Preparedness and Emergency Response Research Centers (PERRC) Mid-Project Review

A Report from the Board of Scientific Counselors (BSC)

Office of Public Health Preparedness and Response (OPHPR)

Centers for Disease Control and Prevention (CDC)

Department of Health and Human Services (DHHS)

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Approved by Vote of the BSC: January 3, 2012

Respectfully Submitted: March 19, 2012

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1.0 Review Objectives and Process

Background

External peer review is a highly regarded mechanism for critically evaluating the scientific and technical merit of research and scientific programs. This rigorous process identifies strengths, gaps, redundancy, and research or program effectiveness in order to inform decisions regarding scientific direction, scope, prioritization, and financial stewardship. External peer review will address program quality, approach, direction, capability, and integrity and will also be used to evaluate the program's public health impact and relevance to the missions of the Centers for Disease Control (CDC) and the Office of Public Health Preparedness and Response (OPHPR).

OPHPR has established standardized methods for peer review of intramural research and scientific programs in order to ensure consistent and high quality reviews. A more detailed description of CDC's and OPHPR's peer review policy is available on request.

CDC policy requires that all scientific programs[1] (including research and non-research) that are conducted or funded by CDC be subject to external peer review at least once every five years. The focus of the review should be on scientific and technical quality and may also include mission relevance and program impact. OPHPR's Board of Scientific Counselors (BSC) provides oversight functions for the research and scientific program reviews. The BSC primarily utilizes ad hoc workgroups or expert panels to conduct the reviews. It is anticipated that the BSC will be engaged in most of the reviews and they may elect to utilize workgroups, subcommittees or workgroups under subcommittees to assist in the review. The BSC will evaluate findings and make summary recommendations on all reviews, including those they engage in, as well as reviews performed by other external experts.

Review Process and Timeline

The peer review was conducted by a seven-member ad hoc workgroup with two members of OPHPR's Board of Scientific Counselors (BSC) serving as workgroup co-chairs and five invited expert reviewers external to the OPHPR BSC. Facilitation and logistical assistance was provided by OPHPR's Office of Science and Public Health Practice (OSPHP).

In preparation for the review, data were collected in an innovative and inclusive manner from all the PERRCs. A survey was created by the Extramural Research Program (ERPO) staff. The survey was developed from performance metrics established with input from the PERRC Principal Investigators (PIs). The performance metrics and the resulting survey instrument were based on a logic model for the evaluation which reflected the priorities, goals, and objectives for the program, the activities required for these research centers described in the funding opportunity announcement and the expected program outputs and outcomes (short- and long-term) for the awards. The survey questionnaire consisted of 33 questions pertaining to four key areas: a) effectiveness and cohesiveness of the Center infrastructure and activities; b) progress towards achieving program/project goals and objectives; c) evidence of research findings having a direct or potential impact; and, d) stakeholder perspectives on research current and future impacts on preparedness and response capabilities. The questionnaire was sent to the PERRCs who were given four weeks to

[1] Scientific program is defined as the term "scientific program" includes, but is not necessarily limited to, intramural and extramural research and non-research (e.g., public health practice, core support services).

complete and return it. After examining the data for accuracy and completeness, data were analyzed by scientists external to the ERPO and a report was written by the Extramural Research Program under the leadership of the director, Dr. Mildred Williams-Johnson. This report and the data and analysis it contained; presentations by ERPO headquarters staff, stakeholders and PERRC PIs (Appendix F) during the three and one-half day review; and the additional material provided by the ERPO and the OSPHP formed the basis of the information used by the workgroup to assess the program. The additional material provided for workgroup to use in their review and assessment included the Research Impact Briefs developed jointly by the ERPO and PERRC staff (Appendix I), the Summary of PERRC Practice Tools and Policies (Appendix J), the PERRC Publications Analysis Report (Appendix K), collated abstracts of PERRC presentations at the 2010 and 2011 National Association of County and City Health Officials (NACCHO) Public Health Preparedness Summits (available on the NACCHO Summit website, or from ERPO upon request), and a CD with individual PERRC responses to the Survey Instrument (available from ERPO upon request).

1. Pre-meeting: OSPHP convened a pre-meeting web conference (webinar) with members of the workgroup on Friday, July 29, 2011 from 2:00 to 4:00 pm (EDT). The webinar agenda included overview presentations on the PERRC Program and individual PERRCs. Reviewers were asked to submit written individual comments in response to the review questions. These comments and questions were intended to inform the co-chairs and assist OPHPR in providing the workgroup with the necessary information in advance of the in-person meeting.

2. Workgroup meeting: The workgroup met for three and one-half days from August 9 – 12, 2011 in Atlanta, GA. On the first and second day, there were presentations, discussions, and question-and-answer sessions with ERPO headquarters staff, PERRC investigators, and external stakeholders. On the third and fourth day the workgroup convened privately to deliberate, formulate findings, write a draft workgroup report (see Attachment A: Suggested Workgroup Report Outline) and provide an outbriefing to OPHPR leadership and ERPO staff.

3. Post-meeting: The workgroup chair(s) led the completion of the final workgroup report. Workgroup members and OPHPR and ERPO staff were given the opportunity to review and comment on the contents of the workgroup report before it was finalized. ERPO will have the opportunity to provide program responses to any findings and individual recommendations in the report at the BSC meeting. The full BSC will deliberate on the final panel report during the next meeting, reach a consensus on recommendations, and present these recommendations as summary determinations to OPHPR leadership. ERPO will respond to the BSC recommendations in writing and present their response and implementation plan at the next full BSC meeting.

2.0 Scope of the Review

Background

The Office of Science and Public Health Practice (OSPHP) in the Office of Public Health Preparedness and Response (OPHPR) provides oversight for the management of the Extramural Research Program Office (ERPO). ERPO is responsible for planning, developing, coordinating, managing, and evaluating extramural research awards, programs, and activities for OPHPR. The current OPHPR extramural research portfolio is ca. $15M.

A significant part of the extramural research portfolio includes the Preparedness and Emergency Response Research Centers (PERRCs). Research to improve federal, state, local, and tribal public

health preparedness and response systems was mandated by the Pandemic and All-Hazards Preparedness Act of 2006 (PAHPA) . To address this mandate, the PERRCs were established at accredited Schools of Public Health to conduct public health systems research on preparedness and response capabilities at the national, state, local, and tribal levels. These research centers were designed to use a multidisciplinary approach to examine the structure, capabilities, and performance of public health systems preparing for and responding to any and all potential threats and hazards.

In 2008, the Centers for Disease Control and Prevention (CDC), awarded $10.9 million per year in the first of a 5-year program to 7 accredited schools of public health for establishing PERRCs. In 2009, CDC awarded another $2.7 million per year in the first of a 4-year program to two additional schools of public health to establish PERRCs. An integral part of the work of these centers is to help translate study results to public health practice. PERRC research directly benefits federal, state, local, and tribal public health preparedness and response activities. All PERRC research is focused on identifying critical elements needed to enhance preparedness for all hazards and to close gaps in public health preparedness and response services.

Each PERRC consists of 3-4 investigator-initiated research projects and an administrative core. PERRC research projects address one of the four research priority recommendations identified in an Institute of Medicine Letter Report (2008; available at www.iom.edu/CMS/3740/48812.aspx). The IOM report resulted from a study convened at the request of CDC. PERRC research also addresses cross-cutting issues for preparedness and response, such as identifying and addressing the unique needs of at-risk populations and rural communities. State and local public health departments are collaborative partners in the research being conducted by several PERRCs.

The Funding Opportunity Announcement (FOA; number TP08-00; P01 grant) that established the PERRCs was published in 2008. It specified that between the third and fourth budget periods OPHPR program staff intend to conduct a comprehensive mid-course evaluation of the research centers in conjunction with consideration for continued funding. The FOA specified that the evaluation may include, but is not limited to, an institutional visit to review ongoing program activities, consultation with PERRC advisory committees, program partners, individual research investigators, or other parties, as determined necessary.

Objectives

Research in the Preparedness and Emergency Response Research Centers (PERRCs) is focused on four priority areas to achieve near-term (3-5 years) impact on public health preparedness and response systems. For the purpose of this review, impact is defined as “present and future research results in the IOM priority areas that can strengthen or improve preparedness and response practices at federal, state, local, or tribal levels.” The priority research areas are to:

- Enhance the usefulness of training
- Create and maintain sustainable preparedness and response systems
- Improve communications in preparedness and response
- Generate criteria and metrics applicable to an all-hazard approach to preparedness to measure effectiveness and efficiency

The aim of the mid-project review of the PERRCs was to assess the functioning and research progress of the PERRCs toward achieving near-term impact. The review included activities conducted within the first 2.5 years at seven PERRCs (Harvard School of Public Health, University of North Carolina, Johns Hopkins University, University of Pittsburgh, University of Washington, Emory

University, and University of Minnesota; funded in September 2008). Activities conducted within 1.5 years were evaluated for PERRCs at the University of California, Berkeley, and University of California, Los Angeles (funded in September 2009).

The review focuses on an assessment of the functioning of the administrative core and progress of the individual and inter-related research projects of each PERRC toward achieving results for near-term impacts on public health preparedness and response systems (PHPRS). This review was focused specifically on an evaluation of:

1. The conduct of required activities (as specified by the FOA) in the administrative core and the support and oversight of individual, inter-related research projects. Reviewers will be asked to evaluate:
    a. The support and development of pilot research projects and new investigator training and the potential public health impact from these activities.
    b. The role of an established Advisory Committee and evidence that this body has provided meaningful support and guidance to research at the PERRC.
    c. Centralized scientific guidance and financial administration for the individual and inter-dependent research projects.
2. The progress in a PERRCs' individual and inter-related research projects toward achieving original research goals and the potential for ongoing research to yield near-term results (3-5 years) to help strengthen practice in the public health preparedness and response system (PHPRS). In evaluating the research, reviewers will be asked to assess the:
    a. Development of transferable knowledge to improve the PHPRS or development of tools, models, and other practical applications for response to all hazards. This may include a consideration of:
        i. Evidence that the projects have yielded research findings that have been transferred to practice and helped improve preparedness and response capabilities and performance (e.g., as a result of research findings, practitioners have changed their behavior resulting in more effective or science-based approaches to practice).
        ii. The future potential for the projects to yield results that can be transferred to practice and improve or strengthen preparedness and response capabilities and performance.
    b. The extent to which a public health systems research approach is used and the extent to which research partnerships are a key factor in achieving research results. This may include a consideration of the quality and quantity of:
        i. Collaborations with state and local public health and organizations across the PHPRS
        ii. A multidisciplinary research team
    c. The adequacy of methods to disseminate research findings that are accessible and appropriate for multiple audiences, in particular public health preparedness and response practitioners and policy makers.
    d. The metrics and indicators developed for this evaluation to illustrate and measure the impact of research outcomes on PHPRS.

3.0 Workgroup Findings and Recommendations

Preamble

Each PERRC consists of 3-4 investigator-initiated research projects and an administrative core. PERRC research projects address one of the four research priority recommendations identified in an

Institute of Medicine Letter Report (2008; available at www.iom.edu/CMS/3740/48812.aspx). The IOM report resulted from a study convened at the request of CDC. PERRC research also addresses cross-cutting issues for preparedness and response, such as identifying and addressing the unique needs of at-risk populations and rural communities. State and local public health departments are collaborative partners in the research being conducted by several PERRCs.

With an awareness that the PERRC program may end after FY 2012 before the PERRCs can complete their project work, the following findings and recommendations are reported. In general, the working group found that excellent progress has been shown thus far from the PERRCs – especially taking into account that they have concluded only three years or less of operation. The working group felt it was important to emphasize several overarching observations:

- The PERRCs are the only research program in the U.S. Department of Health and Human Services that uses a public health systems approach to address complex and rapidly changing issues in preparedness and response. They are also unique in that they conduct multidisciplinary research to yield results for near-term improvements in preparedness and response in areas recommended by the IOM.
- Public health preparedness and response research is a relatively new area of investigation and as such requires core funding to grow research capacity. For young investigators who commit to a research career in this field, funding opportunities are needed to encourage their work and keep them engaged.
- It seems clear that the cost related to emergencies will increase in the future. In the view of the working group, research in this area can help control and even reduce costs.
- Research being done by the PERRC Centers will benefit the public health system as a whole in that many of the research findings have relevance for the field of public health in general.

Findings by Review Objectives

REVIEW OBJECTIVE # 1: *The conduct of required activities (as specified by the FOA) in the administrative core and the support and oversight of individual, inter-related research projects. Reviewers will be asked to evaluate:*

a. The support and development of pilot research projects and new investigator training and the potential public health impact from these activities.
b. The role of an established Advisory Committee and evidence that this body has provided meaningful support and guidance to research at the PERRC.
c. Centralized scientific guidance and financial administration for the individual and inter-dependent research projects.

Pilot Projects and New Investigator Training. Two important activities of the PERRCs, as specified in the FOA, were to sponsor pilot research projects and to train and engage new investigators in PHPRS research. It was very clear to the review panel that all the PERRCs supported pilot projects; a total of 27 pilot projects were funded in the time period reviewed (Appendix H, Figure 1), and that as envisioned in the FOA, these play a major and very positive role in the Centers. Each of the PERRCs reported on the potential or realized impact of one or more of their completed pilot projects. Some had immediate local impact while others served as important building blocks for future research and programmatic efforts. The Review Group expressed concern that the some of the excellent work accomplished through these pilots could be lost unless a formal mechanism was put in place that catalogued their results and lessons learned.

Some examples of how the PERRCS used the pilot projects are:

- To address new research ideas that needed to be developed (Appendix F, LEP pilot, University of Washington)
- To study new emergency/disaster situations with agility and flexibility (Appendix F, H1N1 examples pgs. 12 and 13, UCLA, University of Pittsburgh)
- To enable new investigators to conduct research on preparedness and emergency response that provided the foundation for his/her own research grant in this area (RO1) (University of Washington Individual PERRC Survey Response)
- To rapidly engage a myriad of different stakeholders by using pilot projects to address stakeholder research questions (Appendix H, Figure 2)
- To answer local research questions rapidly (Appendix H, Figure 3)
- To address research questions of at risk populations (Appendix H, Figures 4 and 5)

All the Centers addressed the issue of building the field (of Preparedness and Emergency Response Research) and then sustaining and growing it by training and supporting new investigators. New investigators included young investigators who had chosen public health systems and preparedness as their focus of research as well as more senior investigators from other fields who were new to PHSR, especially preparedness-related PHSR. All Centers have been successful bringing in new investigators and mentoring them in preparedness and emergency response. In total, 30 new investigators were trained and mentored across all PERRCs. An additional 178 junior research personnel that represented students (undergraduate and graduate), fellows (post-doctoral stipend researchers), and research associates (salaried doctoral researchers) were involved with PERRC sponsored preparedness and emergency response research.

It was clear to the reviewers that the PERRCs create an opportunity for researchers to identify themselves with the new and growing field of preparedness and emergency response research. The research that has been done by these new investigators has resulted in 17 research papers. The PIs all mentioned that they are very concerned about sustainability of the interest and involvement of new investigators in the field if funding is not sustained. The Review Group agreed with this concern.

Role of the Advisory Committee. In line with the FOA mandate, all PERRCs have well-established, active and diverse Advisory Committees. Each PERRC has a different mix of committee members but all include both technical experts and stakeholders. Some PERRCs also constituted Advisory Boards to provide more subject matter expertise to the research projects. It was noted, however, that certain gaps in representation existed across several PERRC Advisory Committees, most notably, representatives of the business community, elected officials, and academics from fields or disciplines that are typically under-represented in PHPRS (e.g. engineering, business, psychology). Several PERRCs have extensively integrated their Committee and its members into their programs, meeting monthly, with telephone interactions more often. Committee members perform a number of important functions for the PERRCs. They provide a critical link to the public health practice community and contribute input on specific research projects. The expanded participatory advisory committee concept already adopted by some PERRCs, with greater committee “hands-on” project participation is a good one worth expanding. Committee meetings also provide a venue for investigators to test approaches for communicating their research in terms that practitioners and the public can understand. Importantly, they help build a community of practice.

Through the question and answer session with members of the various PERRC advisory boards who had been invited to the review the working group found the advisors to be very positive about their interactions, leading to an effective two-way, mutually beneficial exchange. The ERPO selected

participants for the Advisory Committee stakeholder panel with the following criteria to alleviate potential biases; 1) reflect a broad representation of organizations on these committees, 2) active participation on an Advisory Committee, and 3) availability to participate on the stakeholder panel.

Centralized Scientific Guidance and Financial Administration. A very important function of the PERRCs is their role in providing centralized scientific guidance and financial administration for individual and inter-dependent research projects. This function was evident in the performance of all PERRCs. Although program plans for conducting required activities in the administrative core varied among PERRCs, each was effective in managing and supporting public health preparedness and response research.

Most PERRCs reported monthly scheduled meetings as the most common method used to manage scientific activity, to increase productivity across individual research projects (IRPs), and to address unanticipated challenges. Some of these challenges included limitations in or access to appropriate technology, resource constraints, and impediments from institutional structure, and challenges posed by geographical locations of PERRC investigators. Using the administrative core to provide technical assistance, collaborating with local partners, using scientific presentations to increase interaction among investigators, and ensuring local partners that research findings would be shared, are examples of how PERRCs overcame challenges.

PERRCs also cited several examples where fiscal oversight helped to ensure research productivity which in some instances led to successful leveraging of available resources and other resources to address unanticipated research challenges and opportunities.

REVIEW OBJECTIVE # 2a: *The progress in a PERRCs' individual and inter-related research projects toward achieving original research goals and the potential for ongoing research to yield near-term results (3-5 years) to help strengthen practice in the public health preparedness and response system (PHPRS). In evaluating the research, reviewers will be asked to assess the:*

> *Development of transferable knowledge to improve the PHPRS or development of tools, models, and other practical applications for response to all hazards. This may include a consideration of:*
>
> *i. Evidence that the projects have yielded research findings that have been transferred to practice and helped improve preparedness and response capabilities and performance (e.g., as a result of research findings, practitioners have changed their behavior resulting in more effective or science-based approaches to practice).*
>
> *ii. The future potential for the projects to yield results that can be transferred to practice and improve or strengthen preparedness and response capabilities and performance.*

The assessment of PERRC progress was limited by time, resource constraints, and the fact that PERRCs have only been operational for 2.5 (and in some cases 1.5) years. Formal assessment of PERRC progress was limited to:

- An inventory of the 34 IRPs according to the IOM recommended areas of emphasis and cross-cutting research priorities identified in the FOA; and,
- Information on the populations targeted to benefit from PERRC research.

According to the survey conducted of PERRC Progress, Accomplishments, and Challenges:

"Overall, the PERRC program is addressing the IOM research priority themes and progressing toward achieving original specific program and project goals and objectives. Though coverage of these themes and across populations is uneven, it is reasonable that each PERRC will not target all population types, given the nature in which investigator-initiated research is developed, the limited coverage of all priorities among the pool of meritorious research applications, and limited funding to award centers that could address all IOM priorities with a focus on all cross-cutting themes priorities (Appendix H, p.48)."

While research emphasis and productivity varies across PERRCs, the program as a whole has been very successful in addressing the IOM research priority themes. Centers are progressing towards achieving overall program and project specific goals and objectives. The review team concurs that the overall PERRC research portfolio is targeting a wide variety of geographic and at-risk populations and that PERRC research can be expected to yield results to strengthen public health preparedness and response systems. The review team observed that the PERRCs have done an admirable job of bridging scientific research and practice, generating promising findings and producing a high volume of policy and practice tools, some of which have already demonstrated impact, albeit largely at the local level. The team notes, however, that it is too soon to infer broad applicability and adoption, and that ongoing assessment and evaluation is needed. It will be particularly important, in moving forward, that emphasis be placed on documenting scalability of interventions and their impact at the regional and national levels and over time. Funding reductions will certainly impede or derail progress toward PERRC goal attainment and knowledge transfer.

While individual PERRCs have been productive, collaboration across PERRCs was less visible.

REVIEW OBJECTIVE # 2b: *The extent to which a public health systems research approach is used and the extent to which research partnerships are a key factor in achieving research results. This may include a consideration of the quality and quantity of:*

iii. Collaborations with state and local public health and organizations across the PHPRS

iv. A multidisciplinary research team

The review team reinforced the importance of a multidisciplinary *and* interdisciplinary approach and the need to involved research partners form disciplines outside public health (which most centers have).

There is ample evidence that PERRCs have taken a systems-based approach in their research and engaged a variety of public and private health partners. (Appendix H, Figure 11). Data presented demonstrate that collaborations across the public health system play an important role in shaping PERRC research. It is less clear from the metrics and data presented to the working group that PERRCs are conducting 'systems research' that directly addresses the challenges of integrating various components of the public health system to ensure an effective and efficient approach to preparedness and response.

REVIEW OBJECTIVE # 2c*:* *The adequacy of methods to disseminate research findings that are accessible and appropriate for multiple audiences, in particular public health preparedness and response practitioners and policy makers.*

The PERRCs are doing a good job of getting research published in journals that will reach the practice audience. There have been 51 peer-reviewed articles published through the PERRCs. The PERRCs use multiple channels to get their messages out to both the research and practice communities.

However, according to a survey presented to the working group, there are relatively few local health departments aware of PERRC activities. The working group felt that most PERRCs did not have a well-developed and articulated strategy for ensuring that research findings reach the proposed target audience to facilitate translation and transfer of research into practice, especially at the local level.

REVIEW OBJECTIVE # 2d*.The metrics and indicators developed for this evaluation to illustrate and measure the impact of research outcomes on PHPRS.*

Overall, the metrics developed by ERPO with input from the PERRCs are appropriate and relatively comprehensive. However, caution should be used in their interpretation as many of the indicators are merely counts of activities and do not address issues of quality or impact. The research impact briefs are good qualitative examples of impact and should be used more effectively to engage with key policymakers and decision makers at the state and local levels. These metrics will be useful in benchmarking future progress. If new metrics are needed in moving forward, OPHPR should re-establish the PERRC Principle Investigator workgroup to develop these metrics.

The Review Group expresses its appreciation to the Extramural Research Program (ERPO) staff for its outstanding support of the review process and for the thorough and thoughtful *Report on the Survey of PERRC Progress, Accomplishments and Challenges*. This report was particularly helpful to the review group in their deliberations. The workgroup is also appreciative of the time taken by the PERRC investigators in responding to the survey and in sharing their experiences with the review group in an open and collaborative process. The commitment of the PERRC investigators to research that will better inform best practices in public health preparedness and emergency response was undeniable.

Recommendations:

Overarching

(1) Financial support of research centers should be continued to ensure sustained development of scientific evidence and research capacity in support of best practices for the field of public health preparedness and emergency response.

(2) If additional funding were to become available for the existing PERRCs, priority should be given to funding centers that meet the following criteria:

- A record of exceptional past performance based on both the quantitative and qualitative metrics used in the mid-course review;
- The use of a truly multidisciplinary and systems based approach to research in public health preparedness and response;

- Presents a proposed research plan that addresses recognized needs in the field, that can be completed within the time frame of the additional funding, and that has the potential to yield results that can inform practice;
- Evidence of ongoing projects that are evaluating new interventions or comparing existing programs or practices to identify what works best.

CORE (Review Objective #1)

Pilot Projects

(3) A database of pilot projects completed by the PERRCs should be developed to include a description of the overall project, a summary of results, documented or potential impact of the results, an assessment of what worked and what did not work, lessons learned and recommendations for next steps. This information should be made broadly available to the research community.

(4) Any future PERRC funding opportunities should continue to encourage grantees to consider the balance and diversity of research partners and populations served in the selection of pilot projects.

New Investigators

(5) While the PERRCs have been successful in engaging new investigators from varied disciplines in their work, they should pay particular attention to ensuring greater diversity, especially of under-represented minorities.

(6) PERRCs should track the extent to which new investigators retain their involvement in public health preparedness and emergency response research. Overall, PERRCs should develop a more systematic way of assessing the impact of PERRC training on the careers of researchers who are new to the field.

(7) If there are future funding opportunities for research in PHPRS, they should continue to encourage awardees to train new investigators and students, in order to grow the multidisciplinary field of PHPRS researchers.

Advisory Committees

Although the PERRCs are to be commended for establishing highly effective Advisory Committees, several gaps in membership across several of the PERRCs were identified.

(8) As appropriate, PERRCs should consider enhancing the involvement of: the business community, elected officials, public safety professionals and emergency management personnel. In addition, they should ensure representation of academics from disciplines often under-represented in public health preparedness and response systems research (e.g., business, engineering, psychology, sociology, anthropology, political science, economics, social work, and other health science professionals).

(9) The workgroup encourages greater use of project-specific advisory groups where appropriate. The expanded participatory advisory committee concept already adopted by some PERRCs, with greater committee "hands-on" project participation is a good one worth expanding.

Collaboration across Centers

Individual PERRCs have been productive. Moving forward, additional cross-center collaboration and communication will enhance the overall impact of the program.

(10) Mechanisms should be created to enhance networking of both new and established investigators across centers. These mechanisms could include:

- Development of a searchable database of PERCC investigators to include their research interests and disciplinary focus
- Implementation of a web-based forum to allow investigators to interact with each other around specific topics of mutual interest
- Development of a clearinghouse of surveys, tools, research findings that can be accessed by PERRC investigators
- Development of monthly webinar series organized by topic areas or cross cutting research themes for the PERRCs to share research results and lessons learned

PROGRESS IN INDIVIDUAL RESEARCH PROJECTS AND EVIDENCE OF IMPACT (Review Objective #2)

(11) OPHPR should work to develop an updated research agenda for public health preparedness and response systems. The updated agenda should build upon the IOM recommended research priorities that are the focus of the PERRCs. Future funding opportunities for research in PHPRS should emphasize the following:

- Systems research that addresses the challenges of integrating across the components of the public health system
- Interventional research (i.e. development and evaluation of new interventions)
- Comparative effectiveness research (i.e., comparing what practices work best for whom and why)
- Translational or implementation research (i.e., research into the barriers and facilitators of implementing strategies of proven efficacy across different settings and at-risk populations).
- Mechanisms to encourage collaboration on joint research projects among awardees

Impact of the Research

Overall, survey data indicate that the PERRCs are and will continue to generate a high volume and variety of policy and practice tools, some of which have already demonstrated impact, although largely at the local level.

(12) In moving forward, there should be greater emphasis on demonstrating impact at the regional and national levels.

Although initial results from several of the research projects are promising in terms of potential impact, there is a need to assess sustained impact over time and scalability to other regions and diverse populations.

(13) As future funding opportunities for research in PHPRS become available, priority should be given to demonstrating longer term impact and scalability of interventions and strategies.

(14) The further development and dissemination of research impact statements should be given priority over the next 12-18 months. These impact statements should be used more effectively to engage with key policymakers and decision makers at the state and local levels.

(15) Wherever possible, PERRCs should use well-established methods for constructing case examples for return on investment (ROI) of their research.

Dissemination

A focused effort at dissemination and translation is required to ensure effective transfer and uptake of research findings and tools.

(16) OPHPR should establish a working group of PERRC investigators and key stakeholders to develop a strategy for dissemination that can be implemented over the next 12-18 months. Particular attention should be paid to developing a strategy that will reach underrepresented minority groups and organizations involved in preparedness (e.g., minority-serving institutions, Historically Black Colleges and Universities, National Association of Black Social Workers). The workgroup should work closely with experts in communication and best practices in dissemination and translation. In developing the strategy, attention should be paid to clearly defining target audiences and how best to convey findings to those audiences, in terms of both dissemination channels and re-packaging the content to be practice friendly and relevant to the audience. The strategy should also be sensitive to the framework of the public health paradigm (e.g., essential public health services) to ensure relevance to the broad public health community.

(17) The workgroup felt strongly that a robust website should be an important component of any dissemination strategy. The website should be accessible to key audiences and include PERRC research findings, practice tools, peer-reviewed articles, abstracts, pilot projects, and new investigators. An example of a website that could be emulated in part was the Cancer Control P.L.A.N.E.T. website (e.g., http://cancercontrolplanet.cancer.gov/).

(18) The broader CDC community should become more knowledgeable of the PERRCs, their activities and the implications of their research for public health practice more broadly (beyond preparedness and emergency response). OPHPR should collaborate with PERRCs to organize a seminar at CDC that would attract a large and diverse audience.

Metric used for Evaluating PERRCs

(19) Overall, the metrics developed by ERPO with input from the PERRCs are appropriate and comprehensive. Caution should be used in their interpretation as many of the indicators are merely counts of activities and do not address issues of quality. These metrics will be useful in

benchmarking future progress. If new metrics are needed in moving forward, a similar process to develop new metrics should be used but with greater attention to quality and not just quantity.

4.0 Appendices

Appendix A. Workgroup Member Biographies

Ad Hoc Peer Review Workgroup Members

Ellen MacKenzie, Ph.D. – Fred and Julie Soper Professor and Chair, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Workgroup Co-Chair

Dr. Ellen MacKenzie is the Fred and Julie Soper Professor and Chair of the Department of Health Policy and Management of the Johns Hopkins Bloomberg School of Public Health. She is a graduate of the School of Public Health where she earned Master of Science and doctoral degrees in biostatistics. She joined the Hopkins faculty in 1980 and holds joint appointments in the School's Department of Biostatistics and with the departments of Emergency Medicine and Physical Medicine and Rehabilitation at the Johns Hopkins University School of Medicine. In addition to her faculty appointments, Dr. MacKenzie served as Senior Associate Dean at the School from 1996 to 2000 and Director of the Center for Injury Research and Policy from 1995-2005. Dr. MacKenzie completed a term as chair of the National Advisory Committee for Injury Prevention and Control and is Immediate Past President of the American Trauma Society.

Dr. MacKenzie's research focuses on the impact of health services and policies on the short- and long-term consequences of traumatic injury. She has contributed to the development and evaluation of tools for measuring both the severity and outcome of injury, which have been used to evaluate the organization, financing and performance of trauma care and rehabilitation. Of particular interest to Dr. MacKenzie is the delineation of factors (both medical and non-medical) that explain variations in functional outcome. Her research has advanced the knowledge of the economic and social impact of injuries and our understanding of how personal and environmental factors influence recovery and return to work. Dr. MacKenzie's ongoing research includes a national evaluation of the cost and effectiveness of trauma care, the evaluation of amputation versus limb salvage in the military, the development and evaluation of self management programs following trauma and limb loss, and efforts to facilitate the development and exchange of information among trauma and EMS providers.

Dr. MacKenzie’s awards include the A.J. Mirkin Service Award from the Association for the Advancement of Automotive Medicine, the Ann Doner Vaughan Kappa Delta Award from the American Academy of Orthopaedic Surgeons, the Distinguished Career Award from the American Public Health Association (Injury Control and Emergency Health Services Section), the American Trauma Society's Distinguished Achievement Award and the Trauma Leadership Award from the Society of Trauma Nurses. She is also an honorary fellow of the American Association for the Surgery of Trauma.

Louis Rowitz, Ph.D. – Director, Mid-America Regional Public Health Leadership Institute; Director, University of Illinois, Chicago, School of Public Health, Center for Public Health Practice, Chicago, IL

Workgroup Co-Chair

Dr. Louis Rowitz has built a unique career in public health academia via public health practice issues and initiatives. Serving as the Director of University of Illinois, Chicago (UIC), School of Public Health's Center for Public Health Practice since it began, he is also the first director of a state-based leadership institute funded by CDC. Since 1992, that Institute, the Mid-America Regional Public Health Leadership Institute (MARPHLI), has encompassed as many as four states and currently includes teams from Indiana, Wisconsin, Michigan and Illinois. The Institute has graduated over 700 Fellows since its inception.

Dr. Rowitz is one of the founding members of the National Public Health Leadership Development Network (NLN,) established in 1994 with funding from CDC to support the growth and improve access to public health leadership institutes across the country. Throughout the past 15 years, Dr. Rowitz has served in numerous roles including chairing various NLN committees and workgroups. He has twice served as the Chair of the NLN Board, leading the Network and its members into a new vision for public health leadership development.

Dr. Rowitz has added two leadership training institutes to the UIC Center for Public Health Practice: the Illinois Institute for Maternal and Child Health Leadership and the Illinois MCH Data Use Academy. In 2001, he became the Director of the Mid-America Public Health Training Center. He is the author of two bestselling books – *Public Health Leadership: Putting Principles into Practice* (Second Edition, 2009) and *Public Health for the 21st Century: The Prepared Leader* (2006). He currently serves on the faculty of the International Center for Leadership Development, also at UIC.

Dr. Rowitz has published a text on leadership in public health based upon his experience in developing the institutes. *Public Health Leadership: Putting Principles into Practice* (Aspen, 2001) is now the premier text in leadership courses and institutes across the country.

Henry A. Anderson, M.D. – State Health Officer and Chief Medical Officer, Occupational and Environmental Health, Madison, WI

Henry Anderson received his BA degree from Stanford University and in 1972 a MD degree from the University of Wisconsin Medical School. He was certified in 1977 by the American Board of Preventive Medicine with a sub-specialty in occupational and environmental medicine and in 1983 became a fellow of the American College of Epidemiology. In 1980 he joined the Wisconsin Department of Health and Social Services as the Wisconsin State Environmental and Occupational Disease Epidemiologist. In 1991 he also assumed the duties of Chief Medical Officer. In July 2008 he was appointed Wisconsin State Health Officer and served in that capacity until January 2009 and was appointed again in October 2010 and continues as the current State Health Officer. Since 1980 he has held adjunct Professorships at the University of Wisconsin - Madison, Department of Population Health Sciences and the UW Nelson Institute for Environmental Studies, Center for Human Studies. He has published over 240 scientific articles on a broad spectrum of occupational, environmental and public health topics. Current research interests include: disease and exposure surveillance, biomonitoring, risk assessment, occupational asthma, lead poisoning, health hazards of Great Lakes sport fish consumption, arsenic in drinking water, emergency preparedness, asbestos disease, vermiculite exposure, occupational fatalities, occupational injuries to youth and occupational hazards of emerging technologies.

He has served on numerous national committees. He is the past chair of the National Institute of Occupational Safety and Health Board of Scientific Councilors. He has a presidential appointment to the Advisory Board on Radiation and Worker Health. He currently is a member of the NIOSH NORA Construction Sector Council and the NORA Manufacturing Sector Council. He is a member of the NAS committee for “Assessment of Water Reuse as an Approach for Meeting Future Water Supply Needs” and of the USEPA National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances. He is a fellow of the Collegium Ramazzini and an associate editor of the *American Journal of Industrial Medicine.*

R. Gregory Evans, Ph.D., M.P.H. – Professor and Director, Institute for Biosecurity, Saint Louis University, School of Public Health, St. Louis, MO

Gregory Evans, PhD, MPH is founder and Director of the Institute for Bio-Security at the Saint Louis University School of Public Health. He is a Professor of Environmental Health and has 20 years of experience in environmental epidemiology with an emphasis on bioterrorism, pandemic preparedness, and disaster preparedness. He has authored over 65 publications, made numerous national presentations, and consults internationally on civilian biodefense issues including pandemic preparedness.

Linda Kupfer, Ph.D. – Deputy Director, Division of International Science Policy, Planning, and Evaluation, Fogarty International Center, National Institutes of Health, Bethesda, MD

Dr. Kupfer joined the Fogarty International Center as the Deputy Director of the Division of Science Policy Planning and Evaluation in 2002. In 2006, she served as the Acting Director for Evaluation for the NIH. Dr. Kupfer's global research interests include implementation science and evaluation, and she is particularly interested in the role of capacity building in international research. Dr. Kupfer received her bachelor's degree in Psychology from Cornell University and her MSc and PhD in Pharmacology from Columbia University before commencing an AAAS Science Diplomacy Fellowship at the State Department in OES. Since receiving her doctorate Dr. Kupfer has held a number of different posts in International Science Policy, ranging from a Program Officer for Bilateral Science Programs at the State Department, to Director of Marine Biotechnology at the National Sea Grant Program, National Oceanic and Atmospheric Administration, to Acting Director of Policy for the Fogarty International Center at the National Institutes of Health.

Jane A. Kushma, PhD – Associate Professor of Emergency Management, Institute for Emergency Preparedness, Jacksonville State University. Anniston, AL

Dr. Kushma, University of Texas at Arlington, has been a member of the Institute for Emergency Preparedness faculty since 2002. She holds the rank of Associate Professor. Dr. Kushma received her Ph.D. in Urban Policy and Public Administration and completed her dissertation research on emergency management policy implementation. She has practiced and taught in the field of emergency management for more than 25 years. Current research interests include emergency management policy, disaster management, nonprofit organizations and volunteer management, and service learning. Dr. Kushma has served in a variety of leadership positions with various nonprofit boards, organizations, and task forces. Dr. Kushma currently serves as the Managing Editor of the Journal of Homeland Security and Emergency Management.

Randolph Rowel, Ph.D. – Associate Professor, Department of Behavioral Health Sciences, Morgan State University, School of Community Health and Policy, Baltimore, MD

Dr. Randy Rowel is an Associate Professor in Morgan State University's (MSU) School of Community Health and Policy. He received his undergraduate degree at Morgan State University and his masters and doctoral degrees from the University of Utah and the University of Maryland College Park, respectively.

At Morgan State University, Dr. Rowel is the Director of the Why Culture Matters Disaster Studies Project, an effort that engages students and faculty to inform public health professionals and faith- and community-based organizations about the needs of vulnerable populations during natural and technological disasters. Dr. Rowel came to Morgan with considerable experience in community organizing, partnership development and evaluation, and teaches Community Needs and Solutions, Community-Based Participatory Research, Preventive Health, and Qualitative Research in Public Health.

Dr. Rowel served as an investigator for the Department of Homeland Security (DHS) funded National Center for the Study of Preparedness and Catastrophic Event Response (PACER). As an investigator for PACER, Dr. Rowel and his research team conducted a study which examined the relationship between daily crisis (community stressors) and disaster preparedness. Dr. Rowel assisted in the development of an online undergraduate disaster awareness course. In a unique partnership with the Washington Bible College, Dr. Rowel also developed curriculum entitled the Role of Pastors in Disasters: Training Pastors to be Agents of Safety.

As a service to our nation, Dr. Rowel served on the National Academies Ad Hoc Committee to plan a Social Network Analysis (SNA) workshop and the National Research Council Committee on Private-Public Sector Collaboration to Enhance Community Resilience to conduct a study that resulted in a framework for developing or maintaining private and public sector partnerships.

Lastly, Dr. Rowel recently initiated two community resilience initiatives. *The Baltimore Arts and Culture Community Resilience Initiative* is a partnership that is using the arts to create social change in a low-income section of the city. Dr. Rowel is also exploring the use of this model internationally with *The Haiti Community Resilience Recovery Initiative,* a broad-based collaborative approach to help Haitians bounce back from the earthquake that devastated their country in January 2010. During a recent visit to Haiti, he and a team of researchers assessed public health needs, initiated a *Nutri-Garden Project*, and gained a better understanding of Haiti's rich culture and history.

Appendix B. Pre-Meeting Web Conference, July 29, 2011

AGENDA
Pre-Meeting Web Conference
Preparedness and Emergency Response Research Centers (PERRC) Mid-Project Review
Board of Scientific Counselors Ad Hoc Workgroup
Office of Public Health Preparedness and Response (OPHPR)
Centers for Disease Control and Prevention (CDC)
Friday, July 29, 2011
2:00 – 4:00 pm (EDT)

Purpose: To orient the workgroup members to the scope and charge for the review and to provide an overview of the PERRC program.

AUDIO: *Please call the toll-free number below to hear the audio for this meeting.*
Toll-Free Number: **1 (866) 507-1338**
Passcode: **76286265**

WEB: To view meeting presentations online, participants can join the event directly at:
https://www.livemeeting.com/cc/cdc/join?id=J9FCF3&role=attend

If you are unable to join the meeting via the above link, follow these steps:
1. Copy this address and paste it into your web browser: https://www.livemeeting.com/cc/cdc/join
2. Copy and paste the required information: Meeting ID: **J9FCF3**

Notes: By participating in this meeting, you agree that your communications may be monitored or recorded. To save time before the meeting, check your system http://go.microsoft.com/fwlink/?LinkId=90703 to make sure it is ready to use Microsoft Office Live Meeting.

2:00 – 2:10 pm **Welcome and Introductions**
Barbara Ellis, Ph.D., Associate Director for Science, OPHPR
Workgroup Co-Chairs, Board of Scientific Counselors, OPHPR

2:10 – 2:25 pm **Review of BSC-WG Scope, Charge to Reviewers, Review Questions, Briefing Materials**
Barbara Ellis, Ph.D., Associate Director for Science, OPHPR

2:25 – 2:50 pm **Overview of PERRC Program**
Mildred Williams-Johnson, PhD, Director, Extramural Research Program Office (ERPO),

2:50 – 3:00 pm **Questions and Discussion**

3:00 – 3:45 pm **Overviews for each PERRC**
Shoukat Qari, D.V.M., Scientific Program Official, ERPO
Mary Leinhos, Ph.D., Scientific Program Official, ERPO

IOM Priority 3: Strengthening Response Systems
- University of North Carolina at Chapel Hill
- Emory University
- Johns Hopkins University

IOM Priorities 1, 4: Metrics; Training and Simulations
- Harvard University
- University of Pittsburgh
- University of Minnesota

IOM Priorities 2, 3: Communications; Strengthening Response Systems
- University of Washington
- University of California, Berkeley
- University of California, Los Angeles

3:45 – 4:00 pm	**Discussion and Next Steps** Workgroup and Co-Chairs
4:00 pm	**Adjourn**

Appendix C. BSC Workgroup Meeting, August 9-12, 2011

AGENDA
OPHPR Board of Scientific Counselors Ad Hoc Workgroup Meeting
Preparedness and Emergency Response Research Centers (PERRC) Mid-Project Review
Office of Public Health Preparedness and Response (OPHPR)
Centers for Disease Control and Prevention (CDC)

Emory Conference Center Hotel, Mountain Laurel Room
August 9-12, 2011

Tuesday, August 9, 2011

9:00 - 9:15 am	**Welcome and Individual Introductions** RADM Ali Khan, MD, MPH, Director, Office of Public Health Preparedness and Response (OPHPR) BSC Workgroup Co-Chairs, Board of Scientific Counselors, OPHPR
9:15 - 9:30 am	**Workgroup Charge and Logistics** Barbara Ellis, PhD, Associate Director for Science, OPHPR
9:30 – 10:10 am	**Report on PERRC Survey, Research Impact Briefs, Practice and Policy Tools** Mildred Williams-Johnson, PhD, Director, Extramural Research Program Office, OPHPR Mary Leinhos, MS, PhD, Scientific Program Official, ERPO, OPHPR Shoukat Qari, DVM, PhD, Scientific Program Official, ERPO, OPHPR
10:10 – 10:30 am	**Questions and Discussion**
10:30 – 10:45 am	BREAK
10:45 – 11:00 am	**Presentation from the Association of Schools of Public Health (ASPH)** Harrison Spencer, MD, MPH, President and CEO, ASPH
11:00 – 11:15 am	**Questions and Discussion**

11:15 – 11:45 am	**Stakeholder Panel: Key External Partners**
	Facilitator: Dr. Louis Rowitz, BSC Workgroup Co-Chair
	Participants:
	• National Association of County and City Health Officers (NACCHO)
	  ○ Jack Herrmann, MSEd, NCC, LMHC, Senior Advisor & Chief, Public Health Preparedness, NACCHO
	  ○ Michael Meit, MA, MPH, Director, Walsh Center for Rural Health Analysis
	• Association of State and Territorial Health Officials (ASTHO)
	  ○ Gerrit Bakker, Senior Director, Public Health Preparedness, ASTHO
	  ○ Max Learner, PhD, Director, Office of Public Health Preparedness, South Carolina Department of Health and Environmental Control

11:45 am – 12:30 pm	**Questions and Discussion**
12:30 - 1:30 pm	LUNCH
1:30 – 3:00 pm	**Stakeholder Panel: Advisory Committee Members from PERRCs** Facilitator: Dr. Ellen MacKenzie, BSC Workgroup Co-Chair Participants (*PERRC affiliation*): • Christopher Nelson, PhD (*Harvard University*) • Lou Turner, DrPH (*University of North Carolina at Chapel Hill*) • Bruce Dixon, MD (*University of Pittsburgh*) • Muntu Davis, MD, MPH (*University of California, Berkeley*) • Cleo Subido (*University of Washington)* • Christopher Atchison, MPA (*University of Minnesota*) • Isaac Ajit, MD (*Johns Hopkins University*) • David Ross, ScD (*Emory University*) • CAPT James W. Terbush, MD, MPH (*University of California, Los Angeles*) ***VIA PHONE***
3:00 – 3:15 pm	BREAK
3:15 – 4:00 pm	(continued) **Stakeholder Panel: Advisory Committee Members from PERRCs**
4:00 – 5:00 pm	**Closed planning session with BSC Workgroup**
5:00 pm	**Adjourn**
~6:30 pm	*Optional workgroup dinner/social hour (The Club Room, Emory Conference Center)*

Wednesday, August 10, 2011

9:00 – 9:05 am	**Welcome Day 2 / Announcements** BSC Workgroup Co-Chairs, Board of Scientific Counselors, OPHPR
9:05 – 9:50 am	**PERRC Investigator Presentations – IOM Priority 3: Strengthening Response Systems** Participants: • Edward Baker, MD, MPH, University of North Carolina at Chapel Hill • Ruth Berkelman, MD, Emory University • Jonathan Links, PhD, Johns Hopkins University
9:50 – 10:00 am	**Panel Discussion** Facilitator: Dr. Louis Rowitz, BSC Workgroup Co-Chair
10:00 – 10:45 am	**PERRC Investigator Presentations – IOM Priorities 1, 4: Metrics; Training and Simulations** Participants: • Viswanath (Vish) Kasisomayajula, PhD, Harvard University • Margaret Potter, JD, MS, University of Pittsburgh

- Debra Olson, DNP, MPH, RN, University of Minnesota

10:45 – 10:55 am	**Panel Discussion** Facilitator: Dr. Ellen MacKenzie, BSC Workgroup Co-Chair
10:55 – 11:05 am	BREAK
11:05 – 11:50 am	**PERRC Investigator Presentations – IOM Priorities 2, 3: Communications; Strengthening Response Systems** Participants: • Mark Oberle, MD, MPH, University of Washington • Tomás Aragón, MD, DrPH, University of California, Berkeley • Kimberly Shoaf, DrPH, University of California, Los Angeles
11:50 am – 12:00 pm	**Interactive Panel Discussion** Facilitator: Dr. Louis Rowitz, BSC Workgroup Co-Chair
12:00 – 1:00 pm	LUNCH *(networking with PERRC investigators and BSC-WG)*
1:00 – 2:00 pm	**Closed session for BSC Workgroup discussion**
2:00 – 3:00 pm	**Follow-up session with PERRC Investigators** (placeholder if needed)
3:00 – 5:00 pm	**Workgroup Deliberations and Report Writing (closed to BSC Workgroup)**

Thursday, August 11, 2011

9:00 – 9:05 am	**Welcome Day 3 / Announcements** BSC Workgroup Co-Chairs, Board of Scientific Counselors, OPHPR
9:05 – 5:00 pm	**Workgroup Deliberations and Report Writing (closed to BSC Workgroup)**

Friday, August 12, 2011

9:00 – 9:05 am	**Welcome Day 4 / Announcements** BSC Workgroup Co-Chairs, Board of Scientific Counselors, OPHPR
9:05 – 11:30 am	**Workgroup Deliberations and Report Writing (closed to BSC Workgroup)**
11:30 am –12:00 pm	**Briefing to OPHPR Senior Staff and ERPO** BSC Workgroup Co-Chairs, Board of Scientific Counselors, OPHPR
12:00 pm	**Adjourn**

Appendix D: List of Invited Stakeholder Panelists and PERRC Investigators

Key External Partners

Gerrit Bakker, Senior Director for Public Health Preparedness, Association of State and Territorial Health Officials (ASTHO)

Jack Herrmann, M.S.Ed., N.C.C., L.M.H.C., Senior Advisor, Public Health Preparedness, National Association of County and City Health Officials (NACCHO)

Max Learner, Ph.D., Director, Office of Public Health Preparedness, South Carolina Department of Health and Environmental Control

Michael Meit, M.A., M.P.H., Director, Walsh Center for Rural Health Analysis,

Harrison C. Spencer, M.D., M.P.H., C.P.H., President and CEO, Association of Schools of Public Health (ASPH)

PERRC Advisory Committee Members (*PERRC Affiliation*)

Isaac Ajit, M.D., Maryland Department of Health and Mental Hygiene
Johns Hopkins University PERRC

Christopher Atchison, M.P.A., The University of Iowa
University of Minnesota PERRC

Frederick M. Burkle, Jr., M.D., M.P.H., D.T.M., Harvard Humanitarian Initiative
University of California, Los Angeles PERRC

Muntu Davis, M.D., M.P.H., Alameda County Public Health Department
University of California, Berkeley PERRC

Bruce Dixon, M.D., Allegheny County Health Department
University of Pittsburgh PERRC

Christopher Nelson, Ph.D., RAND Corporation
Harvard University PERRC

David Ross, Sc.D., Public Health Informatics Institute
Emory University PERRC

Cleo Subido, Seattle & King County Public Health
University of Washington PERRC

Lou Turner, Dr.PH., North Carolina Department of Health and Human Services
University of North Carolina at Chapel Hill PERRC

PERRC Principal Investigators

Tomás Aragón, M.D., Dr.PH., Director, Center for Infectious Diseases and Emergency Readiness, University of California, Berkeley

Edward Baker, M.D., M.P.H., Director, The North Carolina Institute for Public Health
Research Professor, Health Policy and Administration, The University of North Carolina School of Public Health

Ruth Berkelman, M.D., Rollins Professor and Director, Center for Public Health Preparedness and Research, Emory University

Viswanath (Vish) Kasisomayajula, Ph.D., Associate Professor of Society, Human Development, and Health, Harvard University

Jonathan Links, Ph.D., Professor and Deputy Chair of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health

Mark Oberle, M.D., M.P.H., Associate Dean for Public Health Practice, School of Public Health and Community Medicine, University of Washington

Debra Olson, D.N.P., M.P.H., R.N., Associate Dean for Education and Professor, Environmental Health Sciences, University of Minnesota School of Public Health

Margaret Potter, J.D., M.S., Associate Professor of Health Policy and Management; Associate Dean for Practice, Graduate School of Public Health, University of Pittsburgh

Kimberley Shoaf, Dr.PH., Assistant Director, UCLA Center for Public Health and Disasters, and Adjunct Associate Professor of Community Health Sciences, School of Public Health, University of California, Los Angeles

Association of Schools of Public Health
Perspectives on Research to Impact Public Health Practice
Preparedness and Emergency Response Research Centers
Mid-Project Review August 9 – 12, 2011, Atlanta, Georgia

Overarching Question#4 for the PERRC Mid-Project Review– What perspective do stakeholders have on the potential for PERRC research to have current and future impact on preparedness and response practices at federal, state, local, and tribal levels?

Related Questions For ASPH, a Public Health Program Partner:

- What is ASPH's role as an academic organization and governmental partner to support and promote public health?
- What is ASPH's perspective on the criticality of public health research to provide the evidence-base and inform practice?
- What are ASPH views on the impact of the PERRCs to provide the evidence-base and inform practice or to facilitate and expand preparedness research among non-PERRC schools of public health?
- What types of activities has ASPH conducted and how have the outcomes of these activities supported and promoted ongoing research in the PERRC Program?

Key External Partners
Evaluation Questions to Guide the Stakeholder Panel
Preparedness and Emergency Response Research Centers
Mid-Project Review August 9 – 12, 2011, Atlanta, Georgia

Overarching Question #3 for the Mid-Project Review *- What is the evidence that PERRC research has yielded results and findings that have had a direct impact or will have the potential to impact public health preparedness and response practice?*

Related Stakeholder Questions:

• What is the breadth and depth of your knowledge about ongoing PERRC research and progress to yield near-term results (3-5 years) to help strengthen practice in the public health preparedness and response system (PHPRS)?

• Please share with the Workgroup your views on the extent to which the research products, programs, evidence-based interventions, research methods, best practices, tools and services, etc., from the PERRCs will help to strengthen practice in public health preparedness and response.

• Can you share with the Workgroup any examples where findings or products from PERRC research (such as the examples below) contributed to the preparedness and response activities of your organization or constituents?

- Practice Tool or Tool Kits
- Journal Article
- Interventions/Prototypes
- Policy Guidelines/Documents/ Recommendations
- Research Techniques
- Research Briefs
- Practice Guidelines
- Simulation Modeling
- Generic Survey Instrument
- Fact Sheet Template for Practitioners
- Training Materials
- How to Video
- Operation Manuals
- Checklist
- Other

Overarching Question #4 for the Mid-Project Review*– What perspective do stakeholders have on the potential for PERRC research to have current and future impact on preparedness and response practices at federal, state, local, and tribal levels?*

Related Stakeholder Question on Collaboration in PERRC research:

• What role, if any, has your organization or a constituent played in PERRC research? If your organization or a constituent engaged in research activities with any of the PERRCs (such as the examples listed below) please share with the Workgroup how the participation was beneficial to your organization in terms of improving practice in public health emergency preparedness and response.

- Advisory Role (input into process)
- Advisory Role (input into translated research)
- Providing Knowledge and resources needed for Public Health Emergency Preparedness and Response
- Assistance to review research instruments (i.e. surveys, interviews, data collection plans, etc.)
- Helping PERRCs to disseminate and translate research products into practice
- Presenting at practice partner conferences

- Sponsor PERRC poster presentations at meetings
- Organizing Professional Collaborative Presentations
- Integration of results in trainings and with practice partners
- Feature PERRC research in events of partner organizations
- Help inform research questions
- Help define research questions
- Presenting ideas at meetings
- Webinars
- Other

•What do you see as the most significant benefit from collaborations or participation in PERRCs research activities?

•What do you see as the major weaknesses or gaps from collaborations or participation involvement with the PERRCs research activity?

Related Stakeholder Questions on Dissemination of PERRC findings

• Please share with the Workgroup your view of the adequacy of methods to disseminate PERRC research findings that are accessible and appropriate for multiple audiences, in particular public health preparedness and response practitioners and policy makers.

• Please share with the Workgroup how you learn about findings from PERRC research. Discuss you view of the most accessible and appropriate communication channels (such as the examples listed below) the PERRCs have or can use to disseminate research findings to the stakeholders in public health preparedness and response for your organization or constituents.

- Websites, Listserv, Publications of Articles, Presentations in meetings or conferences, Webinars, Manuals, Podcasts, Tools, In-Person meetings, Consultations, Reports, Research Methods, Newsletter, Press release (related media reports), Online Multimedia, Web Page, Online Databases, Best practices documents, New models (e.g., research translation models), Other

PERRC Advisory Committee Panel
Evaluation Questions for PERRC Mid-Project Review

Per the Funding Opportunity Announcement, the Preparedness and Emergency Response Research Centers (PERRCs) are required to establish and convene an external advisory group to support the program project. The purpose of the advisory board is to provide input and advice for the overall success of the PERRC program project grant.

The following questions are intended to guide the input and comments we hope you will provide to the Ad Hoc Workgroup based on your involvement in the Advisory Committee for the PERRC at < ***name of the PERRC represented***>.

1. How well does the Advisory Committee for this PERRC fulfill its intended purpose: to provide input and advice for the overall success of the PERRC program project grant?
    a. Share with the Workgroup your thoughts about the benefit of having Advisory Committees and their importance for research in the PERRC.
    b. Provide an example of critical scientific guidance or practice-based feedback your Advisory Committee provided to the PERRC.
    c. Discuss, to the extent possible, how well the advice was adopted or implemented by the PERRC researchers?

2. Describe any challenges or barriers for the Advisory Committee to provide meaningful input to the PERRC or contribute to the relevance of ongoing research and expected outcomes to practice for preparedness and response. What strategy was implemented by the PERRC to address those barriers or challenges and how effective was the strategy to addressing them?

3. Based on your involvement in the Advisory Board for the PERRC,
    a. What is the potential for the projects to yield results that can be transferred to practice and improve or strengthen preparedness and response capabilities and performance?
    b. What additional activities could the PERRCs undertake to facilitate the transfer of the research results to practice?

