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CREATING ORDER FROM CHAOS: REAL-TIME TOOLS
TO HELP MANAGE MEDICAL SURGE SITES

Whitepaper

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BACKGROUND AND CHALLENGES

Preparing for medical surge is a core principle in emergency preparedness planning. It is the ability to provide medical evaluation and care during events that exceed the capacity of the normal medical infrastructure of the community.[1] A surge can be the result of an influx of patients or a hazard that impacts the normal operations of care delivery. Medical surge planning includes preparing for a large volume of patients requiring additional beds, staff, equipment, drugs, testing, and supplies. The better a healthcare system can maximize its existing operational resources, the better it will navigate through the challenges of medical surge.

Creating surge capacity in a disaster event is a monumental task that requires a multifaceted "team of teams" approach. In order to create medical surge capacity, temporary surge sites are often established to create space for testing and treatment of patients. These spaces include tents, mobile units, or the conversion of spaces such as churches, schools, hotels, or convention centers.[2] Setting up surge sites requires an incredible amount of coordination, execution, and communication. The many factors that need to be considered include location, access, staffing, supplies, oxygen, equipment, electricity, heating/cooling, and WiFi access.

The setup and operation of a surge site tends to be chaotic, especially if the need is emergent. Several of the specific intrinsic challenges that can lead to the chaos of the surge site are highlighted in the following sections; the ability to manage these successfully aids in reducing the chaos and providing safe, effective care for patients.

STAFFING AND THE SURGE SITE

During a surge site operation, staff from multiple departments, hospitals, or even other organizations typically come together to care for incoming patients. The first challenge is defining roles and responsibilities of each team member as quickly as possible. In addition, the staff are working in an unfamiliar environment, so standardizing the work environment quickly is critical.

EQUIPMENT AND THE SURGE SITE

Equipment for the surge site may include resources from multiple sources (multiple departments, other hospitals, rentals from outside companies, and/or supplies from the governmental Strategic National Stockpile); it is critical to track the equipment source and location so it can be returned after the event. In addition, multiple people bringing in equipment can lead to equipment being placed in non-standard locations. This can result in equipment going missing for long periods of time, leading to delays in care and potential safety concerns.

PATIENTS AND THE SURGE SITE

During a large influx of patients into an alternative care surge site, it can be difficult to keep track of patients and their locations while providing care. The ability to quickly find a patient is important for the care and safety of that patient. It is also essential to monitor patient volume demands and balance against resource availability (staff, equipment, and supplies).

Finally, visitor restrictions are generally in place at surge sites, which can lead to additional stress for the patients, visitors, and family members. However, it is important to maintain communication with families and loved ones during this stressful time.

Situational awareness of the demands and resources needed in a surge event is critical. Any inefficiencies in these processes can ultimately result in delays in patient care delivery, which could lead to patient safety events and/or worse patient outcomes. Adding to these concerns is the fact that paper documentation is often the only method of keeping records during surge events, particularly regarding staff and equipment resources and locations.

SOLUTION

A Real-Time Location System, or RTLS, can aid in setting up and managing surge site locations, and can provide the tools and processes to help reduce the intrinsic chaos of this environment.

REAL-TIME TOOLS

Real-time solutions are available to support caregivers in managing the patients, staff, and equipment at any surge site location. Traditional real-time location systems (RTLS) can require weeks or months to install and involve network cabling and expert installation teams. Plug-and-play capabilities are now available that allow a healthcare organization to self-install an RTLS solution in approximately an hour in any location with electrical power and a cellular signal and/or WiFi. The solution can include different hardware types that function as the locating patient/staff badges and equipment tags. It is important to note that each hardware type has its pros and cons, and it is important to understand this when making your final selection. The following example shows how the software application Workflow^{RT} provides visibility into the location of staff, patients, and assets. Workflow^{RT} is a cloud-based and HIPAA-compliant solution that can be viewed on any computer, tablet, or phone by staff at the surge site and from remote locations such as an incident command center. Incident commanders can view data from multiple surge sites at a glance to monitor patient volumes, as well as staff and equipment resources.

PATIENT VISIBILITY AT THE SURGE SITE

Patients receive a badge at point of entry that automatically captures and time-stamps all movements and durations. The location

of staff in the same areas as each patient is also recorded, allowing for contact tracing reporting. As shown in the figure below, patients can be viewed along with their locations and how long they were in an area. This enables staff to quickly know where to find a patient for efficient care.

STAFF AND EQUIPMENT RESOURCES AT THE SURGE SITE
Resource management is a critical function during a disaster event. Staff who have been assigned a badge and are actively working at each surge site are noted on the Active Staff list. As shown in the figure below, active staff and their current location can be quickly scanned.

If equipment is chosen to be tagged, it will also be listed in the Workflow^RT onsite list for each surge site. By using standardized equipment flow, indicators can be set up to

note if equipment is in use or not in use. This enables key resources such as ventilators and infusion pumps to be optimized. As shown in the example below, equipment can be viewed across the surge site indicating the type of equipment, the location, and how long it has been in that location. When the time comes to take down the surge site, the equipment can be quickly located so it can be returned appropriately.

