

BIOTERRORISM KNOWLEDGE SURVEY
OF LICENSED PROFESSIONALS IN HAWAI'I

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ABSTRACT

Survey Objective: To determine the bioterrorism knowledge base, awareness of state-mandated reporting laws, perceived levels of bioterrorism response competency and preferences in training modes and formats of licensed physicians, nurses, dentists, veterinarians, social workers and psychologists in the state of Hawai'i.

Design: Cross-sectional surveys, tailored to each professional class, mailed to a stratified random sample of the target populations.

Thesis Objective: To identify and analyze the demographic and background factors affecting each profession's score on the objective knowledge-based questions.

Results: On their respective survey version, physicians scored 70.2% (SD 14.8), nurses 59.8% (SD 17.3), dentists 60.7% (SD 18.2), veterinarians 73.4% (SD 16.1) and social workers and psychologists 62.7% (SD 16.9). Prior training significantly ($p < 0.05$) increased scores of physicians and nurses. For nurses, working in an academic setting increased their score, but working in patient care decreased their score. Being retired or inactive decreased the scores of social workers and psychologists.

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1 INTRODUCTION

“He that will not apply new remedies, must expect new evils: for Time is the greatest innovator: and if Time, of course, alter things to the worse, and wisdom and counsel shall not alter them to the better, what shall be the end?” -Francis Bacon (1561-1626)¹

An education ... it's knowing where to go to find out what you need to know; and it's knowing how to use the information you get. -William Feather (1889-1981)²

One of the critical components for a successful response to a bioagent attack is a properly trained community of medical personnel and related professions. Physicians and nurses need to recognize, diagnose, treat and alert public health and law enforcement.³⁻⁶ Dentists could provide supplemental medical capabilities, both personnel and facilities, if conventional resources are being overwhelmed.⁷⁻⁹ Veterinarians will be especially important should the bioagent be zoonotic or if the attack is directed at agriculture.^{10,11} Social workers and psychologists will be instrumental in providing early psychological interventions in mass casualty incidents.^{12,13} All will be necessary for early detection, reporting, and an effective response.

In the spotlight after the anthrax mailings, many trainings were created and more information became available. However, there was less attention paid to standardization of trainings or guidelines as to what each profession should know, and clear definitions of their roles in a bioterrorism event. Now the need is to focus training plans on the roles, responsibilities and standard knowledge bases for each profession. These professional groups will need different sets of information.

Crucial information to create these training programs is the current knowledge base of the targeted populations, and the desired methods and modes of the trainings. For the state of Hawaii, this information was not completely available. A pre-9/11 survey¹⁴

had gathered information on the number of physicians and nurses available in a mass casualty event, self-perceived levels of knowledge, barriers to learning and preferences in training formats. This current survey proposes to perform a current assessment, reflecting any and all recent trainings, of knowledge levels, both objective and subjective, in the broader population of health care providers.

This thesis provides a discussion on survey creation and implementation and also results and analysis of the objective knowledge questions.

2 INSTRUMENT AND METHODS

To develop appropriate training plans for key bioterrorism response professionals, information must be gathered on their needs and preferences regarding educational content and delivery. To accomplish this goal, a statewide survey was employed. The cross-sectional survey was sent to a random sample of licensed professionals (physicians, nurses, dentists, veterinarians, social workers and psychologists) in Hawaii. The survey instrument contained four sections to evaluate knowledge levels, objective and subjective, training preferences and background information. The instrument was planned based on Dillman's Tailored Design method¹⁵; a detailed discussion on creation and implementation aspects is included.

As the research involved human subjects, the survey proposal was reviewed by the University of Hawaii Institutional Review Board (IRB) and was granted an exemption.

2.1 Study Population

Data were collected via a survey mailed out to a stratified random sample of the targeted populations in the state of Hawaii:

- Licensed physicians
- Licensed nurses
- Licensed dentists
- Licensed veterinarians
- Licensed clinical psychologists and clinical social workers

The database of licensed professionals was obtained from the Hawai'i State Department of Commerce and Consumer Affairs. The random numbers for sampling

were generated by Epi Info™ 6 [version 6.04d, Centers for Disease Prevention and Control].

Sample sizes were calculated via a construct variable. This variable was defined as achieving greater than or equal to 80% correct on the objective knowledge questions. Since variance of a proportion is highest at 50%, this was designated the expected value. Equations for calculations can be found in Figure 2.1: Equations for Sample Size Calculations. In addition, a low response rate (approximately 30-40%) was expected, so the resulting value was multiplied three. For final sample sizes, please see Table 2.1: Sample Size Calculations.

$$t = \frac{\text{Difference between Expected and Worst Acceptable Frequency}}{\text{Standard Deviation of a Proportion}}$$

$$t = \frac{\text{Expected} - \text{Worst Acceptable Frequency}}{\sqrt{\left(\frac{p(1-p)}{n_o}\right)}}$$

$$t_{\alpha=0.05} = \frac{50\% - 40\%}{\sqrt{\left(\frac{0.5^2}{n_o}\right)}}$$

$$1.96 = \frac{0.1}{\frac{0.5}{\sqrt{n_o}}}$$

$$n_o = 96.04$$

$$n = \frac{n_o}{1 + \frac{n_o - 1}{N}}$$

Where t = Student's t, p = probability of event (scoring ≥ 80%),
n_o = sample size (without finite population correction), N = total population size,
and n = final sample size

Figure 2.1: Equations for Sample Size Calculations

	Total number	Expected Frequency	Worst Acceptable	95% Confidence Interval	Non-response factor	Sample Size
Physicians	3617	50	40	94	3	282
Nurses	10628	50	40	95	3	285
Dentists	1016	50	40	80	3	240
Veterinarians	229	50	40	68		229*
Soc. Workers & Psychologists	1633	50	40	91	3	273
Total						1309

* Note: Sampled entire population of Veterinarians, calculated value was 204.

Table 2.1: Sample Size Calculations

2.2 Survey Concept and Content

The survey was created to assess three aspects [Survey proposal, Dr. Katz]:

1. Assess knowledge base of the target population
2. Uncover areas of weakness and areas of perceived needs with respect to bioterrorism preparedness training
3. Assess knowledge of current mandated reporting laws in the state of Hawaii.

2.2.1 Surveys questions specific to professional class

As the different professionals groups have different areas of expertise, each section was tailored to four groups: Physicians and Nurses, Dentists, Veterinarians, Social workers and Psychologists.

2.2.2 Section I: Knowledge Questions

This section was designed to check the professional's knowledge base by using objective testing. Questions were drawn from current post-training tests or published information by professional organizations. Medical questions were mostly chosen from Morbidity and Mortality Weekly Reports (MMWR)¹⁶⁻¹⁸ or Medscape¹⁹⁻²² training post-

tests. The psychology questions were created from a National Institute of Mental Health (NIMH) publication.¹⁵ The question testing familiarity with state reporting laws was created from Hawai'i Administrative Rules Chapters 11-156²³ and 4-3-22²⁴.

Survey	Number of questions
Physicians and Nurses	13
Dentists	10
Veterinarians	10
Social Workers and Psychologists	7

Table 2.2: Number of Questions in Section I: Knowledge Questions by Survey

2.2.3 Section II: Knowledge Levels

This section attempted to elucidate the perceptions of the professionals in terms of their knowledge levels in areas related to bioterrorism. For competency statement, the respondent was directed to mark the best reflection of their level of competency on a scale from Strongly Disagree, Disagree, Neutral, Agree to Strongly Agree.

Survey	Number of questions
Physicians and Nurses	4
Dentists	7
Veterinarians	7
Social Workers and Psychologists	9

Table 2.3: Number of Questions in Section II: Knowledge Levels by Survey

2.2.4 Section III: Response and Training

This section inquired on any past bioterrorism trainings, whether the respondent would assist in the state's emergency efforts during a bioterrorism event, and desired areas of future trainings. If the professional had received past trainings, they were asked to mark the numbers of hours in the past year and, for social workers and psychologists, if the training was through the Red Cross. Respondents were asked to mark categories for areas in which they wished additional trainings. These categories were created based on the professional group: 11 categories for physicians and nurses, 11 for dentists, 12 for

veterinarians, and 19 for social workers and psychologists. An open-ended question gathered comments for any additional bioterrorism training needs. For all but the physicians and nurses, a couple of questions requested desired training formats and modes. Physicians and nurses were not asked because a concurrent survey included similar questions. [Unpublished data, Linda Nakao from Honolulu Emergency Services Department of the City and County of Honolulu]

2.2.5 Section IV: Background Information

This short section gathered basic demographic information about the respondent. Questions were asked about age (10 year categories), gender, work setting (patient care, administration, public health, academic, retired/inactive) and if the respondent was currently active in the field. Physicians were asked to categorize their practice as primary care, specialty or other and to mark if certified by the American Board of Medical Specialties. Nurses were asked to designate if they were a registered nurse or an advanced practice registered nurse. In the survey to social workers and psychologists, the respondent noted to which of those two professional groups they belonged.

2.3 Survey Design and Implementation

The survey plan was based on Dillman's Tailored Design method.¹⁵ This method helps achieve a key survey goal of a high response rate. Dillman breaks down the instrument and its use into three components: the questions themselves, the instrument, and the implementation.

Surveys, according to the Dillman, incur error from four sources: sampling, coverage, measurement, and non-response. A discussion on how those might affect results in this survey is included.

2.3.1 Questions

Dillman¹⁵ suggests eight criteria to use for evaluating potential survey questions.

1. *Does the question require an answer?*

All questions, except a few, were worded such that they required an answer.

Section I knowledge questions were all multiple choice; the respondents were asked to choose the correct answer. Respondents that did not know a particular question might have left it blank rather than guessing. However, a no answer is considered a wrong answer (the correct answer was not chosen). Section II asks respondents to rate their knowledge levels in several bioterrorism knowledge areas. Section III asks about past trainings and delivery methods. A few of the exception questions are found here. One question asked which areas in which the respondent wanted training, where a blank answer is acceptable. In future surveys, a “None” category may be added to indicate no trainings wanted versus no answer. Section IV inquires basic background and demographic questions about the respondent.

2. *To what extent do survey recipients already have an accurate, ready-made answer for the question they are being asked to report?*

Section IV, background information, is the only section where ready-made answers are expected. Age, gender and area of work are all questions to which the respondent likely has a quick, ready answer. Section I, knowledge questions, might

be answered readily if the respondent is very familiar with the topics. Section II and III were all designed to have the respondent think and consider their perceived knowledge levels and desired trainings. Section III also asked a yes/no question to past bioterrorism education; this answer should be ready-made, however then the respondent has to consider how many hours of training he/she has had in the past year.

3. *Can people accurately recall and report past behaviors?*

The only question that asked about past behaviors was a question in Section III, response and training. The respondent was to report if they had past bioterrorism trainings, and if yes, how many hours in the past year. The first part of the question is a relatively easy yes/no answer. The difficult part is in counting hours in bioterrorism training in the past year. Respondents will have varying levels of records and may not even consult them to answer.

4. *Is the respondent willing to reveal the requested information?*

For the most part, it was hoped that respondents will accurately report their perceived knowledge levels, and answer the knowledge based questions to the best of their ability. It might prove embarrassing to some, especially those who have attended past trainings, that they do not know the answer. This embarrassment could lead to unanswered questions, or non-return of the survey. For the background information section, demographic questions were left vague (age categories, not exact age) as much as feasible. The surveys were anonymous, however the identification number (to track non-respondents, please see section 2.3.3 Implementation) may have scared away some respondents.

