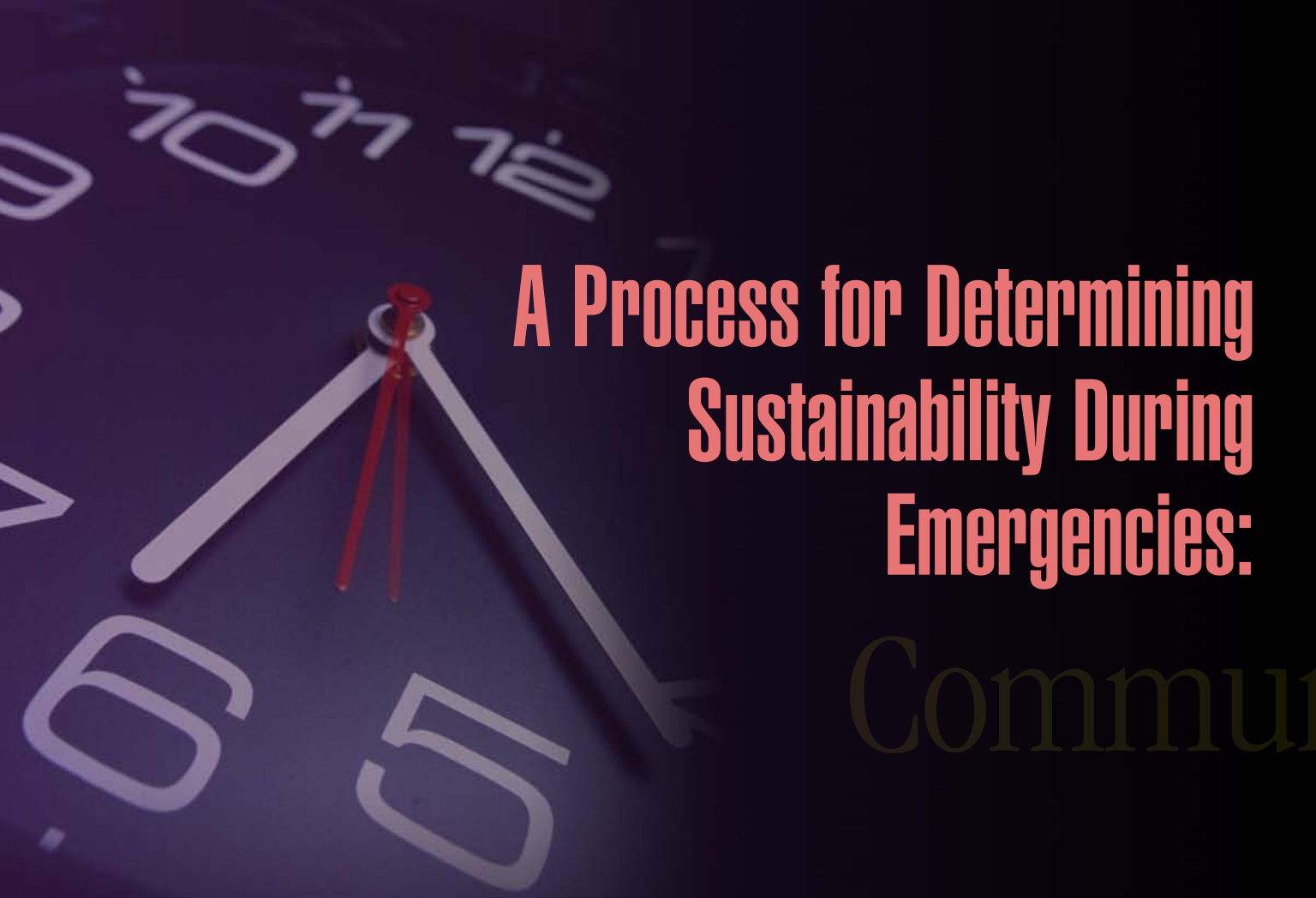

A Process for Determining Sustainability During Emergencies:

