

Developing a Facility Hazard and Vulnerability Analysis (HVA)

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Overview and Objectives

Understanding the risks present in your location, the likelihood of occurrence, and your center's preparedness for these events serve as the foundation for all hazard emergency management plans. This session will review components of a typical Hazard Vulnerability Analysis (HVA), will guide health centers through completion of a sample HVA, and discuss how to integrate the HVA into an emergency management plan.

In this session we will:

- 1. Describe what a hazard vulnerability analysis is and the importance of developing one that is accurate and specific.**
- 2. Describe the sources of data for completing a HVA.**
- 3. Describe steps to mitigate threats and how the HVA findings are incorporated into a centers' EMP.**

Research

- 1. Review best practices in vulnerability assessment**
- 2. Identify most appropriate methodology and outcome needs for your facility (aka – pick your process)**
- 3. Internally validate inputs & outputs**
- 4. Externally validate inputs & outputs**

Critical Components of the HVA

- 1. Risk**
- 2. Probability**
- 3. Severity**

The Risk Matrix

	<u>SEVERITY</u>			
<u>PROBABILITY</u>	CATASTROPHIC (2.6 - 3.0)	CRITICAL (1.6 - 2.5)	MARGINAL (.6 - 1.5)	NEGLIGIBLE (0 - .5)
FREQUENT (2.6 - 3.0)		Landslide	Extreme Temperature	
PROBABLE (1.6 - 2.5)	Infectious Disease Outbreak	Earthquake Radiological Terrorist Attack	Communications Failure Fuel Shortage	HVAC Failure
OCCASIONAL (.6 - 1.5)	Chemical Exposure - External	Fire Alarm Failure Hostage Situation	Infant Abduction Chemical Exposure - Internal	Medical Vacuum Failure
REMOTE (0 - .5)	etc....	Generator Failure	VIP Situation	Ice Storm Hurricane

Assessing Risk

1. **Likelihood of event occurrence and severity of its impact**
2. **Assigns a numeric value**
3. **Subjective and objective outputs**

$$\text{Risk} = \left(\begin{array}{l} \text{Probability Score}^* \\ \text{Severity Score} \end{array} \right)$$

Assessing Probability

- 1. Known frequency of occurrence**
- 2. Concern of occurrence**
- 3. Target and weapons assessment**

Assessing Severity

- 1. Includes impacts, preparedness and response capabilities**
- 2. Geographically sensitive**
- 3. Easier to address mitigation activities**

More On Severity Assessment

Severity includes assessing impacts and mitigation

a) Impacts

- **Human (injury versus death)**
- **Property (patient care?)**
- **Business (critical function?)**

b) Mitigation

- **Preparedness (plans, policies, protocols)**
- **Internal Response (competency)**
- **External Response (MOU, MAA, exercises)**

Involvement and Support

- 1. Health Center Leadership**
- 2. Disaster Committee**
- 3. EMA, LEPC, Associations**
- 4. Local Responders/Hospitals**

The HVA Tool

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Preplanning</i>	<i>Time, effectiveness, resources</i>	<i>Community/ Mutual Aid staff and supplies</i>	<i>Relative threat*</i>
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%
Hurricane	0	2	3	2	1	2	1	0%
Tornado	2	2	3	2	2	2	2	48%
Severe Thunderstorm	3	2	3	2	1	2	1	61%
Snow Fall	1	2	2	1	3	3	3	26%
Blizzard	1	2	2	1	3	3	3	26%
Ice Storm	1	2	2	1	3	3	3	26%
Earthquake	2	3	3	3	2	2	2	56%
Tidal Wave	0	3	3	3	3	0	3	0%
Temperature Extremes	3	2	1	1	1	1	1	39%
Drought	2	1	1	1	1	1	1	22%
Flood, External	2	3	3	3	1	2	1	48%
Wild Fire	1	2	3	2	1	3	1	22%
Landslide	0	2	3	2	2	0	2	0%
Dam Inundation	1	3	3	3	2	3	2	
Volcano	1	3	3	2	2	3	2	28%
Epidemic	2	3	1	3	2	1	2	44%
AVERAGE SCORE	1.38	2.31	2.44	2.00	1.88	1.94	1.88	32%

