C. PROJECT NARRATIVE

Adolescent and Family Decision-Making In Time of Disaster

C.1. PRINCIPAL AND ASSOCIATE INVESTIGATORS

Below is the list of the Key Personnel of this project. For more details on the investigators, please see the **Biosketches.**

Christina W. Hoven, DrPH, MPH (Principal Investigator): Professor, Psychiatry and Epidemiology, Columbia University-NYSPI/RFMH; and, Director, Child Psychiatric Epidemiology Group.

Lawrence Amsel, MD, MPH (Co-Principal Investigator): Psychiatrist; and, Director of Mathematical Psychiatry, Child Psychiatric Epidemiology Group, Columbia University-NYSPI/RFMH.

George J. Musa, PhD (Co-Principal Investigator): Environmental Scientist and Medical Geographer, Child Psychiatric Epidemiology Group, Columbia University-NYSPI/RFMH.

C. 2. INTRODUCTION, BACKGROUND AND JUSTIFICATION

C. 2.1 Summary of the Proposed Project

A major goal of this study is to create knowledge that, working with our end-user partners, can facilitate the creation of educational materials, programs and procedures to improve disaster-related family-based decision-making. Creating programs that help adults and adolescents to identify their own decision-making and family negotiating styles, to know their strengths and weaknesses, and to appreciate how each individual impacts the family in disaster situations, can address important human-factor issues that may hinder public efforts to save lives in time of disaster. To this end, we are partnering with several community and educational institutions (see below and Letters of Support) including: The Red Cross, The Office of Emergency Management of New York City, the National Center for Disaster Preparedness (NCDP) at Columbia University, the Rockaway Youth Task Force, the Urban Assembly School for Emergency Management (UASEM) in New York, and Hunter College High School. Each of which are interested in utilizing our findings to develop, and deliver improved educational materials for adolescents and families, which will improve individual and collaborative family decision-making around disasters and evacuation situations.

Our team, the Child Psychiatric Epidemiology Group (CPEG), is in the Division of Child Psychiatry at Columbia University and the New York State Psychiatric Institute (NYSPI). We have a strong history of dissemination and publication based on our investigations of mental health and other sequelae of trauma in families exposed to 9/11, especially children of First Responders.[1-5]. Our group has been a leader in understanding how children and families cope following severely stressful and traumatic events. Having studied the effects of disasters on adolescents, we now propose to study the effects of adolescents on disaster outcomes for their families.

In the proposed study, we will bring our extensive experience in disaster-related field research to the task of assessing the role of adolescents, and of family negotiating style in

determining family decision-making regarding disaster preparation (DP) and evacuation (DE). Our well-characterized sample of families and children exposed to 9/11 and to Super-Storm Sandy, whose level of pre-storm preparedness is known to us from having interviewed them, and evacuation decisions during Sandy are known, will be used to evaluate this concept. We will conduct focus groups with a random selection of evacuee and non-evacuee families, to capture the family's negotiating and decision-making style, including tolerance for and inclusiveness of adolescents' input into the process, in order to better understand how these factors impacted the family decisions around preparedness and evacuation. Focus groups are important in eliciting concrete information about the family's decision-making and negotiation process, allowing for a deeper understanding of how a family chooses to evacuate or not. They also afford a more nuanced understanding of each family member's perception of the situation, as well as the family's collective perception. Finally, through the focus group, we may be able to partially replicate, and thus observe, the active family dynamics (verbal and non-verbal communication patterns, manifestations of power and control and decision-making processes) in real time decision-making.

In addition, we will, for the first time, combine focus group research with measures of individual decision-making styles, using formal behavioral laboratory tasks that 1) capture risk perception/tolerance and 2) interpersonal trust/reciprocity, factors known to be important in individual and group decision-making. Thus, we will be able to combine the insights from these complementary methodologies to gain a deeper understanding of the role that adolescents play in the family decision-making regarding disasters.

C. 2.2 Introduction

While much research has been done regarding how adults respond to impending disasters and to official alerts regarding evacuation, there is limited research on the role of adolescents in family decision-making or on the role of family negotiating style (including negotiating with adolescents) when making joint disaster-related decisions. However, research indicates that adolescents are increasingly well-informed and are taking a greater role in family decision-making[6]. This change may introduce new challenges as well as new opportunities, as adolescents may bring useful information, including new social-media sophistication and perspectives to the discussion. At the same time, adolescent's decision styles may differ from their parents, particularly in regard to risk taking[7], which may cause added stress to the decision-making process.

C.2.3. Background

In order to improve public disaster preparedness and public response to disaster warnings, one must understand how warning messages are understood and acted on. This recognition has spurred the study of risk perception and behavioral responses[8]. In particular there has been substantial research, in the context of natural disasters, on adult risk perception, risk tolerance, decision-making, and related risk-reducing behaviors[9,10]. Two key focus areas in the research on adult preparedness behavior have been the effectiveness of (warning) messaging, and adult perception of risk[11,12]. Personal and family risk-perception are strong predictors of evacuation behaviors, as people are more likely to take defensive action and evacuate if they perceive that the threat is real[9,13-15]. As for messaging, some researchers find that local and national television programming followed by radio, peers and local authorities are considered the most important

sources of information a family uses to decide to evacuate[9,16], while others find that extended family and peers are the most important sources[17].

Although this research has increased understanding of how **individuals** react to weather-related warnings, many of the most important response decisions involve families acting as a unit and making a group decision. While there has been some work in this area (reviewed below), there is insufficient research examining how the family behaves as a group decision maker, or what role adolescents play as active participants in these decisions.

The research on Group Decision Making (GDM) in relation to Disaster Preparedness (DP), and group response to disasters has been largely focused on work-based groups and generally involves co-workers and managers rather than families[18,19].

Interestingly, outside the area of disaster preparedness, there is a robust literature on adolescent influence on family decision-making in the areas of consumer purchases[20,21], family recycling[22] and other economic/ecological behaviors[6]. Beatty & Talpade (1994)[20] identified the key variables in this influence equation as: adolescent ability, adolescent motivation, parent/household characteristics, and decision characteristics.

