DC Emergency Healthcare Coalition
Enhanced Hazard Vulnerability Analysis (HVA)
Version 7/2015

Introduction

This document presents an enhanced Hazard Vulnerability Analysis (HVA) for the District of Columbia (DC) Emergency Healthcare Coalition (EHC). The described process incorporates enhancements to a standard healthcare HVA, based upon careful application of fundamental emergency management principles. This 2015 version of the DC EHC HVA incorporates revisions to the original 2008 DC EHC HVA process and updates to the 2014 vulnerability analysis.

The DC Emergency Healthcare Coalition is comprised of a range of healthcare organizations that provide point-of-service healthcare in the District of Columbia. The Coalition receives funding from the Hospital Preparedness Program established by the US Department of Health and Human Services (HHS). While the HVA process is commonly applied in healthcare to an individual organization (e.g. a hospital), this enhanced HVA focuses instead upon the broad healthcare coalition. This enhanced HVA process is therefore unique for several reasons:

- It seeks to establish risk from potential hazards and the associated vulnerabilities *to a collective group of healthcare organizations*.

- It includes additional steps beyond those commonly included in the traditional HVA process. These steps promote much deeper understanding of the actual, specific hazard vulnerabilities. This facilitates a more focused approach to reducing or eliminating high-stakes vulnerabilities that are common across multiple hazards, rather than primarily focusing only upon stove piped hazards.

The process utilized to conduct this HVA is based upon six specific steps (See Figure 1) outlined in an emergency management publication written specifically for healthcare organizations.[1] The last two steps provide the "enhanced" methodology for completing the HVA process, such that discrete findings can be produced to easily serve as inputs into an Emergency Management Program (EMP).

Figure 1: The Six Step Enhanced HVA process:

1. Establish the context for the HVA.
2. Establish the primary hazards.
3. Assess the general hazard-associated risk for each identified hazard.
4. Sort and group hazards by approximate magnitude of risk; select priority hazards.
5. Analyze each selected priority hazard and define major vulnerability elements.
6. Group, prioritize, and analyze the specific vulnerability elements across hazards.

[1] *Emergency Management Principles and Practices for Healthcare Systems*. The Institute for Crisis, Disaster, and Risk Management (ICDRM) at the George Washington University (GWU); for the Veterans Health Administration (VHA)/US Department of Veterans Affairs (VA). Washington, D.C., revised June 2010. Available at www.gwu.edu/~icdrm/

For the Coalition, this enhanced HVA process included:

- A collaborative effort by representatives from participating organizations.
- The establishment of an ad hoc committee to the Coalition's Emergency Management Committee (EMC) to develop the HVA content.
- An assessment of existing HVAs and their associated methodologies currently in use at healthcare organizations that participate in the Coalition.
- An assessment of traditional HVA models examining them for strengths and weaknesses (e.g. Kaiser, Veterans Health Administration, and American Society for Healthcare Engineering).

Because this revision to the DC Healthcare Coalition HVA is conducted at a point in time after the development and maturation of the DC Coalition, the "analysis" or end result for this enhanced HVA is focused upon establishing strategic guidance for future Coalition emergency management efforts. As such, the HVA process provides guidance for further development in the upcoming year but is also considered to be dynamic, and will be re-visited whenever there is a new and significant hazard or vulnerability identified. It also intended to be re-examined and potentially revised on a regular basis.

This enhanced HVA collects information and analyzes individual and group risk for a cohort of healthcare organizations. The purpose is to establish collective risks to the coordinated emergency response of these same organizations acting as a healthcare coalition for emergency response and recovery. There are two goals for this analysis:

- Establish the information foundation for enhancing the DC Healthcare Coalition's Emergency Management Program and its component Plans. The intent is that information in the analysis will be utilized to guide the various EMP component activities within the DC EHC.
- Demonstrate a detailed, useful HVA process that individual healthcare organizations can use to enhance their own individual HVAs. The intent is to provide a model process that individual healthcare organizations can use on a voluntary basis to uncover more detail and insight into their own individual organization's risks. **Appendix A** contains more information as to how this process may be applied at the individual organizational level.

STEP 1: Establish the context for HVA

The membership of the DC Healthcare Coalition currently includes the following organizations:

- Children's National Medical Center (Children's National)
- George Washington University Hospital (GWUH)
- MedStar Georgetown University Hospital (MGUH)
- United Medical Center (UMC)

- Howard University Hospital (HUH)
- MedStar National Rehabilitation Hospital (MNRH)
- Providence Hospital
- Sibley Memorial Hospital
- VA Medical Center (VAMC)
- Walter Reed National Military Medical Center (WRNMMC)
- MedStar Washington Hospital Center (MWHC)
- Psychiatric Institute of Washington (PIW)
- BridgePoint Hospital – Capitol Hill
- BridgePoint Hospital – Hadley
- VNA
- DCHA
- DC Primary Care Association (DCPCA) representing ___ Primary Care Facilities
- DC Health Care Association (DCHCA) representing ___ Skilled Nursing Facilities
- Mary's Center
- Bread for the City
- Carl Vogel Center
- Columbia Road Health Services
- Community of Hope
- Family and Medical Counseling Service, Inc.
- La Clinica Del Pueblo
- So Others Might Eat
- Spanish Catholic Center
- Unity Health Care, Inc.
- Whitman-Walker Clinic
- Deanwood Rehabilitation and Wellness Center
- Carroll Manor Nursing and Rehabilitation Center

- Carolyn Boone Lewis Healthcare Center
- Ingleside at Rock Creek
- Jeanne Jugan Residence
- Knollwood
- Lisner-Louise-Dickson-Hurt Home
- Forest Hills of DC
- Rock Creek Nursing Center
- Sibley Memorial Hospital/The Renaissance Unit
- Stoddard Baptist Nursing Home
- The Residences at Thomas Circle
- Unique Residential Care Center
- Transitions Healthcare-Capital City
- Washington Home
- Washington Center for Aging Services
- DC Funeral Directors Association
- National Capital Poison Center
- Armed Forces Retirement Home

The collective mission of these organizations is to provide point of service medical care to the population of DC and surrounding areas. Participating organizations recognize the importance of maintaining their healthcare services during and after hazard impact, and maximizing their ability to provide medical surge for those with healthcare needs from emergencies and disasters. This critical mission is just as vital to the community as the efforts of more traditional emergency response disciplines such as public safety.

As most of the Coalition's organizations are private sector and don't have emergency response as their primary focus, important constraints impact their collective ability to respond. Common constraints are presented below.

- Financial: Both public and private healthcare organizations face financial pressures that are a reality of everyday business operations.
- Regulatory: Healthcare organizations are subject to extensive and wide-ranging regulatory requirements to maintain accreditation and licensure and to receive payment for rendered services. These have been established by numerous

entities including accrediting organizations, local government, State governments, and the Federal government.

- Legal: The current medico-legal environment is such that litigation is likely post incident, especially for continuity of operations issues that affect patient outcomes.