Calculating Risk

Relative Risk

=

$$\frac{\text{Probability of Event Occurrence (0-3)}}{3}$$

*

$$\frac{\begin{array}{l} \text{Human Impact (1-3)} \\ + \\ \text{Property Impact (1-3)} \\ + \\ \text{Business Impact (1-3)} \end{array} + \begin{array}{l} \text{Preparedness (1-3)} \\ + \\ \text{Internal Response (1-3)} \\ + \\ \text{External Response (1-3)} \end{array}}{18}$$

PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	RISK
<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Preplanning</i>	<i>Time, effectiveness, resources</i>	<i>Community/ Mutual Aid staff and supplies</i>	<i>Relative threat*</i>
0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%

Example – Probability for EARTHQUAKE

$$\text{Probability of Earthquake} = \frac{\text{"1" (assigned score)}}{\text{"3" (maximum score)}} = \text{"0.33" (equation value)}$$

PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	RISK
<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Preplanning</i>	<i>Time, effectiveness, resources</i>	<i>Community/ Mutual Aid staff and supplies</i>	<i>Relative threat*</i>
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Example – Severity for EARTHQUAKE

$$\begin{array}{r}
 \text{Earthquake} \\
 \text{Severity}
 \end{array}
 = \frac{
 \begin{array}{r}
 \text{"9"} \\
 (3+3+3; \text{assigned} \\
 \text{impact scores})
 \end{array}
 +
 \begin{array}{r}
 \text{"3"} \\
 (1+1+1; \text{assigned Prep/} \\
 \text{Response scores})
 \end{array}
 }{
 \text{"18"} \text{ (maximum score)}
 }
 = \text{"0.67"} \\
 \text{(equation value)}$$

PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	RISK
<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Preplanning</i>	<i>Time, effectiveness, resources</i>	<i>Community/ Mutual Aid staff and supplies</i>	<i>Relative threat*</i>
0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%

Example – Risk for EARTHQUAKE

$$\text{Earthquake Risk} = \text{"0.33"} \text{ (Probability equation value)} * \text{"0.67"} \text{ (Severity equation value)} = \text{"0.22"} \text{ (relative risk)}$$

PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	RISK
<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Preplanning</i>	<i>Time, effectiveness, resources</i>	<i>Community/ Mutual Aid staff and supplies</i>	<i>Relative threat*</i>
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Exercise

- 1. We are the Emergency Management Committee at Smallville Health Center**
- 2. Our mission is to create an HVA for our facility**
- 3. We will review facts**
- 4. We will create an HVA**

Smallville Health Center

- Suburban area facility built in 1971
- There have been no seismic retrofits or upgrades
- An earthquake in 1984 caused minor structural damage.
- Serves a large geographical region
- 1,000 miles from nearest ocean
- 250 miles from nearest mountain
- Diverse socioeconomic culture
- Center of Excellence
- Nearest hospital is 30 miles away
- Nearest Trauma Center is 50 miles away
- Avg. daily visits of 200 patients

Smallville Health Center

- Area is peaceful. No protests or civil disturbances
- Last year, patient satisfaction was rated at an all time low and there have been several threatening phone calls
- A month ago, a letter was received threatening to take hostages if services did not improve
- Very few politicians or celebrities ever visit area
- A new patient decontamination area was built last month with one shower.
- No one has had decontamination training
- Only 36 hours of emergency medical supplies on hand
- There is one commercial airport 20 miles away
- There is an aging chemical plant in the area. A local environmental group has identified potential leakage into a nearby stream.

Smallville Health Center

- There have been 10 small internal chemical spills in the past 5 years. 2 short-term injuries
- Smallville has Police and County Sheriff services
- **The County EMS office is 25 miles away**
- **1 ALS and 2 BLS transports are in the area**
- One County HazMat team is 25 miles away
- Area not prone to wildfire
- Power to area is frequently interrupted for several days
- **1 satellite telephones are on site**
- IT/IS is regularly tested and updated
- **Staff food and water stored to last 5 days**
- No radiological materials in area
- No Unions in area

Calculations for EARTHQUAKE

Event	Probability	Impacts			Mitigation			Risk
		Human	Property	Business	Prep. - Planning	Internal Response	External Response	
Earthquake	2	3	3	3	3	3	2	

HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED -NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE
<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Preplanning</i>	<i>Time, effectiveness, resources</i>	<i>Community/ Mutual Aid staff and supplies</i>
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Calculations (EARTHQUAKE)