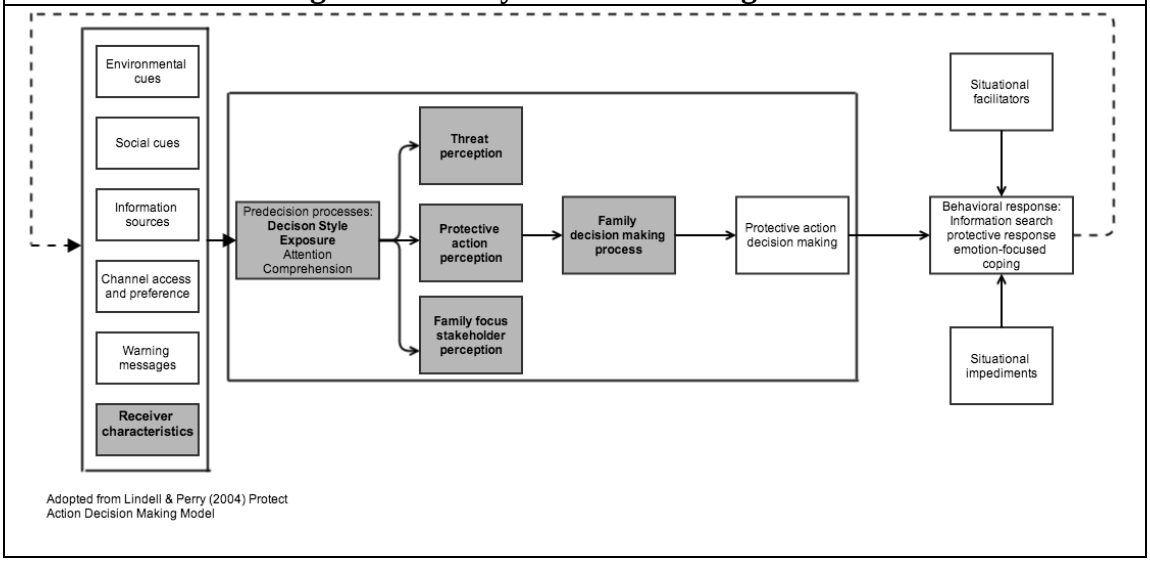
Also present is the beginning of a literature on children and adolescent disaster preparedness and their influence on family members. For example, the American Red Cross[23] developed programs aimed to help children understand and respond to natural disasters. Interestingly, however, direct work on studying or promoting children and adolescents as sources of influence on family decision-making in disasters has primarily taken place in the less developed countries, as described by Garrett[24] for Cuba and by Mitchell et al (2009)[25] for El Salvador and the Philippines. One recent exception to this is the Urban Assembly School for Emergency Management (UASEM) in New York, which has just recently opened, with the goal of teaching high school students how to better respond to extreme disaster situations by placing them in the roles of emergency managers. (They will be partnering with this study as one of our end-users, see letter attached.)

Despite these promising beginnings there remains insufficient research on: (1) the effect that adolescents have on family disaster preparedness (DP) and disaster evacuation (DE) decision-making, (2) the family group dynamics in decision-making, (3) formal (behavioral laboratory) measurement of adult and adolescent risk perception and trust/reciprocity, their comparison with each other, and how these affect the family negotiation process, and (4) the adolescent's role in the family.

To put these open questions in the perspective of the existing literature, we adopt (and modify) the model by Lindell & Perry (2004)[26], which provides an integrative decision-making model that captures many of the variables found to influence individual decision-making in response to disaster[27]. We have modified the Lindell & Perry (2004)[26] model to include decision style as a pre-decision process that influences individual risk perception, and have added to the focus on stakeholders a family perspective to account for the impact that both adolescent and parental trust and perception of each other have on family decision-making. In addition, we have added the family decision-making process as a moderator between perception and action to capture the actual family group decision-making process. We believe the updated model

represents a useful working model of a complex process of family decision-making. In this proposal we focus only on highlighted aspects of this model.

Figure 1. Family Decision-Making Process



C2.4. Preliminary Studies

The strength of our research team at the Child Psychiatric Epidemiology Group (CPEG), at Columbia University-NYSPI/RFMH, in its longstanding role as a leader in studies focused on how children and families are affected by mass disasters[2,28,29]. We will draw upon our existing experience of: studying effects of disasters on adolescent mental health, conducting in-house field work with families, assessing adolescent decision-making with task-based measures, and studying the effect of parental mental health on adolescent well being. Major themes from our prior and ongoing studies will help inform the goals of this application. The wealth of information previously collected, including information on the sample families we propose to study in this application, will enhance the value of our proposed research.

Disaster preparedness: Although our focus was the transmission of trauma, in our post-911 WTC Study, (N=855 families), which just concluded (6/31/13), examined child mental health in specific subpopulations. The longitudinal (two waves) study, included in-home, in-depth assessments of both parents and children. We also collected disaster preparedness information from the parent (24-items) and child (18 items) related to disaster preparedness/training and risk-perception. Table 1 includes a selection of these items. At the WTC Study baseline assessment, more than 90% of parents and children reported that they knew how to get out of their house/apartment during a disaster (see Table 1). However, only 29 to 56% of parents and 18 to 29% of their children reported that they had practiced how to get out of their house/apartment in preparation for an emergency, and only between 40 and 63% reported that their family has a special plan to find each other in case of an emergency. Only about half of the families have an emergency kit at home[30].

Examination of how previously exposed families, whose pre-Sandy disaster preparedness and actual evacuation behavior during Sandy is known, affords a unique opportunity to study

decision processes that mattered, and to improve our understanding of disaster-related, family-based, adolescent-inclusive decision-making. This knowledge can be instrumental in the formulation of training and intervention programs for improving decision-making around impending and actually occurring disasters, thereby helping to save lives.

Table 1. WTC Study: Selected Disaster Preparedness Items by WTC Exposure Groups at Baseline

Item	No Exposure (N=259)		WTC Evacuee (N=242)		WTC First Responder (N=354)	
	Parent (%)	Child (%)	Parent (%)	Child (%)	Parent (%)	Child (%)
Knows how to get out of house/apartment in a disaster	100	93	99	94	99	95
Had practice drill to get out of house/apartment	29	20	33	18	56	27
Family has special plan to find each other in emergency	45	40	55	41	63	48
Parent has discussed emergency procedures with teacher	20		28		29	
Child knows school emergency procedures		95		95		94
School had emergency/bioterrorism drill in last year	72	44	72	45	76	45
Family has emergency kit at home	57	38	69	50	69	51
Feels prepared for:						
Terrorist attack	52		68		76	
Natural disaster	68		70		84	
Parent Received education/training for natural disasters	29		35		58	
IF YES: Info received prepared them well for major disaster	72		88		93	
Child received emergency education/information in school/community		70		70		72
Discussed disaster preparedness with child	37	82	49	80	58	88
Confident government will keep family safe in major emergency	88		81		85	
Confident government will provide support/assistance in major emergency	89		86		85	

C.3. GENERAL WORK PLAN AND MILESTONES

C.3.1 Sample and Procedures

C.3.1.1 Sample: The proposed Study will screen a subsample (N~96) of families exposed to Super-Storm Sandy with an adolescent, ages 14-18 at the time of the screen, from the N=855 families who participated in Wave 1 (88% participation) and wave 2 of the WTC Study (ages 9-16 at Wave 1; ages 10-20 at Wave 2). In current analyses of the WTC Study sample, 329 families were living within 0.25 miles of Super-Storm Sandy's storm surge (exposed). A pre-interview screen will assess if the family evacuated due to the storm, and we will enroll a sample

of N=48 families. The proposed Study design relies on two sub-groups: **Group 1 (N=24)**: those who evacuated due to Super-Strom Sandy, **Group 2 (N=24)**: those who did not evacuate.

