FRIEND OR FOE? THE RELATIONSHIP OF INTERLOCAL COLLABORATION AND EMERGENCY PREPAREDNESS

By
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Abstract

Background

Horizontal intergovernmental coordination, or interlocal collaboration, is an ongoing strategy to enhance U.S. emergency preparedness. The Urban Area Security Initiative (UASI) grant program, administered by the Federal Emergency Management Agency since 2003, has provided 64 high-risk metropolitan areas funding to enhance their interlocal preparedness capabilities. As preparedness funding begins to dwindle, it is important to understand how interlocal collaboration relates to emergency preparedness, how federal homeland security dollars contribute to such an association, and how emergency preparedness exercises can be used to enhance and assess interlocal collaboration.

Methods

A cross-sectional on-line survey was developed and administered in late 2013 to points of contact from FFY2010-funded UASI regions. Summary statistics were calculated to describe the current informal and formal regional collaboration infrastructure. Additionally, rates of agreement with eight collaborative preparedness statements at three time points were collected in the cross-sectional survey, and analyzed for changes over time.

In early 2014, key informants (KIs), knowledgeable about the UASI program, were interviewed. An initial, purposive sample of KIs was identified in coordination with practice-based partners. A snowball sampling strategy was subsequently employed until data saturation was attained. Interviews were recorded, transcribed, coded, and iteratively analyzed.

Results

Forty-nine (77.8%) FFY2010 UASI regions responded to the survey. UASIs reported engaging in collaborative activities and investments to build capabilities, and conducting assessments of their capabilities at the UASI regional level. Collaborative relationships in preparedness among emergency managers and municipal chief executive officers improved during the FFY2010 UASI performance period compared to the pre-UASI award period, with lasting effects among urban areas with discontinued funding.

Twenty-eight KIs were interviewed during 24 interviews. Impacts, barriers, incentives, facilitators, and disadvantages to interlocal collaboration were identified. The UASI program was thought to have a profound and unique impact on the association of interlocal collaboration and national preparedness. KIs felt exercises could enhance interlocal collaboration through seven distinct mechanisms. Exercise design characteristics to promote interlocal collaboration were identified.

Conclusions

Interlocal collaborations contribute to overall national preparedness. Grant programs, such as the UASI, as well as exercise programs, can be used to incentivize, foster, and evaluate preparedness-related interlocal collaboration.

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Introduction

An overview of emergency preparedness and interlocal collaboration

Public health emergency preparedness is the discipline of public health that deals with preparing for and responding to the public health consequences of disaster. It has been defined as *"the capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities. Preparedness involves a coordinated and continuous process of planning and implementation that relies on measuring performance and taking corrective action."*[1] Although the mantra "every disaster is local" continues to guide emergency preparedness practice, this definition implies that an affected area will need to look beyond its borders to ensure efficient and effective disaster response and recovery.

Horizontal intergovernmental collaboration – also known as interlocal collaboration, cross-jurisdictional collaboration, or regionalization – for emergency preparedness purposes has the potential to promote timely and efficacious response and recovery to disaster events that overwhelm an individual municipality.[2] In fields other than emergency management, regionalism has been shown to be cost-effective, for example, by promoting resource sharing and reducing duplicative efforts.[3] The need for regional collaboration among neighboring jurisdictions has been driven by local governments, and coincides with an increase in attention to interlocal collaboration in the public administration sector.[3]

Interlocal collaboration is routinely practiced within U.S. emergency preparedness. In a 2004 survey of U.S. state public health preparedness directors, 39 of 44 respondents reported subdividing their intrastate preparedness programs into regions, over half of which were created after the terrorist attacks of September 11, 2001.[4] In 2013, the National Association of County and City Health Officials surveyed 2,532 local health departments (LHDs) across 48 states with an overall response rate of 79%. After weighting to account for sampling/dissimilar non-response, the study found that 52% of LHDs were engaging in cross-jurisdictional sharing of resources. The highest percent of LHDs reported cross-jurisdictional sharing of resources among LHDs in emergency preparedness (35%) compared to all programmatic areas and organizational functions reported.[1,4]

The Federal Emergency Management Agency (FEMA) supports multi-disciplinary interlocal collaboration in preparedness through its Urban Area Security Initiative (UASI) grant program. From 2003 until 2014, the UASI grant program awarded approximately $8 billion in grant funds to 64 geographically diverse U.S. high-threat, high-density urban areas [5-8] to enhance preparedness by building and sustaining the core capabilities outlined in the 2011 National Preparedness Goal [6,9] using a regional approach [10] (Figure I.1). Urban areas are selected for UASI participation by assessing their relative risk, accounting for threat, vulnerability, and consequences.[10] The UASI grant requires recipient urban areas to develop a charter outlining membership, governance, and grant administration/funding allocation criteria.[10] Membership in the UASI must include representation from all jurisdictions and disciplines that comprise a region (i.e., the urban area).[10] Starting in December 2012, UASI regions were also required to develop and

annually update a regional Threat and Hazard Identification and Risk Assessment (THIRA).[11] In federal fiscal year (FFY) 2010, the UASI program funded the most metropolitan areas (n=64) in its history, representing 32 U.S. states, the District of Columbia, and Puerto Rico.[5]

An overview of the evidence of interlocal collaboration's impact on preparedness

Despite the government's significant investment and the uptick in severe disasters, it remains unclear if we as a nation are now more prepared.[1] There is still a lack of consensus about what preparedness is and how it should be measured. Some proposed reasons for this discord are: lack of accountability as preparedness is the shared responsibility of the public and private sectors; lack of ability for direct observation due to the relatively infrequent number of disasters occurring in any given location; and insufficient evidence linking process indicators to outcomes.[12] While the effectiveness of certain grant programs has been measured to various degrees, preparedness is the result of a complex convergence of factors; the effectiveness of a single grant does not indicate overall preparedness.[8] Measuring, assessing, and evaluating capabilities in light of changing conditions, various grant programs, and disparate resource levels is a unique and daunting challenge. While several metrics and evaluation/assessment systems have been proposed,[12] none has achieved widespread acceptance or use.

As part of the overall lack of evidence in preparedness science, no systematic or demographically representative assessment of preparedness and the incentives, barriers, facilitators, activities, impacts, and disadvantages of interlocal collaboration as it relates to national emergency preparedness has been conducted. In 2004, the Government

Accountability Office (GAO) reported that regional collaboration could be enhanced by the development of a comprehensive strategic plan with measurable goals and objectives; the presence of a regional organization with interdisciplinary representation; and flexibility in membership requirements, collaboration processes, and areas that have traditionally engaged in collaborations (i.e., other than emergency management).[9] The report proposed that the federal government could support these efforts through grant programs and associated requirements. In 2007, the Department of Homeland Security (DHS) identified "Increasing Regional Collaboration" as the first of its ten homeland security priorities.[10] Despite this increased attention and funding, in 2009 the GAO criticized FEMA for failure to track the effectiveness of the UASI grant program's goal of regional collaboration.[11] In 2011, Congress called on the National Academy of Public Administration (NAPA) to aid FEMA in investigating, developing, and implementing quantifiable homeland security grant performance measures, specifically related to the UASI program.[12] Although regional collaboration is a goal of the UASI grant program,[5,11] NAPA did not develop any performance measures for regional collaboration and instead recommended that FEMA develop a multi-disciplinary team to study this area in the future.[12]

While we are without performance measures or quantitative evidence to suggest the relationship of the UASI grant program with interlocal collaboration or interlocal collaboration with national preparedness, some preliminary evidence about this association does exist. A report published by the National Urban Area Security Association, comprised of UASI grant recipients, attempted to describe grant effectiveness in 2011.[8] The report provided anecdotal evidence about how the grant was

effective, and stated that the mechanism by which it increased regional collaboration was through the development of strategic plans. These strategic plans then led to capability building, which led to national preparedness.[8] In the academic literature, political scientists have examined the impediments to interlocal collaboration in emergency preparedness from a federalism perspective, and have found that incompatible communication equipment, state mandates, federal mandates, local cost-sharing complexities, competition for funding, inconsistent information sharing, political tensions between jurisdictions, and differences in personnel qualifications and trainings are all major deterrents to interlocal collaboration.[13] Another survey of Florida public officials found that horizontal homeland security intergovernmental networks were more extensive and of higher quality in areas where intergovernmental networks were more complex.[3] While regional differences were also identified, the linkage of the quality or breadth of these networks with receipt of UASI or other federal funding was not explored.[3] Another study in Florida found that greater infrastructure vulnerabilities ("number of ports, public airports, nuclear plants, and military installations") and population vulnerabilities ("institutionalized population, population below poverty, lacking English language skills, population density") were positively correlated with the perception that regionalism was an effective strategy in emergency management, but jurisdictions reporting poor-to-fair financial status were less likely to perceive regionalism as an effective strategy .[14] An additional investigation looked at the relationship between interoperability, UASI funds, and governance. The association between UASI funds and interoperability was not statistically significant, but mature governance structures (associated with explicit agreements, evidenced strategic planning,

funding specific to interoperability, and strong leadership) were identified as having a strong positive association with interoperability regardless of UASI dollars received.[15]

Preliminary evidence on the effectiveness of interlocal collaboration in public health emergency preparedness has been demonstrated through a small number of case studies conducted in Massachusetts, northern Illinois, the Washington, D.C. metropolitan area,[16] and Kansas.[17] A comparative look across these case studies (excepting Kansas) found regionalization to be preceded by a variety and combination of impetuses, including to enhance local public health capacity, a perceived need for a coordinated response, or to more efficiently coordinate federal preparedness funding. Activities also varied; some cases identified a focus on developing more formal regional organizations, while others focused on building more informal social networks.[2] Identified benefits of interlocal collaboration in preparedness include increased infrastructure development, improved collaboration and communication, improved organizational functioning, increased resources and efficiency, and improved networking.[16,17] Across all case studies, disadvantages, barriers (e.g., funding, multiple mandates, cultural differences among public health and more operationally focused disciplines, and overlapping regional systems in different disciplines), and issues related to sustainability of interlocal collaboration and preparedness were also revealed, including funding, political concerns (e.g., elected officials' perceptions of loss of budgetary control), and leadership challenges (e.g., issues of trust).[16,17]

In the absence of a real-world emergency, emergency preparedness exercises, or simulated emergencies, may serve to contribute to the evidence base in preparedness.[18] Exercises enable the identification of strengths and weaknesses in preparedness

programs, and help clarify roles and responsibilities among interagency stakeholders in advance of an emergency.[19] Moreover, exercises may improve performance during an actual disaster.[20] As such, exercises may allow for assessment or enhancement of interlocal collaboration in the absence of a large-scale emergency. Further exploration on the use of exercises to improve or assess interlocal collaboration is necessary.

A logic model used to guide this investigation

This study utilizes a modified version of a logic model (Figure I.2) published in the National Academy of Public Administration's report entitled "Improving the National Preparedness System: Developing More Meaningful Grant Performance Measures."[21] A logic model is a visual depiction of the resources available/invested, the activities engaged in, and the short- and long-term goals of a program.[22] This logic model identifies inputs, activities, outputs, and outcomes in National Preparedness. The modifications to this model include replacing the capabilities listed in Activities with the 31 core capabilities released by FEMA in September 2011,[9] defining regional/intergovernmental collaboration as interlocal collaboration, and focusing on the interlocal collaboration output (all other outputs proposed in the original model are excluded in this adaptation). Definitions for the main concepts outlined in the logic model are provided in Table I.1.

This dissertation capitalizes on the assertion that interlocal collaboration occurs as a service throughout the preparedness cycle. It is not the final product, and only a tool that may facilitate the outcome. This study attempts to understand the relationships among those inputs, outputs, and outcomes circled in red on the logic model. In brief, Aim 1 explores how government funding, namely UASI funding, facilitates the output of

interlocal collaboration by identification and exploration of different activities (building and sustaining capabilities). Aim 2 explores how the output of interlocal collaboration is associated with the End Outcomes. And finally, Aim 3 explores how emergency preparedness exercises can assess or enhance the association of the output of interlocal collaboration with the End Outcomes.

The logic model authors describe the inputs, activities, outputs, and outcomes as a non-exhaustive list.[21] This dissertation attempts to confirm the inputs, activities, outputs, and outcomes proposed as they relate to interlocal collaboration, and suggest other relationships. Notably, the logic model defines preparedness as actual incidents prevented, loss of life and property damage avoided or minimized, community recovered, and an understanding of preparedness based on incidents and exercises. This is the definition that is employed throughout this dissertation.

Study aims and research questions

This study addresses three aims to help inform researchers and policy-makers about interlocal collaboration, national preparedness, and associated federal grant funding streams:

Aim 1: Explore infrastructure by which federal Homeland Security funds build or enhance interlocal collaboration.

Research Questions:

A. How have UASI regions formally and informally engaged in interlocal collaboration?

B. How have UASI regions measured interlocal collaboration during real-world incidents/events or exercises?

Aim 2: Understand perspectives of key stakeholders regarding the impact of interlocal collaboration on national preparedness.

Research Questions:

A. Do key stakeholders perceive interlocal collaboration as important for national preparedness?

B. Has the UASI program altered stakeholders' perceived impact of interlocal collaboration on national preparedness?

Aim 3: Understand key stakeholders' perspectives on the role of exercises in the relationship of interlocal collaboration and national preparedness.

Research Questions:

A. Can preparedness exercises serve as a method for improving interlocal collaboration in UASI regions?

B. Can preparedness exercises serve as a method for assessing interlocal collaboration in UASI regions?

Overview of dissertation

This dissertation contains three papers that correspond to each of the three aforementioned study aims. A description of the contents of each paper is provided

below. The dissertation closes with overall conclusions, as well as policy and programmatic recommendations.

Paper 1: *Regional Collaboration Among Urban Area Security Initiative Regions: Results of the Johns Hopkins Urban Area Survey*

Paper 1 describes the results of a cross-sectional online survey, the Johns Hopkins Urban Area Survey Tool (JHUAST), developed in coordination with practice-based partners and administered online from September through December 2013. Points of contact from FFY2010-funded UASI metropolitan areas completed the survey, with a response rate of 77.8% (n=49). Summary statistics were calculated to describe the current informal and formal regional collaboration infrastructure, as well as regional collaboration-related activities and assessment methods, in FFY2010 UASI regions. Additionally, the cross-sectional survey collected rates of agreement with eight collaborative preparedness statements at three time points. The paper concludes that urban areas that received a FFY2010 UASI grant award are engaging in collaborative activities and have established inter-jurisdictional relationships among preparedness stakeholders.

Paper 2: *Interlocal collaboration and emergency preparedness: a qualitative analysis of the impact of the Urban Area Security Initiative program*

Paper 2 describes the qualitative findings of 24 semi-structured interviews conducted with 28 key informants in early 2014. Interviews were used to identify, describe, and characterize perceptions of interlocal collaboration, national emergency preparedness, and the UASI grant. The study concludes that interlocal collaborations contribute to

overall national preparedness. Grant programs, such as the UASI, can incentivize and foster interlocal collaboration in preparedness.

Paper 3: *The use of exercises to enhance and assess interlocal collaboration in preparedness: a qualitative analysis*

Paper 3 describes the qualitative findings of 24 semi-structured interviews conducted with 28 key informants in early 2014. Interviews were used to understand key stakeholders' perspectives about the role of exercises in improving and assessing interlocal collaboration for emergency preparedness. Seven distinct mechanisms by which emergency preparedness exercises were perceived to potentially enhance interlocal collaboration were described. Exercise participants, scenarios, administration, formats, and assessment strategies to promote interlocal collaboration were identified. The study concludes that exercises should be a core component of interlocal preparedness programs.

Tables

Table I.1: Logic Model Definitions [21,22]

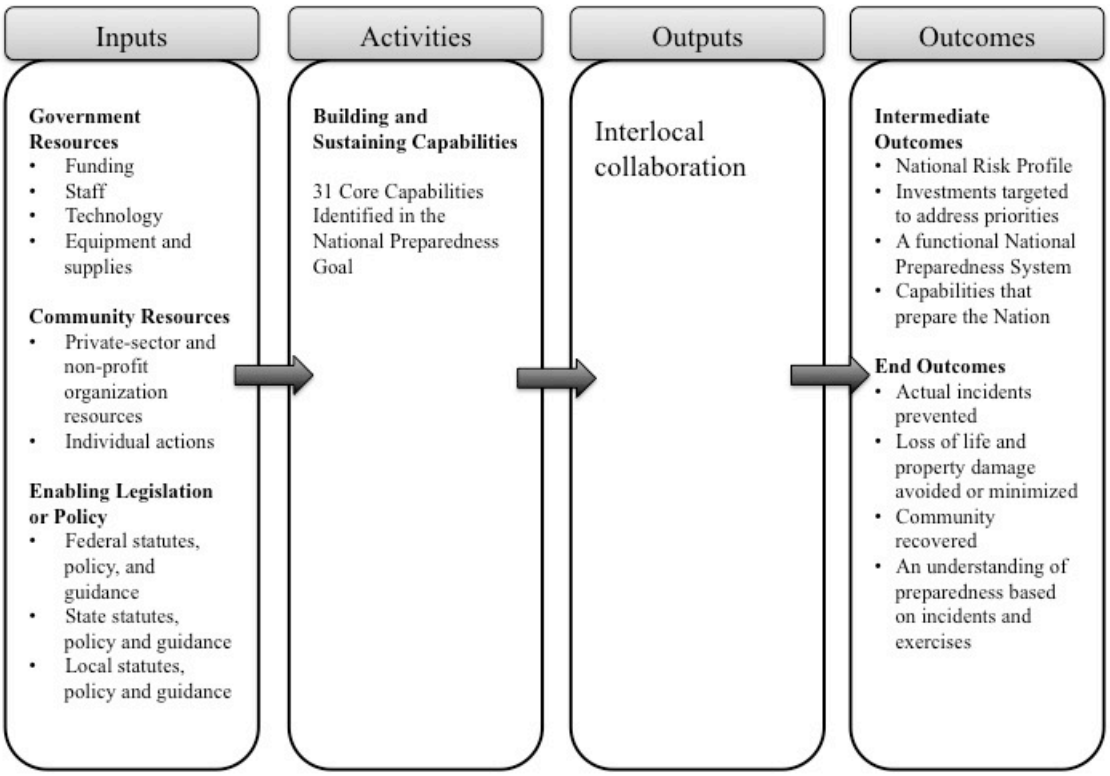
Inputs	Resources used to produce outputs and achieve outcomes
Activities	Programs and services executed
Outputs	Products and services delivered during the reporting period. Outputs do not indicate the results achieved.
Outcomes	Results/accomplishments of work

Figures

Figure I.1: Core Capabilities by Mission Area, as outlined in the 2011 National Preparedness Goal[9]

Prevention	Protection	Mitigation	Response	Recovery
Planning				
Public Information and Warning				
Operational Coordination				
Forensics and Attribution Intelligence and Information Sharing Interdiction and Disruption Screening, Search, and Detection	Access Control and Identity Verification Cybersecurity Intelligence and Information Sharing Interdiction and Disruption Physical Protective Measures Risk Management for Protection Programs and Activities Screening, Search, and Detection Supply Chain Integrity and Security	Community Resilience Long-term Vulnerability Reduction Risk and Disaster Resilience Assessment Threats and Hazard Identification	Critical Transportation Environmental Response/ Health and Safety Fatality Management Services Infrastructure Systems Mass Care Services Mass Search and Rescue Operations On-scene Security and Protection Operational Communications Public and Private Services and Resources Public Health and Medical Services Situational Assessment	Economic Recovery Health and Social Services Housing Infrastructure Systems Natural and Cultural Resources

Figure I.2: National Preparedness Logic Model, adapted from the 2011 National Academy of Public Administration's *Improving the National Preparedness System: Developing More Meaningful Grant Performance Measures*[21]



Methods

As little formative research had been done in the area of interlocal collaboration and national preparedness, this dissertation utilized exploratory methods to develop a more robust framework for future research and practice. The study was divided into two phases that were implemented sequentially. The first phase corresponds with the first study aim and the second phase corresponds with the second and third study aims. The findings from Phase 1 informed the finalization of methods used for the Phase 2.

The Johns Hopkins Bloomberg School of Public Health Institutional Review Board reviewed this study and determined it to be not human subjects research.

The following section describes methods associated with each Phase. Corresponding Aims and Research Questions are reprinted here for convenience.

Phase 1

Aim 1: Explore infrastructure by which federal Homeland Security funds build or enhance interlocal collaboration.

Research Questions:

A. How have UASI regions formally and informally engaged in interlocal collaboration?

B. How have UASI regions measured interlocal collaboration during real-world incidents/events or exercises?

Methods

A brief (12 question) internet-based survey, the Johns Hopkins Urban Area Survey Tool (JHUAST) (Appendix 1), was developed in coordination with practice-

based partners familiar with the UASI program. The survey incorporated questions about structure and funding of regional collaboration among UASI recipient jurisdictions. Respondents were asked about regional collaboration measurement methods, and utilization of regional collaboration strategies during exercises or real-world events.

The survey was administered via SurveyMonkey (SurveyMonkey.com, Portland, OR), and distributed via email (Appendix 2 and 3) to the point(s) of contact for each UASI in September 2013 (n=63). If more than one contact per UASI region existed, one email was sent to all points of contact for that region asking them to coordinate to complete a single survey on behalf of the UASI. All FFY2010 UASI recipient regions were recruited to participate; however, the FFY2010 Miami and Fort Lauderdale UASI areas were combined for the purposes of this investigation secondary to the later consolidation of their individual UASI programs.

Recipients were asked to respond within six business weeks. Three reminder emails were sent to UASI contacts during this period. Incorrect contact information was corrected on an on-going basis. At the conclusion of the six-week period, non-respondents were sent an email allowing an additional two weeks to respond. If after a week they had still not completed the survey, they were sent an additional reminder email. At the expiration of this extension deadline, the study team worked with practice-based partners at the Baltimore City Mayor's Office of Emergency Management to encourage additional responses. The Baltimore UASI Chairman contacted by phone all remaining, non-responding UASI regions for which contact information was available to secure recruitment. The survey was officially closed in December 2013.

Summary statistics were calculated from the survey responses to describe the current informal and formal regional collaboration infrastructure. Additionally, the cross-sectional survey collected rates of agreement with eight collaborative preparedness statements at three time points (i.e., before receipt of any UASI grant award; during the FFY2010 UASI award Performance Period; and after the conclusion of the FFY2010 UASI Performance Period for any metropolitan regions for which UASI funding was discontinued after FFY2010 [UASI regions that continued to receive funding after FFY2010 were asked to abstain from this question, n= 22]). Levels of agreement were collected on a Likert Scale (with 1 indicating strong disagreement, 2 disagreement, 3 neither agreement nor disagreement, 4 agreement, and 5 strong agreement) with a "don't know" option. Mean scores and mean difference in scores across the three time points were calculated for matched pairs in the cross-sectional sample.

