Healthcare System Readiness Measurement Framework

DRAFT REPORT FOR COMMENTING

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DRAFT REPORT

Introduction

Substantial progress has been made in the past 15 years toward improving healthcare and public health systems and capacities to address health security threats. Yet, many complex challenges persist, and many of the nation's preparedness efforts will still not suffice to respond to anticipatable threats (e.g., terrorism, pandemics, severe weather, and others).[1] While some cross-sector programs have been developed or enhanced to improve the nation's healthcare preparedness capabilities during national and regional emergencies, these programs often do not address fundamental challenges of limited baseline healthcare capacity, are usually unevenly distributed, and typically take time to mobilize, which may limit their effectiveness in time-sensitive crises. Along with regional emergency medical services, police, and fire services, healthcare systems are on the front lines of responding to disasters when they occur. The lives saved or lives lost may depend on the readiness of those healthcare systems for disaster. Therefore, a need exists for quality and accountability metrics of healthcare system readiness to encourage successful collaboration between the private and public sectors and ensure high-quality care during times of crisis and community-wide strain.

Healthcare systems are critical resources during these events which can cause both acute illness and injury. Most events disrupt community access to usual and customary healthcare services. To ensure delivery of healthcare services during disasters, healthcare systems must be ready for all types of events (i.e., take an "all-hazards" approach). "Readiness" is the ability to prepare for, mitigate against, rapidly identify, evaluate, react to, and recover from a wide spectrum of emergency conditions related to a disaster or public health emergency. Measuring the quality of a healthcare system's readiness is a very important concept in ensuring the welfare of our communities.

Unfortunately, quality measurement and accountability efforts focused on healthcare system readiness are underdeveloped. Performance of the health system during a disaster or public health emergency presents unique challenges that have not traditionally been part of the broader effort in quality measurement development. Currently these broader efforts focus on measuring day-to-day activities and outcomes for providers, clinics, health systems, and health plans. Many accreditation and regulatory agencies require healthcare systems to have written emergency management plans. These plans must describe specific actions of response during disasters, and the healthcare system must be able to demonstrate these actions during training exercises. In addition, health systems must provide evidence that they have appropriate equipment, processes, and training in place for disasters. Despite the intense level of requirements for emergency and disaster planning, few metrics currently exist to assess how effectively healthcare systems use these plans and resources to save lives and preserve health when disasters occur. Moreover, most of the metrics that do exist focus on emergency care settings and emergency departments (ED), and only a few focus on non-day-to-day healthcare activities such as a high volume of unscheduled visits related to a particular incident and/or structural challenges (flooded

basements, loss of power) and/or operational challenges (staffing, surge capacity) in maintaining high-quality operations during and following disaster events.[2,3]

Several factors contribute to this gap in measurement of capabilities to respond to disasters and public health emergencies. Unlike routine clinical care, disasters and public health emergencies are infrequent events, making it a challenge for healthcare systems to test and/or demonstrate their readiness during daily activities. However, maintaining efficient operations is an important element of disaster readiness. Exercises that simulate disaster events to evaluate response capabilities are important practices to demonstrate response capabilities. However, exercises can be expensive, difficult to plan, and can substantially disrupt normal healthcare operations, all of which can make them challenging to implement.

Nevertheless, disaster events have steadily increased and are an ever-present challenge for the healthcare enterprise and for communities. Additionally, the variety of potential disasters that can occur presents a unique set of challenges for healthcare systems and for measurement.[4] The capabilities required for various disasters can be disparate, and a multiplicity of factors can impact outcomes during disaster response. This has contributed to only sparse empirical research supporting readiness practices that can clearly link a structure or process with an outcome of a disaster response. The result is a state of literature where most frameworks and guidance for readiness are drawn from case studies and focus on lessons learned from specific situations.

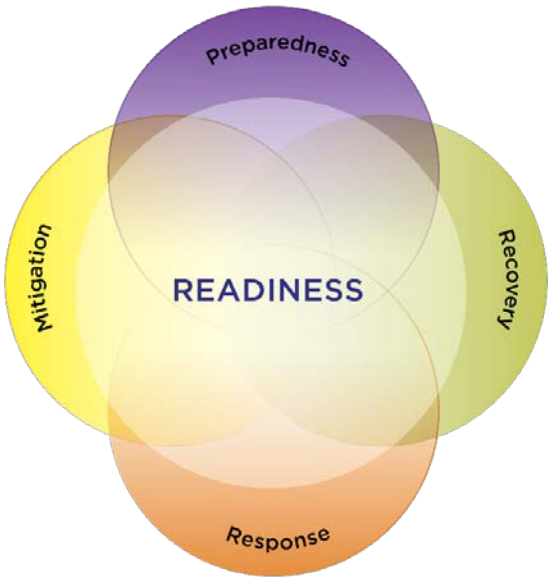
The National Quality Forum (NQF) is an experienced convener of multistakeholder groups for developing consensus around diverse and challenging topics like readiness. NQF has taken on this project at the request of the Department of Health and Human Services (HHS). NQF will develop an actionable all-hazards measurement framework to assess the readiness of healthcare systems to respond to and recover from disasters and public health emergencies. As a first step toward achieving these goals, NQF conducted an environmental scan and published the results in the Healthcare System Readiness Environmental Scan Report.[5] Additionally, NQF convened an expert, multistakeholder Healthcare System Readiness Committee to provide input and guide the creation of a framework. Throughout this project, NQF solicited input from a multistakeholder audience, including NQF membership and public stakeholders.

The findings from the environmental scan and Committee feedback helped to inform the construction of a foundational measurement framework, which provides insight into the key components necessary to develop new measures to assess healthcare system readiness objectively. A measurement framework is a conceptual model for organizing ideas that are important to measure in a topic area and to describe how measurement should take place (i.e., whose performance should be measured, care settings where measurement is needed, when measurement should occur, or which individuals should be included in measurement). Frameworks provide a structure for organizing currently available measures, areas where gaps in measurement exist, and prioritization for future measure development. The framework must be flexible to accommodate changes in data standards, data transport mechanisms, data sources, changes in settings of care, and changes in users of these systems so that it consistently provides utility for those seeking to measure and assess healthcare system readiness.

Measurement Framework Considerations

Development of the framework originated from the belief that readiness exists at the intersection of the four phases of emergency management: mitigation, preparedness, response, and recovery (Figure 1). Readiness depends on successfully addressing the essential components in all of these emergency management phases. Additionally, this framework takes an all-hazards approach to readiness, meaning that the measures created from the framework need to be broad enough to apply to any natural, technological, or human-caused incident. The framework focuses on measurement of the quality of healthcare delivery by the healthcare system prior to, during, and after any emergency or disaster.