The WTC Study sample: The Index sample of the WTC Study was drawn from the World Trade Center Health Registry (WTCHR) population that registered themselves (adults) as either working in the WTC buildings and plaza, residing in the immediate WTC area on 9/11 (thus ordered to evacuate on 9/11), or as a first responder involved in the response (rescue or recovery worker) to the 9/11 attacks. Eighty percent of the youth participants of the proposed study are white, non Hispanic and 51% are female.

Study Participation: Based on feedback questions of the youth's follow-up interview where 92% reported that they would recommend participating in our study to others their age, we estimate that 90% of those families invited into the study will participate. Based on data from waves 1 and 2, both parents will be available to participate in 75% of all families.

C.3.1.2. Assessment Procedures: Currently, 40% of the WTC Study sample resides in NYC. All questionnaires will be done in-person by trained interviewers and will take place at the participants' residence, or at another location agreed to by both parties, such as a local library. All questionnaires will be audio recorded and all tasks collected on laptop computers. See Data Management and Sharing Section D, for complete details about interviewing procedures, data security and maintenance of confidentiality.

C.3.1.3. Reimbursement Scheme: Each family unit will collectively receive $50 for the focus group, and each participant will receive up-to $16 for the decision-making tasks. In addition, each parent and child will receive $25 for completing the study interview. Thus, the maximum amount a family can receive is $175.

C.3.1.4 Assessment Tools and Relevant Data collection

Telephone Screening: Super-Storm Sandy Evacuation: Information about evacuation response to Super-Storm Sandy evacuation orders will be collected during a telephone interview to determine Study inclusion.

Family Focus Groups: Focus group sessions will be conducted under leadership of an experienced and trained facilitator. These will be done in the family's home following task and questionnaire completion, and will include all available family members over the age of 12. The facilitator will guide the discussion by asking a set of predetermined open-ended questions about: a) what kinds of official information the family received regarding the Super-Storm Sandy, the level of risk to their neighborhood and the process of evacuation; and b) how the family decided whether or not to evacuate prior to or during the storm, with the aim of eliciting information about the family negotiation process, the role and contribution of each family member in decision-making, and the degree of parent-child conflict/cooperation during the negotiation and decision-making process. All focus groups will be audio-recorded for analysis as described below.

Interview: Parent and Adolescent Measures

***Disaster Preparedness*:** We already have obtained information about adults' knowledge and practices of disaster preparedness prior to Super-Storm Sandy from our existing WTC Study.

For example: a) did family members know how to get out of their homes if necessary; b) had they had a practice drill to evacuate; c) their reactions to not (possibly) being with their family during the storm; and, d) did their families have a plan for how to find each other after the emergency. These questions, which may influence decision-making, a broad spectrum of behaviors, are relevant to both natural and man-made disasters. In the proposed study, we will again use this assessment tool to examine what families actually did during Super-Storm Sandy, and going forward any changes in preparedness, awareness, and planned practices for the future.

***Super-Storm Sandy Response and Recovery*:** Perceived Risk and Evacuation Behavior Assessment (PREBA), a structured questionnaire adapted from Dow and Cutter[31], will be created to assess the families' perceived risk related to Super-Storm Sandy, past experience with Hurricanes, the Super-Storm Sandy evacuation decision-making process, including impediments, evacuation orders, media use, resources, support and critical pieces of information that dictated evacuation decisions.

Formal Decision-making Tasks: Parent and Adolescent

Risk Taking: *Balloon Analogue Risk Task (BART)***:** Adolescence is a developmental period of increased risk-taking and novelty-seeking behavior. The BART measures risk tolerance by balancing greater reward with greater risk, captures subjects' approach to risky decision-making, and is appropriate for both adolescents and adults. Task and Procedure: We will follow the procedure of the BART task described in detail by Crowley et al. (2009)[32]. In this task the subject sees a small balloon on the computer screen and a balloon pump. Each mouse click on the pump inflates the balloon incrementally (about 0.3 cm in all directions) and increases the amount of money associated with the balloon. However each balloon has a predetermined explosion point, and pumped past its individual explosion point, the computer generates a bursting-balloon sound effect, the balloon is seen to explode, and all the money for the current round is lost. On the other hand, participants can stop pumping the balloon and click the 'Collect $ $ $' button at any point. The task captures participants' willingness to risk another pump, with the potential for an incremental gain, and for losing all the money in the current round. The main outcome variable is the average number of times the subject inflates the balloon before it explodes. We expect average number of pumps will be smaller in adults than in adolescents, as risky behavior is more prevalent in adolescents. Participants will be told that they will receive actual amount won ($8 maximum).

Trust and Reciprocity Game: One of the most important developmental aspects of adolescence is learning appropriate interpersonal behaviors. Decisions regarding disaster preparedness and evacuation all have interpersonal and strategic components that cannot be fully understood without the social component of decision-making. Basic components of these complex behaviors are the ability to trust, including the discernment of when and who to trust, and the capability of social perspective-taking, seeing the world from another's eyes in order to respond appropriately, in other words reciprocity[33]. Moreover, behaviors in Game Theory based tasks have been shown to correlate well with real life behaviors that involve the capacity for trust and reciprocity[34,35]. The task is thus an excellent complement to our focus group research.

For our study we will use the Developmental Trust Game (DTG) which was created and tested by van den Bos and colleagues[36]. Designed to include children and adolescents, The DTG can examine both trust and reciprocity. In the trust condition, it measures the subject's

willingness to trust the other player in the face of potentially costly monetary loss. In the reciprocity condition, it measures a subject's perspective-taking (also known as Theory of Mind), that is, it measures if the subject recognizes when the other player has chosen to be trusting, and that reciprocating this trust is appropriate. van den Bos has shown that the task can be used effectively in children as young as nine, and has demonstrated that separate paths exist in the normal developmental of trust and reciprocity, establishing the task's sensitivity to different stages of social maturity[36]. Participants will be told that they will receive actual amount won ($8 maximum).