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*1. Enhance the Usefulness of Training, 2. Improve Communications in Preparedness and Response, 3. Create and Maintain Sustainable Preparedness and Response Systems, and 4. Generate Criteria and Metrics Applicable to an All-hazard Approach to Preparedness to Measure Effectiveness and Efficiency

Guidance to PERRC Investigators on Presentations
Preparedness and Emergency Response Research Centers
Mid-Project Review August 9 – 12, 2011, Atlanta, Georgia

Each PERRC has been allotted ten minutes for a presentation followed by a five-minute discussion period. The following additional suggestions are intended to frame your presentation to the ad hoc workgroup in highlighting your PERRC's success. The information that you provided from the survey will be included in a review briefing book for the ad hoc workgroup, and therefore does not need to be repeated. Feel free to include other data from your work that may inform the reviewers on the impact of your work on public health preparedness and response. Suggested items for you to cover in your presentation include:

- Brief overview of your PERRC (1 slide)
  (*ERPO will give a detailed orientation to the ad hoc workgroup about all the PERRCs in an a pre-meeting webinar*)

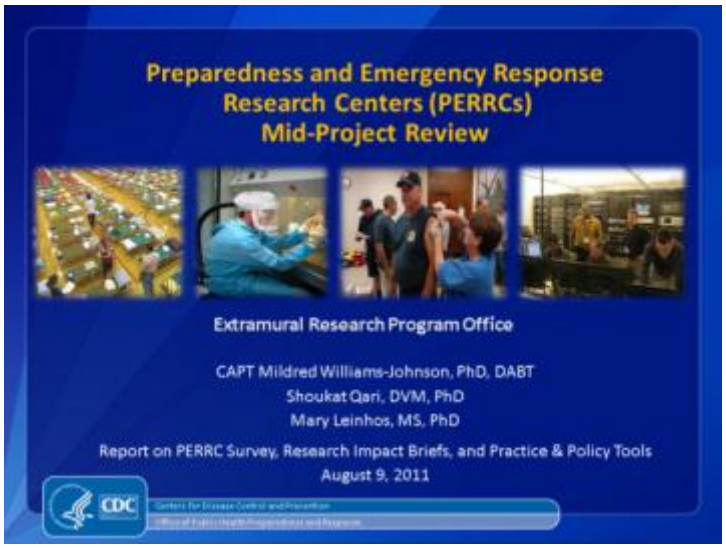
- Highlight one of the candidate research impact briefs ("success stories") that you submitted to ERPO but not the one that was selected as the final impact brief (2 slides)

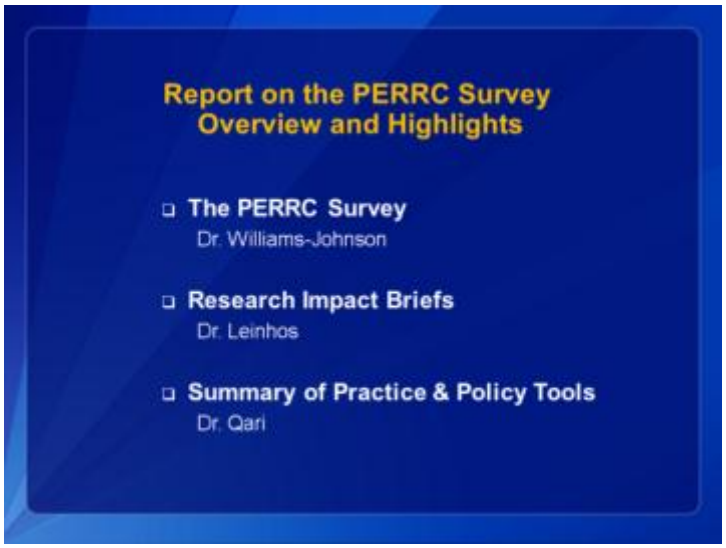
- Important partnerships with the public health systems organizations and value derived from those partnerships (1 slide)

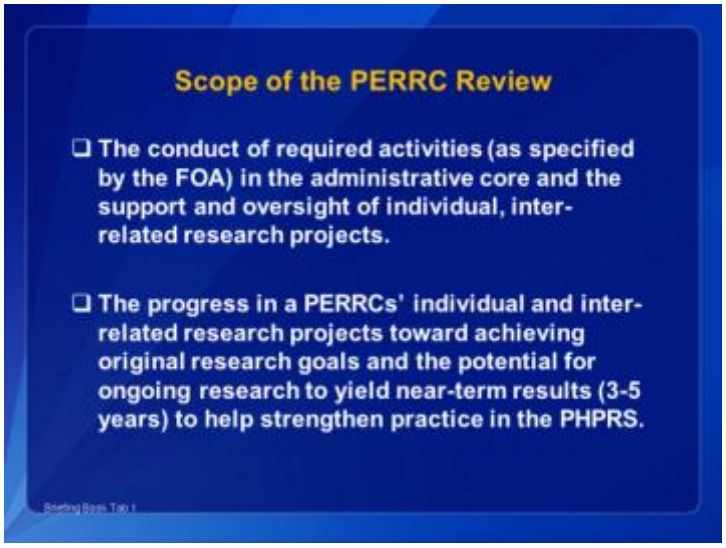
- Development of research products, programs, evidence-based interventions, research methods, best practices, tools and services, etc., and how they have contributed or can contribute to strengthen public health preparedness and response practice (2 slides)

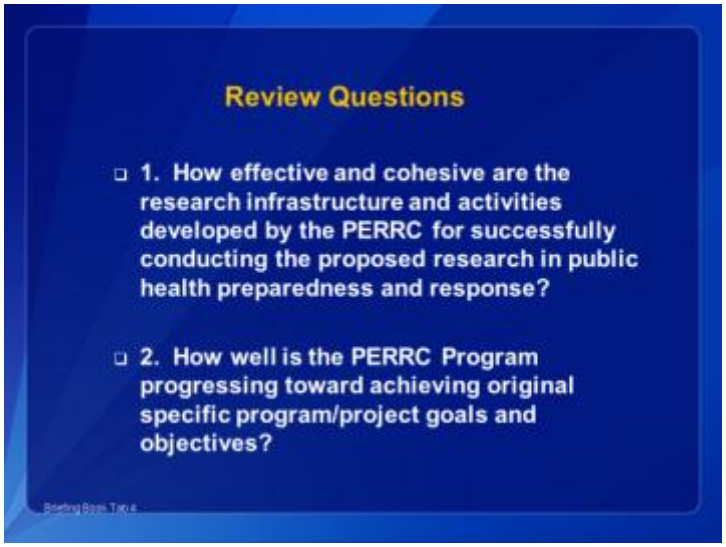
- Discussion of your PERRC's plan to facilitate translation or potential of translation of research findings to practice (1 slide)

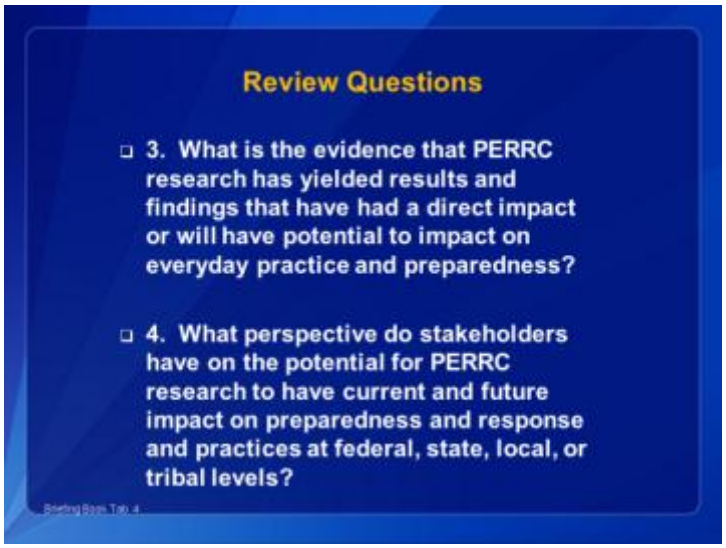
Appendix F: Presentations by Stakeholders and PERRC Investigators

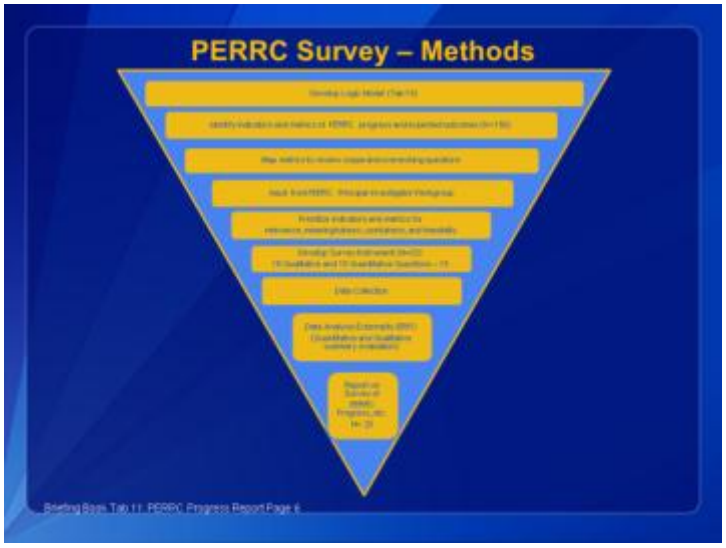





Scope of the PERRC Review
The conduct of required activities (as specified by the FOA) in the administrative core and the support and oversight of individual, inter-related research projects.
The progress in a PERRCs' individual and inter-related research projects toward achieving original research goals and the potential for ongoing research to yield near-term results (3-5 years) to help strengthen practice in the PHPRS.


Review Questions
1. How effective and cohesive are the research infrastructure and activities developed by the PERRC for successfully conducting the proposed research in public health preparedness and response?
2. How well is the PERRC Program progressing toward achieving original specific program/project goals and objectives?


Review Questions
3. What is the evidence that PERRC research has yielded results and findings that have had a direct impact or will have potential to impact on everyday practice and preparedness?
4. What perspective do stakeholders have on the potential for PERRC research to have current and future impact on preparedness and response and practices at federal, state, local, or tribal levels?



PERRC SURVEY

Administrative Core

- Pilot Projects
- New Investigators
- Advisory Boards
- Scientific Guidance
- Fiscal Oversight

PERRC SURVEY

Independent Research Projects

- Institute of Medicine research priorities and cross-cutting themes
- Populations to benefit from research findings
- Policy and Practice tools
  - Developed (TAB 13 and in available binders)
  - Under development and planned
- Research partners and their impact
- Multidisciplinary Teams
- Dissemination of research findings
  - Communication channels used
  - Strategies and methods to facilitate translation

  (i.e., the transfer of research knowledge for practice)
- Evidence of research translation and impact
  - Research Impact Briefs (Tab 12)

PERRC SURVEY

Context:

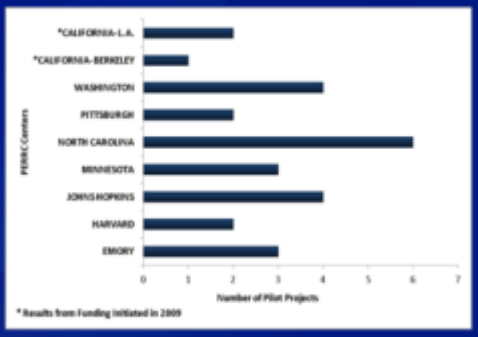
- PERRC Survey not pilot tested
- Data collection and analysis limited by time and resources
- Immature research program
  - Funding initiated in 2008 and 2009
  - Results reported for 7 PERRCs at 30 months activity
  - Results reported for 2 PERRCs at 18 months activity
- Some research affected by disaster responses
- Challenges to conducting research with varying partners

Briefing Book Tab 11: PERRC Progress Report Page 32

PERRC SURVEY

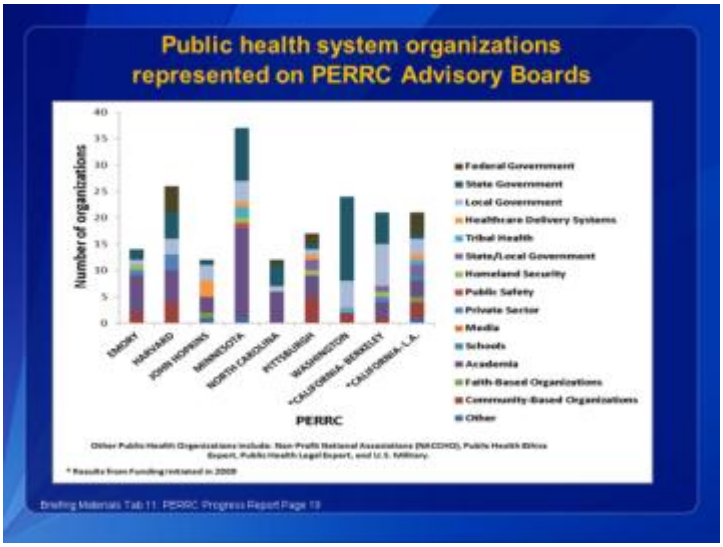
RESULTS

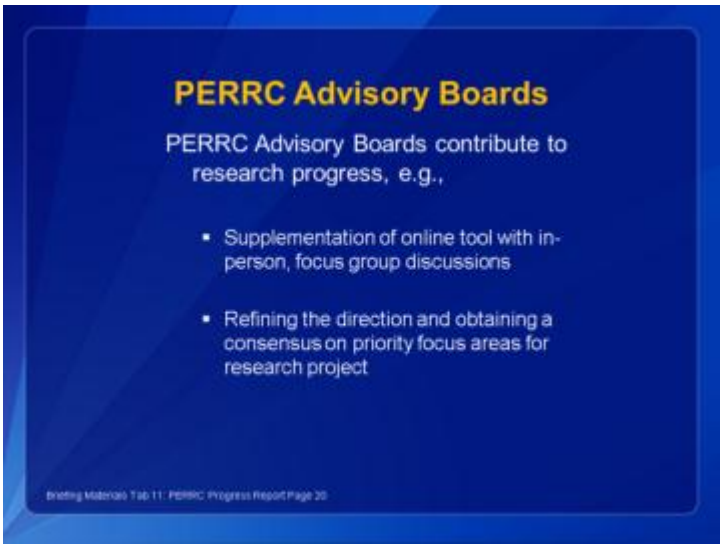
Pilot Projects Completed by the PERRCs



Briefing Materials Tab 11: PERRC Progress Report Page 8

Number of PERRC New Investigators Trained
Number of Trainees
12
10
8
6
4
2
0
EMORY
HARVARD
JOHNS HOPKINS
MINNESOTA
NORTH CAROLINA
PITTSBURGH
WASHINGTON
*CALIFORNIA- BERKELEY
*CALIFORNIA- L.A.
PERRC
* Results from Funding Initiated in 2009
Briefing Materials Tab 11: PERRC Progress Report Page 14


Public health system organizations represented on PERRC Advisory Boards
Number of organizations
40
35
30
25
20
15
10
5
0
EMORY
HARVARD
JOHN HOPKINS
MINNESOTA
NORTH CAROLINA
PITTSBURGH
WASHINGTON
*CALIFORNIA- BERKELEY
*CALIFORNIA- L.A.
PERRC
Federal Government
State Government
Local Government
Healthcare Delivery Systems
Tribal Health
State/Local Government
Homeland Security
Public Safety
Private Sector
Media
Schools
Academia
Faith-Based Organizations
Community-Based Organizations
Other
Briefing Materials Tab 11: PERRC Progress Report Page 13


PERRC Advisory Boards
PERRC Advisory Boards contribute to research progress, e.g.,
Supplementation of online tool with in-person, focus group discussions
Refining the direction and obtaining a consensus on priority focus areas for research project
Briefing Materials Tab 11: PERRC Progress Report Page 20

Scientific Guidance and Fiscal Oversight

- Meet with Lead Investigators for Independent Research Projects
  - Review and comment on research progress
  - Improve communications
  - Improve consistency in research methods across projects
  - Strengthen integration and inter-relatedness across projects
- Coordinate research activities with research partners
- Resolve impediments to productivity
- Monitor project expenditures, timelines, and progress
- Redirect funds to address unexpected or increased research project needs
- Allocate funds to address technical review issues

Briefing Materials Tab 11: PERRC Progress Report Pages 21-24

IOM-Recommended Priorities & Cross-Cutting Themes in PERRC Research

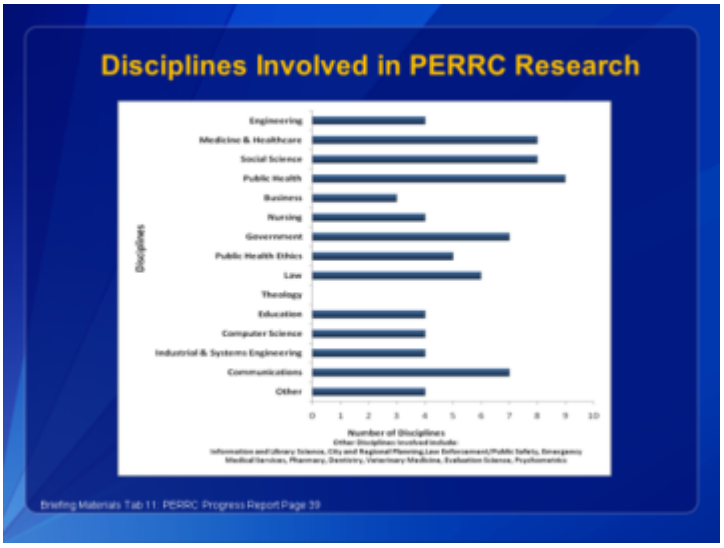
Research Theme	Number of PERRCs addressing theme
IOM research priorities	
Enhance the Usefulness of Training	2
Improve Communications in Preparedness and Response	4
Create and Maintain Sustainable Preparedness and Response Systems	7
Generate Criteria and Metrics Applicable to An All-hazard Approach to Preparedness to Measure Effectiveness and Efficiency	2
Cross-cutting themes	
Vulnerable populations	7
Workforce development	5
Ethical and legal issues	5

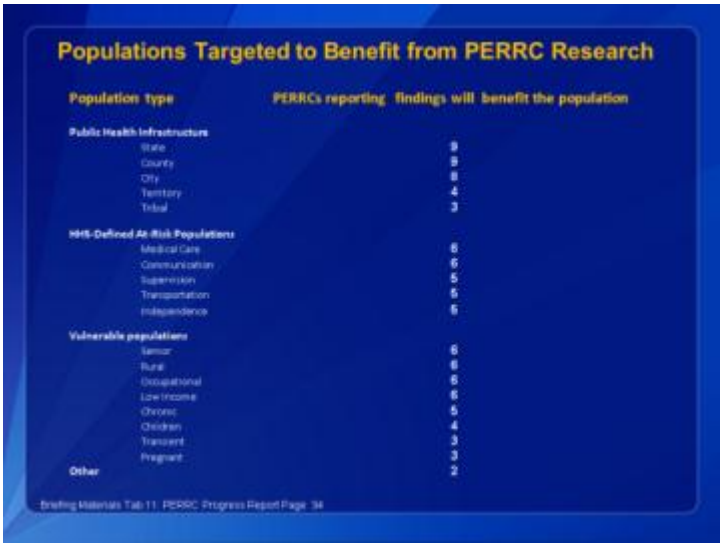
Briefing Materials Tab 11: PERRC Progress Report Page 26

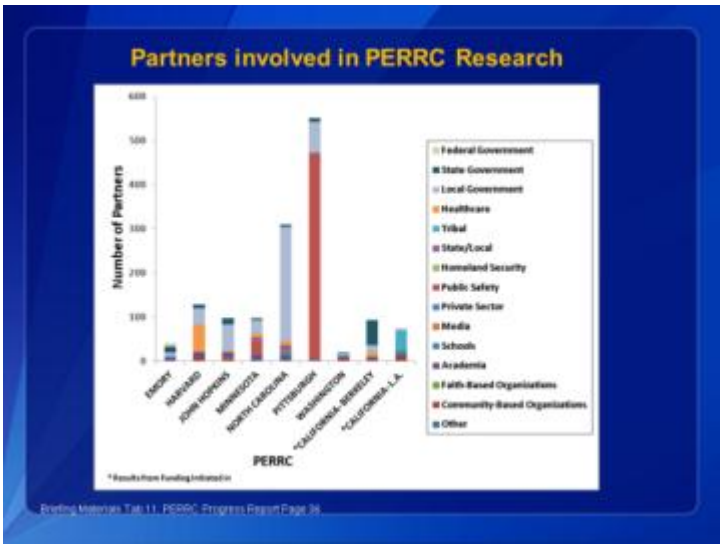
PERRC Independent Research Projects

- Interrelated, Multi-disciplinary, Multi-institutional

Illustrations From Berkeley and Harvard PERRCs


Disciplines Involved in PERRC Research
Engineering
Medicine & Healthcare
Social Science
Public Health
Business
Nursing
Government
Public Health Ethics
Law
Theology
Education
Computer Science
Industrial & Systems Engineering
Communications
Other
Disciplines
0 1 2 3 4 5 6 7 8 9 10
Number of Disciplines
Briefing Materials Tab 11 PERRC Progress Report Page 39


Populations Targeted to Benefit from PERRC Research
Population type
PERRCs reporting findings will benefit the population
Public Health Infrastructure
State 9
County 9
City 8
Territory 4
Tribal 3
HHS-Defined At-Risk Populations
Medical Care 6
Communication 6
Supervision 5
Transportation 5
Independence 6
Vulnerable populations
Senior 6
Rural 6
Occupational 6
Low Income 6
Chronic 5
Children 4
Transient 3
Pregnant 3
Other 2
Briefing Materials Tab 11 PERRC Progress Report Page 34


Partners involved in PERRC Research
Number of Partners
PERRC
EMORY
HARVARD
JOHN HOPKINS
MINNESOTA
NORTH CAROLINA
PITTSBURGH
WASHINGTON
*CALIFORNIA- BERKELEY
*CALIFORNIA- L.A.
Federal Government
State Government
Local Government
Healthcare
Tribal
State/Local
Homeland Security
Public Safety
Private Sector
Media
Schools
Academia
Faith-Based Organizations
Community-Based Organizations
Other
Briefing Materials Tab 11 PERRC Progress Report Page 36

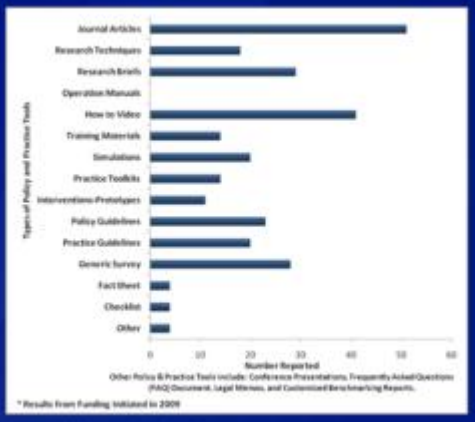
Research Findings Contribute to Improved Preparedness and Response Practice

Common Themes:

- Guidance and recommendations to improve preparedness
- Tools and policies to improve communications across the public health system and to address the needs of at-risk populations
- Procedures to strengthen collaboration across the public health system before, during, and after emergency events
- Methods to evaluate the effectiveness of training programs
- Results to inform policy changes to improve preparedness and response
- Methods to measure system performance and effectiveness during exercises and actual responses
- Improve the accuracy and timeliness of surveillance systems

Briefing Materials Tab 11: PERRC Progress Report Pages 27-32

Policy and Practice Tools Developed from PERRC Research



Other Policy & Practice Tools include: Conference Presentations, Frequently Asked Questions (FAQ) Document, Legal Memos, and Customized Benchmarking Reports.

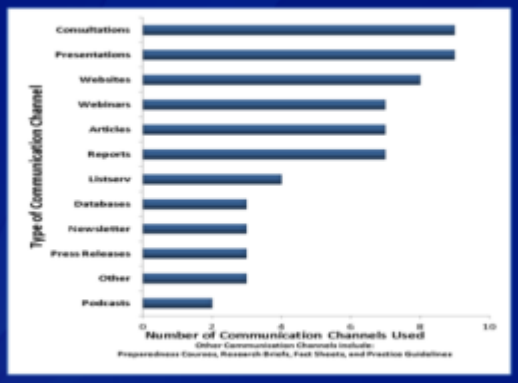
* Results from Funding Initiated in 2009

Briefing Materials Tab 11: PERRC Progress Report Page 27

Preparedness Research Impact Briefs

Briefing Materials Tab 12

Communication Channels to Disseminate Research Findings



Briefing Materials Tab 11: PERRC Progress Report Page 40

Strategy for Translation of Research Findings

- FOA Required PERRCS to include "strategies and methods to evaluate and translate results from research efforts to help achieve national preparedness goals and for enhanced, improved, or expanded preparedness and emergency response capabilities."
- Major focus is on dissemination:
  - national conferences or summits
  - journal articles
  - web-based or internet resources
  - research reports or briefs
  - Press releases and media

Briefing Materials Tab 11: PERRC Progress Report Pages 45-46

PERRC SURVEY

Conclusions:

- Report summarizes response to 25 survey questions
- Effective infrastructure established
  - Assess impact of pilot projects
  - Determine influence of New Investigator training to expand PHSR researches
  - Limited representation from business and media on Advisory Boards
  - Sound fiscal and administrative oversight
- IOM priorities and cross-cutting themes being addressed
- Progress in Independent Research Projects
  - Varying pace and productivity
  - Research is multidisciplinary with practice input or partnerships
  - Findings largely benefit public health infrastructure and at-risk populations
  - Findings contributing to preparedness and response practice
  - Practice and Policy Tools
  - Research Impact Briefs

Briefing Materials Tab 11: PERRC Progress Report Pages 46-53

PERRC SURVEY

Conclusions (cont.):

- Significant stakeholder participation in research
  - Research collaborators and partners from across the PHS
  - Stakeholder input helped strengthen:
    - Research methods, data collection and analysis
    - Survey development and implementation
    - Scope of preparedness issues addressed
    - Improve strategies for dissemination of findings
- Dissemination of research findings
  - Emphasis on conferences and presentations
  - Systematic plans for dissemination needed to:
    - Expand efforts to reach practice and other audiences with appropriate materials
    - Enhance methods to obtain practice feedback and evaluation for tools, guidelines, policies, etc.

Briefing Materials Tab 11: PERRC Progress Report Pages 46-53

Preparedness and Emergency Response Research Centers (PERRC) Program Mid-Project Review

Research Impact Briefs

Extramural Research Program Office

Mary Leinhos, PhD, MS

August 9, 2011

CDC

Centers for Disease Control and Prevention

Office of Public Health Preparedness and Response

Overview

Research Impact Briefs

- Purpose and Background
- Design of the Briefs
- Development Process
- Impact Brief Results

Research Impact Briefs: Relationship to Review Objectives & Questions

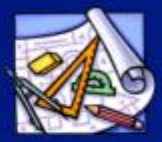
PERRC Mid-Project Review

- Scope Objective #2: Progress toward research goals
  - Near-term results
  - Evidence of the development of transferable knowledge
  - Collaboration with partners across the public health preparedness system
- Review Question #3: Evidence of impact
- Review Question #4: Stakeholder perspective on current and future impact

Research Impact Briefs
Purpose and Background

- Purpose: To document measurable impact of research
- Impact = improved practice performance associated with research in IOM priority areas
- Emphasis on practice applications
- Models for the brief, key characteristics
- Provide evidence for impact and describe specific nature of the impact

Research Impact Briefs
Design of the Briefs



Sections of the template:

A. Public health preparedness and response issue

B. Collaborators and activities

C. Outcomes and impacts of the research activity

D. Evidence of impact

E. Figures

Research Impact Briefs

Development Process

Steps

1. Detailed instructions and template provided to grantees
2. Grantees submit descriptions of two candidates
3. ERPO review and recommendation
4. ERPO review and feedback on drafts
5. Formatting

Research Impact Briefs

ERPO Selection of Candidates

Selection Criteria

- ❑ Science-focused
- ❑ Usefulness to preparedness practice
- ❑ Measures for and evidence of impact
- ❑ Potential for future, broader impact
- ❑ Strong partner engagement

Resulting Briefs: Example Finished Product

Resulting Briefs: Summary and Themes

- Scope of research impact described in PERRC briefs
  - —Nature of impact
  - —Partnerships employed
  - —Evidence of impact
- Challenges
- Overall themes

Preparedness and Emergency Response Research Centers (PERRCs)
Program Mid-Project Review
Report on Practice & Policy Tools

Extramural Research Program Office

Shoukat Qari, DVM, PhD

August 9, 2011

Practice and policy tools
Relationship to review objectives and questions

- Scope Objective #2:
  Progress toward research goals
  - Near-term results
  - Evidence of the development of transferable knowledge
  - Collaboration with partners across the public health preparedness system
- Review Question #3:
  Evidence that PERRC research has yielded results and findings that have had a direct impact or have the potential to impact public health practice and preparedness

Emergency preparedness and response research products

- **Research products developed by PERRCs in collaboration with practice partners (1 ½, 2 ½ Yr)**
  - Practice and policy tools 230
  - Peer reviewed publications 52
- **Disseminated to various target audiences**
  - Federal, state, and local government
  - Community-based organizations
  - Businesses
  - Specific at-risk populations

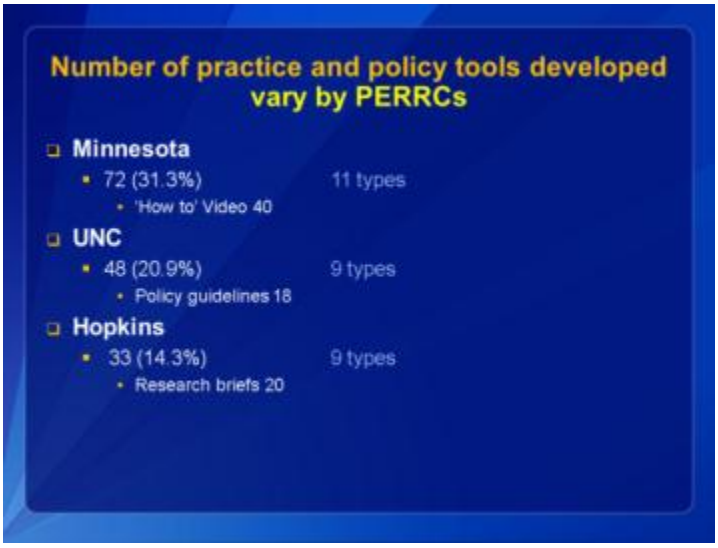
Practice and policy tools Summary and samples

- **Summary in Briefing Book** (Tab 13B)
  - Table – Types and numbers of practice and policy tools developed by each PERRC
  - Highlights – 38 tools
- **Samples of different types of tools in two binders**

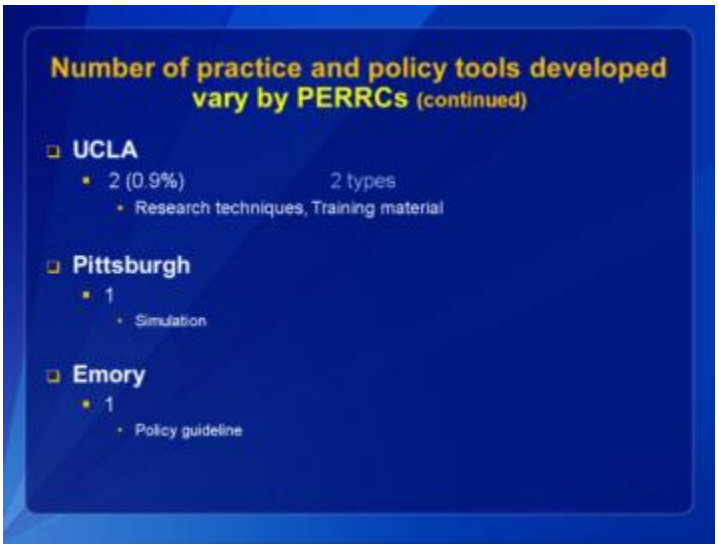
Number of practice and policy tools developed vary by product type

Types of tools (13)	Total (230)	PERRCs
'How to' Video	41	2
Research Briefs	29	5
Surveys & Needs Assessment	28	8
Policy Guidelines	23	5
Simulations	20	3
Practice Guidelines	20	4
Research Techniques	18	7
Practice Toolkits	14	8
Training Materials	14	8
Interventions/Prototypes	11	5
Fact Sheet	A4	3
Checklist	4	2
Other*	4^	3

* Frequently Asked Questions Document, Legal Memos, Customized Benchmarking Report
^ 1 type = 256 Customized Preparedness Capacity Survey Reports sent to participating LHDs in NC and other states


Number of practice and policy tools developed vary by PERRCs
Minnesota
72 (31.3%) 11 types
'How to' Video 40
UNC
48 (20.9%) 9 types
Policy guidelines 18
Hopkins
33 (14.3%) 9 types
Research briefs 20

Practice and policy tools developed vary by PERRCs (continued)
Berkeley
31 (13.5%) 8 types
Practice guidelines 17
Harvard
27 (11.7%) 6 types
Surveys 10
Washington
20 (6.9%) 9 types
Interventions/Prototypes 4


Number of practice and policy tools developed vary by PERRCs (continued)
UCLA
2 (0.9%) 2 types
Research techniques, Training material
Pittsburgh
1
Simulation
Emory
1
Policy guideline

Conclusions

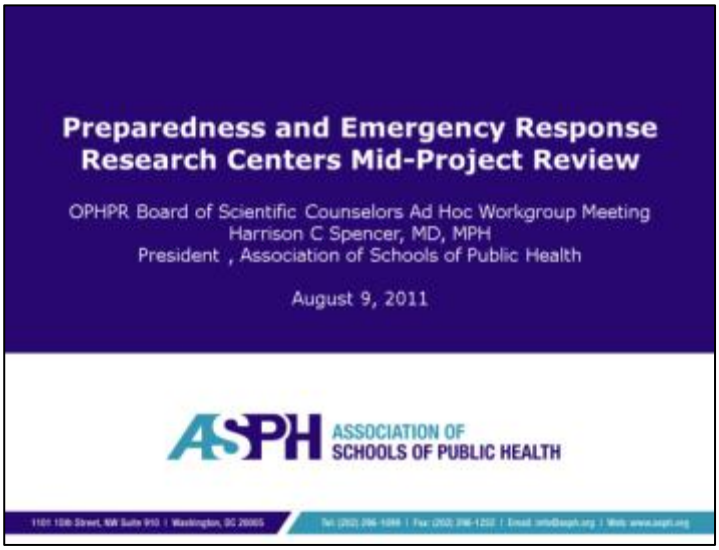
- The variety of products developed by the PERRCs demonstrate the progress made during the past 1 ½ to 2 ½ years to collectively support the mission
  - Strengthen the federal, state, local, tribal, and territorial emergency preparedness and response structure, capabilities, and performance
- To assess the value added of these products, there is a need for qualitative and quantitative measure of
  - Actual uptake and usage
  - Effectiveness, and
  - Adaptability and scalability to specific public health departments

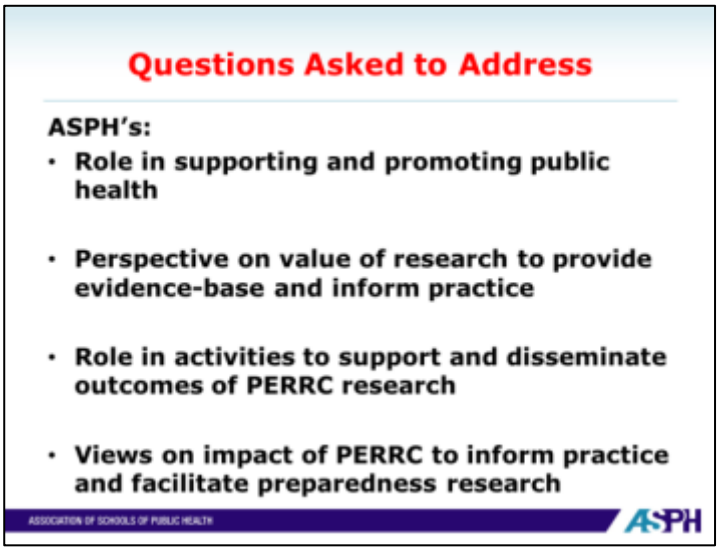
Acknowledgements

- Extramural Research Program
  - Todd Graham, BBA
  - Geraldina Villalobos-Quezada, PhD
- Office of Science and Public Health Practice
  - Sara Crawford, PhD
  - Barbara Ellis, PhD
  - Sarah Henderson, MPH
  - Matthew Jennings, MS, PMP
  - Valerie Kokor, BA MBA
  - Marinda Logan, MPH
  - Alanna Moorer, BA
  - Lee Sanderson, PhD
  - Tara Strine, PhD
- External Science Support
  - Michele Dynes, MSN, MPH, CNM

Questions?

www.cdc.gov/phpr/science/erp_PERRCs.htm


Preparedness and Emergency Response Research Centers Mid-Project Review
OPHPR Board of Scientific Counselors Ad Hoc Workgroup Meeting
Harrison C Spencer, MD, MPH
President , Association of Schools of Public Health
August 9, 2011
ASPH ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH


Questions Asked to Address
ASPH's:
• Role in supporting and promoting public health
• Perspective on value of research to provide evidence-base and inform practice
• Role in activities to support and disseminate outcomes of PERRC research
• Views on impact of PERRC to inform practice and facilitate preparedness research
ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH
ASPH

What is ASPH?

... the only national organization representing the deans, faculty and students of the 48 accredited schools of public health and 4 other institutions seeking accreditation as schools of public health.

ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH

Mission Statement

To strengthen, coordinate, and promote the education, research, and service activities of accredited schools of public health.

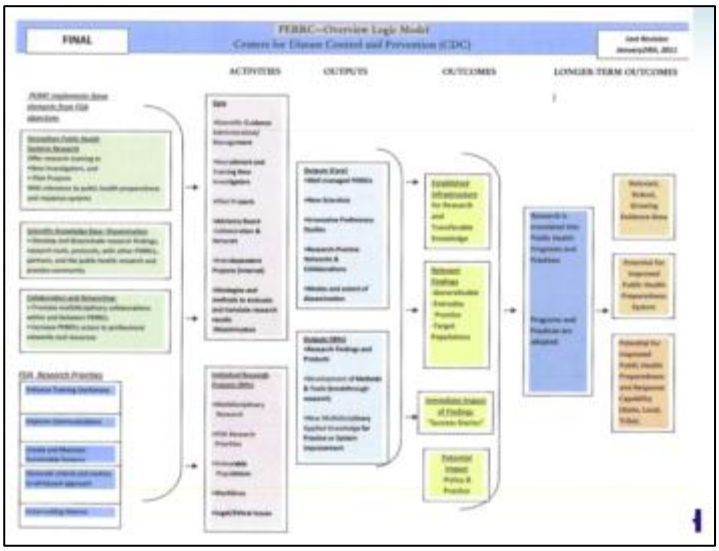
ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH

ASPH Member Schools with PERRC

ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH

New Accredited SPH Trends

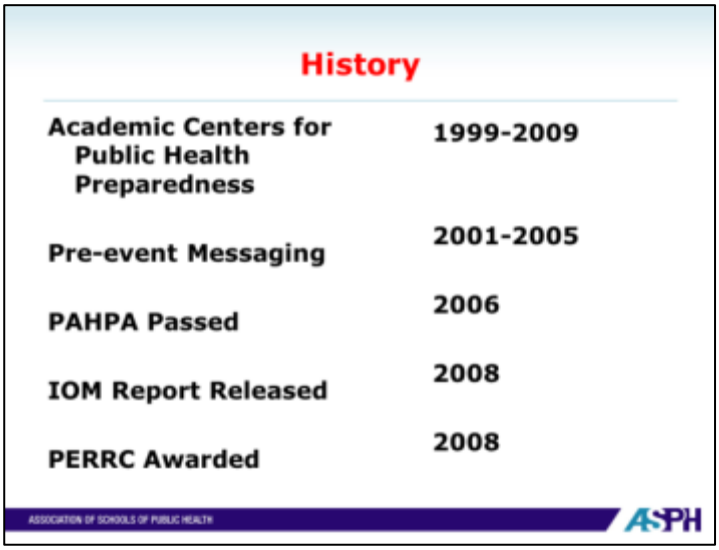
ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH

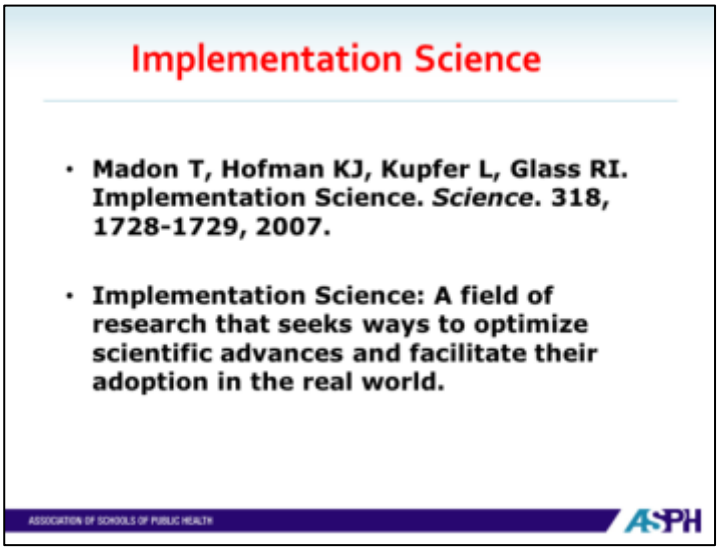


Preparedness Funding in SPH

	FY 2009	FY 2010	FY 2011 President	FY 2011 House	FY 2011 Senate	FY12 President
Funding	$30,000,000	$30,013,000	$30,009,000	$30,009,000	$30,009,000	$0
Research centers	7 centers	9 centers	9 centers	9 centers	9 centers	?
Training centers	27 centers	14 centers	14 centers	14 centers	14 centers	?

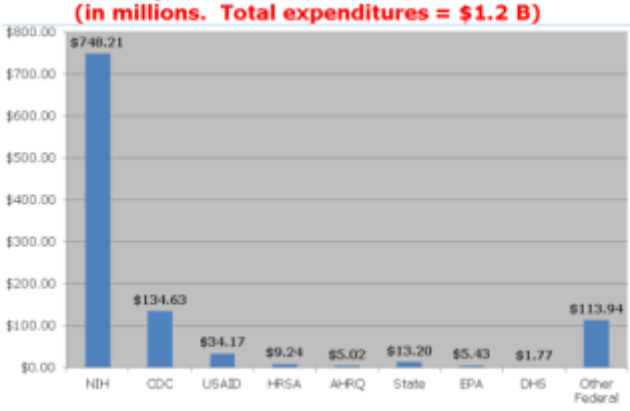
ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH


History
Academic Centers for Public Health Preparedness
1999-2009
Pre-event Messaging
2001-2005
PAHPA Passed
2006
IOM Report Released
2008
PERRC Awarded
2008
ASPH


Implementation Science
• Madon T, Hofman KJ, Kupfer L, Glass RI. Implementation Science. Science. 318, 1728-1729, 2007.
• Implementation Science: A field of research that seeks ways to optimize scientific advances and facilitate their adoption in the real world.
ASPH

SPH Federal Grants and Contracts Expenditures for FY2010

(in millions. Total expenditures = $1.2 B)



schools did not report expenditures

ASPH

Contributions and Uniqueness of Public Health Research

ASPH

ASPH's Role

- Provide network support and coordination
- Conduct outreach to practice partners and PERLC
- Disseminate research findings
- Advocate for funding

ASPH

ASPH Research Publications and Dissemination Tools

ASPH/APHA Academic Public Health Caucus

ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH

Impact of PERRC

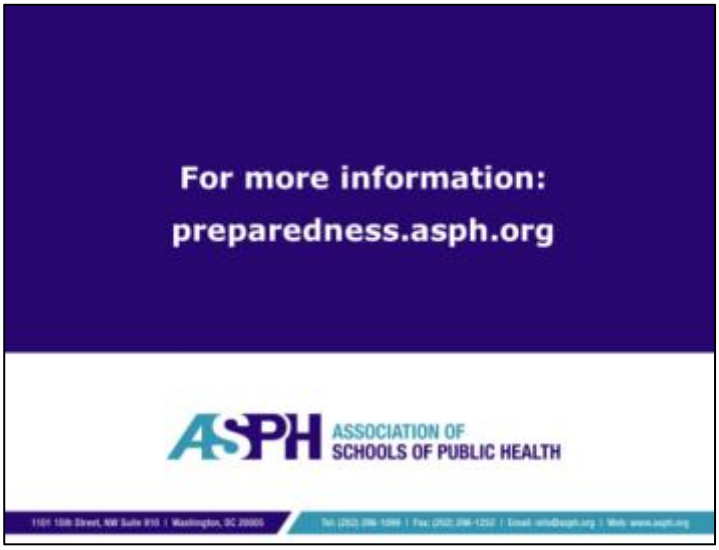
- Met PAHPA and FOA requirements
- Conducting research in identified priority areas (IOM report)
- Leveraging research environment (adapted research activities for H1N1)
- Contributing to initiation of research infrastructure by training new researchers
- Developing tools and products for the practice community

ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH

Conclusion

- PERRC are already successful in building the science base for preparedness
- CDC needs to be diligent in providing mechanisms to allow PERRC to complete research protocols
- CDC needs to be diligent in finding funding to continue work of the PERRC

ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH ASPH


For more information:
preparedness.asph.org
ASPH
ASSOCIATION OF
SCHOOLS OF PUBLIC HEALTH

PERRC
Mid-Year Review
Stakeholder Panel

Jack Herrmann
Sr. Advisor & Chief
Public Health Preparedness

August 9, 2011
Atlanta, GA

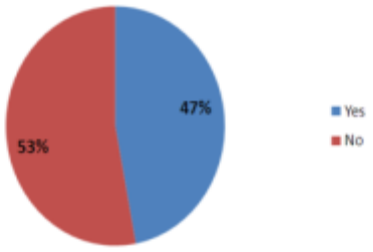
NACCHO

The Survey

- On-line Qualtrics, ten-question survey.
- Launched between July 8, 2011 and July 26, 2011.
- A reminder notice July 18, 2011.
- Overall: 612 people were sampled; 215 responded. Response rate = 35%.

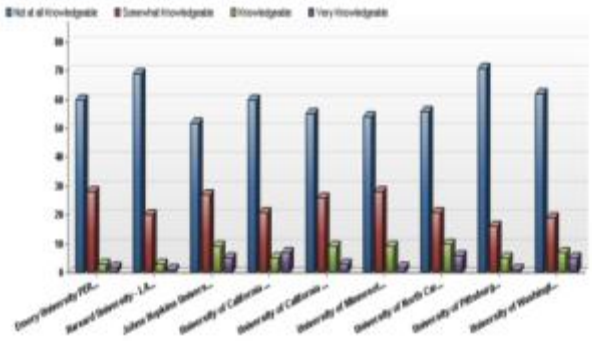
NACCHO

Q1) Are you familiar with the CDC Preparedness and Emergency Response Research Centers (PERRC) program?

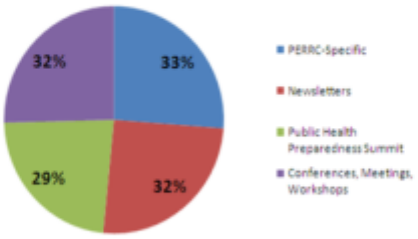


NACCHO

Q2) For each of the PERRC sites, please indicate the level of knowledge you have of that PERRC's research initiatives, activities or products…

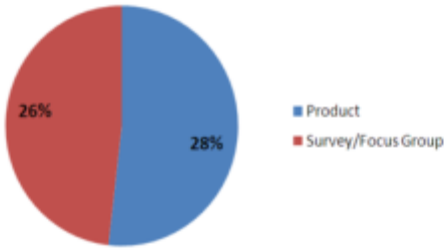


Q4) How did you (or your health department) acquire your knowledge of the PERRCs? Please select all that apply.



NACCHO

Q5) Please identify specific instances of how PERRC research initiatives, activities or products have helped to strengthen your health department's practice in public health preparedness and response. When answering, please indicate which PERRC(s) was helpful to your work.



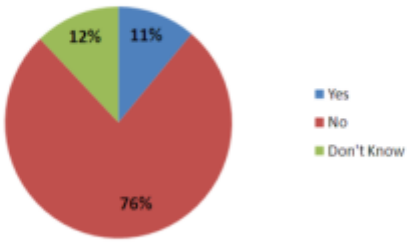
NACCHO

Q6) Which of the following PERRC-related activities, if any, has your health department participated in?

- ❑ PERRC-specific project or activity.
- ❑ PERRC-sponsored focus group, webinar, workshop, or meeting.
- ❑ Disseminated PERRC research findings/products within the LHD.

NACCHO

Q7) Have PERRC investigators served as SMEs for you or your health department?



NACCHO

Q8) What do you think are the most significant challenges to working with PERRCs to put research into practice?

- ❑ Lack of awareness of the mission or specific initiatives of the PERRCs.
- ❑ Lack of funding to actively engage with the PERRCs.
- ❑ Insufficient human resources to participate in PERRC activities or spend time familiarizing themselves with PERRC initiatives .

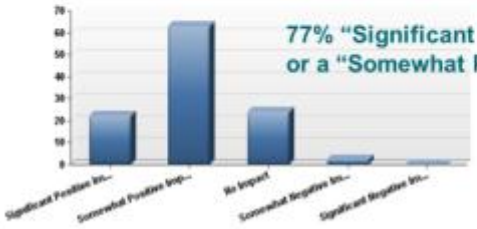
NACCHO

Q9) What do you think are the most significant benefits to collaborating with or participating in PERRC research activities?

- Advancing public health preparedness.
- Subject matter expertise and best practice models.
- Potential for collaboration.

NACCHO

Q10) Overall, how would you describe the extent to which PERRC research initiatives have the potential to impact preparedness and response practices at the federal, state, local and tribal public health levels?



77% "Significant Positive Impact" or a "Somewhat Positive Impact"

Part II: NACCHO Observations

NACCHO

Advanced Practice Centers Program

August 2010, survey - Principal Investigators.

Mesa County APC - University of Pittsburgh
Montgomery County APC - Johns Hopkins University.
Multnomah County APC - University of Washington
San Francisco County APC - UC Berkeley
Seattle-King County APC- University of Washington
Tarrant County APC - University of Pittsburgh RODS Lab.

NACCHO

Medical Reserve Corps Project

Engaged with the Harvard PERRC for the past three years.

Instrumental in identifying the various roles MRC volunteers perform during disasters and public health emergencies.

Develop a series of survey instruments and a database that local MRC units can use to track volunteer participation.

NACCHO

PERRC Advisory Committees

University of Pittsburgh
University of California at Berkeley
Johns Hopkins University
Harvard University.

NACCHO has also provided suggestions for local public health department advisory group representatives (e.g., University of Minnesota, University of California at Los Angeles).

NACCHO

Public Health Preparedness Summit

Highlighted mission and research agenda at 2009 PHP Summit opening plenary session.

Showcased the work of all nine PERRCs during 15 sharing, town hall, or interactive sessions and 23 poster sessions (2009 – 2011).

The 2012 Summit will continue this tradition with additional opportunity to present the PERRCs' most current initiatives.

NACCHO

Partnerships and Promotion

Attended annual PERRC meetings.

Participated in PERRC-hosted webinars.

Provided additional funding support through project related activities.

Contributed to the development of surveys.

Provided PERRC investigators with survey sample frameworks and related LHD contact information.

NACCHO

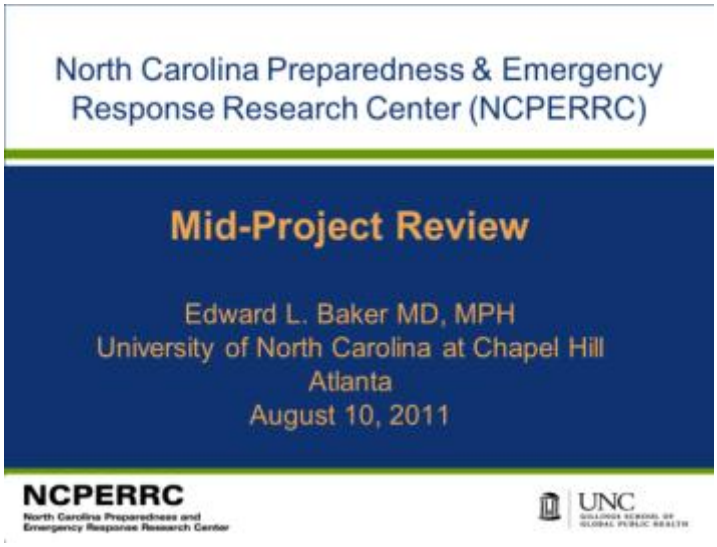
Conclusions

NACCHO has been an instrumental partner in promoting the work of the PERRCs and helping connect their research to the practice community

Still a general lack of familiarity and understanding of the PERRC program, though in the three short years of the PERRCs existence some gains have been made.

Survey data/comments offer an opportunity to identify specific methods for increasing the visibility of the PERRCs and the penetration of their research findings, tools, and resources into the local health department enterprise.

