

# Enhancing Analytic Capacity in State Health Agencies through Competency-Based Education:

## Observations of the Enhanced Analytic Skills Training Program at the University of Illinois School of Public Health

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### INTRODUCTION

Since the publication of the Institute of Medicine's seminal report, *The Future of Public Health* (IOM, 1988), public health agencies have been enhancing their capacity to more effectively carry out the three core functions of public health: assessment, policy development, and assurance. Support for enhancing public health agency capacity has been undertaken at the federal level by the Health Resources and Services Administration (HRSA) and the Centers for Disease Control and Prevention (CDC) of the Department of Health and Human Services (DHHS). These agencies have increasingly turned to schools of public health for the creation of new models of continuing education and professional development designed to enhance the analytic capacity of state and local health agency staff. The goal has been to increase the ability of state and local health departments to engage in information based decision-making.

In 1990, the Maternal and Child Health Training Program of the University of Illinois School of Public Health (UIC-SPH) received a grant from the Maternal and Child Health Bureau (MCHB) of HRSA to develop and implement the Enhanced Analytic Skills Program (EASP), a continuing education program for practicing Maternal and Child Health (MCH) professionals. This was one of four grants given to schools of public health to assist state health agencies to enhance their analytic capacity through either changes in the masters or doctoral programs in MCH or through continuing education programs. The Maternal and Child Health Bureau's effort to increase the analytic focus and skills of MCH professionals was a response not only to *The Future of Public Health* but also to the Omnibus Budget Reconciliation Act (OBRA) of 1989 (Public Law 101-239) which mandated new data analysis and reporting requirements for Maternal and Child Health Block Grant recipients in state health agencies.

The Enhanced Analytic Skills Program at the University of Illinois was designed to improve the analytic skills of MCH professionals in state health agencies. National in scope, EASP served 93 MCH professionals from 44 states and three territories in seven separate offerings between 1991 and 1997. Its educational premise was competency-based education, which utilizes methods in which participants acquire skills and knowledge that directly enable them to better perform their tasks and responsibilities in the workplace; the acquisition of knowledge divorced from application is antithetical to this approach.

### Competency-Based Education

A competency-based educational approach was chosen because it is thought to be best suited to adult learners participating in continuing education programs (Harris, et al., 1995). Competency-based education requires: specification of learning objectives in behavioral terms; establishment of criteria by which to assess individual achievement of competencies; provision of instruction that is directly relevant to the learning objectives; and, assessment of the learner's ultimate experience with respect to the

established competency criteria (Elam, 1971; Houston and Howsam, 1972). Therefore, UIC-SPH Maternal and Child Health faculty and staff worked together with educational consultants to develop a curriculum that would be rooted in the day-to-day experience of MCH practice, be “hands-on” in approach with a focus on real problems and issues faced in the workplace, and which allowed for the assessment of achievement of competency at regular intervals throughout the program as well as after the program’s completion.

At the time of the establishment of EASP, the competency-based approach was just emerging as a viable educational strategy for training professionals in schools of public health (Public Health Faculty/Agency Forum, 1991). With an increasing emphasis on public health practice as the basis for learning, the development of the EASP curriculum demanded an entirely new orientation for the UIC-SPH faculty involved. Armed with the understanding that even familiar content would have to be organized and presented differently, EASP faculty were challenged to identify and assess the functions performed by state level MCH professionals and to translate these into a set of skill-based modules.

## **Defining the Competencies Needed by Maternal and Child Health Professionals in State Health Agencies**

The development of the EASP curriculum began with the delineation of five key activities of state-level MCH staff: surveillance and monitoring, needs assessment, program planning and administration, program evaluation, and policy development. The next task of the planners was to review the skills and knowledge that were necessary to perform each activity related to these functions. Seven competency areas were identified:

1. The ability to develop primary data-sets;
2. The ability to utilize secondary data-sets;
3. The ability to conduct statistical analyses;
4. The ability to use computer systems and packages;
5. The ability to conduct needs assessments;
6. The ability to develop program evaluation and research designs; and,
7. The ability to develop and maintain quality assurance, monitoring, tracking, and management information systems.

For each skill area, the tasks necessary to develop and demonstrate competence were translated into learning objectives, which were then used to direct the content and learning methods of each module. Emphasizing real data, case problems, simulations, and group problem solving activities while minimizing the traditional lecture format, EASP modules mimicked the participants’ work environment to the extent possible, and promoted an interdisciplinary team approach to public health leadership and practice.

