State of Emergency Preparedness of Kentucky's Rural Public Health Workforce: Assessing Its Ability to Identify Community Health Problems

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SYNOPSIS

Objective. The author examined the emergency preparedness readiness of all workgroups within Kentucky's rural public health departments as it related to the 10 Essential Public Health Services. This article describes the results related to the three emergency preparedness competencies for the first Essential Public Health Service: the ability to monitor health status to identify community health problems.

Methods. Onsite surveys were conducted in one urban and 93 rural Kentucky public health agencies during 2005 and 2006. Categorical data were analyzed using univariate and multivariate analysis techniques. The author compared responses to the level of confidence (LOC) and need for training (NFT) among the seven workgroup classifications.

Results. One thousand nine hundred ninety-four public health workers completed the surveys. Of these, 1,813 workers represented 55% of the state's rural local public health workforce. Kentucky's rural public health workforce can be described as predominantly Caucasian, female, and not planning to retire within the next five years. There were significant differences among workgroups for LOC and NFT for each competency examined. Across all workgroups, there was a mean LOC (58%) in the ability to describe the actions to take and procedures to follow in an emergency. There was a correspondingly higher mean perceived NFT (73%) for this competency.

Conclusion. This study raises the question of whether we are adequately prepared to monitor our communities' health status. Further research that minimizes the limitations of self-reports and, instead, requires the worker to demonstrate the competency may provide a more accurate assessment of emergency preparedness.

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A report released by the Trust for America's Health examined 10 key indicators to gauge state preparedness and determine America's overall readiness to respond to bioterrorist attacks and other health emergencies.¹ The report gave Kentucky a score of eight out of 10. Kentucky continues to move forward in preparing its public health workforce to meet the potential emergency situations that face its communities.

Limited research on the particular workforce needs of rural public health departments has been conducted. In a study comparing rural and urban local public health workers in three states, researchers found that rural health departments (1) tended to have less support staff, (2) had a greater reliance on the public health nurse, (3) were less likely to have formal public health training and experience, and (4) were more likely to work part-time.²

Few research studies have examined public health worker competence or capacity.³⁻⁶ In examining national and state public health performance standards, Reid et al. found uneven performance across the state health departments in Florida, especially in the area of workforce development.⁷ There are even fewer studies documenting rural public health workforce competency.^{6,8,9} One such study found wide variations in emergency preparedness in a sample of public health agencies in seven rural, urban, and border California jurisdictions.⁹

The purpose of this study was to examine the emergency preparedness readiness of all workgroups within Kentucky's rural public health departments. The Kentucky Department of Public Health was interested in examining the seven workgroups' level of confidence (LOC) and need for training (NFT) as each related to the 10 Essential Public Health Services. For the purpose of this article, we limited our findings and discussion to the first Essential Public Health Service: the ability to monitor health status to identify a community health problem.

METHODS

This study was a combined qualitative and cross-sectional survey using primary data sources, a categorical distribution model, and systematic sampling. Onsite surveys were conducted in 94 of the 120 Kentucky public health agencies; 93 agencies were rural and one was urban. Rural counties were determined based on the U.S. Census Bureau's definition of urbanized area or urbanized cluster. Anything outside of these two definitions was categorized as rural.¹⁰

We surveyed participants using the Kentucky Public Health Workforce Survey Training Needs Assessment of

Emergency Preparedness instruments that contained emergency preparedness competency questions based on the 10 Essential Public Health Services for eight specific workgroup classifications: (1) Bioterrorism Preparedness Planners, (2) Education & Information Staff, (3) Environmental Staff, (4) Epidemiology Staff, (5) Laboratory Professionals, (6) Leaders & Officials, (7) Nursing Staff, and (8) Technical & Support Workers.¹¹

