Homeland Defense & Security
Information Analysis Center

Critical Infrastructure Resilience

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Homeland Defense & Security
Information Analysis Center

Overview – Infrastructure Resilience

HDIAC

Homeland Defense & Security
Information Analysis Center

Commercial Facilities

Defense Industrial Base

Energy

Nuclear Reactors, Materials, and Waste

Communications

Emergency Services

Financial Services

Food and Agriculture

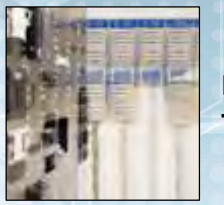
Transportation Systems

Chemicals

Dams

Government Facilities

Healthcare and Public Health



Information Technology

Water and Wastewater Systems

Critical Manufacturing

Resilience: The ability to reduce the magnitude and/or duration of disruptive events

Effectiveness of a resilient infrastructure or enterprise depends upon its ability to:

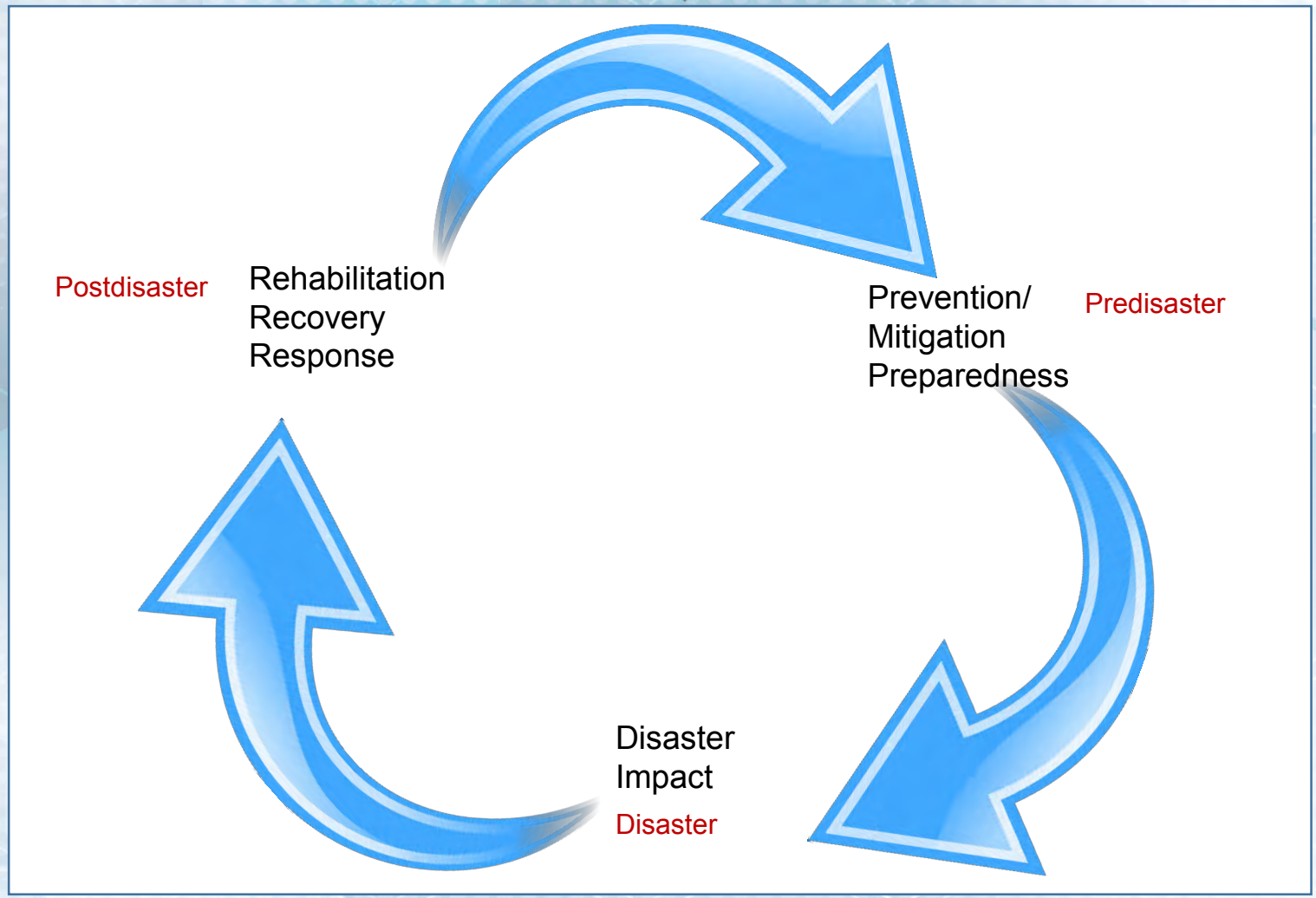
- Anticipate,
- Absorb,
- Adapt to, and/or
- Rapidly recover

from a potentially disruptive event

National Infrastructure Advisory Council, Critical Infrastructure Resilience Final Report and Recommendations, 2009

