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A Community Checklist for Health Sector Resilience Informed by Hurricane Sandy

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ABSTRACT

This a checklist of actions for healthcare, public health, nongovernmental organizations, and private entities to strengthen the resilience of their community's health sector to disasters. This checklist is informed by the experience of Hurricane Sandy in New York and New Jersey and analyzed in the context of findings from other recent natural disasters in the United States.¹ The health sector is defined very broadly including—in addition to hospitals, emergency medical services (EMS) and public health— healthcare providers, outpatient clinics, long-term care facilities, home health providers, behavioral health providers, and correctional health services. It also includes community-based organizations that support these entities and represent patients. We define health sector resilience very broadly including all factors that preserve public health and healthcare delivery under extreme stress and contribute to the rapid restoration of normal or improved health sector functioning after a disaster.

We provide a series of recommended actions for improving health sector resilience at the local level. The recommended actions emphasize those items that individuals who experienced Hurricane Sandy deemed to be most important.¹ The recommendations are presented as a checklist that can be used by a variety of interested parties who have some role to play in disaster preparedness, response and recovery in their own communities. Following a general checklist are supplemental checklists that apply to specific parts of the larger health sector.

¹Toner Eric S., McGinty Meghan, Schoch-Spana Monica, Rose Dale A., Watson Matthew, Echols Erin, and Carbone Eric G.. Health Security. February 2017, 15(1): 53-69. doi:10.1089/hs.2016.0079.

General Checklist of Actions

The following is a checklist of cross-cutting actions that many different health sector organizations can implement to foster resilience.[†] Following this general checklist, we provide supplemental checklists that are specific to individual components of the health sector. Some of these items may be very challenging to accomplish and may require considerable effort over time and collaboration with multiple community partners.

Healthcare Coalitions

- The organization participates in their local Healthcare Coalition (HCC) to promote local collaboration and coordination around healthcare emergency preparedness and response. While the core membership of the HCC includes acute care hospitals, public health, emergency management and EMS, many other health sector entities have a valuable role in resilience and should be participants in ongoing preparedness efforts.

Continuity of Operation/Business Continuity Plan

- The organization has a Continuity of Operations (COOP) or Business Continuity Plan (BCP) addressing how it will continue to deliver essential services in the event of a disruption. This includes deciding what services are truly essential under various circumstances.
- Relevant portions of the plan are shared with patients, partners, vendors, and authorities. Organization confirms that partners and vendors upon which it relies have their own COOP plans, which will enable continued provision of goods and/or services upon which the organization is dependent.

Surge Capacity and Capability

- The organization has a plan for how it will accommodate increased demand for service, i.e., how it will “surge” its capacity. This plan might include augmenting the current workforce with additional personnel from other organizations or jurisdictions or expanding to additional sites. Alternately, this plan might entail altering routine operating procedures and policies and even standards of care to expand capacity under appropriate circumstances.
- The organization has plans, thresholds, and other documentation (i.e. memoranda of understanding) in place to help facilitate an emergency evacuation in the event of a widespread disaster.

[†] Some items in this checklist may overlap to some extent and are not intended to be mutually exclusive. For example, identifying alternate facilities for conducting operations is an essential element of business continuity planning; however, the overall COOP planning process and the specific planning for alternate care sites are sufficiently distinct as to warrant separate listings.

□ **Alternate Care Sites**

- The organization has identified an alternate site(s) from which it can provide essential services, e.g., where patients can receive dialysis or where prescriptions can be picked up. This might include a backup location to which the organization's operations would be relocated, another healthcare facility to which patients would be referred or transferred, and additional provider sites that could augment the capacity of the primary (normal) operating location. This might also include sites where external resources can be located – for example identifying buildings that will be used to establish Federal Medical Stations.

□ **Mobile Healthcare Vehicles and Assets**

- The organization is aware of existing mobile healthcare assets (e.g., vans, buses, RVs) in their communities and has considered how these assets might be used in a disaster such as to augment capacity or to serve as an alternate mechanism for care delivery when regular facilities are unavailable.
- The organization has considered or established memoranda of understanding or service agreements in advance for how these assets may be used and has obtained any regulatory (e.g., cross jurisdiction licensing) approval that might be needed.