The instruments' content was derived from the Emergency Preparedness and Bioterrorism competencies developed by New York's Columbia University School of Nursing under a cooperative agreement between the Centers for Disease Control and Prevention (CDC) and the Council on Linkages Between Academia and Public Health Practice.¹¹ A total of 39 items based on generic emergency preparedness competencies identified by Gebbie and Merrill were presented in each survey instrument for each workgroup.¹²

To determine which workforce members would receive the appropriate assessment instrument, we collaborated with the personnel division to classify each state-assigned position into one of the eight workgroup classifications. The first component of the survey solicited detailed demographic information; the second component assessed the workgroups' perceived LOC and NFT in the 10 Essential Public Health Services as each related to emergency preparedness. For this study, three competencies relating to emergency preparedness were examined for the first Essential Public Health Service: the ability to monitor health status to identify community health problems:

1. Recognize unusual events that might indicate an emergency situation.
2. Describe the appropriate action to take and procedures to follow if there is a suspected or actual emergency.
3. Identify whom to report suspected or actual emergencies.

The main purpose of this study was to find relationships between the independent variable (workgroup classification) and the response variables (LOC and NFT). Participants were asked to respond to each competency using a four-point Likert scale in terms of the following questions:

1. To what extent are you confident of your knowledge/skills reflected by this item? (A = not at all confident to D = very confident)
2. To what extent do you need training in this knowledge/skill area? (A = no need to D = high need)

Our study was part of a more comprehensive research investigation on emergency preparedness for all 10 Essential Public Health Services. This article is limited to an analysis of the relationship between workgroup classifications as they relate to the LOC and NFT for the first Essential Public Health Service. Scores were derived for each emergency preparedness competency for the essential service and calculated for each workgroup.

Data collection

We contacted each targeted county health department administrator or designee to explain the purpose of the study and to arrange a date to conduct the survey. Prior to the survey date, each administrator received a packet of informational materials. The survey was administered using a focus group method in small or large group settings, depending on the health department's scheduling flexibility. We were available to clarify the survey's purpose, help respondents understand and interpret the questions, and ensure respondents completed all appropriate sections. To ensure an increased response rate, a survey was mailed to all staff members who were not present for the onsite administration. Surveys were collated according to workgroup classification. Data were collected over a 52-week period during 2005 and 2006.

Data analysis

The statistical software programs used to analyze univariate and multivariate categorical data were SPSS and JMP.^{13,14} Contingency tables (counts, total percentage, column percentage, and row percentage) and corresponding Tests tables (e.g., Chi-square and *p*-values) were generated for all LOCs and NFTs for each competency (confident, not at all confident, somewhat confident, and very confident; high need, low need, moderate need, and no need). When *p*-values were 0.05 or less, the data were determined to be statistically significant. For analysis purposes, laboratory staff (*n*=9) was combined with technical support staff, resulting in seven workgroup classifications. Distribution tables were generated for workgroup classification and for each of the LOCs and NFTs.

Because we were trying to show workers who were at least confident, we combined the two levels—very confident and confident—into a singular “confident” category. The two levels—not at all confident and somewhat confident—were likewise combined to create a “not confident” category. Also, to identify workers who had an NFT, we combined high need and moderate need, creating a singular “need” category; low need

and no need were combined to create a “no need” category. After combining the levels, we created new contingency tables resulting in an increased *n* for the combined level for each workgroup classification. We also generated additional distribution tables, reorganizing the results into the four categories.

The data were examined for significant differences for LOC and NFT among the seven workgroups for each competency. To determine where the significant differences were occurring, we further analyzed the data for significant differences between paired workgroups (e.g., Education & Information and Nursing; Epidemiologists and Technical & Support). Each workgroup was applied as a constant against the other six workgroups for each competency for both LOC and NFT, resulting in 197 tables. We compared the results obtained when the levels were combined with those obtained when the data remained disaggregated.