NACCHO


North Carolina Preparedness & Emergency Response Research Center (NCPERRC)
Mid-Project Review
Edward L. Baker MD, MPH
University of North Carolina at Chapel Hill
Atlanta
August 10, 2011
NCPERRC
North Carolina Preparedness and Emergency Response Research Center
UNC

NCPERRC: Critical Success Factors
• Focus on NC public health system with eye toward national relevance – accreditation, surveillance, regionalization & modeling
• Multi-disciplinary, multi-university research team
• Close partnership with state & local practitioners (94% average response rate in 9 studies)
• Early emphasis on research translation
• Strategic plan involvement

Translation Strategy
"The NCPERRC pledge"

- Involve practitioners at "the launching not just the landing"
- Conduct "commissioned research"
- Coordinate data collection among projects
- Recognize practitioners contributions
- Share findings **promptly and succinctly**

Key Partners

- NC Division of Public Health
- NC Local Health Directors
- NC Accreditation Program
- Public Health Accreditation Board (PHAB)
- CDC Career Epi Field Officer
- Academic partners:
  - NC State University - Systems Engineering
  - University of Arkansas for Medical Sciences - PHSSR
  - UNC Schools of Medicine, Information Sciences and Public Health

Recent Research Findings

- **Accreditation** can strengthen local public health preparedness
- **Systems engineering** can improve health alerts and immunization clinic efficiency
- **Systems Research** can improve efficiency and effectiveness of electronic disease surveillance and syndromic surveillance systems

Public Health Regional Response

- 7 Regional Teams created in Dec. 2001
- **Research Focus:**
  - Team composition
  - Nature of services
  - Resource allocation

- **Methods:**
  - Survey of local health agencies (98% response)
  - Relate to drills and exercise performance

Regionalization Study: Findings and Impact

- **Findings**
  - Services and capacity of 7 team system described
- **Translation of Findings into Policy**
  - Findings used in NC DPH strategic planning process
- **Result**
  - Restructure to 4 teams resulting in 30% savings ($1M)
- **Missed Opportunity (Year 5)**
  - Conduct evaluation of new teams (capacity & value)

NCPERRC value to NC Public Health

- Actions taken by NC DPH based on 9 reports:
  - **Regional teams** restructured saving $1M per year
  - **Public Health Epidemiology** program's value to LHDs understood; new marketing & training produced
  - **Syndromic surveillance** system modifications; use protocols & training being implemented
  - **Electronic disease surveillance** system & training modifications planned
  - **Health Alert Network** policy advisory committee being formed to address gaps

NCPERRC value derived by partners

- **Preparedness Capacity Assessment Survey** customized benchmarking reports received by 300 LHDs
- Preparedness measured from a statistically-matched peer group of similar agencies nationwide in 8 domains:
  - Surveillance & investigation
  - Plans & protocols
  - Workforce & volunteers
  - Communications & information
  - Incident command
  - Legal infrastructure & preparedness
  - Emergency events & exercises
  - Quality improvement activities

NCPERRC value derived by partners

- 11 NC LHDs collaborate with NCSU systems engineers to produce simulations of 6 vaccination clinic configurations

- Tools to be developed in YR4 for school-based & drive-through clinics to assist in planning & management of future clinics
- Potential collaboration with Minnesota PERRC in YR 4-5 cancelled due to funding reduction/elimination

Facilitation of research translation

North Carolina

Division of Public Health
- State Health Director
- State Epidemiologist
- Preparedness & Response
- Communicable Disease
- Local Technical Assistance
- CDC CEFO

LHD Accreditation Program

Association of Local Health Directors

National
- Public Health Accred. Board
- Int'l Society for Disease Surveillance
- CSTE
- ASTHO
- CDC
- Institute for Operations Research & Management Sciences (INFORMS)
- Institute of Industrial Engineers
- Winter Simulation Conference

Conclusions

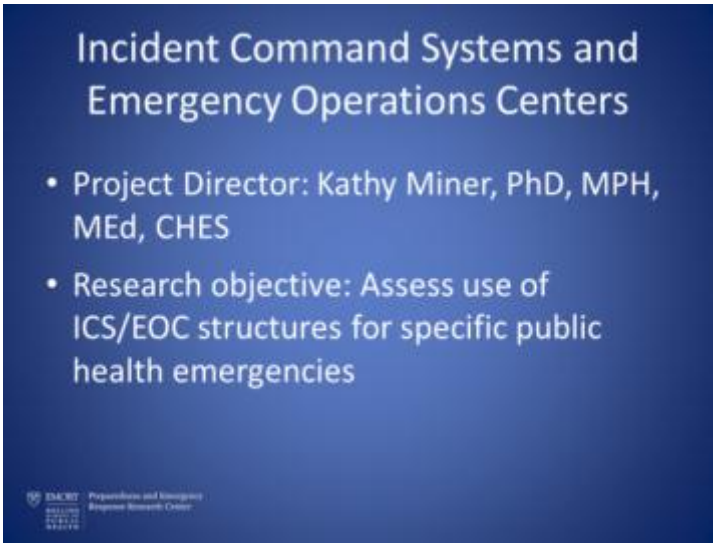
- North Carolina has directly benefited from PERRC
- PERRC program is a model for PHSSR
- CDC staff involvement has been exemplary
- Premature cancellation of the program:
  - Truncates longitudinal studies and evaluations of system changes
  - Limits impact of research and translation
  - Damages relationships with practice partners and new disciplines

Emory Preparedness and Emergency Response Research Center (Emory PERRC)

Ruth Berkelman, MD
CDC Mid Project Review
August 10, 2011

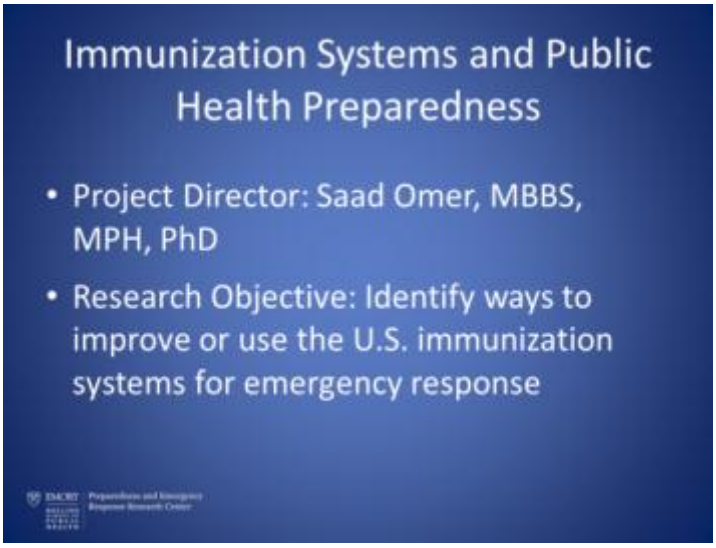
About the Emory PERRC

- Target IOM theme: Create and maintain sustainable preparedness and response systems throughout US public health network
- Principal Investigator: Ruth Berkelman, MD
- Co-PI: Dean Jim Curran, MD, MPH

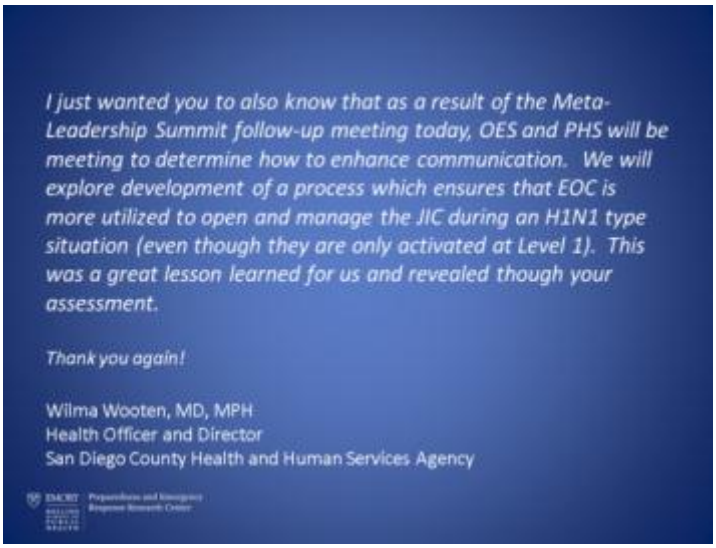

Incident Command Systems and Emergency Operations Centers
• Project Director: Kathy Miner, PhD, MPH, MEd, CHES
• Research objective: Assess use of ICS/EOC structures for specific public health emergencies

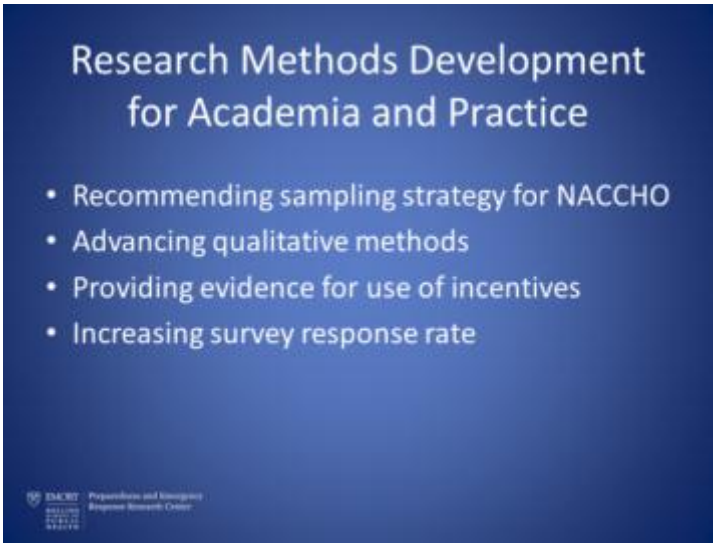
Academic-Community Partnerships in Preparedness
• Project Director: Alexander Isakov, MD, MPH
• Co-Project Director: Anne Dunlop, MD, MPH
• Research Objective: Strengthen sustainable relationships between higher-level academic institutions and community public health partners

Improving Disaster Planning for Nursing Home, Home Health and Dialysis Providers
• Project Director: David Howard, PhD
• Co-Project Director: Sarah Blake, PhD(c)
• Research Objective: Improve preparedness among nursing homes, home health agencies & dialysis centers


Immunization Systems and Public Health Preparedness
• Project Director: Saad Omer, MBBS, MPH, PhD
• Research Objective: Identify ways to improve or use the U.S. immunization systems for emergency response

Partnerships
• Collaborative Project Planning
• Key Interviewees
• Survey Development and Administration
• Discussion of Finding
• Data Interpretation
• Presentation of Findings
• National Recommendations


I just wanted you to also know that as a result of the Meta-Leadership Summit follow-up meeting today, OES and PHS will be meeting to determine how to enhance communication. We will explore development of a process which ensures that EOC is more utilized to open and manage the JIC during an H1N1 type situation (even though they are only activated at Level 1). This was a great lesson learned for us and revealed though your assessment.
Thank you again!
Wilma Wooten, MD, MPH
Health Officer and Director
San Diego County Health and Human Services Agency


Research Methods Development for Academia and Practice
• Recommending sampling strategy for NACCHO
• Advancing qualitative methods
• Providing evidence for use of incentives
• Increasing survey response rate

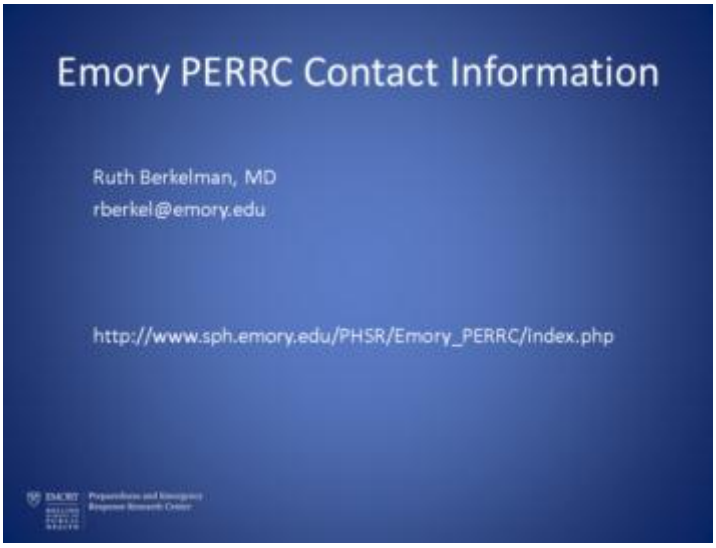
Research Contributions
• Finding: There was a high use of ICS/EOC between immunization and emergency preparedness programs during the 2009-2010 H1N1 influenza pandemic response.
• Public Health Implication: This finding provides evidence to support the National Response Framework goal of "Unity of effort through unified command" – an indicator that PHEP money was a strong investment in preparedness infrastructure.

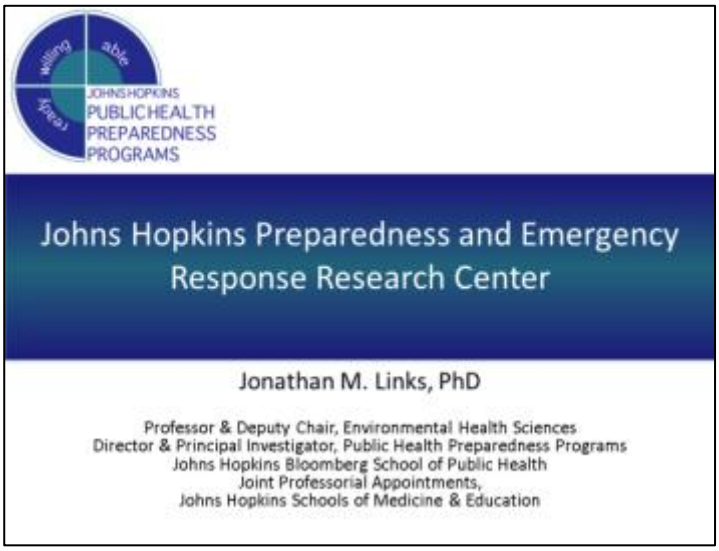
Research Contributions
• Finding: Local health departments with preexisting relationships with academic institutions were more likely to get assistance from those institutions during a crisis.
• Public Health Implication: This finding demonstrates the need for health departments to develop community partnerships for both disaster planning and response.

Research Contributions
• Finding: 55% of nursing homes use the disaster template provided to them by their corporate office
• Public Health Implication: There is an opportunity for CDC and public health agencies to provide information to help inform and strengthen preparedness plans by working with corporate offices of nursing homes.

Research Contributions
• Finding: Only 27% of nursing homes require their staff to receive seasonal influenza vaccinations.
• Public Health Implication: CMS should consider updating conditions of participation to require nursing home staff receive seasonal influenza vaccinations.

Translation into Practice
• Webinars
• Issue Briefs
• In Person Meetings
• Professional Meetings
• Press Releases
• Peer-reviewed Publications
• Policy Recommendations


Emory PERRC Contact Information
Ruth Berkelman, MD
rberkel@emory.edu
http://www.sph.emory.edu/PHSR/Emory_PERRC/index.php


willing
able
ready
JOHNS HOPKINS
PUBLIC HEALTH
PREPAREDNESS
PROGRAMS
Johns Hopkins Preparedness and Emergency Response Research Center
Jonathan M. Links, PhD
Professor & Deputy Chair, Environmental Health Sciences
Director & Principal Investigator, Public Health Preparedness Programs
Johns Hopkins Bloomberg School of Public Health
Joint Professorial Appointments,
Johns Hopkins Schools of Medicine & Education

"Ready, Willing, and Able"
"prepared mentally or physically for some experience or action"
"inclined or favorably disposed *in mind*"
READY
WILLING
ABLE
"having sufficient power, skill, or resources to accomplish an objective"
PROBABILITY OF AN APPROPRIATE RESPONSE

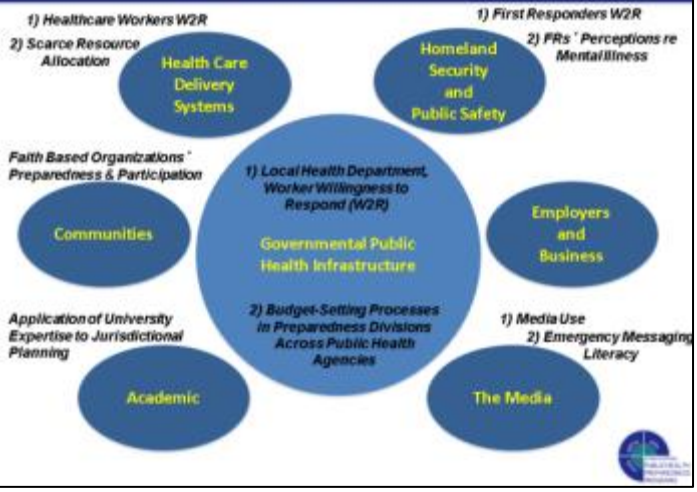
The Johns Hopkins PERRC

- **Focus is on *mental and behavioral health issues* in public health preparedness and response:**
  - Represents the biggest unmet need in preparedness and response
  - Vast majority of disaster-related injuries are psychosocial, not physical
  - Significant vulnerable populations
  - Hopkins model of disaster mental health
  - Hopkins track-record in resilience and recovery
- **Addresses IOM Priority Areas:**
  - ✓ Protecting vulnerable populations in emergencies
  - ✓ Strengthening response systems
  - ✓ Creating and maintaining sustainable response systems
- **Research Core and 4 Individual Research Projects:**
  1. Applying the Extended Parallel Process Model to Willingness-to-Respond in the Public Health System
  2. Fostering Coordinated Mental Health Preparedness Planning
  3. Role of the Media in Resistance
  4. Legal and Ethical Assessment Concerning Mental and Behavioral Health Preparedness
- **Pilot projects and new investigator funding (10 pilots and 5 new investigators funded to-date)**

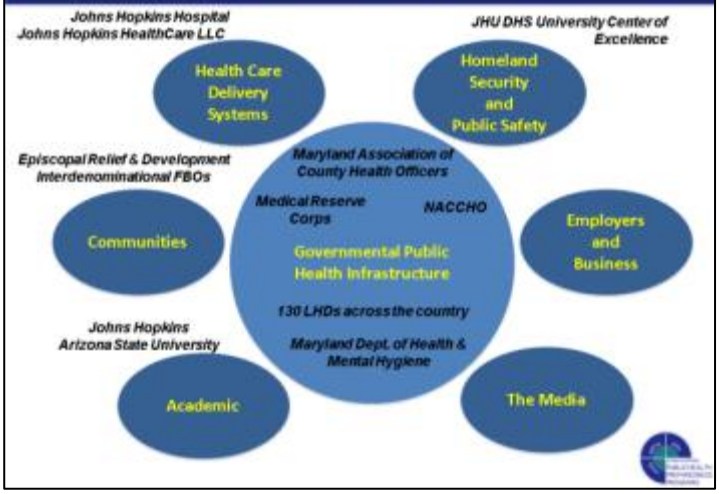
Mental and Behavioral Health Interventions

Time Period	Mental/Behavioral Health Process	Public Health Intervention
Pre-Event	Resistance	Primary Prevention
Event	Resilience	Secondary Intervention
Post-Event	Recovery	Tertiary Intervention

Public Health Preparedness System Research Areas



Public Health Preparedness System Partnerships



Research Publications

- Assessment of Local Public Health Workers' Willingness to Respond to Pandemic Influenza through Application of the Extended Parallel Process Model
- Gauging U.S. Emergency Medical Services workers' willingness to respond to pandemic influenza using a threat- and efficacy-based assessment framework
- Characterizing hospital workers' willingness to report to duty in an influenza pandemic through threat- and efficacy-based assessment
- The Legal Environment Underlying Mental and Behavioral Health Preparedness in Major Emergencies
- A Hidden Epidemic: Assessing the Legal Environment Underlying Mental and Behavioral Health Preparedness in Emergencies
- Ready, Willing, and Able: a framework for improving the public health emergency preparedness system
- Psychological first aid training for paraprofessionals: A systems-based model for enhancing capacity of rural emergency response
- Psychological first aid training for the faith community: A model curriculum
- Prescribing authority during emergencies: challenges for mental health care providers
- Ethical issues raised in addressing the needs of persons with serious mental disorders in complex emergencies
- Preparing for an influenza flu pandemic: Mental health considerations

One of our 'success stories' …

Project 1: Applying the 'Extended Parallel Process Model Willingness to Respond (WTR)' in the Public Health System

- This project examines the influence of *perceived threat* and *perceived efficacy* on public health workers' willingness to respond
- **Two components:** An *evaluation* ('PHIRST'), and an *intervention* ('PHIT')
- **Collaborators:** Local Health Departments in ID, VA, WI, OR, WA, IN, FL, MN, and MO
- **Outcomes and impact of the project:**
  - ✓ Identification of current willingness gaps in the public health workforce
  - ✓ Characterization of employees who are most likely to be willing to respond across the spectrum of hazards
  - ✓ Design and implementation of curricular interventions to to improve workforce response willingness
  - ✓ Preliminary results demonstrate the intervention increases WTR across all disaster scenarios (by as much as 20% for the scenario with the lowest baseline rate: radiological 'dirty' bomb)

Translation of Research Findings

Project 1: Curricular Intervention

- Johns Hopkins ~ Public Health Infrastructure Training (PHIT)
  - ✓ Designed to address the attitudinal and behavioral gaps in willingness-to-respond
  - ✓ Objective: Extend levels of threat awareness, self- and response-efficacy
  - ✓ Goal: Increased system capacity with higher numbers of workers who are willing-to-respond to all hazards
- Translation to Practice
  - ✓ Version 2.0 in development for dissemination to practice partners during Year 2 of JH-PERLC
  - ✓ Modification for delivery to a health care/hospital-based audience during Year 2 of JH-PERLC

Translation of Research Findings

Project 2: Coordinated Community Disaster Mental Health Planning

- Disaster Mental Health Preparedness Planning Model and Workbook for Faith Organizations
  - ✓ Includes a planning template to guide the organization through the critical elements of an effective disaster preparedness plan
- Translation to Practice
  - ✓ Finalize the current Preparedness Planning Workbook for community wide and public use
  - ✓ Adapt the material for web-based delivery of Psychological First Aid and Guided Preparedness Planning interventions

Translation of Research Findings

Project 4: Mental and Behavioral Legal and Ethical Preparedness

- Research Memos, FAQs, Legal and Ethical Guidance Documents
  - ✓ Targets law- and policy-makers, public health practitioners, mental health professionals, patients, and others
- Translation to Practice (developed tools)
  - ✓ Prescribing Authority During Declared Emergencies for Mental and Behavioral Health Care Providers
  - ✓ The Potential Implications of *CALIF v. City of Los Angeles* for Mental and Behavioral Health Preparedness
  - ✓ Frequently Asked Questions about Legal Preparedness for Health Care Providers and Administrators, Public Health Officials, Emergency Planners, and Others Regarding Mental and Behavioral Health
  - ✓ Sample Legal Guidance Letter – Liability for Mental Health Care Providers

LAMPS

Harvard PERRC

Linking Assessment and Measurement to Performance in PHEP Systems (LAMPS)

K.Vish Viswanath, PI

August 10, 2011

Program Overview

(1) *Why measure?* (clarification of the purposes and uses of the measurement effort);

(2) *What* to measure? (identification of the domains and criteria to be measured);

(3) *How* to measure? (development of specific metrics for each concept); and

(4) *How well* do the metrics work? (assessment of the validity, reliability, utility, and practicality of the measures developed.

Measurement Development Cycle ("the Cycle")

- ***Research Core*** *coordinates and integrates the efforts of four LAMPS research projects, as well as supports new research investigators and pilot projects.*
- *Project 1. Linking Assessment and Measurement to PHEP Systems Improvement ("**PHEP Systems Improvement**")*
- *Project 2. Linking Assessment and Measurement to PHEP through Engineering Systems Analysis ("**Engineering Systems Analysis**")*
- *Project 3. Linking Assessment and Measurement to Performance in PHEP Communications ("**PHEP Communications**")*
- *Project 4. Linking Assessment and Measurement to Performance in PHEP Drills and Exercises ("**PHEP Drills and Exercises**")*

H1N1 AAR Workshop: A LAMPS – Systems Improvement Project Success Story

- **Primary Goal**: To identify lessons from the state and local H1N1 response and After Action Reports/Improvement Plans (AAR/IP) process.
- **Background**:
  - The LAMPS SI project is working towards the creation of a incident registry (CIR) for public health emergency preparedness as a way to better understand preparedness for rare incidents.
  - A two-day work shop was held in September, 2010 on H1N1 After Action Reports/Improvement Plans (AAR/IP). Two questions were addressed in the workshop:
    1. What are generalizable approaches or findings about public health emergency preparedness at the state and local level can be learned from this experience
    2. What can be said about the strengths and weakness of different methods used to analyze the experience and present the results
- **Collaboration**:
  - Representatives of state and local health departments
  - Representatives of Preparedness and Emergency Response Research Centers.
  - Representatives of relevant CDC units (OPHPR, ERPO, DEO and Influenza Coordination Unit)

H1N1 AAR Workshop: A LAMPS – Systems Improvement Project Success Story

- **Impacts and Outcomes**:
  1. AAR/IPs can be useful for both accountability and quality improvement
  2. When AAR/IPs are either required or recommended, clarification on the purpose of AAR/IPs in funding guidance is needed
  3. Clarification on the expectations about start and end deadlines and what can and should be produced within them is needed. For example, many PHER recipients agreed that the AAR/IP process must be completed within 60 days of the end of an incident.
- **Evidence**:
  1. Wide differences were noted in the participants' understanding of the intended uses and users of AAR/IPs, their scope, timing, format, and the use of external consultants in their preparation and on the strengths and weaknesses of various approaches.
  2. The AAR/IPs varied in the extent to which they sought to identify root causes and the methods they used to do so.
  3. Participants agreed that a workshop report will enable state and local health department to more effectively assess and improve PHEP capabilities during future events.

Research Products I

- Publications in peer-reviewed journals
- Published Abstracts and Presentations
- Reports
- Evidence-based Interventions
  1. Hospital Drills and Exercises
  2. Courses and Training for Practitioners
  3. LAMPS Project 2 has contributed to successes in MIT. We have had a "seat at the table" in the preparedness planning for public health emergencies. Insights from our modeling research contributed to the planning, particularly in the area of non-pharmaceutical interventions.

Research Products II

- Tool Kit
  1. Savoia E., Higdon M.A., Massin-Short S., Tallon L., Stoto M.A. Evaluation Toolkit for the Deployment of MRC Units during Flu Clinics and other Public Health Activities. Prepared for the Office of the Civilian Volunteer Medical Reserve Corps (OCVMRC) and the National Association of County and City Health Officials (NACCHO). July 2010 (available at http://www.hsph.harvard.edu/hcphp/mrc-toolkit/).
  2. Improvement of Exercise Evaluation Instrument
  3. Development and Validation of Exercise Evaluation Toolkit
- White Paper
  1. Barry JM (2009). White Paper on Novel H1N1: Prepared for the MIT Center for Engineering Systems Fundamentals.
- Program
  1. Learning collaborative meetings for Medical Reserve Corps (MRC) units in Boston, Massachusetts.

Research Translation

- Development and Maintenance of an Intranet and an external website
- PHEP Critical incident registry
- Development of performance measures for MRC units deployed at flu clinics, PODs, health fairs, or other events
- Collaboration with the Massachusetts Department of Public Health (MDPH) in preparation in H1N1 AAR/IP.
- Hospital drills and exercises
- Other potential of translation of research findings to practice

University of Pittsburgh

PHASYS

PUBLIC HEALTH
ADAPTIVE SYSTEMS STUDIES

A CDC Preparedness & Emergency Response Research Center

Presentation for

PERRC Mid Project Review

August 10, 2011

Maggie Potter, JD
mapotter@pitt.edu

PHASYS

PHASYS TEAM

Maggie Potter
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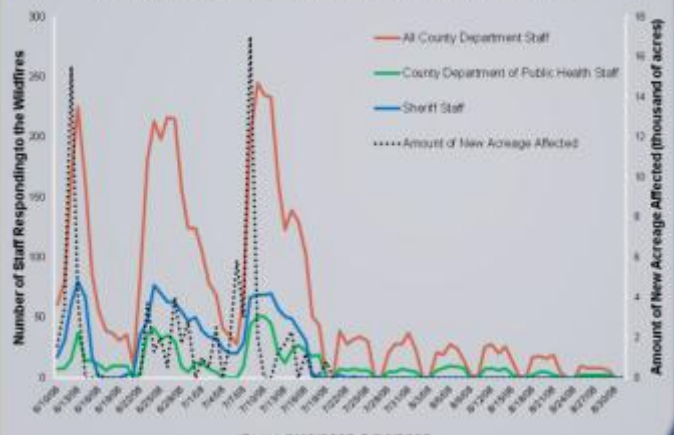
Louise Comfort
Luis Duran
Joshua Epstein
Elizabeth Ferrell Bjerke
Leslie Fink
Jared Galvan
Sherrianne Gleason
Ross Hammond
Tina Hershey
Leonard Huggins
Christopher Keane
Kevin Kim
Chyongchiou J. Lin
Kate Marryshow
Andrew Parker
Jon Parker
Francesca Pillemer
Bruce Pomer
Russell Schuh
Samuel Stebbins
Patricia M. Sweeney
Mark Voortman
Clayton Wukich
Xiaozhi Zhou

University of Pittsburgh
Pittsburgh Supercomputing Center
The Brookings Institution
Johns Hopkins University/Emergency Medicine
RAND–Pittsburgh

2

Measuring a County's Response to Summer Wildfires, Butte CA (2008)



Date: 6/10/2008-8/31/2008

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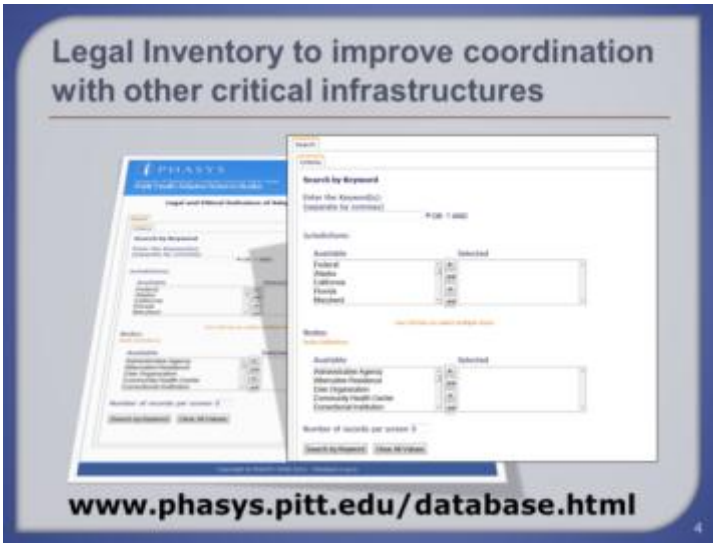
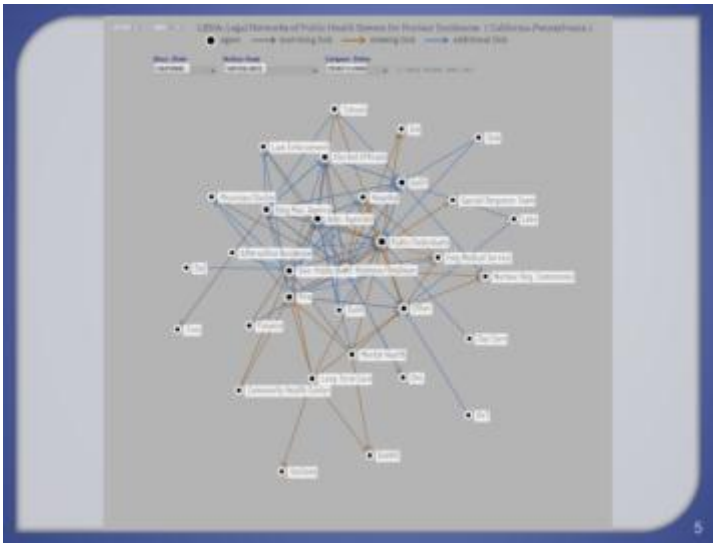
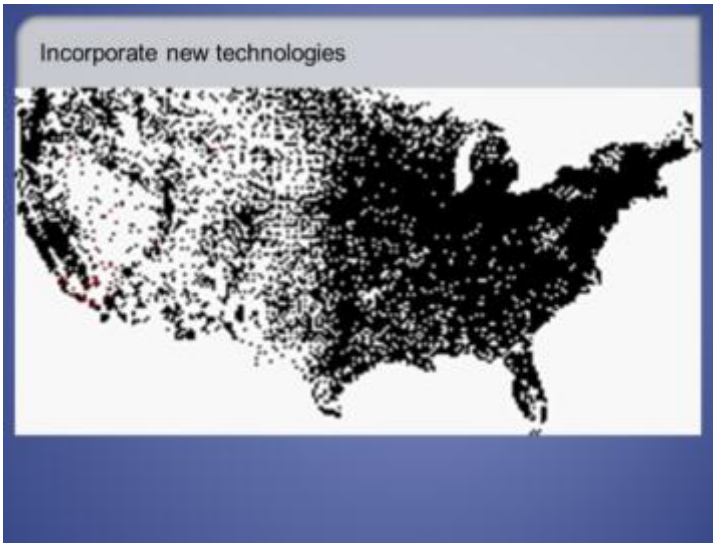
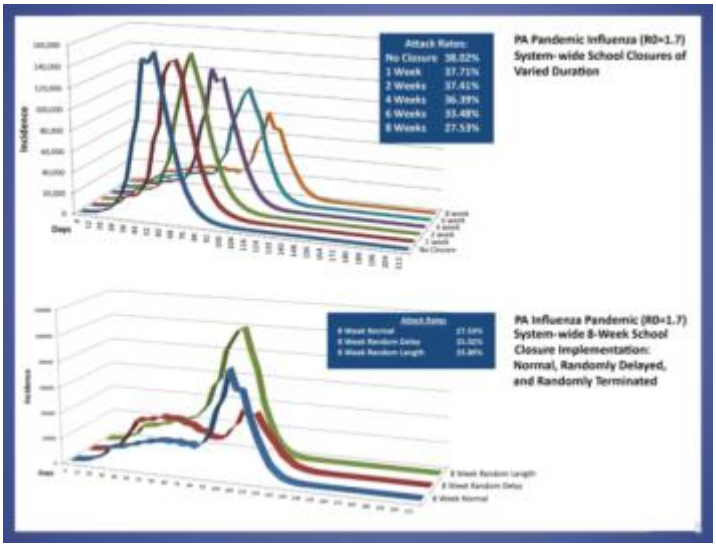
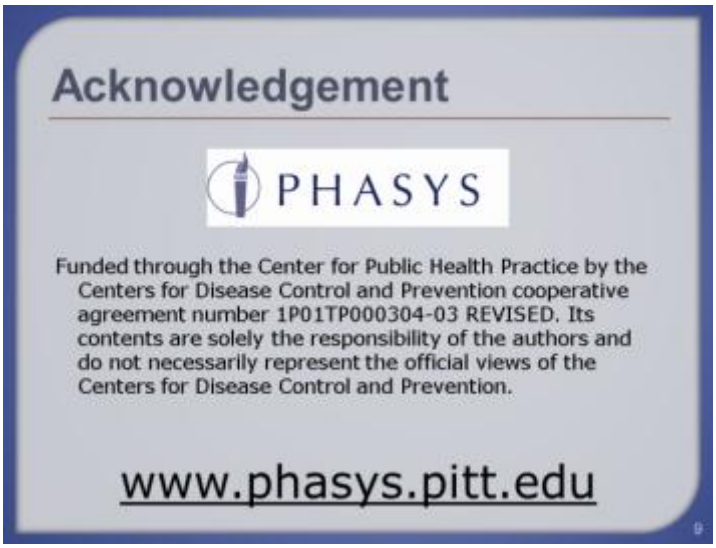

Legal Inventory to improve coordination with other critical infrastructures
www.phasys.pitt.edu/database.html



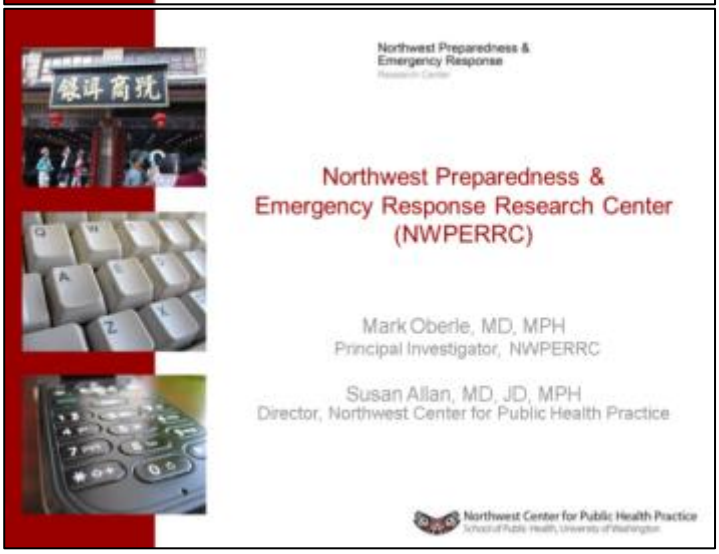
Incorporate new technologies


Incorporate new technologies


Attack Rates:
No Closure 38.02%
1 Week 37.71%
2 Weeks 37.41%
4 Weeks 36.39%
6 Weeks 33.48%
8 Weeks 27.53%
PA Pandemic Influenza (R0=1.7) System-wide School Closures of Varied Duration
PA Influenza Pandemic (R0=1.7) System-wide 8-Week School Closure Implementation: Normal, Randomly Delayed, and Randomly Terminated


Acknowledgement
PHASYS
Funded through the Center for Public Health Practice by the Centers for Disease Control and Prevention cooperative agreement number 1P01TP000304-03 REVISED. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention.
www.phasys.pitt.edu

Northwest Preparedness & Emergency Response
Public Health Emergency Communication
• Text messaging: audience research, logistics, fiscal, legal, technical issues
• Communication with limited English speaking populations
• Randomized trial of provider communication: Fax, email or text message?
Northwest Center for Public Health Practice


Northwest Preparedness & Emergency Response
Northwest Preparedness & Emergency Response Research Center (NWPERRC)
Mark Oberle, MD, MPH
Principal Investigator, NWPERRC
Susan Allan, MD, JD, MPH
Director, Northwest Center for Public Health Practice
Northwest Center for Public Health Practice

Research Impact
Texting systems for vaccine reminders:
• What are the legal and logistical issues for LHJs?
• Will people "opt in" to receive LHJ text messages?
NWPERRC
Northwest Center for Public Health Practice

2nd Dose Research:
Immediate & Potential Impacts

- **Protected Health Information**
  - HIPAA compliant message
  - Legal and security findings shared with other local health departments
- **Opt-in method developed**
  - 84% of parents opted to receive text reminders
  - Transferable to other communities and situations

NWPERRC

Research Products

1. Guide to working with SMS vendors
2. Video "how-to" text message
3. Video podcasts and hour-long training video for LHDs
   - Why SMS in an emergency
   - Findings from audience research
   - How to work with vendors
   - Sending PHI via text

These tools are all available at:
http://www.kingcounty.gov/healthservices/health/ preparedness/texting.aspx

NWPERRC

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School of Public Health, University of Washington

Research Products

Guidelines for emergency communication with limited English speaking populations

- Phone-based emergency communication systems (9-1-1, disaster call centers, etc)
- Incorporated into PHSKC PICC staff training and protocols

Chinese public service announcements about CPR

- Impacted knowledge, awareness
- Offers model for PSAs in other languages

NWPERRC

Northwest Center for Public Health Practice
School of Public Health, University of Washington

REACH Randomized Control Trial

REACH: Rapid Emergency Alerting Communications in Health

To identify most effective methods of communication between public health agencies and health care providers

- Compares e-mail, fax, and SMS text
- 3 sites, including urban and rural
- 5 health care provider types

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School of Public Health, University of Washington

REACH: Impact of Budget Reduction

- Reduced number of alerts/site to 4
- Reduced number of enrolled HCPs (210/message group)
- Reduced power to analyze for primary objectives
  - Effectiveness of message format only; no between or within site or provider type analyses
  - Elimination of analysis for all secondary objectives
  - Reduced dissemination plan

NWPERRC

Northwest Center for Public Health Practice
School of Public Health, University of Washington

Research Translation

NWCPHP Umbrella

- 21 years developing & disseminating trainings
- Established network
  - State, local, and tribal in six state region
- Publish *Northwest Public Health*, the UW School of Public Health Journal

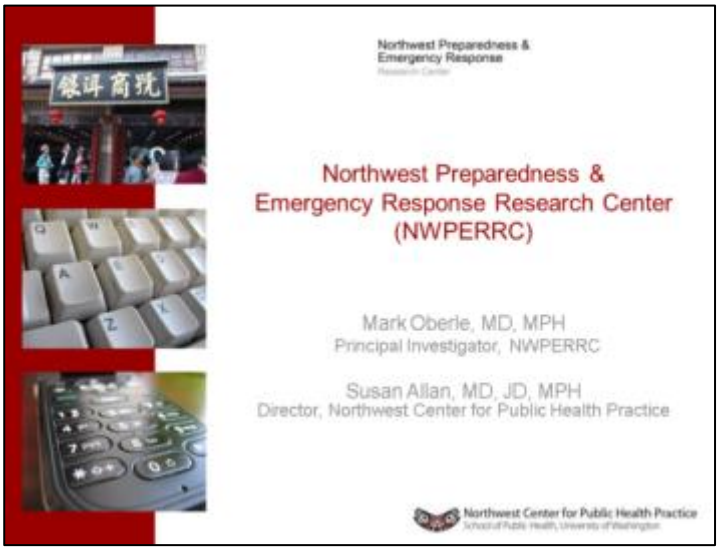
Active participation in national public health organizations

- ASTHO, ASTHO Preparedness Policy Committee
- NACCHO
- American Heart Association

NWPERRC

Northwest Center for Public Health Practice
School of Public Health, University of Washington

Partnerships:
Relevant, Practical, and Mutually Beneficial
Community Based Organizations
Casa Latina
Chinese Information & Service Center
El Centro de la Raza
Hearing, Speech & Deafness Center
Language Line Services
Valley Communications Center
Multi-Service Centers
New Futures
Sea Mar Community Health Center
Tribal Organizations
Muckleshoot Indian Tribe
Seattle Indian Health Board
Snoqualmie Indian Tribe
Academic Institutions
Washington State University
South Seattle Community College
Local & State Public Health
Benton Franklin Health District
Montana Public Health & Human Services
Public Health-Seattle & King County
Spokane Regional Health District
Washington Department of Health
Kitsap County Health District
NE King County Regional Public Safety Communications Agency
Other
Washington State Pharmacy Association
Washington State Medical Association
Chinese Print Newspapers
Chain Pharmacy Community
CDC VAERS
NWPERRC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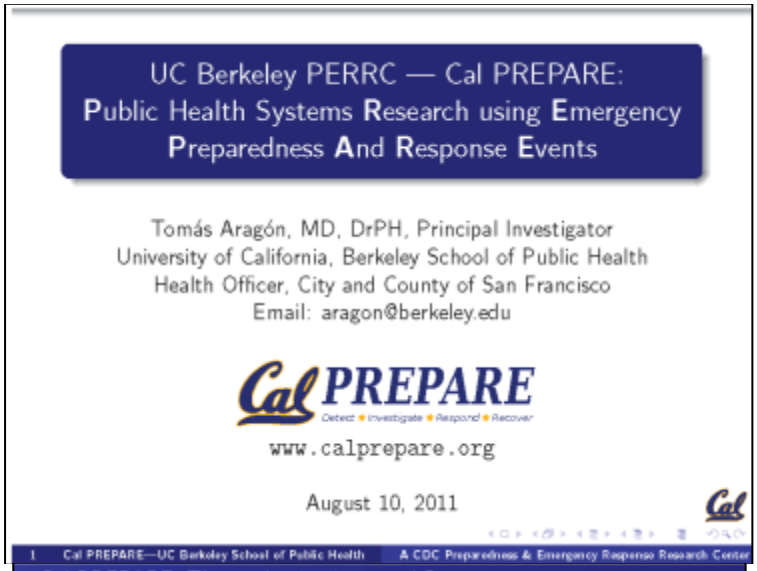
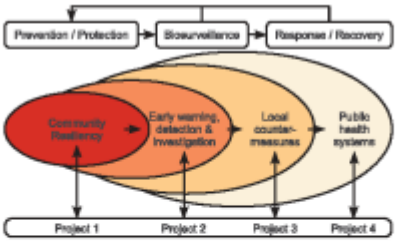

UC Berkeley PERRC — Cal PREPARE:
Public Health Systems Research using Emergency Preparedness And Response Events
Tomás Aragón, MD, DrPH, Principal Investigator
University of California, Berkeley School of Public Health
Health Officer, City and County of San Francisco
Email: aragon@berkeley.edu
Cal PREPARE
Detect • Investigate • Respond • Recover
www.calprepare.org
August 10, 2011
1 Cal PREPARE—UC Berkeley School of Public Health A CDC Preparedness & Emergency Response Research Center

Cal PREPARE: Theme, Institutions, and Partners
Research priority theme
To Create and Maintain Sustainable Preparedness and Response Systems
Institutions and key partners
UC Berkeley, School of Public Health
Center for Infectious Diseases & Emergency Readiness,
Health Research for Action; and
Healthy Aging Research Network;
Monterey Institute of International Studies
James Martin Center for Nonproliferation Studies; Graduate School of International Policy and Management;
Research partners
State of California: CDPH, Cal EMA, Cal EMSA, & CHHS;
State of Hawai'i Department of Health; and
Association of Bay Area Health Officials (ABAHO)
2 Cal PREPARE—UC Berkeley School of Public Health A CDC Preparedness & Emergency Response Research Cent

Cal PREPARE: Background and Overview



P1 All-hazards communication to improve the resilience of vulnerable populations (Linda Neuhauser, DrPH & Susan L. Ivey, MD, MHSA);

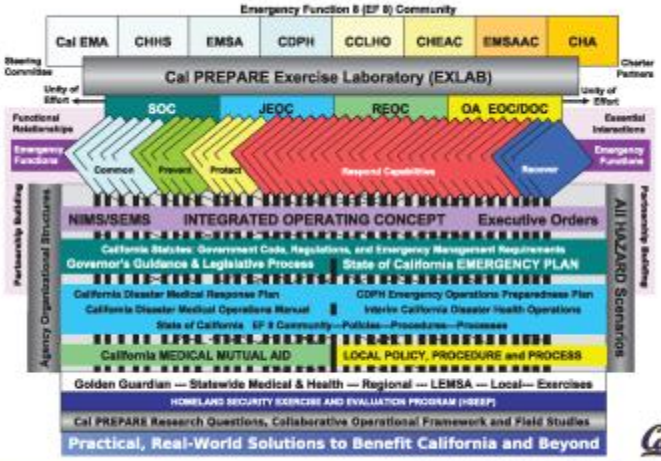
P2 Epidemiology networks in action (Wayne Enanoria, PhD, MPH);

P3 Closing the CRN vulnerabilities in all-hazards preparedness (Ferenc Dalnoki-Veress, PhD & Raymond Zilinskas, PhD, MIIS/CNP); and

P4 California Exercise Laboratory (EXLAB): Systems research using statewide operations-based exercises (Tomás Aragón, MD, DrPH)

3 Cal PREPARE—UC Berkeley School of Public Health A CDC Preparedness & Emergency Response Research Center

Project 4: EXLAB System Model



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Project 3: Closing CRN Vulnerabilities—Historical Analysis

Project Goal

To assess and improve state and local public health departments' capabilities to respond to chemical, radiological, and nuclear (CRN) incidents, whether caused by nature, accident, or terrorism.

Analytic Approach

1. Historical analysis of CRN events to identify vulnerabilities;
2. Analytic Hierarchical Process (AHP) to develop multiple-criteria weights for complex processes.

Analytic Hierarchy Process applications

- Evaluate exercise/event learning, training, or performance;
- Prioritize preparedness vulnerabilities or study process;
- Conduct surveys for complex problems; and
- Strategic decision making.

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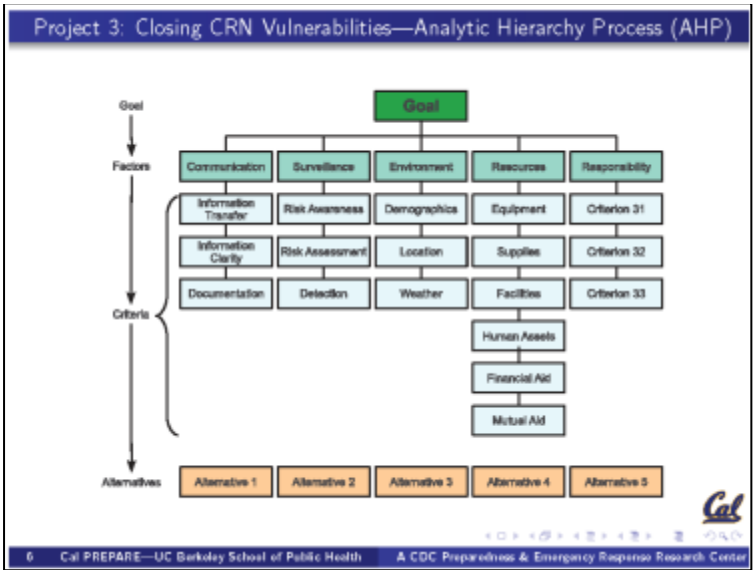
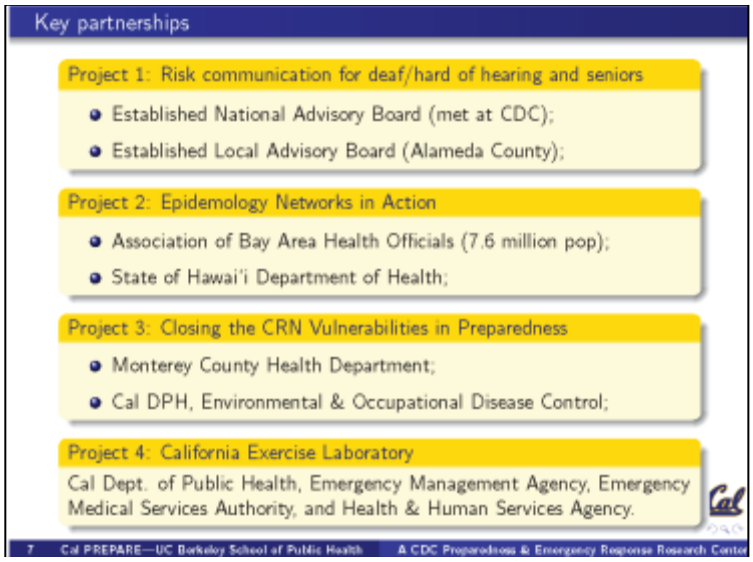

Project 3: Closing CRN Vulnerabilities—Analytic Hierarchy Process (AHP)
Goal
Factors
Criteria
Alternatives
Goal
Communication
Surveillance
Environment
Resources
Responsibility
Information Transfer
Risk Awareness
Demographics
Equipment
Criterion 31
Information Clarity
Risk Assessment
Location
Supplies
Criterion 32
Documentation
Detection
Weather
Facilities
Criterion 33
Human Assets
Financial Aid
Mutual Aid
Alternative 1
Alternative 2
Alternative 3
Alternative 4
Alternative 5
6 Cal PREPARE—UC Berkeley School of Public Health
A CDC Preparedness & Emergency Response Research Center


Key partnerships
Project 1: Risk communication for deaf/hard of hearing and seniors
Established National Advisory Board (met at CDC);
Established Local Advisory Board (Alameda County);
Project 2: Epidemology Networks in Action
Association of Bay Area Health Officials (7.6 million pop);
State of Hawai'i Department of Health;
Project 3: Closing the CRN Vulnerabilities in Preparedness
Monterey County Health Department;
Cal DPH, Environmental & Occupational Disease Control;
Project 4: California Exercise Laboratory
Cal Dept. of Public Health, Emergency Management Agency, Emergency Medical Services Authority, and Health & Human Services Agency.
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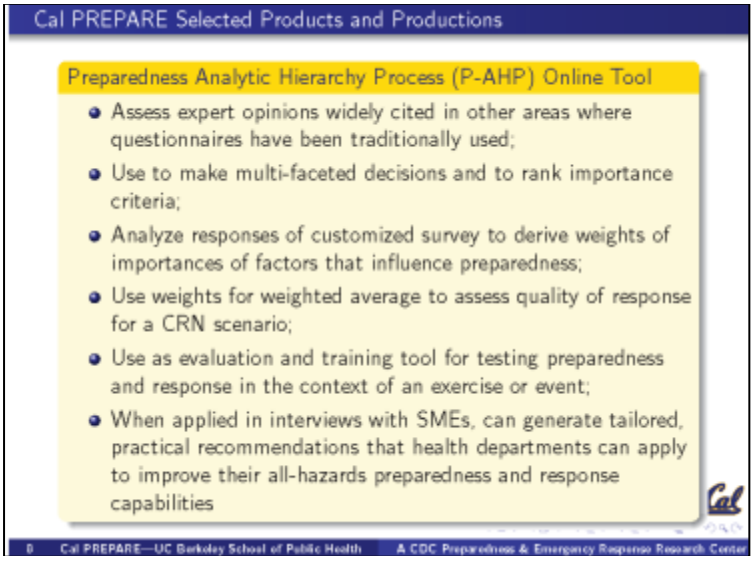
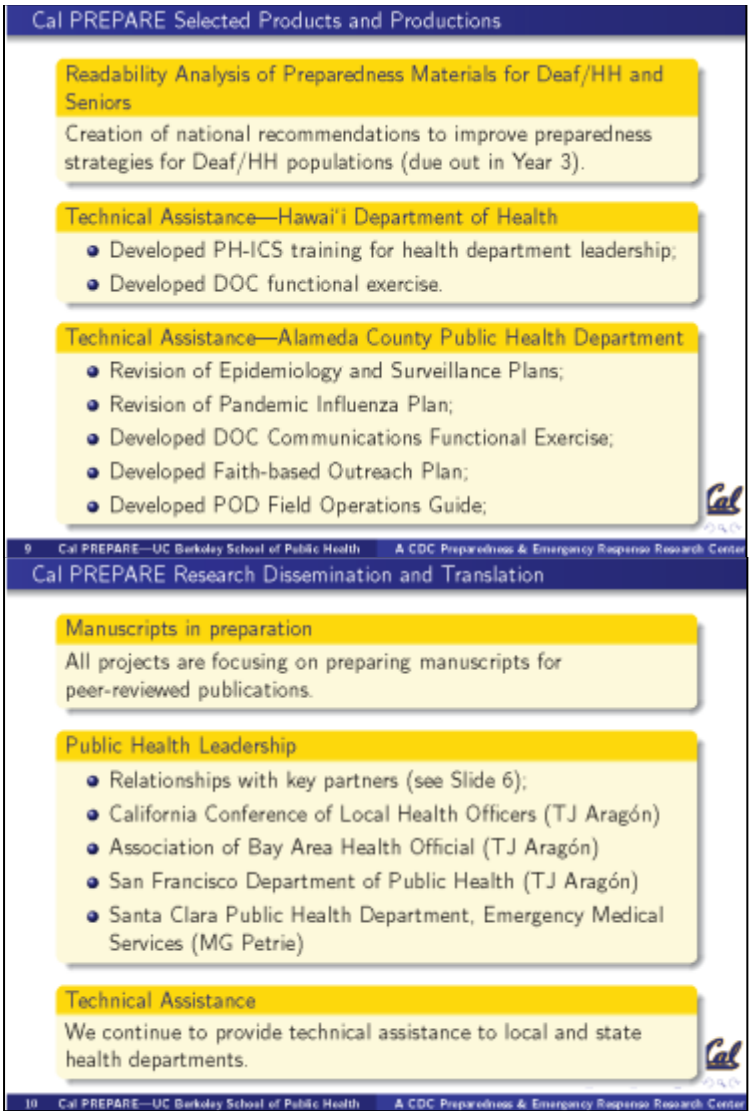
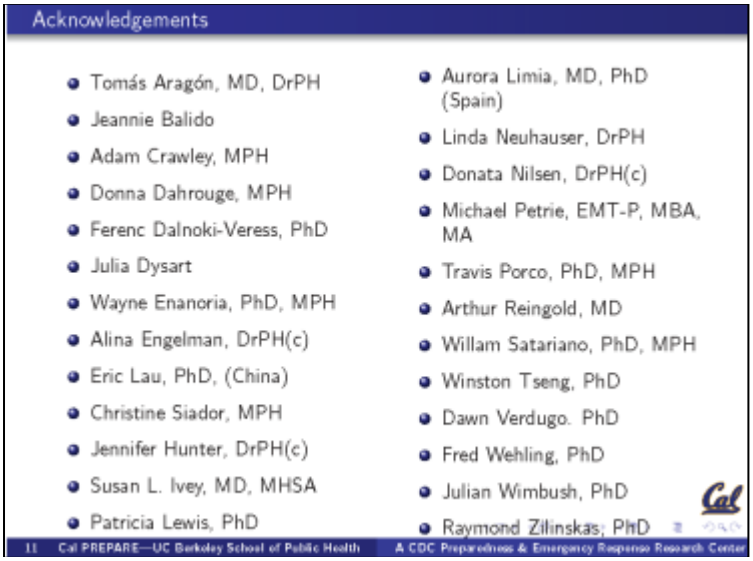
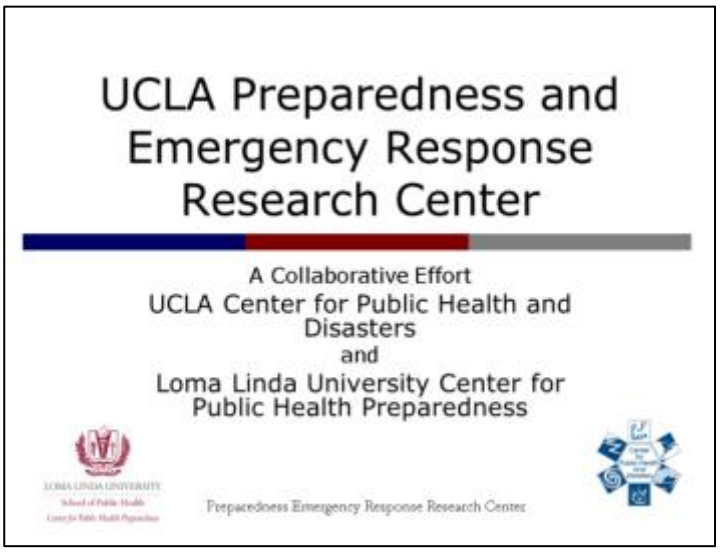
A CDC Preparedness & Emergency Response Research Center


Cal PREPARE Selected Products and Productions
Preparedness Analytic Hierarchy Process (P-AHP) Online Tool
Assess expert opinions widely cited in other areas where questionnaires have been traditionally used;
Use to make multi-faceted decisions and to rank importance criteria;
Analyze responses of customized survey to derive weights of importances of factors that influence preparedness;
Use weights for weighted average to assess quality of response for a CRN scenario;
Use as evaluation and training tool for testing preparedness and response in the context of an exercise or event;
When applied in interviews with SMEs, can generate tailored, practical recommendations that health departments can apply to improve their all-hazards preparedness and response capabilities
8 Cal PREPARE—UC Berkeley School of Public Health A CDC Preparedness & Emergency Response Research Center


Cal PREPARE Selected Products and Productions
Readability Analysis of Preparedness Materials for Deaf/HH and Seniors
Creation of national recommendations to improve preparedness strategies for Deaf/HH populations (due out in Year 3).
Technical Assistance—Hawai'i Department of Health
Developed PH-ICS training for health department leadership;
Developed DOC functional exercise.
Technical Assistance—Alameda County Public Health Department
Revision of Epidemiology and Surveillance Plans;
Revision of Pandemic Influenza Plan;
Developed DOC Communications Functional Exercise;
Developed Faith-based Outreach Plan;
Developed POD Field Operations Guide;
9 Cal PREPARE—UC Berkeley School of Public Health A CDC Preparedness & Emergency Response Research Center
Cal PREPARE Research Dissemination and Translation
Manuscripts in preparation
All projects are focusing on preparing manuscripts for peer-reviewed publications.
Public Health Leadership
Relationships with key partners (see Slide 6);
California Conference of Local Health Officers (TJ Aragón)
Association of Bay Area Health Official (TJ Aragón)
San Francisco Department of Public Health (TJ Aragón)
Santa Clara Public Health Department, Emergency Medical Services (MG Petrie)
Technical Assistance
We continue to provide technical assistance to local and state health departments.
10 Cal PREPARE—UC Berkeley School of Public Health A CDC Preparedness & Emergency Response Research Center


Acknowledgements
Tomás Aragón, MD, DrPH
Jeannie Balido
Adam Crawley, MPH
Donna Dahrouge, MPH
Ferenc Dalnoki-Veress, PhD
Julia Dysart
Wayne Enanoria, PhD, MPH
Alina Engelman, DrPH(c)
Eric Lau, PhD, (China)
Christine Siador, MPH
Jennifer Hunter, DrPH(c)
Susan L. Ivey, MD, MHSA
Patricia Lewis, PhD
Aurora Limia, MD, PhD (Spain)
Linda Neuhauser, DrPH
Donata Nilsen, DrPH(c)
Michael Petrie, EMT-P, MBA, MA
Travis Porco, PhD, MPH
Arthur Reingold, MD
Willam Satariano, PhD, MPH
Winston Tseng, PhD
Dawn Verdugo. PhD
Fred Wehling, PhD
Julian Wimbush, PhD
Raymond Zilinskas; PhD
11 Cal PREPARE—UC Berkeley School of Public Health
A CDC Preparedness & Emergency Response Research Center


UCLA Preparedness and Emergency Response Research Center
A Collaborative Effort
UCLA Center for Public Health and Disasters
and
Loma Linda University Center for Public Health Preparedness
Preparedness Emergency Response Research Center

Goal: Explore the inter-organizational cooperation necessary to create and sustain a public health system that is resilient to disasters
Priority Theme Number 3: Create and Maintain Sustainable Preparedness and Response Systems
Specific Aims
Describe the various components of a public health system that are necessary to ensure that the system is able to respond to emergencies and disasters effectively and efficiently
Describe the inter-organizational relationships that governmental public health agencies have with other components of the public health system and identify factors associated with increased resiliency of the system as a result of those relationships.
Develop tools, resources, and protocols, based on research findings, that will increase the resiliency of the public health system by increasing redundancy, resourcefulness, and rapidity.
Ensure that inter-organizational relationships, tools, resources and protocols meet the needs of all segments of the community served by the public health system including those segments which may be at increased vulnerability during a hazardous event.
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Research Impact: Collaborating with Community and Faith-Based Organizations

- Key Informant Interviews with Local Health Departments
  - What did Public Health response to H1N1 last year show LHDs about outreach?
  - Among disaster preparedness LHD staff, what are current health department policies and practices regarding CBO/ FBO outreach?
  - What facilitates or constrains LHD outreach with CBOs/ FBOs?
  - Results
    - Many respondents had difficulty in defining who their community based organizational partners for disasters should be
    - They tended to mention voluntary agencies
    - Many suggested that relationships with CBOs/ FBOs were much better in other more established public health divisions
    - Many of the LHD staff we talked to did not have a clear idea of what could be accomplished by establishing relationships with CBOs/FBOs
    - Goals and objectives for these relationships were unclear

Next Steps and Impact

- Results driving survey development and Case Studies
- New Collaborative Efforts with LA County DPH and Alameda County PHD
  - LAC-DPH: Developing a toolkit for assessing population's connections to communities and organizations
  - Alameda County: Developing a toolkit for assessing At Risk Populations Needs and CBO's capacity to meet those needs

Partnerships

- Many partnerships pre-existed
  - San Bernardino and Riverside County Health Departments
  - Existing relationships helped to frame and validate instruments
- New partnerships
  - Community Organizations in Riverside Counties
  - Bloomington, MN Public Health Division: Working with Faith Communities

Products

- Research Products/Methods
  - IRB training for lay personnel in community organizations (Spanish)
    - Community organizations using this for training community health workers for other programs as well
  - H1N1 Pilot
    - Results used for Hazard Risk Assessment and for revising PanFlu Planning for a local LHD
  - Tribal Preparedness Pilot
    - Tribes working with LLU to develop internal surveys based on the survey they completed

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Products

- Toolkits/Resources
  - Toolkit for LHD for collaborating with Schools
  - Toolkit for Schools for collaborating with LHDs
  - Online toolkit for LHDs for outreach to CBO/FBO
  - Environmental Health Resilience Fair Curriculum

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Translation

- Production of Toolkits
  - Distribution through Center websites
  - Promotion at Preparedness Summit; APHA; other public health practice meetings
  - Promotion through regular relationships (training; technical assistance) provided to LHD's

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Appendix G. PERRC Program Fact Sheet

Centers for Disease Control and Prevention
Office of Public Health Preparedness and Response

Preparedness and Emergency Response Research Centers

Background

Preparedness and Emergency Response Research Centers (PERRCs) conduct research to evaluate the structure, capabilities, and performance of public health systems for preparedness and emergency response. The establishment of these centers was mandated by the Pandemic and All-Hazards Preparedness Act of 2006, which called for research to improve federal, state, local, and tribal public health preparedness and response systems. In 2008, the Centers for Disease Control and Prevention's (CDC) Office of Public Health Preparedness and Response, Office of Science and Public Health Practice, awarded $10.9 million over 5 years to 7 accredited schools of public health for establishing PERRCs. In 2009, CDC awarded another $2.7 million over 4 years to two additional schools of public health to establish PERRCs. An integral part of the work of these centers is to help translate study results to public health practice.