## **The Evolution of the EASP Curriculum**

The initial EASP curriculum was developed just as states were beginning to struggle with the data requirements set forth in OBRA 1989, and before many state health agencies had begun to switch from a focus on the delivery of personal health services to a more core function, population-based approach. The curriculum was adapted over time to meet the needs of MCH programs and the rapidly changing environment in state health agencies. Modifications to expected competencies, learning objectives, and module content were based on participant feedback and evaluation of each EASP offering, a growing understanding of the needs and expectations with regard to the level and kind of analytic activities

assumed to be appropriate for state MCH professionals, and the acceleration in technology and its increasing availability to state health agencies. While some curricular changes were also related to time and resource constraints, the majority were made in an effort to develop a program that was directly relevant to the needs of state MCH professionals, particularly as states made the transition from a clinical services delivery approach to a population-based approach to meeting the needs of women, children and families.

## **Observations Gleaned from Enhanced Analytic Skills Training for MCH Professionals in State Health Agencies**

The fundamental assumption underlying any analytic skills training program in MCH is that the ability to effectively collect, analyze, and report data will directly lead to the design and implementation of effective programs and the development of appropriate policies to improve the health status of women, infants, children and adolescents. In attempting to meet the challenges of this assumption, during the seven offerings of EASP, we continually forced ourselves to reconsider choices in curriculum design, format, objectives and content. Curricular decisions were based on a number of intersecting factors: expedience and resource constraints, areas of faculty expertise, new insights on how best to mix and match conceptual and skill building components within and across modules, and the need to provide opportunity for practice and synthesis of course material, enabling participants to achieve the greatest degree of competency. Through our experience with the EASP program, we have made a number of observations about competency-based education for MCH professionals in state health agencies. These are offered here for others who are considering similar training efforts.

### **What is the appropriate format for competency-based enhanced analytic skills training for state MCH professionals?**

Competency-based education requires demonstration, practice, and reinforcement of newly acquired skills and knowledge. In choosing an appropriate format for competency-based training to increase the analytic skills of MCH professionals in state health agencies, there are clearly a variety of options available, such as the short workshop or a series of short workshops, the intensive institute (greater than 3 days), computer-based distance learning, or a program which takes place over an extended time period and which incorporates multiple formats; each option is associated with different resource demands as well as different possibilities for learning. Clearly, not all of these formats allow for the same level of integration of substantive knowledge and skills; as such, when planning enhanced analytic skills training there needs to be a consideration of the tradeoffs of time, resources, and the intensity of the learning experience. Within time and resource constraints, the format should be selected based on its potential to allow participants to sufficiently absorb, integrate and translate their newly acquired skills into their daily activities in the workplace.

In making a decision about format, it is also important to consider the role of peer and colleague interaction in the learning experience. When participants are engaged in a group learning situation over an extended period of time, the opportunity increases for interchange and learning from peers both within and outside the classroom setting. Although there is always danger of exhaustion or overload, there seems to be a minimal amount of time (at least 3 full days) required before the benefits of this interaction really begin to manifest. In fact, it appears that this interaction is maximized when participants have at least one week of consecutive time together.

Sufficient time also needs to be built into the training to allow participants to engage in activities and exercises in the direct presence of instructors, so that issues and concerns are immediately addressed. Without such opportunities, participants who return to demanding work schedules, may feel less

confident in using their new skills in the home setting, and in some cases, will be reluctant to do so, or will not be able to do so with a great degree of ease, comfort, and confidence. Even when EASP was offered as a two week session, with a break between weeks, there seemed to be a need for more time to adequately practice skills, suggesting that a format which also includes ongoing support or mentoring by the instructors may be optimal. Most importantly, participants need to be provided with the opportunity and support to use and sharpen their newly acquired skills in their home states.

### **Who should be trained in a competency-based enhanced analytic skills program for state MCH professionals?**

Enhancing analytic capacity within state health agencies requires a commitment by states to the role of information-based decision-making in program planning, management and policy development and a concomitant commitment to increase the analytic skills of staff involved in these activities. As MCH programs in state health agencies shift their focus to population-based activities and as the demand for accountability increases for all programs, it will likely be necessary for the analytic skills of all MCH professionals in state health agencies to be augmented to one degree or another. Therefore, enhancing capacity in state MCH programs requires two strategies. The first strategy is the hiring and/or (re)training of staff specifically dedicated to performing analytic activities which support and promote information based decision-making for maternal and child health. Depending on the organizational structure of the state health agency, these individuals may be located within the MCH program or within adjacent units such as vital records, or in related agencies, such as the state Medicaid program. A second strategy for enhancing capacity requires increasing the ability of those MCH staff whose primary focus is not analytic work to articulate their data and information needs when interacting with their more heavily focused analytic colleagues.