Why is this Important?

- Disasters – natural, technological
- Security
- Wear and tear
- Obsolescence
- Hacking



Adapted from: Malilay J, The Role of Applied Epidemiology Methods in the Disaster Management Cycle, *AJPH*, 2014

Mitigation Strategies

- Technologies
  - Sensors
  - Advanced materials
  - Big data/analytics
  - Smart grid
  - Cyber
- Risk Management
  - New frameworks
  - Community resilience
  - Assessments
- Education
- Policy Development

Adapted from: Nichols G., The Potential for Nanotechnology to Improve Community Resilience through Better Building Materials, Sensors, an Medical Applications, *Nano Research & Applications*, 2015

Community Resilience: A measure of the sustained ability of a community to utilize available resources to respond to, withstand, and recover from adverse situations

http://www.rand.org/topics/community-resilience.html

Six-Step Process to Planning for Community Resilience

1. Form a collaborative team
2. Understand the situation
3. Determine goals and objectives
4. Plan development
5. Plan preparation, review, and approval
6. Plan implementation and maintenance

NIST, Community Resilience Planning Guide, https://www.nist.gov/el/resilience/community-resilience-planning-guide

Resilience assessments strive to address:

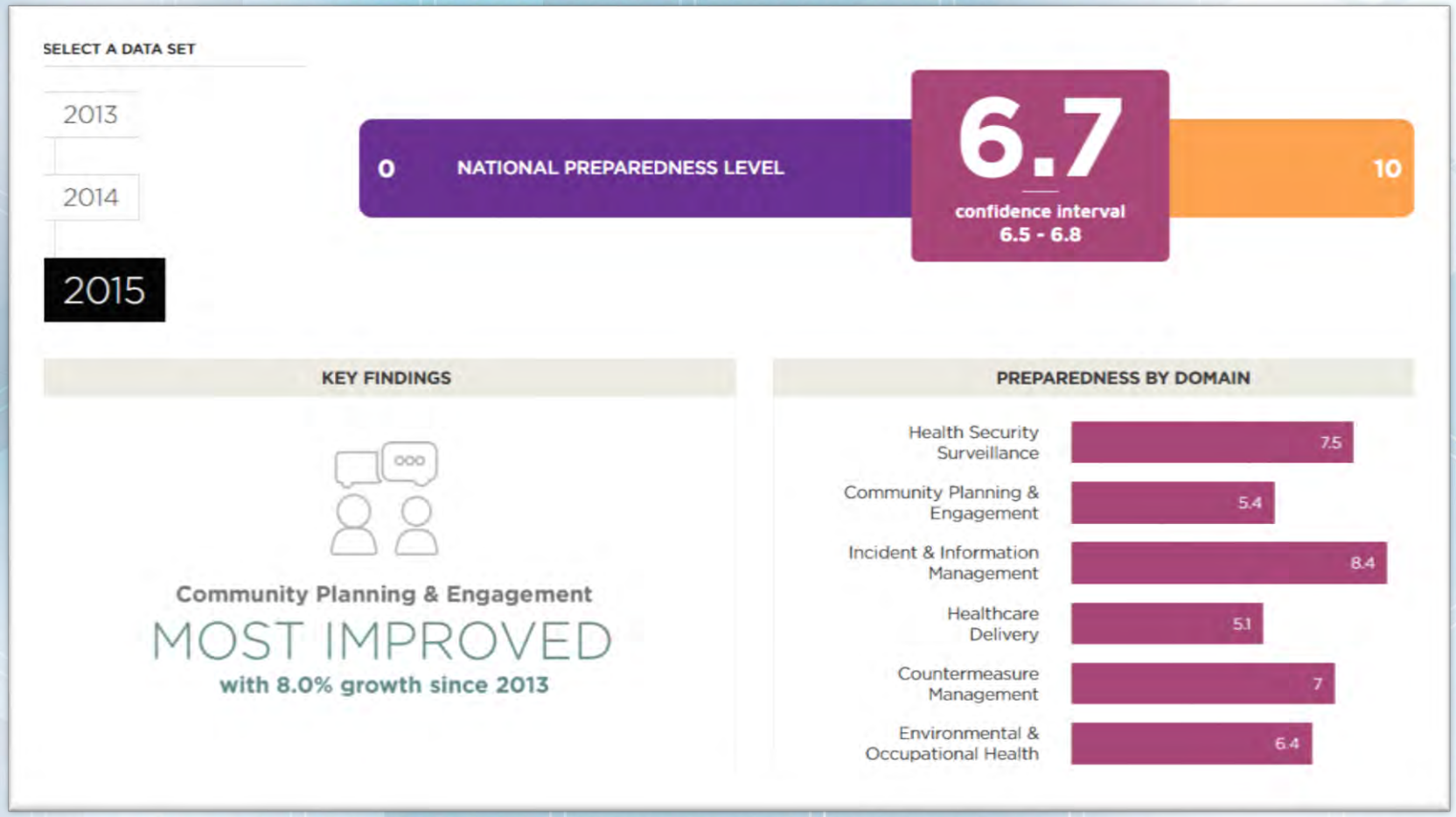
1. How community leaders know the level of resilience of the community
2. If changes implemented to improve community resilience are making a significant difference