□ **Crisis Standards Of Care Planning**

- The organization has a plan for implementing crisis standards of care covering the continuum from conventional through contingency to crisis standards.^{33,34} This plan describes how the delivery of healthcare would be prioritized so as to do the most good for the greatest number. Its ultimate goal would be to put capabilities in place to avoid a transition to crisis care and to attempt to return to conventional care as quickly as possible. The plan is dependent upon close coordination with emergency response partners at the local, regional, state and federal levels.

□ **Early or Alternative Treatment**

- Where possible, the organization devises creative ways to be flexible in how care is provided in a disaster. This might include the ability to provide care or treatment in advance (e.g., early dialysis or early dispensing of prescriptions) or in an adjusted manner (e.g., providing patients with limited take-home supplies of controlled medications) or at alternate locations (e.g., guest dosing of methadone).

□ **Communication, Public Awareness and Situational Awareness**

- Mechanisms exist by which the public (care seekers) can obtain information on the status and availability of health facilities and services (e.g., whether a pharmacy or dialysis center is open or closed). These mechanisms for ensuring communication with and awareness of the public is distinct from communication that must also occur with the health care and public health workforce to ensure situational awareness among providers (see below). At an organizational level, this might include status updates on websites and call lines belonging to the service provider (e.g., the individual pharmacy). On a community level, this might include services like 211[‡] or 311[§]. Such informational portals or hotlines should be distinct from crisis intervention hotlines or emergency services numbers such as 911. Ideally, information would be aggregated at a high level to provide a complete picture of available health services within an entire community.
- These mechanisms for ensuring communication with the public are incorporated into emergency plans and provisions exist for ensuring the continuity of these services in a disaster (i.e., there are COOP or BCP plans for 211 or 311 services).
- A proactive mechanism exists to conduct outreach to patients whose health and mental health services are expected to be interrupted (e.g., pharmacies contact patients who are due for refills at a location that has been closed because of storm damage or providers proactively assist in connecting patients to services at an alternate location).

□ **Engaging and Supporting Workers**

- Healthcare facilities and public agencies engage frontline workers, in addition to managers and executives, in planning and preparing for disasters. This involves including them in all aspects of preparedness such as developing plans, training personnel, and designing and evaluating exercises. Workers should be drawn from a broad sample of the workforce. Such involvement would not only improve the operability of the plans but also foster better adherence and acceptance when implemented.
- Healthcare facilities and public agencies train their workers on their specific roles and responsibilities in a disaster so that the workers can understand what is expected of them and how they can contribute to the success of the whole.
- Beyond engaging workers in preparedness, the organization prioritizes worker morale and sense of commitment to the organization. Willingness

[‡] The United Way operates 2-1-1 call centers in most states that provide information about social services in the community.

[§] Many jurisdictions operate 3-1-1 call centers for the public to use for non-emergency issues

of healthcare workers to respond despite personal and professional stress and hardship depends on a personal commitment to the organization and the community grown out of a sense of loyalty and shared mission. Health and public health providers should develop systems and strategies to monitor and address the psychological impacts of a disaster on their workforces.

- The organization finds ways to support workers so as to allow them to successfully work under stressful times, such as providing family daycare or emergency shelter for staff and their families during an emergency. Additionally, employers develop programs and strategies to help their workers develop personal/family preparedness plans and foster their own resilience.

□ **Public Health Legal Preparedness**

- Public health emergency legal authorities are reviewed so that it is clear what authorities and responsibilities exist and who has which powers and responsibilities related, for example, to health facility evacuations or the management of patient needs in the setting of scarce life-saving or sustaining resources. In addition to clarifying the legal authority of public health officials, the roles and authorities of elected officials and emergency management officials should also be reviewed and communicated.

□ **Flexibility**

- The organization seeks ways to foster improvisation and flexibility in response to unknown circumstances. This is distinct from the ability of people to be adaptable although personnel within organizations should be encouraged and rewarded for improvisation. It is the nature of large organizations to be conservative, risk averse and rule-bound, but this inhibits the adaptation that is essential for resilience. Organizations should consider creating broad-based committees to review internal policies, practices and cultural norms that hinder flexibility in disaster response.