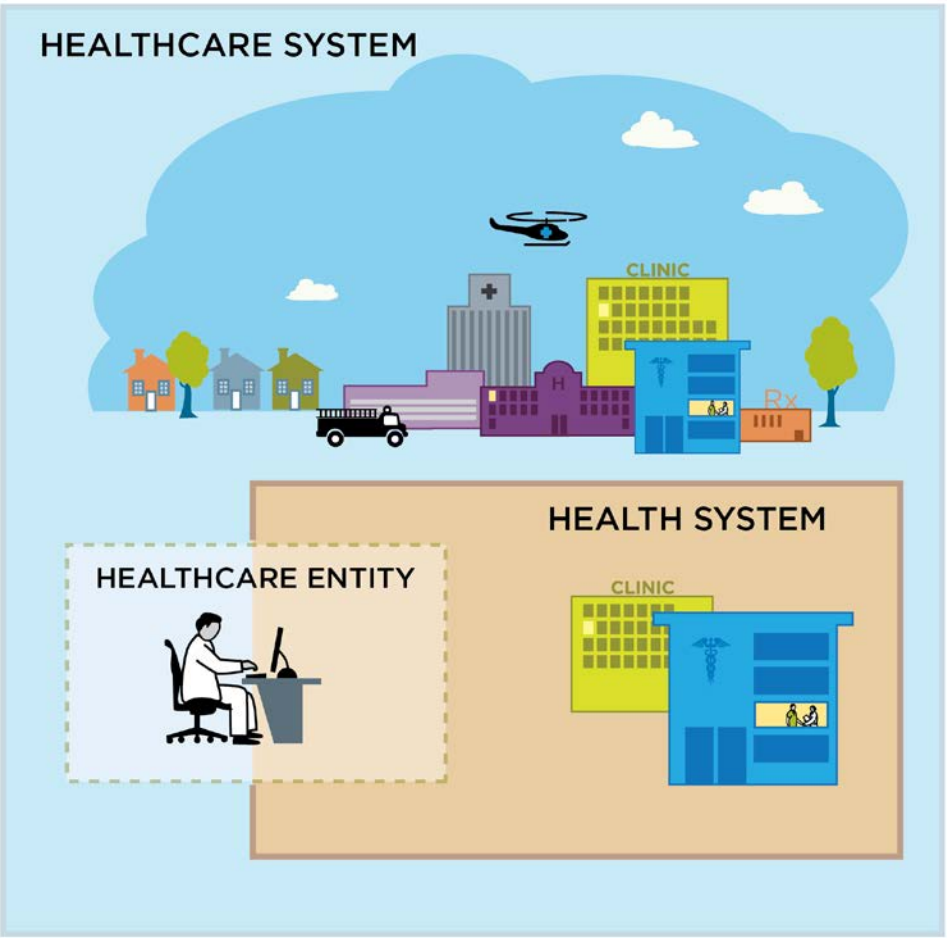
Figure 1. Readiness Concept



The concept of readiness within a healthcare system can pertain to many entities coming together to act as a system. These entities will vary depending on geography, resources, and community structure. This framework includes all entities who provide direct care to the populations they serve. In this framework, the goal is to provide targeted guidance for the measurement of the quality of readiness across the healthcare system. We define healthcare systems as all entities that directly deliver healthcare services to promote continuity and timely care across multiple providers, health systems, and communities. The characteristics of the associated healthcare entities within the healthcare system to which this framework may be applied will vary based on the needs of the community and the potential event. To respond successfully to any disaster and public health emergency, healthcare entities need to work together to meet the health needs of the community. Therefore, this framework is intended to include measures that assess entities within the healthcare system (i.e., individual healthcare organizations) and the entire healthcare system as a whole, which may include multiple related entities (such as health systems like Johns Hopkins Medicine) or standalone healthcare entities (This concept is demonstrated in Figure 2.) In addition, this framework is intended to apply to the measurement of readiness across multiple healthcare systems simultaneously during a disaster, particularly when those entities need to

work together across adjacent communities to ensure the best quality of care for patients across the healthcare continuum.

Figure 2. Healthcare System Concept



Guiding Principles

Understanding the vast diversity in the scale and types of hazards potentially addressed by this framework, a set of guiding principles was created. These guiding principles define key criteria that aim to steer the development of measure concepts into performance measures for healthcare system readiness. Guiding principles were then further divided into the subcategories of "the what", "the where," and "the how" to provide a primer of factors that should be considered when using this framework. An overarching subcategory of "why" was also created.

The Why

As demonstrated above, readiness is a complex, relatively new concept that must take into consideration all of the four phases of emergency management, making it a difficult concept to measure. However, healthcare system readiness measurement is very important in ensuring the welfare of our communities. Measurement assists healthcare systems to set targets for improvement and

determine where to invest resources. Additionally, healthcare system readiness requires a more holistic approach to measurement that goes beyond just determining if a healthcare system has planned for a hazard or how well it did afterwards. Thus, "the why" is part of all the guiding principles and is the driver behind the development of measure concepts and performance measures for healthcare system readiness.

The What

The what addresses factors and system characteristics that broadly impact readiness and that pervade each phase, domain, and subdomain; essentially, they define what system characteristics are necessary for ensuring readiness. For example, readiness requires a person-centered system that addresses issues of system capacity and capability for all hazards. The what also pertains to maintenance of health as well as availability and accessibility of care for all, including those not directly affected by the emergency who require care for chronic, complex conditions, have access and functional needs, and for disproportionally impacted vulnerable groups (such as the children, individuals with disabilities, and the elderly).

Person-Centered

The Committee noted that the concept of readiness should be defined and addressed from a person-centered perspective, where the needs of all individuals who will need to access healthcare services during and after a disaster are considered when planning, developing, and practicing system readiness. It is important that effective communication and patient care preferences be built into the system's practices, especially during a disaster. Additionally, it is important to understand and accommodate the varying needs of individuals who might seek care, including populations with specialized needs that arise from the extremes of patient age, comorbid medical or psychiatric illness, temporary or permanent disability, and those with socioeconomic challenges (e.g., the homeless), among others.

Capacity- and Capability-Focused

The Committee understands that it is extremely disruptive and challenging for institutions to create sufficient clinical capacity to accommodate the volume of patient needs that may occur in a disaster. Nonetheless, institutions need to be able to increase their capacity to provide care both immediately in a scenario for which they may have little advance notice, and on a sustained basis for an extended event, in order to muster the surge capacity needed during an emergency. In addition, institutions may need to be able to rapidly expand certain selected critical capabilities, such as trauma, pediatric, or infectious disease capabilities, within their system. Measures of quality should reflect the healthcare system's ability to create sufficient clinical capacity and to mobilize needed clinical capabilities in the face of disaster.

Available and Accessible

During an emergency, especially during the response and recovery phases, access to the continuum of care should not be disrupted. Not only do healthcare systems need to have necessary healthcare services available, members of the community should be able to access these services readily without undue delay or difficulty. This applies to individuals affected by the disaster and individuals in the community who rely on healthcare services for chronic care.

Maintenance of Health

Often, when considering healthcare system readiness, the focus is on those requiring emergent care and those directly affected by the event. However, maintenance of health for those in the community not directly affected by the emergency is similarly important. For example, individuals with chronic, complex care needs still require continuous care and attention during emergency response and recovery phases, such as maintenance of dialysis facilities for individuals with chronic kidney disease, and ensuring that patients with conditions such as diabetes, heart failure, and chronic lung disease have access to preventive and maintenance therapies.

The Where

Readiness as a concept encompasses locations where care is delivered. Therefore, the where addresses sites providing care while considering issues related to size, scalability and geographic differences within and across communities.

Care Beyond Hospitals

Planning for healthcare disaster readiness is often associated with only the care provided in hospitals. However, healthcare services are delivered in many settings, including outpatient settings, and even people's home. Additionally, in emergencies and disasters, care may be provided in nontraditional settings such as shelters, tents, and schools. For this framework, the definition of a healthcare system is all-inclusive: It includes any entity that provides direct healthcare services. During a disaster or emergency, all entities will need to work together in order to deliver quality care across all designated settings.

Scalability

During normal operations, most organizations and institutions do not perform at maximal capacity. However, based on healthcare needs related to a disaster, institutions are expected to appropriately scale their services and increase capacity. Scaling up requires preparation and needs to be tailored to the type of hazard event/emergency. Furthermore, scalability is not an independent concept, but works in conjunction with the principles of capacity and capability.