C.4. Specific Hypotheses and Statistical Analyses

Qualitative Data Analysis

All focus groups will be audio-recorded and rapidly transcribed by study personnel. Transcripts will be de-identified to preserve participant confidentiality, and imported into a computer-assisted qualitative data analysis software (CAQDAS) program for coding and analysis. Analysis of transcripts will focus on two areas: (1) structured coding for the purpose of extracting categorical/ordinal variables for inclusion in quantitative analysis, and (2) exploratory inductive qualitative analysis for model/theory building.

Structured deductive coding procedures will be used to extract three variables: level of **adolescent participation** in decision-making, intergenerational **conflict/cooperative attitudes**, and **family negotiation style**. Level of adolescent participation in decision-making will be operationalized based on an adaptation of Hart's (1997)[37] 'ladder of child and youth participation', which identifies eight categories of meaningful youth participation in decision-making, arranged along a continuum from 'manipulation', in which young people do what adults tell them to, to 'initiated, shared decision with adults', in which young people take the lead and decisions are made jointly. Interview transcripts will be coded and assigned an ordinal score between 1 and 8 reflecting the participation style.

Intergenerational conflict/cooperative attitudes will be measured by coding the transcripts for instances of both conflict and cooperation between parents and the adolescent, as well as beliefs that predispose family members towards intergenerational conflict or cooperation. Initial conflict belief codes will be adapted from Iyengar and Jackman's (2003)[38] list of common areas of conflict, and others will be added based on inductive qualitative coding. An ordinal intergenerational conflict/cooperative attitude score will be computed based on the frequency of conflict and cooperation codes identified in each transcript, weighted by total word count.

A measure of family negotiation style will be adapted from the Thomas-Kilmann Conflict Mode typology of negotiation and conflict management styles[39]. This model consists of five styles (competing, avoiding, accommodating, collaborating, and compromising) arranged along two axes ("assertiveness" and "cooperativeness"). All negotiation- and conflict management-related actions reported during focus groups will be coded based on these classifications, and family negotiation style will be computed as a categorical variable based on the frequencies with which each negotiation style code appears in each transcript.

Finally, in addition, exploratory qualitative analysis will be used to discover emerging themes and patterns in the transcript data, and to develop a novel model of adolescent participation in emergency response decision-making. Using a grounded theory approach[40],

transcripts will undergo several rounds of inductive coding in order to identify and refine emerging concepts, themes, and relationships, in order to generate insights into the various roles adolescents can play in risk assessment and decision-making, as well as the processes through which this occurs, and the external, family, and individual conditions which influence this process. The resulting theoretical model can be used to educate families and adolescents about effective disaster preparedness and response techniques, and serve as a useful framework for future research on this important yet understudied topic.

Objective 1. To test the effect of Decision-making Styles (DMS) and Decision-making Compatibility (DMC) on Disaster Preparedness (DP) and Actual Disaster Evacuation (DE).

Hypothesis 1 Low Risk Taking (as measured by Balloon Analogue Risk Task (BART)), and high Trust/Reciprocity (as measured by the Developmental rust Game (DTG)), in adults and adolescents, will predict high family Disaster Preparedness (DP), and actual Disaster Evacuation (DE).

Analysis Plan: Family disaster preparedness (DP) score variable will be created by summing the number of Super-Storm Sandy preparedness measures taken by the family, as assessed by the questionnaire. A linear regression model will be constructed with DP score as the outcome and parent and adolescent average number of pumps (from the BART) and mean percentage trust and mean percentage reciprocity (from the DTG) as predictors. A logistic regression model will be constructed with DE status (evacuated or did not evacuate) as the outcome and parent and adolescent average number of pumps (from the BART) and parent and adolescent mean percentage trust and mean percentage reciprocity (from the DTG) as predictors.

Objective 2. To test the effect of Decision-making Styles (DMS) and Decision-making Compatibility (DMC) on constructive family decision-making processes.

Hypothesis 2: Low Risk Taking (BART), high Trust/Reciprocity (DTG) and high level of decision compatibility will predict high level of adolescent participation in decision-making, high level of intergenerational cooperative attitudes, and positive family negotiation style.

Analysis Plan: Ordinal adolescent participation score, ordinal intergenerational conflict/cooperative attitude score, and categorical family negotiation style will be extracted from the family focus groups as described above. Linear or logistic models will be constructed with each of these scores as the outcome variable respectively, and parent and adolescent average number of pumps and mean percentage trust and mean percentage reciprocity as predictors. The differences between parental and adolescent average number of pumps, mean percentage trust, and mean percentage reciprocity will also be included as predictors in the models as measures of family decision-making compatibility.

Objective 3. To test the effect of constructive family decision-making on Disaster Preparedness (DP) and Disaster Evacuation (DE).

Hypothesis 3.1: High level of adolescent participation in decision-making, high level of intergenerational cooperative attitudes, and positive family negotiation style will predict high family Disaster Preparedness (DP), and actual Disaster Evacuation (DE).

Hypothesis 3.2: Constructive family decision-making will mediate the effect of Decision-making Styles on family Disaster Preparedness (DP), and actual Disaster Evacuation (DE).

Analysis Plan: Linear and logistic models will be constructed with DP score or DE status as the outcome, and ordinal adolescent participation score, ordinal intergenerational conflict/cooperative attitude score, and categorical family negotiation style as predictors. The mediation of the effect of family negotiation style on DP score and DE status by ordinal intergenerational conflict/cooperative attitude score, will be assessed using the Baron Kenny steps[41].

Objective 4. To impact curriculum for adolescents around DP and DE behavior.

Plan: We will share our findings with the Sea Grants program of the tri-state area and our end users with the objective to revise/create new curriculum for adolescents focused on DP and DE.

C. 4. OUTCOMES:

C.4.1 End Products of the Research

The ultimate aim of this research is to increase our current understanding of the various intricacies of family decision-making processes and to examine the roles that adolescents play in those processes. This research could benefit public health and public safety by assisting in the development of future strategies for disaster educational programs that are based on a scientific understanding of individual and group decision-making processes and their coordination. It also holds the promise of empowering adolescents and young adults to have more relevant roles in family decisions. CPEG plans to share the research findings with our end-user education partners who will use them to produce curricula and tangible educational materials that will enhance disaster preparedness by including important human-factor aspects of decision and negotiation style into these programs, and, importantly, by helping personalize the education by making learners aware of their individual and family decisional styles, and how this affects their outcomes.