The DC Emergency Healthcare Coalition recognizes the public agencies that are important in healthcare response to emergencies and disasters. Representatives from these entities are therefore invited participants in the Coalition's preparedness and mitigation efforts and have invited representation on the DC Healthcare Coalition's Emergency Management Committee. They also, therefore, have input into this HVA process. They include:

- DC Department of Health/HEPRA
- DC Homeland Security and Emergency Management Agency
- DC Fire and Emergency Medical Services (FEMS)
- DC Metropolitan Police Department (MPD)
- DC Office of the Chief Medical Examiner
- DC Department of Mental Health
- Washington Regional Threat Analysis Center/Fusion Center (WRTAC
- Department of Health and Social Services
- FBI Washington Field Office
- National Weather Service Forecast Office Baltimore/Washington
- Other geographically proximate healthcare entities[2]

For the purpose of this HVA, the hazards and associated risks posed to the collective participants is being considered. This orientation produces data elements (risks) and their associated priorities that differ somewhat from an analysis conducted for an individual organization. This difference exists because:

- Not all individual members' vulnerabilities are the same. For each participating organization, vulnerabilities may vary due to geography, function, and other factors. For example, one healthcare organization might have a higher flood risk based upon its geographic location.
- The Coalition HVA is based primarily upon collective risk. It is therefore expected to involve less specific detail than an HVA for the individual organization. As an example, the vulnerability decomposition for a specific organization might examine specific issues related to compromise of the back-up power generator, fuel tank and pump, location of switching gears, etc., whereas the Coalition analysis would focus

[2] The Coalition coordinates with similar organizing bodies in Northern Virginia and Suburban Maryland. .

on the higher level issue of whether the organization might be required to evacuate its facility due to an uninhabitable environment.

Despite this difference, the HVA for the coalition and one conducted by an individual healthcare organization should have consistent **priorities** incorporated into their analyses. These priorities help guide the ranking of hazards and hazard vulnerabilities in the HVA, as well as subsequent guidance from the HVA analysis. The priorities in rank order are:

1. Emergency life safety issues: Any vulnerability that poses a direct risk to the health and wellness of staff, patients and visitors within the organization's sphere of responsibility before or at the time of hazard impact.

2. Continuity of operations issues: Any vulnerability that would compromise the organization(s) ability to continue their primary healthcare mission.

3. Surge issues: Any vulnerability that compromises the organization(s)' ability to expand services to treat an increased number of patients (surge capacity) or patients with unusual treatment needs (surge capability).

By maintaining these priorities, the resultant analysis will be "all hazards" and will permit the comparison of decomposed vulnerabilities in a structured fashion. The priorities are ranked in this fashion to reflect the reality that a healthcare organization is unable to surge if it cannot maintain its usual ability to conduct regular mission operations and maintain a safe environment for staff, patients and visitors.

STEP 2: Identify the primary hazards

The second step in this enhanced HVA Process is the identification of a primary hazards list for consideration in the analysis. An aggregate list of all conceivable hazards was first compiled to reflect hazards that might threaten healthcare entities anywhere in the U.S. Sources used to develop the list included:

- Hazard lists provided by the healthcare coalition participating organizations, generally from their individual HVAs.

- Extensive hazard lists from the literature and local sources (Local/regional public safety, Kaiser, National Fire Protection Association, Veterans Health Administration, and American Society for Healthcare Engineering). [3]

- Historical investigation was conducted for hazard impacts that affected the greater Washington, DC area in the past 100 years. A variety of public information sources were used, including the Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), US Environmental Protection Agency (EPA), US Geological Survey (USGS), International Hurricane Research Center (IHRC), and historical news articles on local disasters (see **Appendix B** for example references).

All major hazards identified through these sources were included in the initial consideration (i.e., there was no attempt to exclude hazards due to low likelihood of occurrence at this stage).

[3] For a complete list of sources utilized, please see Appendix B: Sources for Hazard Identification

The hazards listing was alphabetized according to type, then edited for redundancies and overlaps. The following were several important considerations for how hazards were selected to the initial hazard list.

- The list focused upon identifying primary hazards rather than impacts that occurred as a consequence of another hazard. For example, electrical power disruption can occur as a primary technological failure (a primary hazard) or as a secondary impact after a hurricane, tornado or other high wind incident.

- Though listed in isolation of one another, many identified primary hazards can co-exist in an emergency or disaster incident. For example, a mass casualty incident could occur during an epidemic involving a contagious disease, with each providing distinct vulnerability considerations. For the healthcare coalition, this level of complexity was deferred.

- Hazards were considered primarily for their impact on the DC Emergency Healthcare Coalition rather than for the detail of how they would affect a single institution. If a hazard posed a threat to only select healthcare organizations, however, it was still included if the impact on these individual organization(s) will affect the Coalition.

The ad-hoc working group to the Coalition's Emergency Management Committee (EMC) provided multi-disciplinary review of the interim hazards list. The most appropriate terminology for each type of hazard was selected to ensure clear understanding of the listed hazards, and to promote consistency in terminology across the list. The final draft hazards list was then presented to the entire EMC for review. The complete list of primary hazards for inclusion in this enhanced HVA is presented in **Appendix C**. During this 2015 revision to the HVA, no additional hazards were added.

STEP 3: Assess the general hazard-associated risk for each identified hazard

The goal of this next step in the HVA process is to provide a general risk assessment and relative ranking process for the identified hazards. This process qualifies hazards according to the relative level of risk generated by that hazard for the coalition, using an objective and sensible approach.

Utilizing strategy similar to earlier HVA models (e.g. Kaiser or ASHE models), this step determines an approximate/relative hazard-associated risk for each hazard identified in Step 2. The risk assignment is based upon estimations of the:

- Probability of hazard occurrence in the region of concern,

- Severity of the hazard impact on the healthcare coalition (i.e., on humans, property, and business continuity) given the current level of mitigation and preparedness.

- Risk Reduction of the hazard impact as judged by preparation and mitigation activities conducted by the Coalition (see below).

Assumptions:

- For the purpose of analysis, hazard impacts are assumed to be the *likely worst case scenario* for that particular hazard. For example, "Tornado/windstorm, proximate" was considered at a magnitude creating direct damage to healthcare organizations as well as generating an increased patient load for some Coalition organizations.

- The threshold of concern at the coalition-level analysis is when the coalition functions themselves are affected, or when a member organization is significantly impacted or disabled and no longer able to conduct its usual function in the coalition.

Scoring:

- The traditional healthcare HVA methodology uses a 0-3 scoring scheme for probability and severity that is commonly defined as "N/A-low-medium-high." Further definition is needed to better ensure standardization and consistency of the analysis among all participants in the coalition's risk determination group. The table in Figure 2 below summarizes the scoring scale selected for this enhanced Coalition HVA.

- The diverse ad hoc HVA work group, composed of representatives from coalition member organizations, worked interactively to score the risk elements for each hazard. Discussion across organizations and relevant professional disciplines promoted a more balanced approximation of probability and consequence for each hazard type. Estimations of the vulnerability component of risk must consider both vulnerabilities in life safety and in continuity of healthcare service delivery as well as the vulnerability in not meeting projected increased healthcare service needs ("surge") from hazard impact on the community.

Figure 2: Kaiser versus DC Healthcare Coalition scoring of Risk

Scoring the Components of Risk		
	Kaiser model	**DC Healthcare Coalition**
Probability		
0	N/A	Very low probability of occurrence.
1	Low	Possible occurrence.
2	Moderate	Probable occurrence
3	High	Very likely (It has happened before, happened in an analogous region, or is judged "very likely" to occur here.
Impact (Property & Business)		
0	N/A	No impact on the coalition; incident managed addresses the impact without compromise at the coalition level.
1	Low	Some disruption that affects the healthcare coalition; operations of the coalition continue effectively.
2	Moderate	Healthcare coalition operations disrupted and some functions/services impaired.
3	High	Healthcare coalition presented with crisis and multiple functions/services impaired.