Research benefits

PERRC research directly benefits federal, state, local, and tribal public health preparedness and response activities. For example, research at one PERRC focuses on enhancing the usefulness of preparedness training. The findings from these studies are expected to identify training modalities that are more effective for improving response capabilities. The results can be used to help direct scarce resources for training. All PERRC research is focused on identifying the most critical elements needed to enhance preparedness for all hazards and to close gaps in public health preparedness and response services.

Research priorities

Each PERRC consists of 3-4 investigator-initiated research projects and an administrative core. PERRC research projects address one of the four research priority recommendations identified in an Institute of Medicine Letter Report (2008; available at www.iom.edu/CMS/3740/48812.aspx). This report resulted from a study convened at the request of CDC. PERRC research also addresses cross-cutting issues for preparedness and response, such as identifying and addressing the unique needs of at-risk populations and rural communities. State and local public health departments are collaborative partners in the research being conducted by several PERRCs.

More Information

For more information on PERRCs, go to http://emergency.cdc.gov/cdcpreparedness/science/research or contact the Extramural Research Program, CDC, Office of Public Health Preparedness and Response (ophpr_extramuralres@cdc.gov).

CDC Office of Public Health Preparedness and Response, Office of Science and Public Health Practice (May 2010)

Research priorities and annual funding for the nine accredited schools of public health in the PERRC program are provided below. (2008-2013)

School	Research Priority	Award
Emory University (Atlanta, GA)	Create and maintain sustainable preparedness and response systems	$1,562,676
Harvard University (Boston, MA)	Generate criteria and metrics to measure effectiveness and efficiency	$1,717,286
Johns Hopkins University (Baltimore, MD)	Preparedness to address the risks of vulnerable populations	$1,495,398
University of California* (Berkeley, CA)	Achieving public health and community readiness for today's challenges and future threats	$1,506,306
University of California* (Los Angeles, CA)	Preparedness and Emergency Response Research Centers: A public health systems approach	$1,193,365
University of Minnesota (Minneapolis, MN)	Enhance the usefulness of training	$1,470,307
University of North Carolina (Chapel Hill, NC)	Create and maintain sustainable preparedness and response systems	$1,695,189
University of Pittsburgh (Pittsburgh, PA)	Create and maintain sustainable preparedness and response systems and generate criteria and metrics to measure effectiveness and efficiency	$1,701,845
University of Washington (Seattle, WA)	Improve communications in preparedness and response	$1,270,632

* Funded 2009-2013.

CDC Office of Public Health Preparedness and Response, Office of Science and Public Health Practice (May 2010)

Appendix H. Report on PERRC Survey

Report on a Survey of PERRC Progress, Accomplishments, and Challenges

Preparedness and Emergency Response Research Centers Mid-Project Review

July 19, 2011

Prepared for:
An ad hoc Board of Scientific Counselors (BSC) Workgroup

by:

Mildred Williams-Johnson, PhD, DABT

Shoukat Qari, DVM, PhD

Mary Leinhos, PhD

Geraldina Villalobos-Quezada, PhD

Extramural Research Program

Tara Strine, PhD

Sarah Henderson, MPH

Office of Science and Public Health Practice

Office of Public Health Preparedness and Emergency Response (OPHPR)

Centers for Disease Control and Prevention (CDC)

Atlanta, GA

EXECUTIVE SUMMARY

The Preparedness and Emergency Response Centers (PERRCs) were established by the Centers for Disease Prevention and Control (CDC), Office of Public Health Preparedness and Response (OPHPR) to support research to improve federal, state, local, and tribal public health preparedness and response capabilities. Research grants with a five year funding period were awarded to seven accredited Schools of Public Health in 2008 and an additional two accredited Schools of Public Health in 2009 for a four year funding period. As part of the CDC and OPHPR commitment to conducting external peer review of existing programs, the OPHPR Board of Scientific Counselors (BSC) is conducting a review of the mid-project progress in the PERRC Program. To facilitate this review, this report contains information and reflections obtained from a recent survey of the PERRCs regarding the current status and progress of their research.

This survey was based on a logic model of required PERRC activities according to the priorities and objectives of the awards. The survey questionnaire consisted of 33 questions pertaining to four key areas: a) effectiveness and cohesiveness of the Center infrastructure and activities; b) progress towards achieving program/project goals and objectives; c) evidence of research findings having a direct or potential impact; and, d) stakeholder perspectives on research current and future impacts on preparedness and response capabilities. The questionnaire was sent to the PERRCs who were given four weeks to complete and return it. After examining the data for accuracy and completeness, data were analyzed by scientists external to OSPHP and this report was written by the Extramural Research Program under the leadership of the director, Dr. Mildred Williams-Johnson.

The PERRCs' infrastructure and activities appear to be effective and cohesive. The PERRCs have successfully supported a diverse array of pilot or exploratory research projects yielding practical results for Public Health Preparedness and Response Systems (PHPRS). Individual PERRCs varied considerably in the number of pilot projects completed, and in the numbers and types of research partners engaged and populations served by their respective pilot projects. The PERRCs are fostering the development of new PHPRS researchers with the potential to impact preparedness practice. The PERRCs have also, to varying degrees, engaged in informal new investigator training through the employment of 178 junior research personnel in PERRC research projects, primarily students. PERRCs completed 27 pilot projects, and trained 30 new investigators. These activities addressed a broad range of at-risk populations, and were, in large part, conducted in partnerships with state and local public health. Pilot projects and investigations by the new investigators will improve and strengthen preparedness and response capabilities and practice. PERRCs are making good use of advisory boards to provide input and advice for their Center activities.

Five PERRCs also constituted dedicated advisory boards for one or more of their independent research projects. Advisory Boards have provided valuable feedback on PERRC research with the majority of advisory board recommendations acted upon by investigators. PERRCs interacted with their advisory boards through both full board meetings and separate consultations with one or more board members. PERRCs are actively employing a number of scientific management strategies to support research success. The PERRCs have been resourceful in coping with the logistic, communication, and data collection challenges of their research projects. Grantees are exercising responsible fiscal stewardship and redirecting funds to support research productivity. The PERRCs have implemented several oversight activities.

Overall, the progress the PERRCs are making with respect to program goals and objectives appears to be nearly on schedule but can be enhanced. The PERRCs are addressing the IOM research priority themes, though fewer address the priorities for the Usefulness of Training, and Generation of Criteria and Metrics. The PERRCs have not consistently been addressing the cross-cutting themes required by the FOA. The PERRC research portfolio is targeting a wide variety of geographic and at-risk populations as research beneficiaries. While some populations are targeted more than others, PERRC research can be expected to improve system performance as it affects an array of populations, assuming the research findings impact policy and practice for preparedness and response.

With respect to research findings having direct or potential impacts, the PERRCs are generating and will generate a high volume and variety of policy and practice tools, some of which have already demonstrated impact. Effective transfer and uptake of research findings and tools will require focused effort to more clearly define target audiences, determine best approaches to convey findings to those audiences, and put into place evaluation metrics to measure success. The PERRCs reported that they have already developed over 200 practice and policy tools available for use, largely in the form of journal articles, how-to videos, research briefs, generic surveys, and policy guidelines. Five of the seven PERRCs funded in 2008 described research findings that have already been translated into practice applications. Research findings of three grantees led to changes at the local and state health department level, and findings from two other research centers led to improvement of preparedness and response services to at-risk populations.

Notably, two PERRCs uncovered information that led to cost savings for states in the thousands (Louisiana) and millions (North Carolina) of dollars. Grantees indicated that they expect future research findings to be transferred to practice in the form of readiness guidance, improved communication and collaboration, better informed policy, and evaluation of program and training performance. From a public health perspective, it will be necessary to promote additional dissemination strategies that are amenable to broader target audiences. The grantees only broadly discussed the overall size and scope of their target audience for dissemination and their plans for repackaging findings and obtaining audience feedback, suggesting that these areas will require focused

attention in the final phase of the program and beyond in order to maximize the uptake and impact of findings.

PERRCs have engaged a remarkable number and array of types of research partners and stakeholders. Each PERRC engaged between six and 14 types of PHPRS partners in their research projects; all grantees had partners from academia and local governments. Most research centers also engaged state and federal research partners. The plurality of research collaborations were with public safety and local public health partners, each numbering close to 500 total partners across PERRCs.

The PERRC FOA calls for multidisciplinary research. Collectively the research centers involved 22 different disciplines in their research, and each PERRC incorporated between six and twelve of the disciplines listed on the survey. The majority (five) of the PERRCs included medicine or healthcare, social science, government, public health ethics, law, and communications amongst the disciplines contributing to their research.

In conclusion, the progress made by the PERRCs to date appears to be on schedule. Critically important research is being conducted and some impacts on public health preparedness and response have already been documented. The remainder of the funding period for PERRCs is essential for completing all research projects and successfully translating all appropriate research findings into preparedness and response practices and procedures.

BACKGROUND

Research to improve federal, state, local, and tribal public health preparedness and response systems was mandated by the Pandemic and All-Hazards Preparedness Act of 2006 (PAHPA). To address this mandate, the Preparedness and Emergency Response Research Centers (PERRCs) were established at accredited Schools of Public Health to conduct public health systems research on preparedness and response capabilities at the national, state, local, and tribal levels.

In 2008, the Centers for Disease Control and Prevention (CDC), Office of Public Health Preparedness and Response (OPHPR), Office of Science and Public Health Practice (OSPHP), awarded seven accredited schools of public health $10.9 million for the first year of a five-year grant to establish a PERRC. In 2009, CDC awarded an additional $2.7 million in grant funds to two additional schools of public health to establish four-year PERRCs. The Extramural Research Program (ERP) is responsible for planning, developing, coordinating, managing, and evaluating extramural research awards, programs, and activities for OPHPR.

The nine PERRCs were required to use a multidisciplinary research approach that examines the structure, capabilities, and performance of public health systems in preparing for and responding to all potential threats and hazards. Each PERRC consists of an administrative core and three to four inves-

tigator-initiated research projects that address one of the four research priority recommendations identified in an Institute of Medicine (IOM) Letter Report (2008; available at www.iom.edu/CMS/3740/48812.aspx and in the appendix of the workgroup briefing book). PERRC research also addresses cross-cutting themes including vulnerable populations, workforce and legal and ethical issues.

There are 34 independent and inter-related R01 research projects (IRPs) across the nine PERRCs with an administrative core. This administrative core provides administrative and grant support for the center and the IRPs and conducts activities to strengthen the field of public health preparedness and response systems research, ensure the relevance of PERRC research to public health practice, and facilitate the translation or transfer of research findings to practice. More information about each of the PERRCs (e.g., names and locations of the PERRCs, the IOM priority addressed by each PERRC, and a description of the research in their program can be found under **Tab 10**, Overview of the Preparedness and Emergency Response Research Centers) in the briefing book for the ad hoc workgroup ("Workgroup Briefing Book").

State and local public health departments and other organizations across the public health system are collaborative research partners with the PERRCs. These important partnerships help ensure that research results are relevant to policy and practice and will yield findings that will have a near-term (three to five years) impact on public health preparedness and response systems.

OBJECTIVE

The purpose of this report is to provide the ad hoc workgroup with a mid-project summary of PERRC activities. This document and other materials in the Workgroup Briefing Book will be considered by the ad hoc workgroup in its evaluation of the PERRC program. Input from stakeholder panels will be provided to the ad hoc workgroup at the review meeting in Atlanta, GA, August 9-12, 2011. A list of stakeholder participants and participation guidance documentation is described under **Tab 7** (Invited Stakeholder Panelists) in the Workgroup Briefing Book.

This document includes an overview of quantitative and qualitative data collected from the PERRCs, a discussion of the functioning of the administrative core, and a description of the successes and challenges in achieving near-term impact on public health preparedness and response systems (PHPRS) for each PERRC. More detailed examples of PERRC successes in achieving research results are located in the Workgroup Briefing Book under **Tab 12** (Preparedness Research Impact Briefs) and **Tab 13** (Dissemination of PERRC Research).

The information in this document addresses four overarching review questions:

1. How effective and cohesive are the research infrastructure and activities developed by the PERRCs for successfully conducting the proposed public health preparedness and response research?
2. How well is the PERRC Program progressing toward achieving original program and project goals and objectives?
3. What is the evidence that PERRC research has yielded results and findings that have had a direct impact or have the potential to impact public health practice and preparedness?
4. What perspective do stakeholders have on the potential for PERRC research to have current and future impact on preparedness and response and practices at federal, state, local, or tribal levels?

METHODS

A logic model (see Tab 15) to guide the review was developed based upon activities the PERRCs were required to accomplish according to priorities and objectives in the Funding Opportunity Announcement (FOA). The logic model graphically represents PERRC activities, the expected outputs, and related short-term and long-term outcomes expected from the PERRC research. These activities, outputs, and outcomes were used to identify indicators and metrics of progress in the PERRCs. A workgroup of PERRC Principal Investigators (PERRC PIs) met with Extramural Research Program (ERP) staff several times to provide input about the proposed indicators and metrics.

More than 150 qualitative and quantitative metrics were identified. This list was reviewed to eliminate redundancies, and each indicator and metric was rated based on relevance, meaningfulness, usefulness, and feasibility for obtaining the data. The revised list was then prioritized. The final list of indicators and metrics contained 18 qualitative and 15 multi-element quantitative metrics.

A survey questionnaire containing these 33 metrics was designed and developed into a PDF format and delivered to the PERRCs to complete over a four-week period. When ERP received the data from each PERRC, the data were examined for accuracy and completeness. ERP contacted the PERRCs when necessary to clarify the survey questions and validate survey responses. Due to the volume of data collected and time constraints, ERP prioritized the responses and included the 25 survey responses most relevant to the scope and the objectives of the review.

A template and guidance were developed for the PERRCs to write an impact brief or success story on research findings that helped improve preparedness and emergency response at the local, state, and or federal level. The PERRCs proposed two research activities to highlight in the impact brief. One activity from each PERRC was selected and the ERP provided input and recommendations to develop the briefs. A publishable format was developed for the briefs which are located under **Tab 13** (Dissemination of PERRC Research).

Both the qualitative and quantitative data from the PERRCs were analyzed by persons external to ERP. The qualitative data were examined for common themes across the PERRCs and the quantitative data were analyzed in SAS and graphics were produced in Microsoft Excel. ERP staff wrote the report based on the results of the analyses of the survey data.

This report is organized with respect to four overarching questions that map back to the objectives of this review (see cross-walk document).

RESULTS

Review Question #1: How effective and cohesive are the research infrastructure and activities developed by the PERRCs for successfully conducting the proposed public health preparedness and response research?

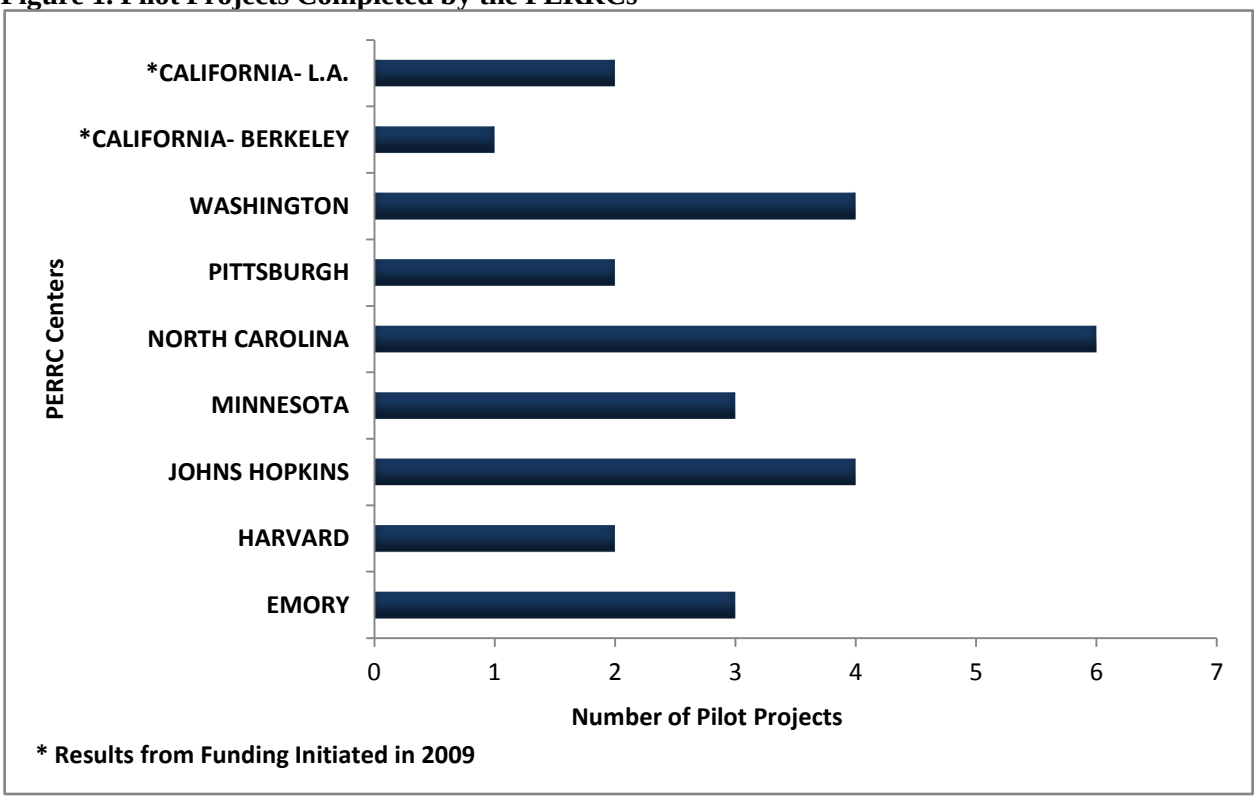
The PERRCs are required to conduct activities in the administrative core to promote and expand the field of public health preparedness research and to provide support and oversight for the independent, inter-related research projects. This section of the report includes an overview of PERRC activities in each of the program activities required for the administrative core. To address Review Question #1, the information in this section provides insight into the successes and challenges PERRCs have experienced in establishing an administrative core and developing an infrastructure to support research for preparedness and response.

The support and development of pilot research projects and new investigator training and the potential public health impact from these activities.

Pilot Projects

The PERRCs funded pilot research projects that are intended to stimulate new and innovative avenues for preparedness research and to help address targeted issues in preparedness and response. The PERRCs had the flexibility to decide the number and the level of funding for their pilot projects each year but could fund up to four at no more than $30,000 each within a 12-month budget period. A total of 27 pilot projects have been completed since the initiation of the program. The number of pilot projects completed in each PERRC is shown in **Figure 1.**

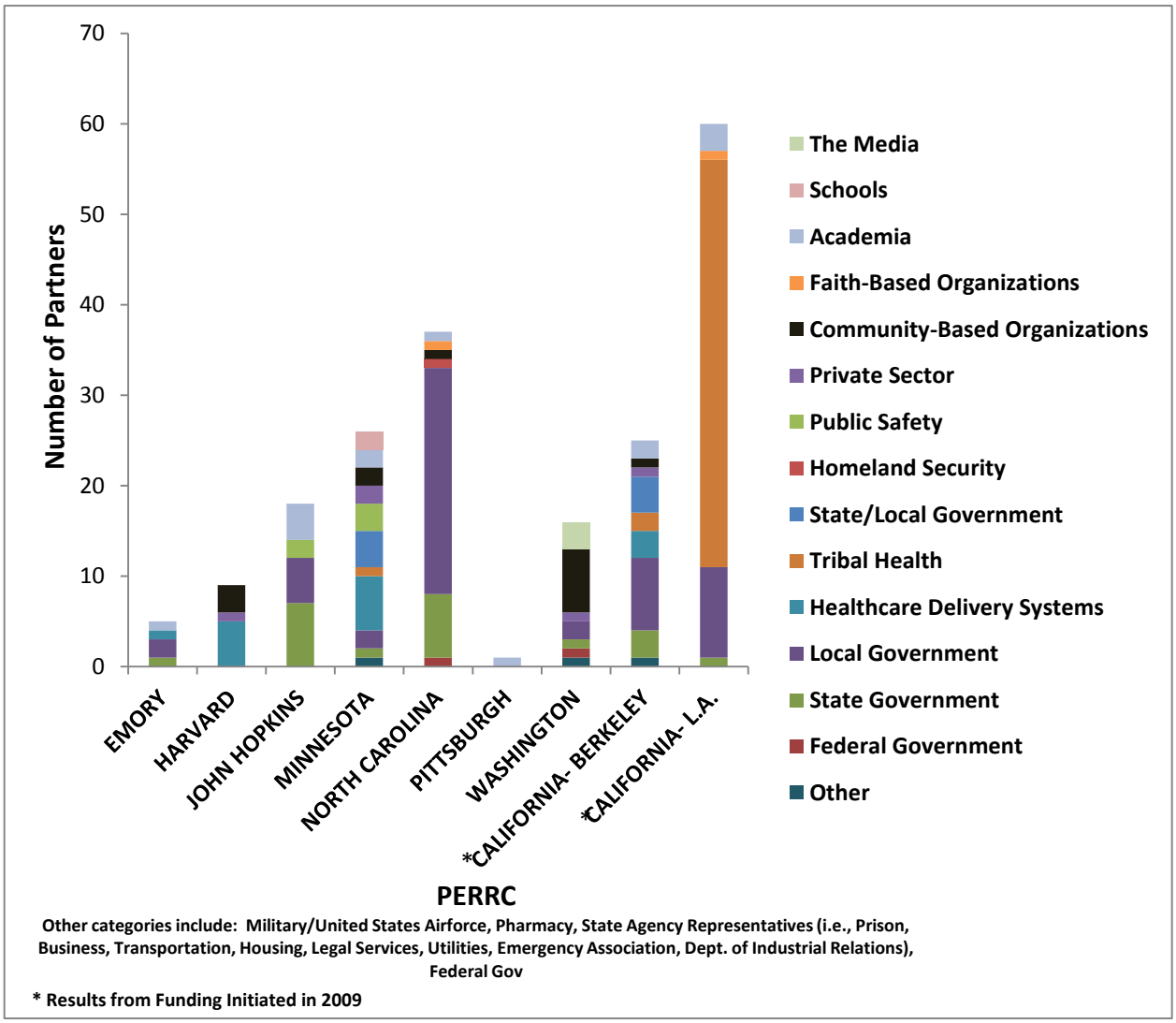
Figure 1. Pilot Projects Completed by the PERRCs



The pilot projects involved research partners from across the public health system (**Figure 2).** While the majority of research partners came from state, local, and tribal public health organizations, there were numerous partnerships with various other organizations.

The majority of partners involved in the research were comparable to the geographic populations that were most commonly served by these pilot projects, i.e., populations at the state, city, and county level (**Figure 3**).

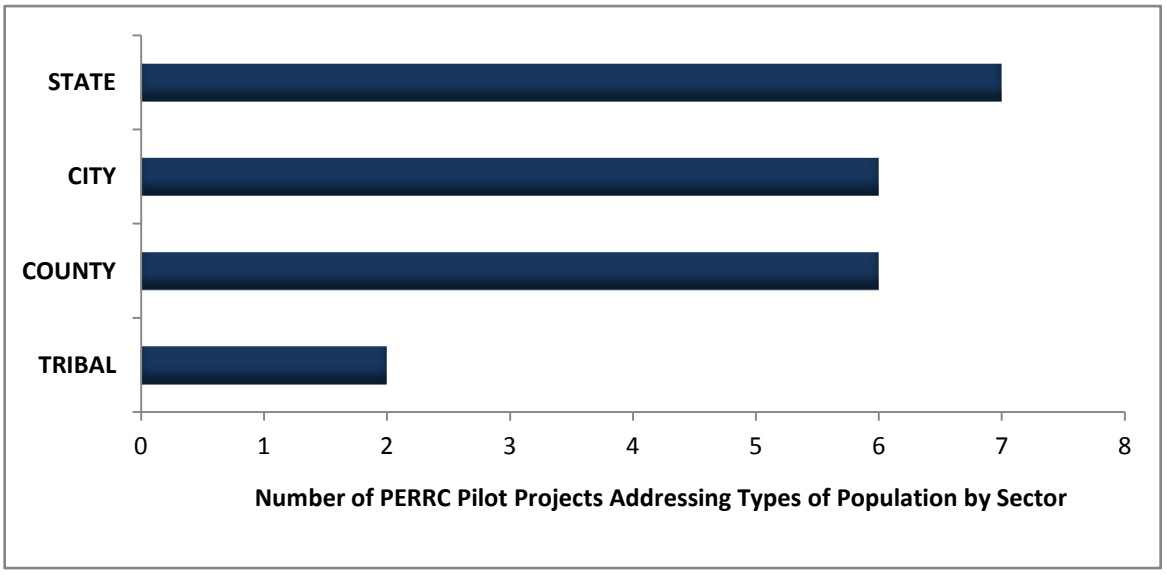
Figure 2. Partners involved in PERRC Pilot Projects



Other categories include: Military/United States Airforce, Pharmacy, State Agency Representatives (i.e., Prison, Business, Transportation, Housing, Legal Services, Utilities, Emergency Association, Dept. of Industrial Relations), Federal Gov

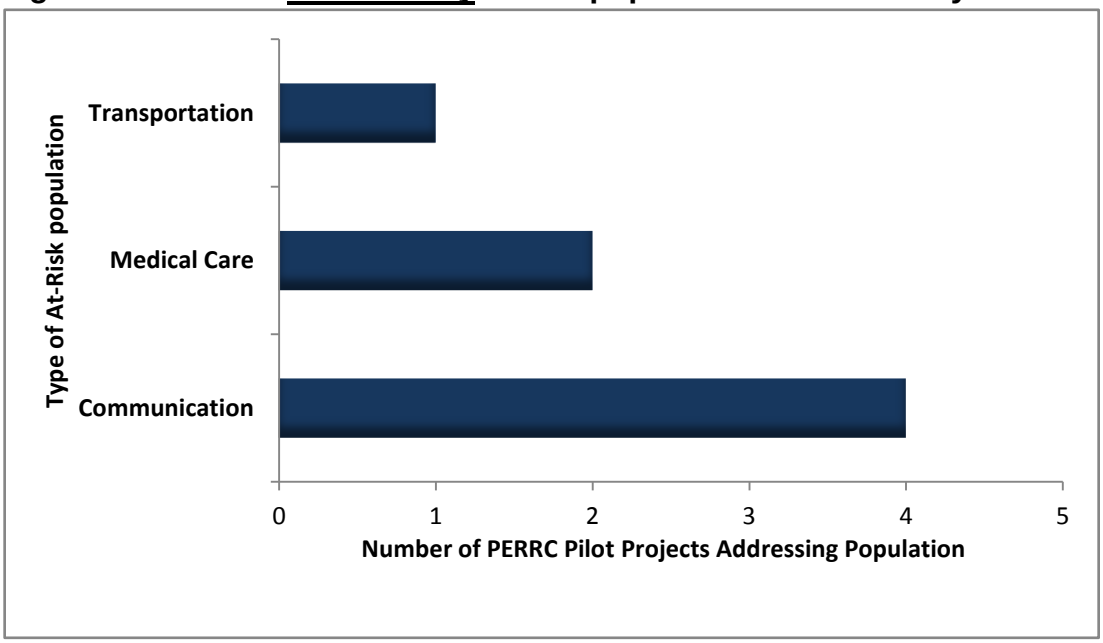
*** Results from Funding Initiated in 2009**

Figure 3. Geographic Populations Addressed by PERRC Pilot Projects



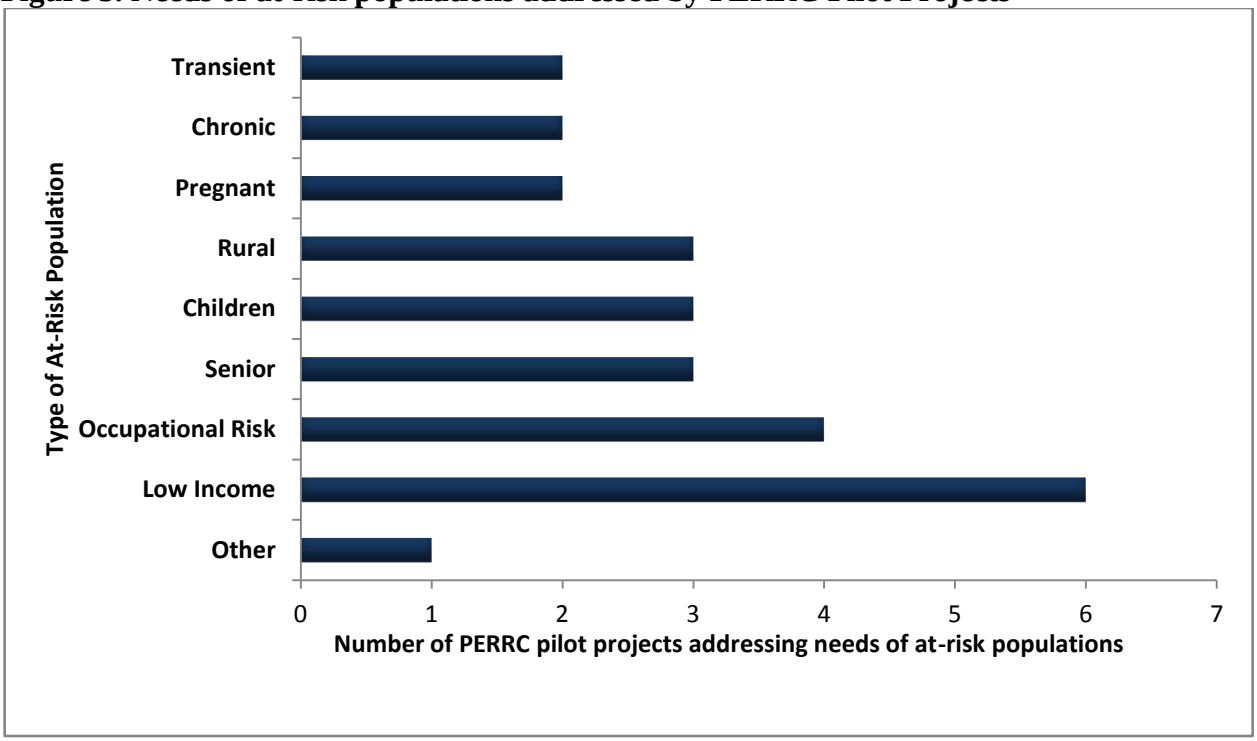
Pilot projects were also focused on addressing the needs of at-risk populations (**Figure 4).** The Department of Health and Human Services (DHHS) defines populations "who have, in addition to their medical needs, other needs that may interfere with their ability to receive medical care" to be functionally at-risk during a response to an emergency (see http://www.phe.gov/Preparedness/planning/abc/Documents/AtRisk.pdf).

Figure 4. Needs of Functionally at-risk population addressed by PERRC Pilot Projects



The number of pilot projects addressing at-risk populations for specific at-risk populations varied from 1 to 6 (**Figure 5**).

Figure 5. Needs of at-risk populations addressed by PERRC Pilot Projects



Findings from the PERRC pilot projects can help strengthen public health preparedness and response practice. Each of the PERRCs reported on the potential or actual public health preparedness and response impact of one of their completed pilot projects. A few examples of the potential public health benefit from the funded pilot projects are described below:

- Limited English Proficiency (LEP) populations are often not informed about cardiopulmonary resuscitation (CPR), an important life-saving technique, because most CPR classes, educational materials, and media-based campaigns are in English. Working with the Chinese Information and Service Center, investigators for a pilot project in the University of Washington PERRC placed CPR public service announcements (PSAs) in local Chinese community-based newspapers circulating to 35,000 readers, over a 1-month period. Pre- and post-campaign surveys with 100 LEP Chinese assessed the campaign's effect on awareness about CPR. This pilot project contributed to increased knowledge about and access to training for early bystander CPR and other medical emergencies and disaster situations for LEP Chinese in this community. These results can help to strengthen the public health ability to prepare for and respond to disasters and emergencies in this community.

- Investigators in the University of California at Los Angeles (UCLA) PERRC conducted a pilot study of the prevalence of H1N1 antibodies in the population on the campus. Investigators found about a 10% of the population were H1N1 antibody positive, though slightly more than 1/2 (55%) reported perceived "flu-like" symptoms and a third reported symptoms as defined by the CDC (fever with cough and/or sore throat). These data provided evidence that the likelihood of another wave of H1N1 was minimal due to the low antibody prevalence. In addition, it showed that a significant proportion of infected individuals do not develop clinical illness based on the low numbers of people who had flu-like symptoms. This information was used by colleagues at UC Berkeley and the Alameda County Health Department to revise pandemic influenza plans and response activities.

- Persons of Haitian ancestry have developed a mistrust of US public health officials. A pilot study in the Harvard University PERRC partnered with the Haitian-American Health Alliance, a community-based organization, a collaboration that is paramount for the development of preparedness and response activities for this ethnic minority population. Investigators examined the communication behaviors of persons of Haitian ancestry pertaining to emergency preparedness and response, preparedness for H1N1 and other infectious epidemics, and knowledge of mental health literacy in the context of emergency situations. Findings from the pilot project suggested that “alerts” of public health messaging using Short Message Service (SMS) may increase receptivity to public health preparedness and response activities within this population.

- One pilot project in the University of Pittsburgh PERRC conducted a random sampling of the US population, with an oversampling of African Americans and Hispanic adults, to study attitudes towards vaccines and emergency use authorization (EUA) drugs during the H1N1 pandemic. The results provided critical insights into the challenges public health practitioners faced in effectively communicating to the public information about EUA drugs and the benefits of accepting vaccine during the pandemic. The H1N1 Vaccine Task Force of the National Center for Immunization and Respiratory Diseases, CDC, found the pilot study results timely and of great public health benefit. The Task Force provided funding to extend the study to identify and address the critical facilitators and barriers to vaccine acceptance and uptake during the H1N1 outbreak. Results from this work have been used by the Pandemic Influenza Working Group and by the National Biodefense Science Board and the Biomedical Advanced Research and Development Authority (BARDA) in the Department of Health and Human Services.

The data collected from the PERRCs indicate that they have successfully funded and provided oversight to complete a significant number of pilot projects since they were established (n=27). All PERRCs, including the two PERRCs established in September 2009, completed at least one pilot project. The maximum number of completed projects by a single PERRC was six. In conducting these

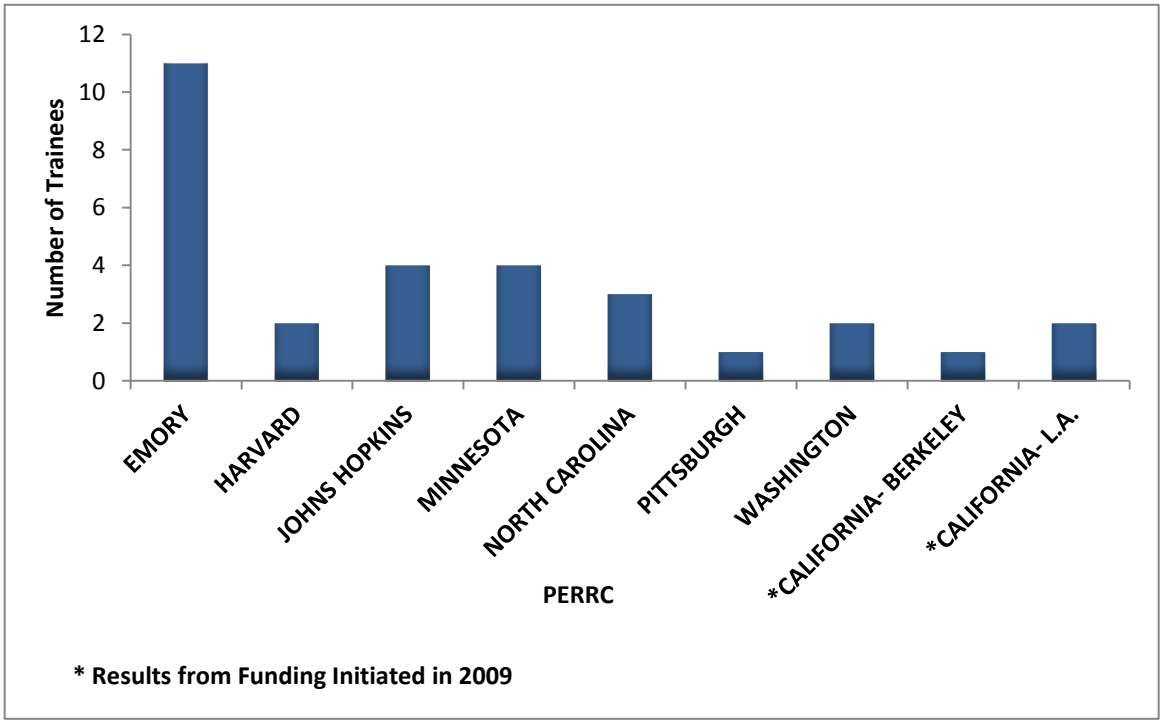
pilots the PERRCs partnered with diverse organizations across the public health system and addressed the preparedness needs of a variety of (though not all) geographic and at-risk populations. This federal investment of no more than $30,000 in 12-month cycles has resulted in a wide array of exploratory research projects that yielded several practical tools and findings that can be applied to improve practice in the public health preparedness and response system.

New Investigators trained and impact of research conducted by the new investigators

The PERRCs were required to fund and train new public health preparedness and response systems researchers. The PERRCs could determine how they would attract and recruit the new investigators but were limited to funding four at up to $30,000 each within a 12-month budget period. Persons eligible were broadly defined and included fellows, senior researchers or investigators, or junior faculty new to preparedness research. The PERRCs were strongly encouraged to consider investigators from varying disciplines to incorporate cross-disciplinary thinking for the research studies.

To date 30 new investigators have received PERRC supported training in public health preparedness research. The number of new investigators trained across the PERRCs varied from 1 to 11 (**Figure 6)**.

Figure 6. Number of PERRC New Investigators Trained



Training activities included participation in conferences, advisory committee meetings, and lectures on preparedness. The most common form of training was mentorship in preparedness research with

PERRC investigators. As a result of this training, several new investigators continue to be engaged in some form of preparedness and response research.

In addition to expanding the pool of scientists conducting preparedness and response research, funding for the new investigators yielded new collaborative efforts across disciplines and new approaches for preparedness research.

The impact of research conducted by the new investigators was measured by the dissemination of research finding through journal publication or conference presentations. In many cases, the research conducted by these new investigators has the potential to influence policy and practice for preparedness and response which is demonstrated by the following examples:

- In a study for the University of North Carolina PERRC conducted by a new investigator, it was determined that in coastal North Carolina high levels of neighborhood social cohesion, markers of territoriality, membership in a church or civic organization, neighbors' evacuation, and longer length of residence were all associated with an increased risk of failure to evacuate for a hurricane. The results revealed that neither the actual nor the perceived flood risk and the level of the evacuation order (none, voluntary, mandatory) were influential in a resident's decision to evacuate. Based on these findings it was recommended that these high risk individuals receive targeted messages regarding evacuation from public officials. These findings also provide important opportunities for local authorities to improve the effectiveness of evacuation orders by making them specific and avoiding changes in an order from voluntary to mandatory just prior to landfall.

- A new investigator in the University of Minnesota PERRC is identifying and applying complex risk and vulnerability assessment methodologies to address the risk of terrorism to food systems. One aspect of this work included an assessment of 17 years of data from CDC on milk-borne outbreaks. As a result of evaluating these data, the investigator identified potential signals or indicators of an intentional food contamination event. This prompted proposed preparedness guidelines that local health officials and the food industry could use for early warnings of an intentional food contamination event. These guidelines can help policymakers develop food safety policies to prevent, detect, and reduce the spread of food-borne illnesses.

- A new preparedness and response investigator in the Emory PERRC conducted a survey of prisons and jails throughout the United States to examine their pandemic preparedness and response to the 2009 H1N1 influenza outbreak. The survey questions were developed in collaboration with the National Commission on Correctional Healthcare, the Federal Bureau of Prisons and Correctional Medical Services with the understanding that results would be widely disseminated. The analysis of survey results revealed that federal prisons received supplies of the H1N1 vaccine and were well prepared for the pandemic. However, most of the local (city

and county) jails that responded to the survey reported that they did not receive H1N1 influenza vaccine for the inmates. As a closed population, incarcerated individuals can be vulnerable to the spread of contagious diseases. Based on these results and the vulnerability of this population, it was recommended that public health agencies include all correctional facilities in future pandemic preparedness planning activities. Theses finding will be presented in an issue brief to the Federal Bureau of Prisons.

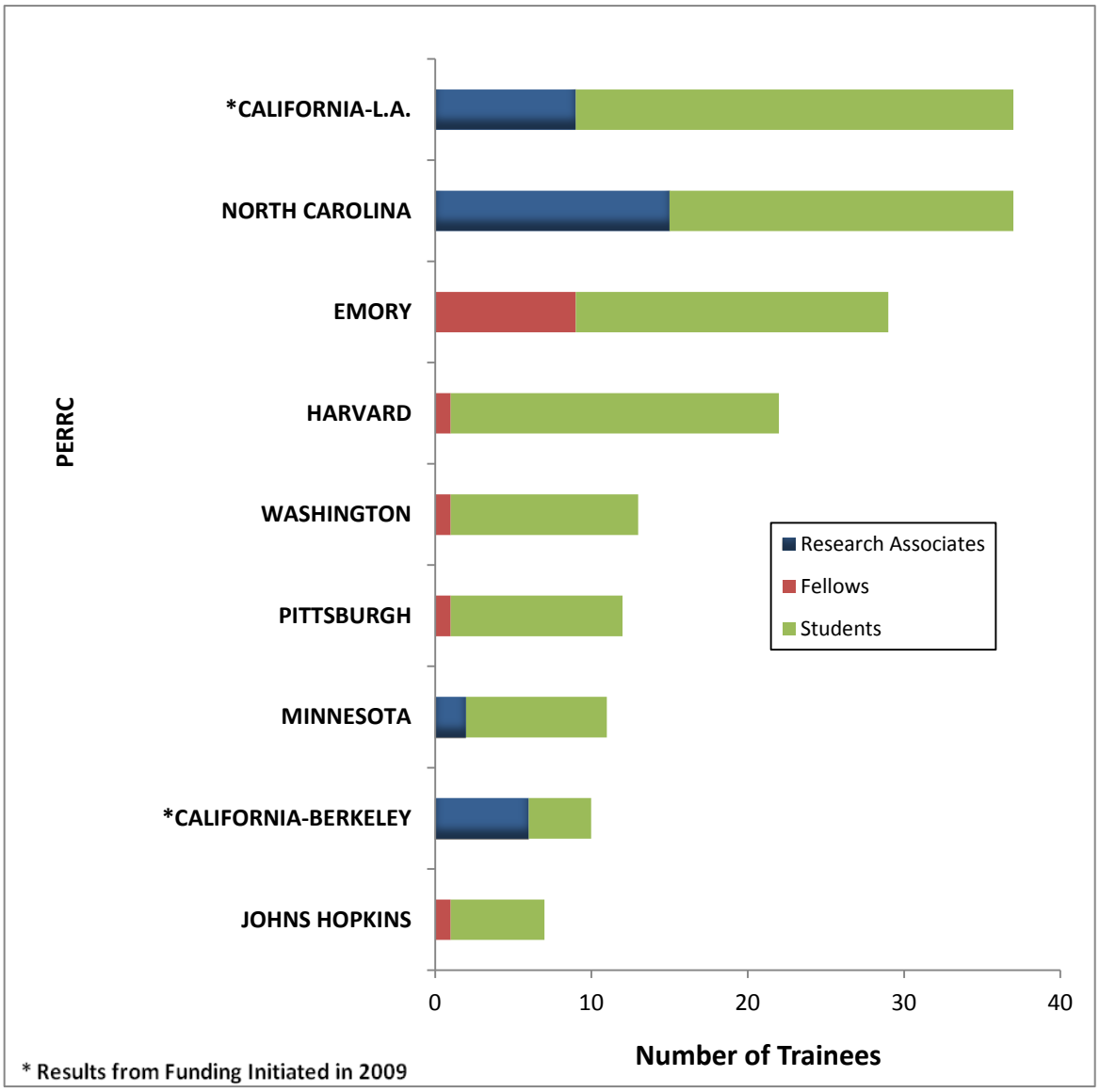
In addition to the new investigators trained, the PERRCs were also asked to report the number of other research trainees and associates that were involved in PERRC research. The respondents reported a total of 178 junior research personnel that represented students (undergraduate and graduate), fellows (post-doctoral stipend researchers), and research associates (salaried doctoral researchers). The majority of other these trainees were students (75%) with a significantly smaller proportion of research associates (18%) and fellows (7%) represented (**Figure 7)**.

Though the proportional number of trainees in each group differs considerably across the PERRCs, the data indicate that nearly 200 persons received some form of training in public health preparedness and response research since the initiation of the PERRC program. These results suggest that the PERRCs have been successful in recruiting and training new investigators to conduct preparedness and response research and expanding the numbers of other trainees engaged in these studies. However, the extent to which these findings will result in a greatly expanded pool of researchers in the field is not known.

PERRC Advisory Boards

The intent of the PERRC Advisory Boards is to bring different perspectives on PERRC research, to help strengthen the relevance of PERRC research to public health practice and to increase the translation of research findings into practice. All PERRCs indicated that they organized and convened an external Advisory Board and described the input and advice the boards provided to support the overall success of the program as directed in the funding opportunity announcement (FOA).

Figure 7. Number of trainees involved in PERRC research



The data revealed that PERRC Advisory Boards included members from various public health system organizations including representatives from federal, state, local, or tribal public health organizations, community and faith-based organizations, schools, the military, and public safety (Fire, Police Department)

Collectively, the PERRCs reported that members on the Advisory Boards represent from five to 11 types of public health organizations with the majority of participants coming from academia (27%), state government (25%), local government (16%), and community organizations which included non-profit organizations, civic groups, and neighborhood organizations (9.4%; **Figure 8).**

The breadth of knowledge and experience of the board members provide meaningful support and guidance to the independent inter-related research projects (IRPs) and the PERRCs. Contact hours illustrate the level of interaction and consultation the PERRCs have had with their respective boards. The average number of contact hours varied from 8 to 24 with the main Advisory Committee Boards, and as high as 100 hours with individual members (**Table 2)**

Table 2: PERRC interaction with their Advisory Boards (average contact hours)

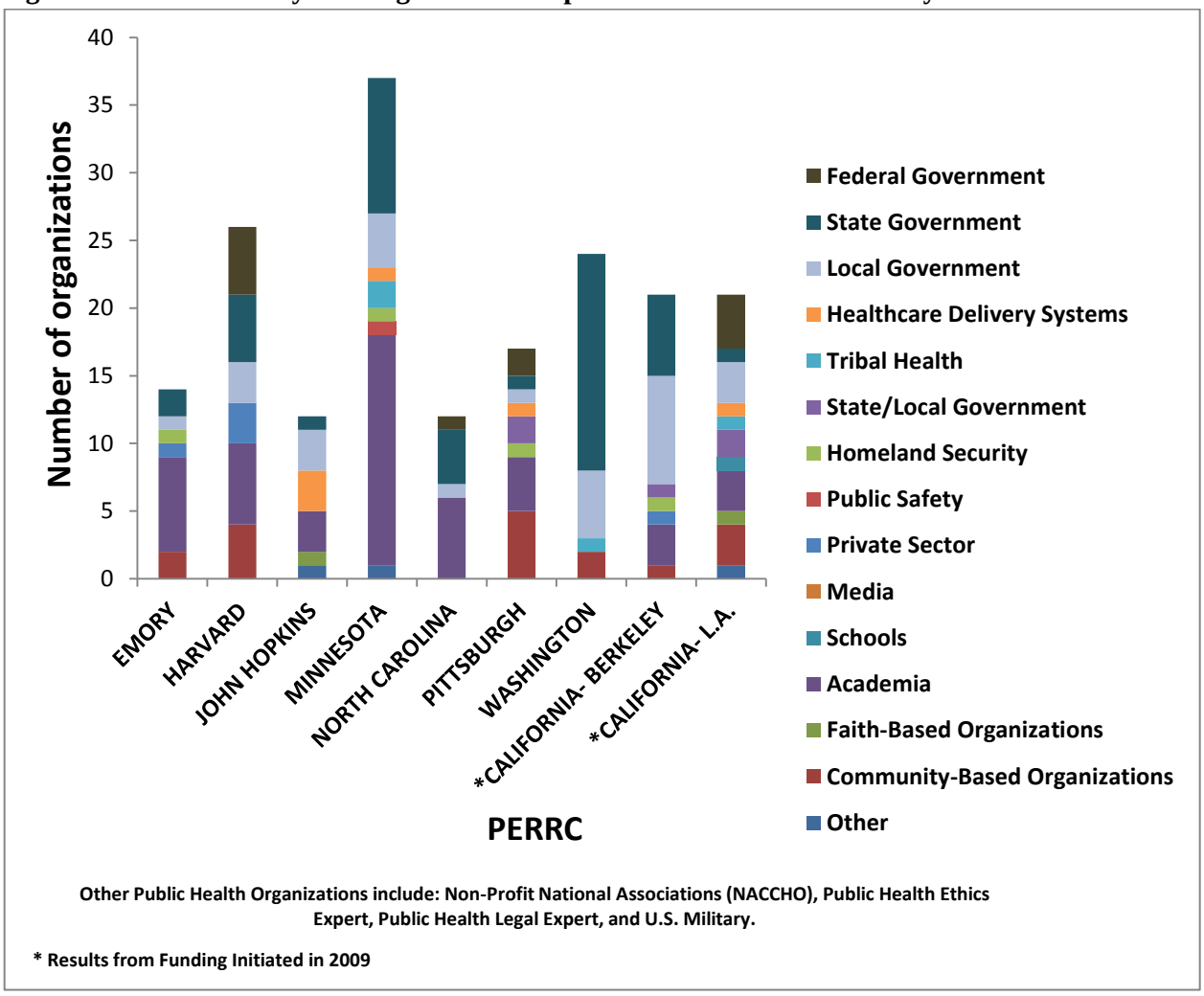
PERRC	Main Board	Individual members	Project-Specific Boards
University of California-Berkeley*	13	0	32
Emory University	12	54	0
Johns Hopkins University	24	13	67
University of North Carolina	16	100	0
University of Washington	9	17	4
University of Minnesota	13	7	0
Harvard University	8	6	21
University of California-Los Angeles*	8	8	0
University of Pittsburgh	9	59	11

*Results from funding initiated September 2009

Since these boards were established, each PERRC conducted at least one and as many as three formal meetings with its Advisory Board(s) within a 12-month period. The PERRCs also interacted with individual board members for input and advice throughout the program year.