RESULTS

Demographics of Kentucky public health workforce

In all, 1,994 public health workers completed the surveys, representing 48% of Kentucky's public health workforce assigned to local health agencies and 55% of the state's rural local public health workforce. One thousand seven hundred ninety-four workers were women and 185 were men; 96% were Caucasian. The respondents included department directors, managers, professionals, and administrative and support staff in the seven workgroup classifications. Of the total respondents, the percentage of valid responses varied as follows: Technical & Support (53%), Nursing (30%), Environmental (6%), Education & Information (6%), Preparedness Planners (3%), Leaders & Officials (2%), and Epidemiology (<1%). The Leaders & Officials surveyed represented 25 rural public health administrators or directors out of a possible 50 respondents for this workgroup.

Table 1 addresses a variety of demographic items: it shows the overwhelming percentage of workers is female; in fact, they dominate all workgroups except Environmental and Epidemiology. Almost 40% of the respondents reported a high school diploma as their highest level of education; 97% of these were Technical & Support Staff. Not counting Epidemiologists because of the small number of respondents, the Environmental and Education & Information workgroups had the most formal education (98% with a bachelor's degree or higher) followed by Preparedness Planners (82%) and Nursing (28%). Sixty-three percent of the respondents did not plan to retire from public health within the

Table 1. Summary of Kentucky public health demographics by workgroup classification

Demographics	Education & Information	Environment	Epidemiology	Leaders & Officials	Nursing	Preparedness Planners	Technical & Support	Total
	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)
Primary worksite	(n=111)	(n=118)	(n=11)	(n=25)	(n=595)	(n=63)	(n=1,061)	
Local public health agency	96/86.5	109/92.4	6/54.5	18/72.0	544/91.4	37/58.7	876/82.6	1,686/85.086/14.4
District public health agency	12/10.8	9/7.6	5/45.5	7/28	51/8.6	25/39.7	177/16.7	286/14.4
State public health agency	3/2.7	0/0	0/0	0/0	0/0	1.6	8/0.8	12/0.6
Position status	(n=109)	(n=118)	(n=11)	(n=25)	(n=593)	(n=62)	(n=1,058)	
Full-time	101/92.7	114/96.6	11/100.0	25/100	538/90.7	59/95.2	1,010/95.5	1,858/94.0
Part-time	8/7.3	4/3.4	0/0	0/0	55/9.3	3/4.8	48/4.5	118/6.0
Working in your current job position?	(n=108)	(n=115)	(n=11)	(n=25)	(n=586)	(n=61)	(n=1,049)	
<1 year	17/15.7	12/10.4	2/18.2	2/8.0	72/12.3	14/23.0	129/12.3	248/12.7
1-2 years	16/14.8	13/11.3	2/18.2	4/16.0	44/7.5	34/55.7	96/9.2	209/10.7
3-5 years	38/35.2	22/19.1	7/63.6	2/8.0	161/27.5	11/18.0	263/25.1	504/25.8
6-10 years	18/16.7	19/16.5	0/0	9/36.0	127/21.7	1/1.6	196/18.7	370/18.9
>10 years	19/17.6	49/42.6	0/0	8/32.0	182/31.1	1/1.6	365/34.8	624/31.9
Working for your current agency?	(n=109)	(n=116)	(n=11)	(n=24)	(n=586)	(n=62)	(n=1,015)	
<3 years	29/26.7	28/24.1	10/91.0	5/20.8	108/18.4	36/58.1	190/18.7	406/21.1
3-5 years	30/27.5	18/15.5	1/9	3/12.5	103/17.6	8/12.9	169/16.7	332/17.3
6-10 years	24/22.0	17/14.7	0/0	5/20.8	118/20.1	7/11.3	172/16.9	343/17.8
11-15 years	12/11.0	22/19.0	0/0	1/4.2	141/24.0	5/8.1	245/24.1	426/22.1
>15 years	14/12.8	31/26.7	0/0	10/41.7	116/19.8	6/9.7	239/23.5	416/21.6
Working in public health?	(n=108)	(n=117)	(n=11)	(n=23)	(n=567)	(n=62)	(n=960)	
<3 years	26/24.1	23/19.7	4/36.4	1/4.3	79/13.9	30/48.4	155/16.1	318/17.2
3-5 years	30/27.8	13/11.1	5/45.4	3/13.0	96/16.9	9/14.5	159/16.6	315/17.0
6-10 years	19/17.6	24/20.5	1/9.1	6/26.1	119/21.0	9/14.5	190/19.8	368/19.9
11-15 years	11/10.2	22/18.8	0/0	1/4.3	152/26.8	6/9.7	230/24.0	422/22.8
16-20 years	11/10.2	9/7.7	0/0	5/21.7	62/10.9	6/9.7	107/11.1	200/10.8
21-25 years	5/4.6	9/7.7	0/0	1/4.3	29/5.1	1/1.6	69/7.2	114/6.2
>25 years	6/5.5	17/14.5	1/9.1	6/26.1	30/5.3	1/1.6	50/5.2	111/6.0