Impact (Human)		
0	N/A	No additional deaths, injuries or illness impacting coalition partners from the incident.
1	Low	Deaths, injuries or illness at a level that is manageable by the coalition partners without disruption.
2	Moderate	Deaths, injuries or illness at a level that is very disruptive to the coalition and some functions/services impaired.
3	High	Deaths, injuries or illness at a level that is a crisis for the coalition and multiple functions/services impaired.

In 2010, a new component to the equation was added. Since its inception, DC EHC has accomplished work related to preparedness and mitigation. A risk reduction element was therefore added to incorporate the effects of these efforts. This percentage reduction in risk was, last year, calculated by a panel of Coalition SMEs and was based on perceived risk reduction from a list of multiple following factors. This year, in an effort to make the risk reduction calculations more consistent across hazards, a new process was utilized. The following concepts were applied:

- It is very difficult to project the *actual* risk reduction from accomplished mitigation measures for most hazards, since their occurrence is generally infrequent. This has been the Emergency Management experience in all sectors, not just healthcare. Assumptions are necessary to provide consistency in calculating relative risk reduction. Over time, these assumptions may be validated or adjusted based upon experience.
- Though a more defensible process is sought, it should be noted that the most important element of this process is the consistent application of any risk adjustment calculation across all listed hazards. Therefore, inherent strengths and weaknesses in the calculation methodology would be applied in the same fashion across all hazards.
- In addition, there is a desire to avoid excessive complexity as the HVA process utilized by the Coalition is already a detailed process.
- Finally, it should be remembered that the end point of this calculation is to provide a ranking of relative risk of individual hazards. The high-priority hazards then undergo further analysis to identify both common and unique vulnerabilities that the Coalition's EMP may further address in the coming year.
- The following assumptions are proposed for the HVA risk adjustment methodology.

  Reduction in Hazard Probability
  - Some actions taken by the Coalition, its collective participants, or other external activities may result in the decrease probability of a specific hazard or group of hazards occurring. This most commonly applies to technical or intentional hazards and not to natural hazards.
  - When reviewing the hazards listed, there are very few, if any, that have a significant reduction in probability of occurrence for the Coalition.
  - Therefore in an effort to maintain simplicity, a risk reduction of "5%" will be applied to any hazard that the panel of SMEs feels has a reduced probability of occurrence based on actions taken.

Reduction in Hazard Vulnerability

- Some actions taken by the Coalition, its collective participants, or other external activities may result in decreased vulnerability to specific element(s) of an individual hazard's impact. These preparation and mitigation activities of the Coalition may also result in an "all-hazards" vulnerability reduction.
- In an effort to maintain consistency and simplicity, the following vulnerability reduction assumptions are proposed:
    - 2% for the development and implementation of the Coalition Emergency Management Program, including EOP Base Plan and conduct of regular EMC meetings. This "across the board" calculation applies equitably to all hazards.
    - 2% for the development and implementation of an incident specific annex to the Coalition's EOP
    - 2% for any planning template that has been developed and distributed to Coalition participants with evidence of use.
    - 2% for the conduct of a seminar(instructional activity) related to the specific hazard within the past 2 years
    - 2% for the exercise of this specific hazard threat within the past 2 years
    - 5% for new installation or revision to collective infrastructure of individual participants (expected to be rare)
    - 5% for evidence of collective purchase of equipment or other durables expected to assist in addressing the individual hazard (expected to be rare)

The subjective nature of this addition to the equation is balanced by the fact that it is consistently applied to the risk reduction calculations across all hazards.

Risk Determination:

The final risk determination was calculated utilizing the following formula for each individual hazard:

% Risk Score = Probability/3) x (Average of Impacts) x (1-Risk Reduction percentage)/9

The hazard list was then be sorted in order of declining Risk Score. The revised ranking was reviewed by the ad hoc working group. When some hazards seem to be ranked out of order intuitively, this prompted further discussion and analysis, and in some cases re-scoring of the hazard. This commonly occurred when there was a variation among working group personnel opinions in the magnitude of impact from a disputed hazard. Once this was agreed upon, a consensus was quickly reached on the revised Risk Score for that hazard. The scoring instrument and result is presented in **Appendix D**.

Step 4. Sort and group hazards by approximate magnitude of risk; select hazards for further analysis

In this step, the hazard list is segmented into priority groups for further analysis to highlight the most pressing concerns requiring further analysis:

- High priority: very likely hazards with significant or moderate life-safety, continuity, and/or surge vulnerabilities; moderate likelihood but very significant coalition consequences

- Moderate priority: probable hazards (moderate likelihood) and/or moderate coalition consequences

- Low priority: possible hazards (low likelihood) and/or low coalition consequences

- Insignificant: very low probability of occurrence hazards and/or insignificant coalition consequence

This segmenting is initially accomplished by identifying Risk Score cutoff levels to create the priority groups. Again, a quick review was performed to examine the prioritization against the intuition and logic of the team members. In addition, hazards that appeared to present common vulnerabilities (i.e. were similar) were also considered in this step. Alterations were incorporated into the prioritization when team consensus indicated it was justified.

Hazards determined to be "high priority" were then considered for closer examination, vulnerability decomposition, and collection of common vulnerabilities across hazards in Steps 5 and 6. The "selected 18" hazards that the HVA ad hoc working group designated from this list for further evaluation are presented in **Appendix E**. These are not necessarily the top hazards in the hazard assessment rankings (from Step 3). The intent of this selection is to move beyond just "hazard identification" and "high-risk" hazards, and to identify hazards with important and varying vulnerabilities. The elements within those vulnerabilities that are important to the Healthcare Coalition also must be studied. The "selected hazards list," therefore, are from the upper end of the hazard assessment list, but some hazards were de-selected since their coalition vulnerabilities were the same as other, more expansive hazards. These hazards, therefore, are subsumed under others with the same plus additional vulnerabilities. It should be noted that this list of high priority hazards for further analysis did not change from the 2014 HVA.

The "selected hazards" may be different for an individual member healthcare organization when conducting an HVA for their own individual facilities, since the perspectives and granularity of hazard vulnerability varies. For example, several hazards affecting a single healthcare organization that requires it to conduct emergency evacuation will all have the same impact on the coalition (i.e., the emergent evacuation needs of a single healthcare facility). All of these "high priority" hazards are therefore not selected for the current DC EHC list, since they all have the same coalition impact. For an individual healthcare organization, each of these high-impact hazards would likely be considered for further analysis.

Step 5. Analyze each selected hazard and define major vulnerability elements for the Healthcare Coalition.

In this step, each hazard from the Step 4 "selected hazards list" is analyzed for Healthcare Coalition vulnerabilities. The vulnerabilities are decomposed into elements and the coalition impact is considered across these vulnerability elements. This necessarily requires some analysis of vulnerability for individual healthcare organizations within the coalition, but not to the level of granularity required when a single healthcare entity performs this step for its facilities. To accomplish this step, a "vulnerability template' was established using an Excel spreadsheet. First, vulnerability was decomposed and the elements assigned to one of the following categories:

1. Emergency Life Safety Vulnerabilities: These are direct or indirect effects that can cause injury, illness or death.

2. Continuity of Operations Vulnerabilities: These are effects that disrupt the function of the coalition during emergency response and the overall healthcare service delivery across coalition partners.

3. Surge Vulnerabilities: These effects are patient care needs ("surge") from the hazard impact that the healthcare coalition and member organizations are at risk for not having the ability to adequately address.