5. *Will the respondent feel motivated to answer each question?*

The cover letter indicated the importance of knowing knowledge levels and desired training areas. The respondents should have felt that they were contributed to the design of new trainings tailored to meet the needs of the professional group.

6. *Is the respondent's understanding of the response categories likely to be influenced by more than words?*

Response categories were used in Section II, knowledge levels, and to some extent in Section III, response and training. A Likert scale was employed to capture perceived knowledge: Strongly agree, Agree, Neutral, Disagree, Strongly Disagree. The answers were equally spaced horizontally and in a consistent order.

7. *Is survey information being collected by more than one mode?*

This question is not relevant to this study, as we only were employing a mailed survey.

8. *Is changing a question acceptable to the survey sponsor?*

The Department of Health Bioterrorism Branch did perform a final review of the survey; otherwise, as long as the assessments were preformed, question wording was at the creators' discretion.

Dillman had many other principles and suggestions for writing questions. A few examples of areas that may be improved in future surveys are listed below. When asking for a quantity (e.g. hours of past training), it would have been useful to indicate the units (hours) after the blank provided to encourage the respondent to use the requested units. In the Likert scale of bioterrorism knowledge levels (Section II), it may have been of

interest to include an “Undecided” category to contrast the “Neutral” category. Dillman suggests that respondents often do not read each topic question with care when answering “check all that apply” type of questions. Section III, response and training, had one question that asked respondents to mark all topics in which they desired training. Perhaps a better choice would have been to ask for the top 3 or 5 areas. In one of the knowledge based questions, the respondent had to pick the incorrect response (as opposed to the correct answer of all the others in that section). The emphasis was added in the question by capitalizing and bolding the word “EXCEPT”. This is in agreement with Dillman’s suggestions for minimizing mistakes from misreading or skipping over important small or single words.

2.3.2 Survey

In his next chapter, Dillman¹⁵ describes techniques to coalesce the now written questions into a questionnaire. He discusses layout, ordering, visual effects, cover pages and pre-testing.

1. Questionnaire Layout

The mailed survey was printed single-sided on 8½ by 11 standard paper. This format is listed as Dillman’s third choice as “not as professional looking.” However, the format is common, easy to follow and inexpensive to create. The font size was 10, and margins were 1-inch top and bottom and 1.25 inches right and left. Dillman observes that when less than 12 point is used, more questions are apt to be skipped. However, the survey contained few blocks of text and much white space, both reducing apparent crowdedness of the pages.

2. Ordering

Similar questions were grouped and then placed in order of objective knowledge questions, subjective knowledge questions, past training and willingness to assist inquiries and finally demographic information requests. Any order would produce corresponding effects in the results. For this survey, ordering effects are most likely to occur in Section II as the respondent marks their perceived level of knowledge, after answering the objective knowledge questions of Section I. Respondents who found the knowledge questions easy might then mark their level of competency higher than if asked to rate their abilities and skills first. Similarly those who found the knowledge questions more difficult might more critically view their knowledge levels. Other ordering effects could play into the question in Section III where the respondent indicates whether or not they would help in the state's emergency efforts. If the knowledge questions were difficult for the respondent, they may have felt dissuaded from offering their help, feeling that they were not qualified.

The very first question plays a vital role in encouraging the respondent to complete the survey. Physicians, nurses, dentists and veterinarians all received the same first question. From a MMWR post-test¹⁶, this general bioterrorism question asked which bioterrorism related diseases have the potential for person-to-person spread. Social workers and psychologists received an overview question on whether or not early intervention reduces distressed in bereaved individuals.

The demographic questions were positioned at the end of the survey. Dillman specifically states that a survey should not begin with demographic type questions. Although the questions might apply to everyone (satisfying another of his criteria),

they are not interesting, nor do they relate directly to the survey purpose. The next logical place to put the demographic section is at the end of the survey, so as to not break the flow of the other sections. Also, some respondents may view demographics as objectionable, e.g. inquiring after too personal information, or concerns about identifying one's self in an anonymous survey. Dillman suggests that 'objectionable' questions are more likely to be answered when placed at the end of the survey, after the respondent has already committed effort into filling out and became interested in the questionnaire.

3. Visual layout

The survey was designed to be visually clear, easy to navigate and to be understood. When possible, section breaks occurred at page breaks. If not, the sections were clearly delineated with a horizontal black line. Dillman provides many details on visual layout, which most had been already incorporated in the survey. The layout of the Section II Likert scale questions had the most considerations. The questions could have been placed in as an "item-in-a-series". Dillman suggests that respondents tend to answer the questions then in relation to each other and not as individual questions. Although less space would have been used in an "item-in-a-series" format, it was desired to have the respondent consider each level of competency question independently. The alignment of the Likert scale was also examined. For flow reasons, it is often better to list answers vertically, rather than horizontally. For space reasons, it was decided that horizontal was acceptable. Horizontal spacing was carefully equalized to reduce any visual leading to answers,

e.g. more space around the central “Neutral” option might lead respondents to that answer because it stands out more than the other choices.

4. Cover pages

Dillman recommends using cover pages, front and back. No cover pages were created for this survey, although they are a possibility for future studies.

5. Pre-testing

Most of the knowledge questions were compiled from sources such as MMWR¹⁶⁻¹⁸ and Medscape post-tests¹⁹⁻²², and NIMH¹³ for the social worker and psychologist survey. A few knowledge questions, such as the state reporting laws^{23,24}, were created. Knowledge level and training preference questions were created, some loosely based on the previous Hawaii study¹⁴. Then each survey was sent to a professional in that field to review and give comments or suggestions. The physician and nurse survey was reviewed by Lisa Hendrickson MD MPH from the Hawai‘i State Department of Health, Bioterrorism Branch. The dentist survey was commented on by Mark Greer DMD MPH, the Chief of the Dental Health Division of the Hawai‘i State Department of Health. The veterinarian survey was critiqued by Arlene Buchholz DVM MPH from the Hawai‘i State Department of Agriculture. And the social worker and psychologist survey was reviewed by Ken Lee MSW, the Hawai‘i State Chapter Disaster Mental Health Lead and a disaster mental health instructor for the American Red Cross. The professionals’ comments were included and the surveys underwent additional edits. The surveys were sent to the Hawaii State Department of Health Bioterrorism Branch for any final edits.

In Dillman terms, this is only “stage 1” of pre-testing. Dillman divides pre-testing in four stages: 1) Review by knowledgeable colleagues and analysts, 2) Interviews to evaluate cognitive and motivational qualities, 3) A small pilot study and 4) A final check. However, Dillman is generally referring to all created surveys, and many of the questions were culled from already pre-tested sources. In future attempts, a pilot study might be considered.

2.3.3 Implementation

As part of Dillman’s¹⁵ implementation procedures discussion, he describes 5 elements to receive a high response rate:

1. Respondent-friendly questionnaire

The survey was designed to be as easy as possible for the respondent to fill out and return. The survey was fairly short, broken into smaller sections, which overall should have taken only about 15 minutes to complete. The layout was visually clean and clear, for easy comprehension and navigation. The respondent should have felt that the survey was interesting, relevant and their contribution would shape future educational opportunities.

2. Four contacts by first class mail, with an additional “special” contact

Dillman suggests a total of five contacts, each of a special type. First, a “prenotice” letter informs the respondent that a survey will be arriving soon and their response would be greatly appreciated. Second, mailing of the questionnaire itself, with a cover letter explaining why the survey is important. Third, sending a postcard thanking them for responding and encouraging the respondent to mail unsent

completed surveys. Fourth, mailing a second copy of the questionnaire to those who have not yet responded. And finally, contacting non-respondents by a different mode (e.g. telephone instead of post).

This survey implementation had a total of four contacts. The first mailing was of the survey instruments and attached cover letters. A week later a reminder postcard was sent, thanking those who had already returned their survey. Three weeks after the initial mailing, a second mailing of the surveys was sent to the non-respondents. Finally, six weeks after the initial mailing (three weeks after the second survey), non-respondents received a third copy of the survey. Please refer to the following table for dates and summary of the contacts:

Contact	Date	Target
First Mailing	June 1, 2004	All
Reminder Postcard	June 8, 2004	All
Second Mailing	June 21, 2004	Non-respondents
Third Mailing	July 17, 2004	Non-respondents
Cut off Deadline	September 7, 2004	

Table 2.4: Timetable of Mailings

3. Return envelope with real first-class stamps

The enclosed return envelopes used real first-class stamps, rather than metered mail. Dillman states that a real stamp suggests that something of a real monetary value has been sent, and respondents might be less likely to throw it away.

4. Personalization of correspondence

High personalization of the contacts also increase response rate. The cover letters were all addressed to the respondents individually by name and were written in second person (e.g. you, your). The thank you postcard was also written in second person.

5. Token prepaid financial incentives

Dillman encourages the use of a financial token in advance. This method increases the response rate over promised incentives, in addition to the increase by using an incentive.

This survey employed no financial incentive, however answers to the knowledge questions were posted on a website. Necessarily the answers could not be posted until after the surveys had been collected, however anyone could access the website if they wished.

Outside of these elements, there are a few more implementation details to consider. The first, as mentioned in section 2.3.1 Questions point 4, was that all the surveys contained an identification number. This number was used solely to target non-responders in later mailings, and was stripped before data analysis. All of this was explained to the respondent in the attached cover letter. Secondly, there is the issue of undeliverable surveys. Not all mailed surveys reached their recipients. Sometimes the professional had moved or was deceased. If the mailing address was invalid, a phone book was used to try and locate their current or correct address.

2.3.4 Survey Error

Dillman¹⁵ refers to four different sources of error that can occur in a survey. The first, sampling error, happens if when sampling the population, the sample is not representative of the general population. Using random sampling and increasing the sample size minimizes this error source. For this survey, the random sample sizes were calculated (see section 2.1 Study Population) large enough to give appropriate power,

then tripled for non-response. However, about a 50% return rate was received, so the sample sizes are larger than originally planned. Hence, this source of error should not play a large role in this survey.

The second source of error is coverage error. This error occurs when the list, from which the sample is taken from, does not include the entire population of interest. A telephone book does not include everyone in the general population (e.g. those who have unlisted numbers, or no phones). For this survey, the only considerations are if there is a large portion of the targeted population who are not in the database, or are not reachable (undeliverable). Since the database was obtained directly from the Hawai'i State Department of Commerce and Consumer Affairs, it is likely to be quite current and up to date. Out of the 1309 surveys, only 73 were undeliverable (moved with no forwarding address, deceased, or invalid address).

The third error source is non-response error. Some members of the sample will not return the survey, no matter the number of contacts or other techniques. This error can be a problem is the non-respondents somehow differ from those that do respond. For example, the non-respondents could be the very busy professional who spends much of their extra time learning (topics like bioterrorism) and have no time to take surveys. Or they could be the professionals who do not believe that bioterrorism is as an important threat as the far more common issues they see everyday. They do not take bioterrorism training, nor do they waste their time with bioterrorism surveys. Increasing the response rate will minimize this source of error. Dillman, and much of the previous sections, describe ways of attempting to increase response rate that were included in this survey.

The fourth error is measurement error. This error occurs when respondents make mistakes when filling out the surveys (failing to skip questions, etc.) or if the question is not measuring what the variable appropriately. Clearly written directions and questions, and considering what the responses will mean, help reduce this source of survey error.