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Table 1 (continued). Summary of Kentucky public health demographics by workgroup classification

Demographics	Education & Information	Environment	Epidemiology	Leaders & Officials	Nursing	Preparedness Planners	Technical & Support	Total
	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)	Number (percent)
Plan to retire from public health?	(n=109)	(n=118)	(n=10)	(n=25)	(n=592)	(n=63)	(n=1,050)	
Don't know/not sure	33/30.3	18/15.2	6/60.0	2/8.0	97/16.4	23/36.5	203/19.3	382/19.2
No	8/7.3	1/0.8	2/20.0	1/4.00	15/2.5	3/4.8	31/2.9	61/3.1
Yes	68/62.4	99/83.9	2/20.0	22/88.0	480/81.0	37/58.7	816/77.7	1,524/77.5
Retire/leave public health in 5 years	(n=109)	(n=118)	(n=10)	(n=25)	(n=592)	(n=63)	(n=1,052)	
Don't know/not sure	23/21.1	20/16.9	3/30.0	5/20.0	106/17.9	20/31.7	223/21.2	400/20.3
No	62/56.9	74/62.7	6/60.0	9/36.0	406/68.6	39/61.9	651/61.9	1,247/63.3
Yes	24/22.0	24/20.3	1/10.0	11/44.0	80/13.5	4/6.3	178/16.9	322/16.4
Gender	(n=109)	(n=118)	(n=10)	(n=25)	(n=594)	(n=63)	(n=1,060)	
Female	101/92.7	34/28.8	5/50.0	14/56.0	589/99.2	37/58.7	1,014/95.7	1,794/90.7
Male	8/7.3	84/71.2	5/50.0	11/44.0	5/0.8	26/41.3	46/4.3	185/9.3
Current age (years)	(n=109)	(n=118)	(n=10)	(n=25)	(n=595)	(n=63)	(n=1,978)	
≤24	4/3.7	5/4.2	0/0	0/0	6/1.0	3/4.7	27/2.5	45/2.3
25–34	42/38.5	44/37.3	6/60.0	2/8.0	116/19.5	24/38.1	181/17.1	415/21.0
35–44	24/22.0	28/23.7	0/0	3/12.0	184/30.9	16/25.4	340/32.1	595/30.1
45–54	25/22.9	29/24.6	1/10	11/44.0	209/35.1	15/23.8	338/31.9	628/31.7
≥55	14/12.8	12/10.2	3/30.0	9/36.0	80/13.4	5/7.9	172/16.3	295/14.9
Educational background (degree)	(n=110)	(n=118)	(n=10)	(n=25)	(n=587)	(n=63)	(n=1,049)	
Associate	1/0.9	1/0.8	0/0	1/4.0	412/70.2	7/11.1	155/14.8	577/29.4
Bachelor	79/71.8	99/83.9	1/10.0	5/20.0	143/24.4	37/58.7	109/10.4	473/24.1
High school diploma	0/0	1/0.8	0/0	3/12.0	12/2.04	4/6.3	743/70.8	763/38.9
Master's or higher	30/27.3	17/14.4	9/90.0	16/64.0	20/3.4	15/23.8	42/4.0	149/7.6

NOTE: Table includes data from 93 rural health agencies and one urban health agency.

next five years. The vast majority of this percentage was represented by the Technical & Support (52%) and Nursing (33%) workgroups.