Each of these categories has defined vulnerability elements within it. These are provided to assist the professionals conducting the HVA in their analysis of the coalition and coalition members' vulnerabilities. The selected vulnerability elements are presented in Figure 3. In conducting this step for individual healthcare organizations, each element is further broken down to obtain more detailed analysis (see Appendix A). It should be noted that though the hazard priorities remained unchanged for the 2015 year, the vulnerability decomposition was updated utilizing new knowledge obtained over the past year.

Figure 3: Hazard Vulnerability Categories and Their Elements

Emergency Life Safety Vulnerability

1) Staff injury, illness, death
   a. Primary hazard exposure
   b. Secondary hazard exposure
   c. Mental health vulnerability

2) Current patient/visitor injury, illness or death
   a. Primary hazard exposure
   b. Secondary hazard exposure
   c. Lack of safe environment
   d. Mental health vulnerability

3) Life safety systems loss

Continuity of Operations Vulnerability

1) Inadequate personnel for required operations
2) Utility loss (electricity, water, gas, steam, back-up generators, etc.)
3) Physical facility compromise - (structural, contamination, etc.)
4) Nonstructural physical system failures (HVAC, elevators, etc.)
5) General equipment & supply inadequacy (pneumatic tubes, linens, food, etc.)
6) Medical equipment & supply inadequacy (incl. medical gasses, pharmaceuticals, etc.)
7) Physical access to facility by patients compromised
8) Information and/or communications systems failure
9) Financial compromise
10) Support services (community) for patient discharge compromised
11) Reputation/Public Confidence adverse impact

Medical Surge Vulnerability

1) Medical surge capacity (personnel, equipment, supplies, lab, pharmacy, alt. sites, etc.)
2) Medical surge capability (pediatrics, burn, hematology [radiation], trauma, etc.)
3) Security surge (increased treatment areas, increased needs, etc.)
3) Fatality surge capacity (increased space, equipment, supplies, or procedures)
4) Fatality surge capability (contaminated human remains)

Common and significant vulnerabilities across multiple hazards are then noted and compiled in Step 6.

For the results of this Healthcare Coalition hazard vulnerability decomposition, see Step 5 Excel Spread Sheet in **Appendix F**. The vulnerability elements are then grouped and analyzed in Step 6.

Step 6. Group and prioritize the specific vulnerability elements across hazards.

In this final enhanced HVA step, the common and significant vulnerabilities are compiled and more fully described, along with the general mitigation, preparedness, response, and recovery considerations necessary to minimize the vulnerability to these hazard impacts. The enhanced HVA process thus provides more specific input into the EMP for the Coalition.

Vulnerability elements that present extreme risk and/or that cross multiple hazards were identified in Step 5 of the Enhanced HVA process. They are presented as vulnerability element groupings with potential coalition-wide risk reduction interventions (mitigation and/or preparedness) that may significantly decrease risk for the Coalition, its participating organizations, and the District of Columbia. Elements are further categorized as “high priority” or as recurring vulnerabilities based upon work the Coalition has already achieved through its EMP. This helps prioritize the guidance for upcoming Coalition activities. These grouped elements are presented in **Appendix G** for consideration by the EMC. This analysis has changed significantly in this 2015 version of the HVA based upon work achieved during the year and new knowledge. Finally, in prior years, it became apparent during the Step 6 analysis that some Coalition vulnerabilities are not directly discoverable as a result of the analysis. These vulnerabilities were listed by the ad hoc working group members as of such grave concern that they should be included in the analysis for consideration by the EMC. These vulnerabilities relate to the ability of the Coalition to sustain itself in the upcoming years given the future funding uncertainty. These elements with analysis are presented for consideration in a final attachment to the HVA, **Appendix H,** which has changed little over the prior year’s findings.

The results of this complex analysis process, contained in Appendices G and H, are expected to better inform the DC EHC Emergency Management Committee EMC in selecting its focus for program activities in the upcoming year.

APPENDIX A: INSTRUCTIONS FOR APPLICATION OF ENHANCED HVA PROCESS TO AN INDIVIDUAL HEALTHCARE ORGANIZATION

This appendix is provided to assist individual healthcare organizations if they chose to apply this enhanced HVA process to their individual Emergency Management Program (EMP). The same 6 steps are outlined but in the context of an individual organization. Suggestions as to how the process may be approached are for guidance only and not intended to set standards or imply mandatory actions.

The main advantage offered by the enhanced HVA process is a more specific output for use in the EMP than with traditional HVA methodologies.

As with any HVA process, it is worth considering the timing of the analysis. The HVA should be updated at least yearly and after the discovery of any significant new potential hazard or vulnerability. Most healthcare organizations have already conducted HVAs in the past and this process, if applied, could be integrated into the next cycle updating the HVA.

Step 1: Set the context for your organization's HVA

Documenting the context for your organization's HVA provides important guidance for personnel internal or external to your organization as to how the HVA was developed and its intended application. The following concepts are worth documenting in relation to your organization:

- Organizational context: Broad parameters describing the organization and its regular community mission should be presented. Some details should also be provided as to the boundaries of the organization being considered for the HVA (e.g. if the organization has multiple facilities). Any constraints on the organization should be listed as well. This is a good practice that provides context to individuals reading the document as to why outputs from the HVA may not be completely addressed with 100% satisfaction in an immediate timeframe. Constraints typically relate to funding, resources, and regulatory concerns.

- Establish the stakeholder group: Establish a list of individuals that should have input into the HVA process. There are two important considerations here:

    - Internal: Individuals from within the organization should be identified to participate in or review the HVA for completeness and adequacy. There may be individuals within your organization with important input to the HVA who are not regular members of your Emergency Management Committee (EMC) so some thought should be given to the development of this list.

    - External: Individual representatives from organizations other than your own should be identified to review specific components or provide input into the HVA. For hospitals, this can help fulfill certain regulatory requirements (i.e. from the Joint Commission) for community participation.

- Establish the objectives for the HVA: In clear terms, document the purpose of the HVA in relation to the organization's EMP. Typically, the HVA provides an information output important for the wide range of planning efforts for the EMP. It may be helpful to

delineate up front, how outputs from the HVA will be prioritized (e.g. emergency life safety issues considered before surge issues).

Step 2: Identify primary hazards

The healthcare organization should next document a list of all primary hazards for consideration in the enhanced HVA process. The list in **Appendix C** to this document is a good starting point. Additional hazards that have occurred before or have the potential of occurring at your organization's geographic location should be added. In addition, the organization may wish to conduct further research based upon the resources listed in **Appendix B** or other resources known to exist. In developing the primary hazard list, it can be helpful to state explicitly:

- What constitutes a primary hazard: Defining a primary hazard as something that can occur independently from any other more primary hazard may simplify work done on developing the hazard list. For example, electrical power interruption can occur as a primary technological hazard, or as a result of multiple other hazards (e.g. explosions, weather events, etc.). Other than primary power failure from direct technological failures, power failure is typically considered a secondary hazard impact.

- Whether combined hazard occurrences will be considered individually or together: Hazards can occur in concurrently. An explosion and structural compromise may occur together, with the structural failure being secondary. By listing and analyzing each independently, and then grouping vulnerabilities (see below), a more comprehensive output is provided (i.e., does not focus on rare, very specific situations).