□ **Infrastructure Continuity And Restoration**

- The organization has undertaken efforts to “harden” its facilities, making them less vulnerable to disruption by a variety of likely hazards. This might include in the case of a hurricane for example, moving generators, fuel pumps and related electrical equipment out of basements, installing water tight doors, or building berms.
- The organization has robust response plans for loss of power, potable and non-potable water, communication, and information technology infrastructure. This includes emergency backup systems (and perhaps redundant back-up in some cases), adequate fuel supplies for emergency

generators and reliable sources for fuel resupply, and procedures for continuing operations without this infrastructure. To the extent possible, these plans should minimize dependence on external help and maximize self-reliance. Plans should consider the possibility of prolonged interruption of services. There should be plans as well for rapid recovery of services when the infrastructure is restored.

- In addition to having redundant back-up communications using different technologies, organizations should have a strategy for dealing with limited communications and information flow, i.e., determining what information is essential.
- Healthcare facilities are identified as critical infrastructure in community disaster planning and, therefore, jurisdictions prioritize rapid restoration of power and other essential utilities to all electricity and utility dependent healthcare facilities (e.g., hospitals, nursing homes, long term care facilities, dialysis centers).

□ **Transportation Continuity, Restoration and Access**

- The organization plans for transportation interruptions and considers how they will adapt to such interruptions, including possible alternative transportation for and sheltering of staff and patients.
- Jurisdictions plan for rapid restoration of transportation including mass transit, roadways, and vehicle fuel. Fuel is needed for emergency vehicles but also for essential personnel using their own private vehicles to travel to and from sites of patient care.
- Policies are reviewed to limit as much as possible large-scale restriction of local travel such as closing all or access roads, shutting down mass transit, or restricting travel to “essential personnel” during disasters.
- Downstream consequences of travel restrictions (especially on the health sector), such as interruption of supply chains and loss of staff, are carefully considered and planned for.
- If travel restrictions must be implemented, provisions are made to enable healthcare, allied health and support personnel who are all essential to the delivery of health services to travel to and from all care sites not just hospitals. These provisions should include family caregivers.
- Jurisdictions work in concert with healthcare facilities to ensure that patients are able to travel to and access needed care after disasters and in particular when travel restrictions are implemented.

□ **Supply chains**

- The organization has plans for maintaining needed supply delivery during and after a disaster. The plan includes redundant supply sources and emergency alternatives sources.

- The organization has determined which supplies are mission-critical and has plans for crisis standards of care if mission-critical supplies run out.
- The organization has stockpiled or worked with others in the region to stockpile essential mission-critical supplies that are sufficient to last until resupply can be reasonably expected.
- The organization has established written assurances with essential suppliers in advance of an event to assure timely resupply.

Supplemental Checklists for Various Components of the Health Sector.

The following supplemental checklists are specific to different entities that play important roles in health sector resilience to disasters. They should be used in conjunction with the general checklist above. In some cases the specific checklists repeat actions included in the general checklist for emphasis. All users of this document are encouraged to read the general checklist first and then read the specific checklist that applies to them. Many of the items in the checklists can be found in other existing guidance such as from the Joint Commission or Centers for Medicare and Medicaid Services (CMS)³⁵ but here we emphasize those items that had greatest salience to health professionals who experienced Sandy and that in our judgment are generalizable to other disasters in other locations.

Hospitals

- In addition to all-hazard preparedness activities as mandated by the Joint Commission and CMS, and encouraged by the ASPR Hospital Preparedness Program, including participation in healthcare coalitions, hospitals place greater emphasis on being prepared for a surge of patients displaced from normal care and needing services not commonly provided, such as outpatient dialysis and methadone maintenance.
- Hospitals are prepared for community members seeking refuge (e.g., food, water, shelter, electrical outlets, accommodations for displaced persons accompanied by a pet), and in addition, have pre-established agreements with near-by community institutions to help provide similar assistance if conditions permit.
- Hospitals create an algorithm for evacuation decision-making that reflects a clear understanding of who has the legal authority and responsibility for decision-making about evacuation and under what circumstances evacuation is appropriate.
 - The evidence base for assessing the risk of precautionary versus emergency evacuation is reviewed and incorporated into the algorithm.