Emergency preparedness competency across workgroups

Tables 2 through 7 show results of the contingency analysis of each of the eight LOCs and NFTs for all three competencies by workgroup classification. After combining the eight LOCs and NFTs into four categories for each competency (tables not shown), a comparison of the two datasets revealed no significant differences ($p < 0.0001$). When the LOCs and NFTs were combined into four categories, the results showed that there were some differences in the Chi-square values for Likelihood Ratio and Pearson Test. However, the p -values remained the same.

Table 8 shows the results of LOCs and NFTs for all three emergency preparedness competencies for this Essential Public Health Service. Results reveal that across all workgroups, competency 1b (describe the appropriate action to take and procedures to follow if there is a suspected or actual emergency) had the lowest average LOC (58%) and the highest NFT (73%).

An analysis of paired workgroups showed a significant difference in the LOCs or NFTs in one or more of the competencies examined for 20 paired workgroups. Across the three competencies, competency 1b had the greatest frequency of significant differences for LOC (8 of 11; $p < 0.0001$) among the paired workgroups. This suggests that the LOC to describe actions to take and procedures to follow in the event of an emergency situation is not as high as the other two competencies, irrespective of the paired workgroup. The results correspond to the results found in Table 8. The results also reveal that significant differences between workgroups

occur less frequently for NFT than for LOC for each competency.

DISCUSSION

The purpose of this study was to examine the state of emergency preparedness of the seven Kentucky workgroups as it related to the workers' ability to monitor health status to identify community health problems (the first Essential Public Health Service). We investigated each workgroup's perceived LOC and NFT for each emergency preparedness competency related to this essential service. With a mean of 58% of the respondents reporting being confident in their ability to describe the appropriate action to take and procedures to follow in case of a suspected or actual emergency situation, this study raises the question of whether we are adequately prepared to monitor the health status of our communities.

Workgroups receiving the most post-9/11 preparedness training perceived themselves as most confident in their knowledge and skills: Preparedness Planners, Leaders & Officials, Epidemiologists, and Environmentalists. Nurses, Technical & Support, and Education & Information workgroups perceived themselves as least confident in their ability to monitor the community's health status. Although we were able to capture most, if not all, of the Preparedness Planners, Leaders & Officials, and Epidemiologists within Kentucky, the sparse sample size of these workgroups is not generalizable to other regions of the U.S. Even if we had surveyed every public health worker in the state of Kentucky, the population of these groups would not have increased by any significant margin. This limitation of the study points to the need for further research capturing a larger sampling of Leaders & Officials,

Table 2. Percent of workers by classification reporting level of confidence (LOC) for 1a: recognize unusual events that might indicate an emergency situation

Workgroup classification	Emergency preparedness 1a (LOC)								Count	Total percent
	Confident		Not at all confident		Somewhat confident		Very confident			
	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	357	40	67	8	351	40	112	13	887	51.87
Nursing	261	47	17	3	171	31	105	19	554	32.40
Environmental	56	57	0	0	17	17	25	26	98	5.73
Education & Information	35	44	5	6	32	40	8	10	80	4.68
Preparedness Planners	21	36	0	0	20	34	18	31	59	3.45
Leaders & Officials	12	52	1	4	3	13	7	30	23	1.35
Epidemiology	5	56	0	0	2	22	2	22	9	0.53
Mean percent		47		3		28		22		

Table 3. Percent of workers by classification reporting need for training (NFT) for 1a: recognize unusual events that might indicate an emergency situation