Geographical Considerations

The geographical location of a community will often dictate resource availability and distribution. This consideration is especially important when determining how entities should interact with one another during a disaster to meet the healthcare needs of a population. For example, a rural or frontier healthcare system might only include one hospital and a few local clinics in the community, while an urban or a suburban healthcare network may include several hospital systems, clinics, and at-home services. Consequently, geographical location is a factor that affects the scalability of the response and specifically the healthcare system's ability to increase and/or decrease care capacity based on the type of disaster. Geographical considerations also play a role in how priorities influence investments in disaster planning. For example, healthcare systems in major cities might focus more on maximizing local treatment capacities and capabilities, whereas systems in more rural areas might focus heavily on patient transport and redistribution after a disaster event.

Healthcare System Size Considerations

When considering healthcare system readiness, the size of the healthcare system is an important consideration, especially since size can often be considered a proxy for resource availability and the system's ability to expand care capacity. Larger healthcare systems may be expected to have greater care capacity and resources that they can call upon during disasters. The Committee noted that smaller healthcare systems may not have the same care capacity and resources as larger systems, and that this should be accommodated by measures within the framework.

The How

The principle of "how" addresses actions such as preparation, communication, and evaluation pre- and post-hazard event. This includes actions necessary to promote readiness such as communication among responders and care providers, maintenance of skills related to preparedness, as well as ability to respond to all types of hazards.

Communication Among Entities

Successful coordination of efforts requires open and clear communication among all entities within the healthcare system. Communication channels and protocols should be proactively created and managed via agreements, emergency response protocols, and appropriate technologies. The success of emergency response and appropriate coordination of efforts hinges on the ability of communications systems and plans to ensure adequate situational awareness across all impacted healthcare entities.

Preparing for the Known and Unknown

The Committee noted that, to be ready, healthcare systems need to be prepared for all hazards, which includes commonly occurring events such as natural and weather-related disasters as well as uncommon and difficult to predict events such as bioterrorism. Preparations for readiness must be broad enough to address the anticipatable emergency needs of any emergency situation. Further, preparedness systems must constantly be learning and incorporating lessons from other disaster incidents as they occur around the world, so healthcare system plans and protocols can be adjusted when new data regarding response effectiveness are gathered.

Maintenance of Preparedness

Committee discussions noted that creating a preparedness plan and undergoing preparedness exercises do not guarantee or ensure maintenance of actual preparedness skills and knowledge. To be truly ready for any hazard, healthcare systems need to continually and consistently perform preparedness activities, trainings, drills, and simulations to optimize staff knowledge and maintenance of necessary skills.

Ongoing Measurement

Any successful quantification of readiness requires measurement of outcomes before, throughout, and after the incident. Consequently, the Committee members noted that the full spectrum of readiness measures may be difficult to quantify before an event. While the results of drills and exercises can provide important data, it may still be impossible to predict precisely how well the healthcare system will actually perform in a disaster situation before an event actually occurs. Therefore, the Committee

noted that it is extremely important to continue to correlate pre-event measures of quality with post-event measures of outcomes when events occur to improve predictive measures and systems.

Domains and Subdomains

After consideration of the information gathered through the environmental scan and discussion of the guiding principles above, the Healthcare System Readiness Committee determined that a four-domain model based on the four S's of surge capacity (staff, stuff, structure, systems) and the four phases of emergency management (mitigation, preparedness, response, and recovery) provided the best combination of utility, simplicity, and accuracy in identifying and covering the main components of healthcare system readiness (Figure 3).[6]

In this framework, the four S's are in the center, and form the basis for domains and subdomains of individual measure concepts. Outside of this are the four emergency management concepts in a circle to denote the cyclical nature of disasters and how, for example, following recovery, it is vital to mitigate against future disasters, which will inevitably occur. Outside of the four phases of emergency management is another concentric circle that involves the ongoing activities of both accreditation and regulatory requirements (which are substantial) as well as the need for ongoing quality improvement and feedback, which is vital to ongoing improvement efforts.

Figure 3. Measurement Framework

A domain is a categorization or grouping of high-level ideas and measure concepts that further describes the measurement framework. Along with developing high-level measurement domains, the Committee defined more in-depth subdomains that further delineate the measures and measure concepts. The

Committee intends that these measures will not be static, but rather undergo an iterative process of continual development for the achievement of an optimal state of readiness. This model helped to frame the Committee's ideas about the measurement and evaluation of key healthcare system readiness elements.

The table below lists the domains and subdomains from the Committee:

Domain	Subdomain
Staff*	Staff Safety Staff Capability Staff Sufficiency Staff Training Staff Support
Stuff	Pharmaceutical Products Durable Medical Equipment Consumable Medical Equipment and Supplies Nonmedical Supplies
Structure	Existing Facility Infrastructure Temporary Facility Infrastructure Hazards-Specific Structures
Systems	Emergency Management Program Incident Management Communications Healthcare System Coordination Surge Capacity Incident -Specific Capabilities Business Continuity Crisis Standards of Care

*Also applies to volunteers (both paid and unpaid), where appropriate

Domain 1: Staff

The staff domain applies to all personnel who may take part within the healthcare system in response to a disaster. It examines whether staff are professionally capable and properly trained to perform the roles and responsibilities that may be assigned to them. The domain applies to both the clinical and nonclinical personnel necessary for successful mitigation, preparedness, response, and recovery efforts. Measures related to staffing may be applied to nurses, physicians, pharmacists, respiratory therapists, technicians, and other clinicians as well as institutional/organizational leaders, clerical and other support personnel, security specialists, housekeeping and physical plant specialists, and volunteers. Measures within this domain may also be applied to citizen volunteers who may be mobilized and utilized in the healthcare system during a disaster.

Staff-related issues that may impact quality may include those elements placed within the system to keep staff safe, assessment of the number of staff whose professional skills and practice make them capable of performing necessary disaster response tasks, and the number of staff who could become capable of performing the necessary disaster response tasks if given additional training or supervision. Staff-related issues also include the adequacy of training for staff that allows them to use their professional skills and practice experience to execute tasks successfully within the roles and responsibilities assigned to them during a disaster. Measures related to the training of staff include both routine pre-event training as well as "just-in-time" training during a response. Other measures related to staffing evaluate the support available to meet the needs of staff outside of their work within the healthcare system.

The Staff Domain is divided into the following subdomains.

Staff Safety: Measures assess the ability of the healthcare system to protect the physical and emotional welfare of personnel responding during a disaster.

Staff Capability: Measures assess the ability of the healthcare system to ensure staff are available whose professional skills and practice make them capable of performing necessary disaster response tasks. Measures also assess the ability of the healthcare system to identify additional staff who could become capable of performing the necessary disaster response tasks if given additional training or supervision.

Staff Sufficiency: Measures assess the number of capable staff who are available to respond to disasters. Measures evaluate the healthcare system's recruitment and maintenance of the necessary workforce for a disaster, as well as techniques to ensure their presence during response, and to mitigate attrition.

Staff Training: Measures assess whether routine and just-in-time training opportunities allow staff to use their professional skills and practice experience to execute tasks successfully within the roles and responsibilities assigned to them during a disaster. Measures may address training for general disaster response tasks, training in specific skills or functions, hazard-specific training (i.e., infectious disease outbreaks) and/or training related to the care of specific populations (i.e., training to care for children and/or those with mental/physical disabilities). Measures address the ability of staff to function appropriately within the incident management system used for disaster response.

Staff Support: Measures assess the ability of the healthcare system to support the needs of staff both inside and outside of their direct work within the healthcare system. Internal measures may address sleeping quarters, food and nutrition, laundry, and personal hygiene while on site during a disaster. External measures may address the availability of support for the welfare of staff families and pets, financial support, and psychological support, among other needs.

