

Public Health Preparedness Research

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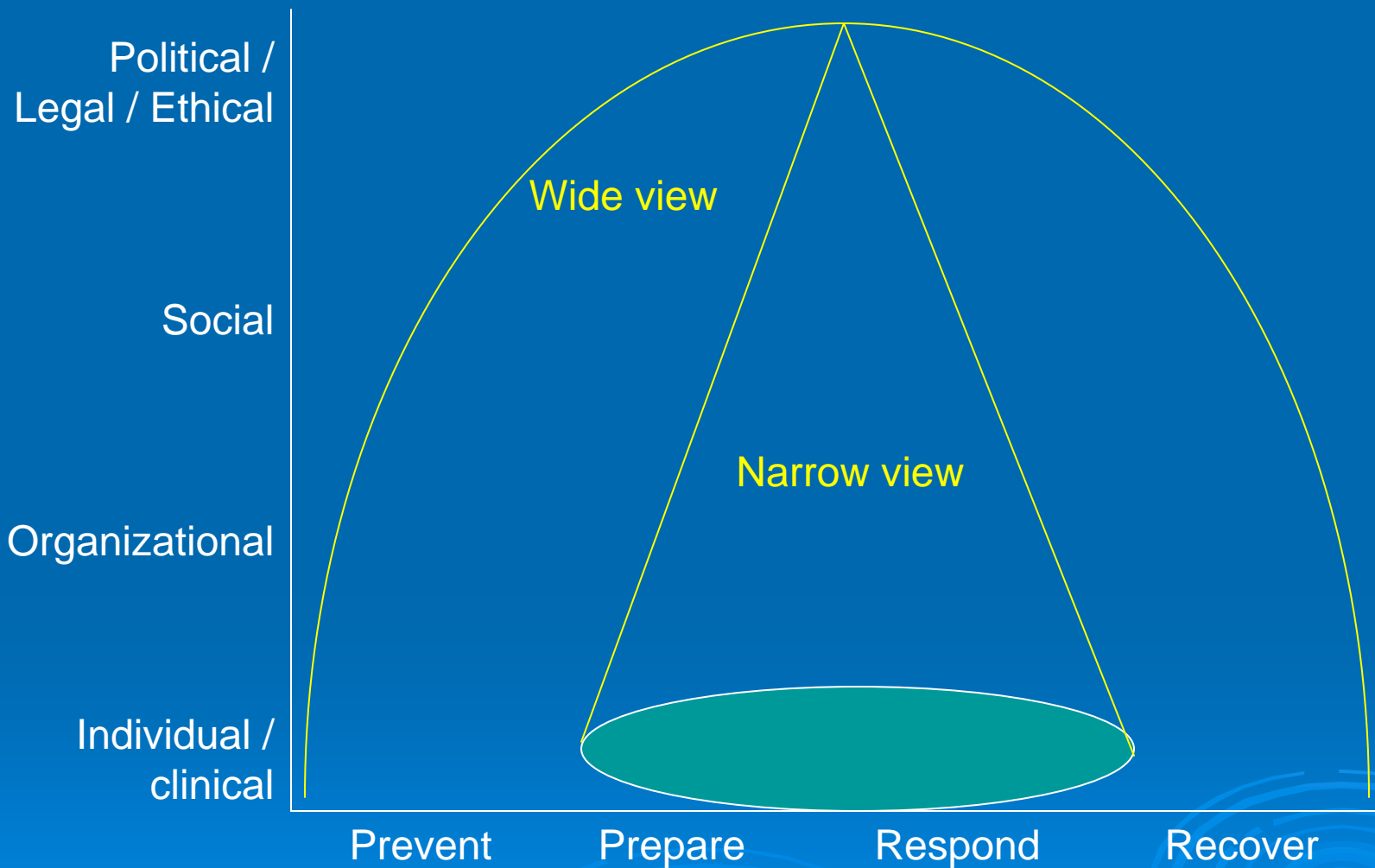
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Review of Public Health Preparedness Literature

- Covering years 2002 – 2007
- Medline + PubMed databases + *Prehospital & Disaster Medicine*
- Excluded editorials, abstracts
- 303 articles identified
- Coded research **method**: survey, case study, secondary data analysis, quasi-experimental / observational, etc.
- Coded research **objective**: descriptive, policy analysis or development, epidemiological, process or impact evaluation, hypothesis-driven, needs assessment
- Characterized each article by **hazard phase**: prevention / mitigation, preparedness, response, short- or long-term recovery
- Characterized by **unit of analysis / ecological level**: individual or clinical, organizational, social, legal or political

Findings

- More “editorial” than empirical
- One third were commentary or reviews, one quarter were case studies
- Most were descriptive or related to organizational or policy development (or protocols)
- Over 40% focused on organizational behavior during the preparedness or response phases
- It appeared that the literature was following the funding (evaluation of exercises, protocol and competency development, convenience survey samples)...
- ...and experiential reports of disasters



What is Public Health Preparedness Systems Research?

- **Public health** = formal organizations and activities, informal partnerships, and legal structures to assure a population's health
- **Preparedness** = range of activities that prepare individuals, organizations, and communities to prevent, mitigate, respond to or recover from a disaster
- **Systems** = represented by the potential integration, coordination, and interaction of various providers, agencies, command structures, and functional activities, internal and external to clinical and population health sectors
- **Research** = systematic accumulation of generalizable knowledge

Overarching research frames

- What are the (1) observed and (2) optimal disaster-related behaviors of organizations, providers (clinical / public health / emergency managers), individuals, and political actors?
- What are the specific vulnerabilities of organized response systems, populations, and policies?
- What are the optimal means for obtaining and disseminating information related to detection / surveillance, risk communication, and decision-making?
- What prevention, mitigation and preparedness factors are associated with optimal response outcomes, recovery outcomes, and resiliency outcomes?