Workgroup classification	Emergency preparedness 1a (NFT)								Count	Total percent
	High need		Low need		Moderate need		No need			
	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	139	17	222	26	408	48	73	9	842	51.56
Nursing	71	13	198	37	234	44	27	5	530	32.46
Environmental	4	4	37	38	51	53	5	5	97	5.94
Education & Information	11	14	17	22	45	59	3	4	76	4.65
Preparedness Planners	12	21	14	25	28	49	3	5	57	3.49
Leaders & Officials	4	18	7	32	10	45	1	5	22	1.35
Epidemiology	2	22	4	44	2	22	1	11	9	0.55
Mean percent		16		32		46		6		

Preparedness Planners, and Epidemiologists to make relevant generalizations.

An interesting observation is the relationship between formal education and perceived LOC across workgroups for the three competencies. One would expect major differences in LOCs in emergency preparedness and educational levels. However, at first glance, the differences between the LOCs of workers with associate or bachelor's degrees do not appear strikingly dissimilar. Further analysis of the data is necessary to determine significance.

An area of concern revealed in the results is the lack of preparedness of the Technical & Support workers based on their reported LOCs in all three competencies. These are primarily clerical staff and are most likely the people who first interface with the public. A little less than half of the respondents in this work-

group perceived themselves as not confident in their overall averaged competency (52%) as related to their ability to monitor the community's health status. This may be a concern for policy makers and public health officials; however, the reasons for the concern may be more complex than at first glance and point to a second limitation of this study: the use of self-reports.¹⁵⁻¹⁷

Is it true that 52% of Technical & Support workers are knowledgeable about their incompetence and rated themselves appropriately? Could it be, as other researchers have argued, a function of an incompetent individual's inability to assess his/her own performance?¹⁵ Studies by Kruger and Dunning found that incompetent people grossly overestimated their abilities relative to their peers.¹⁷

While it was anticipated that Technical & Support workers would have lower LOCs, the results for Nurs-

Table 4. Percent of workers by classification reporting level of confidence (LOC) for 1b: describe the appropriate action to take and procedures to follow if there is a suspected or actual emergency situation

Workgroup classification	Emergency preparedness 1b (LOC)								Count	Total percent
	Confident		Not at all confident		Somewhat confident		Very confident			
	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	249	27	185	20	433	48	44	5	911	52.30
Nursing	178	32	81	15	269	48	26	5	554	31.80
Environmental	53	54	6	6	25	25	15	15	99	5.68
Education & Information	30	34	13	15	42	48	2	2	87	4.99
Preparedness Planners	28	47	2	3	12	20	17	29	59	3.39
Leaders & Officials	14	61	0	0	5	22	4	17	23	1.32
Epidemiology	3	33	0	0	2	22	4	44	9	0.52
Mean percent		41		8		33		17		

Table 5. Percent of workers by classification reporting need for training (NFT) for 1b: describe the appropriate action to take and procedures to follow if there is a suspected or actual emergency situation

Workgroup classification	Emergency preparedness 1b (NFT)								Count	Total percent
	High need		Low need		Moderate need		No need			
	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	271	31	138	16	420	48	40	5	869	51.88
Nursing	158	29	89	17	279	52	11	2	537	32.06
Environmental	19	19	20	20	57	57	2	2	98	5.85
Education & Information	27	33	14	17	38	46	3	4	82	4.90
Preparedness Planners	16	28	17	30	22	39	2	4	57	3.40
Leaders & Officials	4	17	5	22	12	52	2	9	23	1.37
Epidemiology	2	22	3	33	3	33	1	11	9	0.54
Mean percent		26		22		47		5		

ing—the second-largest workgroup identified—were more perplexing. A little less than half of the respondents did not feel confident in their knowledge and skills in the emergency preparedness competencies as related to their ability to monitor the community's health status. In rural areas, nurses are the closest service providers to that of physicians. In more remote areas, there is a greater probability that rural public health nurses may be called upon to respond to an emergency medical event.⁸ However, the nurses who responded to this survey question indicated only a 37% confidence rating in their ability to describe the action to take or procedures to follow in an emergency situation.