Step 3: Assess the general hazard-associated risk for each identified hazard
There are several traditional models that can be used to assist with this effort. The Kaiser and ASHE models appear to be the most commonly applied in the District of Columbia healthcare organizations. The primary focus is to assign a relative value of risk to each of the hazards being considered in the analysis. There are several important considerations:

- Independent of the model utilized, risk is generally considered a product of probability of hazard occurrence and the potential impact upon the organization (vulnerability). Some models will further break impact down into specific categories such as human impact, business continuity impact, and property impact. Numerical formulas are provided by most models to arrive at a relative quantitative value for each hazard. In addition, some models will include a consideration of existing preparedness and mitigation efforts in offsetting identified risk when establishing an overall relative risk for each hazard (as was done in this 2015 revision to the original HVA). Individual facilities may wish to utilize a similar numerical system to provide quantitative assignments to general classes of mitigation and preparedness activities that can serve as risk reduction calculations. Despite best efforts, this ranking remains very subjective. This subjectivity is partially compensated by consistent application of the ranking methodology across all hazards.

- For the enhanced HVA process, this step of the HVA merely provides input into the follow-on steps. Therefore, specific values may not be as important as providing some broad grouping of the hazards for further consideration. Relative groupings, for example might be 1) "important" (to be considered immediately); 2) "moderately important" (to be considered in a delayed fashion); and 3) "low importance" (low probability and low impact).

It should be noted that the more exact the HVA attempts to be in this regard, the less scientific the process becomes, given the subjectivity of specific number values for probability, impact, and preparedness/mitigation, with the subjectivity compounded further by calculations.

- When considering the potential impact of a specific hazard, it is best to consider the *likely worst case scenario* for each. For example, the impact of a hurricane in the District of Columbia could minimally or quite severely impact a healthcare organization. Worse case scenarios provide more valuable material for assessing actual risk.

The end result of this step is some *relative* value (quantitative or qualitative) assigned to each hazard identified in step 2.

Step 4: Sort and group hazards by approximate magnitude of risk; select hazards for further analysis

The purpose of the next step is to sort hazards (and their associated risks) according to relative importance to the organization. The output of this step is a list of hazards to be considered in steps 5 and 6 of the enhanced HVA process. Here too there are several important considerations:

- If quantitative (i.e., numerical) values have been assigned to each hazard, then the initial sorting occurs in a prioritized fashion from highest risk to lowest risk.

- If qualitative values have been assigned to each hazard, then grouping of the hazards into similar groups should be accomplished (see suggestion above in step 3).

- The selection of hazards to analyze further should include the following steps:

    - Determine what is feasible for your organization to achieve within the context of this particular analysis. Steps 5 and 6 can require some effort and attention to detail. It may therefore be important to establish a cut off for the total number of hazards that can be further analyzed (additional hazards could be included in subsequent revisions to the HVA).[4] This process was utilized in the Coalition's HVA and only 18 individual hazards were selected for further analysis. An individual facility may wish to select even fewer.

    - Examine the hazard list (either numerically ranked or grouped by relative ranks). Attempt to determine whether higher ranked hazards are similar enough that by analyzing one will provide enough detail to cover the major vulnerabilities for the other. Some hazards, "lower on the list," may then be considered which will provide very different vulnerabilities in the subsequent steps. Some level of expert judgment is acceptable in this step and was also utilized for the Coalition's HVA (the 18 hazards selected for further analyses were not the exact same top 18 priority ranked by step 3).

[4] It is also important to recognize, for some healthcare organizations, that the Joint Commission requires that all hazards recognized in the organization's HVA are formally addressed. This may be a consideration in deciding the number to list.

- o Document the hazards for further consideration and the reasoning behind the selection (including why limitations were applied to the total to be further analyzed).

Step 5: Analyze each selected hazard and define specific vulnerability elements for your healthcare organization.

Taking the list of hazards developed in step 4, specific vulnerabilities can be researched for your organization. It is helpful to track this step in a spread sheet format so that specific vulnerability elements can be easily tracked across hazards.

As with the Coalition's HVA, utilizing the following vulnerability decomposition can be helpful:

Hazard Vulnerability Categories and Their Elements

Emergency Life Safety Vulnerability

1) Staff injury, illness, death
   a. Primary hazard exposure
   b. Secondary hazard exposure
   c. Mental health vulnerability

2) Current patient/visitor injury, illness or death
   a. Primary hazard exposure
   b. Secondary hazard exposure
   c. Lack of safe environment
   d. Mental health vulnerability

3) Life safety systems loss

Continuity of Operations Vulnerability

1) Inadequate personnel for required operations
2) Utility loss (electricity, water, gas, steam, back-up generators, etc.)
3) Physical facility compromise - (structural, contamination, etc.)
4) Nonstructural physical system failures (HVAC, elevators, etc.)
5) General equipment & supply inadequacy (pneumatic tubes, linens, food, etc.)
6) Medical equipment & supply inadequacy (incl. medical gasses, pharmaceuticals, etc.)
7) Physical access to facility by patients compromised
8) Information and/or communications systems failure
9) Financial compromise
10) Support services (community) for patient discharge compromised
11) Reputation/Public Confidence adverse impact

Medical Surge Vulnerability

1) Medical surge capacity (personnel, equipment, supplies, lab, pharmacy, alt. sites, etc.)
2) Medical surge capability (pediatrics, burn, hematology [radiation], trauma, etc.)

3) Security surge (increased treatment areas, increased needs, etc.)
3) Fatality surge capacity (increased space, equipment, supplies, or procedures)
4) Fatality surge capability (contaminated human remains)

The stakeholder group discusses each selected hazard in the context of the framework listed above. The spreadsheet is utilized (as it was for the Coalition's HVA – see **Appendix F**) to track specific data elements as they are identified. There are several considerations for healthcare organizations in completing this step:

- If no specific vulnerability according to the above framework can be identified then list "none" on the spreadsheet.

- Specific vulnerabilities should be described in a consistent manner such that in step 6, like vulnerabilities may be recognized and grouped. For example, after both explosions and tornados that occur near a facility, primary staff injury/illness/death could occur as the result of flying debris. This should be listed in a similar fashion for each hazard (increasing its importance as a consideration by the EMC after the HVA is completed).

- Healthcare organizations should consider a higher level of detail for each vulnerability element than what was provided for the Coalition's HVA. For example, when considering the primary hazard of power interruption to the facility, the specific vulnerabilities examined under utility loss should include:

    - Specific vulnerabilities of emergency power back up (e.g. amount of fuel available, location of generators and fuel pumps, how long has fuel been stored without evaluation, are fuel pumps on emergency power, location and vulnerability of switching mechanisms, etc.)

    - Specific systems that are on emergency power back up and which ones are not. If the organization has not identified this yet, this would be an important activity to conduct by the EMP.

The output of this step should be a spreadsheet that lists specific vulnerability considerations for each of the hazards selected in step 4.

Step 6: Group and prioritize the specific vulnerability elements across hazards

The final product of the enhanced HVA process is a listing of grouped vulnerability elements from step 5. Looking across the range of analyzed hazards, similar specific vulnerabilities may occur. These should be documented in a fashion similar to **Appendix F** where major groups are listed. For example, the vulnerability of staff/visitor/patient injury to flying debris can occur after multiple different types of hazard impacts that are proximate to the organization (tornado, bomb, natural gas explosion, aircraft crash, etc.). Some degree of prioritization should be applied to these grouped vulnerabilities. The following scheme is suggested for consideration:

- Generally, the more times that a vulnerability element appears across different hazards, the higher the relative importance of that vulnerability.

- Emergency life safety and continuity vulnerabilities elements generally have more importance than surge vulnerability elements (since if the organization cannot care for its own or maintain regular operations, then by default it cannot surge).

