future of the industry.

In our product roadmaps, and in our consultations with hospitals, we technology vendors are trying to help facilitate these shifts. Converting manual processes to digital, and then automating them. Shifting more inpatient care to outpatient, and outpatient care to the patients' homes with the help of remote monitors and sensors. Offloading the parsing of the data from all these sensors to AI.

Can AI prove its value beyond the hype cycle?

If you've read anything on AI, you know enthusiasts fill books on what AI *might* do, good and bad. There is the risk of regulating AI out of existence, before it's had a proper chance to prove itself. That aside, some realistic use cases are starting to emerge. Among them, there are opportunities to use AI to improve and automate hospital workflows.

- AI can help to make staffing predictions. Based on the cumulative patient acuity in this ward, you will probably need this many nurses, this many assistants. That addresses staff wellbeing.
- If we know a patient usually calls for assistance around a certain time, proactively send someone for routine requests before the patient has pressed their call button. This gets at the nebulous "patient experience" metric.
- Monitor sound levels. Measure the baseline volume, and proactively raise an alert if the baseline becomes too high, or if any unusual sounds are heard. Identify any telemetry beeps by their unique pitch and pattern.
- Just as you summon an Uber and it sends your request to drivers nearby, we can do the same for workflow tasks. With RTLS, we know where staff are on the floor, and we know how long it usually takes to complete tasks. We can automatically assign a task to nearby staff who may be able to complete it soonest, and re-calculate if the process is taking too long.
- It may sound like science fiction, but it is possible to measure what reaction a given staff member has upon the patient's vitals. Do certain staff have a rapport with certain patients? Route tasks from that patient's room to the staff member whom they seem to like.
- If there is a queuing system for admissions, AI can predict when a bed will become available.
- Likewise, we can estimate expected discharge times, if we know the journey steps and we have current statuses from all the people who are part of the process. Proactively raise an alert if there is an interruption in the process. Patients want to go home, and in some regions, patient experience surveys affect how much money is reimbursed to hospitals. In *most* regions, there is pressure to get patients discharged, the rooms turned around,

and new patients in as quickly as possible.

- The ultimate goal for nurse call is to get help *before* someone knows they need it. AI can parse disparate data points from multiple systems and raise alerts automatically if it predicts an imminent emergency or worsening condition.

Beyond AI, there are other technologies with enormous potential to streamline hospital workflows.

Wayfinding

The modern hospital is a bewildering maze of parking lots, departments, and corridors, often spread across giant campuses. One emerging trend is using a system to provide wayfinding instructions via touchscreen kiosks and mobile apps.

A good wayfinding platform is like a digital concierge. They have cameras in the garage that recognize arriving license plates and begin a step-by-step instruction process, via a phone app, that guides patients to the right floor and desk. It notifies the correct department of the patient's imminent arrival. Some have touch points with medical record software and insurance, such that they can prompt users when documents need to be submitted, and nudge users to complete certain steps once they are home.

Voice assist devices, commonly deployed within aged care and long-term care facilities, offer an easy, invisible interface for patients.

Voice assist

Voice assistant devices can replace many buttons and fixed interfaces. Patients may ask for help – specifically ask for what they need, like water or assistance to the bathroom. They may control aspects of the room like the television, lights, blinds, or thermostat. If we have integrated data from the medical record software, this may function as an audible version of the in-room whiteboard, with patients asking "what's my schedule today?" or "when will I be discharged?"

Staff may ask questions about the current state of the room. Has it been cleaned? Is there a patient present? Have the porters moved the patient and it's ready for housekeeping? Where is the patient, if not in their room? Staff may also summon help quickly, both for clinical assistance, and as another safeguard against violence or overnight during a lone worker situation.

This is an area where regulations have not caught up with technology. A hardwired nurse call system is a requirement, but if hospitals want to trial voice command devices, it's an additional cost to bear. Similarly, the best language processing algorithms are still commercial (SIRI, Alexa) and the data must be sent to their servers for parsing. Data privacy regulations in many regions inhibit this kind of sharing and cybersecurity concerns may cause IT managers to baulk at an open connection to the internet. Finally, there are privacy concerns with any always-on microphone devices, even when they must be woken with a key word.

Augmented reality

If and when augmented reality glasses become viable, or at least as useful and widely adopted as smart watches, AR takes situational awareness to new levels. It puts relevant information anywhere staff happen to be, overlaid on top of the world. No more screens, no more overhead paging.

Messages are left in virtual space to help staff know where patients need something, or the status of a workflow task. If an alarm goes off and it's not in a direct line of site, indicate what direction it's coming

Augmented Reality is perhaps the ultimate "situational awareness" tool. Should glasses become viable to use within a hospital situation, any piece of data may be shown overlaid wherever staff may look.

from, and provide the wayfinding to get there.

Once staff reach the room, AR provides additional information about the patient, their call history, and any notes from the EMR.

It may seem like we are very far from realising the promise of these technologies, but we're actually much closer than you might think.

Kevin Higgins, Peter Ball
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About Austco

Austco Healthcare Limited is an international healthcare communications and clinical workflow solutions provider. Established in 1986 and headquartered in Australia, the Company has offices in the UK, USA, Latin America, Canada, Singapore and New Zealand. In addition to a worldwide staff, Austco maintains an extensive network of partners supporting over 5,000 installations in more than 60 countries with global support teams in both eastern and western hemispheres.

Austco's Tacera IP Clinical Communications Platform provides superior flexibility to support processes and the way caregivers work in healthcare environments. Open architecture and unrivalled interoperability ensure scaling and adaptability, with a broad scope of integrations available.

Contact Austco Europe to discuss digital transformation and any of the solutions in this document.

Access case studies and information about our products.

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