Domain 2: Stuff

This domain examines whether the healthcare system has sufficient access to the full range of materiel needed to provide adequate clinical care in a disaster, including its distribution and logistics. Measures

related to materiel that may impact quality include the quantity of materiel immediately available as well as the quantity of materiel that may be mobilized upon request. The timeliness of delivery of the materiel, the fairness and appropriateness of its distribution and utilization, and the appropriateness of substitution materiel used may also be examined. Measures within this domain may be applied to materiel resources that are owned and stored within the healthcare system, and also to materiel resources that are owned and/or maintained outside of the direct control of the healthcare system, such as those resources that are under the control of suppliers, distributors, and/or the local, state, or regional coalitions or governments, or the federal government.

The Stuff domain is divided into the following subdomains.

Pharmaceuticals: Measures relate to the availability and timeliness of access to medications, both over-the-counter and prescription, in all their forms, including parenteral, oral, topical, and others. Measures address the availability of medications needed for routine patient care, such as antibiotics, as well as medications needed for specialized patient care needs, such as chemical warfare agent antidotes.

Durable Medical Equipment: Measures relate to the availability and timeliness of access to medical equipment designed for multiple patient uses. Examples include ventilators, beds, and wheelchairs. Measures address the availability of equipment needed for routine patient care, such as cardiac monitors, as well as equipment needed for specialized patient care needs, such as decontamination equipment. Durable medical equipment also includes the medical equipment necessary to support patient care such as laboratory equipment and radiology/imaging equipment.

Consumable Medical Equipment and Supplies: Measures relate to the availability and timeliness of access to any item or equipment that is designed for single use only and is used to provide direct patient care. Examples include gloves, masks, bandages, IV tubing, decontamination materials, personal protective equipment (PPE), as well as oxygen and other consumables.

Nonmedical Supplies: Measures relate to the availability and timeliness of access to all other nonmedical supplies which are necessary to support the ongoing operation of the medical system. This includes items such as drinking water, food, and toilet paper, as well as environmental cleaning supplies. This also includes consumable nonmedical supplies such as fuel oil for emergency generators and nonconsumable, nonmedical supplies such as computers, phones, radios, satellite phones, and other equipment necessary for effective disaster response.

Domain 3: Structure

The structure domain refers to the physical structures that the healthcare system uses to provide medical care, including both the existing facilities utilized in daily patient care, as well as other facilities that may be re-purposed for use for care only in a disaster, and temporary facilities that may be constructed or deployed during an event. Measures related to structure that may impact quality include the appropriateness of the facility to support the necessary clinical care, the accessibility of the facilities to all patients who require care, the resilience of the structure in the face of known or suspected

threats, and the timeliness of the ability to mobilize the facility with respect to the timing of the expected clinical care requirements.

The Structure domain is divided into the following subdomains:

Existing Facility Infrastructure: Measures relate to the ability of the existing medical structures to support medical care in a disaster. This includes assessment of the facility's resilience with respect to known or anticipatable hazards, such as flooding, high winds, severe heat or cold, earthquakes, and others. This subdomain also includes assessment of the critical infrastructure services necessary for facility operations such as power, heating/cooling, steam, water supply, sewage, and technology (servers, switch gear, facility monitoring systems, etc.). Measures within this subdomain also address physical security.

Temporary Facility Infrastructure: Measures relate to the adequacy of temporary and/or repurposed facilities to support medical care in a disaster. This includes assessment of the facility's ability to support safe patient monitoring, infection control, security, and other care needs. This subdomain also includes assessment of the time necessary to modify or construct such facilities, the accessibility of such facilities, and the resilience of these facilities.

Hazards-Specific Structures: Measures relate to the availability and appropriateness of the healthcare system's structures to support specialized care need scenarios. Examples of such scenarios include chemical decontamination, radiation screening, and biological containment.

Domain 4: Systems

The systems domain examines the plans, policies, and protocols, as well as the laws, technologies, and structures that affect readiness. Measures within this domain examine incident leadership as well as communications and information sharing networks. Measures apply to healthcare systems' relationships, both formal and informal, with one another as well as with their local, state, and federal government partners and other nongovernmental organizations, both professional and volunteer.

The Systems domain is divided into the following subdomains.

Emergency Management Program: Measures relate to the effectiveness of the organization's emergency management program to develop, test, and improve plans, policies, and protocols for disaster response. This includes assessment of the organization's exercises of emergency response capabilities, its evaluation of performance in exercises and real events, and its ability to demonstrate continual performance improvement based on measurement of its capabilities and performance in all domains.

Incident Management: Measures relate to the effectiveness of the organization's leaders to receive notification of an incident, mobilize assets, respond, and recover. This includes assessment of the healthcare system's ability to identify and prioritize incident response objectives, to monitor and manage progress towards achieving those objectives, and to frequently reassess the effectiveness of the institutional response and recovery. This also includes monitoring of the effectiveness and quality of

care delivered during incident response and recovery as well as appropriate financial monitoring and management of the response.

Communications: Measures relate to the ability to effectively share needed information with those who need it in a timely manner. This includes both internal and external sharing of information, as well as the ability to receive and organize incoming information. This subdomain includes measures of both the plans and the technologies required to support communications between the healthcare system and its patients, the system and its employees, as well as between the system and its external response partners. This subdomain also includes assessment of the healthcare system's ability both to request and offer information related to resource needs efficiently during a response.

Healthcare System Coordination: Measures relate to the effectiveness of the healthcare system to collaborate in planning, mitigation, response, and recovery with external partners. This includes assessment of existing Memoranda of Understanding (MOUs) among systems and governments, suppliers, and others. This subdomain also includes assessment of the shared planning, training, exercising, and response activities across the community that are necessary for effective response.

Surge Capacity: Measures relate to the ability of the healthcare system to alter its usual operations in order to accommodate a surge in incoming patient volume. This includes plans and mechanisms to reallocate resources, request additional external resources, and/or alter the usual delivery of care as needed during a response. This subdomain includes both the need to surge clinical capacity suddenly in response to a no-notice incident as well as the need to surge clinical capacity in response to a prolonged event, such as a pandemic.

Incident-Specific Capabilities: Measures relate to the ability of the healthcare system to provide safe and appropriate clinical care in a wide range of unique hazards and other scenarios. Such scenarios may include internal or external violent attacks, intentional or accidental release of chemical or radiological hazards, outbreaks of high consequence infectious diseases, or others. This subdomain also includes assessment of the healthcare system's ability to plan for, and respond to, incidents that may affect unique populations, such as children, persons with access and functional needs, pregnant women, or other groups.

Business Continuity: Measures relate to the healthcare system's ability to identify, prioritize, and sustain its essential functions in the setting of disaster events. This includes plans for continuity of leadership and continuity of operations, as well as analyses of the business impact of loss of essential functions and setting of recovery time objectives for reinstatement of those essential functions.

Crisis Standards of Care: Measures relate to the ability of the healthcare system to be able to adjust care delivery in a fair, equitable, ethical, and evidence-based manner when the response needs of an incident significantly exceed the response resources available. This includes assessment of the healthcare system's ability to monitor and manage resource utilization during response, as well as to work with other community partners and governmental authorities to adjust care delivery in a coordinated manner across the community.

Measures and Measure Concepts

NQF worked with the Healthcare System Readiness Committee to examine and develop measure concepts based on information gathered through the literature, and the individual knowledge of each of the Committee members. A measure concept is an idea for a measure, including the planned target and population. The Committee worked collectively to identify measure concepts that aligned to each of the domains and subdomains. The concept of readiness applies to all four phases of emergency management and acknowledges the fluid and oftentimes overlapping transition between the phases. This allows for the inclusion of distinct yet related activities in areas such as communication, coordination, training and education, and operating plans. This framework is intended to be a broad, common approach applicable to all hazards. While the inability to address nuances of emergencies and hazards may be considered a limitation, healthcare emergency management experts can still benefit from a framework that gathers all of the potential readiness-related concepts into one.