- Hospitals engage in planning with their local emergency management agency, EMS and healthcare coalitions to create a centralized system to coordinate patient transportation and distribution in case of facility evacuation including if multiple simultaneous evacuations are needed.
- Hospitals carefully review EMTALA regulations as they apply to disasters and seek clarification of any unclear aspects.
- Hospitals have processes in place needed for evacuation:
 - the ability to provide secure and confidential access to patient medical information during disaster response and recovery. identification of patient destination, and
 - sharing resources and returning resources to source healthcare facility at the conclusion of the evacuation period.
- Hospital senior executives recognize the importance of preparedness to their organization's and community's long term wellbeing and engage personally in ensuring their organization's resilience.
- Hospital senior executives recruit clinician champions to be actively engaged in preparedness activities.

Long-term Care Facilities

- Nursing homes, long-term acute care facilities, and residential adult care facilities prioritize their own resilience to disaster. They have emergency operation plans and continuity of operations plan that anticipate prolonged loss of essential infrastructure.
- Long term care facilities' emergency plans include the circumstances under which evacuation might be needed, where the residents would go and how they would get there. Specific arrangements, memoranda of understanding and/or contracts are executed with any outside entities that would be needed to aid in sheltering in place or evacuating.
- Long-term care facilities create an algorithm for evacuation decision-making that reflects a clear understanding of who has the legal authority and responsibility for decision-making about evacuation and under what circumstances evacuation is appropriate.
 - The evidence base for assessing the risk of precautionary versus emergency evacuation is reviewed and incorporated into the algorithm.
- Long-term care facilities that are part of larger organizations, such as nursing home chains or integrated healthcare networks, actively participate in the larger organizations preparedness activities.
- Long-term care facilities are able to provide secure and confidential access to patient medical information during disaster response and recovery.
- Long-term care facilities have robust plans for loss of power, water, and communication, and information technology infrastructure. This includes emergency backup systems, adequate fuel supplies for emergency generators and reliable sources for fuel resupply, and procedures for continuing operations

without this infrastructure. To the extent possible, these plans should minimize dependence on external help and maximize self-reliance. Plans should consider the possibility of prolonged outages. There should be plans as well for rapid recovery of services when the infrastructure is restored.

Outpatient Medical Facilities

- Physician offices and all types of outpatient medical clinics place greater emphasis on their own resilience to disaster. They have emergency operation plans and continuity of operations plans that anticipate prolonged loss of essential infrastructure.
- Outpatient medical facilities can securely and confidentially access patient medical information during disaster response and recovery.
- Outpatient medical facilities have robust plans for loss of power, water, and communication, and information technology infrastructure. This includes emergency backup systems, adequate fuel supplies for emergency generators and reliable sources for fuel resupply, and procedures for continuing operations without this infrastructure. To the extent possible, these plans should minimize dependence on external help and maximize self-reliance. Plans should consider the possibility of prolonged outages. There should be plans as well for rapid recovery of services when the infrastructure is restored.
- Outpatient medical facilities that are part of larger organizations, such as urgent care chains or integrated healthcare networks, actively participate in the larger organizations preparedness activities.

Behavioral Health Providers

- Mental health and substance abuse clinics emphasize their own resilience to disaster. They have emergency operation plans and continuity of operations plan that anticipate prolonged loss of essential infrastructure. There should be plans as well for rapid recovery of services when the infrastructure is restored.
- Behavioral health providers that are part of larger organizations, such as mental health networks or integrated healthcare networks, actively participate in the larger organizations preparedness activities.
- Where possible, behavioral health providers devise creative ways to be flexible in how care is provided in a disaster. This might include the ability to provide treatment in advance (e.g., early dispensing of prescriptions) or in an altered manner (e.g., providing patients with limited take-home supplies of controlled medications) or at alternate locations (e.g., guest dosing of methadone).
- Behavioral health providers can provide secure and confidential access to patient medical information during disaster response and recovery.
 - Work with state regulators to create an electronic system by which alternate care locations (e.g., other behavioral health clinics and hospital emergency departments) can access patient dosing information.

- Behavioral health providers review relevant public health laws and regulations as they relate to disasters, especially those that related to crisis standards of care and the prescribing and dispensing of controlled substances
- Behavioral health providers are prepared to assist the healthcare workforce and acutely impacted populations, as well as existing clients.
- Behavioral health providers train non-behavioral health first responders and healthcare providers in 1) recognizing potential mental health issues and 2) delivering simple preventive techniques such as Psychological First Aid.