Likewise, a concern exists for the Education & Information workgroup. This workgroup's mean LOC (55%) across all competencies was less than desirable.

In essence, almost half of the workgroup whose role is to conduct community outreach services (e.g., schools, nursing homes, and civic organizations) did not feel confident in their knowledge or skills in monitoring the community's health status. Even where individuals are considered trained and perceive themselves as more confident, such as Environmentalists, Epidemiologists, and Leaders & Officials, we must remain open to the debate on the accuracy of their self-assessments. Some studies on self-reporting have found that highly competent people may also show systematic bias in their self-assessments.¹⁷

The reasons for the perceived LOCs are multifaceted. Notwithstanding the limitations of this study, one plausible reason for LOC may be the limited emergency preparedness training offered to these workers, some of whom are part of rapid response teams. There may

Table 6. Percent of workers by classification reporting level of confidence (LOC) for 1c: identify to whom to report suspected or actual emergencies

Workgroup classification	Emergency Preparedness 1c (LOC)								Count	Total percent
	Confident		Not at all confident		Somewhat confident		Very confident			
	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	402	42	45	5	233	25	270	51	950	53.19
Nursing	247	44	21	4	141	25	149	27	558	31.24
Environmental	40	40	3	3	16	16	40	40	99	5.54
Education & Information	41	47	3	3	20	23	23	26	87	4.87
Preparedness Planners	23	39	1	45	3	5	32	54	59	3.30
Leaders & Officials	10	42	0	0	2	8	12	50	24	1.34
Epidemiology	3	33	0	0	0	0	6	67	9	0.50
Mean percent		41		9		15		45		

Table 7. Percent of workers by classification reporting need for training (NFT) for 1c: identify to whom to report suspected or actual emergencies

Workgroup classification	Emergency preparedness 1c (NFT)								Count	Total percent
	High need		Low need		Moderate need		No need			
	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	110	13	255	29	343	39	163	19	871	52.25
Nursing	61	12	170	32	230	44	67	13	528	31.67
Environmental	7	7	35	35	44	46	10	10	96	5.76
Education & Information	11	13	32	39	28	34	12	14	83	4.98
Preparedness Planners	5	9	30	53	17	30	5	9	57	3.42
Leaders & Officials	3	13	11	48	4	17	5	22	23	1.38
Epidemiology	1	11	6	67	1	11	1	11	9	0.54
Mean average		11		43		32		14		

be other factors that account for the perceived LOC for the groups discussed in this article. Further research is needed to determine, to the greatest extent possible, the LOC of the public health workforce; however, cost may be a major barrier for both the university researcher and state officials.

When we consider overall means for the three competencies, only 65% of the nurses responding

recognized an NFT in one or more of the competencies under this Essential Public Health Service. The results are comparable to findings of an earlier study assessing the nurses' workforce training needs in the 10 Essential Public Health Services across four states.^{2,8,18} In addition, one would expect that Technical & Support Staff would have a correspondingly high NFT. However, not everyone who responded to the LOC

Table 8. Percent of workers reporting level of confidence (LOC) and need for training (NFT) for each emergency preparedness competency (EP) by workgroup classification

Workgroup classification	EP 1a ^a				EP 1b ^b				EP 1c ^c				Mean percent	
	LOC		NFT		LOC		NFT		LOC		NFT		LOC ^d	NFT ^e
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent		
Technical & Support	469	53	547	65	293	32	691	79	672	71	453	52	52	65
Nursing	366	66	305	58	204	37	437	81	396	71	291	55	58	65
Environmental	81	83	55	57	68	69	76	78	80	81	51	53	78	63
Education & Information	43	54	56	74	32	37	65	79	64	74	39	47	55	67
Preparedness Planners	39	66	40	70	45	76	38	67	55	93	22	39	78	59
Leaders & Officials	19	83	14	64	18	78	26	70	22	92	7	30	84	55
Epidemiology	7	78	4	44	7	78	5	56	9	100	2	22	85	41
Mean percent		69		62		58		73		83		43		

^aRecognize unusual events that might indicate an emergency situation.

