

Team Epi-Aid: Graduate Student Assistance with Urgent Public Health Response

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SYNOPSIS

Team Epi-Aid provides graduate students with practical public health experience through participation in outbreak investigations and other applied projects with state and local health departments in North Carolina. It is an initiative of the North Carolina Center for Public Health Preparedness in the North Carolina Institute for Public Health at the University of North Carolina School of Public Health. The program allows state and local health departments access to volunteers and technical expertise from the university when they need assistance. It requires close collaboration with state and county health departments. Team Epi-Aid provides the opportunity for integrated learning with students and faculty within the departments of the School of Public Health, and through recent expansion, within the schools of Medicine and Pharmacy. Orientations are conducted each semester and formal training is provided as needed. Team Epi-Aid has been popular, with 58 active student participants contributing 1,465 hours of service during the initiative's first 21 months.

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State and local health departments occasionally need workforce surge capacity to investigate outbreaks and for other short-term projects, and can greatly benefit from student volunteers and links with academic institutions. In turn, participation by health sciences graduate students in applied public health at the federal, state, and local levels can provide them with opportunities to augment their academic studies and gain practical experience in health department settings. The Institute of Medicine's (IOM's) 2002 report, *The Future of the Public's Health in the 21st Century*, outlined the need for service learning experiences and integrated interdisciplinary learning opportunities for public health students.¹ Its criteria for service learning include: (1) service that is both relevant and meaningful to all stakeholder parties must be provided in the community, (2) the service must not only serve the community but also enhance student academic learning, and (3) the service must also directly and intentionally prepare students for active civic participation in a diverse democratic society.¹ The report suggests that integrated interdisciplinary learning is that which brings students from various health sciences together in efforts to close the gap between these disciplines.¹

Nationally, there is a shortfall in people joining the public sector of public health practice, and students at the University of North Carolina at Chapel Hill School of Public Health (UNC SPH) frequently comment that there are not enough opportunities to experience applied public health in their academic programs. Gaining experience in a public health practice setting while in graduate school could provide students with more interest in and knowledge about pursuing a career in the public sector.

Team Epi-Aid is a new initiative that recruits and places UNC SPH students in the North Carolina Division of Public Health (NCDPH) and local health departments throughout North Carolina to assist with outbreak investigations and other short-term applied public health projects. This initiative was started in January 2003 through the North Carolina Center for Public Health Preparedness (NCCPHP), based in the North Carolina Institute for Public Health (NCIPH), a unit of UNC SPH, and the Department of Epidemiology. The concept is loosely based on the Centers for Disease Control and Prevention's (CDC's) Epi-Aid assistance to state health departments. One of the CDC's roles is to support the investigations conducted by states and localities through the provision of technical assistance and resources. The most intensive CDC support is through the epidemic assistance (Epi-Aid) mechanism, wherein a team goes into the field to assist the state.² Similar to CDC's Epi-Aid mechanism, UNC's Team Epi-Aid is a resource that can be quickly mobilized to address health problems that require immediate response.

This article outlines the Team Epi-Aid initiative, including its goals and objectives, implementation methodology, expansion plans, and training methods. It also describes the Team Epi-Aid response protocol, including procedures for processing requests and the epidemiologic response to outbreaks. It concludes with a discussion of Team Epi-Aid activities and explores the benefits of such a program.

GOALS AND OBJECTIVES

The overall goal of the Team Epi-Aid initiative is to provide UNC SPH graduate students with practical public health experience through participation in outbreak investigations and other applied projects for state and local health departments in North Carolina, while providing these departments with workforce surge capacity. The local or state health department and/or NCCPHP project staff members supervise all activities.

The objectives of Team Epi-Aid are to:

- Create effective partnerships among UNC SPH, NCCPHP, and state and local health departments that facilitate the placement of students in those health departments to work on outbreaks or similar applied public health projects;
- Supply needed surge capacity to state and local health departments;
- Present students with service learning opportunities, enabling them to gain practical public health experience by working with personnel at state and/or local health departments;
- Facilitate integrated learning opportunities for students across different health science fields;
- Offer students the opportunity to use their Team Epi-Aid experience as part of a master's project, formal presentation, or article for publication; and
- Pique students' interest in applied public health so they will consider public health careers at the federal, state, and local level.

IMPLEMENTATION

NCCPHP began the Team Epi-Aid initiative in January 2003, after discussing the concept at a meeting with the dean of the UNC SPH, the state epidemiologist, the state bioterrorism coordinator, staff from NCCPHP and NCIPH, and faculty from the Department of Epidemiology.