C.4.2. End Users of the Research (see Letters of Support)

American Red Cross : Grant Hansen Director, Digital Product Management, American Red Cross is responsible for creating and distributing training materials related to disaster preparedness, with a focus on digital and new media approaches, an avenue especially close to adolescent consumers. He is part a team that won a Fresh award for creative approaches to communication around potential disasters, for a Hurricane app that provides a real-time information during a hurricane, offering invaluable aid. He is thus very aware of the challenges involved in effectively reaching families and getting them to make better decisions around DP. He has expressed interest in the novel aspects of our research that may impact the Red Cross educational materials by developing new ways of conveying important preparedness and recovery information, specifically through adolescents and younger family members.

New York City Office of Emergency Management (OEM): Christina Farrell is the Deputy Commissioner for External Affairs at the New York City Office of Emergency Management (OEM). Among their programs to educate the public is the Ready New York Kids campaign in the public schools, a program aimed at helping young people become more aware of, and

prepared for emergency situations. As such she is very committed to the role of youth in the management of emergency situations. She will be working with us as an end-user, as she believes this study could further the work of the OEM by helping to create better tools to more effectively reach individuals and effect their behavior in ways that matterdecision-making. Using our findings in conjunction with her office could impact a very large population of young people and families in important ways.

Milan Taylor and the Rockaway Youth Task Force has dedicated themselves to empowering young adults through civic engagement, mentoring, and volunteer opportunities (http://www.rytf.org/OUR-MISSION.html). As president and founder of the organization, Mr. Taylor strongly advocates adolescents to take more active leadership roles both within the Rockaway community as well as within their families. The Task Force has worked with the Red Cross in assisting families by rebuilding their homes in the wake of Super-storm Sandy, and has expressed their willingness to work with us as an end user. They feel confident that the findings from this research will prove vital in their continued efforts to better understand adolescents' impacts on family decision-making process during disaster situations and ultimately to empower them through their education programs and civic opportunities.

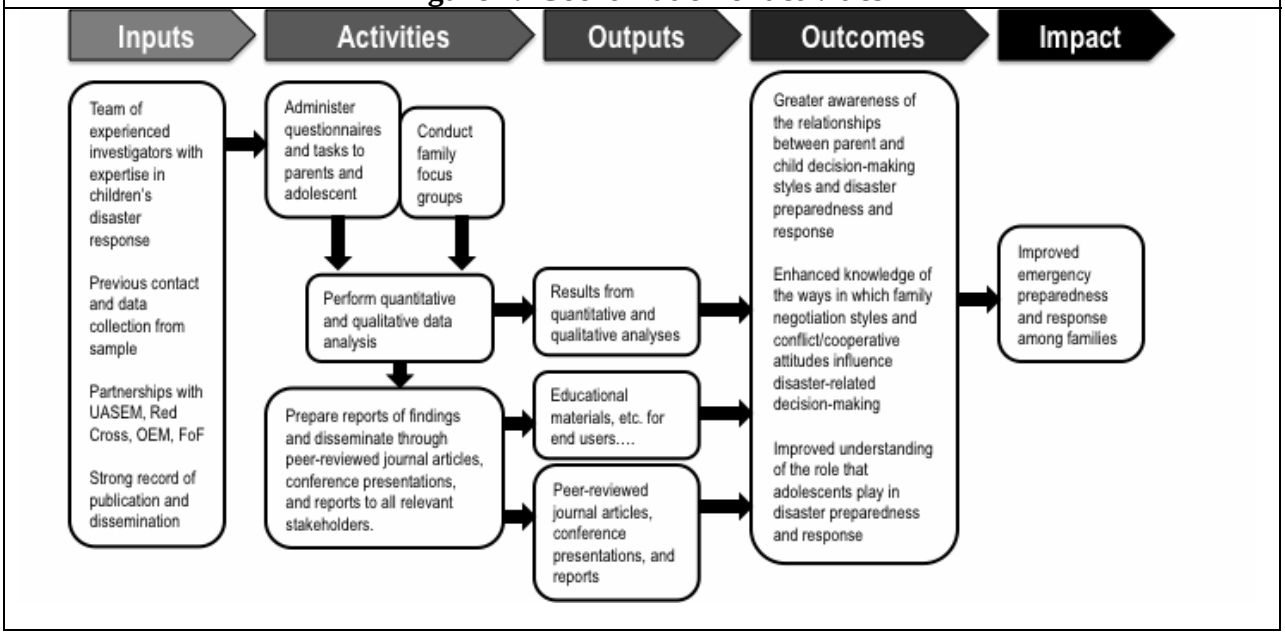
Irwin Redlener and the National Center for Disaster Preparedness (NCDP) at Columbia University have made it their mission to understand and improve the country's response to large scale man-made and natural disasters, and have taken a special interest in assisting vulnerable populations (http://ncdp.columbia.edu/). The NCDP plays a pivotal role in raising awareness of deficiencies in government disaster preparedness. The NCDP believes this research will greatly contribute to its understanding of emergency preparedness and response among families who are exposed to severe catastrophes, and that our future findings may subsequently increase evacuation rates in the event of future disasters.

Partnership Coordinator Elizabeth Oliver of the Urban Assembly School for Emergency Management (UASEM) has expressed her interest in collaborating with our organization as an end user. As a new school, starting only last September, the UASEM's main objective is to teach high school students how to better respond to extreme disaster situations by placing them in the roles of emergency managers (http://www.urbanassembly.org/uasem.html). They implement this by training their students to refine their communication and complex problem solving skills for future careers. Adolescents are often overlooked in the decision-making process, and Ms. Oliver has stated that this institution would greatly benefit from the findings from this research and that CPEG's past experiences with disaster-exposed families will help them to plan and incorporate new curriculum to better prepare New York City youths to face different kinds of emergencies

Principal Tony Fisher of the Hunter College High School has exhibited great enthusiasm for this proposal and has offered his support. Hunter College High School has often been a training ground for innovative new programs and specialized interventions, which include emergency preparedness. Principal Fisher feels that the potential results of this research may yield effective new material to be used in school curricula to promote awareness and better educate young adults on how to prepare for disaster situations. Properly understanding the cognitive and social mechanisms behind family negotiations is an important research goal that Dr. Fisher supports in order to better educate adolescents about disaster awareness and risk assessment in emergency situations.