Event	Probability	Impacts			Mitigation			Risk
		Human	Property	Business	Prep. - Planning	Internal Response	External Response	
Earthquake	2	3	3	3	3	3	2	
Equation	2/3	$\frac{(3 + 3 + 3) + (3 + 3 + 2)}{18}$						
Value	0.67	0.94						0.63

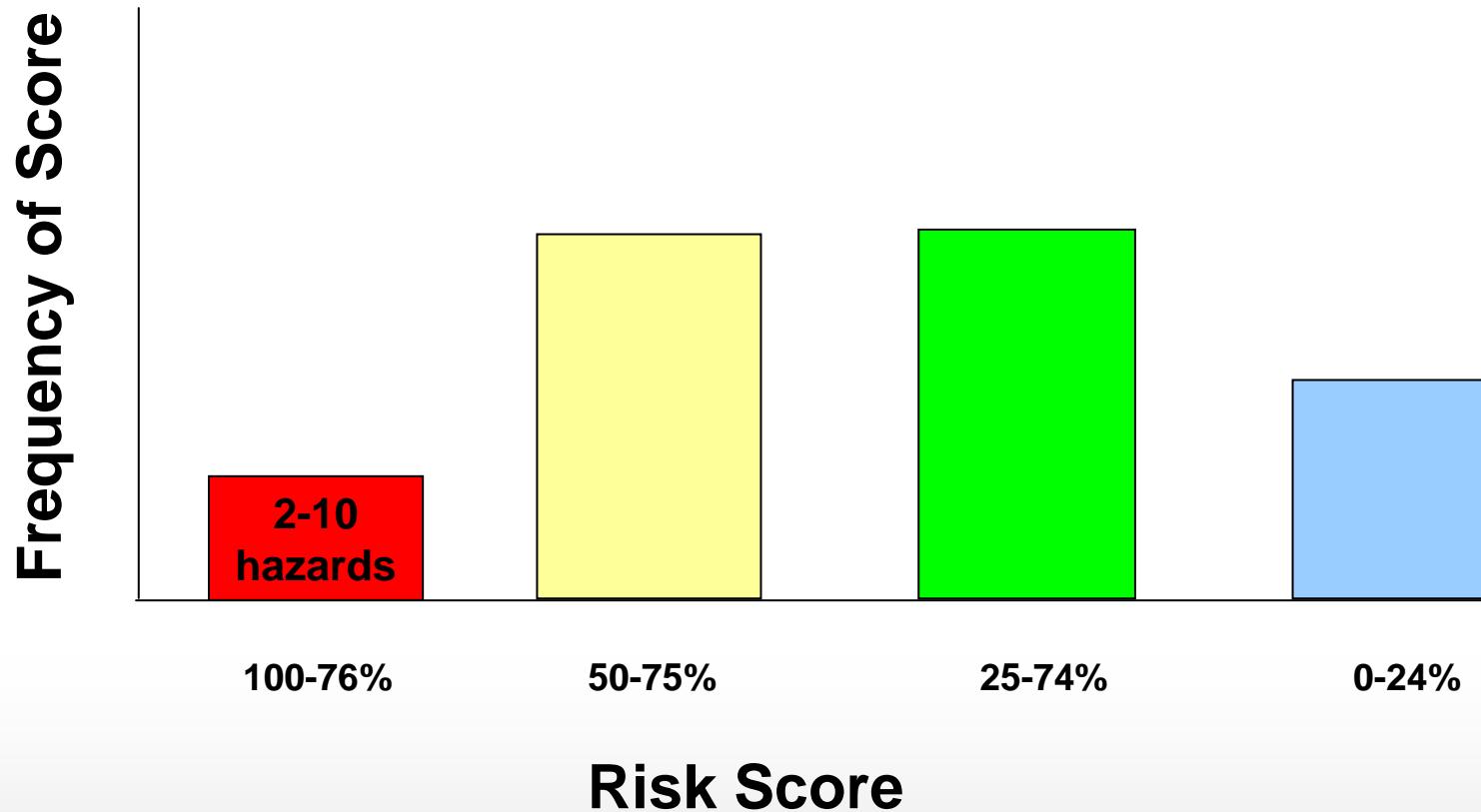
HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE
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YOUR TURN!!