The EASP program's initial offerings focused on enhancing the capacity of MCH administrative and program staff to better understand and express their data and information needs, and to increase their ability to collect and utilize data to address MCH problems. However, over time, the program increasingly focused on meeting the needs of a newly emerging cadre of data analysts in the states, whether these individuals were newly hired or had been recently transferred into new positions. These individuals, while usually possessing basic analytic skills, were not necessarily trained in applied methods, or if newly hired, needed assistance in translating their knowledge and skills to the MCH and public health agency setting. In addition, individuals whose previous job functions had been more clinically based, needed increased preparation for, and orientation to, a population based approach.

As state health agencies move to a more core functions based approach, striking a balance between enhancing the analytic skills of "program" staff and designated "analytic" staff should become easier. In this process, it is essential to move away from job titles to job functions and to ensure that analytic skills training is provided to all those whose daily activities focus on some aspect of the data cycle at a level appropriate to their efforts and responsibilities. While EASP training emphasized the need for an interdisciplinary team of individuals with a variety of skills working together to increase the analytic capacity of the state MCH program, our effort also recognized that analytic skills training needs to occur at multiple levels. EASP chose to fill the particular niche of advanced training because this type of training permits participants to return to their states as leaders capable of moving the analytic efforts of their agencies forward. This "train the trainer" approach, allows analytic skills training to reach a greater number of individuals in state health agencies, while simultaneously promoting the development of MCH state data leaders.

### **How should competency be assessed in a competency-based enhanced analytic skills program for state MCH professionals?**

As skills are being developed during the course of analytic training, it is necessary for participants to practice and demonstrate competency with respect to these newly acquired or enhanced skills. There are a variety of methods to accomplish this; these include variants on traditional formats such as tests, essays or papers, or the use of exercises/practice sessions or interactive case scenarios. Exercises, either narrowly focused on the mastery of a particular skill, or interactive case scenarios which bring together a variety of exercises, allow participants the best opportunity to practice what they have learned as well as demonstrate their mastery of these skills. When utilizing the case scenario approach, it is possible to develop independent cases to accompany specific modules or to use one or two unifying cases in which aspects of the case situation are directly related to several modules, with skills learned in a previous module necessary to complete the next part of the scenario. The use of the unifying case scenario allows for greater synthesis and integration of knowledge and skills than the use of independent cases or exercises, although this may not be the best approach when the program has a short time-frame or very specific skills are the focus.

### **How much hands-on knowledge of computers is necessary in a competency-based enhanced analytic skills program for state MCH professionals?**

When we began EASP, learning analytic skills in conjunction with the use of the personal computer was not seen as essential. In fact, participants submitted data requests to EASP faculty who then conducted appropriate statistical analyses using a mainframe computer. This process was in essence “mimicking” the typical vital records-MCH staff relationship assumed to be prevalent in state health agencies in the early 1990’s. However, as developments in technology accelerated and as health departments began to avail themselves of this increasingly user-friendly technology to conduct analyses with a variety of data-sets, it became clear that while not essential, analytic training would be strengthened by incorporating the use of computers. Using personal computers (laptop computers can be rented for a reasonable cost for an extended period) in the curriculum provides participants with hands-on experience with both user-friendly analytic software readily available to state health agencies (e.g., Epi-Info, Epi-Map) and with new analytic methods or techniques. It also provides participants with the opportunity to practice their newly developing or enhanced analytic skills in a way that they typically find very engaging, and enables them to return home with clearly “visible” skills.

### **What content and skill areas should be included in a competency based enhanced analytic skills program for state MCH professionals?**

While the curriculum in the initial offerings of EASP attempted to address the seven competency areas delineated above, it became clear that some of these competency areas needed to be emphasized over others (e.g., ability to develop and maintain quality assurance, monitoring, tracking, and management information systems was deemed to be such a major, complex and specialized focus that it was excluded from the EASP program) and that some (e.g., ability to develop primary data-sets) were really building blocks in achieving more fundamental competencies such as the ability to conduct a needs assessment. Over time the curriculum solidified around the following elements which we suggest are essential to effective enhanced MCH analytic skills training:

- 1) Information Based Decision-Making as Foundation:** An appreciation of information-based decision-making in public health as an essential first step to developing and enhancing analytic capacity should be a fundamental premise of analytic skills training. As part of this foundation, a discussion of the definitions of health and public health, an understanding of the statutory authority and role of public health, and an appreciation for the philosophical underpinnings and underlying

assumptions which anchor public health policies at the national, state and local levels can be incorporated. Anchoring public health decision-making in an understanding of the interplay between public values, popular opinions, and the level of our scientific knowledge is essential.

