

# A System for Hazard Vulnerability Assessment

Dale Thompson

Threat Assessment Manager



**KAISER PERMANENTE®**

# Hazard Vulnerability Assessment (HVA)

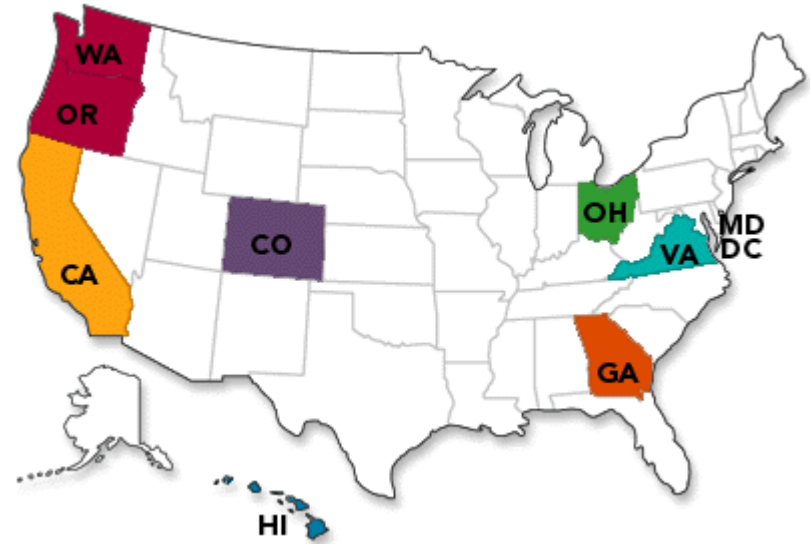
- Where and how are you spending your time and \$ to reduce, eliminate, or control risks to your business?
- Are you distributing those assets in the same proportion as the relative risks they represent?
- Does your Boss have the same opinion of relative risks that you do?
- Do your peers have the same 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?

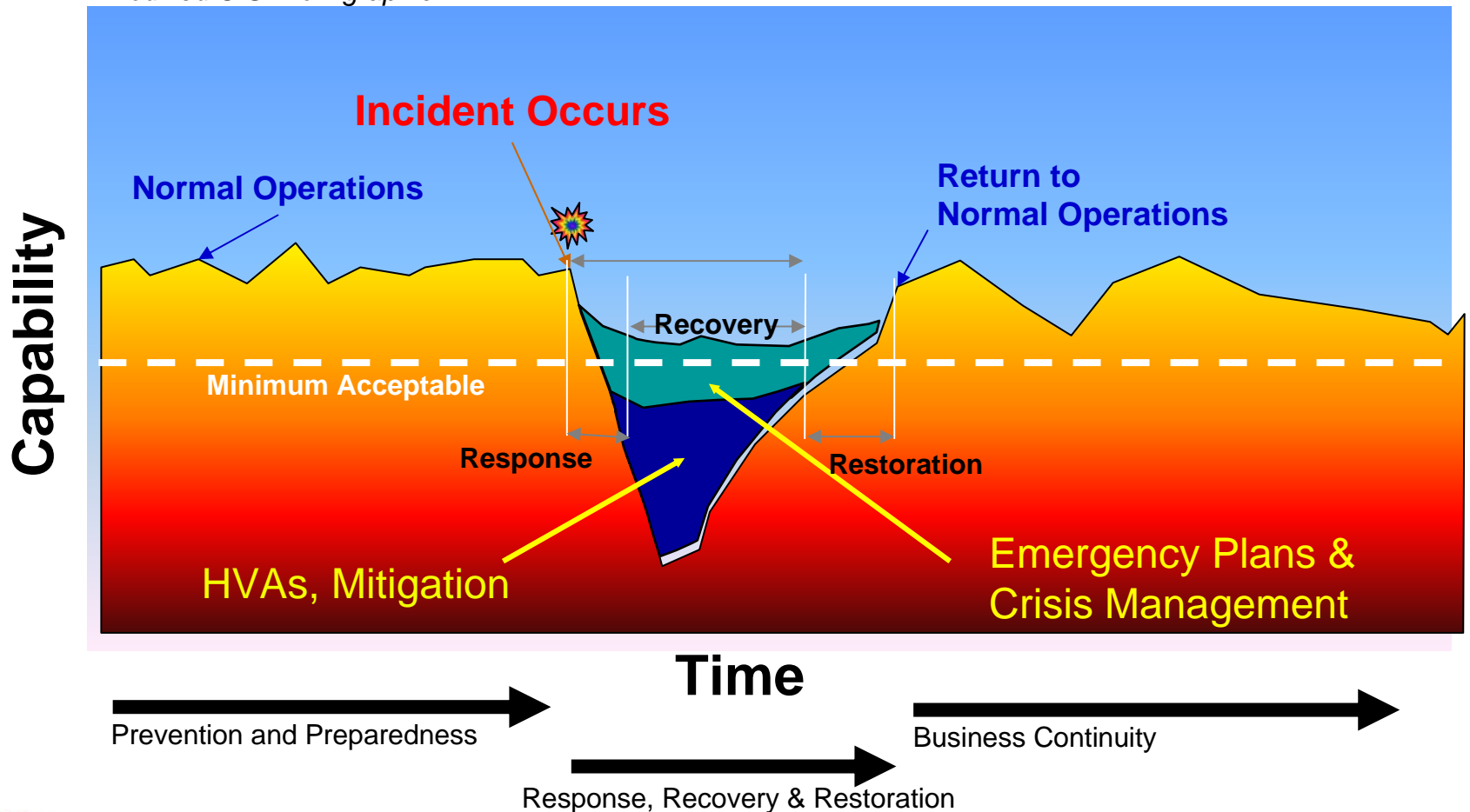
- Healthcare – required since late 90's
- Defense against “Ready, Fire, Aim”
- Effective tool to communicate to leaders, staff, customers, regulators
- Defines “risk” – arbitrary but clear
- Comprehensive – considers all hazards
- Provides a metric to trend preparedness