In more epidemiological terms, error is generally considered to be one of three types: selection bias, information bias or confounding bias.²⁵ Selection bias incorporates sampling error, coverage error and non-response error. Information bias is similar to measurement error. Non-response error is included in the more general category of confounding. Confounding bias is not included in Dillman's error sources. Confounding bias occurs when a factor is associated with both the outcome and another factor. Especially if this factor is not measured in any way, a false association could be seen or a true association could be masked.

2.4 Additional reviews in regards to response rate

A systematic review of nearly 300 published postal questionnaires results by Edwards, et al.²⁶ show many similar ideas for increasing response rates. Significant characteristics, which were also present in this survey, included: incentives that were not conditional on response (posting of answers), short questionnaires, personalized questionnaires, stamped return envelopes, mail by first class post, follow up contact, second copy of survey to non-respondents, survey designed to be interesting and survey originating from universities. Significant response rate increasing characteristics that were not present in this survey included: monetary incentive, colored ink and pre-contact.

2.5 Data Analysis

Data was entered by a third party company, QMark Research & Polling (Honolulu, HI). Despite double-entry method, a random check yielded errors. Data was corrected and verified twice more. A 10% random check showed no further errors.

Analysis was completed using Epi Info™ (version 3.3, Centers for Disease Prevention and Control). The outcome of interest was a count of the correct answers on the objective knowledge questions. All tests were performed at alpha (α) equal to the standard 0.05, except where noted. Means of the count variable were initially compared between those respondents who answered that background or demographic question and those respondents who left that answer blank. Analysis tests included two group t-tests or analysis of variance (ANOVA) and linear trend for the age factor.

3 RESULTS

3.1 Rate of Return

After fourteen weeks from the initial mailing and three additional contacts later, we received an overall response rate of 56.2% [Unpublished data, Dr. Katz]. Social workers and psychologists had the highest rate at 68.5%, followed by veterinarians, dentists, nurses, and then physicians had the lowest rate at 45.1%. Response rate was calculated with the number of surveys mailed successfully in the denominator, i.e. without undeliverable surveys. Please refer to Table 3.1.1: Number of Surveys Mailed, Undeliverable and Returned and also Table 3.1.2: Response Rates for Each Target Population Per Week. (For mail-out dates, please see section 2.3.3 Implementation.)

	Attempted to be Mailed	Un-deliverable	Mailed Successfully	Returned	Response Rate (%)
Physicians	282	27	255	115	45.1
Nurses	285	7	278	146	52.5
Dentists	240	6	234	133	56.8
Veterinarians	229	17	212	125	59.0
Social Workers & Psychologists	273	16	257	176	68.5
Total	1309	73	1236	695	56.2

Table 3.1.1: Number of Surveys Mailed, Undeliverable and Returned

↙ Initial Mailing
(June 1)

↙ Reminder
Postcard (June 8)

↙ Second Mailing
(June 21)

↙ Third Mailing
(July 17)

	June 1: Week Zero	June 8: Week One	June 15: Week Two	June 22: Week Three	June 29: Week Four	July 6: Week Five	July 13: Week Six	July 20: Week Seven	July 27: Week Eight	August 3: Week Nine	August 10: Week Ten	August 17: Week Eleven	August 24: Week Twelve	August 31: Week Thirteen*
Physicians		12.1	18.4	20.8	29.2	32.4	36.8	37.7	41.8	43.4	43.4	44.5	45.1	45.1
Nurses		13.4	22.3	27.0	32.4	37.9	41.6	43.0	48.9	50.0	50.7	52.2	52.5	52.5
Dentists		17.2	27.1	30.5	42.1	45.3	49.6	49.6	54.3	56.0	56.0	56.0	56.0	56.8
Veterinarians		17.9	29.9	35.5	43.5	47.9	50.9	51.4	53.3	54.7	57.5	58.5	59.0	59.0
Soc. Workers Psychologists		22.3	33.5	43.3	51.7	56.2	60.6	61.0	63.7	64.9	63.7	68.1	68.1	68.5
Overall		16.5	26.0	31.4	39.5	43.7	47.7	48.4	52.3	53.7	54.7	55.7	56.0	56.2

*Note: Cutoff deadline for receipt of returned surveys was Sep 7, but no surveys were returned Aug 31 to Sep 7.

Table 3.1.2: Response Rates for Each Target Population Per Week

3.2 Physicians

Out of the thirteen knowledge questions in Section I, physicians correctly answered an average of 9.1 (SD 1.9), or scored 70.2% (SD 14.8). Three physicians correctly answered all thirteen questions and only two physicians answered five or less correctly. None scored less than three questions correct. Approximately 27% of the physicians scored 11 or more correct ($\geq 84.6\%$), about 58% scored at least 9 ($\geq 69.2\%$) and about 82% correctly answered 8 or more questions ($\geq 61.5\%$). Please refer to Figure 3.2.1: Percentage of Physicians with Correct Answers for the distribution of physicians and the number of correct answers, including cumulative percentages. Error bars show one standard deviation above and below the observed score.

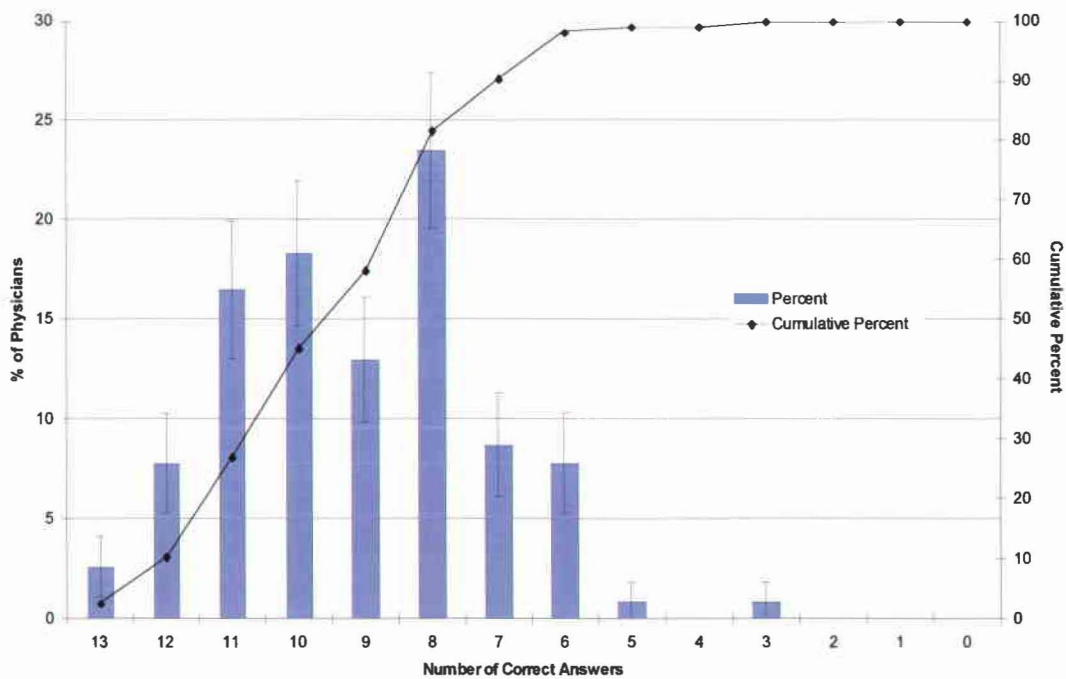


Figure 3.2.1: Percentage of Physicians with Correct Answers

Only 40% to 50% of the physicians were able to correctly answer Questions 4, 5, 6 and 7. 50% to 75% correctly answered Questions 2, 9 and 12. 75% or more correctly answered Questions 1, 3, 8, 10, 11 and 13. Please refer to Figure 3.2.2: Percentage of Physicians with Correct Answers by Question for a distribution of correct responses by individual question. Error bars show one standard deviation above and below the observed score. Physicians scored the lowest (40% to 45.2%) on questions involving smallpox clinical features, smallpox versus chickenpox rash and anthrax chest x-ray (seeing the widened mediastinum). Physicians did the best (92.2% to 98.3%) on questions about smallpox infection control measures, identifying transmissible diseases and the deadliest form on anthrax (inhalation).

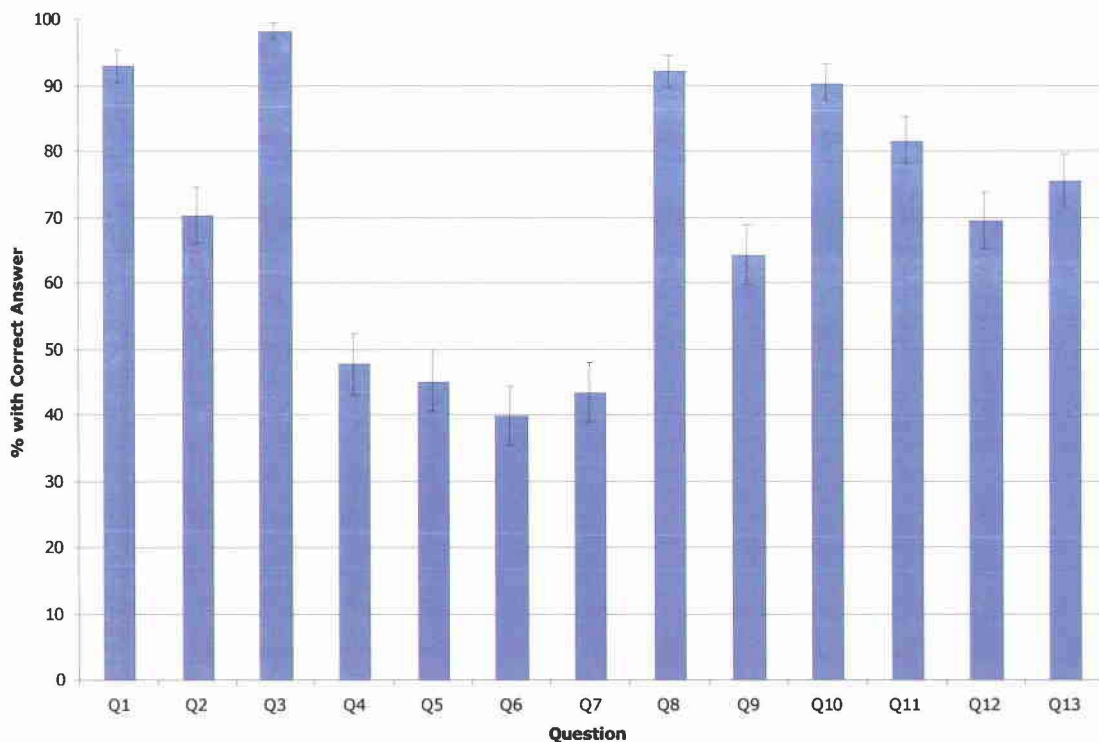


Figure 3.2.2: Percentage of Physicians with Correct Answers by Question

In Section IV: Background Information, respondents were asked to mark their gender, age in 10-year categories, current work setting, and if they were actively practicing in their professional field. Physicians were also asked to identify their practice setting as primary, specialty or other and if they had been certified by the American Board of Medical Specialties (ABMS).

Among the respondents who specified their gender, no differences existed in score between males and females. The six individuals who did not report their gender had a lower mean score than those who did report their sex ($p=0.03$). Please see Table 3.2.1: Physician Gender Distribution for the frequency of male, female and non-respondent physicians.