Research building blocks

- Standardized preparedness, vulnerability, and hazard measures (similar to ICD-10 or DRG coding)
- Database of public health disasters
 - Similar to WHO EM-DAT maintained by the Centre for the Epidemiology of Disasters (CRED) in Belgium
 - Similar to U Delaware's Disaster Research Center case series of disasters
- Stable long-term research funding

Public Health Preparedness Research Funding

- Examined funding from DHHS TAGGS database (Tracking Accountability in Government Grants System) for 2005-2007
- Keyword search on *preparedness, response, disaster, emergency, Katrina, resiliency, readiness, pandemic, terrorism, or crisis*
- Over \$8 billion identified (including health, security, and recovery services)
- \$28.7 million total distributed in scientific research, less than 1% of total disbursement
 - \$589k distributed by AHRQ
 - \$2.0 million distributed by CDC
 - \$26.1 million distributed by NIH

Elements of Public Health relevant to preparedness research

- In the 1988 IOM report, *The Future of Public Health*, authors wrote that PH is led by knowledge (science) and values (politics + social interests)
- Public health agencies operate through direct services and by regulating and facilitating other sectors' work
- Public health practice works...
 - Vertically, along command structures such as ICS and federalist relations
 - horizontally (collaborative problem-solving with other agencies, providers, and communities)
 - along each level of ecological hierarchy (individual to clinical to organizational to social to political / ethical / legal realms)

A Case Study of a Research Question

- What are the unanticipated consequences of non-pharmaceutical interventions secondary to a pandemic flu?
- Data sources
 - Research literature and policy documents
 - Focus groups
 - Key informant panels + pre/post tabletop “labs”
 - Historical hazard data
 - RDD phone survey with sub-population oversampling
- Analytical methods
 - Qualitative data analyses (grounded theory)
 - Survey data analysis
 - Impact analyses of tabletop data
 - Operations research modeling (robust optimization models)

Chain of effects

- Primary effects of a pandemic flu outbreak
 - Specific mortality & morbidity attributable to influenza virus
 - Initiation of public health pan flu protocols
 - Medical/pharmaceutical: vaccination, antiviral medication
 - Non-pharmaceutical interventions: respiratory and hand hygiene, social distancing, increased surveillance, quarantine & isolation, closure of schools and points of mass assembly, workforce shifts
- Secondary effects (the “unanticipated consequences”)
 - Health system congestion, disruption of preventive / primary / and chronic care
 - Quality of life shifts as a consequence of NPI’s + direct effects
 - Potential social disorder

Literature review

- Critical infrastructure loss / disruption
 - Workforce degradation
 - Access barriers
 - Domino effects (e.g., electric leads to water pump failure)
- Social behavior during pandemic / catastrophe
 - Generally adaptive and problem-focused
 - Pro-social rather than anti-social behavior is normative
- Health and social consequences of crowding and health system congestion
 - Unattended chronic care consequences
 - Potential for stigmatization and mental health sequelae
- School closures
 - Nutritional consequences (disruption of free lunch program)
 - Educational consequences (grade promotion, maintaining standards)
 - Unsupervised children (increase in risky and criminal behaviors)

Transportation Policy Review

- Documents retrieved and compared from 7 major US cities (Atlanta, Chicago, Miami, Portland OR, Seattle, SF, DC) and 6 international cities (London, Madrid, Mumbai, HK, Tokyo, Toronto)
- Criteria for comparison included:
 - Closing/curtailment policies
 - Sanitizing or disinfecting transit environment
 - Promoting social distancing on rapid transit
 - Restricting or surveillance of passenger vehicle traffic
 - Stockpiling and/or securing transit authority supply chain
 - Public communication prior to and during crisis

Community-based focus groups

- Conducted in 6 ethnically diverse NYC neighborhoods
 - 4 in English, 1 in Mandarin Chinese, 1 in Spanish
 - Homogeneous groups included Chinese, Dominican, African-American, Jamaican/Caribbean, Greek, and Indian/Bengali
- Research focused on perceptions of neighborhood quality of life and adaptation during a pandemic, and potential response to NPI's
 - Additional focus on trusted messengers and messages
 - Cultural beliefs and “worldviews”

Focus Group Findings

- Communities vary in trust and dependency on government, and in strength of social networks
 - Chinese community expects government to provide staples
 - Black community concerned about civic unrest
 - Jamaican and Indian communities reported strong networks, with the latter mentioning connections to medical professionals
 - All seemed reasonably optimistic about negligible impact of long-term school closures or workforce interruptions
- Trusted media varied considerably by group, although most agreed on absence of a common “face” or “voice” for local public health

H5N1 local outbreak

Locality Initiates Pan Flu NPI's

1st Order

Schools close

Home isolation recc'd

Inter-city transit curtailed

Public assembly curtailed

Health systems re-configure

Workforce shifts

2nd Order

Retail markets close or curtail

Congestion in health care system

Social isolation

Crowding in home and neighborhood, decrease in structured / supervised activity

Resources depleted and scarce (inc. \$\$\$)

Degradation in support for high-risk pops (e.g., institutionalized, homebound, opiate users, etc)

Critical infrastructure degraded

Outcomes

Non-flu morbidity/mortality

Inter-personal violence

High-risk behaviors (drug use, unsafe sex)

Black markets for staples, meds, contraband

Economic productivity

Mental health consequences: depression, stigma, etc

Research challenges

- Multi-year (community-based research is time-consuming and labor-intensive)
 - Difficult to sustain funding
- Multi-disciplinary
 - Epidemiology, sociology/survey research, operations research & mathematical modeling, policy analysis