For sustaining an emergency response, a healthcare organization needs a process to determine the length of time it can remain in existence by supplying the necessary services, protection, and nourishment to its staff and patients. An essential part of being prepared for emergencies involves monitoring the availability of Resources and Assets (RA). If additional RA cannot be obtained, the organization may cease to exist and an evacuation becomes a reality. Determining the period of time that an organization can sustain itself requires a process that is based on reasonable assumptions, an inventory of resources and assets, and a method of monitoring the status of the inventory. Understanding and utilizing the Sustainability Process will aid the Command staff in determining the length of time the organization can exist without support from outside resources.

The Joint Commission® stresses sustainability in the "new" Emergency Management Standards for the Environment of Care® (EC®) by requiring that an organization "identifies its capabilities and establish response efforts when the hospital cannot be supported by the local community for ***at least 96 hours*** in the six critical areas" (EC.4.12.6). The six critical areas are communication, resources and assets, safety and security staff responsibilities, utility management, and patient clinical and support activities (EC.4.13.18). Very few organizations have the capacity to store and maintain a sufficient level of resources and assets to remain at a level of full operation for a period of 96-hours. Even those organizations that have the resources to last 96 hours must complete an evaluation to make that determination. Therefore, the Sustainability Process becomes a compliance issue as well as a practical necessity for managing a response for any organization.

SUSTAINABILITY PROCESS

The Sustainability Process is divided into two categories: Pre-planning and Response Activities. The Pre-planning Activities are important for establishing some basic assumptions based on patient census and RA inventory. The Joint Commission requires during an emergency the minimum RA categories to include, personal protective equipment (PPE), water, fuel, staffing, medical, surgical, and pharmaceuticals (EC.4.11.9). The Response Activities Chart helps an organization take the Pre-planning information, integrate current data, and determine the period of time that the organization can sustain during an event while still providing a minimally acceptable level of care to patients. The Response Activities involve periodic assessments of current patient census and

resources and assets

Dealing with the 96 hour rule

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inventories and will help the Command Staff make appropriate decisions.

PRE-PLANNING ACTIVITIES (CHART 1)

Determining the consumption rate of essential RA, including staffing, depends on the number of individuals, namely patients, support staff, and visitors, in the facility and the quantities of resources available. Accomplishing this requires a current Patient Census and a RA Inventory. To simplify terminology, "consumption" includes materials or staff utilized in providing patient care. Average baseline information on patients receiving care, and resources and assets consumed by these patients, including staff and visitors associated with the patients, is critical. Once these key elements are determined, the organization can develop a Decision Process for sustaining medical and support services during an event. This activity should be done initially and on an annual basis, according to the 2009 Emergency Management standards.

PATIENT CENSUS (CHART 2)

Patient Census is a variable that can be tracked over a period of time and used to determine the number of individuals, whether patients, staff, or visitors, that are consuming resources and assets in the facility at any one time. The number of individuals attributed to each patient varies by type of patient, time of day, and other variables. This includes staff conducting such activities as providing patient care, operating the cafeteria, and delivering supplies, as well as assisting family, and friends visiting the patient.

Overall, the more patients in the facility, the more individuals, including staff and visitors, will be consuming the RA. For example, if an organization determines an Average Daily Census of 749 patients and an emergency occurs with 800 patients in the facility, we can estimate that the inventory will deplete at a higher rate than normal. The consumption rate can be calculated as census changes and used to give the Command staff the necessary information to alter response strategies, thus increasing sustainability (Chart 2). If for example, the Outpatient Clinic were to close, the daily census in that area would be "0" and the "Daily" census for the facility would be 325. As the Sustainability Process is more defined, these numbers can be refined.

Nevertheless, for now this gives us a best guess for planning purposes. The Patient Census should account for all patients, including those in the emergency, pediatrics, surgery, outpatient, nursery, and other departments that received care over a 12-month period.