# 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

*modified U.S. DoD graphic*





# 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

Adobe Acrobat - [WCR.WCR.Adult.Medicine.20020925.pdf]

File Edit Document Tools View Window Help

101%

Bookmarks

- Cover Page
- Table of Contents Summary
- 1- Section 1 - Recovery Plan Overview
- 2- Section 2 - Recovery Team Leader Job Action Sheet
- 3- Section 3 - Recovery Team Leader Task Lists
- 4- Section 4 - Recovery Resources Report
- 5a- Section 5a - Recovery Strategy Elements Report
- 5b- Section 5b - BIA Findings Report

## Walnut Creek Adult Medicine Department Recovery Plan

Department  
Recovery Time Objective  
**< 3 Days**

### 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

1

1 of 64 8.5 x 11 in

# 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

# HVA Template Sample Page

## HAZARD AND VULNERABILITY ASSESSMENT TOOL NATURALLY OCCURRING EVENTS

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)			PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT				
	<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>
<b>SCORE</b>	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%
Tornado								0%
Severe Thunderstorm								0%
Snow Fall								0%
Blizzard								0%
Ice Storm								0%
Earthquake								0%
Tidal Wave								0%

# 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

## NATURALLY OCCURRING EVENTS



EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	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	1	0	1	0	0	0	0	2%
Tornado	0	0	0	0	0	0	0	0%
Severe Thunderstorm	1	1	1	1	0	1	1	9%
Snow Fall	0	0	0	0	0	0	0	0%
Blizzard	0	0	0	0	0	0	0	0%
Ice Storm	0	0	0	0	0	0	0	0%
Earthquake	3	3	3	3	2	2	2	83%
Tidal Wave	1	0	1	0	0	0	0	2%
Temperature Extremes	1	1	1	2	0	1	1	11%
Drought	1	1	1	1	0	1	1	9%
Flood, External	1	1	1	1	0	1	1	9%
Wild Fire	2	1	2	3	1	1	1	33%
Landslide	1	1	1	1	0	1	1	9%
Dam Inundation	0	0	0	0	0	0	0	0%
Volcano	0	0	0	0	0	0	0	0%
Epidemic	2	2	0	2	2	1	1	30%
<b>AVERAGE SCORE</b>	<b>0.88</b>	<b>0.69</b>	<b>0.75</b>	<b>0.88</b>	<b>0.31</b>	<b>0.56</b>	<b>0.56</b>	<b>6%</b>