For each of the collaborative preparedness statements, a Skillings Mack test was performed to determine if there were differences among any of the three time-specific self-reported scores. While the Skillings Mack test determines significant differences between scores for each collaborative preparedness statement, it does not indicate between which scores the differences exist. Thus, following a significant p-value ($\leq .05$) from the Skillings Mack test, three Wilcoxon Signed Rank tests were performed to determine significant differences among pairwise comparisons (i.e., before – during; during – after; before – after). The experiment-wise error rate of 0.05 was adjusted by the number of comparisons being made, and significance at the pairwise comparison level was determined at an alpha of $\leq .0167$ ($0.05/3 = 0.0167$). "Don't know" responses were dropped prior to calculating overall mean scores for each collaborative preparedness

statement, as well as during calculation of the difference in means (i.e., any individual who responded "don't know" to a statement at either time point in a particular comparison was excluded from analyses for that comparison). "Don't know" scores were dropped only following a sensitivity screening where "don't know" values were replaced with "neither disagree nor agree." No substantial difference in the magnitude or direction of the means or mean difference was detected. Therefore, it was determined that dropping the "don't know" responses did not have a substantial impact on the overall findings. The software used for these analyses included STATA version 10 (STATACorp LP, College Station, TX, 2013) and Microsoft Excel (Microsoft, Redmond, WA, 2011).

Phase 2

Aim 2: Understand perspectives of key stakeholders regarding the impact of interlocal collaboration on national preparedness.

Research Questions:

A. Do key stakeholders perceive interlocal collaboration as important for national preparedness?

B. Has the UASI program altered stakeholders' perceived impact of interlocal collaboration on national preparedness?

Aim 3: Understand key stakeholders' perspectives on the role of exercises in the relationship of interlocal collaboration and national preparedness.

Research Questions:

A. Can preparedness exercises serve as a method for improving interlocal collaboration in UASI regions?

B. Can preparedness exercises serve as a method for assessing interlocal collaboration in UASI regions?

Methods

Key informants (KIs) were interviewed from January through April 2014. Individuals were selected as KIs due to their knowledge of a UASI region(s) and its governance structures, investment strategies, and challenges, as well as knowledge of the UASI program's history and goals. A purposive sample [23] of KIs was initially identified in coordination with practice-based partners from FEMA and the Baltimore City Mayor's Office of Emergency Management. Purposive sampling was identified as an appropriate sampling strategy for this qualitative inquiry given its directed scope and the relatively small UASI community. KIs were continuously identified using a snowball sampling approach until data saturation was attained.[23] The goal of the recruitment process was to attain a variety of perspectives (e.g., private/non-profit, local, state, and federal officials; grant recipients; national association leaders) that could inform the study aims.

Again in coordination with practice-based partners, an interview guide (Appendix 4) was developed a priori for guiding discussion. The interview guide contained distinct questions related to each study aim. Information on the interview's structure and purpose was provided at the beginning of the interview, as well as in the interview invitational email (Appendix 5). Interviews were recorded and transcribed, and transcribed data were read in their entirety. A detailed summary of key points was developed shortly after each interview and sent to each KI for validation of accuracy (Appendix 6).

The framework approach for policy-relevant qualitative research[24] was employed during the analytic process:

1) Familiarization: Interview transcripts and interviewer notes were read and re-read. The researcher also listened to and transcribed the first nine interview recordings to ensure sufficient immersion in the data.
2) Identifying a thematic framework: Informed by the logic model, study aims, research questions, and data, a codebook was developed to organize transcribed data into key themes (Appendix 7). Because qualitative inquiry is an evolving process,[25] the codebook was viewed as a working document and all changes to the codebook were documented.
3) Indexing: Codes were systematically applied to the transcribed interview data using N-Vivo 10 and N-Vivo for Mac Beta software (Burlington, MA). A second researcher coded the first two interview transcripts to ensure validity and reliability of code description and application. Discrepancies were minimal; instances of disagreement were discussed, and the codebook was revised as appropriate. After this initial code validation process, co-coding ceased as coding serves to organize, not analyze, data.[25]
4) Charting: Coded data and interview summaries were read and re-read. Analytic memos were developed to synthesize and summarize data into key themes specific to each aim and associated research questions.
5) Mapping and interpretation: Analytic memos, figures, and tables were developed to record patterns and relationships that emerged from the data specific to each aim and associated research questions.

Paper 1: ***Regional collaboration Among Urban Area Security Initiative regions: Results of the Johns Hopkins Urban Area Survey***

Abstract

Context

Regional collaboration has been identified as a potential facilitator of public health preparedness efforts. The Urban Area Security Initiative (UASI) grant program, administered by the Federal Emergency Management Agency (FEMA) since 2003, has provided 64 high-risk metropolitan areas funding to enhance their regional preparedness capabilities.

Objective

To describe informal and formal regional collaboration infrastructure, as well as regional collaboration-related activities and assessment methods, in FFY2010 UASI regions.

Design

A cross-sectional on-line survey was developed in coordination with practice-based partners and administered from September through December 2013.

Setting

The survey was administered via SurveyMonkey. The invitation was sent via email and follow-up reminders were made by email and phone.

Participants

Points of contact from FFY2010-funded UASI metropolitan areas completed the survey, with a response rate of 77.8% (n=49).

Main Outcome Measure(s)

Summary statistics were calculated to describe the current informal and formal regional collaboration infrastructure. Additionally, the cross-sectional survey collected rates of agreement with eight collaborative preparedness statements at three time points.

Results

UASI regions are engaging in collaborative activities and investments to build capabilities, with most collaboration occurring in the Prevention, Protection and Response Mission Areas. Collaborative relationships in preparedness among emergency managers and municipal chief executive officers improved during the FFY2010 UASI performance period compared to the pre-UASI award period, with lasting effects among urban areas with discontinued funding. The majority of UASI regions reported conducting independent, non-FEMA-sponsored assessments of their preparedness capabilities and measuring capabilities at the UASI region level.

Conclusions

Urban areas that received a FFY2010 UASI grant award are engaging in collaborative activities and have established inter-jurisdictional relationships among preparedness stakeholders. The use of grant funds to encourage collaboration in preparedness has the potential to leverage limited resources and promote informed investments. Additional research should be conducted to determine causative and longitudinal associations.

Keywords: preparedness, regional collaboration, grants

Introduction

Collaboration among local, state, and federal public health agencies, as well as with other homeland security-related federal agencies, is necessary for enhanced public health preparedness,[26] and efficient emergency management has been associated with intergovernmental coordination of planning efforts at all levels of government.[27] While the mantra "every disaster is local" continues to guide emergency management practice, local governments may lack sufficient resources to handle disasters on their own. Moreover, disasters do not recognize geopolitical boundaries, and often affect more than one jurisdiction at a given time. In fields other than preparedness (e.g., public administration), regionalism[A] has been shown to be cost-effective, for example, by promoting resource-sharing and reducing duplicative efforts.[3] In public health, regionalization has been identified as a critical dimension of transformation of the public health system to execute increased demands of preparedness.[2]

Since 2003, the Federal Emergency Management Agency (FEMA) has administered the Urban Area Security Initiative (UASI) grant program. The program requires regional governance and collaboration among all disciplines to promote public health and safety as a condition of funding, and is the highest funded grant (in dollars allocated) under FEMA's Homeland Security Grant Program umbrella, administering approximately $8 billion in grant funding from FFY2003 until FFY2014.[5-8] Grant recipients are major metropolitan areas within the United States (U.S.) determined to

[A] Although "regional collaboration" and "regionalism" may be used to describe a variety of alliances, this study employs the terms to describe interlocal collaboration, or collaboration among neighboring independent municipalities.

have the highest risk for terrorism. In FFY2010, the UASI program funded the most metropolitan areas (n=64) in its history, representing 32 U.S. states, the District of Columbia, and Puerto Rico.[8]

In 2004, the Government Accountability Office (GAO) reported that regional collaboration could be enhanced by the development of a comprehensive strategic plan with measurable goals and objectives; the presence of a regional organization with interdisciplinary representation; and flexibility in membership requirements, collaboration processes, and areas that have traditionally engaged in collaborations (i.e., other than emergency management).[28] The report proposed that the federal government could support these efforts through grant programs and associated requirements.[28] In 2007, the Department of Homeland Security (DHS) identified "Increasing Regional Collaboration" as the first of its ten homeland security priorities[29] Despite this increased attention and funding, in 2009 the GAO criticized FEMA for failure to track the effectiveness of the UASI grant program's goal of regional collaboration.[10] In 2011, Congress called on the National Academy of Public Administration (NAPA) to aid FEMA in helping to investigate, develop, and implement quantifiable homeland security grant performance measures, specifically related to the UASI program.[21] Despite the fact that regional collaboration is a goal of the UASI grant program,[8,10] NAPA did not develop any performance measures for regional collaboration and instead recommended that FEMA develop a multi-disciplinary team to study this area in the future.[21]

In the interim, the National Association of County and City Health Officials (NACCHO) established four approaches to regionalizing public health services in emergency preparedness: 1) coordinating, 2) standardizing, 3) centralizing, and 4)

networking, described in detail elsewhere.[30] In 2013, NACCHO surveyed 2,532 local health departments (LHDs) across 48 states with an overall response rate of 79%. LHDs were randomly assigned to receive three question subsets (core questions; core questions plus Module 1; core questions plus Module 2 [Module 2 included questions on preparedness]) and reported statistics were weighted to account for sampling/dissimilar non-response. The study found that 52% of LHDs were engaging in cross-jurisdictional sharing of resources. Of all programmatic areas and organizational functions reported, the highest percent of LHDs reported cross-jurisdictional sharing of resources among LHDs in emergency preparedness (35%).[31] Adopting a regional approach to planning has been identified as a successful preparedness collaboration technique[32] and regional planning models and recovery frameworks have already been developed.[33,34]

Formal and informal infrastructure, as well as activities and accomplishments, in preparedness-related regional collaboration have been preliminarily explored in a small number of case studies.[35-37] A comparative look across case studies found regionalization to be preceded by a variety and combination of impetuses, including to enhance local public health capacity, a perceived need for a coordinated response, or to more efficiently coordinate federal preparedness funding.[16] Activities also varied; some cases identified a focus on developing more formal regional organizations, while others focused on building more informal social networks.[16] For example, regionalization among Massachusetts' 351 autonomous public health boards was incentivized by the need to efficiently allocate and use federal funds.[35,36,38] This resulted in increased efficiency, coordination, standardized operations, capacity, perceived value of public health as a partner among other responding agencies, mutual aid agreements, capability

development, and regional social network capacities, as well as facilitated regional trainings, enhanced response to real-time challenges, and the development of a forum for increased communication with other emergency response agencies. Barriers to regionalization included funding, multiple mandates, cultural differences among public health and more operationally focused disciplines, and overlapping regional systems in different disciplines.[35]

In one particular preparedness region in Massachusetts, regionalization work was described as bridging the gap between state and local response capacities. Accomplishments in this region included development of local and regional plans; upgraded emergency response equipment and supplies; strengthened relationships with other first responders; developing, conducting and participating in training, exercises, and drills to test local and regional capacity; and developing regional services and capacities. [36] In the National Capital Region surrounding Washington, DC, most collaborative efforts focused on coordination, and some new activities led to regional capacity-building although with little focus on standardization. The UASI program's requirement of a regional approach was perceived to be beneficial in that it forced the region to come together. However, some stakeholders believed that the grant's focus on equipment did not support the heavy human resource burden of preparedness in public health.[37]

Although these case studies examined regionalization efforts in public health preparedness in particular geographic areas, little empirical evidence exists about regional preparedness activities or incentives occurring on a national scale in metropolitan areas with high risk or that are encouraged by a federal grant. Moreover, it remains unclear whether homeland security funding is a driver behind successful

development of formal and informal regional collaboration infrastructure, and what constitutes such infrastructure, especially in major urban areas at high risk and whose health departments serve a large proportion of the population. To contribute to the evidence base, this study explores if and how financial incentives, in the form of federal preparedness grants, can build or enhance regional collaboration in preparedness, as well as how UASI regions formally and informally engage in and measure regional collaboration throughout the disaster cycle.

Methods

A brief (12 question) internet-based survey, the Johns Hopkins Urban Area Survey Tool (JHUAST) (Appendix 1), was developed in coordination with practice-based partners familiar with the UASI program. The survey incorporated questions about structure and funding of regional collaboration among UASI recipient jurisdictions. Respondents were asked about regional collaboration measurement methods, and utilization of regional collaboration strategies during exercises or real-world events.

The survey was administered via SurveyMonkey (SurveyMonkey.com, Portland, OR), and distributed via email (Appendix 2 and 3) to the point(s) of contact for each UASI in September 2013 (n=63). If more than one contact per UASI region existed, one email was sent to all points of contact for that region asking them to coordinate to complete a single survey on behalf of the UASI. All FFY2010 UASI recipient regions were recruited to participate; however, the FFY2010 Miami and Fort Lauderdale UASI areas were combined for the purposes of this investigation secondary to the later consolidation of their individual UASI programs.

Recipients were asked to respond within six business weeks. Three reminder emails were sent to UASI contacts during this period. Incorrect contact information was corrected on an on-going basis. At the conclusion of the six-week period, non-respondents were sent an email allowing an additional two weeks to respond. If after a week they had still not completed the survey, they were sent an additional reminder email. At the expiration of this extension deadline, the study team worked with practice-based partners at the Baltimore City Mayor's Office of Emergency Management to encourage additional responses. The Baltimore UASI Chairman contacted by phone all remaining, non-responding UASI regions for which contact information was available to secure recruitment. The survey was officially closed in December 2013.

Summary statistics were calculated from the survey responses to describe the current informal and formal regional collaboration infrastructure. Additionally, the cross-sectional survey collected rates of agreement with eight collaborative preparedness statements at three time points (i.e., before receipt of any UASI grant award; during the FFY2010 UASI award Performance Period; and after the conclusion of the FFY2010 UASI Performance Period for any metropolitan regions for which UASI funding was discontinued after FFY2010 [UASI regions that continued to receive funding after FFY2010 were asked to abstain from this question, n= 22]). Levels of agreement were collected on a Likert Scale (with 1 indicating strong disagreement, 2 disagreement, 3 neither agreement nor disagreement, 4 agreement, and 5 strong agreement) with a "don't know" option. Mean scores and mean difference in scores across the three time points were calculated for matched pairs in the cross-sectional sample.

For each of the collaborative preparedness statements, a Skillings Mack test was performed to determine if there were differences among any of the three time-specific self-reported scores. While the Skillings Mack test determines significant differences between scores for each collaborative preparedness statement, it does not indicate between which scores the differences exist. Thus, following a significant p-value ($\leq .05$) from the Skillings Mack test, three Wilcoxon Signed Rank tests were performed to determine significant differences among pairwise comparisons (i.e., before – during; during – after; before – after). The experiment-wise error rate of 0.05 was adjusted by the number of comparisons being made, and significance at the pairwise comparison level was determined at an alpha of $\leq .0167$ ($0.05/3 = 0.0167$). "Don't know" respondents were dropped prior to calculating overall mean scores for each collaborative preparedness statement, as well as during calculation of the difference in means (i.e., any individual who responded "don't know" to a statement at either time point in a particular comparison was excluded from analyses for that comparison). "Don't know" scores were dropped only following a sensitivity screening where "don't know" values were replaced with "neither disagree nor agree." No substantial difference in the magnitude or direction of the means or mean difference was detected. Therefore, it was determined that dropping the "don't know" responses did not have a substantial impact on the overall findings. The software used for these analyses included STATA version 10 (STATACorp LP, College Station, TX, 2013) and Microsoft Excel (Microsoft, Redmond, WA, 2011).

The Johns Hopkins Bloomberg School of Public Health Institutional Review Board reviewed this study and determined it to be not human subjects research.

Results

Forty-nine out of 63 UASI areas (77.8%) responded to the JHUAST. Twenty-two responding urban areas (44.9%) reported loss of UASI funding after FFY2010.

Regional collaboration activities by Mission Area

Urban areas were asked to report on which activities they engaged in with their regional UASI partners during the FFY2010 UASI Grant Performance Period (i.e., FFY2010 – FFY2013). **Table 1.1** describes the respondents in each Mission Area (Prevention, Protection, Mitigation, Response, and Recovery) that indicated FFY2010 UASI grant-funded municipalities within the metropolitan region worked together during the grant's performance period for each activity.

Across Mission Areas, UASI regions reported working together the most during multi-municipal plan development (61.22 – 87.76%), for operational coordination (57.14 – 83.67%), and on UASI-sponsored multi-municipal plan development (53.06 – 71.43%) during all Mission Areas. Conversely, UASI regions reported working together the least during federally-sponsored exercises, corresponding to generally lower rates of collaboration during state and UASI-sponsored exercises across all five Mission Areas. Fewer respondents reported working together during the Recovery and Mitigation Mission Areas. More respondents indicated collaborative activity during the Protection and Response Mission Areas.

Funds spent on regional capability enhancement

Respondents were asked to report what percentage of their FFY2010 UASI award was spent on regional capability enhancement, described as *"equipment, resources or personnel considered the joint property and/or for the joint use of all jurisdictions within*

the UASI; not intended for the primary use of any individual municipality." As shown in **Figure 1.1**, 49% of respondents indicated spending 75-100% on such investments, and 74% of respondents indicated spending the majority of their FFY2010 UASI award (>50%) on regional capability enhancement. Only 2% of respondents indicated that no funds were spent on regional capability enhancement and 10% of respondents indicated that less than one-quarter of funds were spent on this purpose.

Changes in relationships among emergency managers and municipal chief executive officers

Respondents were asked to rate their level of agreement with a series of statements representing collaborative relationships and preparedness activities for both local emergency managers and municipal chief executive officers within UASI regions before any UASI grant award, during the FFY2010 UASI grant award performance period, and after the FFY2010 UASI grant award performance period if FFY2010 was the last year the grant was received. Higher Likert Scores (level of agreement) with collaborative preparedness statements were indicative of greater perceived collaboration. **Figure 1.2** describes the mean Likert Scores for each collaborative preparedness statement before any UASI grant award, during the FFY2010 UASI grant award performance period, and after the FFY2010 UASI grant award performance period if UASI funding was discontinued after FFY2010.

Table 1.2 reports the numerical mean Likert scores and the mean difference between Likert scores for matched responses for agreement with each of the collaborative preparedness factors before receipt of any UASI grant award and during the FFY2010 UASI award performance period. For all collaborative preparedness statements,

respondents indicated significant increases in agreement with each of the collaborative preparedness statements (mean difference = 0.809 - 1.213, p-value ≤ 0.0167) during the FFY2010 UASI grant performance period compared to before any UASI grant award.

Table 1.3 reports the numerical mean Likert scores and the mean difference between Likert scores for matched responses for agreement with each of the collaborative preparedness factors before receipt of any UASI grant award and after the FFY2010 UASI award performance period if UASI funding was discontinued after FFY2010. For all collaborative preparedness statements except *"The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region*" and *"The municipal chief executive officers within my UASI knew each others' names and how to contact one another*," respondents indicated significant increases in agreement with each of the collaborative preparedness statements (mean difference = 0.722 – 0.900, p-value ≤ 0.0167) after the conclusion of the FFY2010 UASI performance period if UASI funding was discontinued after FFY2010 compared to before any UASI grant award.

Table 1.4 reports the numerical mean Likert scores and the mean difference between Likert scores for matched responses (i.e., responses from the same individual at each of the three distinct time points collected in the cross-sectional sample) for agreement with each of the collaborative preparedness factors during the FFY2010 UASI award performance period and after the conclusion of the FFY2010 UASI performance period if UASI funding was discontinued after FFY2010. While all collaborative preparedness statements demonstrated an absolute decrease in levels of agreement after the conclusion of the FFY2010 UASI performance period if UASI funding was discontinued after

FFY2010 compared to during the FFY2010 UASI grant performance period, none were statistically significant (p-value ≤ 0.0167).

Moreover, most UASI regions (88%) reported that they have sufficiently operationalized regional collaboration such that they would work or have worked together as a region during a real-world event (**Figure 1.3**). In fact, 92% of respondents reported the ability to share resources among FFY2010 UASI-funded municipalities in their region during a real-world event, without state involvement (**Figure 1.4**).

Measuring regional collaboration

Figure 1.5 shows the percent of respondents engaging in different types of measurement methods for real-world events and exercises. Most respondents reported that an assessment of regional collaboration was included in after-action reports of one or more individual municipality(ies) within the UASI during real-world events (61.2%) and exercises (69.4%). More respondents reported development of UASI-wide after-action reports following exercises (51.0%) compared to real-world events (30.6%). However, the same proportion of respondents reported conducting a UASI-wide hotwash (i.e., debriefing) (44.9%) during real-world events, as well as exercises. Only 22% and 26.5% of respondents reported measuring regional collaboration through contribution to a state-wide after-action report for a real-world event or exercise, respectively. Only 16.3% and 12.2% of respondents reported that their UASI has not measured regional collaboration. Over half (55%) of UASIs reported conducting an independent assessment of efforts to enhance emergency management capabilities (i.e., excluding a FEMA-sponsored assessment (**Figure 1.6**)). Thirty-three percent indicated that they had not conducted such an assessment, and 12% did not know. Over three-quarters of respondents indicated that

they measure preparedness capabilities at the UASI level, 49% reported measuring these capabilities at the state level, and 69.2% reported measuring them at the municipality level (**Figure 1.7**).

Discussion

An evidence-supported understanding of the relationship of regional collaboration and preparedness can guide practice and policy decisions, including levels of federal, state, and local public health investments in preparedness.[26] Research into the topic of regional collaboration and national preparedness can inform investments made by the U.S. federal government. This analysis provides a unique opportunity to understand how the U.S. federal government supports the advancement of regional collaboration, and how those at the heart of the public health preparedness system – its practitioners – utilize federal grant funds to practice regional collaboration. In an era of reduced resources, grant programs aimed at regional collaboration may allow for a cost-effective solution to sustainability and streamlining of resources, decreasing geographical redundancies in capabilities, and promoting the development of relationships that will be necessary in the event of a large-scale disaster.

Between FFY2003 and FFY2009, over 500 million UASI dollars were spent on planning,[8] but the types of planning activities this investment supported remained unclear. Results of this investigation show that UASI regions are working to develop multi-jurisdictional plans (i.e., regional plans) among their member jurisdictions across all five Mission Areas (**Table 1.1**). Moreover, UASI regions report translating these plans into action; most UASI regions reported working with their UASI-funded jurisdictions to

operationally coordinate (**Figure 1.3**) and 92% of UASI regions reported capacity for resource sharing among the municipalities funded by the FFY2010 UASI award during a real-world incident or event (i.e., without state involvement, **Figure 1.4**). This demonstrates evidence of multi-jurisdictional planning efforts, and translation to implementation during real-world disasters. Structural variability in the nation's 3,000+ local public health agencies has been identified as an impediment to coordinating with other emergency response disciplines, especially during disasters that cross geopolitical borders.[2] These results indicate that the UASI program may be able to encourage effective collaboration and promote efficiency and timeliness in the wake of disaster by eliminating the need for state involvement for resource-sharing purposes.