Some PERRCs also constituted Advisory Boards to provide more subject matter expertise to their IRPs. For example, investigators for Project 1 in the UC Berkeley PERRC examined state Emergency Operations Plans to evaluate preparedness communication for the Deaf and Hard of Hearing (D/HH). A National Advisory Board was constituted for that project that consists of the leaders who represent D/HH-serving organizations. Many of the members on the board are deaf, hard of hearing, or deaf and blind. This board provides input to the investigators on their research and potential recommendations to strengthen state- and territorial- emergency operations plans and strategies to better address preparedness and response activities to benefit D/HH-populations. This special board helps to ensure that the research activities and findings from the project are relevant to the needs of the D/HH-community.

Figure 8. Public health system organizations represented on PERRC Advisory Boards



Results show that all of the PERRCs have established an Advisory Board and developed a pattern of sustained engagement with their boards and individual members. These interactions ensure that the PERRCs continue to receive input, advice, and guidance from their respective boards on the relevance of PERRC research to practice.

The Advisory Boards provided feedback on all PERRC activities to help ensure their relevance to practice for public health preparedness and response. Data were collected from the PERRCs on the feedback and input provided by the Advisory Boards for the IRPs. The PERRCs were also asked to describe how the input from these boards was used or adopted to achieve research goals and objectives to address the FOA research priorities. Multiple responses were received from the nine PERRCs (n=19), though five of these did not specifically address the critical elements of the survey question.

The PERRCs stated that nearly all of the specific recommendations made by the boards were acted upon. Of the responses provided, the most common input from the boards addressed ways to strengthen the research methodology in the IRPs. Examples of this type of input included improvements in the design of survey questionnaires, ways to better reach the target populations for surveys, or alternative approaches for analyzing the survey data. The PERRCs reported this feedback had an important impact on the outcomes of the research by increasing the response rate of surveys and revealing new relationships and different approaches to analyze the survey results.

Two examples reported by the PERRCs are described below. These examples illustrate feedback provided by the Advisory Boards and how this input has contributed to progress in the IRPs.

- Investigators for one IRP in the Johns Hopkins PERRC relied heavily on the use of online survey tools to collect data from multiple local health departments. The Advisory Committee recommended that the online tool be supplemented with in-person, focus group discussions. As a result of adopting this recommendation, researchers were able to provide health departments with a greater understanding of the value of the survey results, clarify the critical elements in the intervention, and describe how the results from the survey could address the needs of the local health departments. Another outcome was that the relationship between the PERRC and the local health departments was improved and will facilitate the dissemination of the research results and the transfer of these findings to practice.

- At the University of California at Berkeley PERRC, an investigator for an IRP constituted a specific advisory group for the research that included practitioners from state agencies involved in preparedness and response. The advisory group was developed to: a) help determine the priority focus areas for the research; b) provide input on survey instruments; c) provide guidance on the most appropriate survey audience; d) provide insights for interpreting survey results; and e) help champion the research. As a result of engaging these practitioners, the researchers have been able to refine the direction of the project and obtain a consensus on the priority research areas for their state. These areas include: a) communications and information sharing during emergencies; b) clarification of roles and responsibilities of agencies during an emergency response; and c) medical surge.

The PERRCs actively engaged the Advisory Boards and in many cases, project-specific advisory groups, to seek input on the ongoing research. The membership of these Advisory Boards represents diverse disciplines and numerous agencies and organizations from across the public health system. These boards have provided feedback that has been used by the PERRCs to strengthen study design, improve analysis and interpretation of results, and better engage the public health preparedness and response community. As was the intent, the PERRCs' involvement with these Advisory Boards has provided valuable research insights and helped to ensure the relevance of the research to public health practice for preparedness and response.

Centralized scientific guidance and financial administration for the IRPs.

The PERRCs were asked to describe a scientific management activity that increased research productivity (progress to achieve goals and objectives) in the IRPs and discuss how productivity was improved. The PERRCs were also asked to describe strategies used to address an important challenge to productivity in the IRPs and discuss how productivity was improved. These data were requested to describe the effectiveness of the infrastructure the PERRCs have established to manage and provide support for the IRPs and to ensure progress towards achieving research goals and objectives.

The majority of the PERRCs (n=6) described monthly scheduled meetings as the most common method used to manage scientific activity and help increase productivity across the IRPs. One PERRC reported that the frequency of these meetings vary depending on progress in the IRP (biweekly, monthly, or bi-monthly). The format for these meetings differed and consisted of either monthly meetings with all IRP lead investigators, administrative and research staff, graduate research assistants, and pilot project directors; joint meetings with Internal or External Committees and investigators from other related research programs; or monthly Research Executive Committee (REC) Meetings with just the PERRC PI and IRP lead investigators.

These regular meetings contributed in various ways to research productivity and progress. For example, the regular meetings afforded researchers the opportunity to review and comment on various aspects of the research process, including research methodologies, findings, and challenges. The regularly scheduled meetings improved communications, facilitated continuity of research discussions, improved consistency in research methods across IRPs, strengthened the integration and inter-relatedness among the IRPs, and fostered the rapid dissemination of results and translation into training or practice.

Three PERRCs report the use of other scientific management activities to foster research productivity. One PERRC worked with local and state research partners to coordinate the deployment of surveys from the different IRPs. This coordination resulted in high survey response rates for each of the IRPs, enhanced research productivity and output, and an increased number of publishable findings and scientific presentations. Another PERRC presented research findings to other researchers at their university in addition to the regular PERRC meetings. It was noted that extending the venue of PERRC presentations led to new data collection collaborations and enabled the PERRC to collect data on an ethnic community that was not originally included in the research. A third PERRC applied project management methods (e.g., work breakdown structures, network diagrams) to help them plan and monitor their research tasks and take corrective action to avoid delays in research timelines.

Eight of the nine PERRCs indicated that they faced at least one substantial challenge in conducting research activities. Each of these PERRCs described the strategies they implemented to address these issues and continue progress toward achieving research goals and objectives. The reported challenges to productivity included limitations in or access to appropriate technology, resource constraints,

impediments from institutional structure, challenges posed by differing geographical locations of PERRC investigators, and various difficulties in the data collection phase of the research. One PERRC reported that its administrative core has monthly meetings with investigators to provide technical consultations on issues regarding research design, methods, and instruments. This technical support has helped the PERRC avoid challenges to productivity.

Three PERRCs developed coordination strategies to overcome challenges due to constraints on resources. One PERRC sought help from the University administration and established weekly meetings with their IT team to identify and develop solutions for their technological needs. Through this effort, software for electronic surveys was identified for each IRP and manuals on best practices and standard protocol for using the electronic surveys were developed. To address constraints in staffing, one PERRC had their staff concentrate on a few projects rather than tasking them to work across a larger number of projects. This resulted in more consistent support for the IRPs. To address the challenge of limited funding to support health fairs on preparedness, another PERRC partnered with local health organizations to set up community emergency preparedness booths at existing local health fairs and community events. As a result, the PERRC leveraged its resources and still reached more than 300 community residents with information related to preparedness and their ongoing research.

Three of the PERRCs indicated they faced challenges with the general structure and process for conducting research in their IRPs. Monthly scientific presentations and interactions were instituted to address the challenge posed in a PERRC with lead investigators and IRPs in four different institutions. This change contributed to more interaction and discussion among the investigators and helped refine the ongoing research. To eliminate the “talking head” format at its Advisory Board meetings, another PERRC changed its format from a lecture session to an interactive expo format that featured IRP results that were most promising for application and translation to preparedness and response practice. This format garnered more feedback from their Advisory Group. In the third PERRC, it was determined that project coordinators were needed to assist lead investigators for the IRPs. Hiring the coordinators eliminated challenges with implementing the IRPs, responsiveness and timeliness in IRP reportingand contributed greatly to research progress.

The remaining two PERRCs faced challenges in the data collection phase of the IRPs. In one PERRC the IRP encountered difficulty getting the local health departments to participate in the research. Through dialog with research partners, it was determined that this reluctance stemmed from previous experiences with University-based researchers in which data were collected by the health department but they never received the results. To overcome this challenge the PERRC pledged to share research results clearly and promptly with the health department. As a result, survey plans were coordinated and better received and findings from PERRC research are shared regularly with all local and state public health. In the other PERRC it was determined that their planned survey methods were too superficial to adequately capture the perspectives of the expected respondents and to convey the

complexity of the system under investigation. To address this challenge, the PERRC adopted more sophisticated data collection tools that were also more adaptable and suitable for real-time data collection.

The PERRCs were asked to provide an example of how their fiscal oversight has ensured that research funds have been used to strengthen, support, or improve productivity in IRPs. Several oversight procedures and activities were reported by the PERRCs to provide appropriate fiscal management and support ongoing research. These processes included: a) overall program budget planning for continuation based on progress in the IRPs; b) the use of periodic university fiscal reports to monitor program expenditures against project timelines and progress; c) redirecting program funds, including approved unobligated balances to address unexpected or increased research program needs; d) the allocation of funding to address issues raised in the CDC technical review of progress; and e) the development and monitoring of contracts and subcontracts.

As a result of these activities, the PERRCs described several ways in which research productivity has been supported through appropriate fiscal oversight. Two PERRCs supported additional research activities within the scope of their original research aims and objectives targeted toward at-risk populations (examination of H1N1 vaccination in correctional facilities, and evaluation of using text messaging to reach the deaf community during emergencies). Two PERRCs discussed redirecting funds to support research productivity by providing additional staff or restructuring the use of staffing.

Three PERRCs described how providing appropriate fiscal oversight helped address unanticipated costs and needs in the IRPs. In one PERRC, funds were redirected to meet an unanticipated need for translation and interpretation services for both a deaf research team member and a deaf advisory committee member. Another PERRC redirected funds to provide incentives to survey participants when the recruitment support from a national organization did not materialize. When an IRP uncovered a greater pool of state preparedness laws than anticipated, the PERRC redirected funds to support additional legal analysts. The lead investigator modified the research design to sample a smaller set of representative states and pursued collaborations and external funding to develop a novel computational approach to interpreting the legal text.

These examples of fiscal oversight provided by the PERRCs helped to ensure research productivity. The PERRCs take their responsibility for stewardship of the research funds seriously and that they have been successful in leveraging the available funds and other resources to address unanticipated research challenges and opportunities.

Data from the PERRCs described successes and challenges faced in establishing and implementing the functions of an administrative core as required by the FOA. PERRCs completed 27 pilot projects, and trained 30 new investigators in addition to providing research training to nearly 200 other students, fellows, and associates. These activities addressed a broad range of at-risk populations, and were, in

large part, conducted in partnerships with state and local public health. There were numerous examples suggesting that pilot projects and investigations by the new investigators will improve and strengthen preparedness and response capabilities and practice. As a result of the training in the PERRCs, several new investigators will continue research in public health preparedness and response.

All PERRCs have established and convened Advisory Boards with representatives from organizations across the public health system. These boards have provided substantive feedback that the PERRCs have adopted to help strengthen and improve the scientific quality and practice relevance of findings from the IRPs. Several activities have been instituted to support ongoing studies in the IRPs and provide scientific and fiscal management and oversight.

The PERRCs reported the strategies they developed to address challenges that were impediments to progress in the IRPs. Various approaches were described for managing available funds to address unexpected delays, problems, or increased resource needs in the research to support productivity. Although the program plan for conducting required activities in the administrative core varies greatly among the PERRCs, there is evidence that each has developed and implemented a functional administrative core that is effective in managing and supporting public health preparedness and response research using a public health systems approach.

Review Question #2. - How well is the PERRC Program progressing toward achieving original program/project goals and objectives?

Review Question #3. What is the evidence that PERRC research has yielded results and findings that have had a direct impact or will have the potential to impact on public health practice and preparedness?

Each PERRC is responsible for three to four IRPs that address a recommended research priority for public health preparedness and response. Information in this section of the report describes progress in achieving original research goals (to inform Review Question #2) and the potential for ongoing research to yield near-term results (3-5 years) to help strengthen practice in the public health preparedness and response system (to inform Review Question #3).

FOA Research Priorities and Cross-cutting themes addressed by the PERRCs

In response to the FOA, the PERRCs developed research programs to address a specific IOM recommended priority. One PERRC is conducting research to enhance the usefulness of training and another PERRC is conducting research to improve communications in preparedness and response. There are two PERRCs conducting research to generate criteria and metrics to assess the effectiveness of preparedness and response functions. The remaining five PERRCs are using different research approaches to help create and maintain sustainable preparedness and response systems. The specific IOM recommended priority being addressed by each of the PERRCs is given under **Tab 10.**

Research activities across the centers are addressing all of the recommended priority areas (**Table 3)**. Since the PERRCs were established, the number of research activities addressing the IOM priorities and cross-cutting themes has expanded. For example, only one PERRC was initially focused on research to improve communications, but there are now 3 more PERRCs conducting research to address this priority. This may reflect the addition of research in the pilot projects and by the new investigators or that lead investigators for the IRPs have determined that results could have broader application for addressing the IOM priorities.

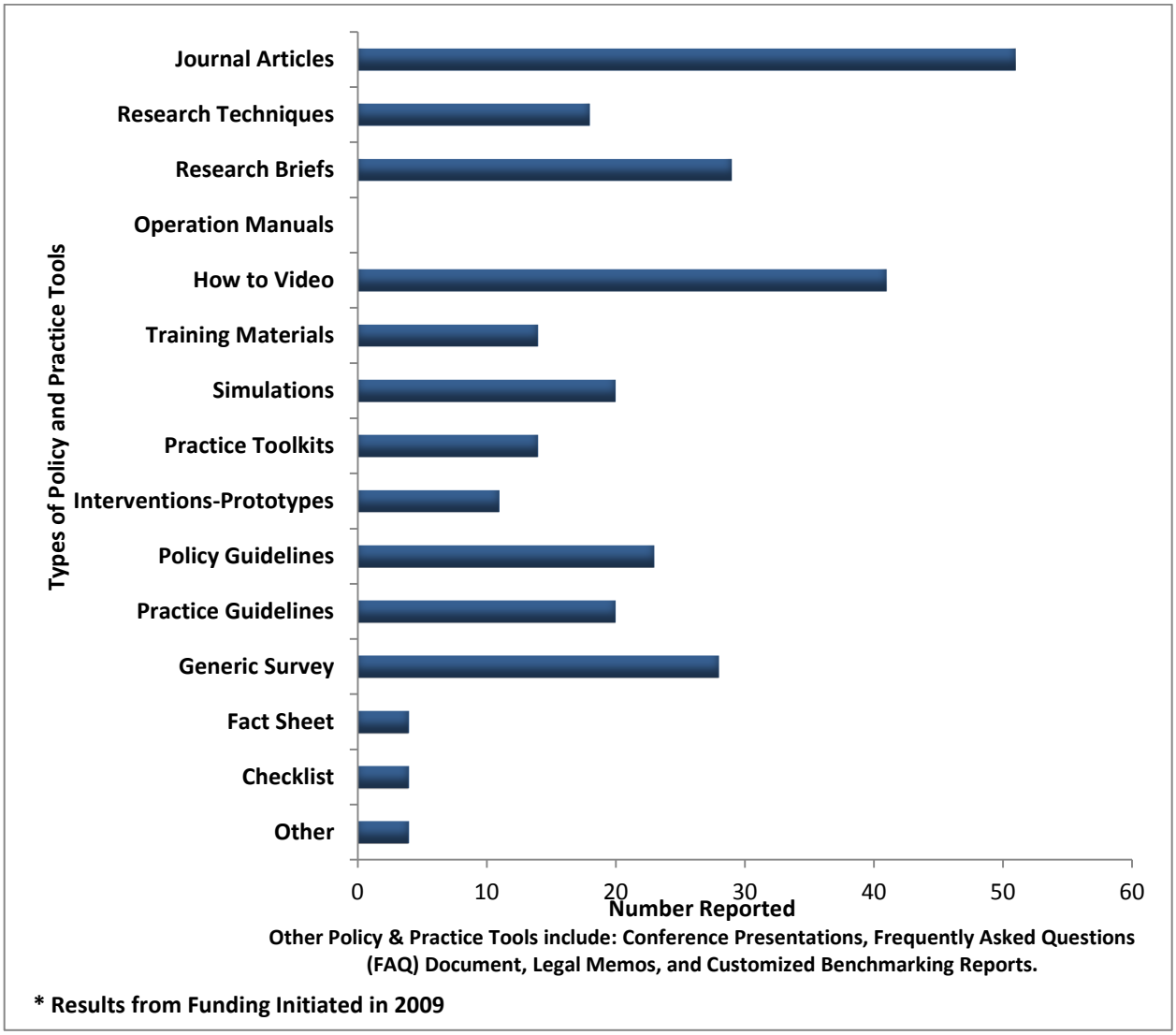
Table 3. Research Priorities Addressed by the PERRCs

FOA Priorities	Number of PERRCs addressing this priority
Enhance the Usefulness of Training	2
Improve Communications in Preparedness and Response	4
Create and Maintain Sustainable Preparedness and Response Systems	7
Generate Criteria and Metrics Applicable to An All-hazard Approach to Preparedness to Measure Effectiveness and Efficiency	2
Vulnerable/At-risk Populations	7
Preparedness Workforce	5
Legal and Ethical Issues	5

Results from the studies addressing the IOM priority recommendations are expected to yield knowledge to help strengthen preparedness and response capabilities and practice. Additionally, the expected findings will help address the needs of numerous at-risk populations, contribute to the response capacity of the preparedness response workforce, and help public health officials better understand and use the legal framework directing preparedness and response activities more effectively.

Data collected from the PERRCs indicate they have already developed over 200 practice and policy tools that are available to public health practitioners and policy makers to strengthen preparedness response practice. The largest numbers of tools reported by the PERRCs are in the form of journal articles, how-to videos, results from survey data, policy guidelines, and research briefs on study findings (**Figure 9)**. A more detailed analysis of journal articles published by PERRC investigators and a summary of selected practice and policy tools shared by the PERRCS are available under **Tab 13 (Dissemination of PERRC Research Findings)**.

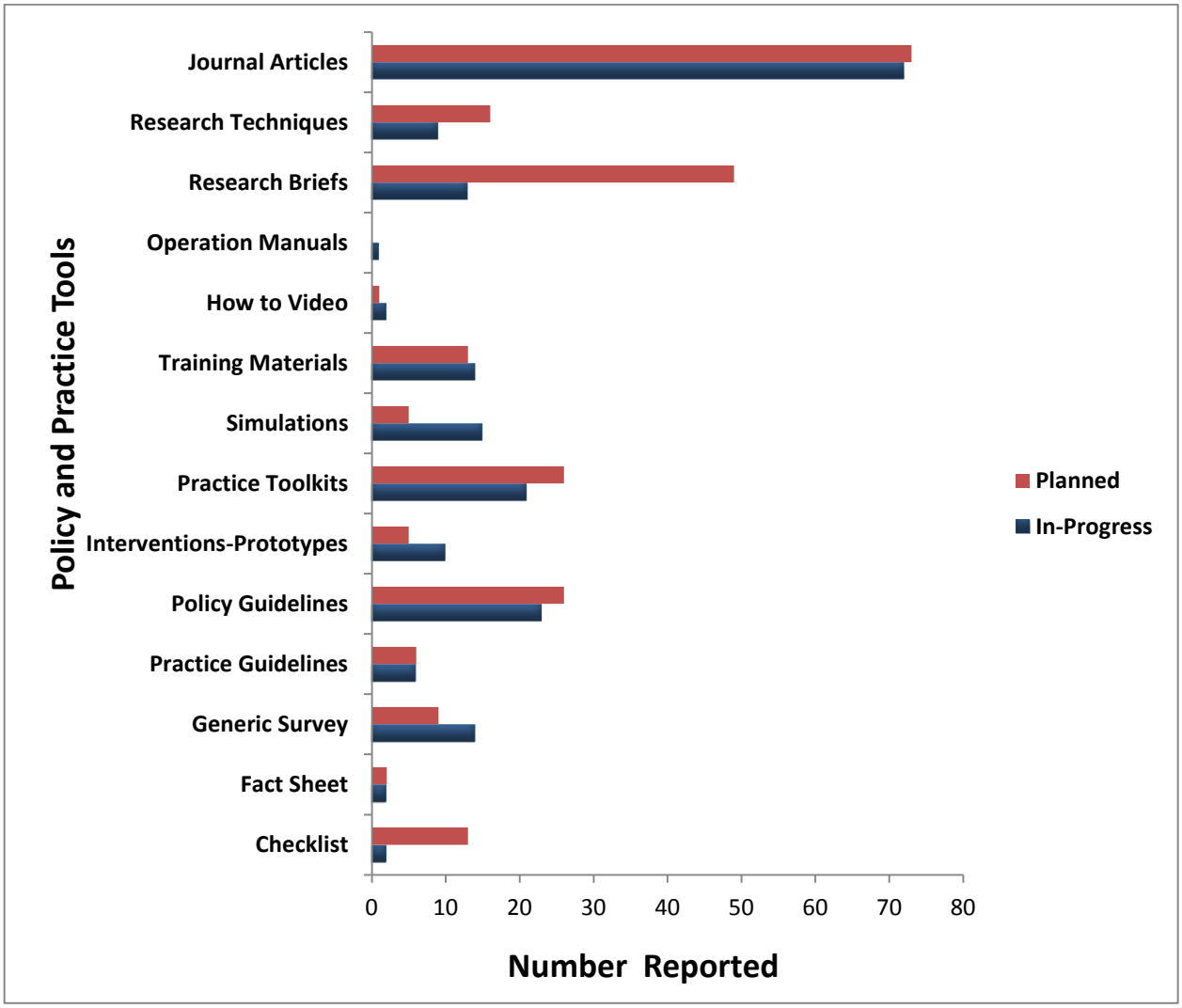
Figure 9. Policy and Practice tools Developed by the PERRCs



As progress continues in the IRPs, investigators report that the development of additional policy and practice tools is either already in progress or planned for development from research findings (**Figure 10)**.

Results from the IRPs are contributing to improvements in preparedness and response practice. The potential for the IRPs to yield results that can be transferred to practice was outlined by each PERRC. Each of the seven PERRCs initiated in September 2008 reported one or more examples of IRP research that had already been translated into practice to enhance preparedness and response practice and activities. The two PERRCs established in September 2009, University of California at Berkeley

Figure 10. Policy and Practice tools In-Progress and Planned



and at Los Angeles, described ongoing research with the potential to yield future results and knowledge that can be transferred to practice. It is particularly noteworthy that IRP research in two PERRCs, yielded results that led to states cost savings in the thousands (Louisiana) and millions (North Carolina) of dollars.

Common themes from IRP results that could be transferred to practice included: a) guidance and recommendations that could be used to improve preparedness; b) policies and tools to improve communications and strengthen collaboration across the public health system before, during, and after emergency events; c) results that could be used to inform changes in preparedness and response policy; d) potential use of findings for evaluating the effectiveness of training programs; c) tools and methods to measure system performance and effectiveness during exercises and actual responses; and d) improved communication to address the needs of at-risk populations. Unique results among the IRPs were findings that could be used to improve the accuracy and timeliness of surveillance systems for notifiable diseases. Evidence that research is yielding results that have been or can be transferred to

practice was collected for all of the IRPs in the PERRCs. One example was selected from each of the nine PERRCs to include in the report below. Additional examples are described in the Research Impact Briefs under **Tab 13** (Dissemination of PERRC Research).

- University of Minnesota PERRC, Retrospective Cohort Study of Responders Training and System Performance: The study team for this IRP created two forms to measure performance for a local health department engaged in the research. In a retrospective measurement of performance, it was revealed that this health department's performance was affected by considerable gaps in its internal record keeping of outbreak investigations. The local health department (LHD) addressed this issue by using a new color-coded folder system and utilizing the performance measurement data collection tools created by the IRP research team to use in continuous quality improvement initiatives. This tool will be replicated and distributed to other health agencies as the research team continues to measure performance in outbreak investigations in Minnesota.

- University of North Carolina PERRC, NC Public Health Regional Surveillance Teams: In 2001, the State of North Carolina used increased federal funding for preparedness to establish Public Health Regional Surveillance Teams (PHRSTs) that were deployed across the state. The IRP examined the effectiveness and efficiency of these teams and other regional teams with an emphasis on identifying opportunities to help improve operations and reduce costs. In the study investigators delineated how the functional, structural, and fiscal characteristics of the regional teams varied.

  These findings were used by the North Carolina Division of Public Health in their state-wide public health preparedness strategic planning process. As a result of the research partnership with the North Carolina Division of Public Health, the lead investigator for the IRP was invited to join the state strategic planning process. The results from this IRP provided evidence the state health department used to restructure its regional response system by reducing the number of regional teams and saving the state $3 million annually. This IRP is now investigating the effectiveness and efficiency of the state's revised regional preparedness system.

- University of Pittsburgh PERRC, Public Health Systems Indicator Project: The purpose of this IRP, the Adaptive Response Metric (ARM), is to measure adaptation in LHDs from normal function to functioning in a disaster response. The ARM helps the LHDs: a) measure how the consumption of resources changes over the course of a response b) consider which system improvements will enhance future response activities by highlighting the actions and activities that either impeded or facilitated communication, coordination, collaboration, and leadership during a specified emergency; c) standardize the measurement of resource consumption across agency functions and at both routine and emergency levels; and d) determine the day-to-day work that may be deferred or neglected while staff members are diverted to the emergency.

This systematic approach for measuring how LHDs adapt to emergency situations was implemented at some pilot sites. Health officials used evidence from this research to form the basis for a new policy decision: to activate their Continuity of Operations plans (COOP) whenever activating the Incident Command System (ICS) or Disaster Operating Center (DOC), to assure that critical routine public health functions are adequately resourced and maintained.

- Emory University PERRC, Immunization Systems and Public Health Preparedness: Lead investigators for the Immunization Systems IRP work closely with practice partners in survey development, data analysis, and dissemination of findings. In 2009, the Immunization Provider Survey sampled vaccine providers in Oregon and Louisiana about their preferred methods of communication with their state public health agency. Providers in Louisiana reported that they preferred receiving faxes and emails, and they did not use Twitter for information related to the provision of vaccines. At the time, the Louisiana Department of Health and Hospitals was planning a Twitter campaign for vaccine providers in preparation for the H1N1 vaccine. State health officials used the results of the IRP survey to revise their notification campaign for vaccine providers and eliminated the use of Twitter notifications, which saved the state thousands of dollars.

- Johns Hopkins University PERRC, Applying the Extended Parallel Process Model to Willingness to Response in the Public Health System: Nationally, public health preparedness workforce development and training has focused almost exclusively on the knowledge and skills needed to respond. This IRP uses the Ready, Willing, and Able model to demonstrate the equal importance of the willingness and readiness of responders to report and perform. The Johns Hopkins investigators developed a research tool called the John Hopkins~Public Health Infrastructure Response Survey Tool (JH~PHIRST) to help health departments assess the willingness of their workforce to report during an emergency event.

  Results from the survey can be coupled with a novel practice tool, the Public Health Infrastructure Training (PHIT), to help improve the willingness of the workforce to respond. These tools have been pilot tested by a LHD and have helped to increase the number of staff indicating their willingness to report based on an improved understanding of their role and the need for their expertise in a response.

- Harvard University PERRC, Linking Assessment and Measurement to Performance in PHEP Drills and Exercises: Investigators for the Drills and Exercises IRP have assisted the Massachusetts Department of Public Health (MDPH) in evaluating two separate, statewide, exercise programs focused on response to public health emergency scenarios (hospital evacuation and a large-scale infectious disease outbreak causing a surge in patients). These tools provided the MDPH with the first quantitative data measuring their regional performance in exercises. These tools indicated different strengths and weaknesses in response performance across the different regions of Massachusetts. Investigators are partnering with the state to

develop recommendations to help enhance preparedness and response performance and capabilities.

- University of Washington PERRC, SMS Text Messaging for Public Health Emergencies: This IRP identified an important communication gap that could impede staffing and deployment during emergencies. It was determined that the LHD was unable to efficiently contact their 1800 public health employees to provide them with timely information and direction (e.g., reporting to alternate work sites, or directing alternate transportation routes). Current communication methods such as phone trees, emails, website posts of information, and reliance on staff to call into an employee hotline were deemed unreliable and inefficient.

  Investigators in this IRP created and implemented Preparedness and Communications units to send text messages to the personal cell phones of public health employees. The system was designed taking into account public health staff attitudes, belief, and preferences regarding agency-based texting, labor issues, and the need for technology training by managers. Different appeals for staff to "opt-in" were tested to ascertain which approach was most appealing. This resulted in a 20% uptake in participation. Communications procedures and emergency plans were changed in the local health department to reflect the new capacity, and staff members were trained on the use of the system.

  Investigators for this IRP are testing the system and conducting interviews with staff to identify the facilitators and barriers to opt-in behavior. This information, along with information on the logistics and costs to implement the system, will be disseminated to other health departments.

- University of California at Los Angeles PERRC, Fostering Collaboration between Public Health and School Systems for Preparedness: This IRP consists of a survey that identifies the barriers and facilitators to successful collaboration between schools and public health in preparedness and response. Data obtained from the survey will be used to develop a toolkit designed to facilitate increased collaboration between school systems and local public health departments. It is anticipated that the outcome of this IRP will help strengthen resiliency in the system to better protect the health of children during an emergency.

- University of California at Berkeley PERRC, Closing Chemical, Biological, and Nuclear gaps for Public Health All-Hazards Preparedness: This IRP is focused on yielding results to help close the gaps in preparedness for chemical, radiological, and nuclear (CRN) events. Investigators are currently applying a multi-attribute decision making survey tool to elicit public health expert perspectives on the relative importance of 50 CRN gaps. Investigators are using the Analytical Hierarchy Process (AHP) method, developed by Thomas Saaty, in their research. A user-friendly online AHP survey tool is currently underway to enable each responding expert to systematically (and anonymously) prioritize and rank the CRN gaps and assess all-hazard CRN preparedness plans and capabilities The national survey allows respondents to consider her or his own

agency's all-hazards preparedness plans and capabilities for CRN. The expert perspectives obtained from the survey will be integral to identifying and ranking gaps in preparedness and response plans that can impede responses to future CRN events.

There is evidence that all the PERRCs are conducting research that will yield results that can provide near-term impact on public health preparedness and response. Nearly all (7/9) of the PERRCs have reported examples of research from the IRPs that has been translated to enhance communications, improve performance, and strengthen capabilities for practice. Results from the two PERRCs that were funded in September 2009 also suggest that research in their IRPs have the potential to yield results that will enhance preparedness and response practice.
Research that addresses the needs of vulnerable or at-risk populations as well as preparedness in rural communities, legal and ethical issues and workforce preparedness are considered a cross-cutting focus area for each of the IOM priority recommended research areas. The PERRCs were surveyed regarding the types of populations that are targeted to benefit from research findings in their IRPs (**Table 4**).

Most of the PERRCs reported that research findings are intended to benefit state, county, and city population types. Less than half of the PERRCs indicated that the research is expected to benefit the U.S. territory and tribal populations.

More than half of the PERRCs (n=5) are conducting research to address the needs of at-risk populations and a large number of these efforts are directed at populations at-risk based on additional needs for medical care and limited communication abilities. Research in a number of the IRPs will address the preparedness and response needs of seniors, children, those in rural communities, as well as populations that are of low income or transient. The needs of populations with chronic medical conditions or who are pregnant are also being addressed thru PERRC research. Of note, two PERRCs indicated that research from their IPRs is expected to address the needs of nearly all types of populations included in the survey questions. Two PERRCs reported that their studies would target other population types, such as the "local/jurisdictional public health workforce; faith communities" and "diverse racial and ethnic groups."

Table 4. Population types targeted to benefit from PERRC IRPs

	#PERRCs addressing population type	Minnesota	UCLA	Emory	Pittsburgh	Berkeley	Washington	Hopkins	Harvard	UNC
State	9	1	1	1	1	1	1	1	1	1
County	9	1	1	1	1	1	1	1	1	1
City	8	1	1	1	1	1	1	1	1	
Territory	4	1	1			1		1		
Tribal	3	1	1				1			
[1]Medical Care	6	1	1	1	1	1		1		
[1]Communication	6	1	1	1	1	1	1			
[1]Supervision	5	1	1	1	1	1				
[1]Transportation	5	1	1	1	1	1				
[1]Independence	5	1	1	1	1	1				
Senior	6	1	1	1	1	1	1			
Rural	6	1	1	1	1		1	1		
Occupational	6	1		1	1		1	1	1	
Low Income	6	1	1	1	1	1	1			
Chronic	5	1	1	1	1	1				
Children	4	1	1	1	1					
Transient	3	1	1		1					
Pregnant	3	1	1	1						
Other	2							Local/jurisdictional public health workforce; faith communities	Low SES and diverse, racial, and ethnic groups	
Total populations addressed	101	18	17	15	15	12	9	7	4	2

[1] DHHS) defines populations "who have, in addition to their medical needs, other needs that may interfere with their ability to receive medical care" to be functionally at-risk during a response to an emergency http://www.phe.gov/Preparedness/planning/abc/Documents/AtRisk.pdf.

Review Question #4: What perspective do stakeholders have on the potential for PERRC research to have current and future impact on preparedness and response and practices at federal, state, local, or tribal levels?

The FOA called for the PERRCs to use a public health systems research (PHSR) approach to examine the organization, function, capacity, and performance of components in the public health preparedness and response systems. As PHSR is a relatively new field of study, OPHPR developed a definition for the purpose of the PERRC research:

> *"The constellation of individuals and organizations in the public and private sector that provide information and assets to promote population health, provide health care delivery, prevent disease and injury and include health care providers, insurers, purchasers, public health agencies, faith-based organizations, and entities that operate outside the traditional sphere of health care. Public health systems research investigates the functions, operations, structure, and interactions of public health systems."*

Within this context, the PERRCs were funded to conduct public health systems research on preparedness and response capabilities at the national, state, local, and tribal levels. PERRC research incorporated perspectives from multiple disciplines from both public and private organizations to yield near-term results for improvements to the complex and rapidly changing public health preparedness and response system.

To inform Review Question #4, this section of the report includes an overview of how the PERRCs have partnered or collaborated with state and local public health departments and organizations across the public health preparedness and response system. This section also includes a summary of evidence that demonstrates the extent to which these collaborative relationships have been instrumental in strengthening preparedness and response efforts for all potential threats and hazards.

Collaboration with partners in PERRC research

The PERRCs involved six to 14 different types of public and private health partners in their research projects (**Figure 11**). All of the PERRCs have established active partnerships with other academic institutions and local governments to assist in conducting research. Many PERRCs have also engaged representatives from federal and state government aside from their collaborations with state, federal, or local public health departments. A large proportion of the collaborative relationships the PERRCs have established are with public safety, local public health departments and professionals in the healthcare delivery systems.

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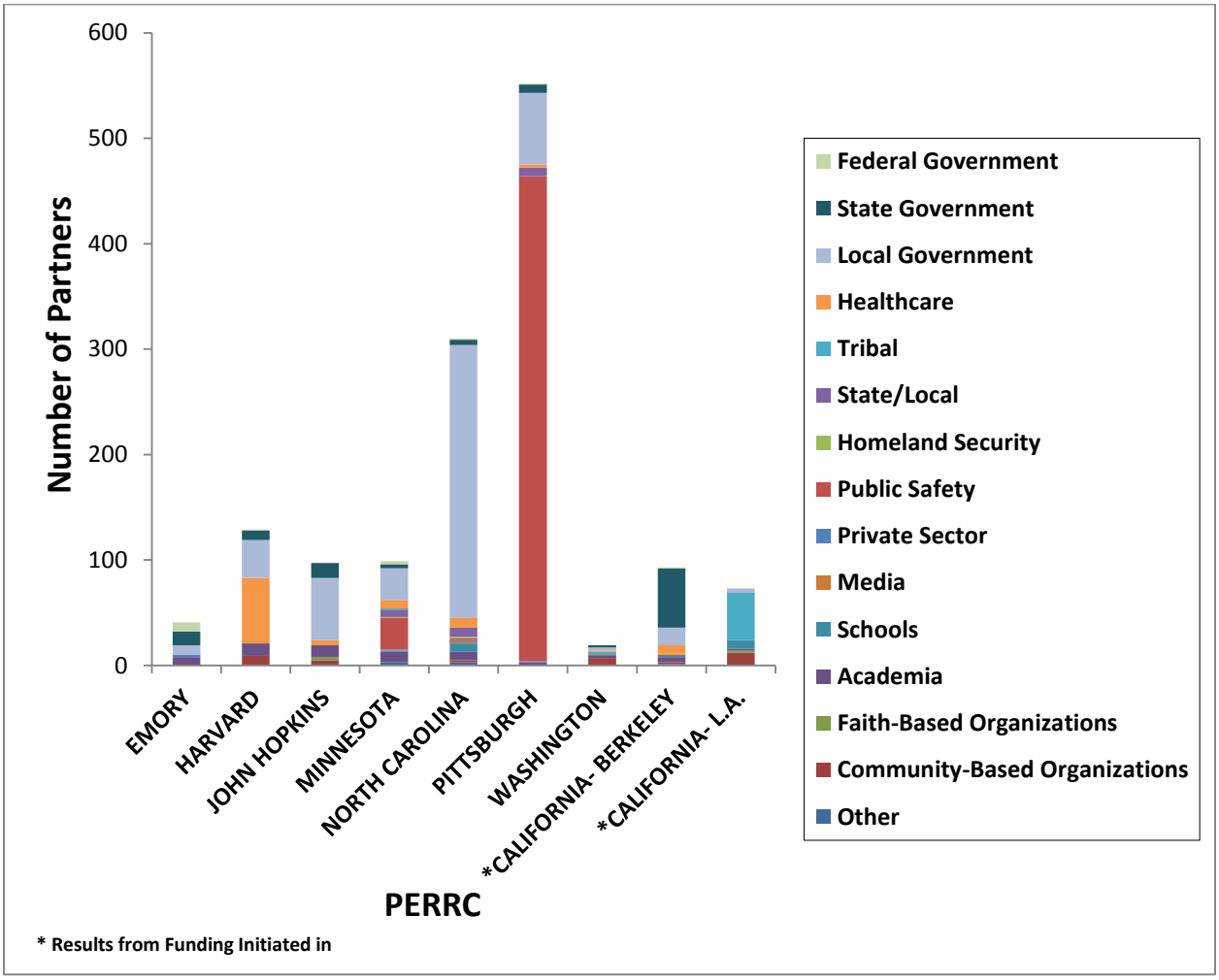
Figure 11. Partners involved in PERRC research.



The most common input partners provided to the PERRCs were suggestions for the development of research surveys. This input helped refine the focus areas and priorities for surveys, design the survey instrument, and revise or add questions, particularly questions of interest to the practice partners. Several PERRCs also collaborated with partners on the implementation of the survey or the analysis of data collected with the survey. Many PERRCs also reported that the direction provided by the partners to improve survey instruments helped them capture more meaningful data. One PERRC described how the addition of an important research question recommended by their partner led to one of the major findings from their IRP. As a result of this partnership the investigators are now examining the willingness to response in rural versus urban LHDs, an important variable for preparedness that was overlooked in the study. Another PERRC indicated that the input they received helped make the survey questions more relevant to the target population and helped achieve high response rates.

These examples indicate that results from surveys being developed by several PERRCs were improved because of the suggested changes from research partners. The collaborations benefited not only the PERRC, but also the partner, who often contributed to a wider dissemination of the results. In some cases, partners released the results of the research along with the PERRC. In other instances, the partners helped the PERRC reach wider audiences with suggestions on research dissemination.

Research partners provided input in other areas to strengthen PERRC research. One PERRC reported that input from their partners helped them change their approach to working with communities which made the community interaction more accepted and more positive. As a result, their work in the communities was less cumbersome and their ability to conduct the research was improved. Another PERRC reported that their federal partner encouraged and supported them in developing a workshop to discuss their results from a study with state public health partners to strengthen the actionable recommendations from H1N1 After Action Reports.

One PERRC indicated that engaging partners could be a challenge. Because the partner was unaccustomed to being involved in the research process, it required a longer time to gain trust and a good working relationship with the partner. Persistence in establishing the relationship with this partner provided the PERRC with important subject-specific expertise for an IRP.

The data from the PERRCs demonstrate that their partnerships with organizations across the public health system play an important role in shaping PERRC research. These partnerships have helped improve research methods and the relevance and utility of research findings for public health preparedness and response policy and practice.

As discussed above, all of the PERRCs reported that their research methods, data collection, and data analysis benefitted from the input of their research partners. A number of PERRCs indicated that their partners connected them to other populations that could be included in PERRC research, and in many cases, the partners also helped recruit research participants. As an example, one PERRC reported that the partner helped them gather a larger and more diverse population sample that led to more generalizable results. Another PERRC commented that their collaboration with research partners increased their communication with key public health leaders to facilitate the dissemination of research findings. Other PERRCs indicated that their partnerships increased the credibility and support of their research and that partners served as advocates for the project and a champion for the research being conducted.

PERRCs acknowledged that the research partnership also benefited the partner. Partners helped design and influence research surveys for results that could be beneficial to their work in

preparedness and response. Some PERRCs reported that they co-presented research findings at conferences and co-author manuscripts with partners. One PERRC reported that their close research collaboration with practitioners has resulted in more rapid and extensive translation of research findings into policy and practice for preparedness and response.

The information on research partnerships indicates that the PERRCs and their research partners derived multiple benefits from the collaborative relationships. The benefits to the PERRCs were largely improved research methods that yielded more meaningful results and to benefits to partners included increased knowledge sharing that could enhance preparedness and response practice.

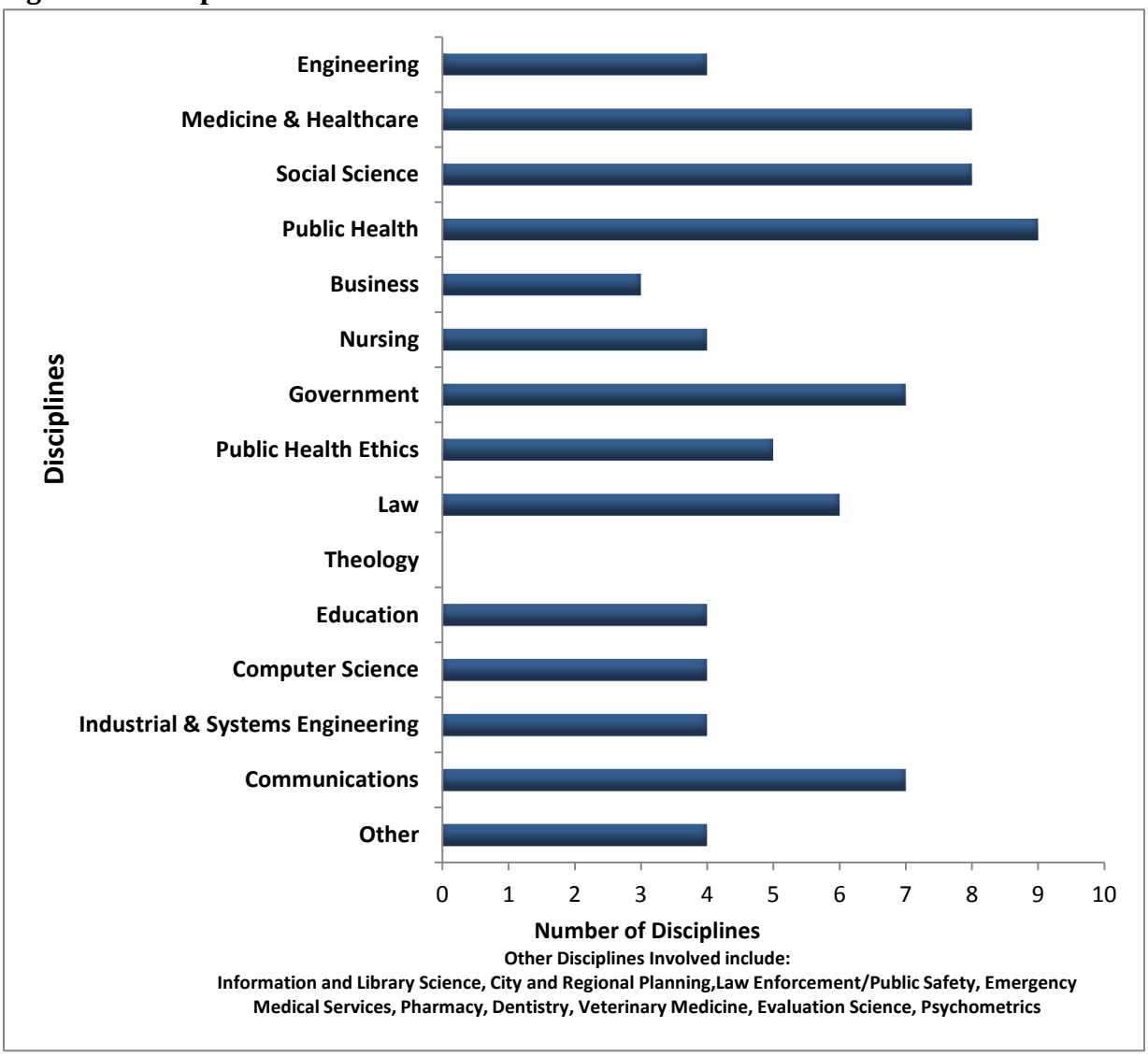
Multidisciplinary Research Teams in PERRC Research

There are numerous disciplines involved in PERRC research (**Figure 12**). Incorporating these multiple disciplines provides varying perspectives that are necessary to investigate ways to improve complex and rapidly changing public health preparedness and response systems. The involvement of research partners from disciplines outside public health reflects the use of a public health systems research approach for achieving results that can improve every-day public health practice while improving preparedness for and response to disasters and public health emergencies.

The body of research in the PERRCs is intended to examine the organization, function, capacity, and performance of components in the public health system in preparing for and responding to any and all potential threats and hazards.

The PERRCs have involved several different types of public and private organizations and engaged multidisciplinary teams in conducting public health system research for preparedness and response. These partnerships and the multiple disciplines are necessary to help the PERRCs yield findings to improve the complex network of public health preparedness and response systems.

Figure 12. Disciplines Involved in PERRC Research

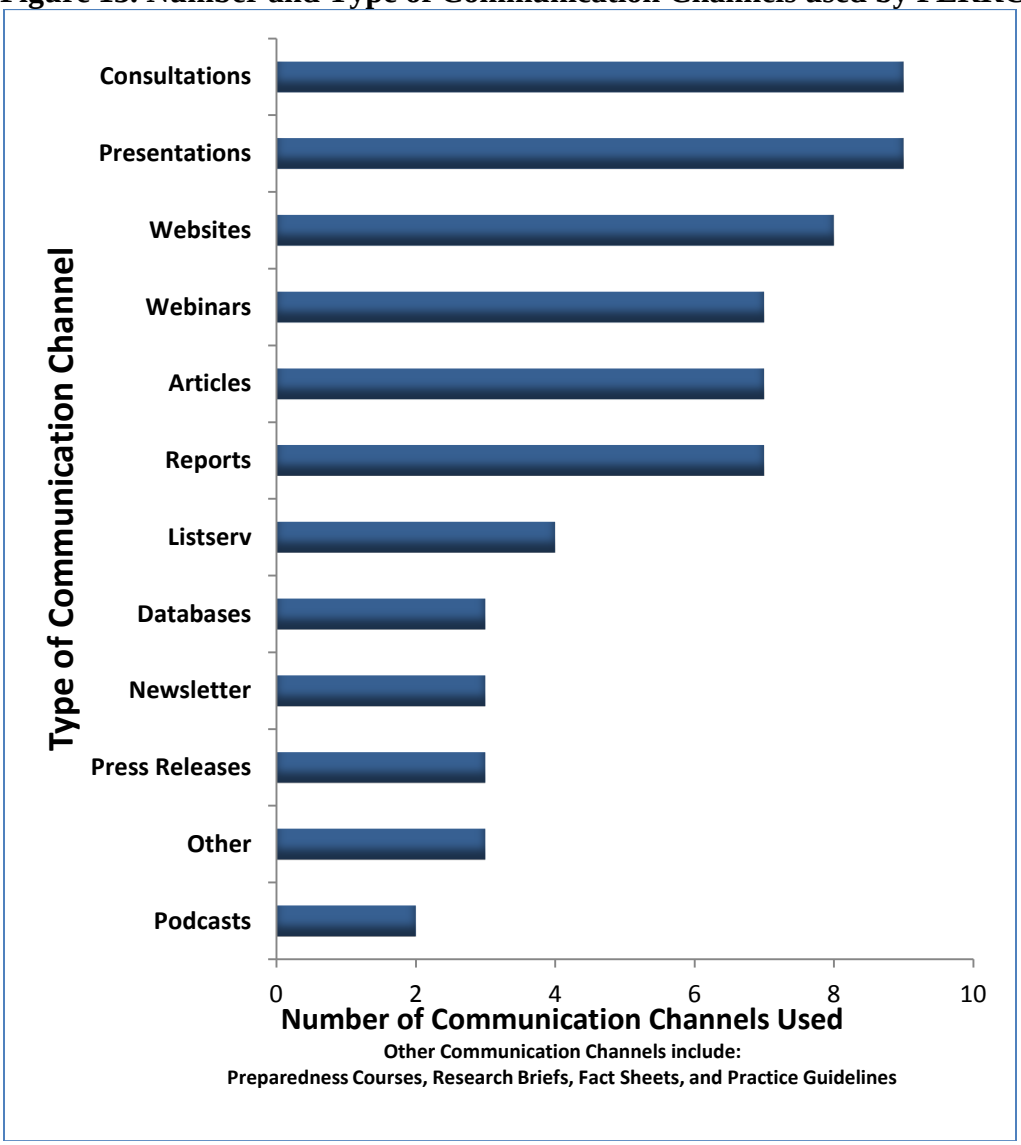


The FOA directed the PERRCs to develop strategies and methods to evaluate and translate results from research into practice. To this end the PERRCs were asked to report the steps they had taken to develop a program plan for disseminating the research findings and making results accessible and appropriate for multiple audiences, in particular public health preparedness and response practitioners and policy makers. This section of the report includes an overview of the methods and strategies the PERRCs are using to share and disseminate research findings and facilitate the translation or the transfer of research knowledge into practice.

Communication channels used to disseminate research findings

The PERRCs were surveyed about the types of communication channels and the frequency in which they were used. Conference presentations and consultations (in-person meetings or other means of discussing PERRC-related issues to solicit advice or opinion) are the two communication channels that have been used by all nine PERRCs to disseminate research results and findings (**Figure 13**). Eight of the PERRCs also used websites and webinars.

Figure 13. Number and Type of Communication Channels used by PERRCs



Communication of research findings through published articles, and reports (information products including manuals, best practices, research methods, tools, and new models) were also commonly used. Three PERRCs reported using databases, newsletters, and press releases, and two used podcasts to share research results. Only two PERRCs used other channel types, including preparedness courses and research briefs, fact sheets, and practice guidelines. The types of audiences targeted for dissemination at conferences and through consultations can be readily determined but these results do not provide sufficient information to determine the audiences the PERRCs are reaching through these other communication channels.

Data were also collected on how frequently each of the PERRCs used these types of communication channels to report their research findings. To date, live presentations, reports, and consultations have each been used more than three times as often as any of the other communication channels (**Figure 14**). Fifty-two articles (51 peer reviewed articles, 1 MMWR, and others) have been published. Websites have been used to disseminate findings on 31 occasions, and the PERRCs have presented findings during 24 webinars. The PERRCs have made limited use of press releases, newsletters, podcasts, listservs, and databases. It is not possible to determine from these data the extent to which the PERRCs have used the different types of communication channels to disseminate the same research information.

The PERRCs vary in the extent to which each has taken advantage of the array of communication channels available (**Figure 15**). The PERRC at the University of Minnesota made use of all 11 channels surveyed, and additionally made use of preparedness courses as a forum for communicating research findings. The PERRC at the University of North Carolina made use of nine communication channels. The PERRCs at the University of California at Los Angeles (UCLA) and the University of California at Berkeley (Berkeley) each used only four types of communication channels, which is likely due in part to their grants beginning a year later than the others. The remaining PERRCs made use of six to eight different types of communication channels for dissemination. Again, it is not possible to determine whether different or the same research information is being disseminated when the PERRCs are using these different types of communication channels.

The PERRCs were surveyed for the types of audiences they were targeting for dissemination of their research findings (**Table 6**). The 13 audiences can be divided among six different public health system sectors: academic, health care, business, media, government (including federal, state, local, territorial and tribal governments, and tribal councils), and community organizations (non-governmental organizations (NGOs), community-based organizations (CBOs), and faith-based organizations (FBOs).