NCCPHP staff identified interested students by sending an e-mail to the UNC SPH student body asking for volunteers to assist with outbreak investigation and other short-term applied public health projects for state and local health departments. From the replies expressing interest, a Team Epi-Aid listserv was created. NCCPHP hosted an orientation and subsequent training sessions during the spring 2003 semester. Another announcement about the initiative was sent to UNC SPH students via mail and e-mail at the beginning of the fall 2003 and 2004 semesters, and the e-mail listserv was updated. A Team Epi-Aid orientation, which included an overview of the program and a panel of students who had participated in past activities, was held at the beginning of the fall 2003 and 2004 semesters.

NCCPHP maintains a database of students who have signed up for Team Epi-Aid. Information in the database includes name, department, computer skills, language skills, type and level of public health experience, access to transportation for fieldwork, and experience with outbreak investigation.

After each activity, forms are used to gather the following information: activity name and scope, location, partnering agency, number of hours worked, payment (if any), populations served, whether the activity provided insight into applied public health, whether the activity augmented classroom training, whether the activity sparked interest in a career in applied public health, and if the student would recommend the activity to fellow students.

Future evaluation plans include monitoring the satisfaction of the local and state health departments with activities involving Team Epi-Aid. NCCPHP will request that a supervisor at the participating health department complete a standardized survey each time an activity is concluded. Moreover, students on the Team Epi-Aid listserv will be surveyed once per year to gather feedback about their satisfaction with the program. The NCCPHP will monitor UNC SPH post-graduate employment data to determine if Team Epi-Aid participants are more likely to take jobs in local, state, or federal public health following graduation.

EXPANSION

Due to the success of Team Epi-Aid, NCCPHP has expanded the program into the UNC schools of Pharmacy and Medicine. NCCPHP has institutional support from these schools and has held orientation sessions with interested students. In the School of Medicine, recruitment efforts have focused on residents in preventive medicine and students interested in infectious diseases. Since pharmacy students have skills that are different from those of students in public health, their group is called Team Pharm-Aid. Team Pharm-Aid began in October 2003 in direct response to the NCDPH's request for a pool of volunteers that could be available for distributing the Strategic National Stockpile (SNS) during an emergency and for SNS exercises. Coordination of activities in which students from the schools of Public Health, Medicine, and Pharmacy work together fosters integrated interdisciplinary learning opportunities for students in the health sciences, as recommended in the 2002 IOM report.¹

TRAINING

NCCPHP offers online training modules, face-to-face classroom training during the semester, and activity-specific trainings on an as-needed basis. The online training modules include required and suggested courses such as CDC's Public Health Training Network's Botulism in Argentina: Interactive Case Study. NCCPHP will expand the Team Epi-Aid program to include a suggested semester-long distance-learning course called "Methods in Field Epidemiology." Topics for the course include the following:

- Epidemiology outbreak investigation teams and individual roles of team members;
- Active and passive case finding, creating a line listing, and contact tracing;
- Using computer programs to generate epidemic curves;
- Generating a hypothesis, designing questionnaires, and selecting a study design to test a hypothesis;

- Designing a database and data entry screen using Epi Info software;
- Data analysis techniques commonly used for outbreak investigation;
- Molecular techniques commonly used in outbreak investigations; and
- Risk communication during an outbreak.

RESPONSE PROTOCOL

A Team Epi-Aid response protocol designed to guide activities and delineate responsibilities is used internally and shared with partners. The protocol includes information about contacting staff and faculty, facilities, liability issues, media, and student training.

Requests

Requests fall into three general categories: collaboration in an urgent disease outbreak investigation, assistance with surge capacity, or working on a short-term epidemiology project. When a request is received by NCCPHP, the respondent collects the following information:

- Name, phone number, and e-mail address of the contact at the requesting agency;
- Details of the situation (who, when, where, what, how);
- Type of assistance needed from Team Epi-Aid or NCCPHP;
- Number of students needed;
- Type of supervision and organization of students needed; and
- Activity time frame.

The NCCPHP respondent summarizes the request in an e-mail to the Team Epi-Aid listserv to determine interest and availability among student volunteers. The state epidemiologist at the NCDPH is notified that a request has been received.