^bDescribe the appropriate action to take and procedures to follow if there is a suspected or actual emergency situation.

^cIdentify to whom to report suspected or actual emergencies.

^dMean percent of LOC for each competency (e.g., Technical & Support [(53+32+71)/3 = 52%]).

^eMean percent of NFT for each competency (e.g., Technical & Support [(65+79+52)/3 = 65%]).

part of the question gave a corresponding response to NFT. Do these individuals have the metacognitive skills to adequately judge their NFT to improve their ability to monitor the community's health status?¹⁷

Because the most trained workers (Preparedness Planners, Leaders & Officials, Environmentalists, and Epidemiologists) perceived themselves as most confident compared with the other workgroups, one would expect a correspondingly low NFT from these groups. However, this is not consistent across the three competencies. A 73% mean of all workgroups perceived an NFT to improve their ability to describe the actions to take in the event of a real or suspected emergency situation. Contrast this with the 62% and 43% means of the other two competencies for the first Essential Public Health Service. The fact that every workgroup, not counting Epidemiologists, had a relatively high NFT (i.e., Environmentalists: 78%, Nursing: 81%, and Technical & Support: 79%) is significant. Could it be that the workgroups understood this question and recognized their lack of knowledge and skills? Or perhaps the responses were based on interest in learning more about a high-profile issue.¹⁶ Another possible explanation may be that the impact of 9/11 and Katrina might have raised the level of urgency to be prepared and meet the public's expectations.

Still another explanation may be that the response to the question is subject to the respondent's interpretation of the question, and this may vary from one individual to another. Some researchers argue the wording of the question influences the response to it.¹⁶ They further argue that the generic nature of the public health workforce survey questions (the one used in this study) make it difficult to adequately interpret the self-report responses.¹⁶

CONCLUSIONS

The results of this study have implications for our work at the local and state levels. For us to adequately protect the public, our workforce—all workgroups—must be competent in the most basic Essential Public Health Service: monitoring health status to identify a community health problem. Without the knowledge and skills to monitor the status of the public's health—(1a) recognize an emergency event, (1b) describe the actions to take, and (1c) know to whom to report the situation—it is questionable as to whether we can meet the other nine Essential Public Health Services as related to emergency health. Local rural health department leaders must recognize the need to train every employee in these competencies; initial contact is a critical juncture to protect the public.

Given the dearth of research studies in rural public health, substantially more research must be conducted for policy makers to make better decisions about workforce competency and training. Further research on the competencies examined in this study that minimizes the limitations of self-reports may provide a more accurate assessment of worker competency. Such a study should allow for workers to demonstrate competency. An obvious drawback is cost and time; therefore, it is expected that such a study may be limited in size and scope. In addition, other studies are needed to compare the readiness of Kentucky's rural workgroups against their urban counterparts. One complicating barrier to this will be sorting through positions to classify them into the appropriate workgroup classifications identified in this study. Finally, further analysis of the existing data for other trends and patterns within and across workgroups is needed.

Providing more formal public health training specific to each workgroup would improve the knowledge and skills fundamental to public health service. This, in turn, would raise the workers' ability to perform multifaceted public health duties and responsibilities, including emergency preparedness. This would most likely result in an increased LOC for public health workers. Improving the LOC in emergency preparedness competencies for each workgroup in the rural public health workforce is critical to maintaining a strong homeland security infrastructure.

The author thanks Richard Clayton, PhD, Associate Dean for Research, and Richard Kryscio, PhD, Chair, Biostatistics, both of the University of Kentucky College of Public Health, Lexington, KY, for their input.

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