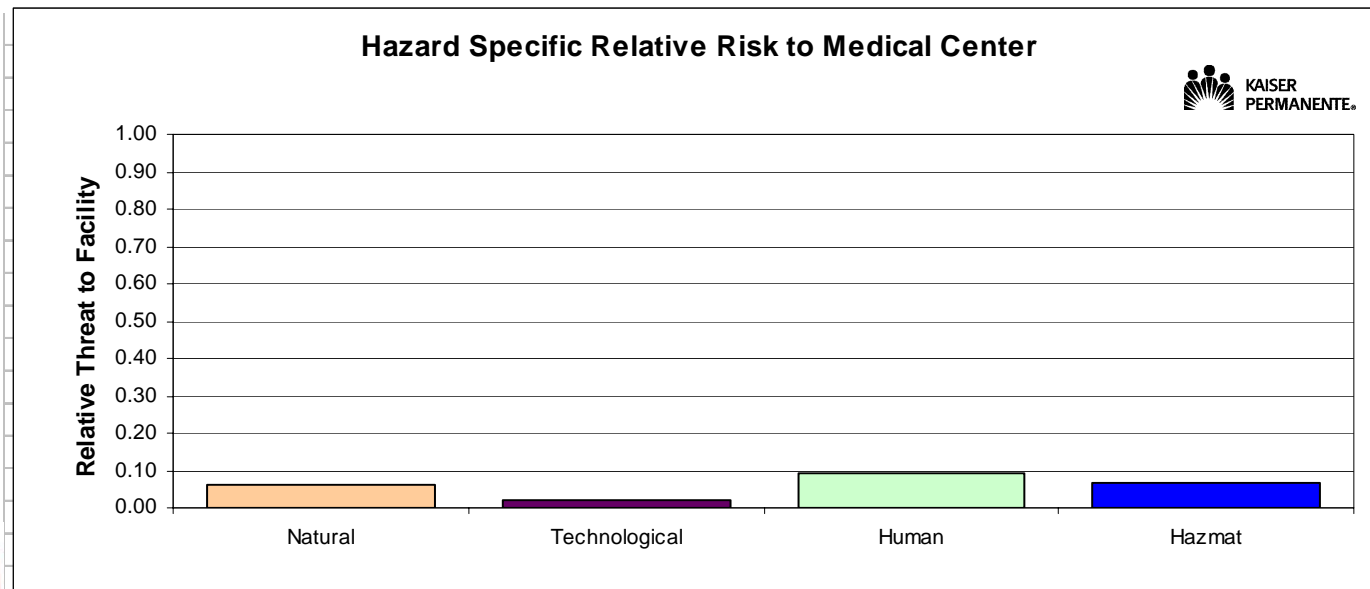
# Example Summary Report – Part I



KAISER  
PERMANENTE®

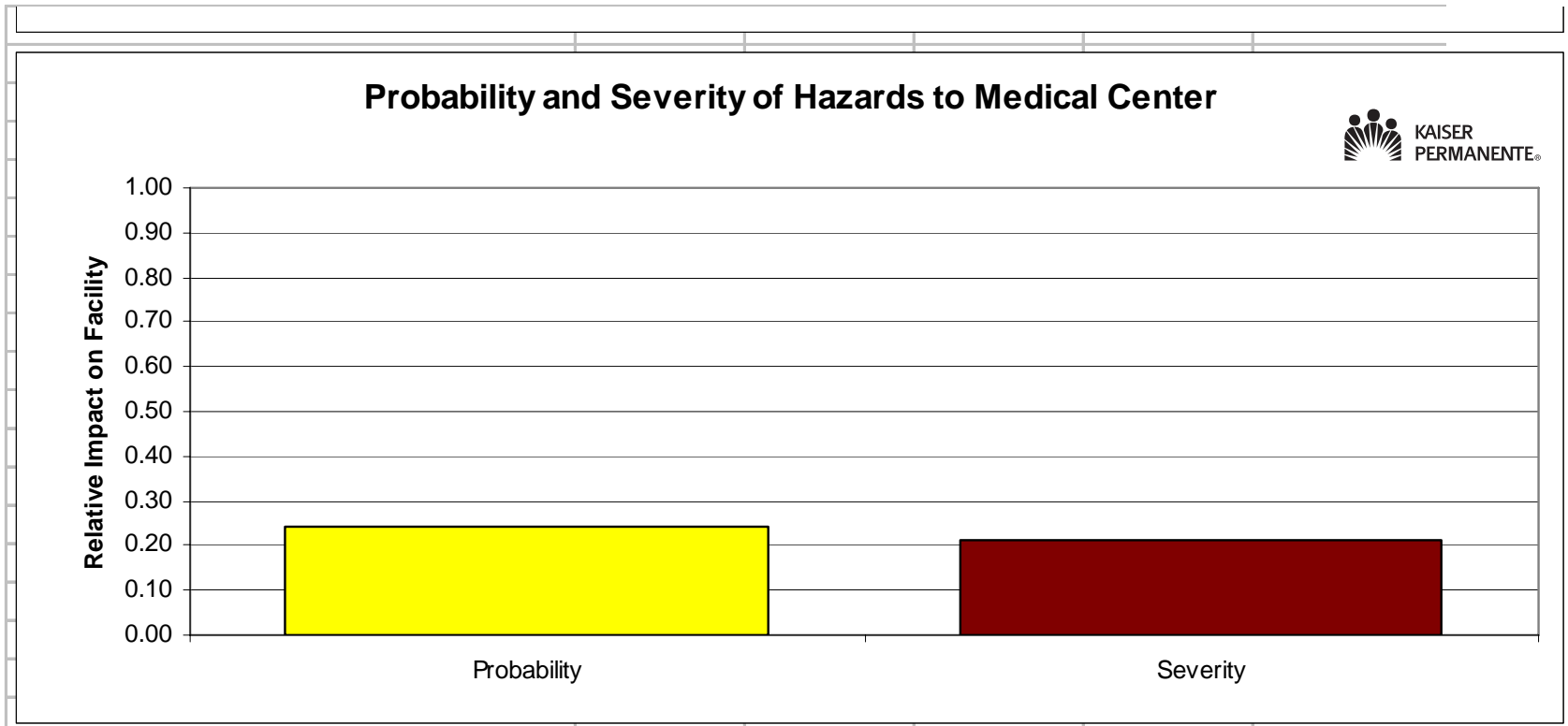
## SUMMARY OF MEDICAL CENTER HAZARDS ANALYSIS

	Natural	Technological	Human	Hazmat	Total for Facility
Probability	0.29	0.16	0.30	0.26	0.24
Severity	0.21	0.13	0.31	0.27	0.21
<b>Hazard Specific Relative Risk:</b>	<b>0.06</b>	<b>0.02</b>	<b>0.09</b>	<b>0.07</b>	<b>0.05</b>





# Example Summary Report – Part II



# A Simple Data Summary

2007 Hazard Vulnerability Assessment		
Ranking	Relative Risk	Type
83%	#1	Earthquake
33%	#2	Wildfires
30%	#3	Epidemic
19%	#4	Mass Casualty (Medical/Infectious)
19%	#5	Terrorism (biological)
15%	#6	Civil Disturbance
15%	#7	Information Systems Failure
13%	#8	Radiologic Exposure, Internal
13%	#9	Hostage Situation
13%	#10	Mass Casualty, Trauma

# 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

# Contact Information

## Dale Thompson

Threat Assessment Manager

Kaiser Permanente

Email: [Dale.L.Thompson@kp.org](mailto:Dale.L.Thompson@kp.org)

Phone: 619-516-6228