Full Name	MRN #	Tag Label	Location	Location Duration ↓	Phase	Phase Duration
Smoth, Arnold	9485749302	0115	Zone 3	50m	Care Zone 3	50m
Biggs, Shari	2385739049	0119	Zone 1	47m	Care Zone 1	47m
Corey, John	9485720394	0114	Zone 3	47m	Care Zone 3	47m
Wagner, Cora	2348590395	0120	Zone 3	46m	Care Zone 3	46m
Charles, Todd	0932849582	0118	Zone 5	46m	Care Zone 5	46m
Jones, Jenny	485940394	0111	Zone 1	45m	Care Zone 1	45m

Patient location visibility at surge sites

Active Staff

Name	Tag	Location
Booth, Jessica	2094746	Zone 3
Bollinger, Stephanie	559158	Zone 5
Ball, Rose	557978	Zone 1
Barber, Donna	2486095	Zone 4
Alexander, Jeff	2487588	Zone 2

Staff resources visibility at surge sites

Assets ▼ **Phases** ▼

Full Name	Tag Label	Location	Location Duration	Phase	Phase Duration ↓
VENTILATOR, ASSET	0102	Asset Zone 3	15m	In Use	15m
VENTILATOR, ASSET	0100	Asset Zone 1	14m	In Use	14m
VENTILATOR, ASSET	0109	Asset Zone 4	10m	In Use	10m
VENTILATOR, ASSET	0101	Asset Zone 2	10m	Not In Use	10m
BIPAP, ASSET	0108	Asset Zone 3	8m	In Use	8m
INFUSION PUMP CONTROLLER, ASSET	0106	Asset Zone 2	8m	In Use	8m

Equipment resources visibility at surge sites

FAMILY COMMUNICATION AT THE SURGE SITE

When visitor restrictions are in place at surge sites, it is important to maintain communication with families and loved ones during this stressful time. An additional solution that can aid in improving communication is through the timely messaging of family members. As an example, Workflow[RT] allows staff to easily text family members. Each patient can have an unlimited number of recipients, and staff can send custom messages or select from a list of common messages.
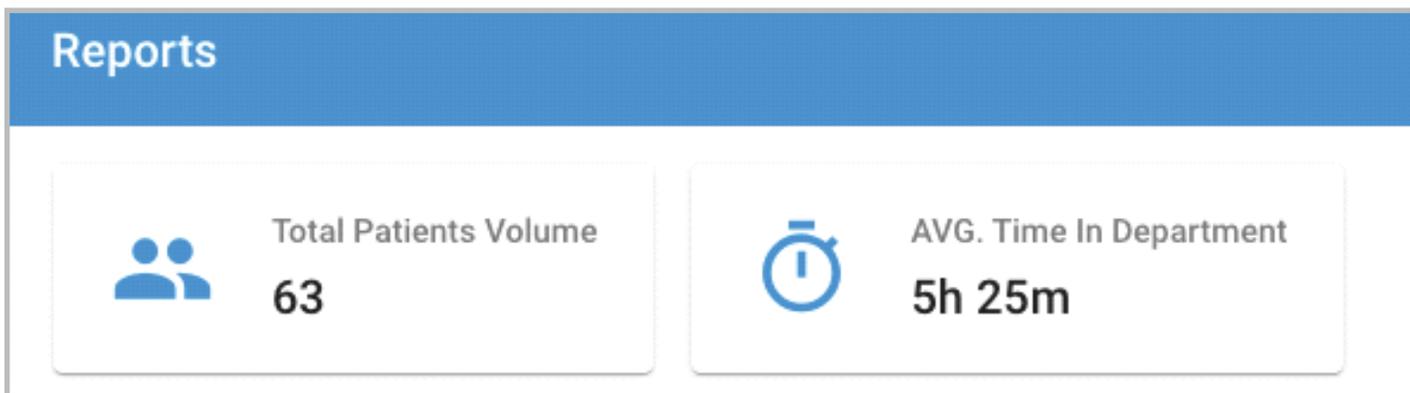
REPORTING TOOLS AT THE SURGE SITE

It is important to understand reporting needs of the surge site and hospital along with the reporting capabilities of any software solution. By monitoring the data from each surge site and feeding that to any local and/or remote incident command center, it greatly assists in identifying ongoing resource demands. As shown below, Workflow[RT] reporting tools are able to provide valuable planning data regarding the number of staff, number of patients, duration patients have been in the surge site, and the equipment usage and availability at each site. Finally, when it is needed, a contact tracing report is also available for staff to determine exposure risk at the site.

Family communication from surge sites

Reporting tools at surge sites

SUMMARY

Managing Surge Sites during a pandemic or other disaster event is a complex operation. Real-Time Location System tools can provide valuable operational information to support the incident command center and site leaders. The recently available RTLS plug-and-play solution now allows for rapid RTLS deployment at surge sites. This ultimately allows for centralized access and visibility to multiple surge sites that may be under a single incident command. These plug-and-play solutions allow for easy, cost effective set-up and take down, enabling rapid deployment. Ultimately, real-time technology can greatly support emergency response teams to efficiently and effectively manage a medical surge site.

REFERENCES

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Mary Jagim has over 30 years of experience in emergency nursing, healthcare leadership, public policy, and healthcare consulting. She served as president of the Emergency Nurses Association in 2001 and was a member of the IOM Study on the Future of Emergency Care in the US Health System. In her current position, Mary serves as the Chief Nursing Officer at Infinite Leap, the premier healthcare consulting group and solutions provider for real-time technologies. Mary is one of the leading experts in the implementation and use of real-time location in healthcare. With her practical expertise in emergency preparedness, she assists healthcare systems with leveraging technology to provide a safer environment for patients and staff.

ABOUT PROMPT.HEALTH
Prompt.Health, an Infinite Leap company, provides easy and affordable real-time technology solutions that make a big impact on patient experience and safety, increased capacity and access, and improved staff satisfaction.

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