Chart 1: Pre-Planning Activities

Essential Elements	Definitions	Activity
Patient Census		
Annual Patient Census (patients)	All patients including Emergency Room, Pediatrics, Surgery, Outpatient, etc, that received care in a period of 12 months	Determine the total number of patients that received care in a period of 12 months
Average Daily Census (patients/day)	Average number of patients receiving care on a given day	Annual Patient Census divided by 365 days
Inventory of Resources and Assets (RA)		
Inventory List of RA (items)	RAs needed for an emergency within the seven categories:	Identify items within the seven categories that will be needed, (i.e. PPE, water, fuel, staffing, medical, surgical, and pharmaceutical)
Actual Inventory Quantity (units)	Quantity of RA on campus	Actual count of RA items on a day picked for inventory
Consumption Rate		
Annual Consumption (units)	Quantity of RA consumed in a period of 12 months	Determine the number of units in the seven categories that were consumed or utilized in a period of 12 months.
Average Consumption Rate (units/day)	Quantity of RA consumed per day	Divide annual consumption of each RA by 365 days
Sustainability		
Inventory Sustainability Period (hours)	A period of time that the average inventory will be depleted	Divide actual inventory quantity by average consumption rate, times 24
Sustainability Gap (hours)	Difference between the sustainability hours before depletion and 96-hours	96-hours minus Inventory Sustainability hours
Decision Point		
Decision Process	The decision process determines the acceptable response alternatives concerning the sustainability	Determine whether to: * Obtain more Resources and Assets * Consider consumption adjustment * Partial or complete evacuation

THE INVENTORY OF RESOURCES & ASSETS

Conducting the inventory begins with a list of items that would be needed during an emergency. As stated earlier, The Joint Commission requires during an emergency the minimum categories to include, PPE, water, fuel, staffing, medical, surgical, and pharmaceuticals. Identifying these items takes a significant effort from the entire organization. Developing a method for monitoring the inventory is essential for all organizations. However, since the level of inventory fluctuates on a daily basis, an Actual Inventory should be conducted periodically for each item to determine what could be available on an average day.

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Chart 2: Census*		
Licensed beds are 200		
Departments	Patients	
	Annual	Daily
Adults	43,435	119
Nursery	2,190	6
Outpatient	158,410	434
Emergency Room	58,400	160
Surgeries	10,950	30
Other	7,300	20
Total	280,685	769
**Staff & visitors associated with the patients are included.*		

The quantity of inventory consumed on a daily basis, under normal conditions can be established from ordering records or purchase orders for a 12-month period or any other methods that can be used to estimate the quantity consumed. Items like potable water may be assessed through meter readings for the year, fuel for generators or boilers could be based on average run times or test period, and food for patients based on actual meals served. Estimating the consumption of staff, including licensed independent practitioners, is somewhat more difficult, but does require a method to determine the number of staff available.

Consumption Rate:

Once the list of resources is developed for the inventory, the Annual Consumption of each item for a 12-month period can be researched from ordering records, utilization analysis, or any other means. Knowing this quantity, a baseline Average Consumption Rate (items/day) can be calculated for the 12-month period. In calculating water consumption, for example, one east coast hospital, determined that 7,000,000 gallons of water was consumed during the 12-month period of Jan-07 to Dec-07. It was further determined that most of the water consumption was from laundry, chillers and toilet usage, in that order. With this information, the hospital can develop procedures for consumption adjustment or curtailment of services during a water shortage or outage. These procedures would be developed during the Pre-Planning Activities. One exception is the consumption rate for fuel used by the emergency power generators. The consumption rate for these units, under operating conditions, will be the same regardless of the census or number of individuals in the facility. The consumption rate can be calculated from manufacturer's specifications, the load test conducted monthly, or the four-hour load test required every three years by The Joint Commission (EC.7.40.5)

Sustainability:

By knowing the Actual Inventory and the Average Consumption Rate, the time to consume all of the RA available on an average day, or the Inventory Sustainability Period (hours), can be calculated. Once the Inventory Sustainability Period is determined, the Sustainability Gap (the difference between the time the organization can sustain on an Average Inventory and 96-hours) can be defined. All of these Pre-Planning assumptions and calculations are based on the Census, which ties consumption to a measurable number. Is this the perfect number? No, but it provides the organization with an initial estimation to begin planning for an emergency.