Within one working day, NCCPHP evaluates the request and decides whether Team Epi-Aid will be able to collaborate. The criteria used to make this decision include: (1) student availability to participate, (2) faculty or staff availability and expertise to supervise, (3) scope of UNC involvement, and (4) expectation of deliverables by the requesting agency. Once a decision is made to collaborate in the activity, UNC assigns a faculty or staff member to act as UNC Team Leader. The Team Leader acts as liaison and sole point of contact to the requesting agency. NCCPHP can provide supervision, logistical support, student volunteers, and training, if necessary. If the activity can be done from a remote location, the work is conducted at NCCPHP.

Determining the scope of work

If appropriate, the Team Leader schedules an in-person meeting with the requesting health agency to determine the scope of work and timeline for completion. If the health agency is geographically distant, a conference call is scheduled to discuss these issues. The Team Leader determines the supervision, organizational, and training needs for

student volunteers, and assigns NCCPHP staff to each area of need.

Outbreak investigations

Faculty and staff in NCCPHP and the Department of Epidemiology have training and experience in field epidemiology, and can provide supervision for student volunteers. During an outbreak investigation, Team Epi-Aid may provide assistance with any or all aspects of an investigation, including:

- Creating a case definition,
- Active case finding,
- Developing a line listing,
- Hypothesis generation,
- Analytic study design,
- Writing a questionnaire,
- Conducting interviews,
- Designing a database in preferred format,
- Entering data,
- Analyzing data using sophisticated epidemiologic methods, and
- Generating summary reports.

The extent of the Team Epi-Aid collaboration is determined by agreement between the requesting agency and the UNC Team Leader.

Surge capacity

Team Epi-Aid student volunteers can participate in situations that do not require NCCPHP faculty or staff supervision. In this scenario, the requesting agency supervises UNC students doing public health-related work.

Short-term epidemiology projects

Team Epi-Aid student volunteers can also assist with short-term projects, such as evaluating a surveillance system or assisting with data analysis.

Ethical issues

Volunteers are trained in issues related to confidentiality and ethical conduct in science. Each student must complete a required online training course for ethical research (<http://www.sph.unc.edu/research/irb/training/>). Moreover, students sign a confidentiality agreement for each Team Epi-Aid activity in which they participate.

RESULTS

NCCPHP maintains a Team Epi-Aid listserv for all students interested in participating in Team Epi-Aid activities. As of September 2004, all departments in the UNC SPH were represented on the Team Epi-Aid listserv, including Epidemiology (42 students), Biostatistics (four students), Environmental Sciences and Engineering (nine students), Health Behavior and Health Education (12 students), Health Policy and Administration (seven students), Nutrition (four students), and Maternal and Child Health (four students), as well as eight students from the School of Medicine (students interested in infectious diseases and preventive medicine

residents). There were also nine School of Pharmacy students on the Team Pharm-Aid listserv. The students have skills in 25 foreign languages and a variety of software applications, in addition to knowledge in their public health fields.

Fifty-eight of these students were actively involved in Team Epi-Aid activities assisting local and state health departments between January 2003 and September 2004. During this time, these 58 students contributed a mean of 17 hours per person (range=0.5–193) and median of six hours per person. In total, the Team Epi-Aid volunteers contributed 1,465 hours of service. Most of these students (41) participated in one activity, while eight students participated in two activities, five students participated in three activities, two students participated in four activities, and two students participated in five activities.

The state and local health departments benefit greatly from student volunteers who provide human resource surge capacity. Dr. Jeffery Engel, North Carolina state epidemiologist, states, "Before Team Epi-Aid, many outbreaks would not be investigated simply because morbidity was low, numbers were low, and/or the outbreak was short-lived and spontaneously abated without a specific public health intervention. Now that the state is able to investigate many of these outbreaks using Team Epi-Aid, state and local public health authorities are better able to plan prevention strategies and learn how to conduct outbreak investigations."

Students who participate in Team Epi-Aid activities gain practical public health experience in the state and local health departments. All volunteers have stated in their activity reports that participation in Team Epi-Aid has enhanced their understanding of applied public health.

As the NCDPH and local health departments have become more familiar with Team Epi-Aid, opportunities for student involvement have continued to expand. As summarized in the Table, Team Epi-Aid has participated in a variety of activities, including investigation of an HIV cluster in North Carolina college students, surveillance for adverse smallpox vaccination events, statewide surveillance of arbovirus diseases, evaluation of foodborne disease surveillance, assistance with the public health response to Hurricane Charley, investigation of gastrointestinal illness outbreak at UNC, investigation of a restaurant-related *Salmonella* outbreak, staffing a Hepatitis A vaccination clinic at a local health department, and staffing the state's Public Health Command Center.