C5. COORDINATION

Figure 2. Coordination of activities



Our research team at CPEG has well-established procedures for ensuring the coordination and quality control of our research process (see Figure 2 above for proposed work flow). Monitoring of recruitment and data collection progress (including questionnaire interview, focus groups, and behavioral tasks) will be conducted via regular (weekly) meetings where the Project Director (Doan) and data manager (Musa) report to all investigators of the project the current status of data collection and possible problems. We employ a sophisticated computerized tracking system to log in the recruitment, scheduling, completion and review status of every study participant. This existing tracking system will be modified accordingly to meet the unique needs of this investigation. Monthly meetings will be held for interviewers and supervisory staff to discuss the recruitment and interviewing procedures and to address any problems from the interviewers' point of view. Monitoring of the decision-making tasks will be conducted by Dr. Amsel. Regarding monitoring the integrity of data analysis, there are practices in place in CPEG that assure the accuracy and quality of all analyses, and this is further described in data section. The proposed study is expected to generate scientifically robust information to help guide clinical and public health actions. We have already begun a coordination effort with our end-user partners (see Letters of Support), and we will continue to coordinate with them, keeping them abreast of research progress and beginning the planning process for the translation of these results into practical educational programs, curricula, and disseminable materials, as soon as is practical.

D. Data Management and Sharing

Sources of Information: *Interview:* The interview will take approximately 45 minutes for each child/parent and will consist of a detailed account of preparedness, exposure and response to Super-Storm Sandy. *Decision-Making Tasks*: Parents and the selected child will be asked to participate in two computer-generated tasks: The Balloon Analogue Risk Task (BART) which examines risk tolerance, and the Trust and Reciprocity Game, which measures the ability to trust. The tasks will take about 20 minutes each. *Focus Group*: All members of the family over the age of 12 will be invited to take part in a focus group exploring the elements of family decision involved in the determination to evacuate or not to evacuate their homes.

Compensation*:* The family as a whole will receive $50 for participating in the focus groups, and each individual will receive up-to $16 for each decision-making task. Each parent or child completing the other study elements will receive $25 for each element.

Potential Risks: Risks to subjects in this study are minimal. However, during the interview, subjects will be asked about psychiatric symptoms they have experienced and about their experience of Sandy. There is thus some risk that they will become distressed in discussing such matters. It is also possible that some upsetting feelings may arise during the focus groups, which will be more open-ended than the rest of the study procedures. However, parents and children are always informed that they may refuse to answer any question and are made aware of psychological resources available to them. In addition, the study employs a procedure of clinical review for severe or urgent cases. There are also no known risks from the behavioral tasks employed in the study. These tasks do not pose physical, emotional, or social risks beyond those encountered in the course of ordinary life. See also "Protection against Risk".

Recruitment Strategy: Families will initially be sent a letter introducing the proposed study and informing them that they will be contacted by telephone within two weeks (time frame required by our IRB) and inviting them to call the study office directly if they wish. This letter will also serve to identify families who have moved and may require special recruitment efforts. Each family will then be called by phone to explain the study further and invite their participation.

The interviews, tasks and focus groups will all be done in one session. All parents and children will be required to give written consent/assent to participate in the interviews, the tasks and the focus groups before they join the study. No interview will be conducted with any youth under 18 years of age without the written consent of a parent or guardian and the written assent of the youth. For family members participating only in the focus groups, the consent form will have a separate box for the respondent to check, indicating that their consent is for focus groups only.

Audio-recording the interviews: For quality assurance purposes, and for coding the focus groups, we will audio-record the interviews, tasks and focus groups. We routinely record our research with families. All participants must give written consent in order for recording to take place. All consent and assent forms will be approved by the Institutional Review Board at Columbia University/New York State Psychiatric Institute.

Protection Against Risk: Participants will be told that they can stop any of the procedures at any time. They will be given a telephone number at the study office to call if they have any questions about the procedure. Parents and youth may refuse to answer any question, or to

complete any of the tasks. Families will be told that they may withdraw their consent at any time. If any study children are in foster care, or are removed from their families after recruitment, we will follow the IRB guidelines and child welfare agency approvals and special consent procedures required.

Data Management: All data (qualitative, quantitative and decision-making tasks) will be collected in the field on AS-256 encrypted laptops, to protect confidentiality. All individual information obtained will be held strictly confidential. No information that might in any way lead to the identification of the source will be made public, and reports will present aggregate data only. All raw data, including audio recordings, from the study will be kept in locked files and identified by ID number only; names, addresses and any other identifying information of study individuals or families will be kept in an entirely separate, locked location. The consent forms will be stored in a separate and secure location from data obtained using the other data collection methods. The data will be used for research purposes only and retained until the research project is completed. All personnel will receive Human Subjects and HIPAA training to ensure compliance with IRB and research ethics guidelines. Electronic data will be protected on a secure server behind a firewall and in accordance with HIPAA regulations. All Protected Health Information (PHI) will be stored on a SQL server with access permitted on the basis of need. The qualitative portions of the interview will be extracted and transcribed.

Data Sharing: CPEG is currently re-designing and re-constructing our website using the Drupal Content Management System (www.childepi.org), which is scheduled to be back up by the end of 2013. This website will allow users to register with our group and request data for all our studies. Once all data collection, quality assurance and analyses has been completed, the data will be de-identified, and all components of the interview will be made available for registered users who have completed the data request application for this study. Due to the possibility that the qualitative narratives may contain Protected Health Information (PHI), no transcriptions will be made available to external users without IRB approval.

In addition to the CPEG website, the de-identified data will be made readily available to users through the Social Science Electronic Data Library (www.columbia.edu/cgi-bin/cul/resolve?clio3302767) a data archive maintained at Columbia University. It is also anticipated that fellow researchers at Sea Grants and NOAA will be interested in using the data. For this reason, the de-identified data will be made available for their use and to be hosted on their websites, if they wish.

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19. Drabek,T.E. (1992). Variations in disaster evacuation behavior: public responses versus private sector executive decision-making processes. *Disasters, 16,* 104-118.