PEOPLES Framework

P – Population and demographics
E – Environment/Ecosystem
O – Organized governmental services
P – Physical Infrastructure
L – Lifestyle and community competence
E – Economic development
S – Social-cultural capital

Gilbert et al., Community Resilience Economic Decision Guide for Buildings and Infrastructure Systems, 2015

Renschler et al., A Framework for Defining and Measuring Resilience at the Community Scale: The PEOPLES Resilience Framework, 2010



National Health Security Preparedness Index - http://nhspi.org/

INFRASTRUCTURE GRADES FOR 2013

ENERGY	D+	SCHOOLS	D
PUBLIC PARKS & RECREATION	C-	TRANSIT	D
ROADS	D	RAIL	C+
PORTS	C	INLAND WATERWAYS	D-
BRIDGES	C+	AVIATION	D
WASTEWATER	D	SOLID WASTE	B-
LEVEES	D-	HAZARDOUS WASTE	D
DRINKING WATER	D	DAMS	D

AMERICA'S G.P.A. **D+**

ESTIMATED INVESTMENT NEEDED BY 2020: **$3.6 TRILLION**

American Society of Civil Engineers, 2013 Report Card for America's Infrastructure, http://www.infrastructurereportcard.org/executive-summary/

Presidential Policy Directive – 21

Advances a national unity of effort to strengthen and maintain secure, functioning, and resilient critical infrastructure

Three strategic imperatives shall drive the Federal approach to strengthen critical infrastructure security and resilience

1. Refine and clarify functional relationships across the Federal Government to advance the national unity of effort to strengthen critical infrastructure security and resilience;
2. Enable effective information exchange by identifying baseline data and systems requirements for the Federal Government; and
3. Implement an integration and analysis function to inform planning and operations decisions regarding critical infrastructure

Presidential Policy Directive – Critical Infrastructure Security and Resilience, https://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil

"It is important to recognize the potential for lessons learned and what can be done moving forward to improve the resilience of the system.

Above all, a frequent theme by participants was simply the importance of planning—communication and action protocols are critical…"

NAS, The Resilience of the Electric Power Delivery System in Response to Terrorism and Natural Disasters: Summary of a Workshop, 2013

Technical Inquiry Service

HDIAC provides up to 4 free hours of information services:

- Literature searches
- Product/document requests
- Analysis within our eight focus areas – *Alternative Energy, Biometrics, CBRN Defense, Critical Infrastructure Protection, Cultural Studies, Homeland Defense and Security, Medical, Weapons of Mass Destruction*

Core Analysis Task (CAT)

Challenging technical problems requiring more than 4 hours of research, can be solved by initiating a CAT:

- Pre-competed, pre-awarded, contract vehicles
- Work can begin on a project approximately two months after the statement of work has been approved
- Cap of $500,000
- Must be completed in less than 12 months

For more information: https://www.hdiac.org/technical_services

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