Appendix A identifies the measure concepts broken down by appropriate domains, subdomains, and emergency management phases. Each domain has its own table. The first column of the table lists the subdomain. The next four columns represent each of the four emergency management phases (mitigation, preparedness, response, and recovery). Each row represents the same general measure concept idea, but the measure concept has been slightly restructured for the appropriate phase. Not every measure concept idea will be appropriate for each phase, and thus many squares have been left blank. Unless otherwise stated, each measure should be applied to individual healthcare entities within the healthcare system, and to the healthcare system as a whole.

There are currently no specific readiness measures available. However, there are some preparedness measures and measure concepts identified in the *Healthcare System Readiness Environmental Scan Report*.[5] These measures are grouped by appropriate domains, subdomains, and emergency management phase (Appendix B). In addition, some measures of readiness are included as requirements in current accreditation and government regulatory programs (i.e., conditions of participation). While the Committee did not specifically discuss measure selection, they noted many emergency management documents that present concepts and guidance on activities to undertake to ensure preparedness for any and all hazard events, such as the Federal Emergency Management Agency (FEMA)/Department of Homeland Security (DHS) National Planning Frameworks, The Joint Commission Emergency Management Standards, Centers for Disease Control and Prevention (CDC) Public Health Preparedness Capabilities: National Standards for State and Local Planning, and the Emergency Medical Services for Children Readiness Toolkit. These documents provide detailed information that may complement this broader, all-hazards framework.[3,7,8,9]

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Appendix A: Healthcare System Readiness Measure Concepts

Staff Measure Concepts

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Staff Safety	Identification of elements that place staff at physical risk during an emergency.	Existing staff and volunteer security plans developed with consideration for disaster planning	Staff and volunteer security during a response (i.e. # of injuries or other reported staff safety events)	Staff and volunteer physical and psychosocial security during recovery (i.e., # of safety events)
Staff Safety		Plan for meeting staff personal medical needs during a disaster established		
Staff Safety			Staff safety during healthcare facility evacuation	
Staff Safety			Monitoring of staff in high pressure or high-risk situations (e.g., use of specialized personal protective equipment)	
Staff Capability	Staffing needs for full operation and contingency scenarios assessed and determined	Readiness plan for all entities in the system includes staffing plans based on assessment of staffing needs	Appropriate staffing maintained based on need during the event to provide continuity of care	Necessary clinical and nonclinical staffing maintained during the recovery period
Staff Capability		Plan for staff to care for patients beyond their conventional patient population	Monitoring of staff in performing their clinical duties per guideline, based on the patient population	
Staff Sufficiency		Mechanism created to credential, identify and deploy necessary licensed personnel during event	Mechanism utilized to credential, identify and deploy necessary licensed personnel during event	
Staff Sufficiency		Mechanism created to credential, identify and deploy necessary registered volunteers during event	Mechanism utilized to credential, identify and deploy necessary registered volunteers during event	
Staff Sufficiency	Establish expected baseline for absenteeism during an event based on staff assessment of availability.	A specific plan that is in place to ensure accountability and that staff report to work during a disaster response	Per Actual Event: Update hazard vulnerability analysis (HVA) based on actual staff absenteeism	

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Staff Sufficiency	Establish staffing plan based on expected % of absenteeism, and anticipated baseline staffing needs		% of off duty staff present during disaster to ensure continuous operations are well supported	% of off duty staff present during the recovery phase of an event
Staff Sufficiency	Volunteer needs for full operation and contingency scenarios assessed and determined	Readiness plan for all entities in the system includes volunteer plans based on assessment of anticipated volunteer needs		
Staff Sufficiency			Staff survey tool administered for after-action report for response. Survey may also be augmented by focus groups	Staff survey tool administered for after-action report for recovery. Survey may also be augmented by focus groups
Staff Sufficiency			Staff attrition during a disaster response	Staff attrition during disaster recovery
Staff Sufficiency			Effectiveness and timeliness of staff/volunteer call-down and deployment during a response	Effectiveness and timeliness of staff/volunteer call-down and deployment during the recovery period
Staff Training	Training needs for full operation and contingency scenarios assessed and determined to include timing and methodology of training.	System-wide training curricula created and allocated necessary resources based on assessment of training needs	Timing and capacity of training resource rollout during a response.	Post event assessment of effectiveness of training resources deployed.
Staff Training		Implementation of training for specific knowledge & skills tailored to specific staff	Just-in-time training provided on specific knowledge & skills tailored to the disaster	
Staff Training			The time from an event start (tailor-based to each event) to fully trained and competent staff for a healthcare organization	
Staff Training		Incorporation of resiliency-based courses into basic emergency response training		

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Staff Training	Account for % staff training for a disaster response based on turnover rate	% staff trained for disaster response within the past prior 12 months	% of capable staff responding during an emergency who can properly respond at point of emergency (i.e., accurately apply training learned)	
Staff Training		% of clinical and non-clinical staff in the system engaged in disaster response exercises relevant to their role within the past 12 months		
Staff Training		% of staff trained on crisis standards of care in the past 12 months		
Staff Training		% of appropriate staff trained on the operations of temporary facilities in the past 12 months		
Staff Training		Frequency: Education/Training - Used to meet competency requirement to ensure the right staff are trained on the right topics monthly, quarterly, semi-annually, annually, etc.		
Staff Training		Frequency – Annual: Ensure a compliance calendar with all required timelines for all training, drills, exercising, communications updates, plan reviews, HVA, etc. – Calendar must be displayed and updated annually. This should also include specific training for high-risk populations.		
Staff Training		Training for staff to understand and be competent in crisis and community standards of care		

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Staff Support	% of individual staff member emergency plans created that include contingency plans for when on duty during an emergency	Plan in place to support staff & volunteers' personal needs (i.e. laundry, nutrition, housing, child care, pet care, etc.)	Plan to support staff & volunteers activated and appropriately utilized during a disaster	
Staff Support		Plan in place to support staff & volunteers' behavioral and psychological health needs	Monitoring of staff & volunteers for adequacy of behavioral and psychological health needs	
Staff Support	Staff, volunteer and families of staff/volunteers provided education on personal/family preparedness to mitigate staff absenteeism			

Stuff Measure Concepts

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Pharmaceutical Products	Systems in place for the proper storage and tracking of pharmaceuticals	Par levels of pharmaceuticals onsite and offsite	Availability of pharmaceuticals inventory to meet planned need as well as capacity surge	Par levels of pharmaceuticals during recovery
Pharmaceutical Products	Inventory and access processes in place in general and for specific use cases (i.e. tapping into the national cache)	Plan for procuring additional pharmaceutical needs for specific disasters	Successful procurement of additional pharmaceutical supplies during a disaster	Ability to fulfill pharmaceutical needs and restock depleted medications during recovery
Pharmaceutical Products	Frequency – Monthly: Having 100% of stored Pharmaceutical Supplies, with expiration dates, verified monthly	Plan in place for rotation of pharmaceuticals based on best practices and/or regulatory requirements		
Pharmaceutical Products	Annual review of the appropriateness of stored supplies			
Durable Medical Equipment	Purchase of recommended medical equipment and critical supplies for disasters	Availability of medical equipment and critical supplies for disaster response for all populations served, including high-risk populations	Access to medical equipment and critical supplies during disaster response	Access to medical equipment and critical supplies during recovery
Durable Medical Equipment	Creation and annual review of inventory list of needed supplies, functionality, and location of durable medical equipment			
Consumable Medical Equipment and Supplies	Creation of inventory list of consumable medical equipment and supplies and location	Establish par levels of Personal Protective Equipment (PPE)	Adequacy of estimated par levels during a disaster	Plan for or ability to replenish consumable medical equipment and supplies
Consumable Medical Equipment and Supplies	Frequency – monthly: Having 100% of stored Consumable Medical Equipment and Supplies, with expiration dates, verified monthly			
Non-Medical Supplies	Identification of critical needs list of non-medical supplies	Plan for replenishing non-medial critical supplies during disaster established		Plan for or ability to replenish non-medial critical supplies post event