Although most UASI regions are spending funds on regional versus jurisdiction-specific capability enhancement, 10% of UASI regions still reported spending less than 25% of their FFY2010 UASI award on regional capability enhancement and 4% reported that they don't know how funds are being spent with respect to jurisdictional or regional capability enhancement (**Figure 1.1**). This may be indicative of a need for increased oversight to ensure grantees are, in fact, investing in regional resources and regional capability enhancement and/or additional clarification/education on the grant's goals and purposes. While it is interesting to note that most UASI regions invested most of their FFY2010 UASI grant on regional capabilities, it is not yet known if and how this investment is associated with preparedness outcomes. Additional research exploring the association of the amount of funds spent on regional capability enhancement and preparedness outcomes is necessary.

Additional research to assess and quantify the development of social capital through regionalization has already been proposed[21] and development of social capital has been posited as the strongest potential of regionalization.[38] A report on on-going collaboration among LHDs found 67% of LHDs collaborating, 12% cooperating, 12% coordinating, and 7% networking in the emergency preparedness programmatic area. The largest percentage of LHDs reported collaborating in emergency preparedness compared to all other programmatic areas reported. Notably, 2% of LHDs indicated that they were not involved in partnerships/collaborations or had no program in the emergency preparedness programmatic area, the lowest level compared to all other programmatic areas reported.[31] Results from JHUAST suggest that UASI regions may have experienced increased perceptions of collaborative preparedness after receipt of the UASI award, with results lasting beyond the performance period of their award (**Tables 1.2, 1.3, and 1.4**). These findings lend themselves to the hypothesis that grant programs focused on regional collaboration in public health and public safety may have the potential to increase collaborative preparedness, with lasting effects. Additional research comparing UASI regions to non-UASI regions while controlling for demographic differences and other potential modifiers should be conducted to determine if the observed increase in agreement with collaborative preparedness statements is, in fact, associated with the UASI grant award. Additional perspectives on changes in collaboration (e.g., among different disciplines and/or ranks of emergency responders) may also be sought to further assess the scope of perceived changes in collaborative preparedness activities. Additionally, since this survey was conducted only a few months after the conclusion of

the FFY2010 UASI award performance period, additional queries to determine long-term changes in collaborative preparedness activities over time should be performed.

While this study did not aim to identify or develop metrics to measure regional collaboration, we did find that most UASI regions (55%) have conducted independent assessments of efforts to enhance emergency management capabilities (excluding a FEMA-sponsored assessment, **Figure 1.6**). Moreover, 75.5% of UASI regions reported measuring their emergency management capabilities at the UASI region level (**Figure 1.7**). While no standardized or "official" regional collaboration measurements exist, it is clear that some measurements are occurring in practice. These should be explored and relevant ones standardized and employed to systematically collect information on this preparedness strategy, as well as its effectiveness and associated outcomes. Moreover, as most UASI regions reported assessment of regional collaboration in municipality-level after-action reports following real-world events as well as exercises, these documents should be systematically reviewed to identify variables that are consistently collated and utilized to convey successful or flawed regional collaboration or capability enhancement.

Strengths and Limitations

Strengths of this study include its employment of a population-level survey and achievement of a high response rate. Additionally, the research team capitalized on practice-based partnerships to ensure practice-based research relevance, well-designed survey questions, and recruitment of participants. Although the research team attempted to reduce limitations through study design, some remain. First, contact information was not complete or up-to-date for all UASI regions, in part due to personnel turnover. Additionally, the contact on file for the UASI program may not have been the most

appropriate person to complete the survey or comment specifically on public health-related collaboration (e.g., a new hire, an individual whose job responsibilities exclusively focused on grant management, or who did not interact/was not aware of the relationships among municipal chief executive officers). Contact information was corrected on an on-going basis by the study team. As such, questions focused on emergency preparedness activities more broadly (i.e., not those specific to public health). Second, because most FFY2010 UASI recipients were receiving multiple federal homeland security/emergency management grants, and some were in the midst of multiple UASI grant award performance periods, it is not possible to infer whether the regional collaboration activities and perceptions identified by the JHUAST were a result of the FFY2010 UASI award, or any UASI award. Notably, this study sought only to describe activities of UASI regions, not to imply causation by or association with receipt of a UASI grant. Future research should collect and analyze data from UASI regions and non-UASI regions to determine if engagement in collaborative activities is modified by receipt of a UASI grant award. Third, the collaborative preparedness statements attempted to capture agreement at three distinct time points (i.e., before, during, and after) in a single round of data collection. However, the cross-sectional study design may have resulted in recall bias among respondents. Moreover, because the study relies on self-reported data, factors such as participant understanding of the survey questions and interpretation and use of rating scales may have impacted responses and the associated validity of the findings.

Conclusion

Metropolitan regions funded by a FFY2010 UASI award engaged in a variety of collaborative public health preparedness and emergency management activities across the disaster cycle. They reported the development of cross-jurisdictional collaborative relationships in preparedness, ability to operationally coordinate and share resources during a disaster, and assessments of their regional efforts. Additional research should be conducted to better understand the relationship of regional collaboration and overall national preparedness, as well as methods to assess and incentivize it. An evidence-informed understanding of regional collaboration and national preparedness can promote efficient government spending and enhanced public health and safety.

Tables

Table 1.1: Percent UASI regions reporting collaborative activity participation by Mission Area (n=49)

Activity	Multi-municipal plan development	UASI-sponsored exercises *(i.e., most of the funding/ organization done by the UASI)*	State-sponsored exercises *(i.e., most of the funding/ organization done by the state)*	Federally-sponsored exercises *(e.g., exercises administered through the National Exercise Program)*	Information/ intelligence sharing	Operational coordination	UASI-sponsored multi-municipal public information campaigns
Mission Area	% Yes	%Yes	% Yes	%Yes	% Yes	%Yes	% Yes
Prevention	81.63%	55.10%	40.82%	22.45%	87.76%	69.39%	71.43%
Protection	81.63%	63.27%	40.82%	24.49%	85.71%	71.43%	63.27%
Mitigation	67.35%	48.98%	34.69%	20.41%	59.18%	57.14%	53.06%
Response	87.76%	77.55%	61.22%	32.65%	81.63%	83.67%	59.18%
Recovery	61.22%	42.86%	30.61%	18.37%	44.90%	63.27%	57.14%

Table 1.2: Comparisons in self-reported levels of agreement (5-point Likert Scale Scores) with collaborative preparedness statements before and during UASI award

Collaborative Preparedness Statement	**Mean Likert Scale Score *During***	**Standard Deviation Likert Scale Score *During***	**Mean Difference in Likert Scale Scores *(During – Before)***	**Standard Deviation in Likert Scale Scores *(During – Before)***	**P-value (Wilcoxon Signed Rank Test)**
The emergency managers within my UASI knew each others' names and how to contact one another. (n=47)	4.830	0.524	1.021	1.189	< 0.001
The emergency managers within my UASI worked with each other on preparedness activities prior to an emergency. (n=47)	4.702	0.779	1.213	1.267	< 0.001
The emergency managers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region. (n=46)	4.413	0.979	0.913	1.244	< 0.001
The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region. (n=47)	4.426	0.972	0.809	1.191	< 0.001
The municipal chief executive officers within my UASI knew each others' names and how to contact one another. (n=46)	4.565	0.834	0.848	1.173	< 0.001
The municipal chief executive officers within my UASI worked with each other on preparedness activities prior to an emergency. (n=45)	4.200	1.120	1.133	1.179	< 0.001
The municipal chief executive officers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region. (n=43)	4.163	1.090	0.909	1.042	< 0.001
The municipal chief executive officers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region. (n=44)	4.250	1.059	0.841	1.098	< 0.001

Table 1.3: Comparisons in self-reported levels of agreement (5-point Likert Scale Scores) with collaborative preparedness statements before and after UASI award

Collaborative Preparedness Statement	Mean Likert Scale Score After	Standard Deviation Likert Scale Score *After*	Mean Difference in Likert Scale Scores (After – Before)	Standard Deviation in Likert Scale Scores (After – Before)	P-value (Wilcoxin Signed Rank Test)
The emergency managers within my UASI knew each others' names and how to contact one another. (n=20)	4.650	0.933	0.900	1.293	0.009
The emergency managers within my UASI worked with each other on preparedness activities prior to an emergency. (n=20)	4.150	1.226	0.900	1.294	0.006
The emergency managers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region. (n=20)	4.150	1.182	0.800	1.056	0.002
The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region. (n=20)	4.050	1.234	0.550	0.999	0.028
The municipal chief executive officers within my UASI knew each others' names and how to contact one another. (n=19)	4.263	1.147	0.895	1.449	0.023
The municipal chief executive officers within my UASI worked with each other on preparedness activities prior to an emergency. (n=18)	3.611	1.378	0.833	1.249	0.009
The municipal chief executive officers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region. (n=18)	4.000	1.237	0.833	1.043	0.003
The municipal chief executive officers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region. (n=18)	3.889	1.278	0.722	1.074	0.009

Table 1.4: Comparisons in self-reported levels of agreement (5-point Likert Scale Scores) with collaborative preparedness statements during and after UASI award

Collaborative Preparedness Statement	Mean Likert Scale Score *After*	Standard Deviation Likert Scale Score *After*	Mean Difference in Likert Scale Scores (After - During)	Standard Deviation in Likert Scale Scores (After - During)	P-value (Wilcoxin Signed Rank Test)
The emergency managers within my UASI knew each others' names and how to contact one another. (n=22)	4.636	0.902	-0.091	0.294	0.157
The emergency managers within my UASI worked with each other on preparedness activities prior to an emergency. (n=22)	4.182	1.181	-0.273	0.703	0.046
The emergency managers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region. (n=22)	4.182	1.140	-0.091	0.426	0.317
The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region. (n=22)	4.091	1.192	-0.091	0.684	0.302
The municipal chief executive officers within my UASI knew each others' names and how to contact one another. (n=22)	4.273	1.077	-0.182	0.501	0.083
The municipal chief executive officers within my UASI worked with each other on preparedness activities prior to an emergency. (n=20)	3.700	1.342	-0.350	0.745	0.046
The municipal chief executive officers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region. (n=21)	4.000	1.183	-0.286	0.561	0.026
The municipal chief executive officers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region. (n=21)	3.905	1.221	-0.286	0.561	0.026

Figures

Figure 1.1: Percent of FFY2010 UASI grant award spent on regional capability enhancement

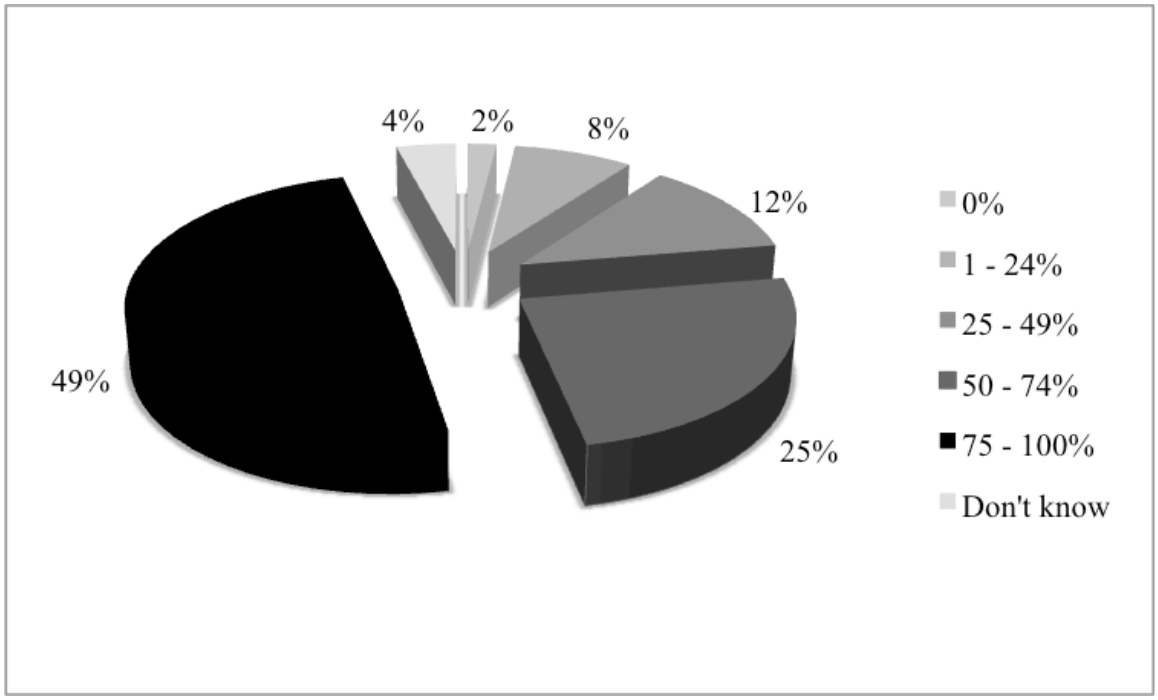


Figure 1.2: Average Likert Scale Scores (5-point) of collaborative preparedness statements before, during and after UASI Grant Award

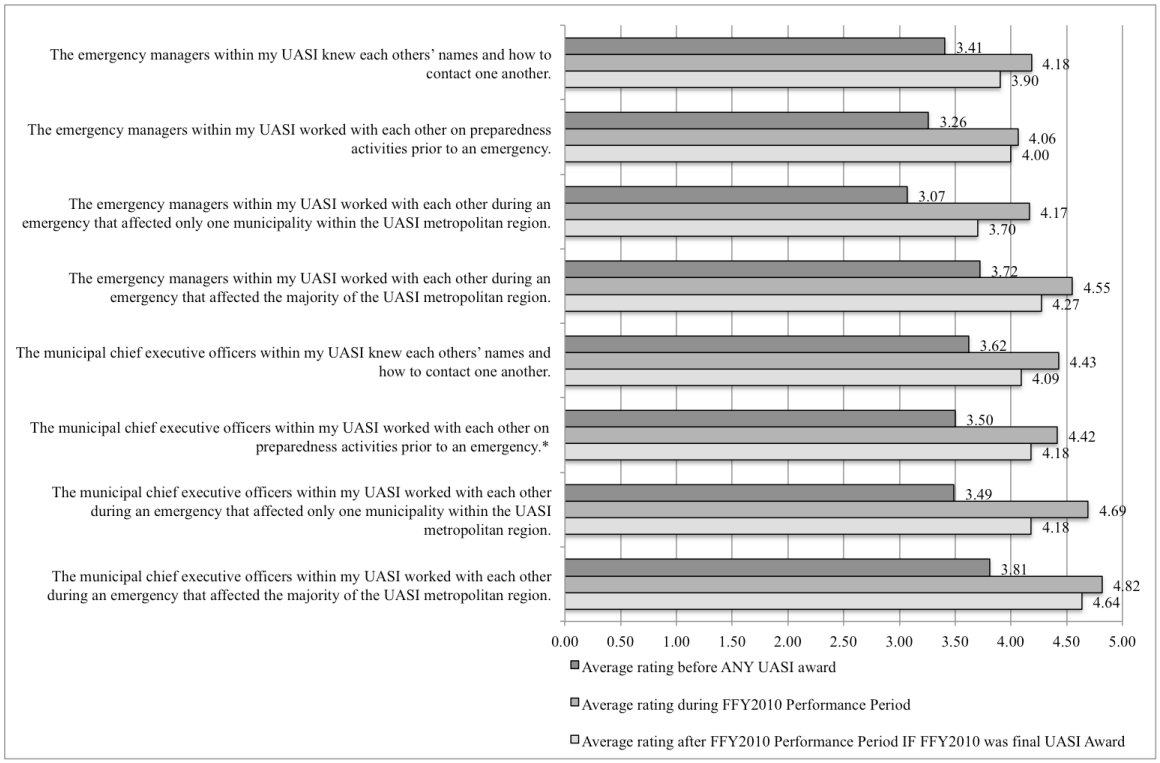


Figure 1.3: Percent of UASI regions that have operationalized regional collaboration such that the municipalities funded by its FFY2010 UASI grant award would work/have worked together as a region during a real-world incident or event

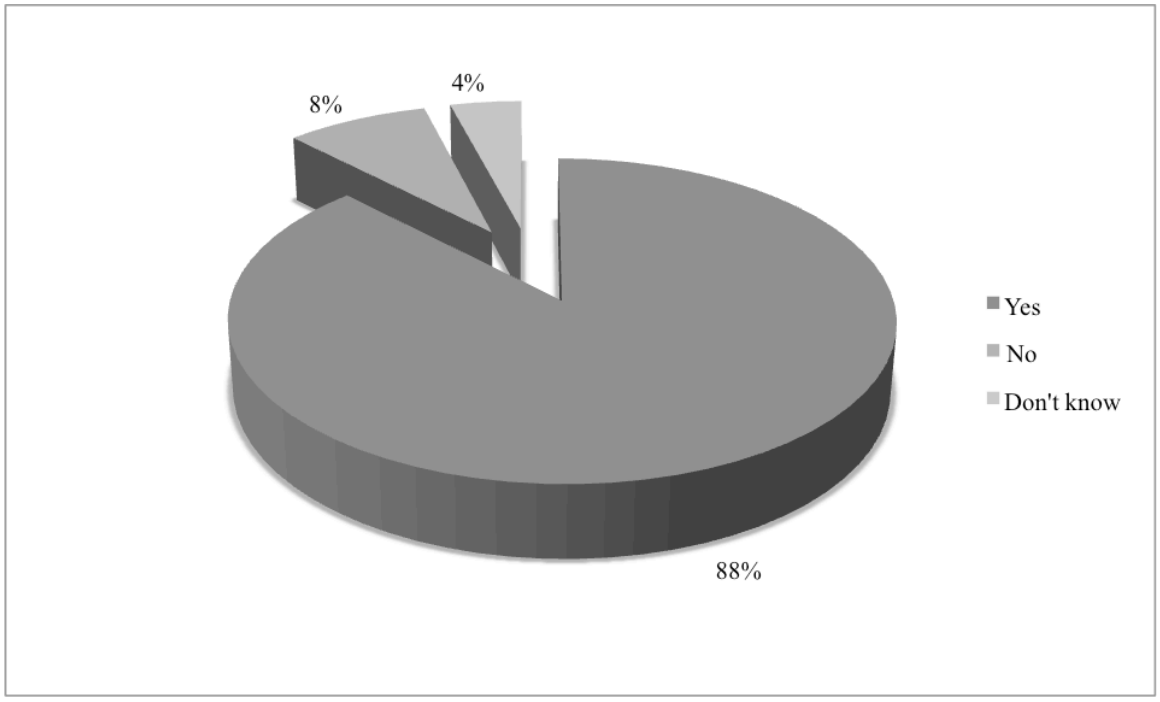


Figure 1.4: Percent of UASI regions with capacity for resource sharing among the municipalities funded by its FFY2010 UASI award during a real-world incident or event (i.e., without State involvement)

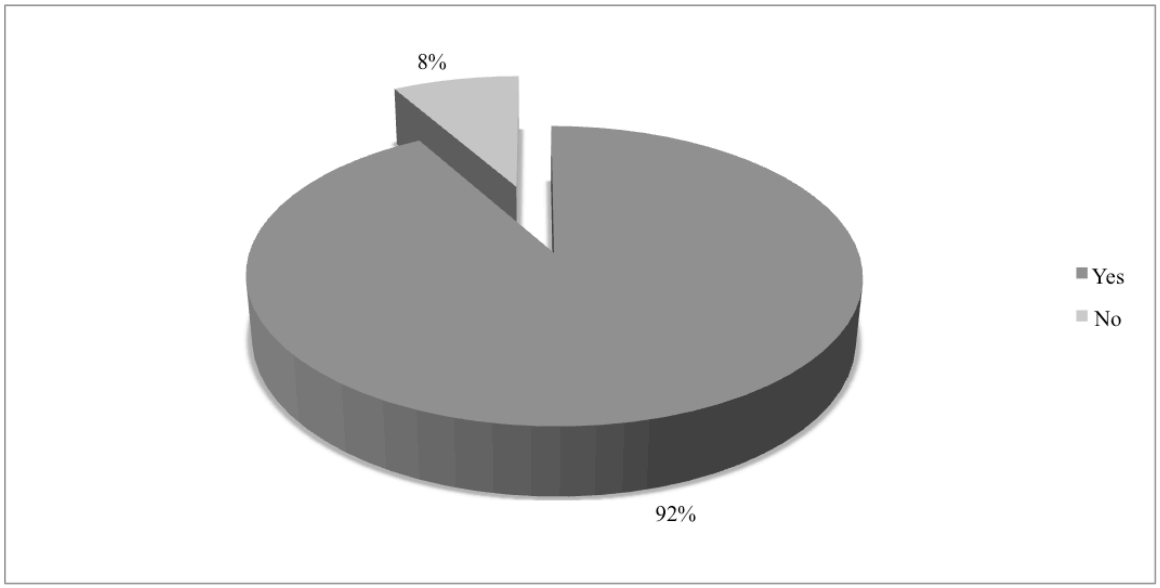


Figure 1.5: Regional collaboration measurement methods during exercises and real-world events (n=49)