Figure 14. Number of research disseminations by communication channel

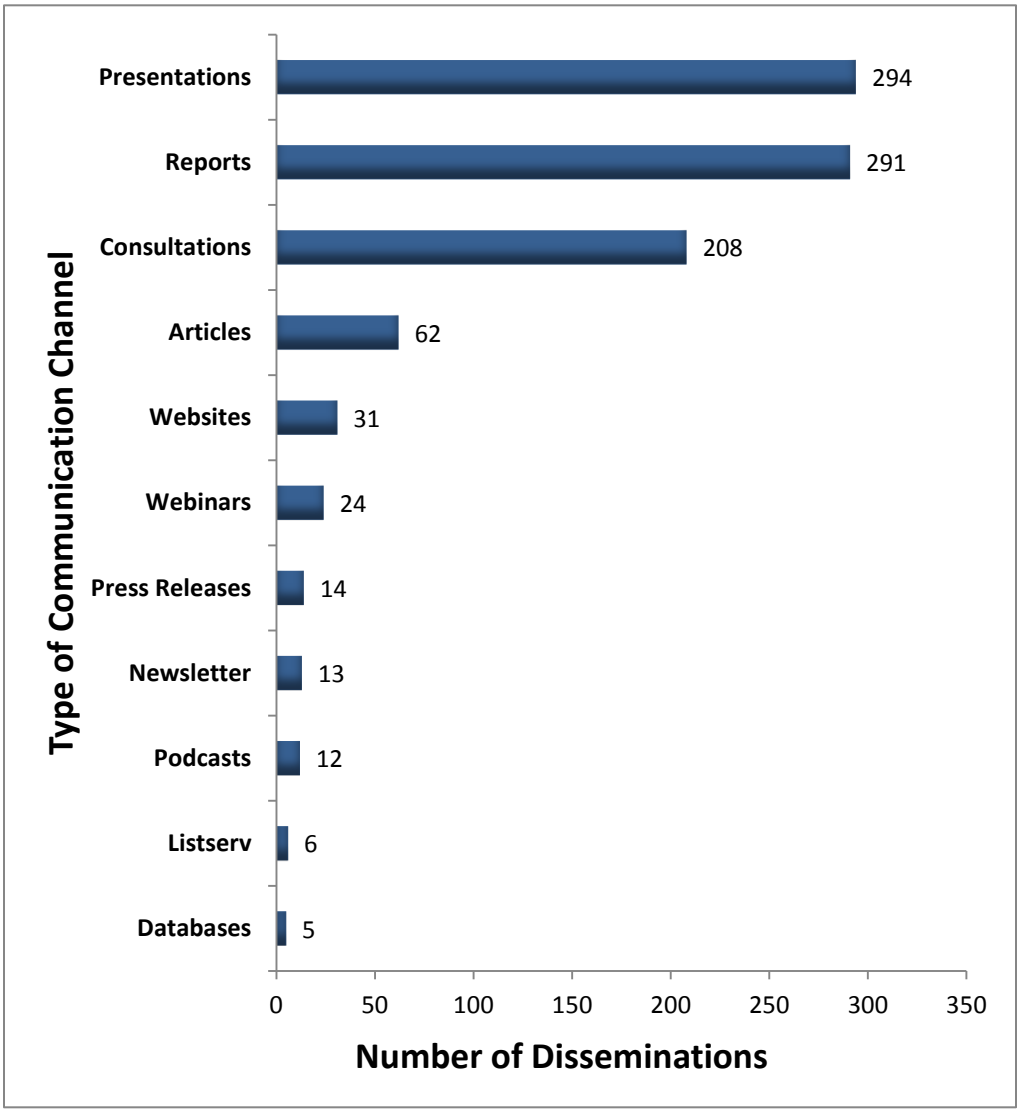


Figure 15. Communication channels used by each PERRC

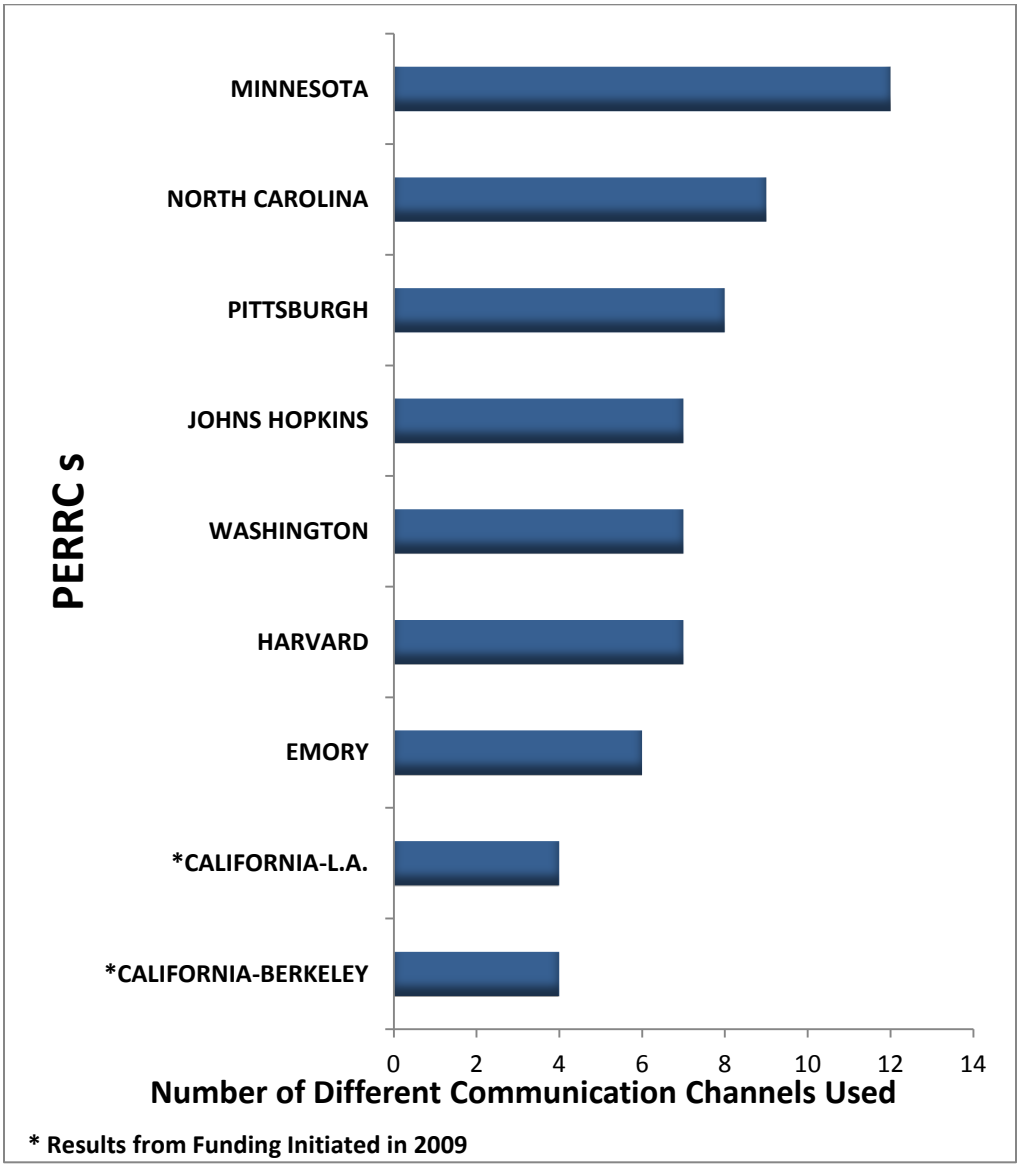


Table 6. Audiences targeted for dissemination of PERRC research

Q34: Audience types targeted by PERRCs for dissemination of research findings

Audience Type	Minn	Wash	Emory	UCLA	Pitt	Berk	UNC	Harv	Hopkins	PERRCs per Audience Type
Academic	1	1	1	1	1	1	1	1	1	9
Local Govs	1	1	1	1	1	1	1	1	1	9
NGOs	1	1	1	1	1	1	1	1	1	9
State	1	1	1	1	1	1	1	1		8
Federal	1	1	1		1	1	1	1		7
Health Care	1	1	1		1	1		1		6
Territorial	1	1	1	1		1				5
CBOs	1	1		1	1	1				5
FBOs	1	1		1					1	4
Business	1	1	1		1					4
Media	1	1			1		1			4
Tribal Govs	1	1		1						3
Tribal Councils	1			1						2
Other*			1							1
Total types per PERRC	13	12	9	9	9	8	6	6	4	

Audience Sectors		
	9 PERRCs	Academic
	9	Government
	6	Health Care
	9	Community Organizations
	4	Business
	4	Media

*Professional Associations

The PERRCs varied with respect to the diversity of audiences they targeted for the dissemination of research findings. Two PERRCs targeted all or nearly all of the 13 audience types, while four of the PERRCs targeted eight to nine audience types. Although one PERRC targeted a smaller number of audience types (n=4), these audiences spanned the three audience sectors (academic, government, and community organizations). One PERRC also identified an additional audience, professional associations.

The academic, government, and community sectors were targeted by all nine PERRCs. The health care sector was targeted by six PERRCs, while business and media sectors were only targeted by four PERRCs each. Within the government sector, federal, state, and local governments were targeted most often, while tribal councils and governments were targeted by only two and three of the PERRCs, respectively. Unfortunately information regarding the type of channels being used to target each type of audience was not collected and would have been useful to more clearly demonstrate the effective transfer of research knowledge to the appropriate audiences.

Translation strategy

Each of the PERRCs were asked to discuss ongoing efforts for the evaluation of research findings and products, the dissemination and transfer of findings to the target audience, and the development of plans for repackaging and obtaining feedback from the target audience(s). While the evaluation of research findings and dissemination of these findings was thoroughly described by the majority of PERRCs, fewer centers provided detailed responses on developing and implementing their plans to repackage or reformat research findings for practice based on the size and scope of the target audience(s). These concepts are described below.

The PERRCs indicated that the relevance of research findings for preparedness and response practices was addressed by PERRCs under several themes: a) evaluation of research and translational tools; b) engagement with practice partners; and c) partnerships and strategic planning. The most common theme for assuring relevance of findings, identified by six PERRCs, was the evaluation of research and translational tools. Evaluation was reported to be conducted by a variety of sources including practice partners, advisory groups, CDC colleagues, and through the peer review process related to publications and presentations. Three PERRCs indicated that engaging practice partners throughout the research process was an important step to assure the relevance of the findings while two other PERRCs determined that engaging partners in strategic planning were methods for assuring the relevance of research findings.

Eight PERRCs identified local and state health departments as the target audiences for the dissemination of the research findings. The majority of the PERRCs (n=6) also cited public health professionals (n=6) and providers practice partners (n=5). Less than half mentioned policy-makers (n=4) as the target audience for dissemination. To some extent there may be overlap among these target audiences.

PERRCs identified numerous strategies for disseminating the research findings. The major themes identified for dissemination included: a) national conferences or summits; b) journal articles; c) web-based or internet resources; and d) research reports or briefs. National conferences were identified as a strategy to disseminate findings for six PERRCs, while publications were identified by five PERRCs. Research reports or briefs were mentioned by six PERRCs while web-based or internet resources were mentioned by five. One PERRC reported plans to disseminate their research findings through media interviews and press releases.

Plans for repackaging or reformatting the findings for the target audience(s) and obtaining feedback from the audience(s) were also discussed broadly. One PERRC described a concept of

"prototyping" in which the research outputs that were iteratively produced during the investigation are evaluated through the engagement of "end-users" in the research process. Another PERRC described the use of print materials as the "repackaging."
Seven PERRCs described their process for eliciting feedback on disseminated findings from the target audiences. Five PERRCs reported that feedback they have received related to the general content of research findings and three PERRCs indicated they received feedback on the applicability and relevance of the research findings to preparedness and response practice.

The PERRCs were directed in the FOA to include "strategies and methods to evaluate and translate results from research efforts to help achieve national preparedness goals and for enhanced, improved, or expanded preparedness and emergency response capabilities." All the PERRCs provided data to indicate that the research results are being actively disseminated through conference presentations, consultations, reports, and other communication channels. The PERRCs report that state and local public health and public health preparedness and response practitioners are the targeted audiences to receive information on the research findings. However, from the data, it cannot be determined if the communication channels used to disseminate research finding are effectively reaching the targeted audiences.

Only one PERRC discussed a detailed strategy for the evaluation of research findings and products, the development of plans for repackaging (reformatting to better reach the target audience) in consideration of the size and scope of the target audience(s) for dissemination, and for obtaining feedback from the target audience. This is an area in the PERRC program that requires more support and attention.

CONCLUSION

Thirty-four survey questions were administered to the PERRC grantees to collect quantitative and qualitative data that indicated progress at mid-project, identified research successes and challenges, and informed the four review questions. Due to the volume of data collected and time constraints for conducting the mid-project review, responses to the survey were prioritized a second time. This report summarizes information from responses to the 25 survey questions that were determined to be the most important for informing the four review questions and addressing the scope and objectives for the review. This report will be considered by the ad hoc workgroup in conjunction with other resources to conduct their evaluation. The conclusions from this report are arranged to inform each of the four review questions.

Question 1: How effective and cohesive are the research infrastructure and activities developed by the PERRC for successfully conducting the proposed research in public health preparedness and response?

Overall, the results indicate that the PERRCs have established an effective administrative infrastructure and have adequate fiscal oversight and scientific support to achieve research goals and objectives. Suggested areas for improvement include methods to: a) better assess the actual impact of completed PERRC pilot projects on preparedness and response practice; b) determine the extent to which new investigators' involvement in preparedness research influences continued research in this field; and c) increase membership from underrepresented sectors of the public health system on Advisory Boards.

Pilot Projects

Survey responses indicate that the PERRCs have successfully supported a diverse array of exploratory research projects yielding practical results for public health preparedness and response systems. The pilot projects have provided the PERRCs with the capacity to solicit research ideas and initiate exploratory studies. Two pilot projects made timely use of this mechanism to investigate responses to the H1N1 pandemic. The 27 pilot projects funded and completed by the PERRCs within the first 2.5 years involved diverse types of public health preparedness partners, were targeted to serve a variety of geographic and at-risk populations, and yielded several practical tools and findings which show significant potential for positive impact on local, state, and federal public health.

Further inquiry is needed to assess the actual impact of completed PERRC pilot projects. Any future PERRC funding opportunities should encourage grantees to consider the balance and diversity of research partners and populations served in the selection of pilot projects.

New Investigator Training & Other Researcher Development

Survey data support the conclusion that the PERRCs are fostering the development of new researchers in public health preparedness and response systems. The definition of new investigator was broadly defined by the PERRCs and trainees ranged from students to senior researchers. Training for the 30 new investigators funded by the PERRCs involved a range of activities, but mentorship by PERRC investigators was the most common. The training for new investigators fostered new collaborations across disciplines, new approaches to PHPRS research, and useful research findings for public health practice. PERRCs also provided research training to nearly 200 students, fellows, and research associates. Few data were reported to indicate how effective the PERRC training has been in expanding the pool of researchers in PHPRS. It is recommended that the PERRCs develop a more systematic way of assessing the impact of PERRC training on new researchers' public health and preparedness career plans. Any future funding opportunities should continue to encourage awardees to train new investigators and students, in order to grow the multidisciplinary field of PHPRS researchers.

Advisory Boards

Survey responses indicate that each PERRC has established an external Advisory Board that has provided input and advice to support the success of the program. Members on these boards are representatives from government and other sectors across the public health system. Five PERRCs also constituted dedicated advisory boards for one or more of their independent research projects. The media sector is not represented by membership on any of the PERRC advisory boards, and the business and healthcare sectors are underrepresented among board members compared to the academic, government, and community constituencies.

The PERRCs described the valuable input Advisory Boards have provided on PERRC research and how they were adopted by investigators. The PERRCs are strongly encouraged to increase membership from underrepresented sectors of the public health system (i.e., business, media, and health care delivery systems) on their advisory boards for the remainder of the project period to support strategies for dissemination. Any future funding opportunities should require the PERRCs to include Advisory Boards members from all sectors of the public health system.

Centralized Scientific Guidance and Financial Administration

Survey responses indicate that the PERRCs are actively employing a number of scientific management strategies to support research success. Although multiple strategies have been used, the most common strategy is regular research lead and team meetings. These regularly scheduled meetings facilitate integration and communication across projects, methodological consistency, and quality improvement of research.

The PERRCs reported challenges to productivity posed by logistical, communication, and data collection problems in the research projects and described the successful strategies that were implemented to address these impediments to conducting the research.

The grantees are exercising responsible fiscal stewardship and redirecting funds to support research productivity. The PERRCs have implemented several fiscal oversight measures; including regular monitoring of expenditures and subcontract progress, redirection of funds across projects or via carryover, and development of annual budgets and spend plans. Grantees have leveraged their fiscal resources both to address unforeseen research needs and to expand research activities within their scope of work.

Question 2: How well is the PERRC Program progressing toward achieving original specific program/project goals and objectives?

Assessing progress toward each of the program goals and objectives in the 34 IRPs would require time and a level of analysis beyond that available for this mid-project review. The PERRC survey inventoried which of the IOM recommended and cross-cutting research priorities identified in the FOA are being addressed in the research. Information on the populations targeted to benefit from PERRC research was also collected.

Each of the PERRCs reported that their ongoing research focuses on one or more of the four IOM-recommended priorities. While all four of the priorities are addressed by at least one of the PERRCs, the coverage is uneven. Two PERRCs are conducting research to address the Usefulness of Training priority; two are focused on Generating Criteria and Metrics; and four are conducting research addressing the Improvement of Communications Systems. Seven of the PERRCs are conducting research on the priority to Create and Maintain Sustainable Preparedness and Response Systems. This prominent focus on this research priority is likely due to the FOA's emphasis on the public health systems research approach for the research program.

In addition to IOM recommendation priorities, the FOA specifies that each proposed research project should reference and address cross-cutting priorities (vulnerable populations, workforce themes, and ethical and legal issues). Survey responses indicate that each of these cross-cutting themes is not being addressed in each of the IRPs, nor are all nine PERRCs addressing all four of the cross-cutting themes. In particular legal and ethical issues are being addressed by only four PERRCs, and workforce issues by only five PERRCs. Grantees were surveyed about the type and number of populations targeted to benefit from their research to provide information on how the PERRCs were addressing the cross-cutting theme for at-risk populations. All 18 geographic and at-risk populations listed in the survey question were targeted to benefit from research results by at least one of the PERRCs.

Results from studies that address priorities for the Usefulness of Training, Improved Communications for Preparedness and Response, and the Generation of Criteria and Metrics are expected to be less than findings from research to address the priority to Create and Maintain Sustainable Preparedness and Response Systems given that there are fewer PERRCs conducting research to address these priorities.

Overall, the PERRC program is addressing the IOM research priority themes and progressing toward achieving original specific program and project goals and objectives. Though coverage of these themes and across geographic populations is uneven, it is reasonable that each PERRC will not target all population types, given the nature in which investigator-initiated research is developed, the limited coverage of all priorities among the pool of meritorious research applications, and limited funding to award centers that could address all IOM priorities with a focus on all four cross-cutting themes priorities.

The PERRC research portfolio is targeting a wide variety of geographic and at-risk populations as research beneficiaries. While some populations are targeted more than others, PERRC research can be expected to yield results to strengthen the public health preparedness and response systems that support the needs of large sectors of the population.

Question 3: What is the evidence that PERRC research has yielded results and findings that have had a direct impact or will have the potential to impact on public health practice and preparedness?

Overall, the survey data indicate that the PERRCs are and will continue to generate a high volume and variety of policy and practice tools, some of which have already demonstrated impact. Effective transfer and uptake of research findings and tools will require focused effort to more clearly define target audiences and how best to convey findings to those audiences, in terms of both dissemination channels and re-packaging the content to be practice friendly and relevant.

The survey measures impact in terms of the types, numbers, and use and adoption of practice tools generated by PERRC research. The PERRCs reported that they have already developed over 200 practice and policy tools available for use, largely in the form of journal articles, how-to videos, research briefs, surveys, and policy guidelines. All of the seven PERRCs that were funded in 2008 described research findings from at least one IRP that has already been translated into practice applications. The two PERRCs established in 2009 described ongoing research with the potential to yield future results with practice impact.

Notably, two PERRCs uncovered information that led to cost savings in the thousands of dollars in Louisiana and the millions of dollars in North Carolina.

Grantees indicated that they expect future research findings to be transferred to practice in the form of readiness guidance, improved communication and collaboration, informing policy, and evaluating program and training performance. The research centers report a number of policy and practice tools currently under development, again mainly in the form of journal articles, but also including a number of policy guidelines and practice toolkits, as well as some research briefs, training materials, simulations, and surveys.

The impact of policy and practice tools is strengthened by evaluation and effective transfer of research findings into practical understanding and use, and effective dissemination to appropriate audiences. Grantees reported that the relevance of their research findings is supported by evaluation of findings and tools by various stakeholders, and engagement with practice partners

in both research and practice activities (i.e., state preparedness strategic planning). PERRCs reported that research findings are targeted mainly towards state and local health departments, followed by public health professionals, practice partners, and policy makers. However, it could not be determined if the communications channels being used to disseminate findings reached the intended target audiences.

PERRC dissemination strategies are characteristically academic, emphasizing national conferences, journal publication, internet, and research reports or briefs. Emphasis on these strategies is understandable given the academic culture of the PERRC investigators. From a public health perspective, it will be necessary to promote additional dissemination strategies that are amenable to broader target audiences. The grantees only broadly discussed the overall size and scope of their target audience for dissemination and their plans for repackaging findings and obtaining audience feedback, suggesting that these areas will require focused attention in the final phase of the program, and beyond, in order to maximize the uptake and impact of research findings.

The PERRCs have used an array of communication channels to disseminate their research, with most centers utilizing consultations, presentations, websites, webinars, articles, and reports. Grantees clearly favored particular communication channels, with live presentations, reports, and consultations used more than three times as often as other channels. Most PERRCs employed six to eight communication channels.

The research centers targeted 13 different survey-designated audience types for dissemination, to varying degrees, with all nine PERRCs targeting the academic, government, and community sectors for dissemination, The research centers varied individually as to how diverse an array of audiences they targeted, ranging from four to 13 different audiences.

The PERRCs were not funded to conduct research to ensure the full translation of their work products and research results. However, the PERRCs should develop more systematic plans for ensuring that their findings are reaching the proposed target audience to facilitate translation and the transfer of research knowledge to practice. Any future funding opportunity should incorporate a strong project element aimed at effective, targeted dissemination and translation of research findings, to maximize the impact of research.

Question 4: What perspective do stakeholders have on the potential for PERRC research to have current and future impact on preparedness and response and practices at federal, state, local, or tribal levels?

The PERRC survey did not capture stakeholder perspectives, which will be captured elsewhere in the mid-project review process. Grantees were surveyed about the numbers and types of research partners that were engaged in the research, the nature and impact of collaborations with their partners, and the types of disciplines involved in PERRC research.

Each PERRC engaged between six and 14 different types of PHPRS partners in their research projects; all grantees had partners from academia and local governments. Most research centers also engaged state and federal research partners, public safety professional, local public health partners, other PERRCs, and the state government and healthcare delivery system.

PERRC grantees indicated that the diverse types of partners provided input that critically strengthened the research in several important ways, including improvements to their research methods, data collection, and data analysis. Collaborators provided input on research questions as well as on survey design, content, and implementation. The PERRCs reported that partner input improved the scientific quality of research methods, strengthened the relevance and credibility of the research, added important research questions and key preparedness issues, and improved dissemination strategies and reach.

The PERRC FOA calls for multidisciplinary research. Survey data indicate that PERRC research teams are truly multidisciplinary, an essential characteristic for using a public health systems approach for preparedness and response research. Collectively the research centers involved 22 different disciplines in their research, and each PERRC incorporated between six and 12 of the disciplines listed on the survey. The majority of the PERRCs reported that expertise from medicine or healthcare, social science, government, public health ethics, law, and communications were among the disciplines contributing to their research.

In conclusion, the data collected from the PERRCs suggest substantial progress in achieving research goals and objectives. This conclusion is based on the examples of research findings that have been translated into practice and that have helped to improve preparedness and response function and capability. There are additional examples of research results that have the potential to impact preparedness and response practice. Although the data indicate that all PERRCs have progressed in the research, the pace at which each has done so varies. This may be due in part to the differences in the research study design in the IRPs across the PERRCs. For example, a number of IRPs are collecting longitudinal data and few results have become available. Other IRPs are collaborating extensively with research partners which may impact the research process. As an example, the productivity in several IRPs was affected by the H1N1 pandemic because their research partners in state and local public health were engaged in this response.

A limitation to the interpretation of these results is that two of the PERRCs were not initiated until September 2009 and thus are reporting results from only 1.5 years of research. Moreover, constraints in the time to conduct the review and the available resources to analyze data limited the amount of information that could be collected and included in this report. However, the data were prioritized and the responses determined to be most important for informing the four review questions and addressing the scope and objectives for the review are included. Analysis of the data by persons external to ERP provided an objective assessment, interpretation of these analyses benefitted from greater program knowledge of Extramural Research Program staff.

ACKNOWLEDGEMENTS:

The following persons are acknowledged for their contribution to the preparation of this report through their data analyses, comments, editorial suggestions, etc.:

Sara Crawford, PhD
Michele Dynes
Barbara A. Ellis, PhD
Lee Sanderson, PhD

Appendix I. PERRC Research Impact Briefs

Preparedness and Emergency Response Research Centers
Preparedness Research Impact Briefs

Each PERRC has submitted a preparedness research impact brief that highlights a significant research finding or outcome of their CDC funded work. Each research project featured in the brief addresses public health preparedness and response issues, discusses research collaborations and activities, explains the impact and outcome of the research, and describes evidence to demonstrate how the research applies to public health practice. The briefs are intended to inform the Board of Scientific Counselors' ad hoc workgroup of program accomplishments for the PERRC mid-project review. These briefs will also be used to communicate the impact of PERRC research findings to public health preparedness stakeholders.

The data and evidence presented in the briefs demonstrate measurable, positive public health impacts that have resulted from PERRC research or partnership activities, such as:

- A change in policy or practice instituted by a health department or other organization,
- Recommended changes in practice that increased participation in exercises or preparedness training, and
- New preparedness or program activities initiated by a research partner as a result of interaction with PERRC researchers.

The examples in the documents that follow represent a few of the PERRCs accomplishments to address near-term recommendations to close gaps in public health preparedness and response practice.

1

Preparedness Research Impact Brief

Emory University

Rollins School of Public Health Preparedness and Emergency Response Research Center

Informing the Development of National Immunization Policy Recommendations

What preparedness issue does this research impact brief address?

Common issues, including scarce resource allocation and supply chain management, arise in vaccine-related public health emergencies. Our aim is to identify best practices for emergencies based on lessons learned from vaccine shortages and pandemics such as the 2009 H1N1 influenza pandemic. In our second national survey of Immunization Program Managers in 2010, we investigated how states' immunization program policies and practices helped or hindered their ability to manage their response to the 2009 H1N1 influenza pandemic.

The survey examined these crucial elements of efficient vaccine delivery:

- vaccine campaign management
- collaborations between state immunization and emergency preparedness programs
- use of the incident command system and emergency operations center structures
- use of immunization information systems
- and communication with providers

Survey results highlighted ways in which immunization program managers can work with emergency preparedness programs to optimize future responses to public health emergencies. Policies that strengthen collaboration between programs will build surge capacity, improve decision making around allocation of scarce resources, and enhance immunization registry utility in emergency situations.

RESEARCH FOCUS

Identify best practices for emergencies based on lessons learned from vaccine shortages and pandemics.

Areas of Examination:

- Vaccine campaign management
- Collaborations between state immunization and emergency preparedness programs
- Use of immunization information systems
- Communication with providers

TARGET AUDIENCES

- Immunization Programs
- Emergency Preparedness Programs

PRINCIPAL INVESTIGATOR

Ruth L. Berkelman, MD

PROJECT INVESTIGATOR

Saad B. Omer, MBBS, MPH, PhD

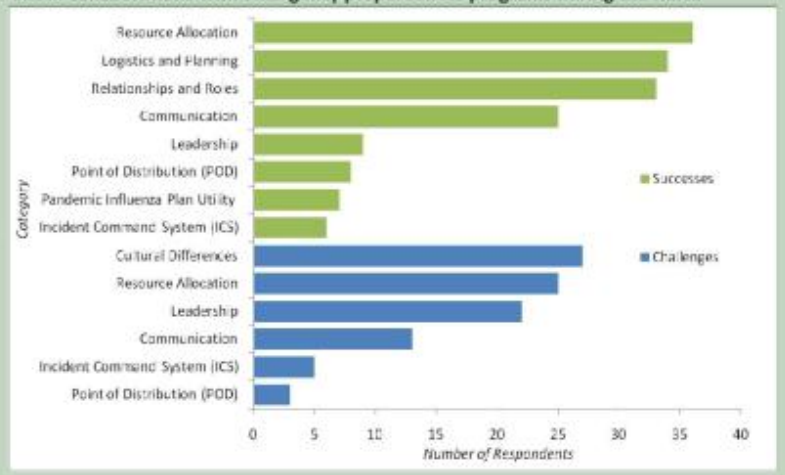
Who collaborated on this research, and what activities were conducted?

We conducted a survey of the 64 immunization program managers (IPMs) representing the city, state, and territory grantee jurisdictions supported by the National Center for Immunization and Respiratory Diseases (NCIRD), at the Centers for Disease Control and Prevention (CDC). Fifty-four territories (84%) responded, representing 46 states, six large cities, and two U.S. territories. In total, responding

jurisdictions cover 93% of the U.S. population. At the 2010 National Immunization Conference, we conducted a focus group comprised of immunization and emergency preparedness program staff to identify areas of focus for our survey. Research partners helped develop survey concepts and the survey instrument. Our partners included six of the original focus group members (from Colorado, Louisiana, Georgia, Kentucky, New York City, and Wisconsin), the Association of Immunization Managers (AIM), and state immunization managers who are members of AIM's research subcommittee. Our findings benefit state and local health departments as they plan for and respond to future public health emergencies involving mass distribution of vaccines and other countermeasures.

What impact or outcomes were achieved by this research?

Figure 1: Successes and challenges reported by immunization program managers about collaborations with emergency preparedness programs during the H1N1



Top successes and challenges [Figures 1 & 2] reported by immunization program managers regarding collaborations with emergency preparedness programs included themes of planning, resources, leadership, and communication. Based on our research findings, the national organization representing immunization program managers, AIM, developed national recommendations [Figure 3]. AIM's Executive Director presented these recommendations in Emory's January 12, 2011, national webinar, which brought staff from both immunization and emergency preparedness programs together in a non public health emergency event to engage in a discussion about lessons learned.

Highlights from AIM's recommendations included:

- Develop shared language and communication strategy between the two programs
- Use common leaders to convene pre-event collaborative activities
- Establish budget-ready response – plan for accepting/using funds from any source

AIM plans to further distribute these recommendations via their website, an issue brief, and email to their stakeholders, the CDC, the Association of State and Territorial Health Organizations, and state and local Emergency Preparedness Programs.

We will measure changes that result from these recommendations in our upcoming focus group at AIM's fall 2011 directors meeting and in our 2012 Immunization Program Managers Study. Specifically, we plan to ask questions about changes to states' immunization plans, changes in the way the immunization programs and emergency preparedness programs collaborate outside of a pandemic event and changes in communication strategies. Collaboration between these programs can leverage their resources to accomplish more with limited funding.

Figure 2: Survey Response Themes: Categories and descriptions of successes and challenges between immunization and emergency preparedness programs during 2009 H1N1 influenza pandemic response

Category	Description
Successes	
Resource Allocation	Access to monetary resources, personnel or equipment flexibility, and access to pursue projects, strategy (e.g., "Ease of funding- PHP allocated funds directed to the Immunization Program to support our vaccine allocation efforts and tracking of doses administered.")
Logistics and Planning	Experience planning, implementing, or running a specific project or campaign-related activity (e.g., "Site visits to all providers to improve storage and handling.")
Relationships and Roles	Beneficial understanding of a particular role; good working relationships established; positive collaboration between groups; developed prior to event or during event (e.g., "Their receptiveness to learning about the centralized distribution process.")
Communication	External and internal communications were helpful (e.g., "Coordinated communications with regional and local health departments.")
Leadership	Decisions were made clearly with both programs' best interest (e.g., "Adhering to roles and management structure.")
Point of Distribution (POD)	POD logistics were good (e.g., "Implementing school based H1N1 clinics in 12 area school districts.")
Pandemic Influenza Plan Utility	Existing plans and relationships were found to be useful for implementing projects/strategies (e.g., "Existence of state and local Pandemic Influenza Plans served as a critical starting point in developing a response strategy.")
Incident Command System (ICS)	ICS improved operations, communication, or other aspects of planning and implementation (e.g., "Incident command created an excellent form for communication between programs and sub-grantees locally.")
Challenges	
Cultural Differences	Lack of understanding of standard operating procedures, differences in approach to problems because of differences in programs and/or cultures within programs (e.g., "Vocabulary...we speak in "health care terms" & they speak in "military" terms.")
Resource Allocation	Obtaining the resources needed in a timely manner (e.g., "PHER money, personnel, supplies, location and space issues.")

What evidence demonstrates that this research had the described impact?

AIM reports that members found the results of our January 2011 webinar helpful and provided guidance for engaging with preparedness programs. The results of our study are currently being used to inform an AIM issue brief that prioritizes investment in immunization infrastructure. This will be published as a companion piece to our primary manuscript and distributed to stakeholders, AIM members, CDC, and posted on the AIM and Emory PERRC websites. An executive summary will also be developed to inform federal and state legislators via the National Conference of State Legislators. The issue brief focuses on improving the U.S. immunization infrastructure, systems, and capacity for vaccine distribution during routine and pandemic circumstances. Our findings provide the evidence base for recommendations to: synergize efforts between immunization and emergency preparedness programs, use resources more efficiently, and strengthen and expand use of immunization information systems. This increases overall surge capacity for provision of vaccine or other medical countermeasures during a public health emergency.

Figure 3: Recommendations for immunization programs and emergency preparedness programs from the Association of Immunization Managers based on Emory PERRC data presented in webinar on January 12, 2011

AIM Recommendation	Example of Implementation
Develop understanding of each other's program prior to emergency event	Conduct tabletop exercises or simulated mass vaccination exercises
Use common leaders to convene pre-event collaborative activities	Encourage public health preparedness directors to include immunization program staff in ICS training and drills
Look for ongoing collaborative opportunities	Designate seats in the EOC for immunization program staff
Maintain communication	Encourage participation in joint monthly meetings
Establish "budget-ready" response – plan for accepting/using funds from any source	Create pandemic influenza plans with "permanency" that cover major areas and concepts, but leave flexibility to adapt to different disease scenarios, different vaccine supply and distribution plans, and various vaccination priority strategies
Build and plan for IT enhancements	Build and plan for vaccine registries that accommodate emergency use needs as well as daily tracking use

Our findings provide strong evidence that the Public Health Emergency Preparedness (PHEP) cooperative agreement funding is generating a good return on investment for improving sustainable preparedness infrastructure. The PHEP[1] funding is designed to support the key principles of engaged partnership outlined in the National Response Framework[1]: "tiered response", "scalable, flexible, and adaptable operational capabilities", "unity of effort through unified command", and "readiness to act". Results from our research indicate the utility in practice of all of these principles.

[1] Centers for Disease Control and Prevention, Office of Public Health Preparedness and Response, *Funding Guidance and Technical Assistance to States*, http://www.cdc.gov/phpr/coopagreement.htm (March 23, 2011)
[2] Federal Emergency Management Agency, *National Response Framework*, http://www.fema.gov/pdf/emergency/nrf/nrf-core.pdf (March 23, 2011)

What is the existing body of knowledge?

Common issues, including scarce resource allocation and supply chain management, arise in vaccine-related public health emergencies.

What has the research contributed?

The research survey results highlighted ways in which immunization program managers can work with emergency preparedness programs to optimize future responses to public health emergencies.

How does this apply to public health practice?

Policies that strengthen collaboration between programs will build surge capacity, improve decision making around allocation of scarce resources, and enhance immunization registry utility in emergency situations.

Preparedness Research Impact Brief

Harvard University

Harvard School of Public Health Preparedness and Emergency Response Research Center

Using Threat Scenario Outcomes to Evaluate Public Health Response Capacity

What preparedness issue does this research impact brief address?

Using tools developed within Linking Assessment and Measurement to Performance in Public Health Preparedness Systems (LAMPS) Project-4, this year we have been able to provide the first quantitative data from all six regions of Massachusetts on regional performance. We used two different fictional disaster situations ("exercises"), demonstrating differing strengths and weaknesses in the different Regions. The State had not previously quantifiably measured performance across the regions during exercises, therefore, had no data to compare performance among regions. In addition, the State needed specific feedback on the realism and appropriateness of its newly proposed planning targets for surge capacity. Our research is currently the only quantitative vehicle to allow the Massachusetts Department of Public Health (MDPH) to collect data on the feasibility of the surge planning targets from every hospital in the Commonwealth using a fictional disaster exercise as the vehicle for collecting such data.

RESEARCH FOCUS

Measure the ability of public health and hospital regions in the state of Massachusetts to respond to two different threat scenarios

Threat scenarios:

- Hospital evacuation
- Major medical surge event

TARGET AUDIENCE

- Massachusetts Department of Public Health

PRINCIPAL INVESTIGATORS
Kasisomayajula Viswanath, PhD
Michael Stoto, PhD

PROJECT INVESTIGATOR
Paul Biddinger, MD, FACEP

Who collaborated on this research, and what activities were conducted?

As part of its work under the Assistant Secretary for Preparedness and Response's Hospital Preparedness Program Cooperative Agreement, the MDPH engaged the Harvard School of Public Health (HSPH) to conduct exercises. These exercises were to measure the ability of each of the state's six public health and hospital regions to respond to two different threat scenarios:

- the need for evacuation of a hospital
- the need to accommodate a major medical surge event

The exercise program began in June 2010 and will conclude in June 2011. Nearly every hospital in Massachusetts has participated in this program. Other participants in the exercises included:

- state public health and emergency management officials
- health center representatives

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- local public health officials
- fire department, police, and EMS representatives

More than 500 people from across the state have participated in the exercise program to date. Objectives for each exercise program were created in collaboration with leadership from the MDPH Emergency Preparedness Bureau. LAMPS Project-4 staff created and/or adapted more than 50 measures for these programs to test performance on the objectives. We used the data collection instrument that we have developed under LAMPS as well in this project. LAMPS staff and other expert evaluators collected data during the exercises. LAMPS staff aggregated and analyzed the data. The data have been presented to the MDPH Emergency Preparedness Bureau and to the exercise participants as well via After-Action Reports and other mechanisms.

The individual measures that we have used in the statewide exercise program that helped us to provide this valuable, quantitative feedback to local and state practice partners are listed below:

Receipt of information

RII1: Initially discussed/assessed significance and impact of the incident on your entity
RII2: Discussed how to integrate the hospital ICS of first responders and other partners
RII3: Discussed/identified triggers, timeframe and risks involved in decision to evacuate
RII4: Discussed/identified how initial information would be disseminated internally
RII5: Discussed/ identified how initial information would be disseminated externally

Information coordination

ISIC1: Identification or assessment of flow of information to leadership
ISIC2: Able to coordinate information sharing across responding agencies to maintain a common operating picture
ISIC3: Activated the JIC
ISIC4: Able to Coordinate and release information and messages through the JIC
ISIC5: Identified strategies to communicate with patient's families and the public
ISIC6: Monitor media coverage and track public inquiries

Evacuation response

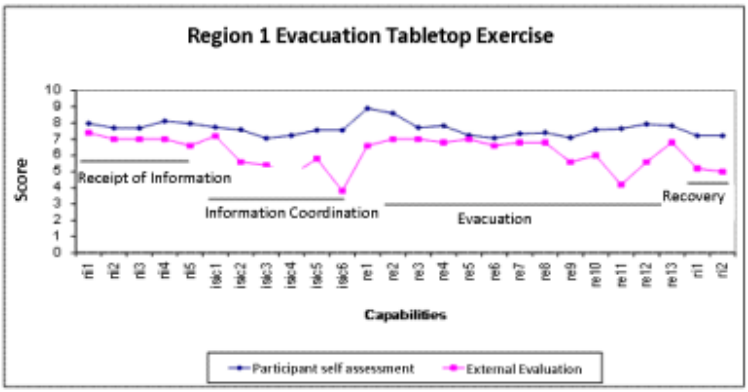
RE1: Able to efficiently notify hospital staff of decision to evacuate
RE2: Able to efficiently notify to first responders and key stakeholders of decision to evacuate
RE3: Able to implement efficient triage strategy to evacuate patients
RE4: Able to efficiently move patients within hospital during evacuation
RE5: Had an efficient plan to determine Patient destination
RE6: Had a clear protocol for Management of patient transfers
RE7: Able to efficiently transport patient from one facility to the other
RE8: Had an efficient Patient tracking system
RE9: Had a plan to identify and manage populations requiring additional assistance during evacuation
RE10: Identified specific personnel and non-personnel resources needed to support response logistics
RE11: Had a plan for Resource management to support the response
RE12: Able to Coordinate and integrate response partners to support the response
RE13: Able to identify and manage the safety issues during the response

Recovery

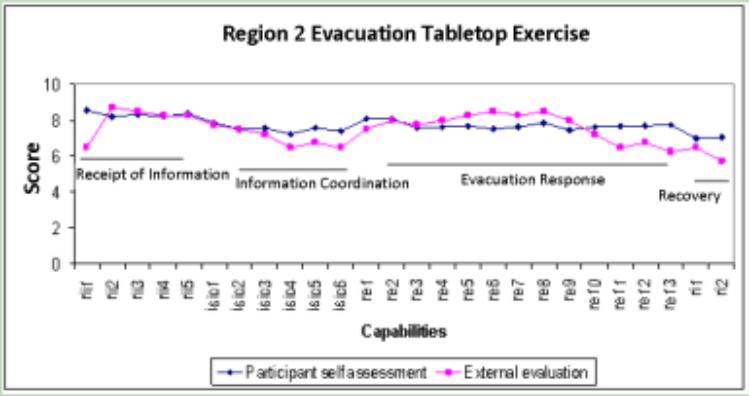
RI1: Able to plan for recovery
RI2: Able to implement recovery plan

What impact or outcomes were achieved by this research?

In the first exercise series on hospital evacuation, our measurement approach was able to document significant differences among the State's Regions in the domains of receipt of information, information

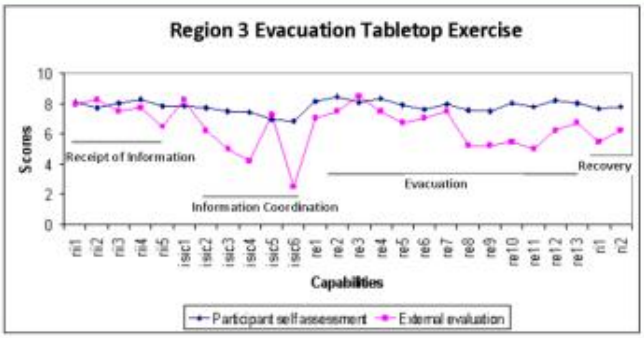


coordination, evacuation and recovery. The included graphs represent a portion of the data obtained in the tabletop exercises. The individual measures that were used in the exercises are listed above. The domain which appeared to be most challenging across nearly all Regions was the domain of information coordination. Of particular note, the data also show that the Region scoring highest on information coordination was the region with the most highly developed plans and procedures for a Regional medical coordinating group, which supports the face validity of our assessment. We are currently in the midst of the second exercise series on surge capacity, but have already collected significant data from the participants that describe the achievability of the targets proposed by the statewide medical surge committee. We have found that nearly all hospitals in Massachusetts can meet the proposed surge targets for critical care and for inpatient medical/surgical bed capability, but very few hospitals can meet the targets for burn or pediatric care. With our research, we have also found, however, that the hospitals' ability to sustain the surge is for a shorter period than originally planned or hoped.



What evidence demonstrates that this research had the described impact?

Our evaluation instrument and individual exercise performance measures developed under LAMPS have been able to provide, for the first time, quantifiable data on exercise performance across all MA public health and healthcare regions. This data has provided crucial, impartial feedback to local, regional, and state partners on areas in need of improvement. Timothy McDonald, Acting Hospital Preparedness Program Manager at MDPH has said that our evaluation "collects an exceptional level of detail" and has said that "the HSPH work allows us to see performance data from the regions that we have not seen before." In addition, our ability to use exercises to collect data on surge targets has had



a direct and measurable impact on the statewide medical surge plan, changing planning targets and ensuring their validity. John Grieb, Deputy Director of the MDPH Emergency Preparedness Bureau, said that "the HSPH measurements are better than any other data we have had to verify the accuracy and appropriateness of our planning targets."

What is the existing body of knowledge?

The state of Massachusetts had not previously quantifiably measured performance across all regions during threat scenarios and normal operations that could be used to compare performance among regions.

What has the research contributed?

This research provides the only quantitative vehicle to allow Massachusetts to collect data on the feasibility of the surge planning targets from every hospital in the Commonwealth using a fictional disaster exercise to collect data.

How does this apply to public health practice?

Using disaster exercises to collect data has had a direct and measurable impact on the statewide medical surge plan, changing planning targets and ensuring their validity.

Preparedness Research Impact Brief

Johns Hopkins University

Bloomburg School of Public Health Preparedness and Emergency Response Research Center

Fostering Coordinated Disaster Mental Health Planning

What preparedness issue does this research impact brief address?

A significantly larger number of psychological than physical injuries occur in disasters; eight out of every 10 people will experience psychological trauma during most disasters. As a consequence, the demand for peri- and post-disaster mental and behavioral health services is much greater than the supply of mental health professionals and the facilities to provide these services and support (Davidson & McFarlane, J Clin Psychiatry 2006). The Johns Hopkins PERRC (JH-PERRC) has created a unique set of interventions to increase both the capacity and competency of public mental health preparedness planning and response (as explained below). It is based on the premise that community resilience and public health emergency preparedness can be strengthened by motivating and guiding partnerships in preparedness planning efforts with the faith community. Accordingly, the model under study for building community capacity and capability to respond to behavioral health surge involves a collaboration between three entities: a faith-based organization, working in partnership with the local health department (LHD), supported by the faculty of an academic health center (AHC). The desired outcomes of this model are both a cadre of trained clergy and laity who can deliver some mental health services, and a robust plan for faith-based disaster response.

RESEARCH FOCUS

Increase the capacity and competency of public mental health preparedness planning and response.

Interventions under study:

- Psychological First Aid Training
- Guided Preparedness Planning

TARGET AUDIENCES

- Faith-Based Organizations
- Local Health Departments
- Academic Health Centers

PRINCIPAL INVESTIGATOR

Jonathan Links, PhD

PROJECT INVESTIGATOR

O. Lee McCabe, PhD

Figure 1: Faith partnership preparedness plan coverage, Eastern Shore, MD

Who collaborated on this research and what activities were conducted?

The JH-PERRC reached out to the faith community and LHDs on Maryland's Eastern Shore. The Episcopal Diocese of Easton responded particularly strongly, and is partnering with the JH-PERRC. The model under study includes two interventions. The first, 'Psychological First Aid' (PFA) training, equips clergy and laity with the skills to act as mental health 'extenders' during and after

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emergencies. The second, 'Guided Preparedness Planning' (GPP), teaches basic concepts and skills in disaster planning, and equips clergy and laity to develop a comprehensive disaster plan for their faith-based organization, which can then be incorporated into broader local jurisdictional planning.

Activities with the Episcopal Diocese of Easton led to a partnership with the US-wide Disaster Program of Episcopal Relief & Development, to assist their newly appointed diocesan disaster coordinators in preparing their parishes. In the initial phase of this national program, the JH-PERRC is working with the Episcopal Dioceses of Iowa to deliver and study the intervention.

Figure 2: Select PFA and GPP metrics and results

Variable	Scoring		Pre-Post Change %
	Pre-Training	Post-Training	
PFA Self-Efficacy *(Skills)*	**30**	**98**	**68**
Willingness to Respond *(Attitudes)*	**56**	**72**	**16**
Preparedness Plan Components *(Knowledge)*	**64**	**95**	**31**
All Hazards Planning Concept *(Knowledge)*	**38**	**100**	**63**
Self-Efficacy as a Planner *(Knowledge)*	**42**	**83**	**41**

The JH-PERRC is also partnering with the Maryland Department of Health and Mental Hygiene (DHMH) in this effort. DHMH accepts the JH-PERRC PFA-trained clergy and laity into the state's Medical Professional Volunteer Corps (MPVC). This is of particular importance because the cadre of trained clergy and laity need to be so recognized in order to be optimally used in a formal sense by the State.

The primary model under study involves a three-way partnership, between the faith community, an LHD, and an AHC. The JH-PERRC has now begun to investigate two important variations of the model. In the first, the model will be tested without the active involvement of an AHC, using the materials, tools, and techniques developed by the JH-PERRC for both PFA training and GPP; this will be piloted in Baltimore City (with research evaluation by the JH-PERRC). In the second, the model will be tested with the leadership of the local Emergency Manager, with participation of the LHD; this will be piloted in Talbot County. Both of these variations potentially foster more widespread adoption and local sustainability of the model, because these variations do not rely on the need for either AHC or LHD leadership, which may not be present in a given jurisdiction. In addition, the PFA training is already available in Christian, Jewish, Muslim, and Spanish (Catholic) versions, further promoting widespread translation to practice.

What impact or outcomes were achieved by this research?

To date, the JH-PERRC's "Fostering Coordinated Mental Health Preparedness Planning" program has had the following impacts:

- As a result of this project's work, Maryland has established a new "paraprofessional" category of project-trained lay responders in its MPVC who can assist in delivering mental health services and support during a declared public health emergency.
- The JH-PERRC trained 67 clergy and laity in PFA in rural Maryland, 39 of which have been registered by the State in the new "paraprofessional' category of emergency responders with the Maryland MPVC.

Figure 3: Parish Plan Completion Data

Parish Preparedness Plan Completion			
Parishes Completing	**Completed Plans**	**Substantial Progress**	**Potential Coverage***
12	**6**	**2**	**187,000 people**

**For formally submitted plans, to date, represent three health jurisdictions in Maryland (Talbot, Wicomico, & Worcester Counties)*

- Three health jurisdictions in Maryland developed faith partnership plans, serving the needs of a potential population of 187,000 persons in these health jurisdictions (please refer to Figure 1).
- The Episcopal Diocese of Easton has made particularly strong progress in building disaster preparedness, including regularly featured articles on preparedness activities and trainings in the Diocese of Easton newsletters (increasing visibility and awareness in parishioners), the creation of parish-level preparedness planning teams and an overarching diocesan Disaster Preparedness Planning Committee, and a professionally-developed disaster planning video called "Sanctuaries of Hope" (which can be viewed at http://www.youtube.com/watch?v=X3vvIJ1CnQE).
- The plans of the faith-based organizations in Kent County have been incorporated as key emergency resource and capacity information in the Emergency Operation Plan (EOP) of the Kent County Health Department.

The combination of these outcomes is local jurisdictions with significantly increased capacity to deal with mental and behavioral health "injuries," as well as more broadly increased capacity for shelter, food, clothing, and other survival necessities.

What evidence demonstrates that this research had the described impact?

The JH-PERRC has developed a series of qualitative and quantitative metrics for both interventions in the model under study (PFA training and GPP). These metrics provide evidence that (for example) the clergy and laity who go through PFA training feel better prepared to deliver PFA as a mental health extender (30% before the training vs. 98% after the training), are willing to be registered with the state of Maryland to do so (72% of those who went through the training), understand and recognize the essential components to creating a preparedness plan (64% pre-training vs. 95% post-training), understand the "All Hazards" approach to planning (38% before training vs. 100% after training), recognize improved self-efficacy as a planner(42% pre-training vs. 83% post-training), and 67% of those who participated in the GPP have either completed or made substantial progress towards completion of their plan (please refer to Figures 2 and 3).

What is the existing body of knowledge?

Psychological injuries far outnumber physical injuries in disasters. As a result, the demand for disaster-related mental and behavioral health services, professionals, and facilities is much greater than what can be supplied by local jurisdictions.

What has the research contributed?

A unique set of interventions was created to increase both the capacity and competency of public mental health preparedness planning and response.

How does this apply to public health practice?

Local jurisdictions will have an increased capacity to deal with mental and behavioral health "injuries," as well as more broadly increased capacity for shelter, food, clothing, and other survival necessities.

Preparedness Research Impact Brief

University of California, Berkeley

Cal PREPARE Preparedness and Emergency Response Research Center

Improving Preparedness for the Deaf and Hard of Hearing

What preparedness issue does this research impact brief address?

An estimated 36 million Americans are Deaf or Hard of Hearing (Deaf/HH), a group neglected in national planning for emergency communication. A 2004 landmark report from Deaf and Hard of Hearing Consumer Advocacy Network gave "a failing grade" to U.S. public warning and emergency communications systems for Deaf/HH post-9/11. This study examines national recommendations on preparedness communication for Deaf/HH, assesses incorporation of recommendations into state- and territorial- emergency operations plans (EOPs), and proposes strategies to benefit Deaf/HH populations. We interviewed key informants (KI) from emergency management or public health agencies and collected EOPs to assess emergency preparedness information and capacity for Deaf/HH populations and provide an evidence-base for informing federal and state emergency planning for Deaf/HH populations.

Who collaborated on this research, and what activities were conducted?

We sampled 59 states/territories, completed 50 KI interviews, and obtained 55 basic EOPs. The Office of Public Health Preparedness and Response's (OPHPR) Extramural Research Program Office and Division of State and Local Readiness at the Centers for Disease Control and Prevention (CDC) assisted in procuring EOPs. We conducted KI and EOP analyses with a limited number of EOP annexes. We examined relationships between Deaf/HH demographics, interview items (like training done in a state), or EOP content items (like having a specific plan for

First National Advisory Board Meeting
Emergency Preparedness in Deaf and Hard of Hearing Populations
May 24, 2010

RESEARCH FOCUS

Examine national recommendations on preparedness communication for Deaf or Hard of Hearing populations, assess how recommendations are incorporated into state and territorial emergency operations plans, and propose strategies to benefit Deaf or Hard of Hearing populations.

TARGET AUDIENCES

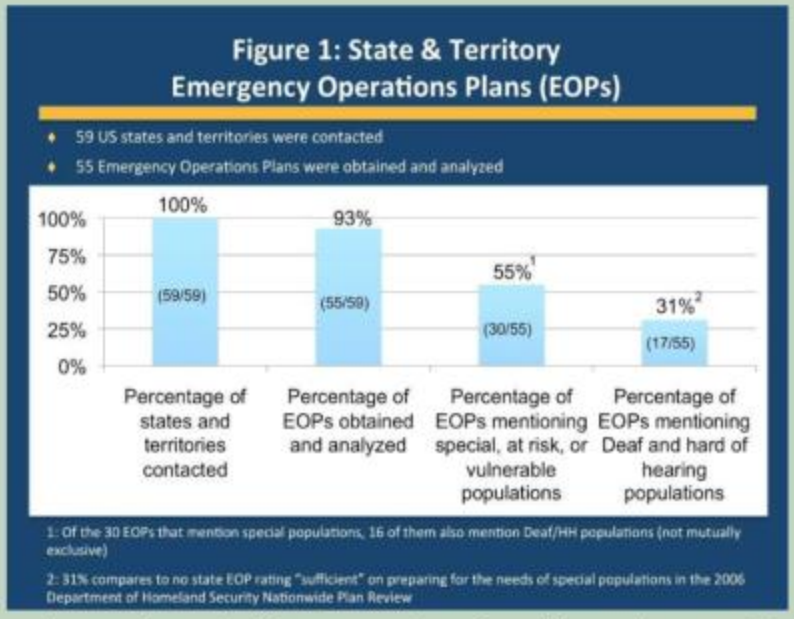
- Deaf or Hard of Hearing populations
- Emergency Management Officials
- Public Health Agencies

PRINCIPAL INVESTIGATOR

Tomas Aragon, MD, DrPH

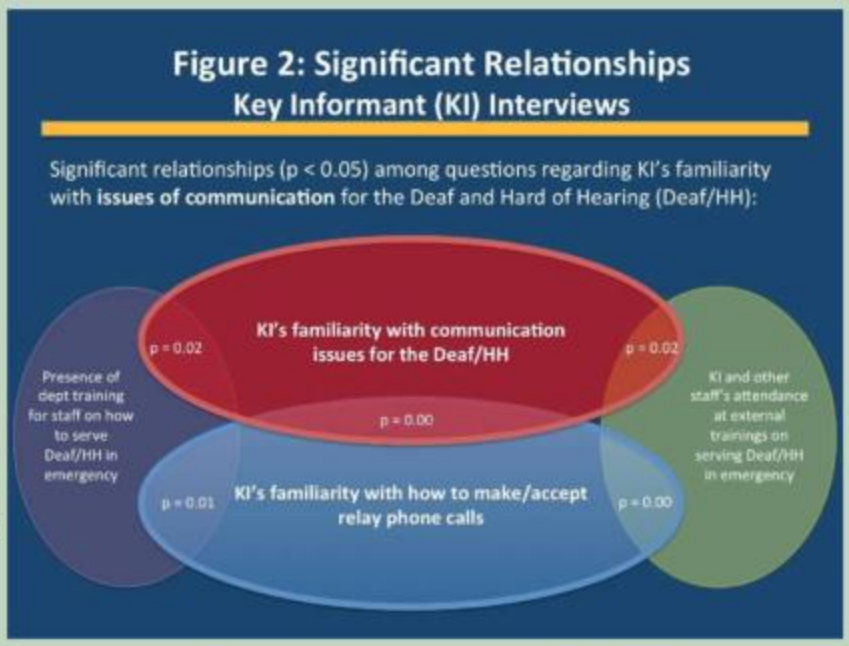
LEAD INVESTIGATORS

Linda Neuhauser, DrPH
Susan L. Ivey, MD, MHSA



Deaf/HH). As an integral part of Community-Based Research Participatory (CBPR), we convened a National Advisory Board (NAB) of leaders from the Deaf/HH community to advise on instruments, protocols, recruitment, report review, and dissemination of findings. Barriers to success in research and partnership activities included recruitment issues and mistrust from state-level employees who worried about comparing unfavorably to other states. The NAB was initially skeptical that issues of preparedness for Deaf/HH could be understood by those from the academic "hearing" community. By involving staff with American Sign Language (ASL) skills, a consultant with expertise in the Deaf community, and a Deaf graduate student, we successfully engaged participants during meetings, paying careful attention to full communication access (FCA). We faced increased challenges in conducting CBPR given the logistical and financial requirements of convening meetings with FCA.

Through the NAB, University of California, Berkeley researchers and staff worked closely with leaders representing Deaf/HH-serving organizations, ensuring research activities were relevant to the Deaf/HH community. We anticipate two groups will benefit: Deaf/HH communities will gain resilience by participating in preparedness activities; the general population will gain from new technologies that assist Deaf/HH communities, which can improve communication during disasters. Internally, we benefitted by gaining knowledge about this unique population and our board gained experience in interfacing with a "hearing



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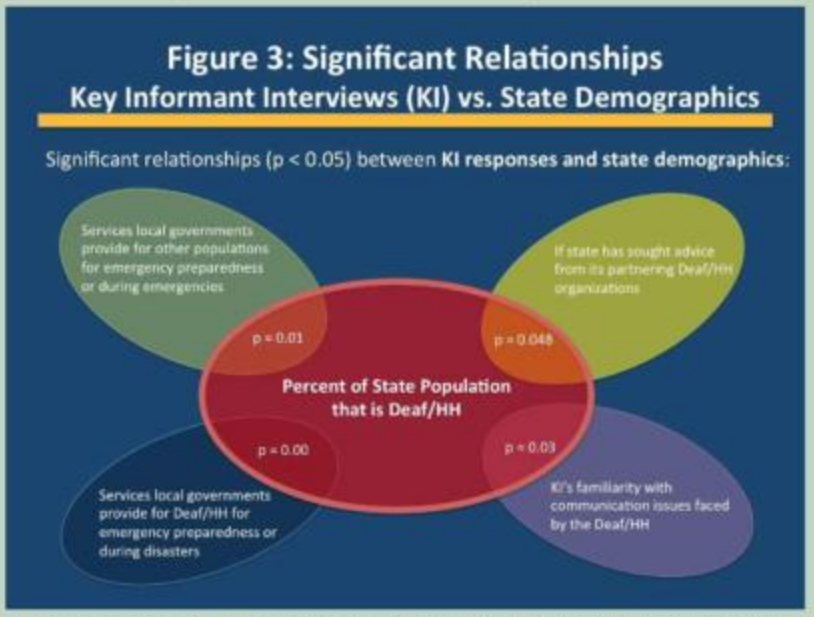
university" and CDC. We also had opportunities to debrief with CDC after NAB meetings about key communication needs for the Deaf.