Gender	Frequency	Percent
Missing	6	5.2%
Male	80	69.6%
Female	29	25.2%
Total	115	100.0%

Table 3.2.1: Physician Gender Distribution

Among the respondents who specified their age, no differences existed in score between the age categories, nor existed a linear trend. The six individuals who did not report their age had a lower mean score than those who did report their age ($p=0.03$). For details on 10-year age categories, please see Table 3.2.2: Physician Age Distribution.

Age	Frequency	Percent
Missing	6	5.2%
30 – 39	17	14.8%
40 – 49	29	25.2%
50 – 59	37	32.2%
60 – 69	18	15.7%
70 – 79	8	7.0%
Total	115	100.0%

Table 3.2.2: Physician Age Distribution

Respondents were asked to identify their work setting as being in patient care, administration, public health, academic institution, or retired/inactive. Seven physicians reported multiple categories. Analysis was performed by comparing all who marked a particular work setting versus all others, (e.g. all those in patient care versus those who did not mark patient care). These are five orthogonal tests, so alpha was adjusted using the following formula: $\alpha_{\text{true}} = 1 - (1 - \alpha_{\text{test}})^n$, where n is the number of orthogonal tests being performed. The desired α_{true} is 0.05, so α_{test} is 0.01. No significant differences in score were found between the different work settings. For frequency information please see Table 3.2.3: Physician Current Work Settings.

Current Work Settings	Frequency
Patient care	91
Administration	9
Public Health	0
Academic institution	8
Retired/inactive	9

Table 3.2.3: Physician Current Work Settings

The survey inquired if the respondents were currently actively practicing in their profession. No significant effects were found from this factor. Please refer to the following Table 3.2.4: Physicians Actively Practicing for detailed information.

	Frequency	Percent
Missing	7	6.1%
Yes	99	86.1%
No	9	7.8%
Total	115	100.0%

Table 3.2.4: Physicians Actively Practicing

Physicians were also asked to identify their practice setting as being primary care, specialty or other. Three physicians chose both primary care and specialty. For analysis, these were treated as specialty. No significant differences were found between practice

types. However, those who did not report their practice type scored lower ($p=0.02$) than those who did mark their practice type. For frequency information please refer to Table 3.2.5: Physician Practice Types.

	Frequency	Percent
Missing	7	6.1%
Primary Care	35	30.4%
Specialty	69	60.0%
Other	4	3.5%
Total	115	100.0%

Table 3.2.5: Physician Practice Types

Physicians were also asked if they held a certification from the American Board of Medical Specialties. No significant difference in score was found.

	Frequency	Percent
Missing	9	7.8%
Yes	91	79.1%
No	15	13.0%
Total	115	100.0%

Table 3.2.6: Physicians Certified by American Board of Medical Specialties

In Section III: Response and Training, respondents were asked if they had received prior training in bioterrorism and if they would be willing to assist in the state's response and control efforts should an event occur.

About one-fifth of the physicians reported prior training. These physicians scored higher (mean 9.9, SD 1.9) than those who did not have prior training (mean 9.0, SD 1.9) ($p=0.03$). Also, those who did not respond to this question scored lower than those who did respond ($p=0.02$). For frequencies, see Table 3.2.7: Physicians with Prior Training.

	Frequency	Percent
Missing	3	2.6%
Yes	24	20.9%
No	88	76.5%
Total	115	100.0%

Table 3.2.7: Physicians with Prior Training

Nearly 69% of the physicians reported that they would be willing to assist the state in an event. No differences in bioterrorism knowledge score were detected from this willingness.

	Frequency	Percent
Missing	8	7.0%
Yes	79	68.7%
No	28	24.3%
Total	115	100.0%

Table 3.2.8: Physicians Willing to Assist

3.3 Nurses

Out of the thirteen knowledge questions of Section I: Knowledge Questions, nurses scored an average of 7.8 (SD 2.3) or 59.8% (SD 17.3). One nurse answered all questions correctly, and one nurse scored zero correct. Only 3 nurses correctly answered 3 or less questions. 35% of the nurses answered 9 or more questions correctly ($\geq 69.2\%$); approximately 58% scored at least an 8 ($\geq 61.5\%$), and 85% answered more than 6 questions correctly ($\geq 46.2\%$). Please refer to Figure 3.3.1: Percentage of Nurses with Correct Answers for the distribution of nurses with the number of correct answers, including cumulative percentages. Error bars show one standard deviation above and below the observed score.

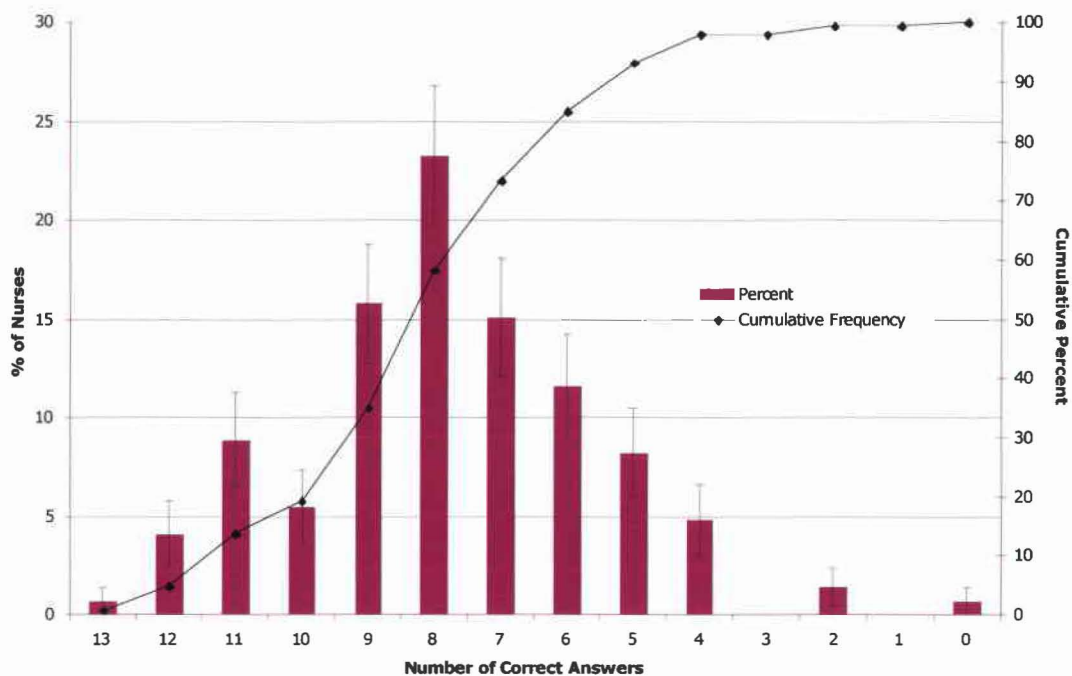


Figure 3.3.1: Percentage of Nurses with Correct Answers

Between 30% and 50% of the nurses answered Questions 4, 5, 6, 7 and 12 correct. 50% to 75% of the nurses correctly answered Questions 2, 9 and 13. 75% or more correctly answered Questions 1, 3, 8, 10 and 11. Please see Figure 3.3.2: Percentage of Nurses with Correct Answers by Question for more details on the distribution of correct answers by question. Error bars show one standard deviation above and below the observed score. Nurses scored the lowest (30.1% to 34.9%) on questions involving anthrax chest x-ray (seeing the widened mediastinum), smallpox clinical features and smallpox versus chickenpox rash. Nurses did the best (87% to 93.2%) on questions regarding identifying transmissible diseases, smallpox infection control measures and the deadliest form of anthrax (inhalation).

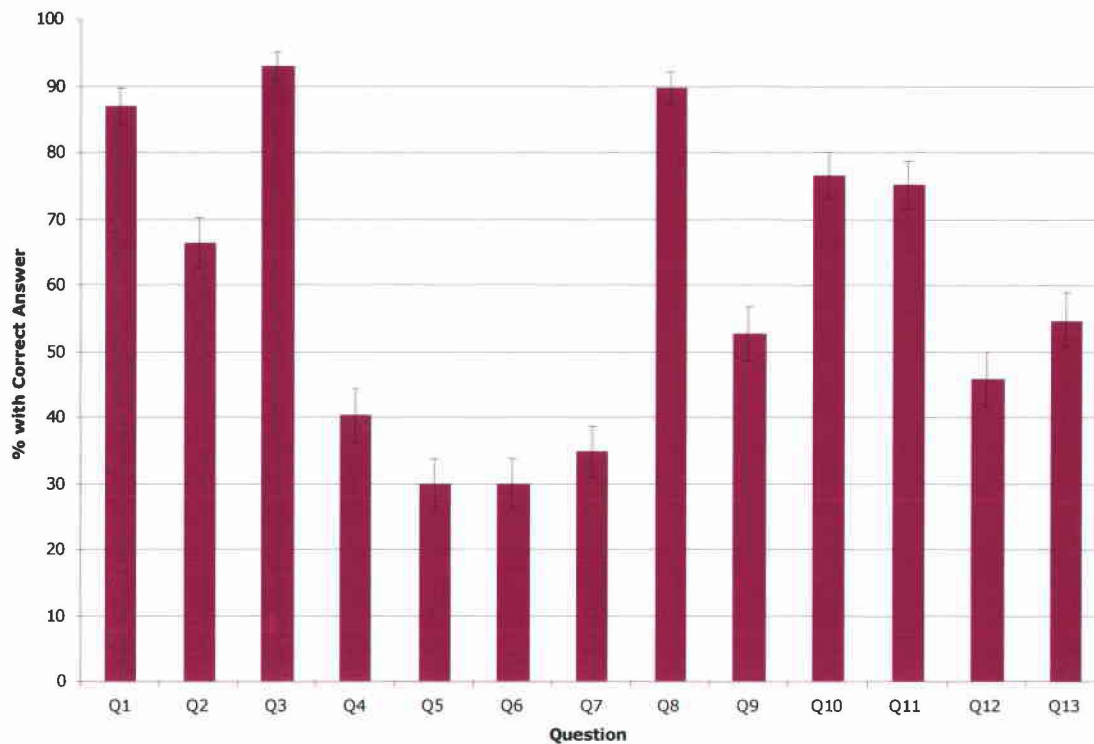


Figure 3.3.2: Percentage of Nurses with Correct Answers by Question

In Section IV: Background Information, respondents were asked to mark their gender, age in 10-year categories, current work setting, and if they were actively practicing in their professional field. Nurses were also asked if they were a Registered Nurse (RN) or an Advanced Practice Registered Nurse (APRN).

Most of the nurses were female, however no differences in score were found between genders. Please see Table 3.3.1: Nurse Gender Distribution for the frequency details.

Gender	Frequency	Percent
Missing	4	2.7%
Male	15	10.3%
Female	127	87.0%
Total	146	100.0%

Table 3.3.1: Nurse Gender Distribution

Significant differences were detected between the different age categories ($p=0.01$), but no linear trend was seen. The mean scores are lower in the youngest age category, and increase with the older age category until 60+, at which point the scores sharply drop. For details on 10-year age categories and scores, please see Table 3.3.2: Nurse Age Distribution and Scores.