FOR EXTERNAL CHEMICAL SPILL

Event	Probability	Impacts			Mitigation			Risk
		Human	Property	Business	Prep. - Planning	Internal Response	External Response	
Chemical Spill	3	3	1	1	1	2	2	
Equation	3/3	$(3 + 1 + 1) + (1 + 2 + 2) = 10$ <hr style="border: 1px solid blue;"/> $(3 + 3 + 3) + (3 + 3 + 3) = 18$						
Value	1.00	0.56						0.56

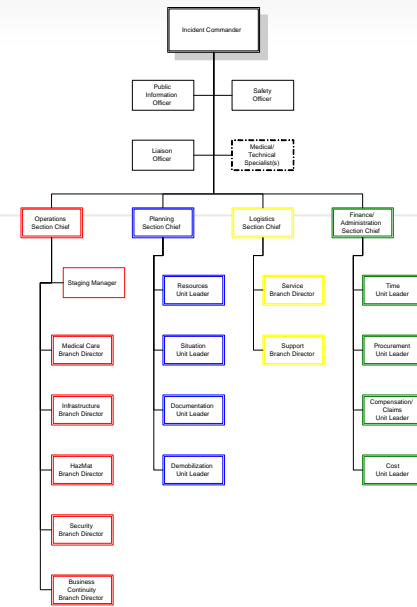
A good rule of thumb....



Management

1. Review frequency

2. Identify next steps



HOSPITAL OVERLOAD

INCIDENT PLANNING GUIDE

Does your Emergency Management Plan Address the following issues?

Mitigation & Preparedness

Does your hospital have a hospital capacity overload plan that includes:

- A procedure for canceling elective surgeries, procedures and clinic appointments?
- A procedure to determine the ED saturation rate?
- Facilitation of early discharges and transfers out of the facility?
- A system to obtain current bed status/availability and patients waiting to be admitted?
- A procedure to evaluate and activate ED diversion status?
- A procedure to enforce patient discharge times and a holding area for discharged patients to wait until transportation arrives?

1. Does your hospital have a plan for prioritizing essential patient care and resources and triggers for implementing altered standards of care (austere care)?

2. Does your hospital have a continuity of operations plan for long term events?

3. Does your continuity of operations include a line of succession when administrative staff are unavailable?

4. Does your hospital maintain a database (registry) of available health care providers in your area, or know the process of requesting volunteers from local, regional or state registries (e.g., the Emergency System and Advanced Registration of Volunteer Healthcare Personnel) to supplement services?

5. Does your hospital have a policy for the use of solicited and unsolicited volunteers that includes verification of licensure and certification?

6. Does your hospital have a plan to supplement staffing including use of registry nurses and other licensed health care professionals?

HOSPITAL OVERLOAD

INCIDENT RESPONSE GUIDE

Mission: To safely manage periods of limited bed capacity, facilitate the timely admission of patients, and minimize holding time in the emergency department (ED).

Directions

- Read this entire response guide and review organization chart
- Use this response guide as a checklist to ensure all tasks are addressed and completed

Objectives

- Maintain current census of ED and inpatients, number waiting to be seen, waiting for admission and pending discharges
- Activate alternate care sites
- Provide safe and appropriate patient care
- Communicate situation status regularly to patients, families, staff, other hospitals and local officials
- Evaluate diversion criteria and outpatient/urgent care clinic resources

Immediate Actions (From Decision to Activate EOP to 2 Hours)

COMMAND

(Incident Commander):

- Activate Hospital Command Center, Command Staff and Section Chiefs, as appropriate
- Activate the Medical/Technical Specialists – Hospital Administration, Clinic Administration, Medical Staff and Pediatric Care

Next Steps:

1. **Prioritize hazards**
2. **Validate priorities with community responders and hospitals**
3. **Develop hazard-specific response plans**
4. **Educate staff on these plans and policies**
5. **Practice using drills and exercises**
6. **Evaluate competencies; update plans and policies**
7. **Introduce mitigation activities (e.g. training)**
8. **Re-test using drills and exercises**

9. **Repeat items 1 through 8**

This is a critical cycle for any comprehensive emergency management program.

ps. MAKE IT FUN!!

For More Information:

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**For Health Center Tools (CA Primary Care Association –
Clinic Emergency Preparedness Project:**

<http://www.cpcsa.org/resources/cepp/>

For HICS tools:

California Emergency

Medical Services Authority

www.emsa.ca.gov

For CDP training programs:

<https://cdp.dhs.gov/>



Emergency Preparedness. Peace of Mind.