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Non-Medical Supplies	Purchase of recommended Non-Medical supplies for disasters	Inventory of nonmedical critical supplies (non-pharmaceuticals)	Availability of nonmedical critical supplies (non-pharmaceuticals) during a disaster	Availability of nonmedical critical supplies (non-pharmaceuticals) during recovery
Non-Medical Supplies	Frequency – monthly: Having 100% of stored Consumable Nonmedical Supplies, with expiration dates, verified monthly			

Structure Measure Concepts

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Existing Facility Infrastructure		Infrastructure established with consideration of disaster preparedness concepts during the design of new facilities		
Existing Facility Infrastructure	Physical facilities assessed for needs during all types of disasters	Infrastructure failure plans prepared, and established		
Existing Facility Infrastructure	Recommended physical facilities are available for disaster (i.e., decontamination tent)	Recommended physical facilities for disaster exist	Physical facilities are sufficient to meet needs during a disaster	Physical facilities are sufficient to meet needs during recovery
Existing Facility Infrastructure	Existing facilities meet building codes requirements for specific types of disasters	Facility testing is conducted to ensure that structural resources are sufficient for all hazards		
Existing Facility Infrastructure	Assessment of specific facilities needed during a disaster including operational facilities, essential facilities and alternate facilities/ facilities contingency	Plan for arranging specific facilities during a disaster, including options based on different scenarios, created and incorporated into drills	Availability of specific facilities during a disaster	Availability of specific facilities during recovery
Existing Facility Infrastructure	Power grid adequate for specific types of disasters	Backup power resources in place and regularly tested	Backup power operational when needed during a disaster	Backup power operational during recovery
Existing Facility Infrastructure			Care of electricity dependent patients maintained during a disaster	Care of electricity dependent patients maintained during recovery

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Existing Facility Infrastructure	Assessment of areas prone to geographic vulnerabilities	Modify areas to withstand geographic vulnerabilities/ determine alternative areas for operations if areas cannot be modified to avoid geographic vulnerabilities	Areas able to withstand geographic vulnerabilities/ operations are able to continue despite geographic vulnerabilities	Geographic vulnerable areas are back to full operation after disaster during recovery
Existing Facility Infrastructure	Assessment of areas prone to loss of electricity	Appropriate arrangement for backup power	Power intact during disaster/restored quickly during a disaster	Power intact during disaster/restored quickly during recovery
Existing Facility Infrastructure	Plan for nonoperational health information technology established, including up and down time procedures	Testing of health information technology for disaster conditions	Functionality of health information technology during disaster	Functionality of health information technology during recovery
Existing Facility Infrastructure	Presence of Technology for Communications (including telecom and data network connectivity)/ Management of Operations Plan for nonoperation of traditional communication methodologies	Testing of inter-facility/inter-healthcare system communication systems, including backup processes	Functioning communication systems for staff, families, and across healthcare entities during a disaster	Functioning communication systems for staff, families, and across healthcare entities during response
Existing Facility Infrastructure		Redundancy plan developed		
Temporary Facility Infrastructure	Identification of alternate delivery care sites	Testing of alternative delivery care sites.	Timeliness of functioning alternate delivery care sites, including primary care	Ability to redirect patients into existing infrastructure post event.
Hazards-Specific Structures	Identify number and location of resources for specific hazards (negative pressure rooms; decontamination units for chemical, radiological, and biological exposures)	Testing of resources for specific hazards (negative pressure rooms; decontamination units for chemical, radiological, and biological exposures)	Appropriate deployment of hazard-specific structures during a response	Appropriate availability of hazard-specific structures during a response

Systems Measure Concepts

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Emergency Management Program				Review of the effectiveness or documentation of effectiveness of existing mitigation measures
Emergency Management Program				Establish goals for improvement plans in after-action reports (AAR) as well as inclusion of the patient experience in AAR
Emergency Management Program				After-action report focusing on the continuation of business operations created after a disaster
Emergency Management Program	Hazards Vulnerability Assessment performed as per regulatory requirements	Performance on table top exercises as per regulatory requirements	Performance during the disaster	After-action analysis and adoption of improvement strategies
Emergency Management Program		Performance on simulation & community exercises performed	Performance during the disaster	After-action analysis and adoption of improvement strategies
Emergency Management Program		Participation in transfer agreements/ Memorandum of Understanding (MOUs)	Transfer agreements/MOUs activated and appropriately utilized during a disaster	
Emergency Management Program	Master Disaster Management plan with multiple sections and considerations created			
Emergency Management Program			Effectiveness of health information technology during a disaster	Effectiveness of health information technology during recovery
Emergency Management Program			Health information exchange functionality across healthcare entities during a disaster	
Emergency Management Program	Ability to address cybersecurity	Plan to address cybersecurity	Ability to address cybersecurity during a response	Ability to address cybersecurity during recover

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Emergency Management Program	Plan for tracking patients using Health Information Technology (HIT) during a disaster established	Ability to track patients using HIT during a disaster tested during drills	Ability to track patients using HIT during a disaster	Ability to track patients using HIT during recovery
Emergency Management Program	Plan for tracking patients without HIT during a disaster	Plan for tracking patients without HIT during a disaster tested during drills	Ability to track patients without HIT technology during a disaster	Ability to track patients without HIT during recovery
Emergency Management Program			Internal and external stakeholders able to communicate necessary information in a timely and efficient manner	Internal and external stakeholders able to communicate necessary information in a timely and efficient manner
Emergency Management Program	Identification of high-risk populations	Plan for ways to identify high-risk populations	Individual's successfully identified as high–risk during response and healthcare needs addressed	Individual's successfully identified as high–risk during recovery and healthcare needs addressed
Emergency Management Program	Funding to support mitigation	Funding of preparedness		Return to normal operations is equitable across a healthcare system
Emergency Management Program	Annual costs of mitigation	Annual costs of preparedness		
Emergency Management Program		Plan for facility evacuation		
Emergency Management Program		Mechanism, including contracts, in place to measure appropriate transportation based on the patient population		
Incident Management	Establish goals for patient experience during emergency based on current standards	Develop tool to measure patient experience in an emergency based on current standards	Patient experience of care during a disaster based on current standards	Patient experience of care during recovery based on current standards
Incident Management			7,30, and 90-day patient mortality during a disaster (adjusted for condition)	90-day and 1-year patient mortality during response (adjusted for condition)
Incident Management			7,30, and 90-day preventable patient complications during a disaster	90-day and 1-year preventable patient complications after disaster