Age	Frequency	Percent	Mean Score	Std Dev
Missing	3	2.1%	-	-
20 – 29	9	6.2%	6.2	1.2
30 – 39	33	22.6%	7.5	5.3
40 – 49	48	32.9%	7.9	4.2
50 – 59	37	25.3%	8.6	5.1
60 – 69	15	10.3%	6.9	5.4
70 – 79	0	0.0%		
80+	1	0.7%		
Total	146	100.0%		

Table 3.3.2: Nurse Age Distribution and Scores

Respondents were asked to identify their work setting as being in patient care, administration, public health, academic institution, or retired/inactive. Three nurses reported working in administration as well as patient care. Analysis was performed by comparing all who marked a particular work setting versus all others, (e.g. all those in patient care versus those who did not mark patient care). These are five orthogonal tests, so alpha was adjusted using the following formula: $\alpha_{\text{true}} = 1 - (1 - \alpha_{\text{test}})^n$, where n is the number of orthogonal tests being performed. The desired α_{true} is 0.05, so α_{test} is 0.01.

Nurses who reported working in patient care scored lower (mean 7.4, SD 2.2) than those who were not working in patient care (mean 8.6, SD 2.1) ($p=0.005$). Nurses who were working at an academic institution scored higher (mean 10.0, SD 1.5) than those who were not (mean 7.7, SD 2.2) ($p=0.004$). For frequency information, please see Table 3.3.3: Nurse Current Work Settings.

Current Work Setting	Frequency
Missing	4
Patient Care	102
Administration	17
Public Health	6
Academic Institution	7
Retired/Inactive	13

Table 3.3.3: Nurse Current Work Settings

The survey inquired if the respondents were currently actively practicing in their profession. No significant effects were found from this factor. Please refer to the following Table 3.3.4: Nurses Actively Practicing for detailed information.

	Frequency	Percent
Missing	3	2.1%
Yes	125	85.6%
No	18	12.3%
Total	146	100.0%

Table 3.3.4: Nurses Actively Practicing

Nurses were asked to identify themselves as being a Registered Nurse or an Advanced Practice Registered Nurse. Two nurses marked both categories, for analysis they were treated as an APRN. No differences in score were found from this factor. For frequency details, see Table 3.3.5: Nurses APRN or RN.

	Frequency	Percent
Missing	4	2.7%
RN	125	85.6%
APRN	17	11.6%
Total	146	100.0%

Table 3.3.5: Nurses APRN or RN

In Section III: Response and Training, respondents were asked if they had received prior training in bioterrorism and if they would be willing to assist in the state's response and control efforts should an event occur.

About one-fifth of the nurses reported prior training. These nurses scored higher (mean 9.0, SD 1.9) than those who did not have prior training (mean 7.5, SD 2.3) ($p=0.0008$). For frequencies, see Table 3.3.6: Nurses with Prior Training.

A stratified analysis was also preformed between the significant work settings and prior training. Prior training increased the scores in nurses who both did and did not work in patient care. Conversely, working in patient care lowered nurses' scores whether or not they working in patient care. However, prior training only increased the score in those nurses who were not at an academic institution. Or, for those in an academic setting, prior training did not increase their score. Reciprocally, working at an academic institution only increased the score if the nurse had not received prior training. Or, for those who had received prior training, working at an academic setting did not increase their score.

	Frequency	Percent
Missing	4	2.7%
Yes	29	19.9%
No	113	77.4%
Total	146	100.0%

Table 3.3.6: Nurses with Prior Training

Nearly 71% of the nurses reported that they would be willing to assist the state in an event. No differences in bioterrorism knowledge score were detected from this willingness.

	Frequency	Percent
Missing	7	4.8%
Yes	103	70.5%
No	36	24.7%
Total	146	100.0%

Table 3.3.7: Nurses Willing to Assist

3.4 Dentists

Out of the ten questions in Section 1: Knowledge Questions, dentists scored an average of 6.1 (SD 1.8) questions correctly or 61% (SD 18). No dentist had a perfect score and one dentist scored zero. Slightly greater than 24% of the dentists scored 8 or better ($\geq 80\%$), approximately 45% correctly answered 7 or more questions correct ($\geq 70\%$) and about 80% scored at least 5 questions correct ($\geq 50\%$). Please refer to Figure 3.4.1: Percentage of Dentists with Correct Answers for the distribution of dentists with the number of correct answers, including cumulative percentages. Error bars show one standard deviation above and below the observed score.

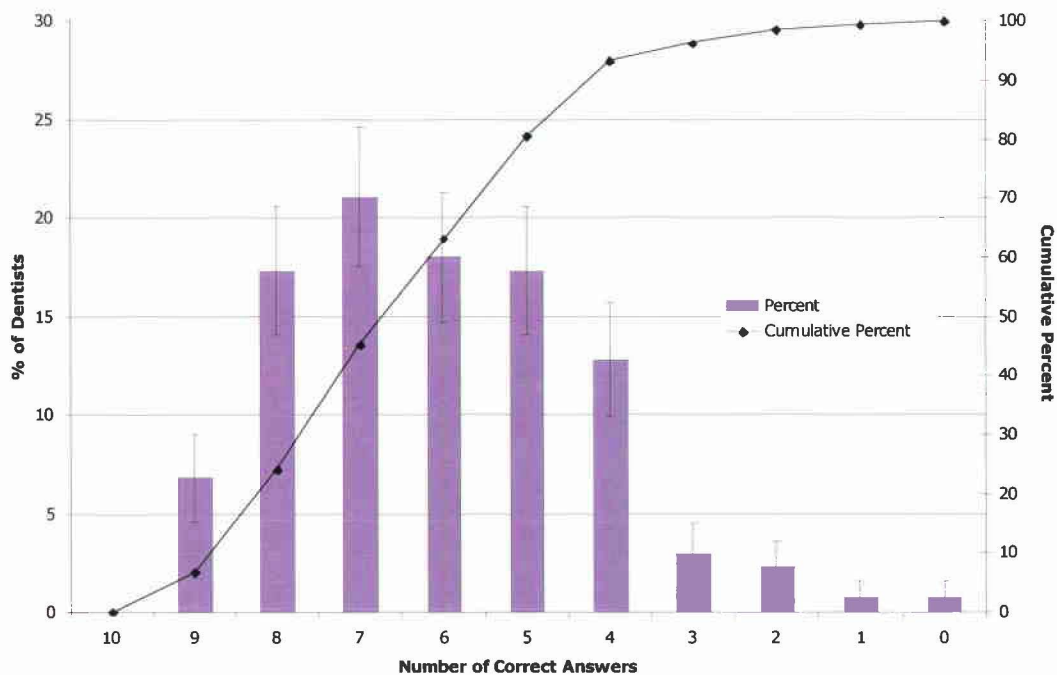


Figure 3.4.1: Percentage of Dentists with Correct Answers

Between 30% and 50% of dentists identified the correct response on Questions 4, 5, 6, 8 and 10. 50% to 75% correctly marked Questions 2 and 9. Greater than 75% of the

dentists answered Questions 1, 3 and 7 correctly. Please see Figure 3.4.2: Percentage of Dentists with Correct Answers by Question for more details on the distribution of correct answers by question. Error bars show one standard deviation above and below the observed score. Dentists scored the lowest (33.1% to 45.9%) on questions about smallpox versus chickenpox rash, symptom difference between inhalation anthrax and upper respiratory tract infection and smallpox clinical features. Dentists did the best on questions involving identifying transmissible diseases, the deadliest form of anthrax (inhalation) and smallpox infection control measures.

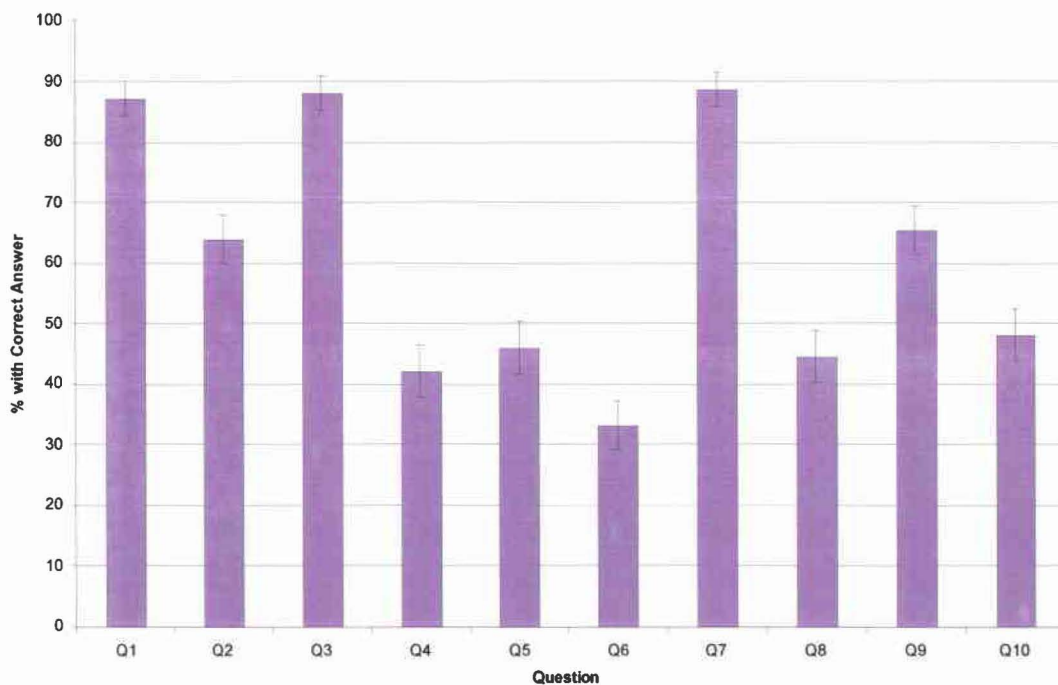


Figure 3.4.2: Percentage of Dentists with Correct Answers by Question

In Section IV: Background Information, respondents were asked to mark their gender, age in 10-year categories, current work setting, and if they were actively practicing in their professional field.

Dentists were predominately (86.5%) male. No significant differences were detected from gender. For frequency information, see Table 3.4.1: Dentist Gender Distribution.

Gender	Frequency	Percent
Missing	2	1.5%
Male	115	86.5%
Female	16	12.0%
Total	133	100.0%

Table 3.4.1: Dentist Gender Distribution

Significant differences were detected between the different age categories ($p=0.048$), but no linear trend was seen. The mean scores are lower in the youngest age category, and increase with the older age category until 70, at which point the scores sharply drop. For details on 10-year age categories and scores, please see Table 3.4.2: Dentist Age Distribution and Scores.

Age	Frequency	Percent	Mean Score	Std Dev
Missing	1	0.8%		
20 – 29	1	0.8%	5.0	-
30 – 39	23	17.3%	5.9	1.8
40 – 49	58	43.6%	6.5	1.5
50 – 59	24	18.0%	5.8	2.2
60 – 69	19	14.3%	6.0	1.6
70 – 79	5	3.8%	4.2	2.0
80+	2	1.5%	4.2	4.2
Total	133	100.0%		

Table 3.4.2: Dentist Age Distribution and Scores

Respondents were asked to identify their work setting as being in patient care, administration, public health, academic institution, or retired/inactive. Three dentists reported multiple categories. Analysis was performed by comparing all who marked a particular work setting versus all others, (e.g. all those in patient care versus those who did not mark patient care). These are five orthogonal tests, so alpha was adjusted using

the following formula: $\alpha_{\text{true}} = 1 - (1 - \alpha_{\text{test}})^n$, where n is the number of orthogonal tests being performed. The desired α_{true} is 0.05, so α_{test} is 0.01. No significant differences in score were found between the different work settings. For frequency information please see Table 3.4.3: Dentist Current Work Settings.