Decision Process:

Identifying the Sustainability Period allows the organization to make a number of decisions. Is it practical to tie up funds to obtain more resources, assets, and storage capacity to maintain the normal level of care throughout the 96-hour period? Might it be better to develop alternatives? These alternatives could include consumption adjustments during the event in order to sustain the organization's longevity. Consumption Adjustment activities can be as simple as reducing the

cooling in nonessential areas or cutting back on the hot water supply to public restrooms. Consumption Adjustments should be developed for each major item on the inventory list by the departments that consume the RA.

However, the major decision faced by leadership is determining service curtailment, or even to initiate evacuation plans, based on the status of the inventory and condition of the facility. Staged evacuation, or discharge of specific patients may allow the organization to sustain for longer periods. Determining the actuation points based on sustainability is important as the event may ultimately result in total evacuation of the facility.

INVENTORY & SUSTAINABILITY OF RESOURCES & ASSETS (CHART 3)

The Inventory and Sustainability of Resources and Assets Chart combines Pre-planning information and current data from the event to automatically calculate a Sustainability Period for the time frames 0-hours to 96-hours. As the data is entered, the Sustainability Period gives the Command Staff the information needed to determine Consumption Adjustments for the various items or initiate potential evacuation activities. A sample for some of the categories is shown in Chart 3.

RESPONSE ACTIVITIES (CHART 4)

The Response Activities Chart helps an organization integrate the Pre-planning Activities with current data to provide a response plan. The Chart also identifies the suggested Job Action Sheet (JAS) from the organization's HICS structure that could be used to obtain the information or make decisions. The Response Activities Chart also suggests actions to take at various time frames to manage the event. The information gathered during the Response Activities assessment is entered into "plug-and-play" Inventory and Sustainability of Resources and Assets charts[1]. Some examples of RA categories are provided in Chart 3.

Components:

Once the event occurs, the Current Census and Inventory of RA (Chart 3) are vital in calculating the data and collecting the information needed. Based on the Consumption Rate established by the Average Daily Census and Average Inventory in the Pre-planning Activities, an Estimated Consumption Rate can be determined. This information is entered into the RA Charts at the appropriate time.

A Current Inventory can be established from the monitoring program that has been developed and is a requirement by The Joint Commission (EC.4.11.10). The Bed Tracking Manager of the organization's HICS structure can determine the Current Census. Based on the Current Census, the Consumption Rate of the organization can be determined. From this data, the Estimated Consumption Rate and Sustainable Period are determined. These calculations will be done automatically in the RA chart. The Sustainable Period tells whether there are sufficient supplies for a 96-hour emergency and whether or not Consumption Adjustments should be implemented.

Time Frame:

The Time Frame provides suggested actions during an event (in hours) to obtain information or take actions based on the sustainability of the organization. The need to recount or modify a procedure will change based on the actual status of the event. A key monitoring issue is the assessment of the Level of Care and the inventory of resources, and assets for the various periods. With adequate inventory, the Level of Care could be maintained at a "standard" level; whereas a reduced inventory in specific areas could result in only "sufficient" level of care being attainable. However, low levels of many resources or assets could mean that only "primitive" care is available. Based on the Level of Care and condition of the facility, various areas of the facility could be either evacuated in stages, or totally evacuated due to the lack of overall inventory. The information in these time frames on the RA Charts are just samples of actions, which could be considered and do not necessarily dictate evacuation.