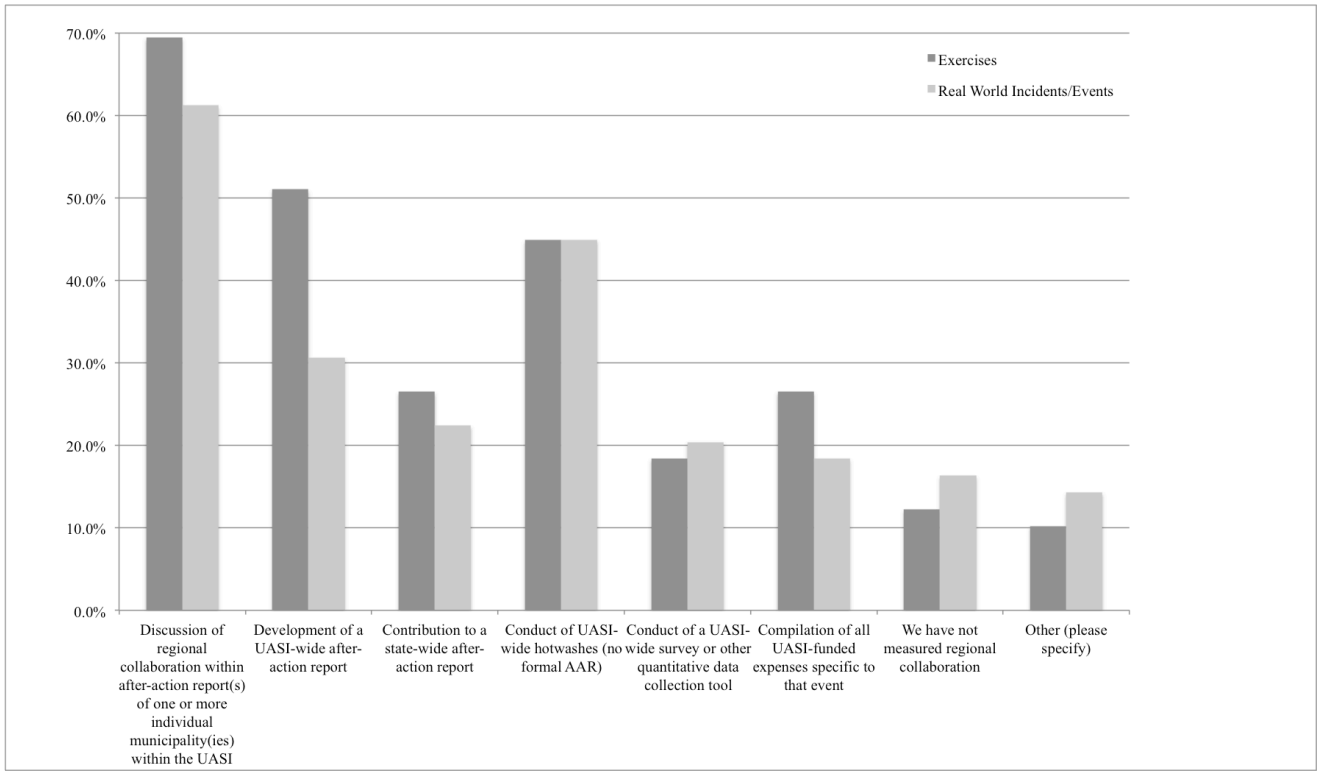


Figure 1.6: Percent of UASI regions that have conducted an independent assessment of efforts to enhance emergency management capabilities (excluding a FEMA-sponsored assessment)

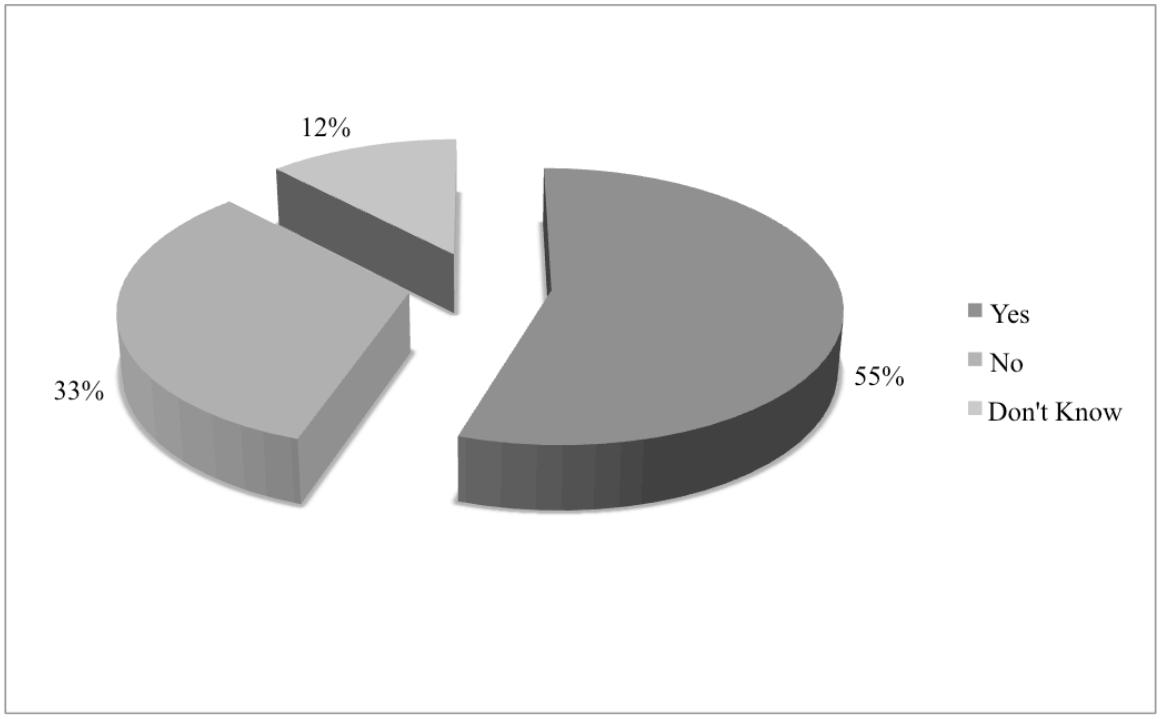
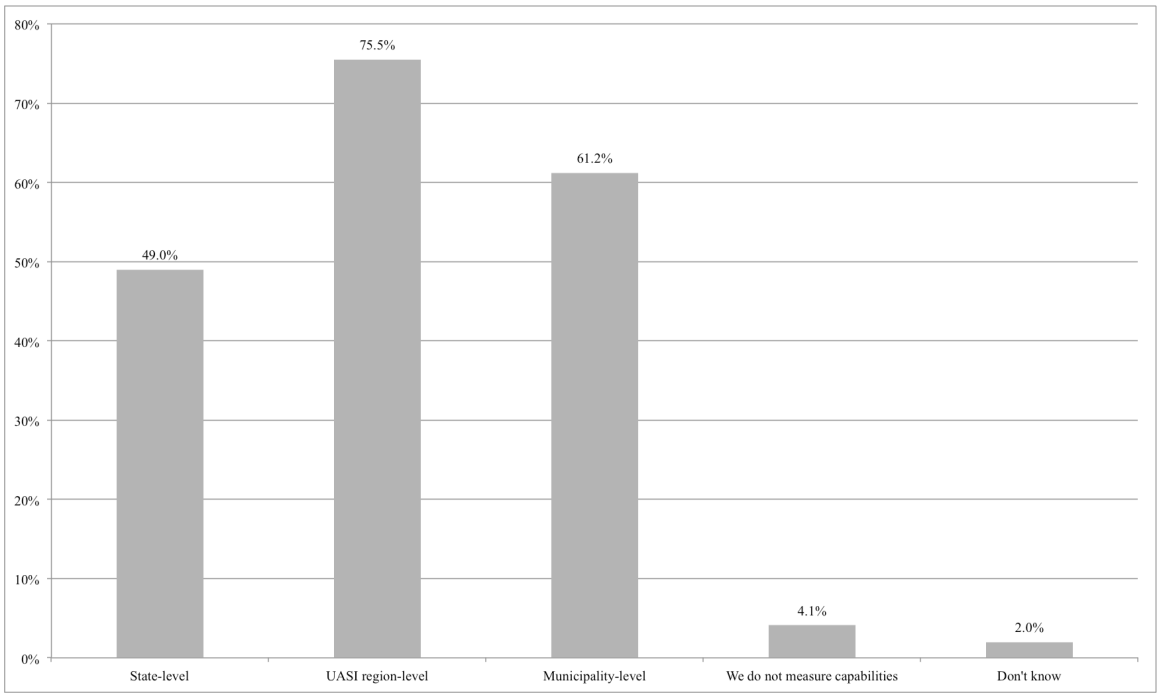


Figure 1.7: Level at which UASIs measure capabilities



Paper 2: ***Interlocal collaboration and emergency preparedness: a qualitative analysis of the impact of the Urban Area Security Initiative program***

Abstract

Objective

Horizontal intergovernmental coordination, or interlocal collaboration, is an ongoing strategy to enhance public health emergency preparedness in the U.S. This study aims to understand the impact of interlocal collaboration on emergency preparedness, and how the Urban Area Security Initiative (UASI) program, a federally-administered grant program to promote regional preparedness capability development, has influenced perceptions of this relationship.

Design

Semi-structured interviews were conducted and recorded in early 2014. Transcribed data were coded and iteratively analyzed. A purposive and snowball sampling strategy was employed.

Setting

Interviews were conducted in-person or by phone.

Participants

Twenty-eight key informants were interviewed during 24 interviews. Individuals were selected as key informants due to their knowledge of a UASI region(s) and its governance structures, investment strategies, and challenges, as well as knowledge of the UASI program's history and goals.

Main outcome measure(s)

Interviews were used to identify, describe, and characterize perceptions of interlocal collaboration, national emergency preparedness, and the UASI grant.

Results

Impacts, challenges, incentives, facilitators, and disadvantages to interlocal collaboration were identified. Interlocal collaboration was found to impact preparedness by promoting the perceived dissolution of geopolitical boundaries; developing self-reliant regions; developing regional capabilities; promoting regional risk identification; and creating an appreciation of interlocal collaboration importance. The UASI program was thought to have a profound and unique impact on the development of interlocal collaboration infrastructure, and on national preparedness.

Conclusions

Interlocal collaborations contribute to overall national preparedness. Grant programs, such as the UASI, can incentivize and foster interlocal collaboration in preparedness.

Key words

preparedness, grants, regionalism

Introduction

Public health emergency preparedness readies communities and health systems for an emergency whose "unpredictability threatens to overwhelm routine capabilities."[1] "Overwhelming" implies the need for an affected area to look beyond its borders to ensure efficient and effective disaster response and recovery. Horizontal intergovernmental collaboration – also known as interlocal collaboration, cross-jurisdictional collaboration, or regionalization – for emergency preparedness purposes has the potential to promote timely and efficacious response and recovery to disaster events that overwhelm an individual municipality.

Regionalization, or the formation of interlocal collaborations, partnerships and infrastructure, has been described as a critical transformation within the public health system to meet the challenges associated with emerging and evolving threat profiles.[2] Moulton et al. defined cross-jurisdictional and cross-sector (i.e., across disciplines) coordination as one of four core elements of public health legal preparedness.[39] Uncoordinated efforts in preparedness, both vertically (i.e., across different levels of government) and horizontally (i.e., across the same level of government), may contribute to a lack of mechanisms to pool resources and harmonize response plans, and a failure of public health agencies to transform to meet the demands of evolving threats.[2]

Preliminary evidence on the effectiveness of interlocal collaboration in public health emergency preparedness has been demonstrated through a small number of case studies conducted in Massachusetts, northern Illinois, the Washington, D.C. metropolitan area,[16] and Kansas.[17] Identified benefits of interlocal collaboration in preparedness include increased infrastructure development, improved collaboration and

communication, improved organizational functioning, increased resources and efficiency, and improved networking.[16,17] Disadvantages, barriers, and issues related to sustainability of interlocal collaboration and preparedness were also revealed, including funding, political concerns (e.g., elected officials' perceptions of loss of budgetary control), and leadership challenges (e.g., issues of trust).[16,17]

Despite limited evidence of its impact, interlocal collaboration is routinely practiced within U.S. emergency preparedness. In a 2004 survey of U.S. state public health preparedness directors, 39 of 44 respondents reported subdividing their intrastate preparedness programs into regions, over half of which were created after the terrorist attacks of September 11, 2001.[4] A 2013 survey of 2,532 local health departments across 48 states found that 52% of local health departments were engaging in cross-jurisdictional resource sharing.[31] Moreover, 35% of surveyed local health departments reported engaging in cross-jurisdictional resource sharing specifically for emergency preparedness, making this the area most frequently subject to interlocal coordination.[31]

Despite the reported rise of regionalism in public health emergency preparedness,[4] the mechanism by which interlocal collaboration impacts national preparedness has yet to be empirically explored. Concurrent to the rise in interlocal collaboration, the federal Urban Area Security Initiative (UASI) grant program created a unique cohort of urban areas required to engage in regionalization. From 2003 until 2014, the UASI grant program, administered by the Federal Emergency Management Agency (FEMA), awarded approximately $8 billion in grant funds to 64 geographically diverse U.S. high-threat, high-density urban areas[5-8] to enhance preparedness by building and sustaining the core capabilities outlined in the 2011 National Preparedness Goal[6,9] using a

regional approach.[10] Urban areas were selected for UASI participation by assessing their relative risk, accounting for threat, vulnerability, and consequences.[10] The UASI grant requires recipient urban areas to develop a charter outlining membership, governance, and grant administration/funding allocation criteria.[10] Membership in the UASI must include representation from all jurisdictions and disciplines that comprise a region (i.e., the urban area).[10] Starting in December 2012, UASI regions were also required to develop and annually update a regional Threat and Hazard Identification and Risk Assessment (THIRA).[11]

To date, no systematic or demographically representative assessment of preparedness and the impacts and disadvantages of interlocal collaboration on national emergency preparedness has been conducted. Moreover, there is little understanding of incentives, facilitators, or barriers to interlocal preparedness relationships, including within the UASI program. In response to this gap in evidence, this study aims to understand the impact of interlocal collaboration on preparedness, and examines how the UASI program has impacted program participants' perceptions of this relationship.

Methods

Key informants (KIs) were interviewed from January through April 2014. Individuals were selected as KIs due to their knowledge of a UASI region(s) and its governance structures, investment strategies, and challenges, as well as knowledge of the UASI program's history and goals. A purposive sample[23] of KIs was initially identified in coordination with practice-based partners from FEMA and the Baltimore City Mayor's Office of Emergency Management. Purposive sampling was identified as an appropriate sampling strategy for this qualitative inquiry given its directed scope and the relatively

small UASI community. KIs were continuously identified using a snowball sampling approach until data saturation was attained.[23] The goal of the recruitment process was to attain a variety of perspectives (e.g., private/non-profit, local, state, and federal officials; grant recipients; national association leaders) that could inform the study aims.

Again in coordination with practice-based partners, an interview guide (Appendix 4) was developed a priori for guiding discussion. Information on the interview's structure and purpose was provided at the beginning of the interview, as well as in the interview invitational email (Appendix 5). Interviews were recorded and transcribed, and transcribed data were read in their entirety. A detailed summary of key points was developed shortly after each interview and sent to each KI for validation of accuracy (Appendix 6).

A codebook was developed to organize transcribed data into key themes (Appendix 7). Because qualitative inquiry is an evolving process,[25] the codebook was viewed as a working document and all changes to the codebook were documented. Codes were systematically applied to the transcribed interview data using N-Vivo 10 and N-Vivo for Mac Beta software (Burlington, MA). A second researcher coded the first two interview transcripts to ensure validity and reliability of code description and application. Discrepancies were minimal; instances of disagreement were discussed, and the codebook was revised as appropriate. After this initial code validation process, co-coding ceased as coding serves to organize, not analyze, data.[25] Coded data and interview summaries were read and re-read. Analytic memos were developed to record patterns and relationships that emerged.

This study was determined to be not human subjects research by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Results

Twenty-eight KIs were interviewed during 24 interviews. Of 42 potential KIs identified during the recruitment period, seven did not respond to the interview invitation, five responded positively but ultimately did not participate due to scheduling or logistical issues, and two declined to participate. KIs worked on or with UASI programs throughout the United States as employees, or on intergovernmental details or rotations, in the federal (n=19), state (n=6), local (n=13), and private (n=4) sectors. KIs' perceptions of the relationship between interlocal collaboration and national preparedness are summarized in **Figure 2.1**. KIs described perceptions of national preparedness (**Text Box 2.1**). In general, KIs noted five broad categories that influence this relationship: incentives; facilitators; barriers; impacts on national preparedness; and disadvantages. No substantive systematic differences were observed among perceptions from KIs across sectors.

Incentives

KIs identified the following factors as providing a stimulus or impetus to preparedness-related interlocal collaboration:

Funding: The central purpose and the main success of the UASI program was perceived by many KIs to be building regional collaboration infrastructure by providing funding and frameworks (i.e., grant and policy guidance). The program was also described as risk-based, terrorism-oriented, and designed to enhance the preparedness of large cities. Interlocal collaboration was initially felt to be promoted through funding

allocation decisions, and to have improved significantly since the UASI program's inception. The impacts of the UASI program are further outlined in **Text Box 2.2**.

Perceived cost-effectiveness of preparedness processes: Interlocal collaboration was perceived to promote awareness of neighbors' assets that could be accessed, as well as reduction of resource and capability redundancy within a region. This benefit was perceived to extend beyond preparedness funds, and was felt to have the potential to prevent redundant investments made with both UASI funds and local-level funds.

It was noted by some KIs that although UASI funding initially encouraged interlocal collaboration, over time the perceived benefit of the relationships built kept players at the table, in instances of both continued and discontinued funding. KIs noted that the cost-efficiency of regional approaches to preparedness (i.e., strategic and collaborative spending approaches) would be more attractive in times of limited resources or budget constraints.

Political engagement: KIs noted the importance of leadership engagement and alignment of UASI-related interlocal preparedness collaboration infrastructure with the existing inter-jurisdictional political infrastructure of county executives/mayors. This allowed for elected leaders to be more engaged in the efforts of the UASI.

One KI noted the importance of having a political stance on interlocal collaboration, similar to having a stance on charter schools, for elected officials. Elected officials could publically promote interlocal collaboration by politicizing it (e.g., take a position on regional collaboration in public safety during political debates), thereby fostering it.

Existing partnerships: KIs noted that UASI funding reignited, or gave purpose and momentum, to existing regional partnerships or stakeholder groups (e.g., standing committees). Urban areas were also described as able to "congeal faster," perhaps because of other intergovernmental and interdisciplinary partnerships that exist at the urban area level.

Facilitators

Key informants identified the following factors as promoting interlocal collaboration after an initial incentive (e.g., UASI funding):

Planning: The development of regional operational and strategic plans, as well as the development of standard operating procedures for engagement in plans, was perceived to foster interlocal collaboration. Regional planning helped individual jurisdictions to understand the planning assumptions of their neighbors and account for these in their own plans. The requirement of a strategic plan, investment justifications, governance structure, and THIRA process allowed UASI regions to collectively assess capabilities and risk, and use UASI funding to strategically address risk and close regional capability gaps. These collaborative planning activities helped promote an understanding of regional resources and capabilities among interlocal collaboration participants.

Organizing: The use of governance structures (e.g., UASI-required Urban Area Working Groups) was perceived to enhance interlocal collaboration. More inclusive interlocal collaboration was felt to be most beneficial. Regions that included more than the "required" counties/partnerships perceived themselves and were perceived to be most impactful, in part because they could see the "bigger picture of preparedness" and access

from and share capabilities with more neighbors. State involvement was also seen as a benefit by some KIs because state-level actors have knowledge of the suite of resources and funding statewide, and can leverage other funding sources to close capability gaps. Additionally, the impact of UASIs on preparedness and collaboration was perceived to be associated with their self-organization and formation of a national conference/association. These forums promote the sharing of best practices across UASI regions and sharing of best practices with non-UASI regions, furthering the impact of the UASI program. Moreover, UASIs located in the same state were reported to have met regularly to collaborate and share information. The self-organization of the UASIs was felt by at least one KI to create a "brand" for regional collaboration.

Exercising: The relationships built during exercise planning and implementation were felt to foster interlocal collaboration by testing regional plans and assumptions, promoting awareness of regional capabilities, and encouraging regional relationship development.

Training: Trainings offered to emergency preparedness personnel across a UASI region using UASI funds allowed personnel to develop collaborative relationships. Moreover, allowing emergency preparedness personnel within an interlocal collaboration to attend trainings offered by another interlocal collaboration member maximizes the amount of training that can be offered within the interlocal collaboration (e.g., because the other interlocal collaboration member does not need to offer the same training and can use funds to offer a different training).

Equipping: The process of purchasing or acquiring equipment using UASI funds did not allow a single jurisdiction to make spending decisions. Rather, UASI members

had to come together to make decisions on spending for the benefit of the region. UASI interlocal collaboration members convened to inventory resources, prioritize investments, and coordinate spending. This promoted the understanding that all jurisdictions within a region may not need to own what they can access, and reduced redundant investments. Jurisdictions became aware of the capabilities of their neighbors, and often did not purchase equipment that they knew they could access via intra-region mutual aid.

Barriers

KIs identified several factors that may inhibit or detract from preparedness-related interlocal collaboration, including:

Vertical intergovernmental integration: The non-uniformity and sovereignty of state and local governments poses myriad challenges in developing a single incentive program for interlocal collaboration in preparedness nationwide. For instance, certain states do not have counties, or have residents living in unincorporated areas. Moreover, while preparedness assets exist at the local level, the constitutional relationship between the local and federal governments is through the states. KIs noted that the development of a one-size-fits-all program that met the needs and satisfied the dynamics (e.g., local-local relationships, local-state relationships) of every urban area was challenging. Moreover, because of the sovereignty of state and local jurisdictions, there is a lack of capacity to regionally manage a disaster, even if there is an interlocal collaboration planning body. For instance, while adjacent counties may communicate with one another and share resources during a widespread event, they may not manage their response to the event jointly (e.g., through the incident command system).

A challenge of the UASI program was perceived to be the building of local capabilities (e.g., using UASI funds to develop local plans or infrastructure) instead of regional capabilities. Moreover, while most UASI-funded equipment or assets could be accessed via mutual aid, KIs perceived interlocal collaboration for preparedness activities across state lines to be challenging. Existing mutual aid agreements were cited as a way to overcome legal impediments associated with insurance and licensure portability across state lines.

Politics: Within and between all levels of government, political considerations were identified as posing challenges to interlocal collaboration. Neighboring local jurisdictions, and local jurisdictions and states, may have different political agendas and spending propensities. Additionally, local consequences of a regionally beneficial project could result in political backlash. While one jurisdiction in an interlocal collaboration may have a higher risk (e.g., the city proper), KIs felt that this jurisdiction should not necessarily receive all the available resources because it would also rely on the support of its neighbors and their resources during an actual event. A need to expand response capacity outside of the "likely target" was expressed in order to garner a regional benefit. As such, interlocal collaboration was perceived to work better in places where there is a balance of power (i.e., all jurisdictions have similar levels of influence) within a metropolitan region.

Local and state political leaders may have differing political agendas. Moreover, there were disparate opinions among KIs about the role of the state in interlocal collaboration. Some KIs felt that the state should serve as the "lynchpin" of all homeland security efforts – including those occurring in the context of an interlocal collaboration –

because it possesses a broader perspective of all homeland security resources statewide and could leverage other funding sources to close capability gaps. Others felt that the expertise in terms of risk and capabilities lay with the locals, and that the state should be consulted as they determined necessary. Finally, lack of federal commitment to funding interlocal collaboration programs that developed from the UASI program, as well as transparency and perceived fairness in funding allocations, were reported frustrations.