Work Setting	Frequency
Missing	1
Patient Care	119
Administration	4
Public Health	3
Academic Institution	1
Retired/Inactive	8

Table 3.4.3: Dentist Current Work Settings

The survey inquired if the respondents were currently actively practicing in their profession. No significant effects were found from this factor. Please refer to the following Table 3.4.4: Dentists Actively Practicing for detailed information.

	Frequency	Percent
Missing	1	0.8%
Yes	124	93.2%
No	8	6.0%
Total	133	100.0%

Table 3.4.4: Dentists Actively Practicing

In Section III: Response and Training, respondents were asked if they had received prior training in bioterrorism and if they would be willing to assist in the state's response and control efforts should an event occur.

Only three dentists reported prior training. These dentists did not score significantly different from others, however they did score slightly lower. For frequencies, see Table 3.4.5: Dentists with Prior Training.

	Frequency	Percent
Missing	1	0.8%
Yes	3	2.3%
No	129	97.0%
Total	133	100.0%

Table 3.4.5: Dentists with Prior Training

About 72% of the dentists reported that they would be willing to assist the state in an event. No differences in bioterrorism knowledge score were detected from this willingness.

	Frequency	Percent
Missing	3	2.3%
Yes	96	72.2%
No	34	25.6%
Total	133	100.0%

Table 3.4.6: Dentists Willing to Assist

3.5 Veterinarians

Out of the ten questions in Section 1: Knowledge Questions, veterinarians scored an average of 7.3 (SD 1.6) questions correct, or 73% (SD 16). Eight veterinarians had a perfect score, and only four had a score of 4 or below. 24% of veterinarians had either 9 or 10 correct ($\geq 90\%$), slightly greater than 47% scored an 8 or above ($\geq 80\%$), and 76% correctly answered 7 or more questions ($\geq 70\%$). Please refer to Figure 3.5.1:

Percentage of Veterinarians with Correct Answers for the distribution of dentists with the number of correct answers, including cumulative percentages. Error bars show one standard deviation above and below the observed score.

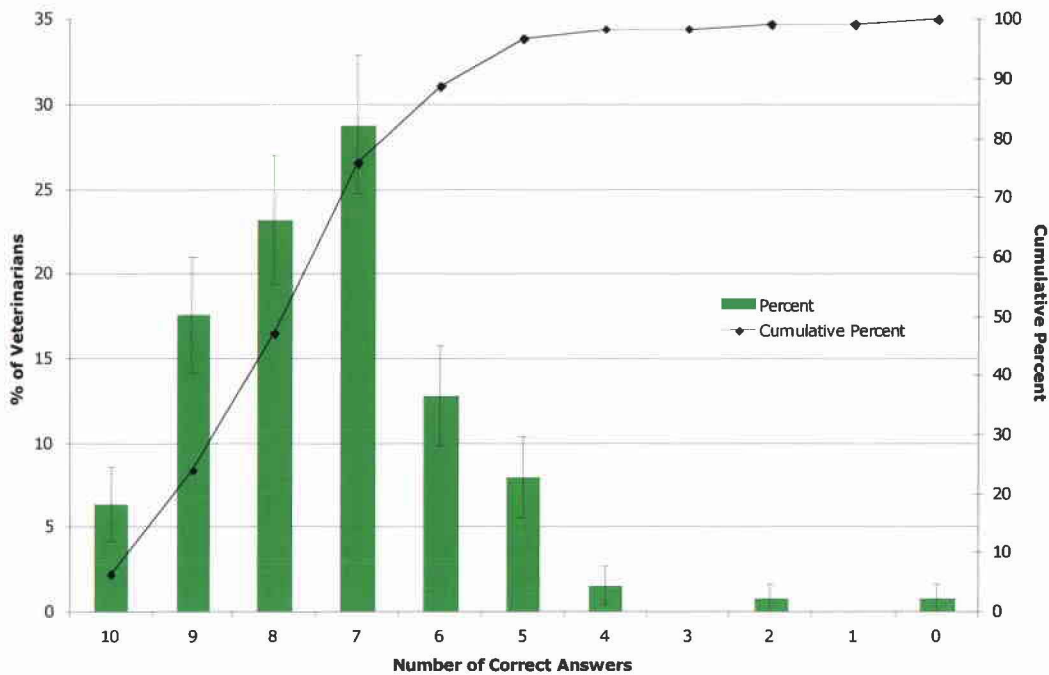


Figure 3.5.1: Percentage of Veterinarians with Correct Answers

Between 30% and 45% of the veterinarians identified the correct response on Questions 2, 5 and 6. Greater than 75% of the veterinarians correctly answered all other questions (Questions 1, 3, 4, 7, 8, 9 and 10). Please see Figure 3.5.2: Percentage of Veterinarians with Correct Answers by Question for more details on the distribution of correct answers by question. Error bars show one standard deviation above and below the observed score. Veterinarians scored the lowest (32% to 42.4%) on questions regarding why tularemia was a dangerous organism/disease, smallpox versus chickenpox rash and smallpox clinical features. Veterinarians did the best (91.2% to 94.4%) on questions about smallpox infection control measures, the deadliest form of anthrax (inhalation), epidemiological features of an unnatural (intentional) outbreak of plague and

knowing that the name and address of the owner must be included when reporting an animal case of anthrax to the state Department of Agriculture.

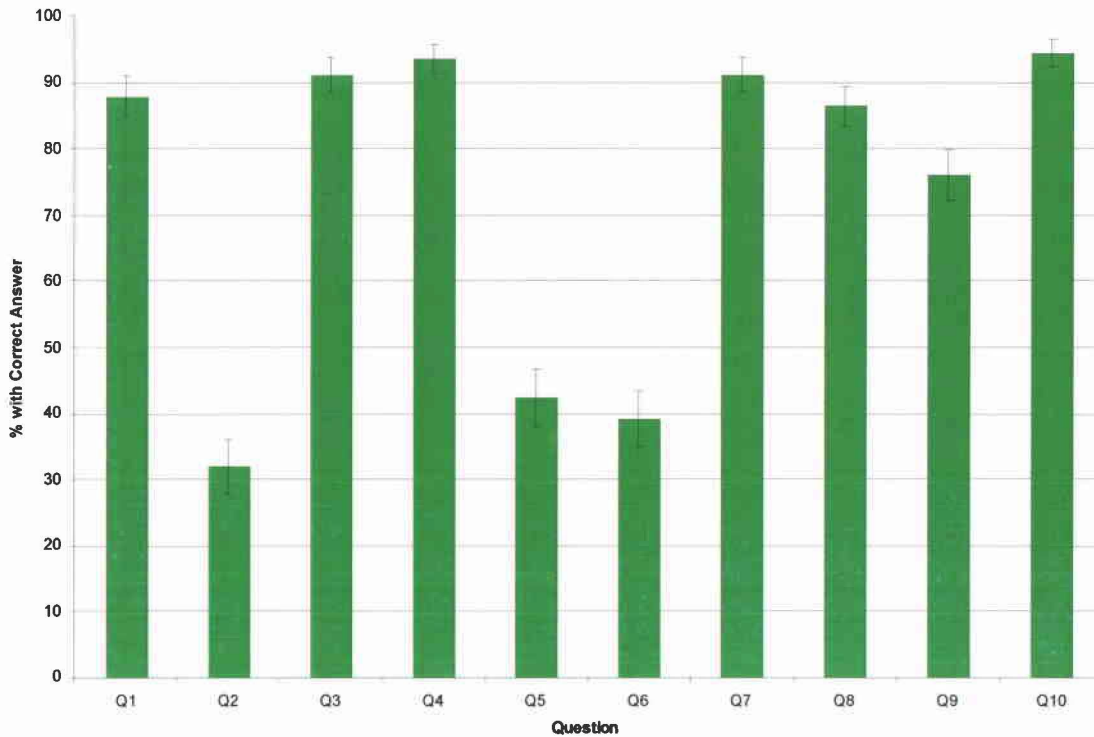


Figure 3.5.2: Percentage of Veterinarians with Correct Answers by Question

In Section IV: Background Information, respondents were asked to mark their gender, age in 10-year categories, current work setting, and if they were actively practicing in their professional field.

Veterinarians were relatively more evenly split in terms of gender with 56% male and 42% female. No significant differences in mean bioterrorism knowledge score were seen. For frequency details, see Table 3.5.1: Veterinarian Gender Distribution.

Gender	Frequency	Percent
Missing	3	2.4%
Male	70	56.0%
Female	52	41.6%
Total	125	100.0%

Table 3.5.1: Veterinarian Gender Distribution

Significant differences were detected between the different age categories (p=0.0006). The mean scores are lower in the youngest age category, and increase with the older age category until 60, at which point the scores decreased. A linear trend was also statistically significant (p=0.03). However, the correlation coefficient (r^2) is 0.04, indicating a very low degree of linear relationship. This association is not very interesting or appropriate for predicting bioterrorism knowledge scores in veterinarians. For details on 10-year age categories and scores, please see Table 3.4.2: Veterinarian Age Distribution and Scores.

Age	Frequency	Percent	Mean Score	Std Dev
Missing	3	2.4%		
20 – 29	4	3.2%	6.5	1.0
30 – 39	21	16.8%	7.0	1.2
40 – 49	41	32.8%	7.9	1.4
50 – 59	37	29.6%	7.5	1.5
60 – 69	13	10.4%	6.5	1.8
70 – 79	5	4.0%	5.2	2.9
80+	1	0.8%		
Total	125	100.0%		

Table 3.5.2: Veterinarian Age Distribution and Scores

Respondents were asked to identify their work setting as being in patient care, administration, public health, academic institution, or retired/inactive. Eight veterinarians reported multiple categories. Analysis was preformed by comparing all who marked a particular work setting versus all others, (e.g. all those in patient care versus those who did not mark patient care). These are five orthogonal tests, so alpha was adjusted using the following formula: $\alpha_{\text{true}} = 1 - (1 - \alpha_{\text{test}})^n$, where n is the number of orthogonal tests being performed. The desired α_{true} is 0.05, so α_{test} is 0.01. No significant differences in score were found between the different work settings. For frequency information please see Table 3.5.3: Veterinarian Current Work Settings.

Work Setting	Frequency
Missing	4
Patient Care	99
Administration	15
Public Health	3
Academic Institution	1
Retired/Inactive	11

Table 3.5.3: Veterinarian Current Work Settings

The survey inquired if the respondents were currently actively practicing in their profession. No significant effects were found from this factor. Please refer to the following Table 3.5.4: Veterinarians Actively Practicing for detailed information.

	Frequency	Percent
Missing	3	2.4%
Yes	111	88.8%
No	11	8.8%
Total	125	100.0%

Table 3.5.4: Veterinarians Actively Practicing

In Section III: Response and Training, respondents were asked if they had received prior training in bioterrorism and if they would be willing to assist in the state's response and control efforts should an event occur.

Less than one-eighth (12%) of the veterinarians reported prior training. These veterinarians did not score significantly different, however they did score slightly higher than those who did not have prior training. For frequencies, see Table 3.5.5:

Veterinarians with Prior Training.

	Frequency	Percent
Missing	2	1.6%
Yes	15	12.0%
No	108	86.4%
Total	125	100.0%

Table 3.5.5: Veterinarians with Prior Training

Nearly 85% of the veterinarians reported that they would be willing to assist the state in an event. No differences in bioterrorism knowledge score were detected from this willingness.