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Project Timeline

Tasks / Activities / Milestones	Related Project Objective(s)	Funding Year 1												Funding Year 2											
		Beginning Month and Year: 01/2014																							
		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24
Meet with End Users	1, 2, 3	X								X							X								
Finalize questionnaire	1,2,3	X	X																						
Select sample	1,2,3		X	X																					
Recruit Families	1,2,3			X	X	X	X	X	X																
Interview Families	1,2,3				X	X	X	X	X	X															
Quality Control	1,2,3				X	X	X	X	X	X															
Qualitative Exploratory Analyses	1,2,3				X	X	X	X	X	X	X														
Qualitative Coding	1,2,3				X	X	X	X	X	X	X	X	X												
Data Analyses	1,2,3						X	X	X	X	X	X	X	X											
Report Writing	4													X	X	X	X								
Publication Preparation	4													X	X	X	X								
Disseminate findings to End-Users	4																X								

BIOGRAPHICAL SKETCH

Christina W. Hoven, DrPH, MPH
Professor of Epidemiolgy and Psychiatry
Director of the Child Psychiatric Epidemiology Group

Education

BA, Psychology & English, Lindenwood University, 1966
MA, Psychology, University of Missouri, 1968
MPH, Health Policy, Columbia University, 1983
MS, Epidemiology, Columbia University, 1987
DrPH, Epidemiology, Columbia University, 1988

Personal Statement

As Principal Investigator, I am proposing the investigation, "Adolescent and Family Decision Making In Time of Disaster," as it is an ideal time to obtain a robust examination of decision making among those who have differentially responded to Super-storm Sandy. As a child psychiatric epidemiologist, I have focused much of my research over the past twelve years studying the indirect impact on children of parental exposure to trauma (9/11), initially based on findings from our epidemiological investigation of 8,236 New York City public school children following the September 11th attack on the World Trade Center. We have just completed a longitudinal epidemiological investigation of the transmission of trauma from 9/11 First Responders and WTC evacuees to their children (5R01 HD046786, PI: Hoven), which collected two waves of in-depth (3-5 hour interviews) information. Importantly, while we analyze these First Responder data, it is clear that not enough is known about family decision making in crisis. This is an excellent opportunity to capitalizing on our existing, rich data set to understand how families make decisions in response to disaster warnings, including calls to evacuate.

Recent Employment

1989-	Research Scientist, NYSPI, Dept. of Child and Adolescent Psychiatry
1992-	Prof, (Assist-Full) Epidemiology & Psychiatry, Columbia University
1993-1996	Dir, NASMHPD Post-Doc Training, NYSPI & Columbia University
2002-	Director, Child Psych Epidemiology, Columbia University – NYSPI

Other Experience and Professional Activities (Selection)

2003-	Scientific Advisory Board, World Trade Center Evacuee Study: NYC-DOH-MH
2006-	Karolinska Institute, Dept. of Public Health, WHO Suicide Prevention Centre
2007-	Center for the Study of Social Inequalities and Health, affiliated member
2007-	Associate: Health & Society Scholars Program, MSPH, Dept. of Epidemiology
2009-	Senior Methodologist, European Union Funded WE-STAY (Working in Europe to Stop Truancy Among Youth) 10 country study, Karolinska Institute
2010-	Chair, Epidemiology Dept. Diversity Committee, Columbia University, MSPH
2010-2012	UNICEF Consultant, suicide in youth, Tajikistan
2013-	Tel Aviv University- Schneider Medical Center, Consultant USAID Children's MH

Honors

1999	W.T. Grant Faculty Scholars Award (Finalist)
2002	Testified, U.S. Senate, Hearings on Children's Mental Health Post-September 11
2002	David E. Rogers Medal in Health Policy, Cornell University
2003	United Nations Address: UNICEF and NGO Health Committee
2009	Nobel Lecture, Nobel Assembly, Karolinska, Stockholm

Selected Peer-reviewed Publications

1. Hoven, CW: Testimony: The United States Senate, Hearing before the Committee on Health, Education, Labor, and Pensions, (Chairs, Hillary Rodham Clinton and John Corzine), Children of September 11: The Need for Mental Health Services. US Government Printing Office, Senate Hearing No. 107-540, Document No. 552-070-29-035-4, June 10, 2002.
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7. Hoven, C.W., Mandell, D.J., Duarte, C.S., Wu, P. & Giordano, V. (2006). An epidemiological response to disaster: The post-9/11 psychological needs assessment of New York City public school students, in 9/11: Mental Health in the Wake of Terrorist Attacks, Y. Neria, R. Gross, R. Marshall and Guest editor E. Susser (Eds.), Cambridge University Press, New York, 2006, pp. 71-94.
8. Hoven, C.W., Duarte, C.S., Turner, J.B. & Mandell, D.J. (2009). Child mental health in the aftermath of disaster: A review of PTSD studies, in Mental Health and Disasters, Y. Neria, S. Galea, F.H. Norris (Eds.), Cambridge University Press, New York, pp. 218-232.
9. Hoven, C.W., Mandell, D.J., Bertolote, J.M. (2010). Prevention of mental ill-health and suicide: Public health perspectives. European Psychiatry, 25(5):252-256, 2010. PMID: 20452753
10. Kelleher, I., Keeley, H., Corcoran, P., Lynch, F., Fitzpatrick, C., Devlin, N., Molloy, C., Roddy, S., Clarke, M., Harley, M., Areeneault, L., Wasserman, C., Carli, V., Sarchiapone, M., Hoven, C.W., Wasserman, D. & Cannon, M. (2012). Clinopathological significance of psychotic experiences in non-psychotic young people: evidence from four population-based studies. British Journal of Psychiatry, 201(1): 26-32. PMID: 22500011

BIOGRAPHICAL SKETCH

Lawrence V. Amsel, MD, MPH
Assistant Professor of Clinical Psychiatry

Education

BA, Mathematics, Columbia College, Columbia University, 1979
MD, Medicine, Yale University School of Medicine, 1988
MPH, Public Health/ Biostatistics, School of Public Health – Columbia University, 1998

Personal Statement

I have been working in psychiatry and public health since graduating from Yale University School of Medicine in 1988. I joined the faculty of Columbia University performing research in suicide prevention and applications of Decision Science and Game Theory to psychiatry. In 2003, I organized the first ever American Psychiatric Association symposium on applications of Game Theory to psychiatry, and have published articles and presented posters on Game Theory modeling of suicide, OCD, and PTSD.

After 9/11, I joined the Trauma Studies and Services division at the New York Psychiatric Institute, and have been involved in treating victims of 9/11 and their families, in training community clinicians in cutting edge treatments for PTSD and Complicated (Traumatic) Grief, as well as in doing research on optimal methods of disseminating this training. I was recently involved in preparing the training materials for the National VA PTSD CBT training program in conjunction with Edna Foa's group at University of Pennsylvania. I have worked with Joy Hirsch at the Program in Imaging and Cognitive Science (PICS) and with Elke Weber and Eric Johnson at the related Decision Imaging Group (DIG) as Director of Mathematical Psychiatry, with the goal of creating innovative collaborations involving fMRI and Decision Science, as applied to psychiatric disorders. Over the last several years I have been collaborating with Dr. Hoven at the Child Psychiatric Epidemiology Group (CPEG) working on understanding the connection between decision deficits, trauma and psychiatric disorders in the developing brain of children/adolescents. I have extensive clinical expertise within psychiatric research, as well as expertise in applying decision science tasks in psychiatric research settings.