Lack of measurement: KIs noted that an impediment to interlocal collaboration was the inability to demonstrate its impact, or the "collaborative impact" of the UASI grant program. Challenges in assessment were associated with politics (e.g., a political leader may not want to show areas in need of improvement), lack of baseline measurements, insufficient data, and difficulty teasing out the precise impact of the UASI program because other emergency preparedness and homeland security grant programs are concurrently administered. KIs expressed discomfort assessing a hypothetical "world without UASI" because it was unclear what other funding streams would be available. However, there was a consensus that even if the same amount of money were distributed, relationships and the ability to receive and provide mutual assistance would likely not be as robust without the UASI program.

While it was noted that several attempts have been made to assess the impact of the UASI grant program, none have been successfully adopted. However, all KIs perceived the UASI program to have had a significant impact on preparedness, even though they could not quantify it. Additionally, it may be hard to quantify the real-world impact of the UASI program because it prevented events or their consequences from

occurring. For instance, it can be challenging to determine the impact of a terrorism event that was foiled using UASI-sponsored prevention capabilities.

Threats to federal or supplemental funding: KIs noted that local everyday priorities would take precedence over preparedness without supplemental funding. KIs perceived local revenue to be earmarked for certain local services or functions, either through legislation or funding source stipulations, making it unavailable for preparedness purposes. Moreover, KIs perceived little financial incentive for locals to look beyond their borders without supplemental funding.

One KI felt that the fear of loss of supplemental funding was a barrier to interlocal collaboration because a local jurisdiction would want to "hoard" resources for itself. Loss of UASI funding was associated with a loss of the collaboration infrastructure required by the grant, as well as grants management infrastructure. Finally, the performance period of interlocal collaboration incentive programs (i.e., the UASI program lasted between two to three years per region) was perceived to be too short for the long-term collaborative projects necessary to foster interlocal collaboration.

Local-level administrative issues: While local jurisdictions no longer receive direct awards through the UASI program, at least one UASI city reported administrative burdens of issuing subgrant awards to member jurisdictions. Personnel turnover, engaging operationally-oriented disciplines (e.g., fire and police) in planning or homeland security, and geographical convenience of meetings (e.g., driving an hour or more) were perceived as challenges to interlocal collaboration. While many KIs noted the benefits of engaging the whole community, it was acknowledged that more partners led to more bureaucracy in regional decision-making processes.

Impacts

KIs felt that interlocal collaboration had a variety of unique impacts on the development and maintenance of overall preparedness. **Figure 2.2** describes how the UASI program was perceived to specifically influence each of the identified impacts of interlocal collaboration on national preparedness.

Dissolution of geopolitical boundaries: Because disasters – and the people affected by them – do not recognize political or geographic boundaries, programs to promote cross-border relationship development and collaboration can facilitate efficient and effective disaster response and recovery. Moreover, cross-border relationships developed through collaborative activities build trust among regional partners in advance of an incident. The UASI program was perceived by some KIs to give purpose and momentum to existing regional stakeholder groups, or to capitalize on pre-UASI intergovernmental coordination efforts (e.g., agreements, memoranda of understanding). Urban areas were perceived by one KI to already have intergovernmental contacts (e.g., with federal agencies), and the confluence of the UASI program and these existing relationships enhanced its effectiveness. The UASI program was also thought to promote interlocal coordination among senior officials for preparedness purposes.

In addition, the UASI program was felt to have helped foster a national, interdisciplinary, and intergovernmental cohesiveness in preparedness. While local emergency managers had previously coordinated nationally through the International Association of Emergency Managers, the UASI program drew upon other disciplines (e.g., public health, emergency medicine, public works) to coordinate on preparedness issues nationally.

Regional risk identification and targeted investments: Interlocal collaboration was felt to allow regions to collectively identify risks and use funds to minimize risk. The UASI program and associated guidance/processes (e.g., investment justification process, THIRA requirement, strategic plan requirement) along with the overall National Preparedness System guidance (e.g., Mission Area frameworks, core capabilities, etc.) have helped create a standardized and coordinated system for recipients to assess and address risk regionally.

Regional capability development: KIs noted that interlocal collaboration promotes efficient, non-redundant investments by encouraging access to capabilities that only one or some jurisdictions need to own (e.g., public health command vehicle), as well as developing systems to share these capabilities. The UASI program promoted the purchase or development of assets that were co-owned or shared by its members. The fact that this capability development occurred in metropolitan areas where large proportions of the U.S. population are housed was thought to be evidence of the magnitude of its impact.

Regional capabilities developed through interlocal collaboration can be used as national assets, eligible for deployment nationwide or even internationally through existing mutual aid systems. One KI noted that regional assets might be more useful extra-regionally because they require staffing by personnel who have other disaster-specific functions during an in-region emergency (e.g., local public health nurses assigned to a regional public health response team). On the other hand, by shifting focus from terrorism to an all-hazards/dual-use approach, the UASI program allowed for the development of capabilities that could be used on an everyday basis and during large-scale events (e.g., rotating stockpiles of antivirals).

Responses to and planning for real-world incidents and exercises, as well as prevention activities (e.g., foiled terrorist plots), were thought to be demonstrative of the capabilities built through the UASI program and the importance of collaboration. In these instances, capabilities developed under the program were utilized.

Self-reliant region development: Regional self-reliance (i.e., regional resources combined with local resources are sufficient to handle most events) was perceived to promote timely response to disasters, because it eliminates the need to wait for mutual or federal aid to arrive or to involve the state for matters of intra-regional mutual aid for disasters that do not overwhelm regional resources. Recent real-world events wherein federal aid was not necessary due to within-region self-sufficiency were thought to be demonstrative of this impact.

Perception to be worthy of sustainment: Interlocal collaboration infrastructure was perceived to be worthy of continuation in the absence or loss of funding. In fact, some KIs believed that decreased resource levels would encourage interlocal collaboration due to its perceived efficiency and cost-effectiveness.

Disadvantages of interlocal collaboration in emergency preparedness

Although very few disadvantages, or negative impacts, of interlocal collaboration on national preparedness were perceived by KIs, those discussed include:

Competition: Some KIs identified disadvantages of an interlocal collaboration, including potential competition over funding within a region. For instance, political stakeholders in a given part of the region may not see value in a particular project or an interlocal collaboration member jurisdiction may be on the receiving end of a negative

consequence of a regionally beneficial project. There may also be competition or political sensitivities over funding with other non-funded regions/state.

Opportunity costs: KIs felt that the time engaging in political discussions about the UASI program's risk formula or selection criteria could be better spent on preparedness activities. Additionally, time spent on regional activities was also described as time that could be spent on local responsibilities.

Discussion

Regionalization has been described as impacting public health preparedness both because hazards do not recognize geopolitical boundaries and because regionalization is associated with resource efficiency.[16] Our study has provided support for these observations by identifying five distinct impacts of interlocal collaboration on national preparedness: perceived dissolution of geopolitical boundaries; regional and national asset development; targeted risk assessments; development of self-reliant regions; and perception of the importance of preparedness-related interlocal collaboration among practitioners. Few disadvantages to interlocal collaboration were identified. Although barriers to interlocal collaboration implementation were described, several incentives and facilitators of interlocal relationships were identified – many of which are ongoing and supported by the UASI program. This study demonstrates the ability of a federal grant program to promote interlocal collaboration in preparedness, as well as how such collaboration can impact preparedness.

Creating meaningful regionalization in public health emergency preparedness, and reflecting regional parameters associated with daily life (e.g., aligning interlocal emergency preparedness systems with interlocal transportation systems), has been

described as an important consideration in ensuring its impact.[2] The multidisciplinary component of UASI-fostered interlocal collaboration was identified by KIs as particularly influential on national preparedness. In addition to engaging disciplines that may not otherwise be active in the preparedness process, multidisciplinary approaches can leverage multiple preparedness-related funding sources and systems to close capability gaps, while also accounting for existing local and regional systems. Collaborations must extend beyond emergency planners and involve those who are responsible for the management and implementation of essential services. Ensuring cross-sector collaboration, in addition to cross-jurisdictional collaboration, should be considered in interlocal collaboration development for preparedness.

The UASI grant was perceived as a major incentive for interlocal collaboration, and its requirements – outlined in grant guidance – promoted activities that facilitated interlocal collaboration (e.g., planning, organizing, exercising, training, and equipping). Such requirements, including the requisite of a governance structure with regional membership, a regional strategic plan, and a regional risk assessment, can be applied to other grant programs that wish to enhance interlocal collaboration in preparedness. However, KIs also noted some challenges such as difficulties developing interlocal collaborations among neighboring jurisdictions located in different states. As disasters do not recognize state political boundaries any more than they recognize local ones, collaboration among local jurisdictions across states lines is critical to ensuring practical preparedness. Issues in the development of inter-state compacts or regional interstate public health authorities have been described to include the requisite of congressional consent, the unlikely receipt of self-sustaining funding, and the length of time necessary

to develop such an agreement.[2] Federal coordination, mandates, or financial incentives were described to potentially enhance efficiency of interstate negotiations.[2] As such, UASI grant guidance could encourage cross-state interlocal collaborations.

Finally, the inability to demonstrate the impact of interlocal collaboration on national preparedness was identified as a barrier to interlocal collaboration. Inability to demonstrate the impact of the regional relationships developed has the potential to limit political will towards future financial incentivization of interlocal preparedness activities (i.e., the UASI program). Furthermore, lack of ability to empirically understand the value of interlocal efforts in preparedness limits the ability to make informed investments and meaningful preparedness improvements. Applying a regional perspective to relevant capability targets (e.g., regional operational coordination, regional mass fatality, etc.) outlined in the National Preparedness Goal and other federal doctrine may be a solution for assessing collaborative performance. Such indicators should be further explored and piloted as potential performance measures for interlocal collaboration during regional exercises or events. Additional research should also be conducted to identify alternative methods to assess the performance and impact of preparedness-related interlocal collaboration.

Strengths and Limitations

This study has been designed to maximize strengths and minimize limitations and bias. Although this study aims to understand the relationship of interlocal collaboration and national preparedness, the focus on the UASI program may limit generalizability. Additionally, interviews rely on self-reported perspectives, which require participant knowledge and candor. A key strength of the study is the employment of purposive

sampling in an effort to identify respondents with suspected differences in perspectives. However, some researcher-based selection bias may have been unavoidable and unrecognized.

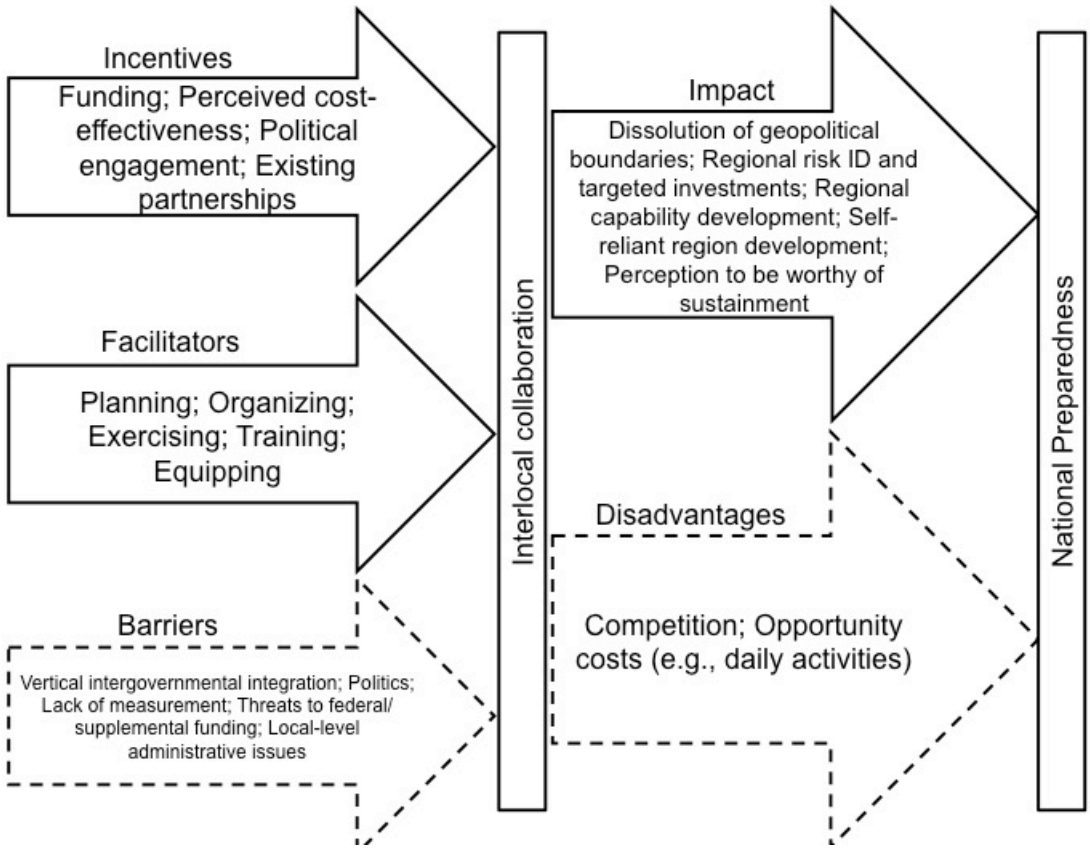
Conclusion

Interlocal collaboration is an important emergency preparedness strategy that can impact overall national preparedness by promoting the perceived dissolution of geopolitical boundaries; the development of regional capabilities; the development of self-reliant regions; the development of regional risk assessments and targeted investments; and positive perceptions of its impact among stakeholders. Although barriers to interlocal collaboration (i.e., vertical intergovernmental integration, politics, lack of measurement, lack of federal/supplemental funding, and local level administrative issues) were identified, several incentives and facilitating activities were also described.

Interlocal collaboration has been successfully fostered by the UASI grant program and associated requirements among urban areas in the U.S. In fact, the UASI program distinctly influenced each of the aforementioned impacts of interlocal collaboration on preparedness. This study suggests that grant programs can be a successful policy solution to foster interlocal collaboration, with important impacts on national preparedness.

Figures

Figure 2.1: The relationship of interlocal collaboration and preparedness

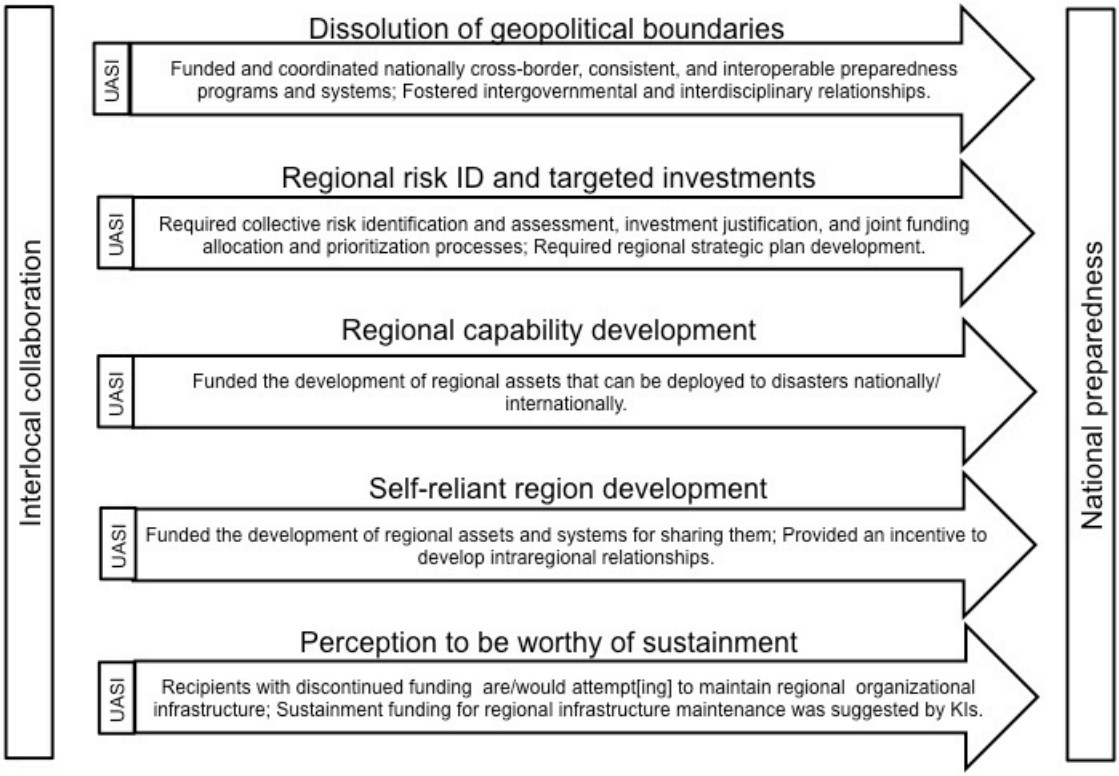


Legend

Positive Association _____

Negative Association - - - - -

Figure 2.2: The influence of the Urban Area Security Initiative (UASI) program on the impacts of interlocal collaboration and national preparedness



Text Boxes

Text Box 2.1: Key informant perceptions of national preparedness

KIs defined national preparedness as being ready for all emergencies, including having the capabilities to deal with any threats and hazards that arise. Such readiness was thought to require flexibility, forward thinking, and proactivity. KIs stressed that preparedness is a continuous and cyclical process; as long as there is a risk, there is a need to prepare for that risk. Because risk for both human-caused and natural-caused disasters is ongoing and evolving, complete preparedness was thought to be impossible and cost-prohibitive.

KIs also believed national preparedness to be a sum of the capabilities (**Figure I.1**) developed within different sectors (e.g., local and state governments, private sector, and community institutions) to address hazards relevant to them. Coordination of the collective aggregate of capabilities was considered necessary. This involved individuals knowing their role in the interdependent preparedness system. A focus on the role and responsibility of the individual and community in preparedness was widespread.

Text Box 2.2: Key informant perceptions of the impact of the UASI program on interlocal collaboration in preparedness

The impact of the UASI program on interlocal collaboration in preparedness was described as secondary to its:

- Multi-disciplinary approach. The UASI program helped to foster a national, interdisciplinary, and intergovernmental cohesiveness in preparedness. While local emergency managers had previously coordinated nationally through the International Association of Emergency Managers, the UASI program drew upon other disciplines (e.g., public health, emergency medicine, public works) to coordinate on preparedness issues nationally.
- Funding of a network of preparedness "epicenters." The UASI-funded regions throughout the country self-organized into the National UASI Conference/Association, and shared benefits/best practices developed under the auspices of the award with non-funded regions. It was felt by most KIs that without the UASI program, collaboration might have happened in pockets across the country, but not to the extent it occurred or was coordinated nationally (i.e., through the grant guidance and development of an association).
- Funding of the highest risk U.S. cities. In doing so, the UASI program promoted capability development in metropolitan areas that house a high proportion of the U.S. population.
- Shift from a terrorism focus to an all-hazards approach. By shifting focus from terrorism to an all-hazards/dual-use approach, the UASI program allowed for the development of capabilities that could be used on an everyday basis and during large-scale events (e.g., rotating stockpiles of anti-virals). This was described by one KI as a "common sense" approach.

Paper 3: *The use of exercises to enhance and assess interlocal collaboration in preparedness: a qualitative analysis*

Abstract

Objective

Because disasters do not recognize geopolitical borders, interlocal collaboration has been generally accepted as an emergency preparedness strategy that improves investment efficiency. However, the use of exercises to enhance or assess interlocal collaboration, or its impact on preparedness, has yet to be empirically explored. The goal of this study is to understand key stakeholders' perspectives about the role of exercises in improving and assessing interlocal collaboration for emergency preparedness.

Method

In early 2014, 28 key informants, identified through purposive and snowball sampling strategies, were interviewed during 24 semi-structured interviews. An in-depth interview guide was developed in coordination with practice-based partners. Interviews were recorded, transcribed, member-checked, coded, and analyzed to identify key themes related to emergency preparedness exercises and the enhancement and assessment of interlocal collaboration.

Results

Exercises were felt to enhance interlocal collaboration in preparedness by promoting: the collective identification and understanding of regional risks; the testing and operationalizing of regional emergency plans; the development of relationships among interlocal stakeholders; the assurance of buy-in among interlocal stakeholders to regional plans and operational structures; the practice of regional capability delivery in

advance of a real-world disaster; the sharing of best practices in interlocal collaboration in preparedness; and the engagement of elected or senior leadership in interlocal preparedness endeavors. Exercise participants, scenarios, administration, formats, and assessment strategies to promote interlocal collaboration were identified.

Conclusions

Exercises should be a core component of interlocal preparedness programs.

Introduction

A relatively small number of large-scale emergencies has limited the ability to test performance in preparedness.[18] Exercises, or simulated emergencies, offer one solution to obtaining data and building the evidence base in preparedness in the absence of real-world events.[18] Exercises enable the identification of strengths and weaknesses in preparedness programs, and help clarify roles and responsibilities among interagency stakeholders in advance of an emergency.[19] Moreover, exercises may improve performance during an actual disaster. Indeed, a study of Massachusetts hospitals found that more frequent participation in earlier exercises was associated with higher performance during a later tabletop exercise, suggesting that frequent participation in exercises may improve actual response to a real-world event.[20]

Exercises may allow for the enhancement or evaluation of collaboration among regional emergency preparedness partners (i.e., interlocal collaboration) in the absence of a large-scale emergency. Some preliminary, state-specific evidence about the role of exercises in interlocal collaboration exists. Well-designed multi-agency exercises have exposed issues in inter-agency coordination and incident management and coordination infrastructure,[40,41] as well as differing operational assumptions among intra-state organizations.[40] Potential benefits of regional exercises have been demonstrated among local health department workers who participated in a 2005 pilot, multi-county electronic infectious disease exercise in Kansas, including increased perceptions of their own ability to coordinate with other local health departments.[42] Subsequent focus groups among Kansas exercise participants found that increased regional coordination was identified as a primary benefit of this type of exercise.[43] A 2006 regional exercise among rural

hospitals in Texas was found to identify regional gaps (e.g., necessity of regionalism for a medical response in a major medical emergency) and promote regional team development.[44] Additionally, among five regional public health exercises conducted in 2009 in North Carolina, one of the main benefits of participation among counties and regions included building interlocal relationships. However, developing an exercise scenario that promoted interlocal collaboration among response partners was identified as a challenge.[45]

Although these state-specific examples provide some insight into the role of exercises in interlocal collaboration enhancement and assessment, little demographically-representative empirical evidence exists to describe the association. However, significant investment of local, state, and federal funds and effort towards interlocal collaboration is ongoing. The Federal Emergency Management Agency (FEMA), through its Urban Area Security Initiative (UASI) grant program, financially supports interlocal collaboration in preparedness. Since 2003, the UASI program has administered over $8 billion in grant funds to 64 urban areas to promote regional capability development.[5-8] UASI grant guidance requires interlocal membership, governance structures, and risk assessments. [10]

In response to this gap in evidence, and in an effort to inform FEMA's multi-billion dollar preparedness investments, we designed a study to understand the role of exercises in the improvement and assessment of interlocal collaboration for emergency preparedness among participants in the UASI program, and we report these findings herein. Additionally, this investigation seeks to identify characteristics of exercise participants, scenarios, format, administration, and assessment methods that are perceived

by participants to contribute to an exercise's ability to enhance or evaluate preparedness-related interlocal collaboration.