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Incident Management			Impact on population health outcomes in the community related to a disaster	
Incident Management	Command Center roles and responsibilities are defined	Frequency – Per Exercise Schedule: Structure: Facility will set-up and have operational a Command Center in ____ minutes.	Incident command system functional during a disaster	
Incident Management		Frequency – Per Exercise Schedule: Structure: Facility will set-up and have operational a Command Center in ____ minutes.	Timeliness of deploying of the incident command system during a disaster	
Incident Management	Define parameters for normal business operations within the disaster management plan			Business Operations Resilience: Timeliness of recovery of healthcare system to normal business operations during recovery
Incident Management	Define timeliness of acquisitions of resources within the disaster management plan		Timeliness of acquisitions from alternative sources of resources after a disaster	
Incident Management	Decision criteria defined for shelter in place vs. healthcare full or partial facility evacuation	Training exercises include documented decisions regarding sheltering in place vs. evacuation	Timeliness of full or partial healthcare facility evacuation during a disaster	
Incident Management	Normal community clinical operations are defined within the disaster management plan			Timeliness of recovery of normal community clinical operations
Incident Management	Process is created to track patient/caregiver safety events		# of patient/caregiver safety events during healthcare facility evacuation	
Communications	Identify languages most relevant to the health system population	Provide information in multiple languages	Interpreters/interpreter software/translator pool available	Interpreters/interpreter software/translator pool available

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Communications	Ensure fully operational healthcare system-generated emergency communications and warning systems	Participation in healthcare system-generated emergency communications and warning system	Participation in healthcare system generated emergency communications and warnings sent to community in real time	Lapses in healthcare system generated emergency communications and warnings identified in after-action report
Communications	Develop communication plan for internal and external stakeholders	Evaluate effectiveness of communication plan with internal and external stakeholders during training exercises	Evaluate effectiveness of communication plan with internal and external stakeholders during emergencies	Evaluate effectiveness of communication plan with internal and external stakeholders post event
Communications	Health Information Technology sharing with and without power processes established	Availability of information sharing in variety of languages	Information sharing with and without power	
Communications		Communication plan with external stakeholders created	External stakeholders able to communicate necessary information in a timely and efficient manner	
Healthcare System Coordination	Community Needs Assessment conducted			
Healthcare System Coordination	Partnerships created and maintained with community stakeholders and local/state public health/emergency management departments, as well as healthcare coalitions		Partnerships activated and appropriately utilized	
Healthcare System Coordination	Coordination among entities to ensure availability of ambulatory care	Determine facilities (temporary or permanent) that can be used for ambulatory care	Percent of open appointments for ambulatory care	Percent of open appointments for ambulatory care
Surge Capacity		Surge capacity for each facility within the system pre-determined	Number of providers who turned patients away or shut down admissions	Number of providers who turned patients away or shut down admissions
Surge Capacity	Plan for alternate level of care bed availability	Determine ED/chronic care volume per inpatient bed capacity	Number of ED beds at capacity greater than 6 hours	Number of ED beds at capacity greater than 6 hours
Surge Capacity			% Inpatient occupancy	% Inpatient occupancy

Subdomain	Mitigation Measure Concept	Preparedness Measure Concept	Response Measure Concept	Recovery Measure Concept
Incident Specific Capabilities	Plan for patient behavioral issues due to stress/withdrawal established			
Business Continuity		Test backup systems during training exercises		
Business Continuity	Identify essential business functions that could be compromised during an emergency	Backup systems in place to perform essential business functions		Create transition plan for return to normal business operations
Crisis Standards of Care	Identify triggers and indicators for crisis standards of care in disaster plan by provider/partner type	Define community standards of care	Pre-determined community standards of care met	After-action assessment of the decision to activate crisis standards of care

Appendix B: Healthcare System Readiness Measures

Staff Measures

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Staff Sufficiency			Access to Specialists (Agency for Healthcare Research and Quality)	
Staff Training			Pre-identified staff reported to the public health Emergency Operations Centre within the target time of 2.5 hours (Centers for Disease Control and Prevention)	
Staff Training			Time for pre- identified staff covering activated public health agency incident management lead roles (or equivalent lead roles) to report for immediate duty. Performance Target: 60 minutes or less (Centers for Disease Control and Prevention)	
Staff Safety	Safety Climate: Overall Performance Measure: Develop and evaluate a set of new best practices or recommended performance measures to improve the organization of emergency response activities and to promote a pro-active crew-based safety climate. Reduce exposures, illnesses, or injuries attributable to improvements in safety climate (Centers for Disease Control and Prevention – National Institute for Occupational Safety and Health)	Safety Climate: Overall Performance Measure: Develop and evaluate a set of new best practices or recommended performance measures to improve the organization of emergency response activities and to promote a pro- active crew-based safety climate. Reduce exposures, illnesses, or injuries attributable to improvements in safety climate (Centers for Disease Control and Prevention – National Institute for Occupational Safety and Health)		

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Staff Safety	Surveillance: Overall performance measure: Reduce the development of illnesses or injuries attributable to occupational exposure during disaster response through the use of prevention tools developed from information from short and long-term surveillance reporting systems. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Surveillance: Overall performance measure: Reduce the development of illnesses or injuries attributable to occupational exposure during disaster response through the use of prevention tools developed from information from short and long-term surveillance reporting systems. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Surveillance: Overall performance measure: Reduce the development of illnesses or injuries attributable to occupational exposure during disaster response through the use of prevention tools developed from information from short and long-term surveillance reporting systems. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Surveillance: Overall performance measure: Reduce the development of illnesses or injuries attributable to occupational exposure during disaster response through the use of prevention tools developed from information from short and long-term surveillance reporting systems. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)

Stuff Measures

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Pharmaceuticals			Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Activate dispensing modalities	
Pharmaceuticals			Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Dispense medical countermeasures to identified population	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Dispense medical countermeasures to identified population
Consumable Medical Equipment and Supplies			Access to medical equipment (Mathematica)	Access to medical equipment (Mathematica)

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Consumable Medical Equipment and Supplies			Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Direct and activate medical material management and distribution	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Direct and activate medical material management and distribution
Consumable Medical Equipment and Supplies			Access to medical equipment (Mathematica)	
Pharmaceutical Products **Consumable Medical Equipment and Supplies**		Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Acquire medical material	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Acquire medical material	
Pharmaceutical Products **Consumable Medical Equipment and Supplies**	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Maintain updated inventory management and reporting system	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Maintain updated inventory management and reporting system	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Maintain updated inventory management and reporting system	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Maintain updated inventory management and reporting system
Pharmaceutical Products **Consumable Medical Equipment and Supplies**	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Establish and maintain security	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Establish and maintain security	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Establish and maintain security	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Establish and maintain security

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Pharmaceutical Products **Consumable Medical Equipment and Supplies**			Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Distribute medical material	Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Distribute medical material
Pharmaceutical Products **Consumable Medical Equipment and Supplies**				Composite performance indicator from the Division of Strategic National Stockpile in CDC's Office of Public Health Preparedness and Response (Centers for Disease Control and Prevention) – Recovery medical material and demobilize distribution operations

Structure Measures

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Existing Facility Infrastructure **Temporary Facility Infrastructure** **Hazards-Specific Structures**	Engineering/ Technological Interventions and Controls: Overall Performance Measure: Reduce exposure through improved engineering/ technological interventions and controls. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Engineering/ Technological Interventions and Controls: Overall Performance Measure: Reduce exposure through improved engineering/ technological interventions and controls. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)		

Systems Measures

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Emergency Management Program		AAR/IPs developed following an exercise or real incident. After Action Reports/Improvement Plans (ARR/IPs) (Centers for Disease Control and Prevention)	AAR/IPs developed following an exercise or real incident. After Action Reports/Improvement Plans (ARR/IPs) (Centers for Disease Control and Prevention)	AAR/IPs developed following an exercise or real incident. After Action Reports/Improvement Plans (ARR/IPs) (Centers for Disease Control and Prevention)
Emergency Management Program			AAR/IPs developed within target time of 60 days (Centers for Disease Control and Prevention)	AAR/IPs developed within target time of 60 days (Centers for Disease Control and Prevention)

