A System for Hazard Vulnerability Assessment

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Threat Assessment Manager

KAISER PERMANENTE®
Hazard Vulnerability Assessment (HVA)

• Where and how are you spending your time and $ to reduce, eliminate, or control risks to your business?

• Are you distributing those assets in the same proportion as the relative risks they represent?

• Does your Boss have the same opinion of relative risks that you do?

• Do your peers have the same opinion of relative risks that you do?

• Do others in your industry in your area share your opinion of relative risks?
Hazard Vulnerability Assessment (HVA)

- Requirements for a HVA
- An element in a Preparedness Program
- Typical Key Features and Challenges
- How to Define “Risk”? 
- Kaiser Permanente’s System for HVA
- Benchmarking
- Example HVA
Kaiser Permanente

- Nation’s Largest not-for-profit Integrated Healthcare Delivery System
- $38B Revenue
- Would be ~ 50 on Fortune 500
- Labor Management Partnership with 33 Participating Unions
- 9 States and the District of Columbia
- 8.7 Million Members
- 32 Medical Center
Scope of Preparedness Challenge

- 421 Medical Offices
- 14,000 Physicians
- 159,000 Employees
- 450,000 Surgeries
- 85,000 Deliveries
- 109 Million Prescriptions
- 34.6 Million Doctor Office Visits
Why an HVA?

- Healthcare – required since late 90’s
- Defense against “Ready, Fire, Aim”
- Effective tool to communicate to leaders, staff, customers, regulators
- Defines “risk” – arbitrary but clear
- Comprehensive – considers all hazards
- Provides a metric to trend preparedness
An Element of an Overall Program

- The HVA’s the foundation to build from
- “Needs are Infinite, Resources Limited”
- Analysis of HVA should drive:
  - Emergency Operations Plans
  - Business Continuity/Recovery plans
  - Drills – scenarios, response plan testing
  - Priority for funding for mitigation activities
  - Training
As part of a Systematic Program

- Minimum Acceptable
- Normal Operations
- Incident Occurs
- Recovery
- Response
- Restoration
- Return to Normal Operations
- HVAs, Mitigation
- Emergency Plans & Crisis Management
- Prevention and Preparedness
- Business Continuity
- Response, Recovery & Restoration
Emergency Operations Plans

- Organize by Planning steps:
  - Mitigation – steps to reduce the risk and/or potential damage (require air bags in cars)
  - Preparedness – steps to organize and be ready for the unavoidable (flashlights & batteries)
  - Response – strategies and actions to take when it occurs (active Emergency Operations Center)
  - Recover – strategies and actions to restore critical systems, and return to normal (back-up offsite call center contracts)
BCM Program Design

Walnut Creek Adult Medicine Department Recovery Plan

Quick Guide to Recover Critical Operations

1. Event occurs and EOC activates Emergency Response Plan, if necessary
2. EOC assesses the situation and determine if recovery is necessary?
3. Department authorized by EOC to invoke Recovery Plan, if appropriate
4. EOC and Department review Recovery Strategies
5. Department implements Recovery Plan
Common HVA Challenges

- Subjective; Hard to assess/defend
- Overlong
- Hard to communicate to staff, customers
- Don’t cover all possible hazards
- Tend to “overreact” to more recent events
- Hard to benchmark against other HVAs
- Don’t clearly define “risk”
Don’t Assume Common Understandings

“The English and American peoples are separated by a common language.”

Winston S. Churchill
“Risk” Definition

- Risk = Probability x Severity

- Risk is relative to all possible bad things

- Examples:
  - Graffiti in L.A. (80%) x Severity (5%) = 4% risk
  - Earthquake in L.A. (50%) x Severity (90%) = 40% risk
“Severity” Definition

- Severity = Magnitude – Mitigation

Examples

- Power loss (90%) – emergency generators (80%) = 10%
- Hurricane (50%) – govt assistance (10%) = 40%
Kaiser Permanente’s HVA Template

- Standard process to allow internal comparison
- Considers a wide range of hazards
- Uses 0 – 3 scale to assess probability, magnitude (or impact) and mitigation (preparedness or response capabilities)
- Calculates relative risk then provides bar graphs for comparison
- Is amenable to committee analysis, revision, and consensus
- Has become the default process in healthcare
Naturally Occurring Hazards Considered

- Hurricane
- Tornado
- Severe Thunderstorm
- Snow Fall
- Blizzard
- Ice Storm
- Earthquake
- Tidal Wave

- Temperature extremes
- Drought
- Flood, External
- Wild Fire
- Landslide
- Dam Inundation
- Volcano
- Epidemic
Technological Hazards Considered

- Electrical Failure
- Generator Failure
- Transportation Failure
- Fuel Shortage
- Natural Gas Failure
- Water Failure
- Sewer Failure
- Steam Failure
- Fire Alarm Failure
- Communications Failure
- Medical Gas Failure
- Medical Vacuum Failure
- HVAC Failure
- IT System Failure
- Fire, Internal
- Flood, Internal
- HAZMAT, Internal
- Supply Shortage
- Structural Damage
Human Related Hazards Considered