Methods

Semi-structured key informant (KI) interviews were conducted in early 2014. In coordination with practice-based partners, an in-depth interview guide was developed a priori and an initial purposive sample of KIs was identified. Individuals were selected as KIs if they possessed a broad knowledge of the history, goals, and implementation of the UASI program, as well as knowledge of interlocal collaboration exercises conducted as part of the UASI program. Purposive sampling was determined to be an appropriate initial strategy given the small scope of the UASI community, and the limited number of individuals familiar with interlocal preparedness exercises.[23] A snowball sampling strategy was subsequently utilized until data saturation was attained.[23] Alternative theories and perspectives on the use of exercises in interlocal collaboration enhancement assessment were sought through interview probes.[23]

Interviews were recorded, transcribed, and member-checked by sending KIs a summary of key points shortly after the interview to increase the validity of subsequent findings.[23] A codebook was developed and codes were applied to data using NVivo 10 for Mac Beta (Burlington, MA) and NVivo-8 (Burlington, MA) software. A second researcher double-coded the first two transcripts to increase the validity and reliability of code description and application. A consensus-building approach was utilized to adjudicate minor discrepancies, and modifications to the codebook were made as appropriate. Coded data were analyzed after iterative familiarization. Analysis memos

were generated to summarize key themes identified across interviews. The Johns Hopkins Bloomberg School of Public Health Institutional Review Board determined this study to be not human subjects research.

Results

Twenty-eight KIs were interviewed during 24 semi-structured interviews conducted from January through April 2014. KIs worked on or with the UASI program, including on UASI interlocal exercises, across the United States as employees, or on intergovernmental details or rotations, in the federal (n=19), state (n=6), local (n=13), and private (n=4) sectors. In total, 42 potential KIs were identified during the recruitment period. Seven did not respond to the interview invitation, five responded positively but ultimately did not participate due to logistical issues, and two declined to participate.

Overwhelmingly, KIs described exercises as fostering interlocal collaboration. KIs cited seven specific reasons for this perceived enhancement, outlined in **Figure 3.1**. KIs described how core exercise design components, such as participants, scenarios, format, and administration, could be tailored to encourage interlocal collaboration. Additionally, KIs described how exercises could be used to assess interlocal collaboration in preparedness. More details of these findings are outlined below.

Exercise participants

KIs believed that exercises designed to enhance interlocal collaboration should involve as many stakeholders as are manageable and relevant to the scenario or exercise objectives, including private sector partners and individuals who may not be involved in day-to-day emergencies (e.g., stakeholders who may not be involved within jurisdiction-

specific events, but are involved in major cross- or multi- jurisdictional events). KIs felt that all stakeholders who may be asked to respond to a scenario should be included in an exercise, while others expanded this concept to include any stakeholder who may be involved with the scenario at any point throughout the disaster cycle, including the planning process. Moreover, some KIs stressed the importance of involving the public either as participants or evaluators because of their knowledge of their communities and involvement in a real-world event. In fact, members of the public were described to be the ultimate judges of performance in an actual disaster. Including the media and financial partners (e.g., government finance offices) was also specifically cited as important to improving the impact of an exercise because their participation would be essential in a real-world event.

Exercise scenarios

Exercise scenarios that include the following design components were identified as fostering interlocal collaboration:

- Located at the intersection of more than one jurisdiction (e.g., on the county line)
- Geographically dispersed (e.g., multiple events occurring in different jurisdictions at the same time, such as multiple improvised explosive device dispersals)
- Widespread (e.g., a power grid failure or pandemic),
- Resource-intensive and requiring mutual assistance

KIs felt that the scenario should be relevant to all regional partners involved (i.e., they should each have a unique role or responsibility). The larger the scope of the

scenario, the more intergovernmental participation would be required. Some KIs believed that exercises should be designed to test capabilities germane to multiple events, and the chosen scenario is not relevant to its ability to foster interlocal collaboration. However, several KIs believed that scenario realism was necessary for stakeholder buy-in to the exercise. Others believed that scenarios could be developed from hazards identified in regional risk assessments.

Exercise administration

Most KIs believed in the importance of local-level, ground-up exercise ownership and tailoring. Local-level stakeholders were cited as having the best awareness of their capabilities and gaps that need to be tested in an exercise. Some KIs believed that state-level stakeholders had the capacity and perspective (i.e., awareness of capabilities/resources among all interlocal players) to successfully administer interlocal exercises. Others believed that the administration of a successful interlocal exercise depended more on competent exercise professionals, trusted by all participants, who could continuously oversee the entire exercise cycle, than on level of government. Local emergency management, as well as leadership, involvement was also described as important to the success of an interlocal exercise.

While most KIs did not believe that the federal government should administer exercises designed to enhance interlocal collaboration, the benefit of some federally-sponsored exercises (e.g., Mobile Education Teams [METS] and Joint Counterterrorism Awareness Workshops [JCTAWS]) in improving interlocal collaboration was noted. KIs generally felt that all levels of government should be involved in, or at least not excluded

from, interlocal exercise development processes (e.g., including stakeholders from all levels of government on exercise planning committees).

Pre-developed "canned" exercises (i.e., "exercise in a box") were felt to have some value in creating a foundation for an exercise. However, by design, pre-developed exercises cannot incorporate assumptions of local level plans that were felt to be core exercise elements. Moreover, KIs noted that scenario development ignites excitement among interlocal stakeholders and, subsequently, collaboration.

Exercise format

Tabletop exercises (TTX) or similar discussion-based exercises (e.g., JCTAWS, METS) were consistently cited as a cost-effective exercise solution for enhancing interlocal collaboration. These discussion-based exercises were perceived to be particularly beneficial in fostering interlocal collaboration among senior-level officials and an effective and efficient use of their time. KIs noted the importance of regular (i.e., multi-annual), smaller exercises (e.g., TTX) in building and maintaining relationships.

The value of more complex, operational exercises (e.g., full scale) was discussed in terms of their ability to involve more interlocal stakeholders, and engage interjurisdictional players (e.g., operational players, such as firefighters and police officers) as they would in a real-world incident. Such operational exercises were described as able to test the interoperability of capabilities, including equipment. On the other hand, at least one KI noted that lower-level operational players (e.g., those with "boots on the ground") may simply be performing tasks or following orders, and not understand the bigger, regional picture of an interlocal exercise.

KIs warned against developing exercises "for public consumption" and discussed the need to avoid the "pageantry" of larger exercises. They also noted the high expense of operational exercises, including costs of exercise administration, personnel time, and backfill costs (e.g., costs to pay additional personnel performing the day-to-day roles of the personnel participating in the exercise). Many KIs believed that exercise programs should use an iterative approach (i.e., "building block," as outlined in former versions of the Homeland Security Exercise and Evaluation Program [46]) where larger, more complex exercises (e.g., operational exercises) build on smaller, less complex exercises (e.g., discussion-based exercises). Additionally, KIs discussed "layering" interlocal exercises with local exercises (i.e., conducting local exercises prior to interlocal exercises using the same scenario as part of a single exercise program) to test both local capabilities and their interlocal relevance in a larger event.

Assessing interlocal collaboration

Since interlocal responses may be more relevant to catastrophic events, and some regional capabilities may only be tested during an exercise, KIs noted that an exercise allows jurisdictions to walk through a scenario together, and tests and reinforces readiness. In some instances, it may help a jurisdiction to realize that it will rely on mutual assistance and learn where to get it and how to access it. An exercise has the ability to demonstrate and assess regional preparedness in the absence of a real world event. It can also highlight gaps in the ability to deliver a capability and provide an opportunity to close those gaps in advance of a real world event, potentially utilizing regional funds. One KI felt that exercises should be designed to promote capability-level proficiency (i.e., exercises focused on particular capabilities and continuing to work on

them until they are perfected before expanding scope and moving on to other capabilities).

Exercises were thought to be most effective in interlocal collaboration assessment if they were designed to exploit weaknesses, provided a safe environment for failure, and led to honest after-action reports describing lessons learned. An honest after-action reporting process in which jurisdictions are comfortable sharing, disclosing and tracking weakness, as well as following through on corrective action development, was described as necessary in regional corrective action planning. Persistent challenges (e.g., removal of politically sensitive content from after-action reports prior to publication) with no known robust solutions were described in these areas. The hotwash (i.e., post-exercise debriefing) was described as a prime opportunity to discuss regional capability gaps and opportunities for improvement, since interlocal stakeholders may not review an after-action report, or there may be a lag until it is developed. KIs suggested several exercise objectives and metrics that could be collected by evaluators to assess interlocal collaboration (**Table 3.1**).

While the benefit of self-identification of capability gaps in terms of obtaining buy-in and ownership of corrective actions (e.g., as applied in the JCTAWS exercises) was identified, KIs also described the value of using external evaluators to assess exercise performance. External evaluators were perceived to enhance consistency and honesty of evaluation. Such external evaluators could include federal evaluators, professional peer-evaluators, or even the public. “Local bias,” or peer-evaluators’ perception that the way of doing things at their home jurisdictions is the best way, was described as potentially limiting their effectiveness. KIs discussed political barriers to the use of external

evaluators. Other KIs noted that a standardized evaluation process with flexible content was more important than the use of standardized or external evaluators.

KIs described corrective action planning and implementation in response to an exercise to be more complex with additional stakeholders involved. There is no overarching authority or power to ensure accountability in the completion of corrective actions within an individual jurisdiction identified in an interlocal exercise. However, the Urban Area Working Group (UAWG), the UASI-required interlocal governance structure, was described by some KIs as a forum for providing accountability in corrective action implementation among individual jurisdictions funded by a UASI award. It was noted that future UASI funding could be limited by the UAWG without compliance to corrective actions. Moreover, UASI funds could be used to close regional capability gaps, and UASI funds could be prioritized by the UAWG to ensure the closure of regional gaps over other projects.

Some KIs felt that regional after-action reporting and corrective action planning implementation could be most successful if there were both individual-level and regional-level after-action reports. Others preferred a single after-action report and improvement plan with buy-in from all regional stakeholders.

Discussion

Our study demonstrates the potential for exercises to improve and assess interlocal collaboration in emergency preparedness. Moreover, the study identifies components of exercise design – including participants, scenario, format, and administration – that enhance an exercise's ability to foster and assess interlocal

collaboration. In fact, KIs offered several alternative exercise characteristics that could assess and enhance interlocal collaboration. Although challenges in the design of exercises to promote interlocal versus local capability testing and enhancement have been previously described,[45] our study has identified explicit ways to tailor exercise design components and processes to foster and assess interlocal collaboration. In general, exercises designed to enhance interlocal collaboration were found to involve the whole community, be administered from the ground up, and utilize scenarios that involve, or are relevant to, all interlocal players. While "pre-developed" scenarios can be useful as a platform for exercise development, collaboration building that occurs through exercise planning and design should not be discounted.

This study has several policy implications. The seven distinct perceived impacts of exercises on interlocal collaboration (**Figure 3.1**) suggest that they are an effective method to enhance preparedness-related interlocal collaboration. Smaller, frequent, discussion-based exercises were described as a cost-effective solution for developing and sustaining interlocal collaboration. UASI regions, or other interlocal collaborations, may wish to conduct these and other exercises using a building block approach (i.e., complex exercises preceded by smaller, less complex exercises[46]) to test regional capabilities and promote collaborative responses. Additionally, exercises could be a requirement of federally-administered grants designed to promote interlocal collaboration in preparedness. FEMA's National Exercise Division may choose to sponsor exercises that test regional capabilities as part of its National Exercise Program,[47] and smaller grant programs may be developed to promote testing of such capabilities. Additional

investigation on the use of federal preparedness grant funding to support or incentivize regional exercises should be considered.

In our study, KIs suggested several practical exercise objectives and performance metrics to assess interlocal collaboration during exercises (**Table 3.1**). Of note, the Government Accountability Office had previously criticized FEMA's lack of metrics to assess the impact of regional collaboration.[10] In 2011, Congress called on the National Academy of Public Administration to study and implement grant performance measures for two homeland security grant programs administered by FEMA, including the UASI program.[21] Although regional collaboration is a core component of the UASI program, [8] the study did not develop any performance metrics for regional collaboration and suggested that FEMA study this area in the future.[21] Findings from our study may provide a foundation for future efforts in regional collaboration-related metric development undertaken by FEMA or others.

While our results generally highlight the benefit of exercises to promote and assess interlocal collaboration, several KIs discussed "scrubbing," or removal of content that may negatively reflect on a jurisdiction from after-action reports, and the need for more honest evaluations of exercises to make meaningful improvements to preparedness. Given the additional layers of bureaucracy and politics involved in a multi-sector, multi-governmental evaluation, political challenges to producing an after-action report that candidly discusses weaknesses in homeland security and emergency preparedness would likely be exacerbated during an interlocal collaboration. KIs cited external evaluation as a potential solution to improving the candor of evaluations and the associated ability to make improvements. However, political barriers to external evaluation implementation

(i.e., a region may not want an honest assessment or have others made aware of their weaknesses) were also discussed.

Despite KIs' concerns about the barriers to peer-to-peer review, such systems have been successfully implemented in other fields. Since 1991, the World Association of Nuclear Operators (WANO) has operated peer reviews of nuclear power sites.[48] Peer evaluation teams conduct an in-depth, objective analysis of the safety and reliability of WANO nuclear stations every four years, with follow-ups every two years.[48] Assessments are independent of a regulatory body, and result in open discussions, candid and confidential reports documenting findings and recommendations, as well as improvements in safety.[48-50] Moreover, the process allows for best practices and lessons learned to be shared across institutions.[48,50] The use of a similar peer review approach in the healthcare system has been proposed to minimize patient harm.[49-51] Barriers identified to implementing a peer review system in the healthcare arena are similar to, and a seemingly expanded version of, the political barriers in emergency preparedness, and include: "persistent culture of fear, autonomy and secrecy; lack of trained peer evaluators; lack of validated evaluation tools; lack of infrastructure; and time demand and cost."[51] However, given the myriad potential benefits of peer-to-peer assessment programs, discussions about overcoming these challenges in the healthcare arena are ongoing.[50] Discounting the potential for a successful, national, and confidential peer-review process to emergency preparedness exercises is premature. Approaches taken to peer review in other safety-related fields should be further explored for adaptation to emergency preparedness exercises.

Although our study design attempted to minimize limitations, interviews rely on self-reported information that can be biased. A key strength of this study was the use of purposive sampling to identify knowledgeable KIs and pursue competing perspectives. However, as knowledge of the UASI program was a key determinant of KI selection criteria, generalizability of study findings outside UASI-funded metropolitan areas may be limited.

Conclusions

Exercises are a core component of preparedness-related interlocal collaboration development and maintenance. Exercise format, scenario, participation, and administration can be tailored to more explicitly promote collaboration. Exercises with candid after-action reports and interlocal buy-in can be used to assess interlocal collaboration. Interlocal collaborations can serve to promote accountability in corrective action implementation, and regional UASI grant funding can be used to address lessons learned and identified gaps during exercises.

Tables

Table 3.1: Suggested objectives and metrics to be used in exercises assessing interlocal collaboration

Objectives	• Validate ability to share resources via intra-region mutual aid
	  o Identify regulatory/legal requirements of mutual aid
	  o Test ability to deliver local capabilities that may be required regionally
	• Ensure ability to operationally coordinate
	  o Assess ability to make decisions including all interlocal stakeholders
	  o Determine ability to incorporate all interlocal stakeholders into unified command/command post operations
	  o Test congruence of local planning assumptions
	• Test regional systems, capabilities, and plans
	• Assess ability to perform and timeliness of interlocal communication (face-to-face and non)
	• Ensure interoperability of communications and capabilities
	• Ensure ability to agree on protective action decisions
	• Test legal preparedness, including identification of overlapping authorities

Metrics	• Targets for the Operational Coordination capability outlined in the National Preparedness Goal • Frequency of communications among interlocal partners (e.g., how many times did they interact, how many emails were sent) • Receipt of information among interlocal stakeholders (e.g., did the right people get the right information in a timely manner) • Coordinated protective action decisions (e.g., did interlocal players develop a consistent and coordinated protective action decision) • Coordinated alert and warning (e.g., was a consistent protective action decision or warning communicated to the public, were all interlocal stakeholders invited to a regional press conference) • UASI THIRA regional capability targets • National standards, where appropriate • Number of regional corrective actions taken • Ability of systems and capabilities to interface (e.g., were radio systems interoperable) • Ability of regional stakeholders and systems to react to failure (e.g., were attempts made to remedy the problem after a setback)

Figures

Figure 3.1 The relationship of emergency preparedness exercises and interlocal collaboration enhancement

Overall strengths and limitations

This study has many strengths, including its employment of a population-level survey and achievement of a high response rate. Additionally, the research team capitalized on practice-based partnerships to ensure practice-based research relevance, well-designed survey questions, and recruitment of participants. Key informants were recruited through a purposive sample and subsequent snowball sampling approach, leading to rich data and associated findings.

Although the research team attempted to reduce limitations through study design, some remain. First, contact information used for survey administration was not complete or up-to-date for all UASI regions, in part due to personnel turnover. Additionally, the contact on file for the UASI program may not have been the most appropriate person to complete the survey or comment specifically on public health-related collaboration (e.g., a new hire, an individual whose job responsibilities exclusively focused on grant management, or who did not interact/was not aware of the relationships among municipal chief executive officers). Second, because UASI grants are administered as part of a suite of homeland security grants, recipients were likely receiving multiple federal homeland security/emergency management grants and some were in the midst of multiple UASI grant award performance periods. As such, it is not possible to infer whether the regional collaboration activities and perceptions identified by the JHUAST or KI interviews were a result of the FFY2010 UASI award, or any UASI award. Notably, the purpose of this study was not to imply causation by or association with receipt of a UASI grant, but to describe activities of UASI regions, the perceived determinants of interlocal collaboration, the perceived relationship of interlocal collaboration with national

preparedness, and the role of exercises in enhancing and assessing interlocal collaboration and its association with national preparedness. Future research should collect and analyze data from UASI regions and non-UASI regions to determine if engagement in collaborative activities is modified by receipt of a UASI grant award. Third, the collaborative preparedness statements attempted to capture agreement at three distinct time points (i.e., before, during, and after) in a single round of data collection. However, the cross-sectional study design may have resulted in recall bias among respondents. Moreover, because the study relies on self-reported data, factors such as participant understanding of the survey or interview questions and interpretation and use of rating scales may have impacted responses and the associated validity of the findings. Fourth, as knowledge of the UASI program was a key determinant of KI selection criteria, generalizability of study findings outside UASI-funded metropolitan areas may be limited. Finally, although survey questions focused on activities described in previous research to have public health participation, public health-specific capabilities were not explicitly addressed.

Overall conclusions and policy implications

An evidence-supported understanding of the relationship of interlocal collaboration and preparedness can guide practice and policy decisions, including levels of federal, state, and local preparedness investments.[1] Understanding the relationship of interlocal collaboration and national preparedness is of particular importance for public health and healthcare systems. Like disasters, public health problems do not recognize government-created boundaries. The spread of a pandemic will not stop at the county line. An individual may not live in the same municipality as his/her healthcare provider and the closest emergency room may not be in his/her county. These access issues can only be exacerbated in the event of an emergency.

The analyses in this dissertation provide a unique opportunity to understand how the U.S. federal government supports the advancement of regional collaboration, and how federal grant funds – specifically Urban Area Security Initiative (UASI) funds – have been utilized to implement interlocal collaboration. This study demonstrates that interlocal collaboration is an important emergency preparedness strategy that can impact overall national preparedness by promoting the perceived dissolution of geopolitical boundaries; the development of regional capabilities; the development of self-reliant regions; the development of regional risk assessments and targeted investments; and positive perceptions of interlocal collaboration impact among stakeholders.

Interlocal collaboration has been successfully fostered by the UASI grant program and associated requirements among urban areas in the U.S. Results from the Johns Hopkins Urban Area Survey Tool (JHUAST) suggest that UASI regions experienced increased perceptions of collaborative preparedness after receipt of the UASI award, with

results lasting beyond the performance period of their award. Metropolitan regions funded by a FFY2010 UASI award engaged in a variety of collaborative preparedness and emergency management activities across the disaster cycle. They reported the development of cross-jurisdictional collaborative relationships in preparedness, ability to operationally coordinate and share resources during a disaster, and assessments of their regional efforts. In fact, findings from the JHUAST provide evidence of ongoing multi-jurisdictional planning efforts in UASI jurisdictions, and translation to implementation during real-world disasters. JHUAST results suggest the UASI program's ability to encourage effective collaboration and promote efficiency and timeliness in the wake of disaster by eliminating the need for state involvement for resource-sharing purposes. Moreover, key informants interviewed perceived that the UASI grant was a major incentive for interlocal collaboration, and its requirements – outlined in grant guidance – promoted activities that facilitated interlocal collaboration (e.g., planning, organizing, exercising, training, and equipping). Such requirements, including the requisite of a governance structure with regional membership, a regional strategic plan, and a regional risk assessment, along with its multidisciplinary approach, can be applied to other grant programs that wish to enhance interlocal collaboration in public health preparedness.

In addition, key informants described the engagement of political leaders as an incentive to interlocal collaboration. Results from the JHUAST indicate that collaborative relationships among municipal chief executive officers increased after receipt of the FFY2010 UASI grant award compared to the pre-UASI award period. As such, it can be inferred that grant programs aimed at regional capability enhancement may engage

leadership in interlocal collaboration, thereby promoting interlocal collaboration public health preparedness efforts.

This study did, however, reveal the need for oversight to ensure grantees are investing in regional resources and regional capability enhancement and that investments are resulting in measurable impacts. JHUAST findings demonstrated that 4% of respondents did not know if their UASI funds were spent on regional capability enhancement, and nearly a quarter of all survey respondents reported spending less than half of their FFY2010 UASI award on regional capability enhancement. More explicit requirements in UASI or other grant guidance for spending and financial reporting may have the potential to limit inappropriate spending and enhance grantee accountability.

Furthermore, is not yet known if and how this investment is associated with preparedness outcomes. Inability to demonstrate the impact of the regional relationships developed has the potential to limit political will towards future financial incentivization of interlocal preparedness activities (i.e., the UASI program). Furthermore, lack of ability to empirically understand the value of interlocal efforts in preparedness limits the ability to make informed investments and meaningful preparedness improvements. There is a pronounced need to ensure that grantees are given sufficient tools to measure the impact of their investments and the state of their own preparedness. These tools should be designed to create assessments that are immune to political influence on risk and funding determination decisions, and that have the potential for aggregation to assess overall national preparedness. Their completion or findings may be a requisite or determinant of future grant funding. Immediate further research is necessary to create systems for

standardly measuring preparedness despite differences in regional risk profiles, and associated threats, vulnerabilities, and capability requirements, in the U.S.