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Emergency Management Program	Characterization/ Assessment of Potential Hazards: Overall Performance Goal: Reduce the incidence and severity of injuries and illnesses through improved and more rapid characterization/ assessment of potential hazards. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Characterization/ Assessment of Potential Hazards: Overall Performance Goal: Reduce the incidence and severity of injuries and illnesses through improved and more rapid characterization/ assessment of potential hazards. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Characterization/ Assessment of Potential Hazards: Overall Performance Goal: Reduce the incidence and severity of injuries and illnesses through improved and more rapid characterization/ assessment of potential hazards. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Characterization/ Assessment of Potential Hazards: Overall Performance Goal: Reduce the incidence and severity of injuries and illnesses through improved and more rapid characterization/ assessment of potential hazards. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)
Emergency Management Program		Conducted at least one unannounced activation (Centers for Disease Control and Prevention)		
Emergency Management Program		Conducted at least one unannounced notification outside of normal business hours (Centers for Disease Control and Prevention)		
Emergency Management Program		EOC– Incident Action Planning (Centers for Disease Control and Prevention)		
Emergency Management Program				EOC - After Action Report/Improvement Plan Annual (Centers for Disease Control and Prevention)
Emergency Management Program			Performance Measure 74 (formerly PM 66c medical) (Emergency Medical Services for Children)	Performance Measure 74 (formerly PM 66c medical) (Emergency Medical Services for Children)
Emergency Management Program			Performance Measure 75 (formerly PM 66c trauma) (Emergency Medical Services for Children)	Performance Measure 75 (formerly PM 66c trauma) (Emergency Medical Services for Children)

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Emergency Management Program			Performance Measure 73 (formerly PM 66b) (Emergency Medical Services for Children)	Performance Measure 73 (formerly PM 66b) (Emergency Medical Services for Children)
Emergency Program Management			Time to complete a draft of an After-Action Report and Improvement Plan (Centers for Disease Control and Prevention)	Time to complete a draft of an After-Action Report and Improvement Plan (Centers for Disease Control and Prevention)
Emergency Management Program			The Ability for Providers with HIT to Receive Laboratory Data Electronically Directly into their ONC-Certified EHR System as Discrete Searchable Data (Centers for Medicare and Medicaid Services)	The Ability for Providers with HIT to Receive Laboratory Data Electronically Directly into their ONC-Certified EHR System as Discrete Searchable Data (Centers for Medicare and Medicaid Services)
Emergency Management Program			Tracking Clinical Results between Visits (Centers for Medicare and Medicaid Services)	Tracking Clinical Results between Visits (Centers for Medicare and Medicaid Services)
Emergency Management Program	Personal Protective Equipment (PPE): Overall Performance Measure: Reduce the number of injuries and illnesses to first responders as a result of improper selection or use (or non-use) of PPE. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Personal Protective Equipment (PPE): Overall Performance Measure: Reduce the number of injuries and illnesses to first responders as a result of improper selection or use (or non-use) of PPE. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	Personal Protective Equipment (PPE): Overall Performance Measure: Reduce the number of injuries and illnesses to first responders as a result of improper selection or use (or non-use) of PPE. (Centers for Disease Control and Prevention – National Institute of Occupational Safety and Health)	
Emergency Management Program	Production of the approved Incident Action Plan before the start of the second operational period (Centers for Disease Control and Prevention)	Production of the approved Incident Action Plan before the start of the second operational period (Centers for Disease Control and Prevention)		

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Emergency Management Program	Re-evaluated response capabilities following approval and completion of corrective actions identified in AAR/IP (Centers for Disease Control and Prevention)			
Incident Management			Access to Care (Agency for Healthcare Research and Quality)	Access to Care (Agency for Healthcare Research and Quality)
Incident Management			Acute Care Hospitalization (Claims Based) (Centers for Medicare and Medicaid Services)	
Incident Management			Acute Care Hospitalization (OASIS Based) (Centers for Medicare and Medicaid Services)	
Incident Management			Comprehensive assessment for patients with complex needs (National Committee for Quality Assurance)	Comprehensive assessment for patients with complex needs (National Committee for Quality Assurance)
Incident Management		Pre-identified staff notified to fill all eight Incident Command System (ICS) core functional roles due to a drill, exercise, or real incident (Centers for Disease Control and Prevention)	Pre-identified staff notified to fill all eight Incident Command System (ICS) core functional roles due to a drill, exercise, or real incident (Centers for Disease Control and Prevention)	
Incident Management			Pre-identified staff acknowledged notification within the target time of 60 minutes (Centers for Disease Control and Prevention)	

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Incident Management		Public health EOC (Emergency Operations Center) activated as part of a drill, exercise, or real incident (Centers for Disease Control and Prevention)	Public health EOC (Emergency Operations Center) activated as part of a drill, exercise, or real incident (Centers for Disease Control and Prevention)	
Incident Management			Care Coordination (Centers for Medicare and Medicaid Services)	Care Coordination (Centers for Medicare and Medicaid Services)
Incident Management			NQF 0703: (Not Endorsed) Intensive Care: In-hospital mortality rate (Philip R. Lee Institute for Health Policy Studies)	
Communications			Emergency Department Transfer Communication Measure (EDTC) (University of Minnesota Rural Health Research Center)	Emergency Department Transfer Communication Measure (EDTC) (University of Minnesota Rural Health Research Center)
Communication			Emergency Public Information and Warning (EPIW) - Public Message Dissemination (Centers for Disease Control and Prevention)	
Communications			Physician Information (University of Minnesota Rural Health Research Center)	Physician Information (University of Minnesota Rural Health Research Center)
Communications			Physician Notification Guidelines Established (Centers for Medicare and Medicaid Services)	Physician Notification Guidelines Established (Centers for Medicare and Medicaid Services)
Communications			Vital Signs (University of Minnesota Rural Health Research Center)	
Healthcare System Coordination		Community Preparedness (CP) – Identification of key organizations Annual (Centers for Disease Control and Prevention)		

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Healthcare System Coordination		CP – Community engagement in risk identification Annual (Centers for Disease Control and Prevention)		
Healthcare System Coordination		CP – Community engagement in public health preparedness activities Annual (Centers for Disease Control and Prevention)		
Healthcare System Coordination		CP – Community engagement in recovery planning Annual (Centers for Disease Control and Prevention)		
Healthcare System Coordination			Emergency Department Use with Hospitalization (OASIS Based) (Centers for Medicare and Medicaid Services)	
Surge Capacity			NQF 0497: (Endorsed) Admit decision time to ED departure time for admitted patients (Centers for Medicare and Medicaid Services)	NQF 0497: (Endorsed) Admit decision time to ED departure time for admitted patients (Centers for Medicare and Medicaid Services)
Surge Capacity	Inpatient Hospital Utilization (National Committee for Quality Assurance)			
Surge Capacity			Medical and public health surge outcome (Centers for Disease Control and Prevention)	
Surge Capacity			Surge capacity: beds (Health Resources and Services Administration)	surge capacity: beds (Health Resources and Services Administration)
Surge Capacity			NQF #0498: (Not Endorsed) Evaluation by a Qualified Medical Personnel (Louisiana State University)	
Surge Capacity			Emergency Medical Services (University of Louisville)	Emergency Medical Services (University of Louisville)

Subdomain	Mitigation Measures	Preparedness Measures	Response Measures	Recovery Measures
Surge Capacity			NQF 0496: (Endorsed) Median time from ED arrival to ED departure for Discharged ED patients (Centers for Medicare and Medicaid Services)	
Surge Capacity			NQF 0495: (Endorsed) Median time from ED arrival to ED departure for admitted ED patients (Centers for Medicare and Medicaid Services)	

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