What impact and outcomes were achieved by this research?

Fifty-five% of EOPs mention vulnerable populations, 31% mention Deaf/HH populations (Fig. 1). A KI's familiarity with communication issues for Deaf/HH was significantly associated with KI's familiarity with making relay calls (p=0) and whether KI's department provides trainings about serving Deaf/HH populations during disasters (p=0.02) (Fig. 2). Looking at KI familiarity with Deaf/HH in relation to state demographics, there's a significant association between a state's percent population that is Deaf/HH and KI's familiarity with communication issues for Deaf/HH (p=0.033) and whether local governments provide any disability services to Deaf/HH in emergencies (p=0.003) (Fig. 3). We increased our reach into the Deaf/HH community, the intended beneficiaries. NAB meetings were very successful. One short-term success was engagement and co-learning between NAB and CDC officials, including Phil Navin (Director, Division of Emergency Operations) and Daniel Sosin (Deputy Director, OPHPR) at the CDC-hosted NAB meeting. Communication access for that meeting brought new levels of understanding about functional and access needs for preparedness. Towards better practices in EOPs, we updated state-level knowledge about EOPs and preparedness capacity pertaining to Deaf/HH. This project highlights the value of participatory research - vital for increasing reach, effectiveness, and community relevance of preparedness and emergency response - building on key capacities in Deaf/HH communities: rapid uptake of new technologies (SMS texting, smartphones, and video communications) that might help low literacy populations. Recommendations will directly link to points of dissemination.



What evidence demonstrates that this research had the described impact?

Our study addresses critical preparedness research gaps for Deaf/HH Americans, yielding unique processes and tools guiding future research. Process measures assessed study progress. We recruited 13 experts in communications for Deaf/HH and convened two successful NAB meetings. NAB evaluations suggest increased visibility of emergency preparedness in Deaf/HH communities. The project will provide evidence-based policy recommendations in the areas of communication/media, training/materials, and policy. Discussion on evaluation of trainings led to

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graduate student evaluating Oakland Police Department trainings. Deaf/HH leaders on NAB had opportunities to present information on communication, training and policy issues directly to CDC staff; as a consequence, leaders reported feeling more confident that their needs would reach a national audience. Two KI instruments were developed and can be used for future research.

What is the existing body of knowledge?

An estimated 36 million Americans are Deaf or Hard of Hearing (Deaf/HH), a group neglected in national planning for emergency communication.

What has the research contributed?

This study examines national recommendations on Deaf/HH preparedness communication, assesses incorporation of recommendations into emergency operations plans, and proposes strategies to benefit Deaf/HH populations.

How does this apply to public health practice?

Emergency operations plans and preparedness capacity pertaining to Deaf/HH populations were updated on the state level based on evidence provided through the study.

Preparedness Research Impact Brief

University of California, Los Angeles

Preparedness and Emergency Response Research Center

Increasing Environmental Health Emergency Preparedness with Community Participation

What preparedness issue does this research impact brief address?

This project was designed to increase the resilience of both the health department and the communities they serve in the face of potential environmental health emergency. The study looked to validate a Community Based Participatory Research (CBPR) Approach as a tool for engaging environmental health professionals with the community to increase the community's resilience to potential disasters. The hypothesis is that CBPR is more effective at increasing the community's preparedness for and ability to respond to and recover from disasters than traditional public health interventions. This effectiveness stems from the strong connections between the local health department, existing community organizations and the public that are built in working together to improve the community. This project is creating these strong connections between the public health department and the community based organizations involved. These organizations have a strong presence and acceptance in the community. Their new relationship with the health department should increase the acceptability of the health department in these communities where they do not currently have relationships.

RESEARCH FOCUS

Improve community resilience to recover from or respond to disasters by strengthening relationships between health departments and community based organizations.

TARGET AUDIENCES

- Public Health Departments
- Community Based Organizations
- Tribal Agencies

PRINCIPAL INVESTIGATOR

Kimberly Shoaf, DrPH

PROJECT INVESTIGATOR

Suzanne Montgomery, PhD, MPH, MS

Who collaborated on this research, and what activities were conducted?

Loma Linda University School of Public Health

This research is a collaboration between the Loma Linda University (LLU) School of Public Health researchers, the Riverside County Department of Public Health (both Environmental Health Services and Preparedness division professionals), and two community based organizations, Center for Community Action and Environmental Justice (CCAEJ) and Poder Popular of the Coachella Valley (PPCV). Furthermore, the San Bernardino County Department of Public Health is also participating in the project as a control site. Their environmental health professionals were trained in Environmental Health Emergency Preparedness and are using their current model of traditional health education to provide emergency preparedness training for their community.

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Within Riverside County, the research team met with the community based organizations and they signed Memorandums of Understanding with LLU and the Health Department. The three entities are active participants in the research and are engaged to improve the capacity of the population to prepare for, respond to and recover from all types of environmental hazards and disasters. The two communities engaged in this research were not communities where the health department had a strong presence. Participation alongside the Community Based Organizations (CBOs) will engage the health department in these at risk communities.

The engagement of the CBOs in the CBPR methodology has given them new opportunities to further engage the community as well. As part of the research team, community health workers and organizers from both CCAEJ and PPCV received two intensive trainings prior to administering the community surveys. The first training consisted of an overview of community- based participatory research and instruction on human subjects research (HSE) and research ethics. Participants were asked to practice CBPR and HSE principles through role play. The second training consisted of training in safety protocol, professional appearance, and how to conduct a successful survey. The training continued with an in depth review of the informed consent form and community survey items.

Community health workers and organizers from the participating community based organizations received necessary training to conduct the survey.

What impact or outcomes were achieved by this research?

The connection between the health department and the community based organizations is one significant outcome of this project that has already been realized. The CBOs were already engaged in environmental justice issues as well as community health issues. They were not however connected to the county public health agency. They also were not engaging the population in emergency preparedness activities as they did not see the connection. Both the CBOs are currently working to include community preparedness curricula as part of their toolkit of services. Similarly, we are seeing connections being made between the local health departments and the tribal entities in Riverside County. Our survey of tribal partners found that very few were aware of training or other opportunities open to them, but 100% were interested in partnering with public health, the University and other partners.

We also found that reaching out to the community as partners in research, encourages them to want to use sound research principles to help solve their community's problems. Both of the CBOs and a number of the Tribal agencies were interested in learning how to conduct research themselves. Due to the extremely high literacy level of existing human subject's protection training courses, this project developed a community oriented IRB training that was well received by the promotoras in the community. This training will be turned into a durable product that is available for other researchers and the health department to use when working with community organizations.

What evidence demonstrates that this research had the described impact?

One of the tribes involved has asked for training to conduct their own survey of their community's needs in regards to prepararedness. More than 80% of the tribal partners surveyed reported wanting to

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Example of an Emergency Preparedness Kit

connect both with the University and the local health department to increase resilience in their tribes. Similarly, we found that the CBOs were engaged in wanting to better engage their constituent community and increase their resilience.

Along with our Riverside County EH partners, we set up a community emergency preparedness booth at the Easter Egg Hunt in Coachella Valley. We presented eight information sessions of five to seven minutes each on what to do in case of a fire or earthquake. These two hazards were previously identified (in key informant interviews and focus groups) to be perceived as the greatest threats to this community. Emphasis was made in how to create a low-cost emergency kit.

The team also enacted two skits on the main stage for all participants to see. A Kids Jeopardy session was held at our booth prior to the end of the event. Prizes and giveaways included mini-hand sanitizers, mini-personal emergency kit, three-day survival backpacks, and a crank radio. Our handouts included information on how to create emergency kits, what to do in case of an earthquake, and environmental health topics. Because the majority of the population in Coachella is Spanish-speaking the sessions were conducted in Spanish, with English translation available if necessary. Approximately 300 community residents visited our booth and took part in our mini-workshops. Approximately 500 people attended the health fair.

As the public health agency engages with the tribes and community based organizations, they will be better able to access these hard to reach populations with messages and material that will help the community themselves increase their resilience to environmental health emergencies. Both Riverside and San Bernardino counties are geographically immense with both dense urban centers and dispersed rural communities. The CBOs increase the reach of the health department and thus are able to increase the resilience of the geographically isolated rural communities as well as the socially isolated urban communities.

What is the existing body of knowledge?

Community Based Participatory Research is more effective at increasing a community's preparedness for and ability to respond to and recover from disasters than traditional public health interventions.

What has the research contributed?

The study looked to validate a Community Based Participatory Research approach as a tool for engaging environmental health professionals with the community to increase the community's resilience to potential disasters.

How does this apply to public health practice?

Community resilience will be improved by strengthening relationships between health departments and community based organizations.

Preparedness Research Impact Brief

University of Minnesota
School of Public Health Preparedness and Emergency Response Research Center

Using Collaborative Virtual Environments for Public Health Planning

What preparedness issue does this research impact brief address?

A challenge in public health preparedness planning, given limited training budgets, personnel resources and time constraints, is to provide all-hazards training that not only addresses core readiness issues but is flexible, adaptive and effective. The use of Collaborative Virtual Environments (CVE), such as Second Life, shows great promise as a low-cost way to address some of these fundamental issues. A CVE provides the closest replication of an actual environment and has the potential to improve disaster response planning, specifically through increased effectiveness of planning, improved collaboration and increased awareness of needs of vulnerable populations. The overall goal of this project is to determine whether the use of CVEs improves performance in public health preparedness and response planning. This is achieved through the delivery of workshops on developing points of dispensing (POD) - using the CVE - to locally designated public health planning teams from across the U.S.

RESEARCH FOCUS

Determine whether the use of Collaborative Virtual Environments improves performance in public health preparedness and response planning.

TARGET AUDIENCES

- Mass Vaccination Clinic Staff and Volunteers
- Hospitals
- Health Departments
- Emergency Management Planners

PRINCIPAL INVESTIGATOR
Debra K. Olson, DNP, MPH, RN

PROJECT INVESTIGATOR
Colleen Monahan, DC, MPH

Who collaborated on this research, and what activities were conducted?

This project's research activities center on the delivery of a six-hour local POD planning workshop. As of May 20, 2011, the study team had delivered 21 workshops across the U.S; forty will be delivered by the end of this study.

Real Fairground Community Center to be Used as POD

Half the workshops train participants to use the CVE tool and the other half train participants to use more traditional planning methods. In summer 2010, a workshop was provided for the Walla Walla (Washington) County Health Department (WWCHD). The Washington State Region 8 Public Health Emergency Preparedness and Response (R8-PHEPR) Coordinator attended the workshop and wanted to

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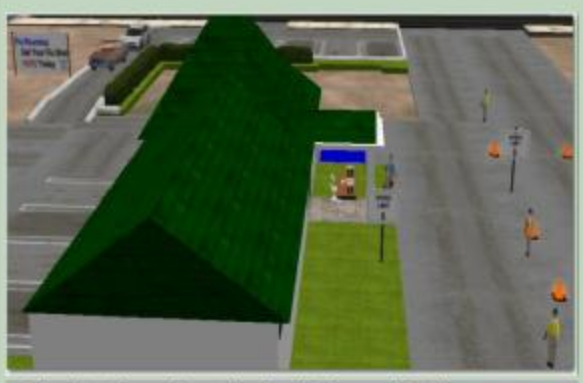
continue using the CVE to create a novel approach to train staff and volunteers to support mass vaccination clinic operations. Using the principles and techniques presented in the workshop, the coordinator and his local staff partnered with the study team to build out virtual basic spaces and objects necessary to conduct a mass vaccination clinic that would take place on the Walla Walla County Fairgrounds. Using floor diagrams and pictures provided by WWCHD, the study team and the coordinator used Second Life (http://secondlife.com) to create the virtual Community Building, used for walk-ins, and a Pavilion, used for a drive-thru operation. Forty training videos using the virtual environment were developed to be both role-specific (e.g., Greeter, Vaccinator) and provide an overview of the entire mass vaccination clinic operations. The videos were seen by 120 first and second year nursing students from Walla Walla Community College, 80 POD volunteers, and 25 organizations represented by 25 staff.

Inside the Simulated POD (i.e., site for large scale distribution of medications, vaccines, and other medical supplies/pharmaceuticals).



Drive-Thru Dispensing at Simulated Fairground Pavilion

What impact or outcomes were achieved by this research?

Previously, R8-PHEPR assisted local health jurisdictions in POD setup, by mapping the setup on paper. This often resulted in re-arranging the environment at the physical site which consumed precious time. In contrast, a virtual POD can be easily created, modified and shared with others locally/remotely to examine potential bottlenecks and identify any security and accessibility concerns, etc. This ultimately results in improved and more efficient preparedness planning.

The reach of this activity broadened from what started at the county level to a regional activity. In addition to WWCHD and R8-PHEPR participation, there were numerous other participants, including two hospitals, emergency management, community clinics, colleges/universities and high schools, Fire Department, EMS, private clinicians, and retirees.

The long term impact of this research is to improve public health practice. A CVE, being Internet-based, allows local jurisdictions to share virtual planning models and more easily plan as a region. Therefore the use of a CVE has the potential to improve the availability of training, while dramatically reducing cost related to travel, face-to-face meetings, etc. Individual virtual models can be used as templates for other planners to modify according to their own local needs thus reducing planning time and improving the efficiency of planning.

What evidence demonstrates that this research had the described impact?

Simulated Fairground Community Center in the CVE

This planning activity was measured by the extent of the developed products, the success of their public flu vaccination clinic and the feedback from their users. The R8-PHEPR Coordinator shared: "A retiree participated in the flu clinic for the last three years, always as Greeter. She never saw or operated past her position. When she had a chance to see the orientation video of the virtual POD she saw how big the flu clinic is, how many people are needed to make the flu clinic work and why so many people were needed, and most importantly, she saw how significant her place is in the flu clinic." Ultimately, use of the CVE "solidified pre-existing relationships and allowed us to engage new partners." Future uses of the CVE include "augmenting tabletop presentations, planning virtual incidents and developing training to educate the community at large."

What is the existing body of knowledge?

A challenge in public health preparedness planning is to provide all-hazards training that not only addresses core readiness issues but is flexible, adaptive and effective.

What has the research contributed?

This project investigates whether the use of collaborative virtual environments will improve performance in public health preparedness and response planning.

How does this apply to public health practice?

Local jurisdictions can share virtual planning models and more easily plan as a region, potentially improving the availability of training, reducing costs, and increasing the efficiency of planning.

Preparedness Research Impact Brief

University of North Carolina, Chapel Hill

Gillings School of Global Public Health Preparedness and Emergency Response Research Center

Strengthening Local Public Health Preparedness through Accreditation

What preparedness issue does this research impact brief address?

The ability to carry out core public health and emergency preparedness activities varies widely across local communities. The development of accreditation standards for public health agencies has received considerable policy attention because of its potential to promote quality, consistency and interoperability among agencies and thereby reduce inequities in risk protection. While a national accreditation program is still under development, state-based programs exist in North Carolina and several other states. To date, 55 of the 85 North Carolina local health departments are accredited. The remaining local health departments must undergo accreditation by 2014.

Specific preparedness benchmarks in the North Carolina accreditation program are:

- The local health department shall be able to respond to a public health emergency on a 24-hour-a-day, seven-day-a-week basis;
- The local health department shall maintain and implement epidemiological case investigation protocols providing for rapid detection and containment of communicable disease outbreaks; environmental health hazards; potential biological, chemical and radiological threats;
- The local health department shall engage in surveillance activities and assess, investigate and analyze health problems; threats and hazards; maintaining and using epidemiological expertise.

The 2009 outbreak of novel H1N1 influenza in North Carolina provided an opportunity to observe local variation in response activities and investigate determinants and drivers. This study examined two overarching questions:

RESEARCH FOCUS

Observe local variation in H1N1 response activities among accredited and non-accredited local health departments and investigate determinants and drivers.

Overarching Questions:

1) How did the scope and timing of responses to H1N1 vary across local public health agencies in North Carolina?
2) How did accredited public health agencies compare to their non-accredited counterparts in responding to the outbreak?

TARGET AUDIENCES

- State Health Department and Accreditation Program Officials
- National Public Health Accreditation Board officials
- Public Health and Policy Stakeholders

PRINCIPAL INVESTIGATOR

Edward L. Baker, MD, MPH

PROJECT INVESTIGATORS

Glen Mays, PhD
Mary Davis, DrPH

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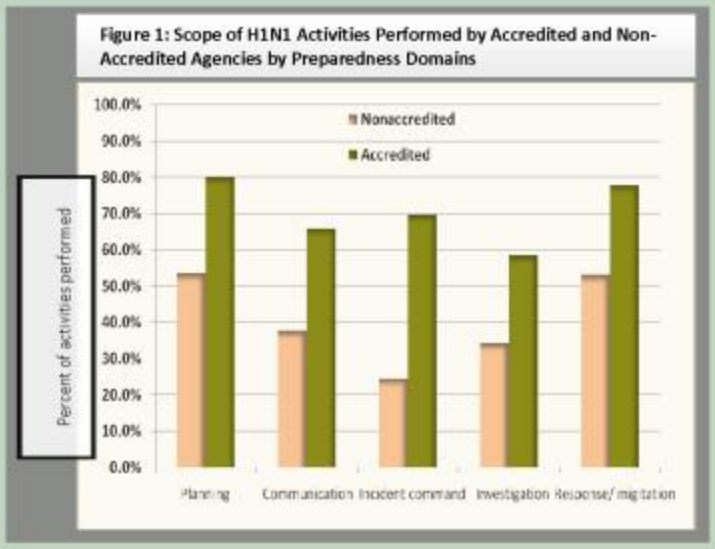
1. How did the scope and timing of responses to H1N1 vary across local public health agencies in North Carolina?
2. How did accredited public health agencies compare to their non-accredited counterparts in responding to the outbreak?

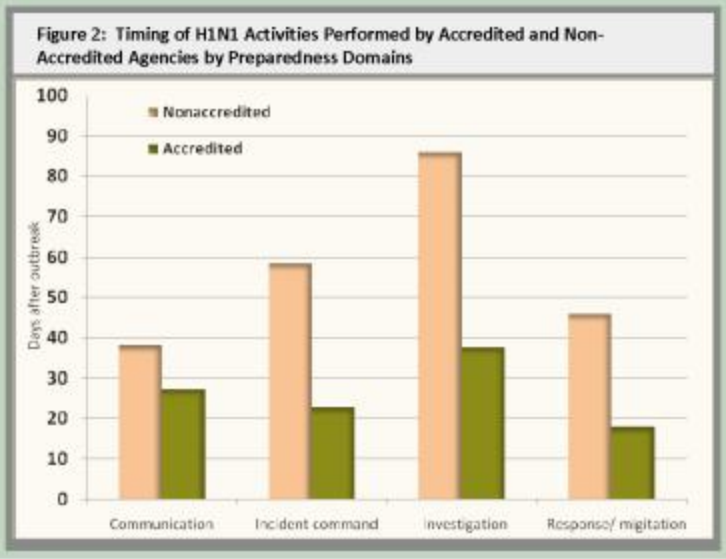


Who collaborated on this research, and what activities were conducted?

University of North Carolina Gillings School of Global Public Health (UNC) researchers have a long history of working with the state and local health departments to conduct relevant research initiatives. This specific project grew out of a request from the North Carolina Division of Public Health to use any available opportunities to conduct research on the "unfolding natural experiment" of H1N1 outbreak response by local health departments.

Using a matched case-comparison study design, we invited five North Carolina accredited local health departments (with at least two confirmed cases of H1N1 in the county as of July 31, 2009) to participate in this study. Each accredited agency was matched, using county population size and H1N1 case volume as matching variables, with a North Carolina agency that had not yet been accredited through the state program. Among the 10 invited local health departments, five accredited and four not-accredited local health departments were able to participate in the research.

The research team from UNC and the University of Arkansas for Medical Sciences collected data on H1N1 response activities implemented during the initial two months of the outbreak through: 1) a closed-form questionnaire administered to local preparedness coordinators; and 2) on-site focus groups held with H1N1 organizations involved in activities in each community. More than 75 individuals representing 55 organizations participated in the on-site focus groups in the nine local health departments. All data were collected during August and September 2009, prior to the initiation of H1N1 vaccination activities.



Factor analysis was used to group more than 200 individual response

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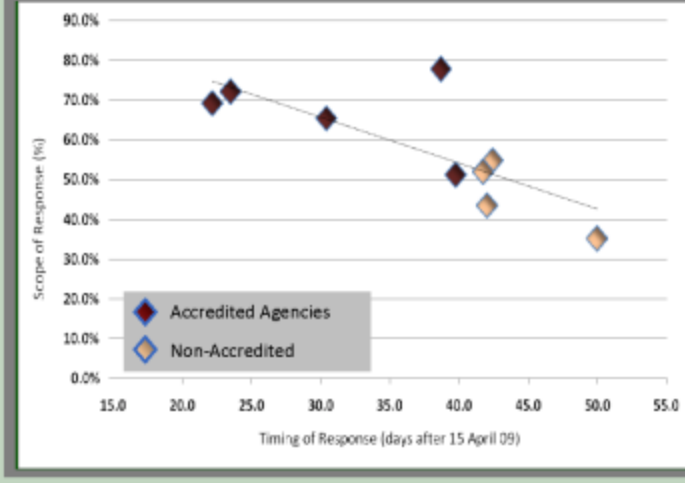
activity measures into six composite domains of activity, with separate measures constructed for (1) the scope and (2) the timing of response activities performed in each domain. Bayesian latent variable analysis methods were used to compare the response activities of accredited and not-accredited agencies.

We used results to construct an after action report (AAR) for each participating agency that highlighted opportunities for improved response. Other key audiences for the project included state health department and accreditation program officials, national accreditation officials with the Public Health Accreditation Board (PHAB) and a variety of public health and policy stakeholders who are contemplating the merits of accreditation. We prepared a Research Brief summarizing the nine local health departments' preparedness activities that were performed well and activities that could use improvements in future responses. This Research Brief is on the NCPERRC Web site: http://cphp.sph.unc.edu/ncperrc/research/H1N1_AAR_Brief_June2010.pdf.

What impact or outcomes were achieved by this research?

Our results demonstrated that local public health agencies varied widely in the scope and timing of their H1N1 activities. Accredited agencies performed a significantly larger scope of activities in response to the H1N1 outbreak compared to non-accredited agencies ($p<0.05$), and these differences were apparent across all domains including planning, incident command, investigation, communication, and response and mitigation activities (Figure 1). Additionally, accredited agencies appeared to implement these activities more rapidly, particularly for incident command and investigation activities ($p<0.05$) (Figure 2). Although some of the differences in H1N1 response were attributable to agency and community characteristics that predisposed agencies to participate in accreditation, most differences remained large and significant after adjusting for these selection effects.

Figure 3: Scope and Timing of H1N1 Response Activities: by Agency Accreditation Status



Overall, the findings suggest that accreditation can make valuable contributions to preparedness development efforts both by documenting the enhanced preparedness capacities held among agencies that choose to pursue accreditation (selection), and by motivating agencies to enhance their preparedness capacities in order to achieve accreditation standards (improvement) (Figure 3). Consequently, the nation's local capabilities for preparing for and responding to public health emergencies may improve significantly as larger numbers of public health agencies attain the standards required for national voluntary accreditation.

What evidence demonstrates that this research had the described impact?

The project rapidly provided participating local health agencies with customized AARs during the fall of 2009, thereby helping agencies to identify and implement improvements while H1N1 response activities were still underway. On a broader policy level, the project has provided state and national public health officials with some of the earliest and most tangible evidence concerning the value of public health agency accreditation. In North Carolina, this evidence was cited by Dr. Edward Baker (NCPERRC PI) to help justify the need for state legislative appropriations to support accreditation activities within the state. At the national level, the PHAB, the Centers for Disease Control and Prevention, and others have used the evidence in public communications and press releases to describe the types of benefits that public health agencies may experience by pursuing accreditation.[1] Additionally, the PHAB has convened a special work group to examine improved ways of incorporating preparedness capabilities into accreditation standards based on the work of this project. These research dissemination and translation activities have helped to increase awareness of the potential benefits of accreditation, and may accelerate the adoption of accreditation standards among public health agencies once the national voluntary accreditation program is operational later in 2011.

[1]CDC Press Release. New Accreditation Opportunity for State, Local, Tribal Health Departments. Released March 24, 2011. http://www.cdc.gov/media/releases/2011/p0324_publichealthdeptaccreditation.html.

What is the existing body of knowledge?

Standards of accreditation for core public health and emergency preparedness activities have the potential to promote quality, consistency and interoperability among agencies and reduce inequities in risk protection.

What has the research contributed?

Accreditation can make valuable contributions to preparedness development efforts, consequently increasing local capabilities for preparing for and responding to public health emergencies.

How does this apply to public health practice?

Policymakers on the local and national levels now have evidence of the value of accreditation and can incorporate preparedness capabilities into accreditation standards.

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Preparedness Research Impact Brief

University of Pittsburgh

Graduate School of Public Health Preparedness and Emergency Response Research Center

Evaluating Emergency Responses Using an Adaptive Response Metric

What preparedness issue does this research impact brief address?

Emergencies and disasters require local health departments (LHDs) to redirect resources to the immediate threat while also maintaining day-to-day functions. Before, no standardized all-hazards method existed to quantitatively measure or evaluate this resource consumption. The Public Health Adaptive Systems Studies (PHASYS) "Adaptive Response Metrics Method" (ARMM) measures changes in resource consumption over the course of a response as a LHD adapts from normal, to disaster, and eventually back to normal levels. For example, when interviewed about response to a season of wildfires, an LHD's staff subjectively reported maximum effort for an entire summer; but, as measured by ARMM using daily time logs, the wildfire response actually occurred in three distinct peaks separated by days or weeks. Health officials might have used ARMM to deploy personnel more effectively during the emergency— such as by staff rotations or engaging surge personnel. With continued application, analysis, and testing, the ARMM will apply to any response agency and to disasters of any scale.

RESEARCH FOCUS

Use an Adaptive Response Metrics Method to measure changes in a local health department's resource consumption over the course of a response.

TARGET AUDIENCES

- Local Policy Makers
- Health Departments

PRINCIPAL INVESTIGATOR
Margaret A. Potter, JD

LEAD INVESTIGATOR
Samuel Stebbins, MD, MPH

Who collaborated on this research, and what activities were conducted?

PHASYS researchers needed access to LHDs in California for site visits to collect data for ARMM. Among the collaborators facilitating this access were:

- Health Officers Association of California (HOAC), which helped to identify LHD sites and provided all logistical support;
- California Advisory Committee comprised of public health and emergency response leaders from local jurisdictions and several divisions of the California Department of Public Health;

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Normal duties response cross-subsidized: Added to function in addition to existing duties	Normal duties altered for key staff: Overtime or some duties postponed	Normal duties altered or suspended: Workforce expanded; extra staff & volunteers enrolled	Staff impressed from or assigned to external response efforts	All normal functions cease: All staff dedicated to response

Description and color coding of the stages of resource consumption during a disaster or emergency, as used in the Adaptive Response Metric Method.

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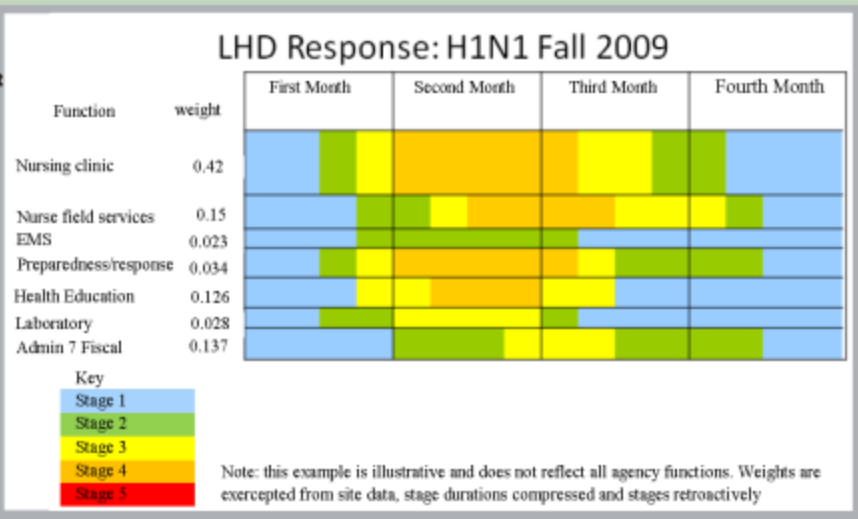
- California Conference of Local Health Officers (CCLHO);
- Working Group of LHDs that provided feedback regarding usability, accuracy, reliability, and completeness.

Because site visits would consume staff time, PHASYS had difficulty at the outset in finding LHDs to participate. But early participants found both the process and the results of the ARMM to be useful and let their reactions be known to colleagues. As a result, additional LHDs came forward with 11 have participated to date. In a media interview, the Butte County Public Health Department Director said "We are very, very pleased that we were selected" for a site visit. Another need was to elicit feedback from LHDs, which was addressed by sharing draft ARMM reports on use in actual crises including measles and rabies outbreaks. Their feedback concerned the manner in which site visit data were interpreted and presented, thus enabling PHASYS to refine and develop the ARMM. Preliminary results have received attention and feedback at multiple forums, including at the Centers for Disease Control and Prevention (CDC), the annual National Association of County and City Health Officials (NACCHO) Preparedness Conference, the CCLHO, and other state associations of local health officials/officers.

An example application of the Adaptive Response Metric output depicting relative contribution of each function of one local health department during the H1N1 pandemic in the fall of 2009.



This figure demonstrates visually what may be obscure in after-action reports. For example, the EMS function was "minimally" affected—never exceeding Stage 2 resource consumption—which may reflect the nature of the emergency, or the function's more streamlined organizational practices for dealing with emergencies, or that the function could be called upon to provide more assistance in future disasters. Weight" refers to the fraction of the total LHD budget that supports this function.

What impact or outcomes were achieved by this research?

The development and pilot-testing of ARMM has had two actual impacts and another potential impact:

1. ARMM led health officials and local policy makers to consider system improvements with specificity for future response activities by measuring the same resource outputs across all hazards. LHDs serving as pilot sites used the draft ARMM to help analyze responses to H1N1, a local measles outbreak, extensive wildfires, and a natural gas explosion and fire.

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2. ARMM enhances after-action reporting by providing a standard measurement of resource consumption across agency functions (*i.e.*, divisions or departments), distinguishing those actually involved in an emergency response from those maintaining routine operations. In three pilot sites, health officials used ARMM reports as the basis for improving response operations: they decided to activate their continuity-of-operations plans for critical routine functions to assure maintenance throughout any emergency.
3. ARMM offers the potential for supplementing after-action reporting methods—which may be lengthy, inconsistent, and needing subjective interpretation—with standardized, validated, quantitative methods that apply across agencies, disaster types, and levels of severity. This generalizability greatly increases for decision-makers and policy makers the availability of reliable and valid information about improving preparedness and emergency response.

What evidence demonstrates that this research had the described impact?

The above-stated impacts are based on evidence recorded during meetings, conferences, and site visits.

- PHASYS researchers met with the CCLHO on June 2-3, 2010; December 1, 2010; and April 7, 2011.
- PHASYS conducted site visits to LHDs in September 2009 in Imperial County; February 2010 in Sacramento and Humboldt counties; April 2010 in San Diego County; February 2011 in Butte and Colusa counties; March 2011 in Berkeley, Alameda, San Mateo, and Santa Clara counties; and April 2011 in San Diego and Santa Barbara counties.
- PHASYS meets with HOAC by teleconference on a weekly basis. These are ample opportunities for feedback concerning impacts. For example, at the 2010 CCLHO meeting, health officers confirmed that ARMM had captured an essential characteristic of the H1N1 pandemic response, which had been especially burdensome because it did not entirely displace day-to-day responsibilities even though it required the diversion of resources from them.

What is the existing body of knowledge?

Emergencies and disasters require local health departments to redirect resources while maintaining day-to-day functions. A standardized all-hazards method is needed to quantitatively measure or evaluate this resource consumption.

What has the research contributed?

Adaptive Response Metrics Method was developed to measure changes in resource consumption over the course of a response as a local health department adapts from normal, to disaster, and eventually back to normal levels.

How does this apply to public health practice?

System improvements for response activities, enhanced after-action reporting, and standardized reporting methods, as a result of the Adaptive Response Metrics Method, provides reliable information to decision and

Preparedness Research Impact Brief

University of Washington

Northwest Preparedness and Emergency Response Research Center

Improving Emergency Communication with Non-Native English Speakers

What preparedness issue does this research impact brief address?

Imagine calling 9-1-1 and trying to explain your emergency to an operator who speaks a different language. Every day, over 20 million people across the country who speak limited English [US Census, 2000] face this situation, putting them at higher risk for negative health outcomes. In order to improve emergency communication with limited English proficiency people (LEP), Northwest Preparedness & Emergency Response Research Center (NWPERRC) researchers are studying what specific barriers native Chinese, Vietnamese, and Spanish speakers face and how to overcome those barriers. Public health departments will learn from this research how to design systems for more effective communication with LEP populations. Improving public health emergency communication will help save the lives of individuals and also build resilience within LEP communities.

RESEARCH FOCUS

Investigate barriers to emergency communication between public health departments and communities with limited English proficiency, in this case, native Chinese, Vietnamese, and Spanish speakers.

TARGET AUDIENCES

- Limited English Proficiency Communities
- Public Health Departments

PRINCIPAL INVESTIGATORS

Mark Oberle, MD, MPH
Susan Allan, MD, JD, MPH

PROJECT INVESTIGATOR

Hendrika Meischke, PhD

Who collaborated on this research, and what activities were conducted?

In reaching the populations of interest, devising research instruments (e.g., survey questions), and addressing critical practice issues, researchers are working in close partnership with: the Chinese Information and Service Center, Public Health – Seattle & King County's Emergency Medical Services, the Vulnerable Populations Action Team, Public Information Call Centers (PICC), the Washington State Department of Health, and the 2-1-1 Hotline. Research activities include:

- two in-person, just-in-time surveys of Chinese (N=100, response rate =93%) and Vietnamese (N= 181, response rate=80%) LEP persons about access to H1N1 flu vaccine and trusted sources of vaccine information
- analysis of Computer Assisted Dispatch reports to determine time intervals for dispatching care in LEP and non-LEP call situations

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- using a public information call center (PICC) functional exercise to evaluate service to Spanish and Chinese LEP callers, in terms of operator behaviors, language line use, and technical difficulties
- four focus groups with Cantonese and Mandarin-speaking people on the use of phone-based emergency communication and response systems, with questions that explored facilitators/barriers to 9-1-1 use, and trusted resources during times of emergency
- a telephone survey about perceived barriers and benefits of phone-based emergency response communication systems, conducted with 250 Chinese LEP persons and 50 English speakers of Chinese ethnicity
- 40 "customer satisfaction" follow-up interviews with Spanish, Mandarin and Cantonese speakers to 9-1-1 (currently selecting sample)
- analysis of 9-1-1 dispatcher communication and use of language line, from audio recordings, to determine if LEP status is related to emergency response time delays, and what aspects of communication reduce or increase these delays

These research activities are designed to:

1. Assess individual characteristics, cultural beliefs, and communication preferences of LEP communities
2. Assess dispatcher and LEP caller behaviors to assess impact on communication and care delivery outcomes
3. Develop a protocol guide to structure effective phone-based emergency communication with LEP callers
4. Develop outreach efforts to educate LEP communities on effective communication with phone-based emergency response systems
5. Develop recommendations for health departments on strategies to reach LEP communities with vaccination information

RESULTS

On average, the time to Basic Life Support (BLS) dispatch was 34% longer for LEP callers. (N = 385)

On average, the time to Advanced Life Support (ALS) dispatch was 57% longer for LEP callers. (N = 118)

- **Median time to ALS dispatch was 207 seconds for LEP callers and 105 seconds for callers with no language barrier.**
- **Average time to ALS dispatch was 358 seconds for LEP callers and 250 seconds for callers with no language barrier.**

Table 1: Delays by medical complaint

Dispatch Code	N matched pairs	Effect of language (Relative)	Confidence Interval	p-value
1 Abdominal/Back Pain	**38**	**1.48**	**(1.08, 2.02)**	**< 0.05**
7 Chest Pain/Heart	**33**	**1.60**	**(1.08, 2.36)**	**< 0.05**
17 Sick Unknown/Other	**45**	**1.30**	**(0.91, 1.86)**	**0.08**
19 Unconscious/Syncope	**21**	**0.95**	**(0.55, 1.63)**	**0.83**
20 Pediatrics	**18**	**2.77**	**(1.66, 4.62)**	**< 0.05**
24 Falls/Accidents/Pain	**47**	**1.28**	**(1.06, 1.54)**	**< 0.05**

What impact or outcomes were achieved by this research?

- Researchers developed a protocol to include LEP simulators in PICC functional exercises. Inclusion of Spanish and Chinese-speaking callers in the activation of PICCs tested the system's capacity to

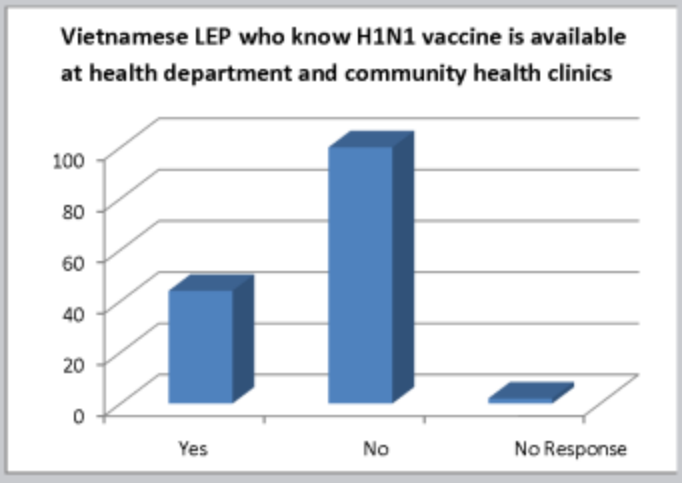
LEP communities effectively. Based on their PICC center research, researchers offered recommendations to PHSKC regarding PICC operator training, criteria for use of interpreters with LEP callers, and Language Line connectivity issues. As a result, PHSKC modified operator training to stress aspects of speech (e.g., succinctness, use of pauses) and appropriate use of language line; and worked to resolve technical issues that were causing Language Line calls to be dropped. (Calhun R, Young D. Meischke H, Allan S. Practice, More Practice, Best Practice. Improving Our Service to Limited-English Callers. Washington State Journal of Public Health Practice, 2009, 2(1):34-37).

- Results from the two H1N1 surveys shed light on Chinese and Vietnamese LEP beliefs, behaviors, and intentions to get H1N1 and seasonal flu vaccine. The findings identify best communication channels for improving vaccine information and access within these communities, such as effective places for public health to advertise and provide vaccines.

- In focus groups, Chinese LEP reported that they would call 9-1-1 only for very serious emergencies – a finding that was later corroborated when a 9-1-1 database search failed to identify any Chinese LEP who had called 9-1-1 for non-life-threatening emergencies. Past experience with 9-1-1 and understanding of the system also appear to influence whether or not Chinese LEP call 9-1-1 in times of emergency.

- Initial results of CAD report analysis show that the average time to Basic Life Support dispatch was 34% higher for language barrier callers than for non-language barrier callers, while average time to Advanced Life Support dispatch was 57% higher for language barrier callers. LEP pediatric related calls had the longest response delays. These results will be clarified and finalized by October 2011.

- When completed, findings from the customer satisfaction survey and the 9-1-1 audio recordings will form the basis for recommendations to PHSKC on communication training and protocols for 9-1-1 operators. PHSKC is awaiting these results before making changes in how 9-1-1 LEP calls are handled. These and other findings will also inform strategies for educating LEP communities about emergency preparedness and response. A pilot study based in part on this research is testing the effectiveness of a media campaign on Chinese LEP awareness of the 9-1-1 system.



I

What evidence demonstrates that this research had the described impact?

These research activities have increased awareness at PHSKC about emergency communication with LEP populations. As a result, the health department has added a "Language Barrier" field to one of its EMS databases, which will allow more accurate assessment of how the emergency response system is working (or not) for situations where there is a language barrier.

This research has also prompted the PHSKC EMS Division to allocate resources and begin GIS work to locate language isolated neighborhoods within fire districts and determine if EMS services work as well in these neighborhoods as in non-LEP areas.

PHSKC has delayed policy changes in order to base them on evidence from this research. Policy changes regarding dispatcher training and communication protocols with LEP callers will be field tested and evaluated at two 9-1-1 call centers in King County, Washington.

The PHSKC Vulnerable Population Action team is using these research findings in adapting its emergency preparedness community outreach and education efforts for LEP communities. With its reputation for excellence and innovation, PHSKC has been a model for other public health departments, making it likely that the impact of this research will ripple across the country.

"The public safety community, 9-1-1 in particular, wants to provide the best level of service to all citizens. NWPERRC research on best ways to communicate with LEP populations is being used to develop training and improve the transfer of information between 9-1-1, citizens needing an emergency response, and the responders providing care. The research also builds a much needed bridge between LEP communities and police, fire and EMS responders. The results of this much needed research and the training developed will be made available nationally to 9-1-1 public safety answering points, in the form of documentation as well as presentations." -- PHSKC Emergency Medical Dispatch Program Administrator

"Public Health - Seattle & King County has prioritized outreach and education to refugee and immigrant residents living in our community. NWPERRC research findings regarding H1N1 in the Vietnamese community are helpful in supporting our efforts to effectively reach this community with critical health information. The study's findings, related to where Vietnamese residents prefer to get emergency health information and vaccine, are particularly likely to influence programmatic decisions at the local level." – Program Manager, PHSKC Vulnerable Populations Action Team

What is the existing body of knowledge?

Limited English proficiency populations are at higher risk for negative health outcomes in emergency situations.

What has the research contributed?

Researchers are working to improve effective emergency communication with limited English proficiency populations by investigating barriers experienced by these populations and how to overcome those barriers.

How does this apply to public health practice?

Public health departments have an increased awareness about emergency communication with limited English proficiency populations and are taking steps to more accurately assess and improve how emergency

Appendix J. PERRC Publications Analysis Report

Selected Research Products Developed by the Preparedness and Emergency Response Research Centers (PERRC) for the Grant Period 2008-2011

SUMMARY

July 19, 2011

Prepared for:

An ad hoc Board of Scientific Counselors (BSC) Workgroup

By

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Atlanta, GA

Purpose

For the past 2.5 years, Preparedness and Emergency Response Research Center (PERRC) grantees have been conducting research on public health preparedness systems and working

collaboratively with practice partners to develop relevant emergency preparedness and response practice and policy tools. Overall, the PERRCs have produced a plethora of such tools and engaged in a variety of activities that directly impact public health emergency preparedness and response capabilities at the federal, state, local, or tribal public health levels. These practice and policy tools have been disseminated to various target audiences, including but not limited to federal, state, and local level government, community-based organizations, and businesses, as well as to specific at-risk populations.

The information provided in this document is intended to inform an external peer review of the PERRCs that will be conducted by an ad hoc OPHPR Board of Scientific Counselors workgroup. Specifically, this summary includes: (1) an analysis of the number and types of practice and policy tools developed by the PERRCs to date that have been or can be transferred to strengthen practice in the public health preparedness and response system; and (2) a description of 38 practice and policy tools the PERRCs shared with CDC as evidence to address Review Question 3: *What is the evidence that PERRC research has yielded results and findings that have had a direct impact or have the potential to impact public health practice and preparedness?*

Methods

PERRC grantees were asked in the PERRC survey to report on the number of PERRC practice and policy tools disseminated from their research over the past 2.5 years. The grantees were then asked to provide examples of tools or other research outputs. Practice and policy tools (tools) provided by the PERRCs are printed in a separate binder that will be available to the ad hoc BSC workgroup members to review at the meeting in Atlanta, GA, on August 9-12, 2011.

In addition, highlights of 38 of the 230 practice and policy tools produced by the PERRCs during the grant period 2008-2011 were summarized in order to provide an overview of the depth and breadth of the tools (Appendix A).

This document provides only a high-level summary of the types of tools developed and is not intended to be all inclusive. Only completed or drafted products are included in this discussion, products that the PERRCs are planning to develop in the last two years of the FOA are excluded from this summary report. Moreover, the California PERRCs reported results from only 1.5 years, whereas the rest of the PERRCs reported results from 2.5 years. Given this, caution should be taken when making comparisons among the PERRCs.

Results

The number and type of evidence-based practice and policy tool varied by product type and by PERRC. A total of 230 practice and policy tools were reported in response to a survey on progress in the PERRCs. Of the 17 types of practice and policy tools reported to the Centers for Disease Control and Prevention (CDC), 53% (n=121) were “How to Videos,” research briefs,

surveys, and policy guidelines (Table 1). The majority of products were “How to” videos (n=41) produced by the Minnesota PERRC (n=40). This was followed by research briefs (n=29; Johns Hopkins n=20); surveys (n=28; Harvard n=10; North Carolina n=7; UC Berkeley n=5); policy guidelines (n=23, North Carolina n=18), simulations (n=20; North Carolina n=11; Minnesota n=8) and practice guidelines (n=20; UC Berkeley n=17), research techniques (n=18; Harvard n=6; Minnesota n=4; UC Berkeley n=3), practice toolkits (n=14; Harvard n=4; Minnesota n=4) and training materials (n=14; Harvard n=5; Minnesota n=5), intentions and prototypes (n=11; Washington n=4; Johns Hopkins, Minnesota, and North Carolina n=2 each), and fact sheets, checklists, and other practice and policy tools (n=4 each).

The majority of products came from the Minnesota PERRC (31.3%) followed by the North Carolina PERRC (20.9%), the Johns Hopkins PERRC (14.3%), the UC Berkeley PERRC (13.5%), the Harvard PERRC (11.7%), and the Washington PERRC (6.5%). The Emory, Pittsburgh, and UCLA PERRCs produced less than 1% of the practice and policy tools. Thirty-eight of these practice and policy tools were shared with CDC as examples and will be available during the review meeting.

Conclusions

The products developed by the PERRCs demonstrate the progress made during the past two to three years to collectively support the mission to strengthen the federal, state, local, tribal, and territorial emergency preparedness and response structure, capabilities, and performance. Quality and measurement of actual uptake, usage, and adaptability to specific public health departments needs to be measured to assess the value added of those products developed to date.

Table 1. Summary of types of practice or policy tools developed by PERRCs, 2008-2011 (n=230). The “other” tools listed below include: Conference presentations, frequently asked questions, Frequently Asked Questions (FAQ) document, legal memos, and customized benchmarking reports.

Practice or Policy Tool	Emory	Harvard	Johns Hopkins	Minnesota	North Carolina	Pittsburgh	UC Berkeley	UCLA	Washington	Total	%
How to Video	0	0	0	40	0	0	0	0	1	41	17.8
Research Briefs	0	0	20	1	5	0	2	0	1	29	12.6
Surveys	0	10	2	2	7	0	5	0	2	28	12.2
Policy Guidelines	1	1	1	0	18	0	0	0	2	23	10.0
Simulations	0	0	0	8	11	1	0	0	0	20	8.7
Practice Guidelines	0	0	1	1	0	0	17	0	1	20	8.7
Research Techniques	0	6	1	4	2	0	3	1	1	18	7.8
Practice Toolkits	0	4	2	4	1	0	1	0	2	14	6.1
Training Materials	0	5	1	5	1	0	1	1	0	14	6.1
Interventions/Prototypes	0	0	2	2	2	0	1	0	4	11	4.8
Fact Sheet	0	0	0	2	0	0	1	0	1	4	1.7
Checklist	0	1	0	3	0	0	0	0	0	4	1.7
Other practice and policy tools	0	0	3	0	1	0	0	0	0	4	1.7
Total	1	27	33	72	48	1	31	2	15	230	
Column percent	0.4	11.7	14.3	31.3	20.9	0.4	13.5	0.9	6.5		100.0*

*Does not equal 100.0% due to rounding.

Appendix 1. Highlights from 38 of the 230 practice and policy documents and tools produced by the PERRCs, 2008-2011.

Research Instruments or Methods

- **Public Health Infrastructure Training (PHIT):** This agency-wide curriculum was developed by the Johns Hopkins PERRC for health department employees. The PHIT curriculum is designed to get health department employees to think actively about their respective roles within their public health agency in the context of all-hazards emergency response. The curriculum includes a combination of face-to-face and independent learning activities, and is divided into three major parts in the following sequence: 1) a facilitated discussion session focusing on the employee's roles in a variety of public health emergencies; 2) a series of independent learning activities highly relevant to the employee's roles in all-hazards public health response; and 3) a group learning activity involving a tabletop (discussion-based) exercise and related risk communication role-playing exercise.

- **MDPH AAR Interview Guide:** Designed by the Harvard School of Public Health PERRC, this interview guide is designed to gather information regarding the public health system response to the fall 2009 H1N1 outbreak in Massachusetts. This guide was used to educate health professionals about the strengths and areas of improvement for state public health emergency response systems in the Commonwealth of Massachusetts. Other interview guides were developed by Harvard School of Public Health as part of **Linking Assessment and Measurement to Performance in PHEP Systems (LAMPS),** to assess the feasibility and practicality of exercise evaluation forms gathering information from the exercise external evaluators.

- **Research Briefs. Utilizing Systems Engineering Models to Enhance Collaboration and Vaccination Clinic Efficiency:** Developed by the NC PERRC, this research brief describes the partnership between the Southern Piedmont Partnership for Public Health (SPPPH) and the NC PERRC and explores the utility of regional research-practice collaboration and integration of systems engineering concepts and clinic planning tools into local public health mass vaccination clinic planning.

- **Research Brief. Increasing Environmental Health Emergency Preparedness with Community Participation:** This research is a collaboration between the University of California, Los Angeles (UCLA) PERRC and the Loma Linda University (LLU) School of Public Health researchers, the Riverside County Department of Public Health (both environmental health services and preparedness division professionals), and two community based organizations, Center for Community Action and Environmental Justice (CCAEJ) and Poder Popular of the Coachella Valley (PPCV). This project was designed to increase the resilience of both the health department and the communities they serve in the face of a potential environmental health emergency. The study focused on validating a Community Based Participatory Research (CBPR) approach as a tool for engaging environmental health

professionals within the community to increase the community's resilience to potential disasters. The hypothesis is that CBPR is more effective at increasing the community's preparedness for and ability to respond to and recover from disasters than traditional public health interventions. This effectiveness stems from the strong connections between the local health department, existing community organizations, and the public working together to improve the community. This project is creating strong connections between the public health department and the community based organizations involved.

- **Research Techniques. Social Network Analysis in the NCPERRC Regional Project:** Developed by the NC PERRC, this regional project used social network analysis (SNA) to evaluate the effectiveness of the Public Health Emergency Preparedness (PHEP) as it relates to the relationships and roles contributing to the transfer of public health surveillance information and communication. The purpose was to assess how the Public Health Epidemiologist (PHE) program facilitates the exchange of public health surveillance information and communication. The project examined the extent to which contact among these organizational actors depended on third parties to broker, or mediate communications between different groups. This study demonstrated how a specific type of SNA, called brokerage analysis, is used to better understand if a public health preparedness program is meeting its goals with regard to communication and information-sharing. Specifically, the project focused on answering the question: To what extent is PHEs fulfilling their intended role as liaisons between hospitals and local health departments (LHDs)?

- **Community Preparedness Fair:** Local community fairs were hosted by the UCLA PERRC and the Loma Linda University (LLU) School of Public Health researchers. These local community fairs were proposed as a means of engaging community members about emergency preparedness. The first pilot fair occurred in Coachella Valley at the Catholic Charities 5th Annual Easter Picnic on April, 2011. Activities were planned by graduate students from Loma Linda University, and shared in advanced with partners from Poder Popular and Riverside County Environmental health (EH) Department for feedback and comments. Preparations included children's activities, interactive skits, model emergency preparedness kits, and informative handouts. Emergency preparedness-related incentives were also prepared, including mini-survival kits, emergency preparedness backpacks, hand-crank radios, and flashlights. The content for the pilot booth and fair activities was focused largely on emergency preparedness related to earthquakes, food, water, and sanitation. UCLA PERRC team members attended the fair and provided verbal information and hand-outs related to emergency preparedness to community members who stopped by the booth. In addition, short, ten-minute presentations were conducted for fair participants in English and Spanish, alternating with planned activities and skits. Members of Poder Popular and Riverside County EH Department also participated in the fair skits and activities.

Practice Guidelines

- **SMS Service provider Summary and the Practitioner Guide to SMS Text Messaging:** Developed by the University of Washington-Northwest PERRC, these tools, one website content and the other a written guide, present information on implementing agency-based

text messaging programs. The target audiences for these tools are LHDs, and Community-Based Organizations (CBOs). These tools are useful to LHDs and CBOs interested in developing and implementing text messaging programs. The tools provide information to guide intelligent decision making about text messaging programs. The written "vendor guide" was distributed to CBOs who attended a recent workshop at Public Health - Seattle and King County.

Checklists

- **Assessing the Emergency Response Capabilities required to respond to a Surge Incident**, and a **Participant Self-Assessment: Post-Exercise Evaluation (2011):** Produced by Harvard School of Public Health PERRC.

Fact Sheet Template for Practitioners

- **Po-210 and Radiation Fact Sheet for Stakeholders**: Produced by the California PREPARE Exercise Laboratory (Cal PREPARE EXLAB), at the UC Berkeley Center for Infectious Diseases and Emergency Readiness (CIDER), this fact sheet includes information on Polonium-210 (Po-210), types of radiation, four ways to measure radiation, and a radiation dose chart.

Databases

- **Online searchable database of literature on public health system research in emergency preparedness:** Conducted by Harvard School of Public Health PERRC this database is used to identify and characterize the public health emergency preparedness research literature produced in the USA in the past ten years. Articles were classified according to study design and the Institute of Medicine (IOM) Public Health Emergency Preparedness (PHEP) research goal areas. 547 articles published between January 1, 1997 and May 31, 2008 were reviewed and 314 (57%) were classified according to the four IOM emergency preparedness research goal areas.

- **Emergency Preparedness and Response Legal Database:** Developed by the University of Pittsburgh PERRC, this is a comprehensive legal database of the laws and regulations directing emergency preparedness and response activities in several states. This database can be searched by keywords for a given action (e.g., quarantine, evacuate or report); emergency type (e.g., fire, flood, earthquake); or by organization (e.g., Emergency Medical System, Governmental Public Health, or Employer). This emergency preparedness and response legal database can be used by policy makers, preparedness and emergency response planners, individuals with emergency preparedness training responsibilities, and anyone interested in emergency preparedness and response law.

Survey Instruments

- **LHD Staff Questionnaire on MRC Volunteers:** This is a survey that has been designed by Harvard School of Public Health PERRC and Georgetown University, in collaboration with the National Association of County and City Health Officials (NACCHO), to understand the effectiveness of involving Medical Reserve Corp (MRC) volunteers in Local Health Department's activities. The Harvard School of Public Health PERRC has also developed several surveys such as: **A (H1N1) & General Emergency Preparedness Survey, 2010; Massachusetts Water Crisis Emergency Preparedness Communications Survey;**

Barriers to Volunteering Questionnaire; and Volunteer Self Assessment Questionnaire.

- **Emergency Response Survey**: Johns Hopkins PERRC developed this survey to assess health department's emergency preparedness and response efforts. The survey focuses on response during weather-related disaster, pandemic flu emergency, radioactive bomb emergency, inhalation anthrax bioterrorism emergency, and included some questions about general preparedness. The results of this survey will help in improving health department's emergency preparedness and response efforts during these scenarios.