Findings from the JHUAST revealed that some measurements of regional collaboration are occurring in practice. These should be explored and relevant ones standardized and employed to inform ongoing efforts to systematically collect information on this preparedness strategy, as well as its effectiveness and associated outcomes. Moreover, key informants suggested objectives and metrics that could be used during exercises to evaluate interlocal collaboration. These may provide a foundation for future efforts in regional collaboration-related metric development undertaken by FEMA or others, and should be explored during future research.

Policy solutions to barriers (i.e., vertical intergovernmental integration, politics, lack of measurement, lack of federal/supplemental funding, and local level administrative issues) and disadvantages (i.e., competition, opportunity costs) to interlocal collaboration development and maintenance identified by key informants should be further explored. For instance, key informants noted some challenges in interlocal collaborations among neighboring jurisdictions located in different states. Grant guidance may be used as a tool to encourage cross-state interlocal collaborations. Additionally, key informants noted that lack of supplemental funding was identified as a barrier to interlocal collaboration. In light of the myriad preparedness benefits of interlocal collaboration, solutions to encouraging state and local investments in interlocal collaboration need to be explored. Additionally, threats to federal/supplemental funding imply a need for more long-term stability in funding availability for interlocal collaboration efforts. Increasing the period of performance; making future grant determination criteria (e.g., risk formulas), grantee

selection processes, and level of funding more transparent, predictable, and understandable by grantees; and/or creating a manageable and realistic transition plan to allow for state and local investment and ownership of interlocal collaboration in preparedness are potential solutions to this barrier that should be considered for future investigation or implementation.

While these analyses focused specifically on the UASI grant program, results may be applicable to other cohorts engaging in preparedness-related interlocal collaborations. For instance, regional healthcare coalitions – defined as a formally linked group of hospitals, public health agencies, emergency management agencies, and emergency medical services[52]– often cross jurisdictional boundaries. They engage in several capability enhancing activities, including coordinating alternative care facilities, serving as a clearing house for policy decisions (e.g. related to allocation of scarce resources), conducting joint threat assessments, planning, resource acquisition, training and exercising. [52,53] The use of grant funds to encourage these organizations to extend beyond jurisdictional boundaries may provide a cost-effective solution to enhancing national preparedness. Determinants of interlocal engagement of public health-specific personnel and organizations (e.g., local health workers and departments) and the associated impact on emergency preparedness should be further explored.

Findings from our study may also have implications beyond the interlocal level of intergovernmental collaboration. Similar to how disasters do not recognize or conform to local level political barriers, they do not recognize or conform to state level political barriers. As such, collaboration among neighboring states or tribal regions (i.e., interstate collaboration) may also enhance emergency preparedness. As some metropolitan regions

funded by the UASI cross state lines (e.g., the New York City metropolitan area includes New York, New Jersey, Connecticut, and Pennsylvania), incentives, barriers, and facilitators described in Paper 2 of this study may be, at least in part, applicable to this type of collaboration. Future investigation on the determinants and impact of interstate collaboration is especially important secondary to KI discussion of impediments to this type of collaboration outlined in Paper 2.

In addition to interstate collaboration, collaboration among nations (i.e., international collaboration) may enhance preparedness. Today's global community allows for the rapid transport of people, goods, and pathogens. This environment, conducive to the rapid spread of emerging infectious diseases, requires cross-border intelligence, information, and resource sharing. Moreover, climate change, and the associated likelihood of a future increase in the severity and magnitude of disasters, may concurrently require an increase in the need for international resource and information coordination, both among nations with neighboring geopolitical borders and with similar global health security interests. Collaboration may be a successful policy solution for enhancing global preparedness. The applicability of the impacts and disadvantages of, as well as the incentives of, barriers to, and facilitators of preparedness-related interlocal collaboration identified in this study on international collaboration should be further explored with additional research.

In addition to grants, exercises were described as a programmatic solution to both enhancing and assessing interlocal collaboration. This study identifies components of exercise design – including participants, scenario, format, and administration – that enhance an exercise's ability to foster and assess interlocal collaboration. Smaller,

frequent, discussion-based exercises were described as a cost-effective solution for developing and sustaining interlocal collaboration. UASI regions, or other interlocal collaborations, may wish to conduct these and other exercises using a building block approach (i.e., complex exercises preceded by smaller, less complex exercises [46]) to test regional capabilities and promote collaborative responses. Additionally, exercises could be a requirement of federally-administered grants designed to promote interlocal collaboration in public health preparedness. Exercises with candid after-action reports and interlocal buy-in can be used to assess interlocal collaboration. Interlocal collaborations can serve to promote accountability in corrective action implementation, and regional UASI grant funding can be used to address lessons learned and identified gaps during exercises. FEMA's National Exercise Division may choose to sponsor exercises that test regional capabilities as part of its National Exercise Program, [47] and smaller grant programs may be developed to promote testing of such capabilities. In addition, the role of exercises in the assessment and enhancement of interstate and international preparedness-related collaboration should be further explored.

In conclusion, interlocal collaborations contribute to overall national and public health preparedness. Additional types of collaborations, both at different levels of government and among different disciplines, should be further investigated. Grant programs, such as the UASI, and emergency preparedness exercises can incentivize, foster, and assess interlocal collaboration in preparedness.

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Appendix 1: Survey questions

1. Which Urban Area Security Initiative (UASI) grant funded metropolitan area do you represent?

- Drop down menu of all UASI regions

2. For each phase of an emergency, please indicate the activities for which municipalities funded by your metropolitan region's FFY 2010 UASI grant award have worked together during the grant's performance period:

	Prevention	Protection	Mitigation	Response	Recovery
Multi-municipal plan development	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK
UASI-sponsored multi-municipal exercises (i.e., most of the funding/organization done by the UASI)	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK
State-sponsored multi-municipal exercises (i.e., most of the funding/organization done by the state)	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK
Federally-sponsored multi-municipal exercises (e.g., through National Exercise Program)	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK
Information/ Intelligence sharing	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK
Operational coordination during a real-world incident or event	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK
UASI-sponsored multi-municipal public information campaigns	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK	Y/ N/ DK

3. What percentage of the FFY 2010 UASI grant award for your metropolitan area was spent on regional capability enhancement (i.e., equipment, resources or personnel considered the joint property and/or for the joint use of all jurisdictions within the UASI, not intended for the primary use of any individual municipality)?

   a. 0%

   b. 1 - 24%

   c. 25 - 49%

   d. 50 – 74%

   e. 75 - 100%

   f. Don't know

4. Please indicate your agreement with the following statements PRIOR to your metropolitan area's receipt of ANY UASI grant award.

The emergency managers within my UASI knew each others' names and how to contact one another.

   1- Strongly disagree

   2- Disagree

   3- Neither agree nor disagree

   4- Agree

   5- Strongly agree

6- Don’t know

The emergency managers within my UASI worked with each other on preparedness activities prior to an emergency.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don’t know

The emergency managers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan regio

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don’t know

The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI knew each others' names and how to contact one another.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other on preparedness activities prior to an emergency.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

5. Please indicate your level of agreement with the following statements DURING the performance period of the FFY 2012 UASI grant.

The emergency managers within my UASI knew each others' names and how to contact one another.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The emergency managers within my UASI worked with each other on preparedness activities prior to an emergency.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The emergency managers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don’t know

The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don’t know

The municipal chief executive officers within my UASI knew each others’ names and how to contact one another.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don’t know

The municipal chief executive officers within my UASI worked with each other on preparedness activities prior to an emergency.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

8. Please only answer this question if FFY 2010 was the last year your metropolitan region received UASI funding. Please indicate your level of agreement with the following statements after the conclusion of the FFY 2010 UASI grant performance period.

N/A – My metropolitan area received UASI funding post-FFY 2010.

The emergency managers within my UASI knew each others' names and how to contact one another.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The emergency managers within my UASI worked with each other on preparedness activities prior to an emergency.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The emergency managers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The emergency managers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI knew each others' names and how to contact one another.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other on preparedness activities prior to an emergency.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other during an emergency that affected only one municipality within the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

The municipal chief executive officers within my UASI worked with each other during an emergency that affected the majority of the UASI metropolitan region.

1- Strongly disagree

2- Disagree

3- Neither agree nor disagree

4- Agree

5- Strongly agree

6- Don't know

6. Has your UASI operationalized regional collaboration such that the municipalities funded by your FFY2010 UASI grant award would work/have worked together as a region during a real-world incident or event?

   a. Yes

   b. No

   c. Don't know

   If yes, please describe how (e.g. through implementation of plans that go beyond footprint of any individual municipality, deployment models, automatic mutual aid, identification of a regional authority, etc.): _____

7. Does your metropolitan region have the capacity for resource sharing among the municipalities funded by your FFY2010 UASI grant award during a real-world incident or event (i.e., without State involvement)?

    a. Yes

    b. No

    c. Don't know

8. During real-world incidents or events, how has your metropolitan area measured regional collaboration among municipalities funded by the FFY 2010 UASI award (select all that apply)?

    a. Discussion of regional collaboration within after-action report(s) of one or more individual municipality(ies) within the UASI

    b. Development of a UASI-wide after action report

    c. Contribution to a state-wide after-action report that included UASI-specific regional collaboration discussion

    d. Conduct of UASI-wide hotwashes, without the formal development of an after-action report

    e. Conduct of a UASI-wide survey or other quantitative data collection tool

    f. Compilation of all UASI-funded expenses specific to that incident

    g. We have not measured regional collaboration

    h. Other (please specify) _____

9. During exercises, how has your metropolitan area measured regional collaboration among municipalities funded by the FFY 2010 UASI award (select all that apply)?

    a. Discussion of regional collaboration within after-action report(s) of one or more individual muncipality(ies) within the UASI
    b. Development of a UASI-wide after action report
    c. Contribution to a state-wide after-action report that included UASI-specific regional collaboration discussion
    d. Conduct of UASI-wide hotwashes, without the formal development of an after-action report
    e. Conduct of a UASI-wide survey or other quantitative data collection tool
    f. Compilation of all UASI-funded expenses specific to that incident
    g. We have not measured regional collaboration
    h. Other (please specify) _____

10. Excluding a Federal Emergency Management Agency (FEMA)-sponsored assessment, has your UASI completed an independent assessment of its efforts to enhance emergency management capabilities?

    a. Yes
    b. No
    c. Don't know

If yes, has this been shared with outside stakeholders? Please specify how.

12. At what level does your metropolitan region measure capabilities? (check all that apply)

    a. State-level

    b. UASI region-level

    c. Municipality-level

    d. We do not measure capabilities

    e. Don't know

Thank you for your time.

Appendix 2: Survey invitational email template

[Date]

Dear [Metropolitan Area] Urban Area Security Initiative (UASI) Representative(s),

As the point(s) of contact for the federal fiscal year (FFY) 2010 UASI grant award for your metropolitan region, you are invited to complete the Johns Hopkins – Urban Area Survey Tool (JH-UAST). You may access the survey here: [link]

The survey is part of a broader exploratory study on the relationship of regional collaboration and national emergency preparedness. Specifically, this survey aims to explore infrastructure by which federal Homeland Security funds build or enhance regional collaboration; how UASI regions have formally and informally engaged in regional collaboration; and how UASI regions have measured regional collaboration during real-world incidents/events or exercises. This survey is part of an academic study, and is not intended to determine funding decisions. The survey and its findings may, however, become part of the broader evidence-based literature that guides such determinations.

Your participation in this survey is completely voluntary. All answers to this survey are strictly confidential and survey findings will be de-identified prior to reporting or publication. The survey is designed to take less than twenty minutes to complete. If you choose to participate, **please complete your response no later than [Date]**. Please answer the questions as honestly and accurately as possible, consulting records (e.g., investment justifications, grant applications, after-action reports, governance structures,

memoranda of understanding, meeting minutes) as appropriate to aid in your recall. *Please ensure that only one survey is completed per UASI region*.

You have been provided with a list of definitions (attached). These definitions describe what we mean by the terminology employed in the survey. It is recommended that you print out the list of definitions for your reference prior to starting the survey.

Thank you for your time and any assistance you may render in the completion of this valuable research project. If you have any questions or concerns about the survey or while completing this survey, please do not hesitate to contact me by email at [email] or by phone at [phone number].

Regards,

[Signature]

Appendix 3: Survey definitions

Definitions for the Johns Hopkins – Urban Area Survey Tool (JH-UAST)

Because we recognize that local definitions vary, we have provided a definition for what we mean by each of the following words used in this survey. We recommend that you print this list prior to commencing the survey, and keep it accessible to reference while completing the survey.

Municipal Chief Executive Officer	The highest-ranking executive or administrative officer in charge of overall management of the municipality. He/she may be an elected official, such as the Mayor, County Executive, or City Manager.
Emergency manager	The lead person within a municipality who has the day-to-day responsibility for emergency management programs and activities. The role is one of coordinating all aspects of a jurisdiction's mitigation, preparedness, response, and recovery capabilities. (Source: FEMA)
FFY 2010	Federal fiscal year 2010 – referring to UASI grant award administered for fiscal year 2010 and its associated performance

	period, including any approved no-cost extensions.
Municipality	A political unit having powers of self-government, such as parishes, jurisdictions, counties, or independent cities. Multi-municipal refers to multiple (i.e., more than one) municipalities.
Prevention	The Prevention mission area comprises the capabilities necessary to avoid, prevent or stop a threatened or actual act of terrorism. It is focused on ensuring we are optimally prepared to prevent an imminent terrorist attack within the United States. (Source: FEMA)
Protection	The Protection Mission Area houses "the capabilities necessary to secure the homeland against acts of terrorism and manmade or natural disasters." (Source: FEMA)
Mitigation	The Mitigation Mission Area comprises "the capabilities necessary to reduce the loss of life and property by lessening the

	impact of disasters." (Source: FEMA)
Response	The Response Mission Area comprises "the capabilities necessary to save lives, protect property and the environment, and meet basic human needs after an incident has occurred." (Source: FEMA)
Recovery	The Recovery Mission Area comprises the core capabilities necessary to assist communities affected by an incident to recover effectively through a focus on the timely restoration, strengthening and revitalization of infrastructure, housing and a sustainable economy, as well as the health, social, cultural, historic and environmental fabric of communities. (Source: FEMA)
Regional capability	A capability that is considered the joint property or for the collective use of all jurisdictions funded by the same UASI grant. A capability provides the means to accomplish one or more tasks under specific conditions and to specific

	performance standards. A capability may be delivered with any combination of properly planned, organized, equipped, trained, and exercised personnel that achieves the intended outcome (Source: FEMA)
Regional collaboration	Collaboration among independent municipalities funded by the same UASI grant. Collaboration encompasses a wide range of activities (e.g., joint planning, training, operations) aimed at coordinating the capabilities and resources of various entities (e.g., agencies, organizations, and individuals from many tiers of public and private sectors) for the common purpose of preventing, protecting against, responding to, and recovering from intentional as well as natural threats to people or property. (Source: FEMA)

Appendix 4: In-depth interview guide

I. Greetings

My name is Nicole Errett and I am a doctoral candidate in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. I am completing my doctoral work as a fellow in FEMA's National Exercise Division.

II. Explanations

This interview is part of a broader exploratory study on the relationship of regional collaboration and national emergency preparedness. Specifically, the interview portion of this project aims to understand perspectives of key stakeholders regarding the impact and importance of regional collaboration on national preparedness, and whether or not the Urban Area Security Initiative (UASI) grant program has impacted this perception. The interview portion also aims to explore the role of exercises in the relationship of interlocal collaboration and national preparedness.

You have been identified as a key informant. Key informants have been defined as individuals who have a broad knowledge of the history, goals, and implementation of the overall UASI grant program.

I would like to record this interview, so that it can be transcribed and referred to later when I analyze all of the interviews. Are you comfortable with me recording the interview?

I will also be taking notes, and referring to this guide in front of me to ensure I don't miss anything I wanted to ask you.

This interview is designed to last between thirty minutes and an hour, depending on how the discussion goes. You may stop the interview at any time.

Do you have any questions for me before we begin?

III. Questions

1. Tell me about how you first became involved with the UASI program.

    a. When did you become involved?

    b. Are you still involved?

    c. In what capacity?

2. How would you describe the core elements of the UASI program?

3. What have been the main developments in the UASI program since you first became involved?

    a. How would you describe the progress/evolution of the grant program's priorities or outcomes since its inception/you first became involved?

4. Please describe the biggest successes of the UASI program.

    a. How have these successes been operationalized?

    b. *If the informant <u>does not mention interlocal collaboration</u>, ask:* Do you perceive that the grant has engaged stakeholders across jurisdictions within a metropolitan region funded by a UASI award? If yes, how? Which stakeholders?

5. Please describe the biggest challenges of the UASI program.

    a. What do you think is at the root of these challenges (may describe challenges discussed individually)?

    b. *If the informant <u>does not mention interlocal collaboration</u>, ask:* Do you perceive that there are challenges engaging stakeholders across jurisdictions within a metropolitan region funded by a UASI award? If yes, why? Which stakeholders?

6. What is your definition of national preparedness?

7. Please talk about if and how you feel the UASI program has had an impact on national preparedness.

    a. Do you think these changes would have happened without the UASI program?

    b. If the informant <u>does not</u> mention interlocal collaboration <u>but has discussed interlocal collaboration positively</u> earlier in the interview, ask: Do you believe the regional relationships fostered by the UASI program have contributed to this impact?

    If the informant <u>does not</u> mention interlocal collaboration but <u>has discussed lack of interlocal collaboration</u> or <u>has not discussed interlocal collaboration</u> earlier in the interview, ask: Do you believe a greater emphasis on regional relationships fostered by the UASI program would have altered

your perception of the impact of the grant on national preparedness? If so, how?

8. How prepared do you think (your jurisdiction, our nation) would be in the absence of the UASI program?

9. How can exercises, such as drills, table-top, functional, or full-scale exercises, be used to improve regional collaboration in preparedness?

    a. *If the informant states that exercises cannot improve interlocal collaboration, ask:* Why not?

    b. *If the informant states that exercises can improve interlocal collaboration, ask:* Can you describe any specific exercises that you have participated in, or that you know of, that you believe helped to foster interlocal collaboration? How did they accomplish this?

10. What exercise format(s) would be most conducive to interlocal collaboration enhancement among UASI regions? (e.g., drill, TTX, functional, or full-scale)

    a. What disciplines should be involved in an exercise to improve interlocal collaboration? (e.g., emergency management, health, law, fire, police, elected officials' offices)

    b. What exercise scenarios would be most appropriate for improving interlocal collaboration?

        i. Should scenarios be regionally specific or uniform (e.g., issues that are most likely to disregard artificial jurisdictional boundaries in many metropolitan regions)?

    c. Who should administer exercises designed to promote interlocal collaboration (e.g., should they be developed by the federal government and rolled out to states and locals; should locals develop their own exercises based on their specific needs; should they be part of the National Exercise Program)?

11. How can exercises capture a UASI region's ability to work together?

    a. Can you suggest exercise objectives that may facilitate the testing of interlocal collaboration?

    b. Can you suggest any specific indicators that can be captured by exercise evaluators?

    c. Should interlocal collaboration be measured at a capability level, or as a separate, aggregate measure of operational coordination at different phases of the disaster cycle?

    d. How can UASI regions collaboratively address corrective actions and lessons learned during exercises?

IV. Closing comments

This conversation has been very helpful. Those are all the questions that I have for you today.

1. Is there anything else you would like to tell me?

2. Do you have any questions for me?

3. Within the next week, I would like to send you an email summarizing key points from our conversation today. I will ask you to look it over and approve it or return it and any edits or comments within a week. Is this okay with you?

4. Would you mind if I contacted you again if I have any follow-up questions?

    a. If yes, what is the best way to reach you for follow-up?

5. Are there others you recommend that I should talk to about this?

a. If yes, do you mind if I let them know that you recommended I speak with them?

Thank you very much for your time.

Appendix 5: Interview invitational email template

[Date]

Dear [Key Informant Name],

Based on your knowledge of the history, goals, and implementation of the overall Urban Area Security Initiative (UASI) grant program, I am writing to cordially invite you to participate in an exploratory study on the relationship of regional collaboration and national emergency preparedness. Specifically, I would like to request your participation in an interview that will aim to understand perspectives regarding the impact and importance of regional collaboration on national preparedness, if/how the UASI grant program has impacted this perception, and the role of exercises in the relationship between interlocal collaboration and national preparedness.

Your participation in this interview is completely voluntary. All answers to this interview are confidential and findings will be de-identified prior to reporting or publication. This interview is designed to last between thirty and sixty minutes, depending on how the discussion goes. The interview can be scheduled at a time and location that is convenient for you. You may stop the interview at any time. This interview is part of an academic study, and is not intended to determine funding decisions. The interview and its findings may, however, become part of the broader evidence-based literature that guides such determinations.

If you would like to participate or have any questions or concerns, please contact me by email at [email] or by phone at [phone] Thank you for your time and any

assistance you may render in the completion of this valuable research project.

Regards,

[Signature]

Appendix 6: Member-checking email template

[Date]

[Address]

Dear [Key Informant Name],

Thank you for taking the time to participate in an interview as part of our study to understand perspectives regarding the impact and importance of regional collaboration on national preparedness, if/how the UASI grant program has impacted this perception, and the role of exercises in the relationship between interlocal collaboration and national preparedness. Your perspectives were both salient and informative. I am very appreciative of the time that you took out of your busy schedule to contribute to this research.

As I mentioned during the interview, I am emailing you a summary of the key points that I took from our discussion. Please review these for accuracy by COB [Date]. You can simply reply to this email to let me know that you believe these take-away points to be accurate based on our conversation, or to provide any revisions or comments. In order to conform to study timelines, no response by this time will be interpreted to mean "okay as-is."

[Bulleted key points]

Please contact me by email at nerrett@jhsph.edu or by phone at [phone number] with any questions or concerns. Thank you for your time and assistance in the completion of this valuable research project.