- Vulnerability elements that are under the direct control of the organization (i.e., “internal hazards”) generally have higher relative importance because they should be completely mitigated or have an optimal response. For example, an internal hazardous materials spill creates vulnerabilities that are higher priority than an external spill off hospital property.

Rather than attempting numerical ranking of grouped vulnerability elements, it may be more important to provide some relative value (e.g. high, moderate, or low). This output then can be provided to the EMC for further preparedness and mitigation consideration.

At this point in the analysis, broad guidance can be given to propose mitigation or preparedness activities that the organization’s emergency management program may wish to consider in addressing the common, prioritized vulnerability elements. As stated earlier, this guidance should be presented only as recommendations and should be considered within the constraints listed in Step 1.

To simplify presentations to EMC participants, the stakeholder group may consider presenting just the results of this final step for consideration and a simple overview of the 6 steps utilized to arrive at the conclusions. More detail on steps 1-5 can be provided as requested.

APPENDIX B: RESOURCES UTILIZED FOR STEP 2, PRIMARY HAZARD IDENTIFICATION

The following resources were utilized in step 2 of the enhanced HVA process to assist in the identification of hazards for consideration in the analysis.

Websites:

- Federal Emergency Management Agency (FEMA), "Disaster Information." Available at http://www.fema.gov/hazard/index.shtm accessed April 1, 2008.
- Federal Emergency Management Agency (FEMA), "Region III Disaster History, District of Columbia Disaster History." Available at http://www.fema.gov/news/disasters_region.fema?region=3#DC accessed April 1, 2008.
- Federal Emergency Management Agency (FEMA), "National Flood Insurance Program." Available at http://www.fema.gov/plan/prevent/fhm/index.shtm accessed April 1, 2008.
- US Geological Survey (USGS), "National and Regional Seismic Hazard Maps." Available at http://www.earthquake.usgs.gov/research/hazmaps/ accessed April 1, 2008.
- National Oceanic and Atmospheric Administration (NOAA), "National Weather Service (NWS)." Available at http://www.nws.noaa.gov/ accessed April 1, 2008.
- US Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA), "Hazardous Materials Incident Data." Available at
  - http://hazmat.dot.gov/pubs/inc/data/2005/2005frm.htm accessed April 1, 2008.
  - http://hazmat.dot.gov/pubs/inc/data/2006/2006frm.htm accessed April 1, 2008.
  - http://hazmat.dot.gov/pubs/inc/data/2007/2007frm.htm accessed April 1, 2008.
- US Geological Survey (USGS), "World Hot Spots." Available at http://pubs.usgs.gov/gip/dynamic/world_map.html accessed April 1, 2008.
- Federal Emergency Management Agency (FEMA), "Tornado Activity in the United States." Available at http://www.fema.gov/plan/prevent/saferoom/tsfs02_torn_activity.shtm accessed April 1, 2008.
- US Environmental Protection Agency (EPA), "Local Drinking Water Information." Available at http://www.epa.gov/safewater/dwinfo/dc.htm#offices accessed April 1, 2008.
- Gendisasters, "Washington DC Disasters, Tragic Accidents, and Deaths." Available at http://www.gendisasters.com/dc/ accessed April 1, 2008.

Hazards lists considered from specific HVA Tools:

- National Fire Protection Association, “NFPA 1600 Standard; 1996, 2004, and 2007 editions. Annex A: Explanatory Information.” 2007 edition available at http://www.nfpa.org/assets/files/pdf/nfpa1600.pdf accessed April 1, 2008

- American Society for Healthcare Engineering (ASHE), Hazard Vulnerability Analysis Tool. Available from ASHE.

- Kaiser Permanente, Hazard Vulnerability Tool. Available at http://www.calhealth.org/public/press/Article%5C103%5CHazard%20&%20Vulnerability%20Analysis_kaiser_model.xls accessed April 1, 2008.

In addition, individual hazards from the HVA of the following hospitals were considered:

- VA Medical Center, Washington DC

- Children’s National Medical Center

- MedStar Washington Hospital Center

APPENDIX C: PRIMARY HAZARD LIST FOR HEALTHCARE ORGANIZATIONS

Active shooter incident (within a healthcare organization)
Aircraft crash, proximate[5] (usually medical helicopter)
Biological – Unusually severe contagious disease, not epidemic
Biological, epidemic/pandemic, contagious
Biological (epidemic/pandemic), non-contagious
Bomb Threat, proximate (on-site)
Cash flow interruption, primary (e.g. ATMS/credit cards not working, banks inaccessible)
Civil disturbance, external, proximate or remote
Civil disturbance, internal
Collapse of occupied structural, remote[6]
Collapse of occupied structural, proximate (on-site)
Communications failure, backup system
Communications failure, telephone, single facility
Communications, area telephone network
Compressed air, primary failure
Contaminated air, external, proximate
Contaminated water, internal, single facility
Dam/levee failure
Drought
Earthquake/land shift
Electricity failure, general primary (multiple facilities); requiring use of backup power
Electricity failure, emergency (back-up) power
Electromagnetic Pulse
Elevator breakdown, primary, single facility
Explosion, single site, external remote
Explosion, single site, external proximate
Extreme cold weather
Extreme hot weather
Fire, large external, proximate
Fire, large internal, single facility
Flood, external
Flood, internal, single facility
Fuel supply interruption, primary failure (e.g. oil, gasoline)
Gas supply (natural gas), primary failure
Gas supply (medical gasses), primary failure

[5] "Proximate" means directly affecting one or more healthcare coalition member organizations.
[6] "Remote" means far enough away from any healthcare coalition member organization that the direct impact does not affect their facilities.

Hazardous materials release, external, proximate

Hazardous materials release, external, remote

Hazardous material release, internal, single facility

Hostage/barricade situation

Hurricane

HVAC, primary failure, not repairable in 8 hours

Infant abduction

Information systems, primary failure

Information systems, primary failure, breach of IS firewall

Internet, primary failure

Landslide/mudslide/avalanche

Mass casualty incident, medical, non-contagious

Mass casualty incident, trauma

Medical vacuum, primary failure

Radiation release, external, proximate

Radiation release, external, remote

Radiation release, internal, single facility

Service loss, primary failure, outpatient discharge support services (e.g. home help, home oxygen, etc.)

Service loss, primary failure, outpatient services (e.g. dialysis, primary care physician clinics, etc)

Sewer system, primary failure, municipal

Special events and demonstrations (includes National Special Security Events - NSSE)

Strike and labor disruption, external to healthcare organizations

Strike and labor disruption, internal, single healthcare organization

Supply shortage, blood products

Terrorist attack, primary, proximate (multiple explosions as proxy)

Thermonuclear detonation

Thunderstorm

Tornado/windstorm, proximate

Traffic/road interruption to hospital, primary failure

Transportation disruption, mass transit

Trash collection interruption, primary

Tsunami

VIPs, multiple and distributed across facilities

Volcano

Water main disruption or failure

Winter storm (cold, snow, ice, wind, power loss, pipe freeze)

APPENDIX D: HAZARD VULNERABILITY ASSESSMENT AND HAZARD RISK SCORES

(See Separately Attached Excel Spreadsheet)

APPENDIX E: SELECTED HAZARD LIST

Below are the "Top 18" hazards selected by the HVA ad hoc working group for closer examination, vulnerability decomposition, and collection of common vulnerabilities across hazards. These are not the top 18 hazards on the Hazard Vulnerability Assessment. The intent of this selection is to move beyond "hazard identification" and identify important vulnerabilities and the elements within those vulnerabilities that are relevant to the Healthcare Coalition.