Pharmacies

- Pharmacies emphasize their own resilience to disaster. They have emergency operation plans and continuity of operations plan that anticipate prolonged loss of essential infrastructure.
- Pharmacies can securely access patient's prescription information during disaster response and recovery.
- Pharmacies that are part of larger organizations, such as drug store chains or integrated healthcare networks, actively participate in the larger organizations preparedness activities.
- Where possible, pharmacies devise creative ways to be flexible in how care is provided in a disaster. This might include the ability to provide treatment in advance (e.g., early dispensing of prescriptions) or in an altered manner (e.g., providing patients with greater than normal supplies of medications) or at alternate locations (e.g., transferring prescription to another pharmacy).
- Pharmacies review relevant public health laws and regulations. The law can provide legal approval or waive legal requirements for adjusted delivery of services (e.g., expanded scope of practice and alternate care facilities).

Correctional Health Facilities

- Health clinics and infirmaries in prisons and jails prioritize their own resilience to disaster. They have emergency operation plans and continuity of operations plan that anticipate prolonged loss of essential infrastructure.
- Correctional health facilities' plans include the circumstances under which evacuation might be needed, where the inmates would go and how they would get there. Specific arrangements, memoranda of understanding and/ or contracts are executed with any outside entities that would be needed to aid in sheltering in place or evacuating.

Public Health Departments (State and Local)

- The public health department has a COOP plan addressing how it will continue to deliver essential services in the event of a disruption. This includes deciding what services are truly essential under various circumstances.

- The public health department has a plan for how it will accommodate increased demand for service, including augmenting current workforce with additional personnel from other organizations or jurisdictions or reassigning personnel.
- The public health department has identified an alternate site(s) from which it can provide essential services.
- Public health emergency legal authorities are reviewed so that it is clear what authorities and responsibilities exist and who has which powers and responsibilities related, for example, to health facility evacuations and alterations in standards of care.
- To the extent possible under law, public health departments encourage or require that all organizations have robust response plans for loss of power, water, and communication, and information technology infrastructure. This includes emergency backup systems (and perhaps redundant back up in some cases), adequate fuel supplies for emergency generators and reliable sources for fuel resupply, and procedures for continuing operations without this infrastructure.
- The public health department working with other local and state agencies prioritizes rapid restoration of power and other essential utilities to all electricity and utility dependent healthcare facilities (e.g., hospitals, nursing homes, long term care facilities, dialysis centers, etc.). Healthcare facilities are identified as critical infrastructure in community disaster planning.
- If travel restrictions must be implemented, the public health department works with other agencies to enable healthcare, allied health and support personnel who are all essential to the delivery of health services to travel to and from care sites (not just hospitals). This should include family caregivers. The public health department works in concert with healthcare facilities to ensure that patients are able to travel to and access the needed care after disasters and in particular when travel restrictions are implemented.
- The public health department ensures the development of plans for special needs and medical shelters, which may or may not be operated by public health. Plans ensure that special needs and medical shelters have adequate capacity (including space, staffing, and supplies) for expected volume of citizens requiring electrical power and other assistance related to their medical conditions. Plans address how public health and safety (e.g., prevention of infectious disease outbreaks, food safety) at medical shelters will be ensured as well as how shelter residents will be connected to care that is not available onsite (e.g., drug treatment programs).

Patient Transport Providers

- Emergency medical services (EMS) and other patient transport providers (private ambulance, ambulette, etc.) have a COOP addressing how they will continue to deliver essential services in the event of a disruption.
- EMS agencies have a plan for crisis standards of care that address staffing, scope of practice, patient destination, etc. The plan incorporates close coordination with local healthcare providers, and regional, state and federal partners.

- EMS agencies review public health emergency legal authorities so that it is clear what authorities and responsibilities exist and who has which powers and responsibilities related, for example, to health facility evacuations and adjustments in standards of care.

Home and Community-based Care Providers

- Home care agencies, companies, and providers of all types emphasize their own resilience to disaster. They have emergency operation plans and continuity of operations plan that anticipate prolonged loss of essential infrastructure.
- They have robust plans for loss of power, water, and communication both to their own offices and to their patients. This includes emergency backup systems, adequate fuel supplies for emergency generators and reliable sources for fuel resupply, and procedures for continuing operations without this infrastructure.
- Home care agencies, companies and providers can securely access patient medical information during disaster response and recovery.
- They have plans for dealing with degraded transportation capabilities.
- They have a process for prioritizing (triage) which patients are to be seen.
- They have mutual aid arrangements with other home and community-based care organizations.
- Home care providers that are part of larger organizations, such as home care chains or integrated healthcare networks, actively participate in the larger organizations preparedness activities.