Regards,

[Signature]

Appendix 7: Code Book

"Big chunk codes"		
Mneumonic or "Brief Code"	**Full description of code**	**When to use code and when not to use code. Examples of use of the code to assist coders.**
UASI Grant	UASI grant	Describes resources used to produce outputs and achieve outcomes in preparedness made under the auspices of the UASI grant. This is also an Input, and can be co-coded as such when discussion is directly about the UASI funding itself.
Input	Emergency preparedness inputs other than UASI	Describes resources used to produce outputs and achieve outcomes in National Preparedness, including Government Resources (funding; staff; technology; equipment and supplies), Community Resources (private-sector and non-profit organization resources; individual actions), and Enabling Legislation or Policy (federal statutes, policy,

		and guidance; state statutes, policy, and guidance; local statutes, policy, and guidance) other than the UASI Grant.
Activities	Emergency preparedness activities	Describes programs and services executed to build or sustain one or more of the 36 national preparedness capabilities outlined in the National Preparedness Goal (Planning; Public information and warning; Operational coordination; Forensics and attribution; Intelligence and information sharing; Interdiction and disruption; Screening, search and detection; Access control and identity verification; Cybersecurity; Physical protective measures; Risk management for protection programs and activities; Supply chain integrity and security; Community resilience; Long-term vulnerability reduction; Risk and disaster resilience assessment; Threats and hazard

		identification; Critical transportation; Environmental response/health and safety; Fatality management services; Infrastructure systems; Mass care services; Mass search and rescue operations; On-scene security and protection; Operational communications; Public and private services and resources, Public health and medical services; Situational assessment; Economic recovery; Health and social services; Housing, Infrastructure systems; and Natural and cultural resources)
Outputs	Emergency preparedness outputs other than Interlocal Collaboration	Describes products and services delivered during the reporting period other than interlocal collaboration. Outputs do not indicate the results achieved.
Intermediate Outcomes	Emergency preparedness intermediate outcomes	Describes results/accomplishments of work in National Preparedness, such as National risk profile; investments targeted to address priorities; a

		functional National Preparedness System; Capabilities that prepare the Nation.
Assess	Assessment	Describes measurement methods, strategies, tools or metrics used to assess interlocal collaboration in preparedness.
Recommendation	Policy/Program recommendation	Recommendation for policy or programmatic change or continuation by interviewee. This policy or programmatic activity may be one that is being implemented or that should be implemented in the future.
Impact	Impact of UASI	Describes the impact of the UASI grant program. Apply when describing how the UASI has impacted overall national preparedness and/or the state of preparedness/readiness in the areas that received its funding.
Evolution	Evolution of UASI	Describes the evolution of the UASI grant program, including

		its administration or priorities, over time.
IC	Interlocal collaboration	Describes collaboration among independent, neighboring municipalities for preparedness purposes.
National Preparedness	End Outcome of National Preparedness	Describes End Outcomes – i.e., *National Preparedness* (Actual Incidents prevented; loss of life and property damage avoided or minimized; community recovery; an understanding of preparedness based on incidents and exercises).
Attribute codes		
Mneumonic or "Brief Code"	**Full description of code**	**When to use code and when not to use code. Examples of use of the code to assist coders.**
GQ Great quote	Particularly great or well-phrased quote from document, observation, or interview	For phrases or sentences that might be particularly great to include in a final document.
KI Local	To indicate if	Apply to all notes and transcripts

	interviewee works in government at the local level	from local government key informants.
KI State	To indicate if interviewee works in government at the state level	Apply to all notes and transcripts from state government key informants.
KI Fed	To indicate if interviewee works in government at the federal level	Apply to all notes and transcripts from federal government key informants.
KI Private	To indicate if interviewee works in the private sector	Apply to all notes and transcripts from private sector key informants.
Interview 1	To indicate this is the initial interview with a key informant	Apply to all notes and transcripts from the first interview with any key informant.
Interview 2	To indicate this	Apply to all notes and transcripts

	is a follow-up interview with a key informant	from a follow-up with any key informant.
Sub-codes (within big chunk)		
Mneumonic or "Brief Code"	**Full description of code**	**When to use code and when not to use code. Examples of use of the code to assist coders.**
UASI Grant/Determinants	Determinants	Describes factors or considerations made in determining UASI awards or funding levels.
UASI Grant/Guidance	Guidance	Describes the development, contents, or implications of UASI grant guidance.
Input/OHS Grant	Other homeland security grant	Describes resources used to produce outputs and achieve outcomes in preparedness made under the auspices of a homeland security grant that is not the UASI grant.
Input/Gov other	Other government input	Describes government resources used to produce outputs and achieve outcomes in preparedness not associated with the UASI or

		other homeland security grant, such as funding; staff, technology, equipment and supplies.
Input/Community	Community input	Describes community resources used to produce outputs and achieve outcomes in preparedness, such as private-sector and non-profit organization resources and individual actions.
Input/Policy	Enabling Legislation or Policy	Describes enabling legislation or policy (federal statutes, policy, and guidance; state statutes, policy, and guidance; local statutes, policy, and guidance) used to produce outputs and achieve outcomes in preparedness.
Activity/Exercise	Emergency Preparedness Exercises	Describes emergency preparedness exercises executed to build or sustain one or more of the 36 national preparedness capabilities outlined in the

		National Preparedness Goal interlocally, and/or foster interlocal collaboration.
Activity/Exercise/Objectives	Emergency Preparedness Exercise Objectives	Describes emergency preparedness exercise objectives designed to foster or test interlocal collaboration.
Activity/Exercise/Scenario	Emergency Preparedness Exercise Scenarios	Describes emergency preparedness scenarios or characteristics of such scenarios with respect to facilitating or testing interlocal collaboration.
Activity/Exercise/Administration	Emergency Preparedness Exercise Administration	Describes exercise administration (including who and how) of exercises designed to foster or test interlocal collaboration.
Activity/Exercise/Participation	Emergency Preparedness Exercise Participation	Describes stakeholders that do/should participate in exercises designed to foster or test interlocal collaboration.
Activity/Exercise/MA	Mission Area	Describes which Mission Areas KI believes exercises, including interlocal collaboration

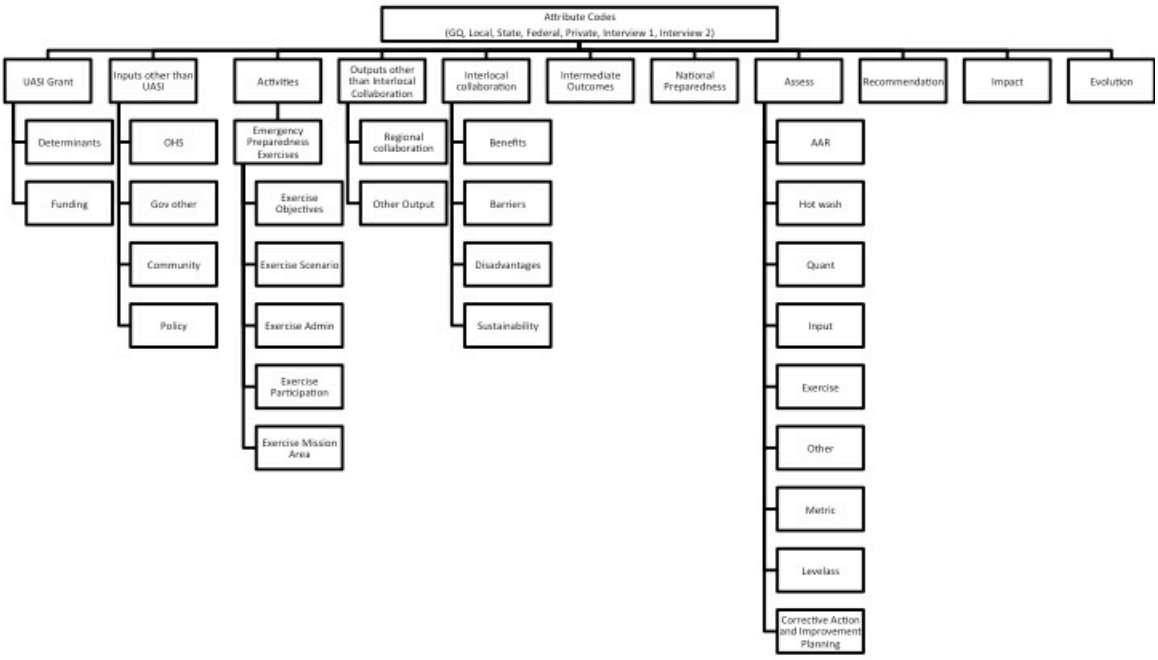
		building/testing exercises, should be focused on.
IC/Benefits	Benefits of interlocal collaboration	Describes benefits (realized or potential) of collaboration among independent, neighboring municipalities for preparedness purposes.
IC/Barriers	Barriers to interlocal collaboration	Describes barriers (realized or potential) to collaboration among independent, neighboring municipalities for preparedness purposes.
IC/Disadvantages	Disadvantages of interlocal collaboration	Describes disadvantages (realized or potential) or challenges of collaboration among independent, neighboring municipalities for preparedness purposes.
IC/Facilitator	Facilitators of interlocal collaboration	Describes facilitators (realized or potential) of collaboration among independent, neighboring municipalities for preparedness purposes.
IC/Sustainability	Sustainability	Describes sustainability issues

	issues in interlocal collaboration	(realized or potential) in collaboration among independent, neighboring municipalities for preparedness purposes.
Output/ORC	Regional collaboration	Describes regional or interdisciplinary collaboration other than interlocal collaboration (among independent, neighboring municipalities) for preparedness purposes.
Output/Other Output	Other output	Describes an output other than interlocal collaboration or regional collaboration.
Assess/AAR	Assessment using an after-action report	Describes assessment of interlocal collaboration, or association of interlocal collaboration with national preparedness that has been or could be conducted through an after-action report (AAR).
Assess/Hot wash	Assessment using a hot wash	Describes assessment of interlocal collaboration, or association of interlocal

		collaboration with national preparedness that has been or could be conducted through a hot wash. The hot wash may or may not be associated with an AAR. If it is associated with an AAR, it should be co-coded with "Assess/AAR."
Assess/Quant DCT	Assessment using a survey or other quantitative data collection tool	Describes assessment of interlocal collaboration, or association of interlocal collaboration with national preparedness that has been or could be conducted through a survey or other quantitative data collection tool.
Assess/Input Assessment	Assessment through inputs	Describes assessment of interlocal collaboration, or association of interlocal collaboration with national preparedness that has been or could be conducted by looking at inputs.

Assess/Exercise Assessment	Assessment through emergency preparedness exercises	Describes assessment of interlocal collaboration, or association of interlocal collaboration with national preparedness that has been or could be conducted through emergency preparedness exercises.
Assess/Other Assessment	Assessment using another method	Describes assessment of interlocal collaboration, or association of interlocal collaboration with national preparedness that has been or could be conducted through a method not described by existing codes.
Assess/Metric	Metrics	Describes any metrics or measurements that are used or could be systematically used to measure interlocal collaboration.
Assess/Level of Assessment	Level of assessment	Describes which level of government (local, state, tribal, federal) has conducted, or should

		conduct, an assessment of interlocal collaboration.
Assess/Corrective Action and Improvement Planning	Corrective Action and Improvement Planning	Describes interlocal corrective action and improvement planning processes post-exercise or event.


Attribute Codes
(GQ, Local, State, Federal, Private, Interview 1, Interview 2)
UASI Grant
Determinants
Funding
Inputs other than UASI
OHS
Gov other
Community
Policy
Activities
Emergency Preparedness Exercises
Exercise Objectives
Exercise Scenario
Exercise Admin
Exercise Participation
Exercise Mission Area
Outputs other than Interlocal Collaboration
Regional collaboration
Other Output
Interlocal collaboration
Benefits
Barriers
Disadvantages
Sustainability
Intermediate Outcomes
National Preparedness
Assess
AAR
Hot wash
Quant
Input
Exercise
Other
Metric
Levelass
Corrective Action and Improvement Planning
Recommendation
Impact
Evolution

Curriculum Vitae

Nicole A. Errett

September 2014

PERSONAL DATA

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Phone: (516) 637- 2614

Date of birth: September 24, 1987

Place of birth: Manhasset, New York, U.S.A.

EDUCATION AND TRAINING

2014 (exp)	Ph.D., Health and Public Policy Johns Hopkins Bloomberg School of Public Health Baltimore, MD
2013	Graduate Certificate, Humanitarian Assistance Johns Hopkins Bloomberg School of Public Health Baltimore, MD

2011	M.S.P.H., Health Policy Johns Hopkins Bloomberg School of Public Health Baltimore, MD
2010	Graduate Certificate, Public Health Preparedness Johns Hopkins Bloomberg School of Public Health Baltimore, MD
2008	B.A., Public Health Studies The Johns Hopkins University Baltimore, MD

PROFESSIONAL EXPERIENCE

2014 -	Special Assistant to the Assistant Secretary for Preparedness and Response U.S. Department of Health and Human Services (via contract with GAP Solutions, Inc.) Washington, DC
2012 - 2014	Doctoral Fellow, National Preparedness Directorate Federal Emergency Management Agency Washington, DC

2012 - 2013	Director of Policy and Special Projects, Emergency Management and Public Safety City of Baltimore Baltimore, MD
2012	Policy and Legislative Director, Mayor's Office of Emergency Management City of Baltimore Baltimore, MD
2011 - 2012	Director of Planning and Policy Development, Mayor's Office of Emergency Management City of Baltimore Baltimore, MD
2010 - 2014	Research Assistant, Preparedness Programs Johns Hopkins Bloomberg School of Public Health Baltimore, MD
2010 - 2011	Emergency Planner, Mayor's Office of Emergency Management City of Baltimore Baltimore, MD

2009 - 2010	Graduate Assistant, Mayor's Office of Emergency Management City of Baltimore Baltimore, MD
2009	Emergency Planner Maryland Emergency Management Agency Reisterstown, MD
2008	Intern, Center for Emergency Preparedness Policy Maryland Department of Disabilities Baltimore, MD
2006 – 2009	Research Assistant, Department of Anesthesiology Johns Hopkins Hospital Baltimore, MD

PUBLICATIONS

Peer Reviewed

Rutkow L, Vernick JS, Semon NL, Flowers A, **Errett NA**, Links JM. Translating legal research on mental and behavioral health during emergencies for the public health workforce. *Public Health Rep*. (in press)

Harrison KL, **Errett NA,** Rutkow L, Thompson CB, Anderson MK, Ferrell JL, Freiheit JM, Hudson JM, Koch MM, McKee M, Meija-Echeverry A, Spitzer J, Storey D, Barnett DJ. An intervention for enhancing public health crisis response willingness among local health department workers: A qualitative programmatic analysis. *American Journal of Disaster Medicine*. 2014; 9(2) 87-96.

Barnett DJ, Thompson CB, Semon NL, **Errett NA**, Harrison KL, Anderson MK, Ferrell JL, Freiheit JM, Hudson R, McKee M, Mejia-Echeverry A, Spitzer J, Balicer RD, Links JM, Storey JD. EPPM and Willingness to Respond: The Role of Risk and Efficacy Communication in Strengthening Public Health Emergency Response Systems. *Health Commun.* 2014; 29(6):598-609.

Barnett DJ, **Errett NA**, Rutkow L. A threat- and efficacy-based framework to understand confidence in vaccines among the public health workforce. *Vaccines*. 2013; 1(2):77-87.

Errett NA, Barnett DJ, Thompson CB, Tosatto R, Austin B, Schaffzin S, Ansari A, Semon NL, Balicer RD, Links JM. Assessment of medical reserve corps volunteers' emergency response willingness using a threat- and efficacy-based model. *Biosecur Bioterror.* 2013; 11(1):29-40.

Errett NA, Barnett DJ, Thompson CB, Semon NL, Catlett C, Hsu E, Gwon H, Balicer RD, Links JM. Assessment of psychological preparedness and emergency response

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Errett, NA. Promoting Pubic Health System Resilience is Everyone's Job. *Epidemic Proportions.* 2014.

PRESENTATIONS

Errett NA, Egan S, Garrity S, Schor K, Walsh L, Strauss-Riggs K, Altman B, Thompson C, Rutkow L, Barnett DJ. Local Public Health Agency Workers' Efficacy Perceptions Toward Hurricane Sandy Recovery Activities. Accepted for presentation at the American Public Health Association Conference in New Orleans, LA, November 2014.

Errett NA, Frattaroli S, Barnett DJ, Resnick B, Rutkow L. Evaluating the role of regional collaboration in emergency preparedness. Accepted for presentation at *Evaluation 2014* in Denver, CO, October 2014.

Errett NA, Bowman C. Is There a Relationship Between Interlocal Collaboration and National Preparedness? *National Homeland Security Conference.* Philadelphia, PA, May 2014.

Errett NA. Blizzards of 2010: Lessons Learned in Baltimore City Presented at the Federal Emergency Management Agency's Emergency Management Institute Course, *Integrated Emergency Management Course* in Emmitsburg, MD, August 2013.

Errett NA. Introduction to Public Health Preparedness. Presented to *Hagerty Consulting* Associates in Washington, DC, March 2012.

Errett NA, Plasencia L, Cleary K, Maloney RM. Emergency Management and Public Health Integration at the Baltimore Grand Prix. Presented at the *Public Health Preparedness Summit* in Anaheim, CA, February 2012.

Errett NA, Knapp J. Incorporating Functional Needs into Regional Emergency Preparedness Planning. Presented at the *National Urban Area Security Initiative Conference* in San Francisco, CA, June 2011.

Errett NA, Spendley B. Public Health 101 – What Every Emergency Manager Needs to Know. Presented at the *Partners in Preparedness Conference* in Tacoma, WA, April 2011.

Errett NA, Spendley B. Public Health 101 – What Every Emergency Manager Needs to Know. Presented at the *International Association of Emergency Managers Conference* in San Antonio, TX, November 2010.

POSTERS

Errett NA, Frattaroli S, Resnick B, Barnett DJ, Rutkow L. Role of interlocal collaboration in public health emergency preparedness. Accepted for presentation at the American Public Health Association Conference in New Orleans, LA, November 2014.

Errett NA, Harrison K, Semon NL, Storey JD, Barnett DJ. Emergency response willingness among public health workers: A qualitative evaluation of an extended parallel process model (EPPM)- centered curricular intervention. Presented at the *American Public Health Association Conference* in Boston, MA, November 2013.

Errett NA, Harrison K, Semon NL, Storey JD, Barnett DJ. Emergency response willingness among public health workers: A qualitative evaluation of an extended parallel process model (EPPM)- centered curricular intervention. Presented at the *American Public Health Association Conference* in Boston, MA, November 2013.

Errett NA, Maloney RM, Kenney C. Consensus building in multi-agency public health policy development: Baltimore's subcabinet structure. Presented at the *American Public Health Association Conference* in Boston, MA, November 2013.

Errett NA, Barnett DJ, Thompson CB, Tosatto R, Austin B, Schaffzin S, Ansari A, Semon NL, Balicer RD, Links, JM. Understanding Willingness to Volunteer Among Medical Reserve Corps Volunteers. Presented at the *Integrated Training Summit* in Nashville, TN, May 2012.

TEACHING EXPERIENCE

Course Design and Instruction – Undergraduate Students

Spring 2013	Public Health and Disasters (AS.280.406) Johns Hopkins University Baltimore, MD
Winter 2011	Public Health and Crisis: Introduction to Public Health and Emergency Management (AS.280.206) Johns Hopkins University Baltimore, MD

Teaching Assistantships – Graduate Students

Spring 2013	Public Health Practice [online] (PH.305.607.81) Johns Hopkins University

Baltimore, MD

Summer 2012 Effective Writing for Public Health Change (PH.308.604)
Johns Hopkins University
Baltimore, MD

Teaching Assistantships – Undergraduate Students

Spring 2010 & 11 Lead Teaching Assistant, Fundamentals of Health Policy and Management (AS.280.340)
The Johns Hopkins University
Baltimore, MD

Spring 2009 Fundamentals of Health Policy and Management (AS.280.340)
The Johns Hopkins University
Baltimore, MD

Advising and Mentoring

2013 - Faculty Mentor, M.S.P.H. in Health Policy Program
The Johns Hopkins University
Baltimore, MD

2011, 2013 Field Placement Preceptor, JHSPH M.S.P.H. in Health Policy
Mayor's Office of Emergency Management
City of Baltimore
Baltimore, MD

2010 - 2013 Intern Program Coordinator, Mayor's Office of Emergency Management
City of Baltimore
Baltimore, MD

2010 – 2012 Preceptor, JHSPH PHASE Internship Program
Mayor's Office of Emergency Management
City of Baltimore
Baltimore, MD

2009 - Adviser, Phi Mu Fraternity
The Johns Hopkins University
Baltimore, MD

Career Panels

Errett NA (panelist). Careers in Government. Johns Hopkins Bloomberg School of Public Health. Baltimore, MD; October 2011.

Errett NA (panelist). Careers in Government. Stevenson University. Stevenson, MD; March, 2011.

Errett NA (panelist). Careers in Public Health. Johns Hopkins University. Baltimore, MD; October 2010

HONORS AND AWARDS

2013	Gordis Teaching Fellowship Public Health Studies Program The Johns Hopkins University Baltimore, MD
2013	Sandvold-Hydle Family Scholarship Department of Health Policy and Management' The Johns Hopkins University Baltimore, MD
2013	Rosemary Gutherie Scholarship Phi Mu Foundation Peachtree City, GA
2012	Student Employee of the Year (2nd Place)

Career Center

The Johns Hopkins University

Baltimore, MD

2012 The John C. Hume Award, Department of Health Policy and Management

The Johns Hopkins University

Baltimore, MD

2011 Ella Jean Kromer Scholarship

Phi Mu Foundation

Peachtree City, GA

2010 President's Scholarship

Phi Mu Foundation

Peachtree City, GA

2009 Bachelor of Arts with University Honors

The Johns Hopkins University

Baltimore, MD

2009 Outstanding Student in Public Health Service Award

Public Health Studies Program

The Johns Hopkins University

Baltimore, MD

2009 Woman of the Year

Office of Greek Life

The Johns Hopkins University

Baltimore, MD

2008 Inductee

Order of Omega National Leadership Honor Society

The Johns Hopkins University

Baltimore, MD

2007 Founding Member, Vice President, and Inductee

Rho Lambda National Leadership Recognition Society

The Johns Hopkins University

Baltimore, MD

2007 The Outstanding Sophomore Award

Office of Greek Life

The Johns Hopkins University

Baltimore, MD

CERTIFICATIONS

2013 -	Certified Emergency Manager International Association of Emergency Managers Falls Church, VA
2011 -	Certified in Public Health National Board of Public Health Examiners Washington, DC
2006 – 2012	Emergency Medical Technician – Basic Maryland Institute for Emergency Medical Services System Baltimore, MD

PROFESSIONAL ACTIVITIES

Professional Memberships

2014 -	American Evaluation Association
2011 -	International Association of Emergency Managers
2010 -	American Public Health Association
2010 - 2012	Maryland Emergency Management Association
2010 - 2011	Association of Contingency Planners, Central Maryland Chapter

Peer Review Activities

2013 -	Disaster Medicine and Public Health Preparedness

2012 -	BMC Public Health
2011	National Association of County and City Health Officials, Project Public Health Ready

ACADEMIC SERVICE

2013 -	Advisory Committee Member, The Public Health Policy Practicum PhD Innovation Initiative The Johns Hopkins University Baltimore, MD
2012 - 2013	Co-chair, Student Coordinating Committee Department of Health Policy and Management The Johns Hopkins University Baltimore, MD