The "selected hazards" may be different for an individual member healthcare organization when conducting an HVA for their own individual facilities, since the perspectives and granularity of hazard vulnerability varies. For example, several hazards affecting a single healthcare organization that requires it to conduct emergency evacuation will all have the same impact on the coalition (i.e., the emergent evacuation needs of a single healthcare facility). All of these "high priority" hazards are therefore not selected for the current list, since they all have the same coalition impact. For an individual healthcare organization, each of these high-impact hazards would likely be considered for further analysis.

Similarly, some hazards create vulnerabilities for the proximate healthcare organizations and the coalition that are the same as other, more expansive hazards. These hazards, therefore, are subsumed under others with the same plus additional vulnerabilities.. The Selected 18 are listed in alphabetical order:

- Active shooter, inside healthcare facility
- Aircraft crash, proximate (usually medical helicopter)
- Biological - epidemic/pandemic, contagious
- Civil disturbance, external, proximate or remote
- Electricity failure, general primary (multiple facilities); requiring backup power
- Extreme hot weather
- Fire, large external, proximate
- Flood, external
- HVAC, primary failure, not repairable in 8 hours
- Information systems, primary failure, breach of IS firewall
- Mass casualty incident (MCI), trauma
- Special events and demonstrations
- Strike and labor disruption, internal, single healthcare organization
- Supply shortage, blood products
- Terrorist attack, primary, proximate (multiple explosions as proxy)
- Tornado/windstorm, proximate
- Water main disruption, primary failure
- Winter storm (cold, snow, ice, wind, power loss, pipe freeze)

APPENDIX F: HVA DECOMPOSITION OF VULNERABILITIES TO PRIORITY HAZARDS

(See Separately Attached Excel Spreadsheet)

APPENDIX G: PRIORITY VULNERABILITY ELEMENTS

Utilizing the analysis provided in **Appendix F**, common vulnerability elements across the priority hazards have been further analyzed against Coalition emergency management program efforts. The following summary is provided and is intended to be utilized to guide Coalition Emergency Management efforts in the future. Priority vulnerabilities indicate areas recommended for focused attention. Recurring vulnerabilities indicate areas where Coalition activities to date have helped to mitigate the effects but should still receive on-going attention.

Finally, through this analysis, a new set of vulnerabilities specific to the Coalition were discovered that are not related to any individual hazard. These are listed in **Appendix H** for consideration ("Program Vulnerabilities").

Emergency Life Safety Common Vulnerability Elements:

Priority vulnerabilities

- Violence within healthcare organizations posing risk to staff and patients: Though a recurring vulnerability, the consequences of this vulnerability remain significant throughout the Coalition causing it to be listed as a priority vulnerability in this analysis. Though this vulnerability is not associated with all hazards, it is significant across several hazards. The risk is posed by incidents such as active shooters or incidents in which there may be opposing groups (gangs). The Coalition has maintained a Security Directors Work Group designed to facilitate relevant information to facilities and common templates have been developed in the past (e.g. active shooter template for healthcare facilities). DC MPD has been a regular participant on this WG. ***Common security procedures should continue to be investigated by the Coalition for application at healthcare organizations. In addition, further enhancements to integration with law enforcement organizations should be sought.***

Recurring vulnerabilities

- Direct and indirect injuries to patients and staff in healthcare facilities: A significant risk to staff, patients, and visitors from external forces exists across multiple hazards. Some of this may be lessened or eliminated with rapid protective action after short-notice warnings. The Coalition has notification methodologies (e.g. HMARS, HIS) that can provide associated actionable information to HCOs to rapidly prompt protective action by each notified healthcare organizations. **The penetration of notifications should be increased and verified within the healthcare organization/HCO community (i.e. enhance CHC and SNF participation). In addition, acute care facilities should be surveyed to establish how notifications are handled internally.**

- Exposure to contaminated or infectious patients, visitors, staff: Various hazards pose the risk to staff, patients, and visitors through exposure to infectious or contaminated persons entering the HCO. Currently, a decontamination template is being developed by the Coalition for acute care facilities to address situations in which a contaminant may be removed from a patient. However, the Coalition has not yet examined intensively incidents in which contagious diseases are present (which would help to address various additional vulnerabilities – see below). The Coalition can assist with this issue through consideration of **development and dissemination of standard screening methods**

(location, staffing, and screening processes) for evaluating staff/arriving patients/visitors for infection before entry into the facility.

- Loss of Life Safety Systems likely across many hazards, requiring evacuation or significant assistance: The loss of life-safety systems (fire alarms/suppression, critical medical equipment, climate control in hot weather, others) remains a recurring vulnerability and **may require increased resources (personnel, equipment, supplies) to continue operations or require the facility to partially or fully evacuate**. The Coalition provides an operational mutual aid/cooperative assistance process and can assist with identifying resource assistance through DC DOH and other City agencies.

- Psychological trauma (fear) secondary to poor incident information to staff, patients, and visitors: Significant risk for behavioral health impact exists across all identified hazards. The Coalition has just initiated a Mental Health Work Group to examine some of these issues across all healthcare organizations. The Coalition has continued to develop methods to obtain and share information from relevant public safety, public health, and other agencies during an incident and to disseminate it across HCOs. The work of the Mental Health Work Group should continue to **examine common methodologies for addressing behavioral health issues post-incident for both patients and staff.**

Continuity of Operations Common Vulnerability Elements for Healthcare organizations:

Priority Vulnerabilities

- Lack of personnel available to work at healthcare facilities: Multiple hazards pose the risk of diminished numbers of healthcare facility personnel being available for work at their respective facilities. This can have various etiologies depending on the hazard involved but commonly represents an impact on the transportation system (i.e. mass transit). **The Coalition may consider an initiative with public agencies (Department of Transportation, Metro, MPD/ law enforcement, etc.) to develop a standardized safe method for assisting employees to and from work** when major roads or mass transit is affected. **In addition, template procedures for the use of volunteer drivers could be considered. Finally, the Coalition could consider exercising the Mutual Aid MOU to elicit any challenges with the sharing of healthcare employees.**

- Facility structural compromise: Multiple hazards pose the risk of direct structural compromise to healthcare facilities. This was highlighted in the aftermath of the 2011 earthquake in which facilities were challenged with appropriate methods for establishing whether they had suffered any damage. **The Coalition could examine template methods for initial evaluations of facilities after structural impact and/or develop lists of resources that may be of assistance in these activities.**

Recurring vulnerabilities

- One or multiple HCOs compromised requiring evacuation: A significant risk for the Coalition remains one or more HCOs needing to evacuate as a result of one of many hazard impacts. The Coalition has developed an evacuation annex to its EOP with accompanying documentation. This has been exercised in the past and in addition, planning started this year on multiple facilities evacuating out of the City. **These tools require continued evaluation and remain a focus of Coalition preparedness activities.**