Local Elected Officials and Jurisdictions

- Local elected officials ensure that every government agency, utility and infrastructure provider has a COOP or BCP addressing how it will continue to deliver essential services in the event of a disruption. Local elected officials ensure that every government agency, utility and infrastructure provider has a plan for how it will accommodate increased demand for service, including augmenting current workforce and altering routine operating procedures and policies to expand capacity under appropriate circumstances.
- Local elected officials ensure that every government agency, utility and infrastructure provider has identified an alternate site(s) from which it can provide essential services.
- Local elected officials use their ties with community-based organizations to engage them in planning for disasters. Ideally this engagement is accomplished through a mature healthcare coalition.
- Local elected officials ensure that procurements and contracts with community-based organizations and service providers include provisions in contracts requiring development and occasional exercising of emergency response plans, including engagement with the HCC and other emergency preparedness/response partners, and sufficient additional funding to do this work
- Local elected officials have been consulted on plans for crisis standards of care.

- Local elected officials review public health emergency legal authorities so that it is clear what authorities and responsibilities exist and who has which powers and responsibilities related, for example, to health facility evacuations and alterations in standards of care.
- Local elected officials work through their existing incident command structures (jurisdictional emergency management and public health agencies) to take actions during disasters.

Patients and Families

- All members of the public should take actions to enhance their personal disaster resilience such as:
 - Maintaining a several day supply of water, food, cash and medicines,
 - Considering the types of disasters they are most likely to experience and what measures are likely to reduce their vulnerability,
 - This information could be provided by the local emergency management or public health agency.
 - Considering what items (e.g., important papers and medications) they might need if they must evacuate on short notice and plan where they might go,
 - Plan different means by which they can contact family and friends in a disaster and inform them of their plans, and
 - Ensuring that they have redundant mechanisms to access information in a disaster including if electrical power is out, such as with a battery powered or hand-crank radio.
- Above and beyond these general measures, patients with serious chronic diseases require additional actions. A comprehensive list of actions for all types of patients is beyond the scope of this checklist as is a completely detailed list of actions for any particular condition but the following list addresses some more common situations:
 - Patients and their families who depend on life-sustaining medications should maintain a maximal supply of medications at all times and know how to refill medications in an emergency. They should inquire about their pharmacy's emergency plan and alternative sites if their usual pharmacy is closed. If there is warning of an impending disaster, such as a hurricane, they should request advance dispensing of essential medications. They should maintain a hard-copy list of all medications in case their pharmacy or medical records are not accessible. For medications that require refrigeration, patients and their families should have back up plans to keep medications cold during prolonged power outages.
 - All patients and their families who depend on life-sustaining home care should be familiar with the emergency plans of their home care providers. Since many home care patients depend on more than one

provider, they should be aware of the plans of each. They should know how to remain in contact with the providers in an emergency. They should have a back-up plan if their provider is not able to reach them.

- All patients and their families who depend on life-sustaining electrical devices at home should have access to adequate emergency power sources, such as batteries or emergency generator.
- Patients and their families who depend on life-sustaining supplies at home (e.g., peritoneal dialysis solution, oxygen or intravenous medications) should ensure they have at least several days' worth of supplies at all times, know how to get resupplied in an emergency, and what to do if re-supplies do not arrive.
- Patients and their families who depend on life-sustaining equipment at home should know what to do in case of evacuation and how the equipment can be moved.
- Some jurisdictions have compiled registries of medically vulnerable individuals; patients and their families should inquire about such registries with their home care providers, utilities, police, fire, public health or emergency management agencies.
- Dialysis patients (either peritoneal or hemodialysis) should know what alternative dietary guidelines they should follow if their dialysis is delayed.
- Patients and their families who require complicated or uncommon ongoing treatments (e.g., cancer chemotherapy) should maintain copies of their medical records and treatment protocols/regimens) with them if evacuated or if they need to seek alternative sites of care.