- **Post-Tsunami Survey (Draft)**: This survey was developed by Cal PREPARE EXLAB, at the UC Berkeley Center for Infectious Diseases and Emergency Readiness (CIDER). The purpose of the Cal PREPARE EXLAB is to conduct research using statewide exercises in order to better describe preparedness and response challenges and identify solutions in the medical and public health emergency response system in California. The purpose of this survey is to reach out to representatives from public health and emergency medical services agencies (i.e., directors of local offices of emergency services, health officers of local health departments, and local EMS agency administrators) regarding the response to the tsunami threat in California as a result of the earthquake in Japan. This survey focus is on the threat of the tsunami itself, and not the subsequent radiation threat. The survey focuses on five questions: 1) What was the impact of the tsunami threat in your operational area?; 2) When and how did you become aware of the tsunami threat in California resulting from the earthquake in Japan?; 3) Who did your organization notify after becoming aware of the tsunami threat in California?; 4) What were your organization's most significant challenges to interagency information sharing during this event?; and 5) What preparedness and response activities were performed in response to the tsunami threat in your operational area?

- **2010 Statewide Medical and Health Exercise (IED) Survey:** Designed by the Cal PREPARE EXLAB, the purpose of this survey is to reach out to hospitals, local health departments, local emergency medical services agencies, Medical and health Operational area coordinators, and regional Disaster Medical Health Specialists in California, regarding the 2010 Statewide Medical and Health exercise. The survey focuses on five questions: 1) What roles and functions does your agency provide during an improvised Explosive Device (IED) event?; 2) How did your organization participate in the 2010 Medical and Health Exercise?; 3) What influenced your organization's decision to participate or not participate in the 2010 Medical and Health Exercise?; 4) How does your organization communicate health and medical information to other agencies during emergency incidents?; and 5) What are the challenges in communicating with other medical and health organizations during emergency incidents?

- **Community Emergency Preparedness Survey:** Developed by the UCLA PERRC and the Loma Linda University (LLU) School of Public Health researchers, this survey was implemented in Riverside County (intervention site) with community members from Jurupa (urban) and Coachella Valley (rural). The surveys were also administered in San

Bernardino County (control site) in the city of San Bernardino (urban). The purpose of this survey was to examine emergencies in urban and rural communities that threaten the community's health and way of life. This survey included several themes related to perceived barriers and facilitators to an integrated system of Emergency Preparedness. These themes included: 1) community readiness for Environmental Health and Emergency Preparedness (EHEP); 2) community satisfaction with governmental emergency response; 3) individual community member or household preparedness for an environmental health emergency; 4) perceived need for sustainable disaster preparedness at the community level; 5) appropriate and timely emergency communications with governmental agencies and community; and 6) basic knowledge and identification of hazard information related to common food safety, sanitation, shelter, and water safety.

- **Environmental Health (EH) and Emergency Preparedness and Response (EPR) Workforce Survey:** Developed by the UCLA PERRC and the Loma Linda University (LLU) School of Public Health researchers, this survey was administered to 198 workforce employees including administrators, field staff, and technical staff from Riverside County Community health Agency Department of Public Health and the Environmental Health Department from San Bernardino County (SBC). These two counties comprise the Inland Empire (IE) of Southern California. The IE is vulnerable to natural and man-made environmental hazards. In addition to the frequent earthquake threats endemic to all of California, the health and safety of the residents of this area are endangered by environmental hazards including seasonal wildfires, floods and landslides, and high levels of air pollution. Participants from this survey were asked about their personal and collective confidence, capacity, and readiness to engage community members in environmental health emergency preparedness. Participants were also asked about their department's resources, assets, and needs to employ a sustainable community-based environmental health emergency preparedness program. The results from this study will be used to develop an evidence-based best-practice toolkit that other public departments can use when planning environmental health emergency preparedness interventions and programs for the communities they serve.

Simulation Modeling

Researchers from the University of North Carolina at Chapel Hill-PERRC, the University of Pittsburgh, and University of Minnesota have worked extensively on a number of simulations such as:

- **Adaptive response Metric (ARM):** An interactive tool developed by the University of Pittsburgh-PERRC, the ARM measures how the allocation of resources (such as staff line) changes or adapts to meet the demands of an emergency or disaster. ARM records resource allocation with each programmatic function of an organization, such as the divisions of a local health department (i.e., nursing clinic, laboratory, emergency services, etc). ARM uses five stages to categorize data according to defined levels of functioning. Once the ARM is validated and calibrated the ARM will be able to: 1) Determine what departments are being stressed as an emergency response progresses over time, allowing

an agency to react accordingly; 2) Analyze an agency's response after a disaster or emergency to identify strengths and weaknesses in the response. This interactive tool can be used in after action reports and to help improve future responses; and 3) Compare responses between departments, agencies, and systems across similar and disparate disasters and outbreaks.

- **Interactive Models of Response to Outbreaks:** Developed by the University of Pittsburgh PERRC, this is an interactive model that allows the users (e.g., emergency preparedness planners, public health personnel) to adjust processes to try to stop the spread of illness. The user can try different strategies including education, alerts, vaccination, and school closure. Users can adjust levels of interventions, change the type of organizational interaction, and can change attitudes of the target populations to discover surprising interactions and resulting outcomes, including disparities between subpopulations.

- **Interactive Models of Legal Networks:** Developed by the University of Pittsburgh PERRC, this is an interactive model allowing the user to visualize the organizations that are legally required to interact together during an emergency. The target audience for this interactive tool is emergency preparedness planners, responders, and policy makers. This tool can be used in the development of training exercises to: 1) ensure the exercises are including all the necessary stakeholders; 2) learn how communication is disrupted when certain organizations are taken out of the scenario; 3) help facilitate the development of policy to strengthen the emergency response and preparedness system; and 4) visualize legally required resource and information flow to make connections before a disaster.

- **NCHAN Project- Developed Simulation and Mathematical Models**, **eleven simulation models:** Developed by the NC PERRC, please refer to the practice and policy tools notebook for a brief description of each simulation and citations.

- U-SEE: University of Minnesota (UNM) has developed different **Simulations and Exercises for Educational Effectiveness**, such as **Disaster 101 Workshop: Effectiveness of Simulated Disaster Response Scenarios**. This workshop is designed to improve UNM's emergency preparedness capabilities by: improving training of health science students; improving inter-professional team skills; testing best practices in immersive simulation; and assessing the short-term and long-term effectiveness of immersive simulations for teaching emergency response and team knowledge, skills, attitudes (KSAs). Results indicate: 1) a significant improvement in understanding of emergency medical response, incident command, and NIMS; and 2) a consistent improvement in team performance using best practices in simulations (i.e., mastery learning, repetitive practice, focused feedback, and debriefing). Self-reports indicate that students and evaluators strongly agree that the content and delivery methods are effective. Other tools that have been developed as part of Disaster 101 include different exercise scenarios blueprints (i.e., explosion, structural collapse), and the Disaster 101 Response Skills Assessment tool.

- U-SEE: University of Minnesota has also developed other **Simulations and Exercises for Educational Effectiveness**, such as **Creating High Reliable Teams for Public Health Preparedness.** This study is focused on learning more about the dynamics of teams in public health emergency preparedness. This is accomplished by team participation in an in situ (work environment) simulation exercise process. Other tools that have been developed as part of Creating High Reliable Teams for Public Health Preparedness are different exercise scenarios blueprints (e.g., ice storm, pandemic influenza, floods, explosion), and pre-training assessment tool about incident command and the Department Operations Center.

- **Minnesota Department of Health (MDH)/University of Minnesota Public Health Preparedness Training Research Grant**: Staff from the MDH Office of Emergency Preparedness are partnering with the University of Minnesota PERRC on a project titled "Creating High Reliability teams for Public Health Preparedness" to enhance the effectiveness of team performance and team dynamics. This research adapted simulation training that has been used successfully in the airline industry to train pilots and in the hospital setting to train obstetrics teams. The training, called in situ simulation, will help identify best practices used to improve and sustain high-level performance of the public health preparedness system. The research will also examine what situations and characteristics make a team successful in public health emergency preparedness and response.

Training Materials/Posters

- **Video:** Developed by Northwest PERRC research team, this video provides simplified instruction on how to send a text message using a cell phone. The target audience for this video is public health departments. This video provides a simple tool for public health departments to use in teaching text messaging to audiences they want to be able to reach with health alerts and emergency information via text message. These audiences could include their own staff and segments of the community who are typically difficult to reach using other communication channels.

- **Partnerships for Disaster Mental Health Preparedness**: Researchers from Johns Hopkins PERRC have worked extensively on a project that involves engaging both Faith-Based Organizations (FBOs), and LHDs, in a two-phased approach to coordinated disaster mental health planning. The first Psychological First Aid (PFA), teaches participants the concepts of mental health surge demand, the evidence and logic for training FBOs in PFA, the core competencies to effectively provide the Johns Hopkins' model of PFA during an emergency, and the principles and practices of self care for the caregiver. The second, Guided Preparedness Planning (GPP), encourages participants to create practical emergency preparedness plans.

- **Emergency Preparedness Posters**: These are four Chinese language public service announcements (PSAs) developed by the University of Washington PERRC as part of one of their pilot research projects (Mei Po Yip, PI). These public service announcements are

placed in local Chinese newspapers to increase knowledge and awareness of cardiopulmonary resuscitation (CPR). The posters provide information about learning CPR, including compression-only CPR, and they include questions and answers that address concerns lay people might have about performing CPR. Written in Chinese, these PSAs are prototypes for CPR PSAs for other non-English native speaking communities. The PSAs are a resource for public health departments and community based organizations, and for the communities they serve. These PSAs can be used within Chinese communities to provide information about the importance of CPR, how to perform it, and where to go for further instruction. Public health departments can also translate these PSAs into the native languages of other limited English proficient populations in their communities. The PSA content can be presented in newspapers, as tested in this research pilot, and in other formats such as posters.

- **Poster:** "**Closing Chemical, Radiological, and Nuclear Gaps in Public Health All-Hazards Preparedness: Exploiting Lessons learned from past Chemical and radiological Events."** This poster at the "Public Health Preparedness Summit 2011" and developed by the Cal PREPARE EXLAB and Monterey Institute of International Studies. This poster explains how All-Hazard Preparedness (AHP) could be used in assessing emergency preparedness and response.

- **Community-Based Participatory Research Training Curriculum (CBPR)**: A collaboration between the UCLA PERRC and the Loma Linda University (LLU) School of Public Health researchers, the Community-Based Participatory Research (CBPR) engages researchers, community members, and organizations in research. These groups work in partnership to identify research issues in the target population and to use community resources to find solutions to the identified issue. CBPR employs a diverse range of research methods and strategies to address the research issue. The first session of the CBPR training focuses on helping learners understand the basics of CBPR, its five phases, and how to work as a group. The second session elaborates on the phases of CBPR which include partnership formation and maintenance, community assessment and diagnosis, issue identification, documentation and evaluation, and the interpretation, dissemination, and application of research results. The learners are taught how to use both qualitative and quantitative research methods and data collection tools within the CBPR approach. This training employs a combination of teaching methods including lectures, demonstrations, discussions, and hands-on activities.

Policies, Guidelines, or Best Practice Documents

- **Lessons Learned from the H1N1 Vaccination Campaign**. The Immunization Systems and Public Health Preparedness Project of the **Emory University Rollins School of Public Health** gave a joint webinar with research collaborator, the Association of Immunization Managers (AIM) on January, 2011. AIM is the national organization for immunization managers from the 64 jurisdictional grantees including the 50 U.S. states, U.S. outlying territories and selected cities. The primary goal of the Immunization Systems

Project of the Emory Preparedness and Emergency Response Research Center is to explore ways to enhance the U.S. immunization system to more effectively handle a disaster in which leveraging the immunization system may be useful. In the webinar, Emory presented results of the 2010 Immunization Program Managers Survey. Survey topics and results focused on: management of the H1N1 pandemic influenza vaccination campaign, outreach and communication with providers, use of incident command structures and emergency operations centers during H1N1 response, collaborations with Emergency Preparedness Programs during emergency response, and use of Vaccine Registries in managing vaccine implementation. AIM presented recommendations based on the results of the survey. AIM's recommendations, which were geared for improving collaborations between immunization programs and emergency preparedness programs, were: to develop an understanding of each other's program prior to emergency event, to use common leaders to convene pre-event collaborative events, to establish "budget-ready" response-plan for accepting/using funds from any source, to look for ongoing collaborative opportunities, to maintain communications, and to build and plan for IT enhancements.

- Johns Hopkins PERRC developed **"Ready, Willing, and Able**:" A comprehensive framework for improving the public health emergency preparedness system. This framework was developed to encourage a focused conversation to improve preparedness for the benefit of individuals, families, organizations, communities, and society as a whole. The elements or constructs associated with this framework represent a standardized approach to ensure high-quality emergency response across the disparate entities that make up the public health emergency preparedness system.

- **Recommendations for Public Information Call Centers Serving LEP Callers**: Developed by the Northwest PERRC , this tool includes a set of recommendations for emergency call centers on telephone-assisted emergency communication with limited English proficient populations. These recommendations were incorporated into Public Health-Seattle and King County's Public Information Call Center (PICC) staff training and protocols.

Practice Tool or Tool Kits

- **After Action Report (AAR) Review Tool for Pandemic Influenza**: Developed by the NC PERRC, this After-Action Report (AAR) is intended to assist LHDs striving for preparedness excellence by analyzing response to the 2009 H1N1 pandemic via detailed recall of events, event evaluation guides, and group discussion with response partners. This AAR assist LHDs specifically by: identifying strengths to be maintained and built upon, identifying potential areas for further improvement, and recommending follow-up actions. The NC PERRC in cooperation with the University of Arkansas for Medical Sciences, College of Public Health conducted a one-day site visit to the county health department in

2009 to collect data for this AAR and related research highlighting statewide lessons learned and promising practices.

- Johns Hopkins University developed and utilized a **"Disaster Planning Workbook," "Coaching Guide for Completing Planning Workbook" and "Quality Assessment Scales for Disaster Mental Health Plans"** to guide faith communities in developing a disaster preparedness plan template using Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, listing resources that the parish and community may have in case of an emergency, developing contingency communication plans, and evaluating the effectiveness of this plan. Johns Hopkins University also designed a "Quality Assessment Scale (QAS) for Disaster Mental Health Plans" to assess the quality and comprehensiveness of community disaster mental health plans developed by faith communities working in partnership with their local health departments.

- Development of a **"Motivational Preparedness Training (MPT) Outcomes Logic Model"**, and a **"Guided Preparedness Planning (GPP) Outcomes Logic Model,"** as part of the training materials used in the one of Johns Hopkins PERRC Projects "Fostering Coordinated Mental Health Preparedness Planning: A Systems-Based Study," these models were designed to assist in the development and validation of interventions that can increase jurisdictional planning capacity (not to increase planning capacity, per se).

- Harvard School of Public Health PERRC developed the **"Evaluation Toolkit for the Deployment of MRC Units during Flu Clinics and other Public Health Activities."** This is a performance online tool created for Medical Reserve Corps (MRC) units. MRC units can use this tool to assess the effectiveness of engaging volunteers in public health activities, specifically flu clinics. This online tool provides unit coordinators with the ability to display graphs on the units' performance as well as benchmark performance against the average of units in the country.

- **P-AHP** is an adaptation of the **Analytical Hierarchy Process Emergency Preparedness (AHP) Tool.**Adapted by the Cal PREPARE EXLAB, the AHP tool is a multi-decision making tool developed originally by Thomas Saaty at the University of Pittsburgh. This tool has become widely used in industry and government to assist in multi-faceted decision-making. The AHP tool is designed to systematically access opinions held by public health experts from local and state health departments on Chemical, Radiological, and Nuclear (CRN) issues. The University of California-Berkeley has adapted the AHP tool and developed a beta version of a software package called *P-AHP* that will be used to carry out complex analyses on the preparedness and response attributes identified from historic CRN events analyses. AHP has not been utilized in public health research, and the University of California-Berkeley goal is to use this tool if it proves successful.

- **Local Health Department Preparedness Capacities Survey (P-CAS)**, is a sample report from the 256 of a **Customized Preparedness Capacity Benchmarking Reports**, developed by the Accreditation Research team within the NC PERRC. This customized report summarizes survey responses provided by local public health agencies that participated in an emergency preparedness survey. This project was conducted by the University of Arkansas for Medical Sciences in collaboration with the University of North Carolina at Chapel Hill. The purpose of this survey was to collect data on preparedness and response capacities of local public health agencies located across the country. The NC PERRC will use project data to help identify opportunities to enhance public health preparedness and response capabilities thorough activities such as public health agency accreditation, performance measurement, and quality improvement. The NC PERRC will broadly disseminate recommendations based on assessments of these activities. The web-based survey was sent to 332 local health departments nationwide. Usable responses were received from 264, for a response rate of 80%. This report summarized survey responses provided by a local health department and compares them with norms from two other groups of health departments. This report compares the local public health agency's responses to: a) average responses from the national group; and b) average responses from a statistically-matched peer group of agencies that are similar to the agency based on population size of community, agency expenditures per capita, breadth of services offered, rural or urban designation, and poverty rate. These comparisons can be used to identify opportunities for improvement, peer learning, and collaboration. Future data points will allow agencies to track and compare changes over time.

Appendix K. Summary of PERRC Practice Tools and Policies

Review of Preparedness and Emergency Response Research Centers (PERRCs) Peer-Reviewed Publications for the Grant Period 2008 – 2011

SUMMARY

July 11, 2011

Prepared for:

An ad hoc Board of Scientific Counselors (BSC) Workgroup

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Preparedness and Emergency Response Research Center
Peer-Reviewed Publications for the Grant Period 2008 – 2011

Purpose

Publications of scientific endeavors are critical to form the basis for public health practice, policies, and programmatic activities. The purpose of this document is to summarize peer-reviewed publications by seven Preparedness and Emergency Response Research Centers (PERRCs) funded by the Office of Public Health Preparedness and Response (OPHPR), Centers for Disease Control and Prevention (CDC) for the grant period 2008-2011. Two of the nine PERRCs, UCLA and UC Berkeley, are in the 2nd year of funding, therefore have no publications to report at this time.

The information provided in this document is intended to inform an external peer review of the PERRCs that will be conducted by an ad hoc OPHPR Board of Scientific Counselors workgroup. Specifically, these data will inform two objectives: (1) Examine the extent to which publications of research findings reach preparedness and response public health practitioners and policy makers in order to promote advancement in the field; and (2) Delineate the strengths and opportunities to improve the reach of research publications to the intended public health preparedness and response audiences. A companion summary of other information products that describe the practice tools developed by the PERRCs to date is found elsewhere in the briefing book materials.

Methods

A list of peer-reviewed publications from the grant period 2008-2011 was obtained from the PERRC Principal Investigators. One *Morbidity and Mortality Weekly Report* article was published by a PERRC during this time period.

The list was compiled by asking PERRC researchers to provide manuscripts that

- were peer reviewed
- were published, in press, or accepted
- were conducted as part of the studies approved and funded by CDC

Peer-reviewed publications are one of many means available to PERRCs for dissemination of research findings. In order to examine the breadth of research and the important contributions that these articles make to the scientific literature, various approaches were used to analyze the data:

- Number of publications by year
- Number of publications by PERRC

- Number of publications by type of journal, with the categories defined as:
    - Preparedness
    - Public health
    - Legal medicine
    - Practitioner oriented
    - Specialty
    - General science
- Number of publications by Institute of Medicine (IOM) research priority area
    - Enhance the usefulness of training
    - Improve communications in preparedness and response
    - Create and maintain sustainable preparedness and response systems
    - Generate criteria and metrics to measure effectiveness and efficiency
- Number of publications by crosscutting theme. In addition to each article covering a specific IOM research priority area, many also had crosscutting themes, or topics that span across all IOM research priority areas (i.e., vulnerable populations, workforce, legal and ethical issues)
- Number of publications by impact factor, article influence score, and cited half life. When available, the annual impact factor, cited half-life, and article influence score were assessed using the Journal Citation Reports (JCR). Definitions and a description of how the JCR measures are calculated are provided below verbatim from JCR:
    - *Impact Factor*: "The annual JCR impact factor is a ratio between citations and recent citable items published. Thus, the impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years. The impact factor is useful in clarifying the significance of absolute (or total) citation frequencies. It eliminates some of the bias of such counts which favor large journals over small ones, or frequently issued journals over less frequently issued ones, and of older journals over newer ones. Particularly in the latter case such journals have a larger citable body of literature than smaller or younger journals. All things being equal, the larger the number of previously published articles, the more often a journal will be cited." See http://thomsonreuters.com/products_services/science/free/essays/impact_factor/
    - *Article Influence*: "The Article Influence determines the average influence of a journal's articles over the first five years after publication. It is calculated by dividing a journal's Eigenfactor Score by the number of articles in the journal, normalized as a fraction of all articles in all publications. This measure is roughly analogous to the 5-Year Journal Impact Factor in that it is a ratio of a journal's citation influence to the size of the journal's article contribution over a period of

five years. The mean Article Influence Score is 1.00. A score greater than 1.00 indicates that each article in the journal has above-average influence. A score less than 1.00 indicates that each article in the journal has below-average influence. "

- *Cited half-life:* "The cited half-life is the median age of the articles that were cited in the *Journal Citation Report* year. This means that half of a journal's cited articles were published more recently than the cited half-life."

These analyses contain a "snapshot" of the PERRC's recent contribution to the peer-reviewed scientific literature. Other means by which PERRC's have contributed to the body of science include development of informative internet websites, development of tools for public health practice, participation in scientific workgroups, and presentations at scientific meetings, etc.

Results

Peer-reviewed Publications

Between 2008 and 2011 the PERRCs published 52 articles. Fifty-one were peer-reviewed articles and one article was in CDC's *Morbidity and Mortality Weekly Report* (MMWR). Of these articles, none were published in 2008, 11 were published in 2009 (including the MMWR), 13 in 2010, 12 in 2011, and 16 are currently accepted or in press. Johns Hopkins had the most publications (n=12), followed by Harvard (n=10), the University of Pittsburg (n=9), the University of North Carolina, Chapel Hill (n=8), the University of Washington (n=7), Emory (n=5), and the University of Minnesota (n=1). Of the 51 peer-reviewed articles, 16 were published in preparedness journals, 14 in public health journals, nine in general science journals, and four each in practitioner oriented, legal medicine, and specialty journals.

One article addressed the IOM priority area of enhancing the usefulness of training (University of Minnesota), seven addressed improving communications in preparedness and response (University of Washington), 34 addressed creating and maintaining sustainable preparedness and response systems (John Hopkins, Emory University, the University of Pittsburg, the University of North Carolina Chapel Hill), and ten addressed generating criteria and metrics to measure effectiveness and efficiency (Harvard). Of these articles 26 addressed cross-cutting themes: vulnerable populations (n=6), workforce (n=8), and legal and ethical issues (n=12).

Among the 51 peer-reviewed articles, 18 (35%) were in journals with JCR statistics (Table 1). The impact factor for these journals ranged from 4.371 (American Journal of Public Health) to 1.325 (Public Health Reports). Five of the articles were published in

BMC Public Health (impact factor 2.223), four in Public Library of Science One Journal (impact factor 4.351), and two in the American Journal of Preventive Medicine (impact factor 4.235). Of the 18 articles, ten (56%) were published in journals with an article influence score >1 indicating that they are of significant influence.

Table 1. Peer-reviewed journals that PEERCs published their work for grant period 2008 to 2010 that contain an impact factor, cited half-life and article influence score values for the journals.

Journal Title	# of articles	Impact Factor	Cited Half-Life	Article Influence Score
American Journal of Public Health	1	4.371	8.8	2.045
Public Library of Science One Journal	4	4.351	1.7	1.921
American Journal of Preventive Medicine	2	4.235	5.5	1.891
Journal of the American Medical Informatics Association	1	3.974	5.7	1.583
Vaccine	1	3.616	4.5	0.871
Health Affairs	1	3.582	4.8	1.689
Health Services Research	1	2.407	6.3	1.495
BMC Public Health	5	2.223	3.0	0.808
Journal of Law and Medical Ethics	1	1.433	5.1	0.445
Public Health Reports	1	1.325	>10.0	0.637

Conclusions

The PERRCs were remarkably productive in successfully publishing their work in scientific journals, including some very prestigious journals with high impact factors and article influence scores. This is particularly apparent given the number of manuscripts produced in the short grant period and the many venues available for information dissemination (e.g., research briefs, presentations, fact sheets, policy and practice guidelines, practice toolkits). Fifty-one peer-review articles were either published or are currently in press, with at least one article in each IOM priority area (range 1 to 34 articles) and at least one article in each cross-cutting theme (range 6-12) . This uneven distribution of publications by IOM priority area is to be expected given unequal funding across the four priority areas. While the majority of articles were published in preparedness (31%), public health (27%), and general health science journals (18%), the variety of journal types suggest that results are being disseminated to diverse audiences. Peer-reviewed publications may sometimes have lengthy delays due to the review and acceptance process. It is anticipated that the number of publications resulting from PERRC research is likely underestimated in this analysis.

APPENDICIES

Appendix 1. Peer-reviewed journals that PERRCs published their work in for grant period 2008 through 2010, including the impact factor, cited half-life, article influence score values of the journals as well as the target journal audience.

IOM research priority Journal Title	# of articles	Impact Factor	Cited Half-Life	Article Influence Score	Journal Target Audience
Enhance the usefulness of training					
IEEE Xplore Digital Library	1	NA	NA	NA	Unspecified (General Science)
Improve communications in preparedness and response					
American Journal of Disaster Medicine	1	NA	NA	NA	Physicians and medical professionals (Preparedness)
BMC Public Health	1	2.223	3.0	0.808	Persons engaged in health policies, practices, and interventions with regard to public health (particularly social, environmental, behavioral, and occupational specialist) (Public Health)
Health Promotion Practice	1	NA	NA	NA	Professionals engaged in the practice of developing, implementing, and evaluating health promotion and disease prevention programs

					(Practitioner)
Journal of the American Medical Informatics Association	1	3.974	5.7	1.583	Biomedical and health informatics specialists (Specialty)
Journal of Immigrant and Minority Health	1	NA	NA	NA	Persons interested in public health, epidemiology, medicine and nursing, anthropology, sociology, population research, immigration law, and ethics (Specialty)
Washington State Journal of Public Health Practice	2	NA	NA	NA	Public health professionals, health educators, and researchers in Washington and the Pacific Northwest (Public Health)
Create and maintain sustainable preparedness and response systems					
ACM Transactions on Modeling and Computer Simulation	1	NA	NA	NA	Persons interested in computer simulations (Specialty)
American Journal of Disaster Medicine	1	NA	NA	NA	Physicians and medical professionals (Preparedness)
American Journal of Preventive Medicine	1	4.235	5.5	1.891	Prevention research, teaching, practice, public health, and policy professionals

					(Public Health)
American Journal of Public Health	1	4.371	8.8	2.045	Public health and health policy professionals (Public Health)
Biosecurity and Bioterrorism	3	1.644*	NA	NA	Individuals with strategic, management, scientific, or operational responsibilities in fields that have a bearing on bioterrorism issues (e.g. medicine, public health, law, national security, bioscientific research) (Preparedness)
BMC Public Health	2	2.223	3.0	0.808	Persons engaged in health policies, practices, and interventions with regard to public health (particularly social, environmental, behavioral, and occupational specialist) (Public Health)
Disaster Medicine and Public Health Preparedness	4	NA	NA	NA	Health care and public health professionals (Preparedness)
Health Affairs	1	3.582	4.8	1.689	Health policy professionals (Practitioner)
IEEE Xplore Digital Library	4	NA	NA	NA	Unspecified (General Science)

Journal of Homeland Security	1	NA	NA	NA	Anyone interested in homeland security problems, characteristics, and issues in the United States or other parts of the world. Purpose is to support DHS in addressing important homeland security issues, particularly those requiring scientific, technical, and analytical expertise. (Preparedness)
Journal of Law, Medicine, and Ethics	1	1.433	5.1	0.445	Health law teachers, practitioners, policy makers, risk managers, and anyone involved with the safe, equitable, and ethical delivery and promotion of the public's health (Legal Medicine)
Journal of Legal Medicine	1	0.26*	NA	NA	Persons interested in legal medicine, health law and policy, professional liability, hospital law, food and drug law, medical legal research and education, the history of legal medicine, and a broad range of other related topics. (Legal Medicine)
Journal of Public Health Management	3	1.413*	NA	NA	Persons interested in public health practice and research (e.g. emergency

and Practice					preparedness; bioterrorism; infectious disease surveillance; environmental health; community health assessment, chronic disease prevention and health promotion, and academic-practice) (Public Health)
Public Library of Science One Journal	4	4.351	1.7	1.921	All scientific disciplines (General Science)
Prehospital Disaster Medicine	3	NA	NA	NA	Physicians, professors, EMTs and paramedics, nurses, emergency managers, disaster planners, hospital administrators, sociologists, and psychologists (Preparedness)
Saint Louis University Journal of Health Law & Policy	2	NA	NA	NA	Persons interested in health law and policy (Legal Medicine)
Generate criteria and metrics to measure effectiveness and efficiency					
American Journal of Disaster Medicine	1	NA	NA	NA	Physicians and medical professionals (Preparedness)
American Journal of Preventive Medicine	1	4.235	5.5	1.891	Prevention research, teaching, practice, public health, and policy professionals (Public Health)

BMC Public Health	2	2.223	3.0	0.808	Persons engaged in health policies, practices, and interventions with regard to public health (particularly social, environmental, behavioral, and occupational specialist) (Public Health)
Disaster Medicine and Public Health Preparedness	2	NA	NA	NA	Health care and public health professionals (Preparedness)
Health Services Research	1	2.407	6.3	1.495	Health services researchers, managers, policymakers, and providers. (Practitioner)
International Journal of Health Management and Information	1	NA	NA	NA	Executives, managers, educators, and researchers interested in health management and information. (Practitioner)
Public Health Reports	1	1.325	>10.0	0.637	Practitioners, professors, scholars and students of public health (Public Health)
Vaccine	1	3.616	4.5	0.871	Vaccine academicians, persons in vaccine research and development, and workers in the field (Specialty)

*Available on journal website.

Appendix 2. List of peer-reviewed publications from PERRCs for grant period 2008-2010 by IOM research area and crosscutting priorities

Enhance the Usefulness of Training:

1. Monahan C, Ullberg L, Harvey, K. Virtual Emergency Preparedness Planning Using Second Life, Service Operations. IEEE Xplore Digital Library 2009; 306 – 310. (**University of Minnesota**)

Improve Communications in Preparedness and Response:

1. Calhoun R, Young D, Meischke H, Allen S. Practice, More Practice: Improving Our Service to Limited-English Callers. Washington State Journal of Public Health Practice 2009;2(1):34-37. (**University of Washington**)

2. Karasz H, Bogan S. What 2 know b4 u text: Short Message Service Opportunities for Local Health Departments. Washington State Journal of Public Health Practice 2011; 4(1): 20-27. (**University of Washington**)

3. Kirchhoff K, Turner AM, Axelrod A, Saavedra F. Statistical Machine Translation of Public Health Information: A Feasibility Study. Journal of American Medical Informatics Association 2011; 18(4):473-478. (**University of Washington**)

4. Ong B, Yip M, Feng S, Calhoun R, Meischke H, Tu SP. (In press) Barriers and Facilitators to Using 9-1-1 and Emergency Medical Services in a Limited English Proficiency Chinese Community. Journal of Immigrant and Minority Health. (**University of Washington**)

5. Revere D, Nelson K, Thiede H, Duchin J, Stergachis A, Baseman J. Public Health Emergency Preparedness and Response Communications with Health Care Providers: A Literature Review. BMC Public Health 2011, 11:337. (**University of Washington**)

6. Yip MP, Ong B, Meischke H, Calhoun R, Ida Lam, and Tu SP (In press). The Role of Self-Efficacy in Communication and Emergency Response in Chinese Limited English Proficiency (LEP) Populations. Health Promotion Practice. (**University of Washington**)

7. Yip MP, Ong B, Painter I, Meischke H, Calhoun R, and Tu SP. Information-seeking Behaviors and Response to the H1N1 Outbreak in Chinese Limited-English Proficient Individuals Living in King County, Washington. American Journal of Disaster Medicine 2009; 4(6):353- 360 (**University of Washington**)

Create and Maintain Sustainable Preparedness and Response Systems:

1. Balicer RD, Barnett DJ, Thompson CB, Hsu EB, Catlett CL, Watson CM, Semon NL, Gwon HS, Links JM. Characterizing hospital workers' willingness to report to duty in an influenza pandemic through threat- and efficacy-based assessment. BMC Public Health 2010; 10:436. (**Johns Hopkins**)

2. Barnett DJ, Balicer RD, Thompson CB, Storey JD, Omer SB, Semon NL, Bayer S, Cheek LV, Gateley KW, Lanza KM, Norbin JA, Slemp CC, Links JM. Assessment of Local Public Health Workers' Willingness to Respond to Pandemic Influenza through Application of the Extended Parallel Process Model. PLoS ONE 2009*;*4(7):e6365. (**Johns Hopkins**)

3. Barnett DJ, Levine R, Thompson CB, Wijetunge GU, Oliver AL, Bentley MA, Neubert PD, Pirrallo RC, Links JM, Balicer RDt. Gauging U.S. Emergency Medical Services Workers' Willingness to Respond to Pandemic Influenza Using a Threat- and Efficacy-Based Assessment Framework. PLoS ONE 2010*;* 5(3):e96856. (**Johns Hopkins**)

4. Blake S, Howard D, Eiring H. San Diego's Area Coordinator System: A Disaster Preparedness Model for U.S. Nursing Homes (In press). *Disaster Medicine and Public Health Preparedness*. (**Emory University**)

5. Brown ST, Tai JHY, Bailey RR, Cooley PC, Wheaton WD, Potter MA, Voorhees RE, Lejeune M, Grefenstette JJ, Burke DS, McGlone SM, Lee BY. Would school closure for the 2009 H1N1 influenza epidemic have been worth the cost? A computational simulation of Pennsylvania. BMC Public Health 2011;11:353. (**University of Pittsburgh**)

6. Carr S, Roberts S. Planning for Infectious Disease Outbreaks: A Geographic Disease Spread, Clinic Location, and Resource Allocation Simulation. IEEE Xplore Digital Library 2010, 2171-2184. (**University of North Carolina, Chapel Hill**)

7. Chamberlain AT, Wells K, Seib K, Kudis A, Hannan C, Orenstein WA, et al. (In press) Lessons Learned from the 2007 – 2009 Hib Vaccine Shortage: Implications for Future Vaccine Shortages and Public Health Preparedness. Journal of Public Health Management and Practice. (**Emory University**)

8. Dunlop AL, Beltran G, Logue K, Isakov A. (In press) The Role of Academic Institutions in Community Disaster Response since September 11, 2001. Disaster Medicine and Public Health Preparedness. (**Emory University**)

9. Dunlop AL, Logue K, Vaidyanathan L, Isakov A (In press). Facilitators and Barriers for the Effective Academic-Community Collaboration for Disaster Preparedness and Response. Journal of Public Health Management and Practice. (**Emory University**)

10. Epstein JM, Pankajakshan R, and Hammond R. (In press) Combining Computational Fluid Dynamics and Agent-Based Modeling: A New Approach to Evacuation Planning. PloS One. (**University of Pittsburgh**)

11. Hegle J, Markiewicz M, Benson J, Horney J, Rosselli R, MacDonald P. Lessons Learned From North Carolina Public Health Regional Surveillance Teams' Regional Exercises. Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science 2011; 9(1):41-47. (**University of North Carolina, Chapel Hill**)

12. Hodge, JG, Rutkow L, Corcoran, AJ. A Hidden Epidemic: Assessing the Legal Environment Underlying Mental and Behavioral Health Conditions in Emergencies. Saint Louis University Journal of Health Law & Policy 2010; 4(1):33-92. (**Johns Hopkins**)

13. Horney JA, Markiewicz M, Meyer AM, Macdonald PD. Support and Services Provided by Public Health Regional Surveillance Teams to Local Health Departments in North Carolina. Journal of Public Health Management Practice 2011; 17(1):E7-E13. (**University of North Carolina, Chapel Hill**)

14. Horney JA, Markiewicz, Meyer AM, Casani J, Hegle J, MacDonald PDM. Regional Public Health Preparedness Teams in North Carolina: An Analysis of Their Structural Capacity and Impact on Services Provided. American Journal of Disaster Medicine 2011;6(2):107-117. (**University of North Carolina, Chapel Hill**)

15. Howard D, Zhang R, Huang Y, Kutner N (In press). Hospitalization Rates among Dialysis Patients during Hurricane Katrina. Prehospital and Disaster Medicine. (**Emory University**)

16. Hilyard KM, Freimuth VS, Musa D, Kumar S, Quinn SC. The Vagaries of Public Support for Government Actions In Case Of A Pandemic. Health Aff 2010; 29(12):2294-2301. (**University of Pittsburgh**)

17. Hodge, JG, Rutkow L, Corcoran, AJ. A Hidden Epidemic: Assessing the Legal Environment Underlying Mental and Behavioral Health Conditions in Emergencies. Saint Louis University Journal of Health Law & Policy 2010; 4(1):33-92. (**Johns Hopkins**)

18. Lee BY, Brown ST, Cooley P, Grefenstette JJ, Zimmerman RK, Zimmer SM, Potter MA, Rosenfeld R, Wheaton WD, Wiringa AE, Bacon KM, Burke DS. Vaccination deep into a

pandemic wave potential mechanisms for a "third wave" and the impact of vaccination. Am J Prev Med 2010; 39(5):e21-29. (**University of Pittsburgh**)

19. Lempel H, Hammond R, Epstein J. Economic Cost and Health Care Workforce Effects of School Closures in the U.S. PLoS ONE 2009; 1:RRN10512009. – (**University of Pittsburgh**)

20. McCabe OL, Perry C, Azur M, Taylor HG, Bailey BS MBA, Links JM (In press). Psychological first aid training for paraprofessionals: A systems-based model for enhancing capacity of rural emergency response. Pre-Hospital and Disaster Medicine. (**Johns Hopkins**)

21. McCabe OL, Perry C, Azur M, Taylor HG, Gwon H, Mosley A, et al. (In press) Guided Preparedness Planning with Lay Communities: Enhancing Capacity of Rural Emergency Response through a System-Based Partnership. Pre-Hospital and Disaster Medicine. (**Johns Hopkins**)

22. McCabe, OL, Barnett, D, Taylor, HG, links, JM. Ready, Willing and Able: A Framework for Improving Public Health System Emergency Preparedness. Disaster Medicine and Public Health Preparedness 2010; 4(2):161-168. (**Johns Hopkins**)

23. Moore Z, Standberry N, Bergmire-Sweat D, Maillard J-M, Horney J, MacDonald PDM, Fleischauer AT,Dailey NJ. Intent to Receive Influenza A (H1N1) 2009 Monovalent and Seasonal Influenza Vaccines --- Two Counties, North Carolina, August 2009. Morbidity and Mortality Weekly Report 2009; 58(50):1401-1405. (**University of North Carolina, Chapel Hill**)

24. Parker J and Epstein JM. (In press). A Distributed Platform for Global-Scale Agent-Based Models of Disease Transmission. Transactions on Modeling and Computer Simulation (TOMACS), Association for Computing Machinery (ACM). (**University of Pittsburgh**)

25. Parker J. (In press). The Inter-Region Epidemic Dynamics Model. Journal of Homeland Security. (**University of Pittsburgh**)

26. Quinn SC, Kumar S, Freimuth VS, Kidwell K, Musa D. Public willingness to take a vaccine or drug under Emergency Use Authorization during the 2009 H1N1 pandemic. Biosecurity and Bioterrorism 2009; 7(3):275-290. (**University of Pittsburgh**)

27. Quinn S, Kumar S, Freimuth V, Musa D, Casteneda-Angarita N, Kidwell, K. **Racial Disparities in Exposure, Susceptibility, and Access to Health Care in the US H1N1 Influenza Pandemic.** Am J Public Health 2011; 101:285 – 293. (**University of Pittsburgh**)

28. Rabins PV, Kass NE, Rutkow L, Vernick JS, Hodge JG. Challenges for mental health services raised by disaster preparedness: mapping the ethical and therapeutic terrain. Biosecurity & Bioterrorism 2011. 9(2):175-179. (**Johns Hopkins**)

29. Rutkow L, Gable L, Links JM. Protecting the mental health of first responders: legal and ethical considerations. Journal of Law, Medicine, and Ethics 2011; 39(Supp 1):56-59. (**Johns Hopkins**)

30. Rutkow L, Vernick JS, Wissow LS, Kaufmann CN, Hodge JG. (In press). Prescribing authority during emergencies: challenges for mental health care providers. Journal of Legal Medicine. (**Johns Hopkins**)
31. Wissow LS, Rutkow L, Kass NE, Rabins PV, Vernick JS, Hodge JG (In press). Ethical issues raised in addressing the needs of persons with serious mental disorders in complex emergencies. Disaster Medicine and Public Health Preparedness. (**Johns Hopkins**)

32. Worth T, Meyer AM, Uzsoy R, Malliard JM, Samoff E, Wendelboe A. Modeling the Response of a Public Health Department to Infectious Disease. IEEE Xplore Digital Library 2010; 2185- 2198. (**University of North Carolina, Chapel Hill**)

33. Wynter S, Ivy J. Simulating Public Health Emergency Response: A Case Study of the 2004 North Carolina State Fair *E. Coli* Outbreak. 2009, IEEE Xplore Digital Library 2009; *1957 – 1968.* (**University of North Carolina, Chapel Hill**)

34. Yarmand H, Ivy J, Roberts S, Bengtson M, Bengtson N. Cost-effectiveness Analysis of Vaccination and Self-Isolation in Case of H1N1. IEEE Xplore Digital Library 2010*;* 2199-2210. (**University of North Carolina, Chapel Hill**)

Generate Criteria and Metrics to Measure Effectiveness and Efficiency:

1. Biddinger PD, Savoia E, Massin-Short SB, Preston J, Stoto MA. Public Health Emergency Preparedness Exercises: Lessons Learned. Public Health Rpt 2010;125(Suppl 5):100-106. (**Harvard**)

2. Finkelstein S, Hedberg KJ, Hopkins JA, Hashmi S, Larson RC. Vaccine availability in the United States during the 2009 H1N1 outbreak. American Journal of Disaster Medicine, 2011; 6(1):23-30 (**Harvard**)

3. Finkelstein S, Prakash S, McDevitt J, Larson RC. (In press). A Home Flu "Kit" to Empower Individuals and Families for Pandemic Flu. Disaster Medicine and Public Health Preparedness. (**Harvard**).

4. Finkelstein S, Prakash S, Nigmatulina K, Klaiman T, Larson RC. Pandemic Influenza: Non-pharmaceutical Interventions and Behavioral Changes That May Save Lives. International Journal of Health Management and Information 2010;1(1):1-18. (**Harvard**)

5. Galarce EM, Minsky S, Viswanath K. (In press). Socioeconomic status, demographics, beliefs and A(H1N1) vaccine uptake in the United States. Vaccine. (**Harvard**)

6. Griffin BA, Jain AK, Davies-Cole J, Glymph C, Lum G, Washington SC, Stoto M. Early Detection of Influenza Outbreaks Using the DC Department of Health's Syndromic Surveillance System. BMC Public Health 2009. 9:483 (**Harvard**)

7. Klaiman T, Kraemer JD, Stoto MA. Variability in School Closure Decisions in Response to A/H1N1. *BMC Public Health* 2011;11(1):73. (**Harvard**)

8. Savoia E, Massin-Short S, Higdon MA, Tallon L, Matechi E, Stoto MA. A toolkit to assess Medical Reserve Corps Units' performance. Disaster Medicine and Public Health Preparedness 2010; 4:213-219. (**Harvard**)

9. Savoia E, Massin-Short SB, Rodday AM, Aaron LA, Higdon MA, Stoto MA. Public Health Systems Research in Emergency Preparedness: A Review of the Literature. American Journal of Preventive Medicine 2009; 37(2):150-156. (**Harvard**)

10. Savoia E, Rodday AM, Stoto MA. Public Health Emergency Preparedness at the Local Level: Results of a National Survey. Health Services Research 2009; 44 (5 Pt 2):1909-1924. (**Harvard**)

PERRC Peer-Reviewed Publications by Crosscutting Priorities

Vulnerable Populations:

1. Calhoun R, Young D, Meischke H, Allen S. Practice, More Practice: Improving Our Service to Limited-English Callers. Washington State Journal of Public Health Practice 2009; 2(1):4-37. (**University of Washington)**

2. Howard D, Zhang R, Huang Y, Kutner N (In press). Hospitalization Rates among Dialysis Patients during Hurricane Katrina. Prehospital and Disaster Medicine. (**Emory University**)

3. Ong B, Yip M, Feng S, Calhoun R, Meischke H, Tu SP (In press). Barriers and Facilitators to Using 9-1-1 and Emergency Medical Services in a Limited English Proficiency Chinese Community. Journal of Immigrant and Minority Health. (**University of Washington**)

4. Quinn S, Kumar S, Freimuth V, Musa D, Casteneda-Angarita N, Kidwell, K. **Racial Disparities in Exposure, Susceptibility, and Access to Health Care in the US H1N1 Influenza Pandemic** Am J Public Health 2011; 101:285–293. (**University of Pittsburgh**)

5. Yip MP, Ong B, Meischke H, Calhoun R, Ida Lam, and Tu SP (In press). The Role of Self-Efficacy in Communication and Emergency Response in Chinese Limited English Proficiency (LEP) Populations. Health Promotion Practice. (**University of Washington**)

6. Yip MP, Ong B, Painter I, Meischke H, Calhoun R, and Tu SP. Information-seeking Behaviors and Response to the H1N1 Outbreak in Chinese Limited-English Proficient Individuals Living in King County, Washington. American Journal of Disaster Medicine 2009; 4(6):353- 360. (**University of Washington**)

Workforce:

1. Barnett DJ, Balicer RD, Thompson CB, Storey JD, Omer SB, Semon NL, Bayer S, Cheek LV, Gateley KW, Lanza KM, Norbin JA, Slemp CC, Links JM. Assessment of Local Public Health Workers' Willingness to Respond to Pandemic Influenza through Application of the Extended Parallel Process Model. PLoS ONE 2009;4(7):e6365. (**Johns Hopkins**)

2. Barnett DJ, Levine R, Thompson CB, Wijetunge GU, Oliver AL, Bentley MA, Neubert PD, Pirrallo RC, Links JM, Balicer RDt. Gauging U.S. Emergency Medical Services Workers' Willingness to Respond to Pandemic Influenza Using a Threat- and Efficacy-Based Assessment Framework. PLoS ONE 2010; 5(3):e96856. (**Johns Hopkins**)

3. Balicer RD, Barnett DJ, Thompson CB, Hsu EB, Catlett CL, Watson CM, Semon NL, Gwon HS, Links JM. Characterizing hospital workers' willingness to report to duty in an influenza pandemic through threat- and efficacy-based assessment. BMC Public Health 2010; 10:436. (**Johns Hopkins**)

4. Horney JA, Markiewicz M, Meyer AM, Macdonald PD. Support and Services Provided by Public Health Regional Surveillance Teams to Local Health Departments in North Carolina. Journal of Public Health Management Practice 2011; 17(1):E7-E13. (**University of North Carolina, Chapel Hill**)

5. McCabe OL, Perry C, Azur M, Taylor HG, Bailey BS MBA, Links JM. (In press). Psychological first aid training for paraprofessionals: A systems-based model for enhancing capacity of rural emergency response. Pre-Hospital and Disaster Medicine. (**Johns Hopkins**)

6. McCabe OL, Perry C, Azur M, Taylor HG, Gwon H, Mosley A, et al. (In press). Guided Preparedness Planning with Lay Communities: Enhancing Capacity of Rural Emergency

Response through a System-Based Partnership. Pre-Hospital and Disaster Medicine. (**Johns Hopkins**)

7. Monahan C, Ullberg L, Harvey, K. Virtual Emergency Preparedness Planning Using Second Life, Service Operations. IEEE Xplore Digital Library 2009; 306 – 310. (**University of Minnesota**)

8. Revere D, Nelson K, Thiede H, Duchin J, Stergachis A, Baseman J. Public Health Emergency Preparedness and Response Communications with Health Care Providers: A Literature Review. BMC Public Health 2011, 11:337. (**University of Washington**)

Legal and Ethical Issues:

1. Balicer RD, Barnett DJ, Thompson CB, Hsu EB, Catlett CL, Watson CM, Semon NL, Gwon HS, Links JM. Characterizing hospital workers' willingness to report to duty in an influenza pandemic through threat- and efficacy-based assessment. BMC Public Health 2010; 10:436. (**Johns Hopkins**)

2. Hodge, JG, Rutkow L, Corcoran, AJ. A Hidden Epidemic: Assessing the Legal Environment Underlying Mental and Behavioral Health Conditions in Emergencies. Saint Louis University Journal of Health Law & Policy 2010; 4(1):33-92. (**Johns Hopkins**)

3. Hodge JG, Rutkow L, Corcoran AJ. Mental and behavioral health legal preparedness in major emergencies. Public Health Reports 2010; 125:759-762. (**Johns Hopkins**)

4. Lempel H, Hammond R, Epstein J. Economic Cost and Health Care Workforce Effects of School Closures in the U.S. PLoS ONE 2009; 1:RRN10512009. – (**University of Pittsburgh**)

5. Quinn SC, Kumar S, Freimuth VS, Kidwell K, Musa D. Public willingness to take a vaccine or drug under Emergency Use Authorization during the 2009 H1N1 pandemic. Biosecurity and Bioterrorism 2009; 7(3):275-90. (**University of Pittsburgh**)

6. Quinn S, Kumar S, Freimuth V, Musa D, Casteneda-Angarita N, Kidwell K. **Racial Disparities in Exposure, Susceptibility, and Access to Health Care in the US H1N1 Influenza Pandemic.** Am J Public Health 2011; 101:285–293. (**University of Pittsburgh**)

7. Rabins PV, Kass NE, Rutkow L, Vernick JS, Hodge JG. Challenges for mental health services raised by disaster preparedness: mapping the ethical and therapeutic terrain. Biosecurity & Bioterrorism 2011; 9(2):175-179 (**Johns Hopkins**)

8. Galarce EM, Minsky S, Viswanath K (In press). Socioeconomic status, demographics, beliefs and A(H1N1) vaccine uptake in the United States. Vaccine. (**Harvard**)

9. McCabe OL, Perry C, Azur M, Taylor HG, Bailey BS, MBA, Links JM. (In press). Psychological first aid training for paraprofessionals: A systems-based model for enhancing capacity of rural emergency response. Pre-Hospital and Disaster Medicine. (**Johns Hopkins**)

10. Rutkow L, Gable L, Links JM. Protecting the mental health of first responders: legal and ethical considerations. Journal of Law, Medicine, and Ethics 2011; 39(Supp1):56-59. (**Johns Hopkins**)

11. Rutkow L, Vernick JS, Wissow LS, Kaufmann CN, Hodge JG. (In press). Prescribing authority during emergencies: challenges for mental health care providers. Journal of Legal Medicine. (**Johns Hopkins**)

12. Wissow LS, Rutkow L, Kass NE, Rabins PV, Vernick JS, Hodge JG. (In press). Ethical issues raised in addressing the needs of persons with serious mental disorders in complex emergencies. Disaster Medicine and Public Health Preparedness. (**Johns Hopkins**)

Appendix I. Acronyms

AAR	After Action Report
AHC	Academic Health Center
AIM	Association of Immunization Managers
ARMM	Adaptive Response Metrics Method
ASIs	Adaptive System Indicators
ASL	American Sign Language
ASPH	Association of Schools of Public Health
ASTHO	Association of State and Territorial Health Officials (ASTHO)
ATSDR	Agency for Toxic Substances and Disease Registry
BSC	Board of Scientific Counselors
BSC-WG	Board of Scientific Counselors Workgroup
COTPER	Coordinating Office for Terrorism Preparedness and Emergency Response
CAD	Computer Assisted Dispatch
Cal-DPH	California Department of Public Health
Cal-EMSA	Emergency Medical Services Authority
Cal-OES	California Office of Emergency Services
Cal-OHS	California Office of Homeland Security
CBO	Community-Based Organizations
CBPR	Community Based Participatory Research
CBRN	Chemical, biological, radiological, and nuclear
CCLHO	California Conference of Local Health Officers
CCAEJ	Center for Community Action and Environmental Justice
CDC	Centers for Disease Control and Prevention
CEFO	Career Epidemiology Field Officer
CFR	Code of Federal Regulations
CNS	Center for Nonproliferation Studies
CPA	Certified Public Accountant
CPHD	UCLA Center for Public Health and Disasters
CPHP	Centers for Public Health Preparedness
CVE	Collaborative Virtual Environment
Deaf/HH	Deaf or hard-of-hearing
DFCI	Harvard University, Georgetown University, Dana-Farber Cancer Institute
DHHS	Department of Health and Human Services
DHMH	Department of Health and Mental Hygiene
DHS	Department of Homeland Security
EOC	Public Health Emergency Operations Center

EOP	Emergency Operation Plan
EP	Emergency Preparedness
ERPO	Extramural Research Program Office
ESF	Emergency Support Functions
EX-LAB	California Exercise Laboratory
FBO	Faith-Based Organizations
FCA	Full Communication Access
FOA	Funding Opportunity Announcement
GMO	Grants Management Officer
GPP	Guided Preparedness Planning
HHS	Health and Human Services
HIPAA	Health Insurance Portability and Accountability Act
HOAC	Health Officers Association of California
HSR	Human Subjects Research
HSPH	Harvard School of Public Health
ICS	Incident Command System
IHI	Boston University, the Institute for Healthcare Improvement
IIS	Immunization Information Systems
IPM	Immunization Program Managers
IOM	Institute of Medicine
IRG	Initial Peer Review Group
JCR	Journal Citation Reports
JH-PERRC	Johns Hopkins PERRC
KI	Key Informant
KSAs	Knowledge, Skills and Attitudes
LAMPS	Linking Assessment and Measurement to Performance in PHEP Systems
LEIP	Legal and Ethical Indicators for Adaptive Public Health System Response
LEP	Limited English Proficiency
LHD	Local Health Department
LLU	Loma Linda University
LOI	Letter of Intent
MCHD	Monterey County Health Department
MDPH	Massachusetts Department of Public Health
MMWR	Morbidity and Mortality Weekly Report
MPVC	Medical Professional Volunteer Corps
NAB	National Advisory Board
NIH	National Institutes of Health
NVOAD	National Voluntary Organizations Active in Disaster
OASPA	Office of the Assistant Secretary for Public Affairs
PART	Government Program Assessment Rating Tool
PFA	Psychological First Aid

PPCV	Poder Popular of the Coachella Valley
PPHA	Local Public Health Agencies
PHS	Public Health System
PICC	Public Information Call Center
PMC	Pub Med Central
POD	Points of Dispensing
MDC	Measurement Development Cycle
MGH	Massachusetts General Hospital
MIT	Massachusetts Institute of Technology
MPT	Motivational Preparedness Training
MS	Outbreak Management Systems
NACCHO	National Association of County and City Health Officers
NC DETECT	NC Disease Event Tracking and Epidemiologic Collection Tool
NC EDSS	NC Electronic Disease Surveillance System
NCPHPSRC	North Carolina Public Health Preparedness Systems Research Center
NCHAN	North Carolina Health Alert Network
NoA	Notice of Award
NRC	National Research Council
NWPERRC	Northwest Preparedness and Emergency Response Research Center
OMB	Office of Management and Budget
OPHPR	Office of Public Health Preparedness and Response
OSPHP	Office of Science and Public Health Practice
PAHPA	Pandemic and All-Hazards Preparedness Act of 2006
PARM	Preparedness and Adaptive Response Model
PERRC	Preparedness and Emergency Response Research Center
PHAB	Public Health Accreditation Board
PHASYS	Public Health Adaptive Systems Studies
PHEP	Public Health Emergency Preparedness
PHPRS	Public Health Preparedness and Response Systems
PHRST	Public Health Regional Surveillance Teams
PHS	Public Health System Public Health Service
PHSR	Public Health Systems Research
PHSIP	Public Health System Indicators Project
PI	Principal Investigator
PICC	Public Information Call Centers
R8-PHEPR	Washington State Region 8 Public Health Emergency Preparedness and Response
REACH	A Randomized Trial of Communication Methods Between Public Health and Healthcare
RTI	Research Triangle Institute

SBIR	Small Business Innovation Research
SEP	Special Emphasis Panels
SES	Socioeconomic Status
SME	Subject Matter Expert
SMS	Short Message Service
SRC	Secondary Review Committee
SRG	Scientific Review Groups
SPOC	State Single Point of Contact
UNC	University of North Carolina
UP-PERRC	The University of Pittsburgh Preparedness and Emergency Response Research Center
U-SEE	University of Minnesota: Simulations and Exercises for Educational Effectiveness
WWCHD	Walla Walla (Washington) County Health Department