	Frequency	Percent
Missing	9	7.2%
Yes	106	84.8%
No	10	8.0%
Total	125	100.0%

Table 3.5.6: Veterinarians Willing to Assist

3.6 Social Workers and Psychologists

Out of the seven questions in Section 1: Knowledge Questions, social workers and psychologists scored an average of 4.4 (SD 1.2) questions correct, or 62.9% (SD 17.1). Four had a perfect score and one answered zero questions correct. 19% of the social works and psychologists answered 6 or 7 questions correct ($\geq 85.7\%$), 47% scored 5 or more ($\geq 71.4\%$), and 76 correctly answered 4 or more questions correct ($\geq 57.1\%$). Please refer to Figure 3.6.1: Percentage of Social Workers and Psychologists with Correct Answers for the distribution of social workers and psychologists with the number of correct answers, including cumulative percentages. Error bars show one standard deviation above and below the observed score.

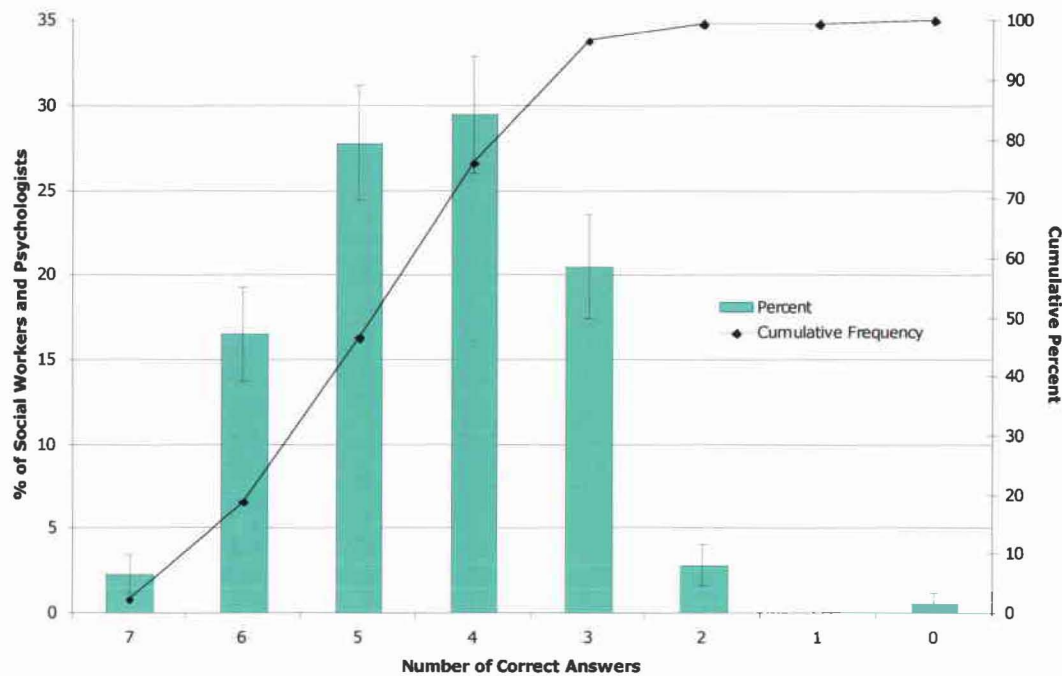


Figure 3.6.1: Percentage of Social Workers and Psychologists with Correct Answers

12.5% of the social workers and psychologist correctly identified the answer to Question 2. Approximately 39% answered Question 5 correct. Between 55% and 75% correctly answered Questions 4, 6 and 7. Greater than 90% of the social workers and psychologists marked the correct response to Questions 1 and 3. Please see Figure 3.6.2: Percentage of Social Workers and Psychologists with Correct Answers by Question for more details on the distribution of correct answers by question. Error bars show one standard deviation above and below the observed score. Social workers and psychologists scored the lowest (12.5% and 38.6%, respectively) on the questions whether survivors with no symptoms of adjustment difficulties for 2 months after an event do not routinely require follow-up (true) and if one-on-one recitals of events and emotions as an early intervention has been shown to reduce risk of later post-traumatic

stress disorder (PTSD) and related adjustment difficulties (false). These professionals did the best (94.3% and 97.7%) on the questions if early, brief and focused psychotherapeutic intervention can reduce distress in bereaved spouses, parents and children (true) and if cognitive behavioral approaches reduce incidence, duration and severity of acute stress disorder, PTSD and depression (true).

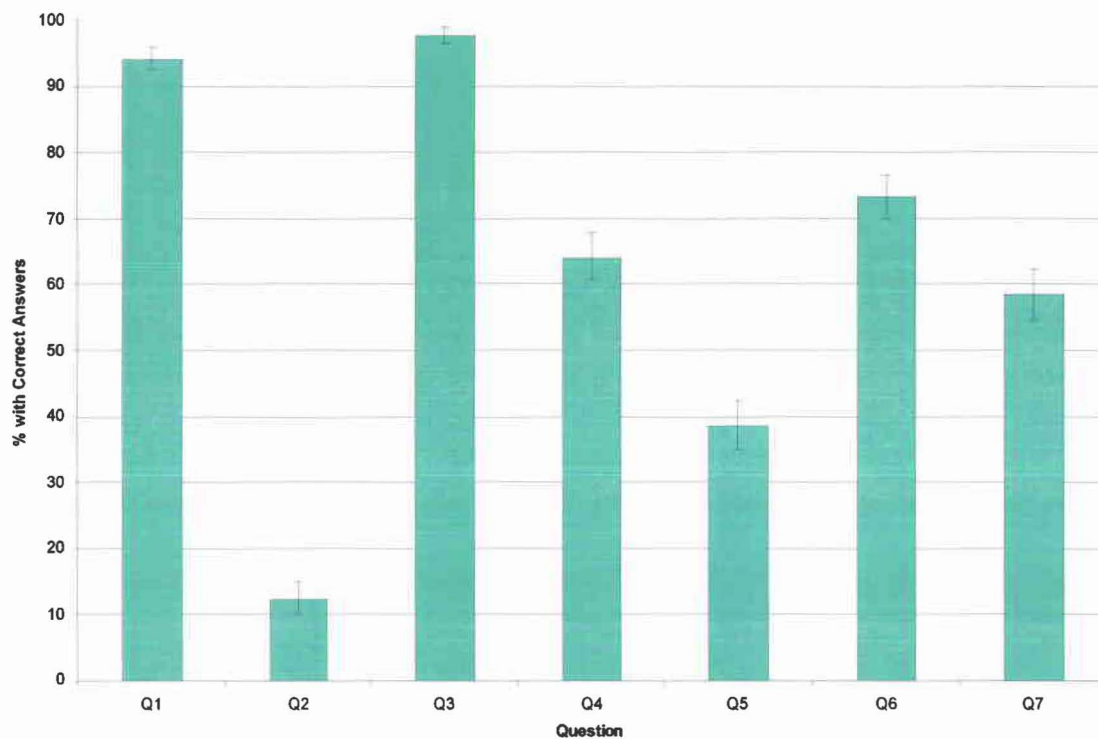


Figure 3.6.2: Percentage of Social Workers and Psychologists with Correct Answers by Question

In Section IV: Background Information, respondents were asked to mark their gender, age in 10-year categories, current work setting, and if they were actively practicing in their professional field.

Social workers and psychologists were predominately female (76%). No differences in knowledge scores were detected from gender. For frequency details, please see Table

3.6.1: Social Worker and Psychologist Gender Distribution.

Gender	Frequency	Percent
Missing	2	1.1%
Male	40	22.7%
Female	134	76.1%
Total	176	100.0%

Table 3.6.1: Social Worker and Psychologist Gender Distribution

No differences were detected in score between 10-year age categories, nor was a linear trend found. For frequency details on 10-year age categories, please see Table

3.6.2: Social Workers and Psychologists Age Distribution.

Age	Frequency	Percent
Missing	3	1.7%
20 – 29	10	5.7%
30 – 39	28	15.9%
40 – 49	43	24.4%
50 – 59	64	36.4%
60 – 69	24	13.6%
70 - 79	4	2.3%
80+	0	0.0%
Total	176	100.0%

Table 3.6.2: Social Worker and Psychologist Age Distribution

Respondents were asked to identify their work setting as being in patient care, administration, public health, academic institution, or retired/inactive. Several reported multiple categories. Analysis was preformed by comparing all who marked a particular work setting versus all others, (e.g. all those in patient care versus those who did not mark patient care). These are five orthogonal tests, so alpha was adjusted using the following formula: $\alpha_{\text{true}} = 1 - (1 - \alpha_{\text{test}})^n$, where n is the number of orthogonal tests being performed. The desired α_{true} is 0.05, so α_{test} is 0.01. Social workers and psychologists

who reported being retired or inactive scored significantly ($p=0.008$) lower (mean 3.4, SD 1.5) than those who did not report being retired or inactive (mean 4.5, SD 1.1). For frequency information please see Table 3.6.3: Social Worker and Psychologist Current Work Settings.

Work Setting	Frequency
Missing	4
Patient Care	102
Administration	27
Public Health	13
Academic Institution	25
Retired/Inactive	14

Table 3.6.3: Social Worker and Psychologist Current Work Settings

The survey inquired if the respondents were currently actively practicing in their profession. No significant effects were found from this factor. Please see the following Table 3.6.4: Social Workers and Psychologists Actively Practicing for frequencies.

	Frequency	Percent
Missing	4	2.3%
Yes	140	79.5%
No	32	18.2%
Total	176	100.0%

Table 3.6.4: Social Workers and Psychologists Actively Practicing

In Section III: Response and Training, respondents were asked if they had received prior training in bioterrorism and if they would be willing to assist in the state's response and control efforts should an event occur. Social workers and psychologists were also asked if their training was received from the American Red Cross.

About one-tenth of the social workers and psychologists reported prior training. These professionals did not score significantly different from those who did not receive training, but they did score slightly higher. For frequencies, see Table 3.2.7: Social Workers and Psychologists with Prior Training.

	Frequency	Percent
Missing	3	1.7%
Yes	18	10.2%
No	155	88.1%
Total	176	100.0%

Table 3.6.5: Social Workers and Psychologists with Prior Training

Of the 18 who had prior training, 12 had received training from the American Red Cross (ARC). No significant differences were detected in score between ARC training and no training or between the training types. For frequency details see Table 3.6.6: Social Workers and Psychologists with Training by American Red Cross.

	Frequency	Percent	Total Percent
Missing	1	5.5%	0.6%
Yes	12	66.7%	6.8%
No	5	27.8%	2.8%
Total trained	18	100.0%	10.2%
Total	176		100.0%

Table 3.6.6: Social Workers and Psychologists with Training by American Red Cross

Nearly 73% of the social workers and psychologists reported that they would be willing to assist the state in an event. No differences in bioterrorism knowledge score were detected from this willingness.

	Frequency	Percent
Missing	5	2.8%
Yes	128	72.7%
No	43	24.4%
Total	176	100.0%

Table 3.6.7: Social Workers and Psychologists Willing to Assist

3.7 Comparison Questions

Physician and nurses received the same survey, so a comparison can be made between all the questions. The two professional classes scored differently ($p < 0.0001$) overall; physicians scored a mean of 9.1 (SD 1.9) and nurses a mean of 7.8 (SD 2.2). For a graph comparing the percent of physicians and nurses who scored each question correctly, Figure 3.7.1: Percentage of Physicians and Nurses with Correct Answers by Question. Error bars show one standard deviation above and below the observed score.