TEAM EPI-AID ACTIVITIES

Foodborne Hepatitis A

As part of a CDC-directed multi-state investigation of Hepatitis A in October 2003, the state epidemiologist requested Team Epi-Aid's assistance with an epidemiologic study of 16 case-patients to determine the source of a Hepatitis A outbreak presumably associated with two Asheville restaurants. NCCPHP staff and two Team Epi-Aid volunteers traveled to Asheville, met with representatives from the Buncombe County Health Center, and visited the suspect restaurants. Under supervision of NCCPHP staff members and in collaboration with the state and county health departments, nine Team Epi-Aid student volunteers were involved with

Table. UNC student participation in selected Team Epi-Aid activities, January 2003–September 2004

Activity name	Student participation and hours contributed				
	Number of students (n)	Total hours ^a	Mean hours ^a	Median hours ^a	Range of hours ^a
Investigation of an HIV cluster in North Carolina college students	3	332	111	137	2–193
Investigation of and response to a severe acute respiratory syndrome (SARS) case-patient in North Carolina	10	159	16	10	4–60
Surveillance of adverse smallpox vaccination events	8	51	6	3	2–20
Investigation of Hepatitis B outbreak in a nursing home	1	80	—	—	—
Statewide surveillance of arbovirus diseases	2	60	30	30	20–40
Assistance with the public health response to Hurricane Isabel	18	322	18	8	3–72
Investigation of a multi-state Hepatitis A outbreak	9	171	21	4	4–100
Investigation of an outbreak of gastrointestinal illness at the University of North Carolina at Chapel Hill	11	53	5	4	1–15
Strategic National Stockpile exercise	3	8	3	3	2–3
Investigation of restaurant-associated outbreak of <i>Salmonella</i>	2	10	5	5	4–6
Assistance at an outbreak-related Hepatitis A vaccination clinic	1	2	—	—	—
Assistance with the public health response to Hurricane Charley	4	83	21	20	15–28

^aAll numbers are rounded to the nearest whole number.

UNC = University of North Carolina

designing the case-control study, developing the questionnaire, conducting interviews, entering and analyzing data, and writing a summary report. State officials sent information from the report to the CDC, where it supported the need to conduct an international trace-back of an implicated food item. During this outbreak, UNC students were able to provide surge capacity and epidemiologic knowledge, and in return received valuable experience in applied public health. Following the activity, Marc Fowler, the Buncombe County environmental health specialist, wrote, “Collaboration between the state, local health departments, and UNC should be the wave of the future in North Carolina. It worked well for us, and I hope that our work will serve as a model in the future.”

Hurricane Isabel public health response

Immediately after Hurricane Isabel struck the North Carolina coast in September 2003, four student volunteers traveled to eastern North Carolina with representatives from the Public Health Regional Surveillance Teams and the NCDPH

to conduct a rapid needs assessment. Students administered surveys regarding flood damage and power outages and distributed information about safe clean-up after the storm. Three of these students served as Spanish-speaking interpreters for their teams. In addition, four student volunteers assisted with designing a data collection instrument for the emergency room injury surveillance project. Ten other students were also involved in response activities such as data entry. In all, 18 Team Epi-Aid volunteers contributed a total of 322 hours to the Hurricane Isabel public health response.

Hepatitis B outbreak in a nursing home

From mid-July through September 2003, a Team Epi-Aid student assisted the state’s General Communicable Disease Control Branch staff in their investigation of an outbreak of acute Hepatitis B at a North Carolina nursing facility. The student collected data (including an initial chart review of the medical records of 192 facility residents), entered data, and compiled summary statistics. The CDC became involved in the outbreak investigation via an Epi-Aid, after which the

student assisted with an additional medical record chart review activity. The student contributed a total of 80 hours to this activity and used this work as the basis for a master's in public health project.

Severe acute respiratory syndrome (SARS)

During June and July 2003, eight Team Epi-Aid volunteers worked in collaboration with the NCDPH during an investigation of SARS. (There was a large-scale public health response in North Carolina because one of the eight SARS patients in the United States was living in the state.) Team Epi-Aid activities included assisting with designing an epidemiological study, developing a questionnaire, conducting interviews, entering and analyzing data using SAS and Epi Info™ software, preparing a SARS guidelines notebook, reviewing the surveillance procedures for reportable diseases, developing a database, writing directions for hospitals to send specimens to the state laboratory, and answering the telephone hotline in the Public Health Command Center. Team Epi-Aid students contributed a total of 83 hours to this effort.

Strategic National Stockpile (SNS) exercise

On November 14, 2003, four Team Epi-Aid students and one Team Pharm-Aid student assisted with an SNS exercise. The students role-played members of the public who were ill, and practiced the steps required to request and receive medication from the stockpile.