- Mass Casualty, Trauma
- Mass Casualty, Infectious
- Bio-Terrorism
- VIP Casualty/Patient
- Infant Abduction

- Hostage Situation
- Civil Disturbance
- Labor Action
- Forensic Admission
- Bomb Threat
Hazardous Materials Hazards Considered

- Mass Casualty HAZMAT (over 5 victims)
- Mass Casualty HAZMAT (less than 5 victims)
- Chemical Exposure, External
- Small-Medium Internal HAZMAT Spill
- Large Internal HAZMAT Spill
- Terrorism, Chemical
- Radiologic Exposure, Internal
- Radiologic Exposure, External
- Terrorism, Radiologic
### HAZARD AND VULNERABILITY ASSESSMENT TOOL
#### NATURALLY OCCURRING EVENTS

<table>
<thead>
<tr>
<th>EVENT</th>
<th>PROBABILITY</th>
<th>SEVERITY = (MAGNITUDE - MITIGATION)</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HUMAN IMPACT</td>
<td>PROPERTY IMPACT</td>
</tr>
<tr>
<td></td>
<td>Likelihood this will occur</td>
<td>Possibility of death or injury</td>
<td>Physical losses and damages</td>
</tr>
<tr>
<td>SCORE</td>
<td>0 = N/A</td>
<td>1 = Low</td>
<td>2 = Moderate</td>
</tr>
<tr>
<td>Hurricane</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Tornado</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Severe Thunderstorm</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Snow Fall</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Blizzard</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Ice Storm</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Earthquake</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Tidal Wave</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Recommended HVA Process

- The HVA should be a consensus document reflecting the collected wisdom at least 4-5 people.
- Distribute it ahead of time so people can mull on it.
- Work through each page, then re-evaluate the whole, once the summary page is done.
- Simplify the summary results
- Forward it to leadership, noting that it will be the future basis for plans, training, etc.
- Communicate it internally – up, down, across
- Check against training, purchasing, leases, etc.
Benchmarking

- The quality and credibility increases with benchmarking
- Compare it through industry associations.
- Compare it through professional associations. (local professional assn chapter?)
- Compare it assessments by local or County Offices of Emergency Preparedness.
# Hazard and Vulnerability Assessment Tool

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<td>0 = N/A</td>
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<td>2 = Moderate</td>
</tr>
<tr>
<td>Hurricane</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Tornado</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Severe Thunderstorm</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Snow Fall</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Blizzard</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ice Storm</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>Earthquake</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Tidal Wave</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Temperature Extremes</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Drought</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Flood, External</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wild Fire</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Landslide</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dam Inundation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Volcano</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Epidemic</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>AVERAGE SCORE</strong></td>
<td><strong>0.88</strong></td>
<td><strong>0.69</strong></td>
<td><strong>0.75</strong></td>
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</table>
### Example Summary Report – Part I

#### SUMMARY OF MEDICAL CENTER HAZARDS ANALYSIS

<table>
<thead>
<tr>
<th>Natural</th>
<th>Technological</th>
<th>Human</th>
<th>Hazmat</th>
<th>Total for Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.29</td>
<td>0.16</td>
<td>0.30</td>
<td>0.26</td>
</tr>
<tr>
<td>Severity</td>
<td>0.21</td>
<td>0.13</td>
<td>0.31</td>
<td>0.27</td>
</tr>
<tr>
<td>Hazard Specific Relative Risk:</td>
<td>0.06</td>
<td>0.02</td>
<td>0.09</td>
<td>0.07</td>
</tr>
</tbody>
</table>

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#### Hazard Specific Relative Risk to Medical Center

- **Natural**
- **Technological**
- **Human**
- **Hazmat**

![Graph showing relative risk to medical center](image-url)
## A Simple Data Summary

### 2007 Hazard Vulnerability Assessment

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Relative Risk</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>83%</td>
<td>#1</td>
<td>Earthquake</td>
</tr>
<tr>
<td>33%</td>
<td>#2</td>
<td>Wildfires</td>
</tr>
<tr>
<td>30%</td>
<td>#3</td>
<td>Epidemic</td>
</tr>
<tr>
<td>19%</td>
<td>#4</td>
<td>Mass Casualty (Medical/Infectious)</td>
</tr>
<tr>
<td>19%</td>
<td>#5</td>
<td>Terrorism (biological)</td>
</tr>
<tr>
<td>15%</td>
<td>#6</td>
<td>Civil Disturbance</td>
</tr>
<tr>
<td>15%</td>
<td>#7</td>
<td>Information Systems Failure</td>
</tr>
<tr>
<td>13%</td>
<td>#8</td>
<td>Radiologic Exposure, Internal</td>
</tr>
<tr>
<td>13%</td>
<td>#9</td>
<td>Hostage Situation</td>
</tr>
<tr>
<td>13%</td>
<td>#10</td>
<td>Mass Casualty, Trauma</td>
</tr>
</tbody>
</table>
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Contact Information

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