I will contribute to the proposed study, "Adolescent and Family Decision Making In Time of Disaster," as Co-Principal Investigator and will serve as the team expert on decision tasks, helping to incorporate the selected tasks into the overall study design. I will be involved in supervising the collection of data related to these tasks and will help guide study design, data collection and analysis, and assist in the interpretation and publication of research findings.

Positions and Employment

1992-1993	National Institute of Mental Health Fellowship in Mental Health Statistics, Columbia University School of Public Health
1995-	Assistant Attending in Psychiatry Columbia Presbyterian Hospital
1996-1998	Director of Clinical Education, In-Patient Psychiatry Columbia Presbyterian Hosp.
1997-1998	Assistant Unit Chief, In-Patient Psychiatry Service. Columbia Presbyterian Hosp.
1993-	Course Director, *Introduction to Psychiatry for Epidemiology* Columbia University School of Public Health
1994-1995	Freedom Forum Center Fellow in Health Care Reform & the Mass Media. NY, NY

1995- Assistant Professor of Clinical Psychiatry, P&S Columbia University
1997- Research Associate for Education in Bioethics. The Hastings Center, Garrison, NY
1998-1999 Research Psychiatrist, New York State Psychiatric Institute
1999-2001 Research Fellow, Division of Child and Adolescent Psychiatry, Columbia University
2001- Research Psychiatrist, Division of Therapeutics, New York State Psychiatric Institute and Columbia University
2008- Research Psychiatrist, Child Psychiatric Epidemiology Group, New York State Psychiatric Institute and Columbia University

Fellowships

1992-1994 Fellowship Training: National Institute of Mental Health Fellowship in Mental Health Statistics and Psychiatric Research Methods at Columbia University School of Public Health.
1994-1995 Freedom Forum Center Fellow, Research Topics: Analysis of healthcare reform, and journalistic representations of the reform process.
1999-2000 NIMH Research Fellow, Division of Child and Adolescent Psychiatry, Columbia University

Selected Peer-reviewed Publications Most Relavant (in chronological order)

1. Amsel, L. (2001). The role of decision science in the understanding and prevention of suicide. Society for Medical Decision Making, Abstract, October, 2001.
2. Amsel, L.V. & Pilpel, A. (2002). A game theory model of suicidal behavior: Improving prediction and prevention. American Psychiatric Association Abstract, May 2002. Component paper in APA Symposium on Application of Decision Theory and Game Theory to Psychiatry, organized and chaired by L. Amsel.
3. Mann, J.J., Currier, D., Stanley, B., Oquendo, M.A., Amsel, L.V. & Ellis, S.P. (2005). Can biological tests assist prediction of suicide in mood disorders? International Journal of Neuropsychopharmacology, 9(4), 465-474. PMID: 15967058
4. Amsel, L., Suh, E. J., Marshall, R. & Neria, Y. (2006). Training therapists to practice evidence-based psychotherapy after 9/11. In Yuval Neria, Raz Gross, Randall Marshall & Ezra Susser (Eds.). 9/11: Mental Health in the Wake of Terrorist Attacks, Cambridge University Press. Cambridge, UK.
5. Marshall, R.D., Bryant, R., Amsel, L., Suh, E.J., Cook, J. & Neria, Y. (2007). The psychology of ongoing threat: relative risk appraisal, the September 11 attacks, and terrorism-related fears. American Psychologist, 62(4), 304-316. PMID: 17516775
6. Amsel, L. & Pilpel, A. (2008). Towards a mathematical psychiatry – Game theory modeling of OCD. Society for Judgment and Decision Making Annual Meeting Abstract, 2008.
7. Jensen, P.S., Goldman, E., Offord, D., Costello, E.J., Friedman, R., Huff, B., Crowe, M., Amsel, L., Bennett, K., Bird, H., Conger, R., Fisher, P., Hoagwood, K., Kessler, R.C. & Roberts, R. (2011). Overlooked and underserved: "action signs" for identifying children with unmet mental health needs. Pediatrics, 128(5), 970-9. PMCID: PMC3387881
8. Amsel, L.V., Hunter, N., Kim, S., Fodor, K.E. & Markowitz, J.C. (2012). Does a study focused on trauma encourage patients with psychotic symptoms to seek treatment? Psychiatr Serv, 63(4), 386-9. PMCID: PMC3617213

BIOGRAPHICAL SKETCH

George J. Musa, PhD
Environmental Scientist and Medical Geographer

Education

PhD, Earth and Environmental Sciences, City University of New York, 2013
MPhil, Earth and Environmental Sciences, City University of New York, 2008
MA, Geography, Hunter College, City University of New York, 2006
BA, Geography, Hunter College, City University of New York, 2003

Personal Statement

As an environmental scientist and medical geographer, my expertise allows me to apply Geographic Information Science (GISciences) analytical techniques to determine spatial and environmental determinants of risk. Specifically for this study, through the geo-coding of individual-level data, the overlay of satellite imagery, and the use of GIScience methods, I am able to determine which households were within the Super-Storm Sandy storm-surge. Such geographic information will be necessary to fully understand the evacuation decision-making processes of families affected by Super-Storm Sandy.

I have worked in the Division of Child and Adolescent Psychiatry at Columbia University since 1995, and I have contributed to many domestic and international epidemiological studies examining the mental health of young people and their families, specifically those at risk, such as children of 9/11 First Responders and parents who have been arrested.

As Co-Principal Investigator, I will contribute to the proposed study, "Adolescent and Family Decision Making In Time of Disaster," to investigate risk assessment and decision-making in the wake of Super-Storm Sandy. We will draw on a sample of 9/11 families who were exposed to Sandy and will utilize a combination of interview techniques and computerized tasks in order to understand family decision-making in response to threat of natural disaster. I will be involved in identifying our subjects by location, overseeing the geo-coding of our data, and interpreting the results from the perspective of environmental science.

Positions and Employment

1995-	Research Scientist, Department of Child and Adolescent Psychiatry, Columbia University, New York, NY
2004-	GIS Consultant, National Health Research Institute, Taipei, Taiwan, R.O.C.
2006-	Adjunct Lecturer, Department of Geography, Hunter College, City University of New York
2003-	Member, Association of American Geographer

Honors

2003	Excellence of Scholarship Award, National Council for Geographic Education
2003	Gordon Darkenwald Graduate Study Award
2003-2005	MAGNET-STEM AGEP Doctoral Study Fellowship, National Science Foundation

Selected Peer-reviewed Publications

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