DISCUSSION

Developing and implementing the Team Epi-Aid initiative created a series of challenges and resulted in lessons that may benefit future programs of its kind. A protocol that explains how partners can work with Team Epi-Aid and guidelines for collaboration are critical. Having one point of contact for partners to call to initiate a request, develop a work plan, and coordinate with throughout the activity is also important. Confirmation that student volunteer activities are covered in the university's liability policy is necessary. While the students are volunteering their time, a substantial amount of staff and faculty supervision is required. In some states and localities, unions may exist that would not support this type of program, as student volunteers may jeopardize possible overtime hours and pay for unionized public health staff.

Student-led technical assistance programs benefit both students and the partnering health department. Team Epi-Aid assists with the documented need for an expanded public health workforce. In 2003, both the CDC and the Council of State and Territorial Epidemiologists (CSTE) addressed the need to improve epidemiologic capacity in the United States.^{3,4} A recent CSTE survey found that national epidemiology infrastructure in state and local health departments is lacking in capacity, and that it is still not adequate for performing the 10 essential public health services.³ The CDC has noted that given state budget deficits, it is important to identify additional resources to increase epidemiologic capacity.³ Team Epi-Aid is one such resource. With negligible cost to the state and local health departments, a supplement-

ary public health workforce is available for responding to urgent public health problems in the field.

Team Epi-Aid provides interested students with exposure to applied epidemiology and public health prior to graduating. Not only does this augment their classroom training, but it also exposes students to the type of work public health practitioners do in a local and state health departments. As a solution to the workforce shortage at state and local health departments, CSTE funds the Applied Epidemiology Fellowship Training program for students graduating from schools of public health.⁴ For a long-term solution, however, it would be preferable if students matriculating at schools of public health have the opportunity to learn applied epidemiology during the course of their graduate program. In *Providing a Framework for Public Health Bioterrorism Preparedness*, schools of public health are encouraged to "develop training programs that . . . emphasize practical skills, internships, and field experience."⁵ The CDC has also called for "additional and more diverse training venues."⁶ Combining service with training has been a successful model for learning in programs such as the CDC's Epidemic Intelligence Service and the Field Epidemiology Training Program.³ Expanding the applied epidemiology component of academic programs will encourage the field to better define the combination of skills, education, and training needed to work as an epidemiologist, which will in turn facilitate the incorporation of applied epidemiology into academic programs.³

The Team Epi-Aid initiative blends service, practice, and education, and creates a bridge between UNC SPH and local and state health departments. This connection can yield mutual benefits, enhance relationships, and leverage resources and expertise. Greater collaboration between academic faculty and local and state public health practitioners is recommended to "allow students to be better prepared to enter the workforce" and could "enhance the relevancy of academic centers to the day-to-day practice of public health."⁵ Moreover, a national evaluation of the State-Based Epidemiology for Public Health Program Support program has made recommendations to improve connections with academic institutions and improve technical assistance and consultation as strategies for alleviating insufficient epidemiologic resources at health departments.⁷ Creative mechanisms for sharing expertise are necessary to maintain the range of disease prevention and control and surveillance programs within health departments.⁸

Experiential learning programs like Team Epi-Aid have proven successful in similar educational settings, particularly in schools of medicine and nursing, both of which have effectively integrated service learning into their curricula. Programs similar to UNC's Team Epi-Aid can be found at the University of Illinois at Chicago School of Public Health (Student EpiCorps), Emory University Rollins School of Public Health (Student Outbreak Response Team), Johns Hopkins Bloomberg School of Public Health (Student Outbreak Response Team), University of Minnesota School of Public Health (Team Diarrhea), and The University of Texas School of Public Health (Student Epidemic Intelligence Society).

A program like Team Epi-Aid supports all stakeholders. State and local health departments gain access to volunteers

to augment their workforce, links to the resources of an academic institution, and the opportunity to influence the career goals of the prospective public health workforce. Student volunteers gain the opportunity to enhance what they learn in the classroom with field experiences. Moreover, students have the opportunity to participate in service-learning and interdisciplinary activities with students from other health sciences fields. By operating within the UNC School of Public Health and expanding to the schools of Pharmacy and Medicine, Team Epi-Aid could be a recruiting tool for future public health leaders. Team Epi-Aid is one mechanism to assist the state of North Carolina and local health departments in effectively preparing for and responding to bioterrorism and other emerging health threats, as well as current health problems.

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