- The financial impact of mass casualty care, with uncompensated services, increased expenses, loss revenue, and delays for reimbursements may be crippling to healthcare organizations: Incident expenses and recovery costs across hazards may compromise optimal medical surge or may delay or prevent recovery of medical services in the community. True costs for any healthcare organization are expected to exceed actual reimbursement in many large-scale hazard impact scenarios. Emergency response includes delivering services that may not be recoverable through direct billings to third party payers and when they are, payment is inherently delayed, sometimes for extraordinary periods of time. In some large-scale hazard impacts, the financial impacts on any individual organization can be potentially crippling threatening the viability of the organization and impacting the entire Coalition negatively. The Coalition has begun the process this year of investigating issues related to reimbursements and other financial vehicles (e.g. grants) in the post-impact environment. As these issues are clarified, **the Coalition should consider investigating emergency and disaster response mechanisms to ensure adequate and rapid compensation to healthcare organizations for services rendered. In those instances in which formal Federal disasters have been declared, mechanisms should be investigated to meet the needs of both the for-profit as well as non-profit organizations. An effective process for facilitating financial needs of healthcare organizations for large-scale or specialty healthcare emergency response will further serve the public health/public safety mission of the DC government.**

- Risk of litigation and/or penalties from regulations designed for day-to-day healthcare management: The healthcare industry is heavily regulated and the vast majority of regulations and standards were developed for day to day operations. Necessary alterations in operating procedures during hazard impact may run the risk of compromising adherence to these regulations. This year, the Coalition has begun to catalogue the numerous City and Federal regulations that could be problematic during emergency response. As with compensation issues, **the Coalition should begin to identify mechanisms that will protect participating healthcare organizations. Establishing community standards through *consistent strategy and tactics* regarding healthcare degradation, mass evacuation, and other critical response actions may also be protective. Similarly, establishing efficient mechanisms for petitioning for regulatory variance could be beneficial.**

- Healthcare operations affected by utility failure: Utility disruption is potentially problematic across multiple hazards. The Coalition has also identified a methodology (through DC HSEMA) for facilities to receive priority utility attention from the respective responsible organizations. **The Coalition should work continuously (through public sector partners) to highlight priority restoration of these services to healthcare facilities.**

- Public perception of protective actions & response may adversely impact reputation and confidence, affecting recovery of business, liability, recovery funding, etc.: Keeping the public, political leadership and public response organizations informed about the Coalition and its members' response is important for obtaining assistance and maintaining public confidence in healthcare. The Coalition has processes for ***providing public information*** and for ***promoting consistency of message*** across the participating HCOs. **These should be exercised in the upcoming year.**

- Communications and IT compromise: Multiple hazards can affect communications and IT at one or several HCOs, and can also impact the Coalitions information processing and communications. The current HMARS radio system that can provide critical back-up communications during telephone and cellular disruption connects hospitals, SNFs, and DC agencies. In addition, HIS can similarly provide critical messaging services on-line. **The Coalition should continue efforts to examine and ensure the resiliency of both HMARS and HIS.** .

Surge Vulnerability Elements:

Priority vulnerabilities

- Large number of unusual (specialty) casualties in non-specialty HCOs: There is a significant risk of specialty care victims (trauma, burn, chem/rad, pediatrics, eye trauma, etc.) arriving at non-specialty HCOs seeking care, especially during large incidents. The Coalition is currently working on procedures to specifically address a large burn incident. Once completed, **the Coalition should exercise this plan either individually or in conjunction with partners in the National Capital Region. Inter-facility transfer of burn patients is expected to be challenging and should receive special attention to further elucidate solutions. In addition, the Coalition can extrapolate common elements for *remotely accessing and providing expert information* to these HCOs during incidents of other unusual etiologies (e.g. radiation injuries).**

- Large number of incident casualties requiring additional resources: A significant risk exists across hazards for large number of casualties distributed across HCOs. Though a recurring vulnerability, it is highlighted as a priority due to probabilities and multiple vulnerabilities. The Coalition needs ***to continue to exercise effective and efficient processes for rapid sharing of incident related information. Attention should be given to unifying triage methodologies utilized by acute care facilities and DC FEMS. The process for identifying resource needs and matching them through requests to DC agencies or mutual aid should continue to be a focus. Work initiated this year on modified means of delivery of care in surge situations should be expanded.***

- Surge capabilities required during contagious disease incidents: Though the vulnerabilities are limited to a few hazard impacts, the specific processes and procedures required across the Coalition for a large-scale contagious disease incident have yet to be explored fully. **The Coalition should dedicate specific attention to a contagious disease outbreak with focus on common screening and evaluation methodologies, protection of healthcare assets and personnel, and efficient integrations with DC DOH.**

Recurring vulnerabilities

- Mass decontamination surge needs in all HCOs: Significant risk exists across hazards for the presentation of patients contaminated with substances that pose a risk of injury/illness to healthcare workers. This year, a decontamination template for healthcare facilities has been initiated. **These efforts should continue and potentially include a large exercise of acute care facility resources.**

- "Missing" individuals generated by the incident and the need for family re-unification surge: Many families will be looking for loved ones after a large-scale hazard, creating both continuity of operations issues and public confidence risks for HCOs. The Coalition recently lost the ED-IT capability that addresses hospital reunification issues only. Efforts have been initiated to develop a patient tracking capability in HIS that could be utilized by any healthcare facility type. **This capability should be exercised to prove utility and identify corrections needed for not only hospitals, but SNFs and CHCs as well.**

- Large number of fatalities at Coalition HCOs: There is a significant risk for many fatalities across multiple hazards faced by DC. The Coalition has developed a mass fatality template for healthcare facilities and has worked with DC OCME to coordinate plans. **The response procedures should be exercised when feasible, with a performance evaluation and follow-on improvement planning.**

- Risk of psychological trauma in victims treated in coalition facilities: Mental health consequences exist across multiple hazards. The recent development of the Coalition's Mental Health Work Group has started to identify issues related to patient care. **These efforts should continue with the development of common templates for response.**

APPENDIX H: COALITION PROGRAM VULNERABILITY ELEMENTS :

The following are all considered priority vulnerabilities for the Coalition based upon analysis and discussion in development of the Coalition HVA revisions. These represent continuations of similar vulnerabilities identified last year. As such, some work has been initiated to address these:

- Coalition structure: The Coalition remains an unincorporated entity functioning in a day-to-day fashion according to guidance established in a several year old strategic administration document. Though it has functioned well in this capacity**, the structure should be re-examined for potential enhanced efficiencies and protections for participating organizations**. Any recommended changes should account for enhanced longevity of the Coalition. Efforts started this year should be continued.

- Coalition Funding: The Coalition's success is in large part due to the funding that it has received. Much of this funding has been utilized to compensate/reimburse organizations for their personnel to develop Coalition products and to participate in Coalition activities. Actual fixed, on-going costs have been designed to be relatively limited (e.g. technology such as the common number for CNCs and ED-IT on-going costs). Other costs have been supported by organizations in a uncompensated fashion (e.g. HIS server support by WHC). If all funding were discontinued to the Coalition, it is anticipated it would continue to operate albeit in a lesser capacity. **Coalition management should continue to seek funding through the DC Department of Health and should prioritize program elements that should continue if funding were to be severely curtailed or eliminated altogether.**

- Coalition senior personnel: The Coalition has had relatively consistent management and administration since being formally established in 2007. Much of the coalition's progress is due to individual efforts that are not inherently sustainable over the long term**. The Coalition should continue to seek methods to recruit and train new program managers and administrators in an effort to broaden these management and program administration capabilities to support Coalition sustainment. These efforts may include focused training and education to enhance professionalization of Emergency Management within the Healthcare Coalition's member organizations.**

- Improving depth and penetration of HCOs: The Coalition has had good success at incorporating hospitals and is increasing participation by SNFs and CHCs in efforts to improve both Coalition and member organization response procedures. **These efforts should continue encouraging these and other non-hospital healthcare organizations (such as specialty care centers) to participate in the Coalition.**