- 2) **Planning Cycle Functions Framework:** The analytic activities engaged in by MCH professionals in state health agencies revolve around the planning cycle: surveillance, needs assessment, program planning, program monitoring and evaluation, and policy development. Presentation of a strong conceptual framework which focuses on the components of the planning cycle is therefore a necessary underpinning for analytic training in MCH. Without such a foundation, newly acquired skills are less likely to be successfully integrated into an individual's skill and knowledge base and are less likely to be appropriately implemented in the participant's work environment.
- 3) **Epidemiology and Biostatistics as Building Blocks:** Epidemiology and biostatistics are scientific tools for public health and the essential building blocks for advanced analytic modules. Without a requisite understanding of their basic principles, analytic skills training will not be successful. While enhanced analytic training requires individuals to possess some knowledge in these areas before participation in training, a review of the basics of biostatistics and epidemiology before proceeding to advanced topics strengthens participants' confidence in their existing skill and knowledge base. However, relevance to practicing MCH professionals requires emphasis on the application of these tools in the practice rather than the research setting.
- 4) **Advanced Skill Areas:** Analytic training programs must be on the pulse of emerging issues which are essential to the analytic work of analytic professionals in Maternal and Child Health. Curricula should be revised as appropriate to both expand and fine tune skill areas for development. Examples of content areas which were developed into EASP modules to meet emerging demands for increased competency include: systems analysis, economic analysis, analysis of trend data, summarizing data for decision-making, small area analysis and geographic information systems, and population based program evaluation. Of note, each one of these offerings required several iterations as understanding the importance of a skill or substantive area was not always easily translated into effective educational modules for practicing MCH professionals. As future enhanced analytic skills training programs emerge, an assessment of new areas in which competency needs to be enhanced is necessary.
- 5) **Key Data-sets:** Incorporating didactic and practice sessions using data-sets which are of increasing importance to the analytic efforts of MCH professionals in state health agencies is an essential component of enhanced analytic skills training. At various times, EASP modules were offered which focused on the use of hospital discharge data, census data, Medicaid claims data, the Child Health Interview survey, and the National Maternal and Infant Health survey, while traditional data-sets such as vital records continued to form the basis of many exercises. When incorporating these data-sets into an analytic skills training program, the extent and level of interaction with the data will vary depending on time and other resource constraints; however, participants should be familiar with the purposes, strengths and limitations of each particular data-set. The goal is to promote creative and maximal use of available data-sets to answer and address questions and concerns relevant to the maternal and child population.

Within the limitations of time and available funding, operationalizing and combining all of these elements into a successful analytic skills training program requires an appropriate balance of didactic presentations, skill building sessions, practice exercises, and individual assessment in order to engage and sustain participants as they develop and enhance their analytic skills. Achieving this balance always involves trade-offs and an understanding that each training program or offering cannot meet the multitude of training needs of state level MCH professionals. While recognizing that the "perfect" training program

does not exist, incorporating some or most of the components described above provides an empirical foundation on which to base the efforts of future MCH analytic training programs.

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## THE MODULES IN THIS WORKBOOK

The modules in this workbook reflect the effort of the last seven years and the contribution of all of the faculty of EASP. While the majority of EASP modules are not included, we believe that the modules which do appear here contribute new information or new insights that are not found in a similar format elsewhere. In keeping with EASP philosophy and practice, we have incorporated examples and exercises throughout the modules so that the user of this workbook can learn at their own pace or with their colleagues, testing themselves as they proceed. Alternatively, the workbook can be used as a reference manual to which an MCH professional can turn to check or review an analytic approach. The workbook assumes that the user has had some previous exposure to graduate level epidemiology and biostatistics.

We share this workbook with you, our MCH colleagues engaged in information-based decision-making so that we may reach those professionals who applied to EASP, but who we were not able to serve, as well as the many other individuals whose job responsibilities are changing as their health departments begin to de-emphasize the delivery of personal health services and focus on the core functions of public health. It is our hope that this workbook will contribute to the ongoing effort to increase the analytic capability within state and local MCH programs to improve the health of women, infants, children and adolescents throughout the nation.

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