Summary

Utilizing the basic assumption that inventory consumption can be linked to Average Census allows the organization to develop the fundamentals of a sustainability Process. This can be used for planning purposes and for forecasting Sustainability during an event. However, obtaining an actual inventory of the resources and assets suggested by The Joint Commission is the key and requires cooperation of the total organization. The charts provide examples and can be refined with time to establish a workable format. ASHE

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[1] A full compliment of these tools are provided in MS Excel format on CDR and may be obtained free of charge by contacting Safety Management Services, Inc. via info@safemgt.com.

Sample Chart 3: Inventory & Sustainability Resources & Assets (RA)

		Pre-Planning				Response Activities									
		Baseline Data				Time Frame (0-2)					Time Frame (2-12) with influx of patients				
RA Item	Units	Annual Consumption (units)	Average Consumption Rate (units/day)	Actual Inventory Quantity (unit)	Inventory Sustainability (hours)	Current Inventory (units)	Current Census (patients)	Estimated Consumption Rate (unit/day)	Sustainable Period (hours)	Consumption Adjustment	Current Inventory (units)	Current Census (patients)	Estimated Consumption Rate (unit/day)	Sustainable Period (hours)	Consumption Adjustment
			@Ave Census = 769*			(Date/ time)	(Date/ time)	(Date/ time)	Hours	Yes or No	(Date/ Time)	(Date/ Time)	(Date/ Time)	Hours	Yes or No
N95 Masks	each	52,560	144	200	33	200	769	144	33	No	100	250	163	14	Yes
Blood Units	pint	2,938	8	119	3541	100	749	7	306	No	100	875	9	262	Yes
Staff Physician	Individual	25,550	70	70	24	100	749	68.18	35	No	100	875	79	30	Yes
Diesel Fuel*	gallons	NA	2400	10,000	100	10,000	NA	2400	72	yes	9,800	NA	100	66	Yes
Non-potable water	gallons	7,000,000	19178	4,900	6.13	4,900	769	1,9178	6	Yes	4,900	875	21,821	5	Yes

* Based on a fuel consumption rate of 100 gallons/hours at operational load

The Data in **red** boxes is entered by the organization
The Data in **clear** boxes is the results of the calculation of the form
The Census in **orange** boxes is the total number of patients in the organization (*see example below*)
The Answers in **green** boxes are made by the organization based on the results of the calculations
The **Response Activities** for 12-96 hours are on the extended RA Charts (*located on SMS, Inc.'s CD-R*)

Chart 4: Response Activities

Components			Response Activities Time Frame (hours)				
Essential Elements	Definitions	*Suggested HICS Staff	0-2	2-12	12-24	24-48	48-96
Current Inventory (units)	Estimated quantity of RA available on the day of the event	Personnel Tracker Supply Leader	Determine quantity of RA available			Recount if change in staffing	
Census (patients)	Number of patients receiving care on day of event	Bed Tracking Manager	Determine the number of patients receiving care	Recount if there is an influx/deflux	Recount if there is an influx/ deflux		Determine patient population for evacuation
Estimated Consumption Rate (Units/ hour)	Potential consumption rate of RAs at current census	Resource Leader	Complete RA tables		If change in census, recalculate		
Estimated Sustainability Period (hours)	A period of time that the current inventory will be depleted	Resource Leader	Complete RA tables		If change, recalculate		
Consumption Adjustment (units/hour)	Modifications to normal activities implemented to extend sustainability	Incident Commander Logistics Chief Planning Chief Operations Chief		Modify the procedures or eliminate services	If necessary readjust consumption rate		Readjust for potential evacuation
Level of Care	The appropriate level of care (standard, sufficient, or primitive) being provided to patients based on available RA, and other emergency considerations.	Incident Commander Command Staff	Standard	Standard	Standard or Sufficient	Sufficient	Sufficient or Primitive
Level of Evacuation	Staged evacuation may be a unit, floor, or section of building. A total evacuation is relocating all to an alternate care site.	Incident Commander Command Staff	Staged or Total	Staged or Total	Staged or Total	Staged or Total	Staged or Total

* *This will very depending on the HICS profile of the organization*