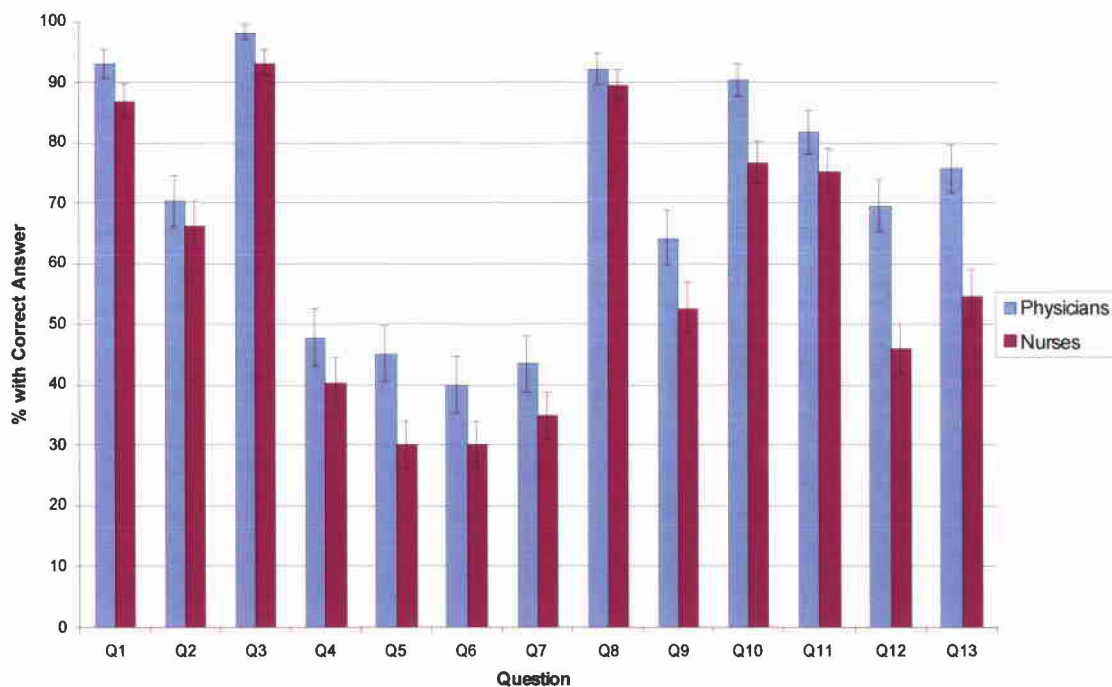


Figure 3.7.1: Percentage of Physicians and Nurses with Correct Answers by Question

By question, physicians scored higher than nurses on questions 3, 5, 9, 10, 12 and 13. For details comparing the questions, along with p-values (mid-p exact) and relative risk (physicians to nurses), see Table 3.7.1: Physician and Nurse Comparison Question Percentages and Relative Risks.

Question	Physician (%)	Nurse (%)	Difference (%)	p Value	Relative Risk	RR 95% CI
3	98.3	93.2	5.1	0.03	1.05	1.00 – 1.11
5	45.2	30.1	15.1	0.006	1.50	1.09 – 2.06
9	64.3	52.7	11.6	0.03	1.22	0.99 – 1.50
10	90.4	76.7	13.7	0.002	1.18	1.06 – 1.31
12	69.6	45.9	23.7	<0.0001	1.52	1.22 – 1.88
13	75.7	54.8	20.9	0.0002	1.38	1.15 – 1.65

Table 3.7.1: Physician and Nurse Comparison Question Percentages and Relative Risks

Although the professional classes received different surveys, some of the versions contained a subset of the same or similar (reporting law) questions. For a graph of comparison questions by professional class, please see Figure 3.7.2: Comparison between Physicians, Nurses, Dentists and Veterinarians. Error bars show one standard deviation above and below the observed score.

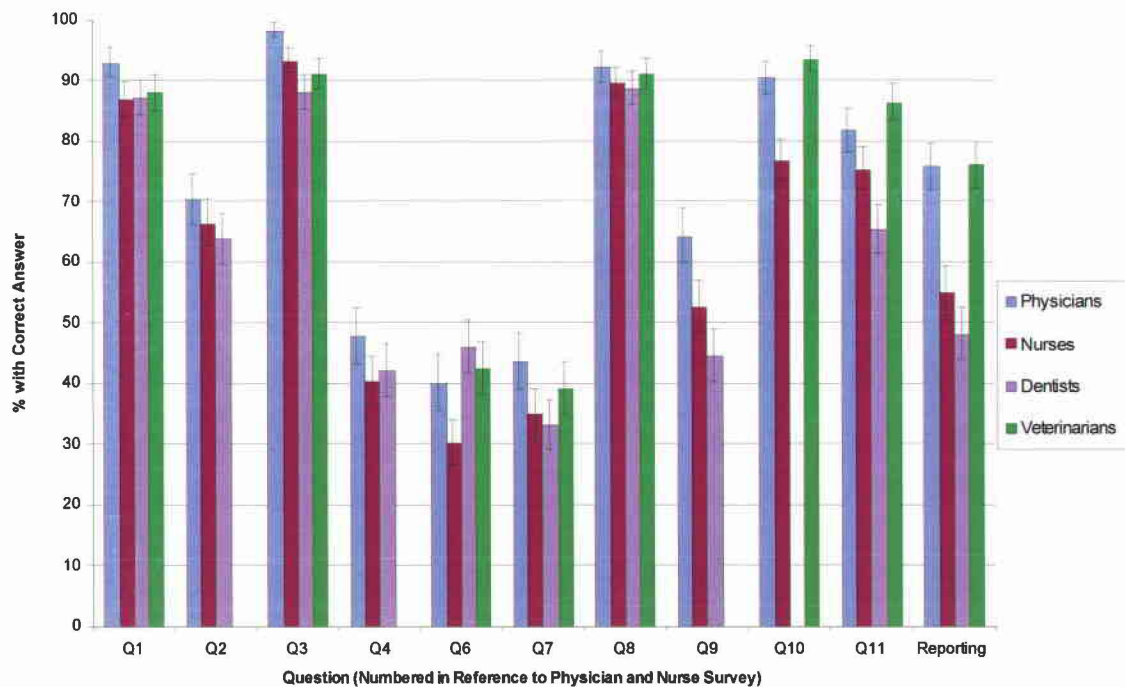


Figure 3.7.2: Comparison between Physicians, Nurses, Dentists and Veterinarians

Physicians, nurses, dentists and veterinarians saw six identical questions (questions 1, 3, 6, 7, 8 and 11, numbered in reference to the physician/nurse survey), in addition to a similar state-law reporting question. Physicians, nurses and dentists received three other questions (questions 2, 4 and 9). Physicians, nurses and veterinarians shared one additional question (question 10). Out of these eleven questions, six contained significant differences between the different professional classes. Of particular interest is the question regarding state law mandated reporting. Physicians and veterinarians both scored around 75%, and nurses and dentists around 50%. For question percentages, please see Table 3.7.2: Comparison Question Percentages and p Values.

Question	Physicians	Nurses	Dentists	Veterinarians	p Value
3	98.3	93.2	88.0	91.2	0.02
6	40.0	30.1	45.9	42.4	0.04
9	64.3	52.7	44.4	-	0.007
10	90.4	76.7	-	93.6	0.0001
11	81.7	75.3	65.4	86.4	0.0005
Reporting	75.7	54.8	48.1	76	<0.0001

Table 3.7.2: Comparison Question Percentages and p Values

4 DISCUSSION

Only the three factors of prior training, age and current work setting, had significant effects on the knowledge scores of the different professional classes. Any prior training in bioterrorism increased the scores of physicians and nurses. These professional categories also had the highest rates of prior training at 20.9% and 19.9%, respectively. Also apparent was a positive trend in the veterinarians and social workers and psychologists. These groups had a moderate rate of prior training at 12.0% and 10.2%, respectively. Dentists actually showed a negative effect, however, only three (or 2.3%) dentists reported any prior training. Past training is one of the most obvious factors to increase score, however the quality of the training and/or the retention of knowledge from those trainings are important aspects to also consider.

Age (in 10-year categories) affect the scores of nurses, dentists and veterinarians. Notably, it was the only significant factor for both dentists and veterinarians. In all three groups, scores increased from the youngest age groups to the 50s or 60s, at which point the scores decreased sharply. Most likely this is due to the accumulated knowledge of decades spent in their professional fields. Because bioterrorism has recently gained much attention, it could have been expected that the professionals most recently in educational programs (the younger populations, in general) would have received more exposure to the topic and thus scored better. However, the analysis shows that this is not the case; the younger categories scored worse than most of their older counterparts. In the oldest categories, the scores dropped considerably, possibly due to these professionals being out of touch with recent developments and trainings.

Current work settings affected nurses and social workers and psychologists. Interestingly, nurses working in patient care setting had a lower score than those not. This effect remained in nurses who both did and did not have prior training. Nurses in academic setting scored higher than those not in academic settings. This effect was only present in those who did not have prior training. Conversely, prior training significantly increased nurses scores, but not for those working in academic settings. Retired or inactive social workers and psychologists scored lower than others.

All other factors: gender, active in profession, ABMS (physician only), practice type (physician only), RN or APRN (nurse only) or willingness to assist, showed no significant differences. The last factor, willingness to assist in the state's response and control efforts in a bioterrorism event, shows that it is neither only the professionals who possess a high or low degree of knowledge about bioterrorism who are willing to respond. Volunteers would possess a gradient of skills and knowledge. Veterinarians were most willing to volunteer at 84.8%, followed by social workers and psychologists and dentists at 72.7% and 72.2%, respectively. 70.5% of the nurses marked that they would be willing to assist and physicians at 68.7% were the least willing of the professional classes.

From looking at the questions themselves, the area in which the doctors, nurses, dentists and veterinarians all had trouble was identifying possible bioterrorism diseases in patients. For smallpox, professional had difficulty with knowing the clinical features and how to differentiate the rash from chickenpox. For inhalation anthrax, they had problems knowing what to look for in a chest x-ray (widened mediastinum) and symptom

differences from an upper respiratory infection. Future training should consider focusing on the identification of diseases in patients, including differential diagnoses.

5 FUTURE DIRECTIONS

The analysis presented here sparks a few questions of its own, as well as fitting into the larger framework of the entire survey objectives. Why do nurses working in patient care have a lower bioterrorism knowledge score? Why do roughly three-quarter of the physicians and veterinarians have a good grasp of the state-mandated reporting laws, but only half of the nurses and dentists? Future work might wish to explore these factors, to better understanding training in these professional groups.

This analysis of demographic and background factors is a subcomponent of the larger survey research. The other sections of the survey, specifically Section II: Knowledge Levels, need to be explored further. A comparison of requested bioterrorism training topics can be compared with the respondent's score on relevant knowledge questions. Are the respondents asking for training that they really need? Investigations into the relationship between prior training, willingness to assist and other factors can be explored.

This analysis, plus other analyses, will be used to create tailored and appropriate trainings for the professional classes. Content will be matched to weak areas of knowledge questions, requested topics and role-specific information. Reported preferences will influence the modes and formats of training delivery. From this analysis, for example, training in state-mandated reporting laws is needed more for the nursing and dental professionals. Also indicated is the need to increase the overall rates of bioterrorism training in the health professional groups.

6 RECOMMENDATIONS

Physicians: Physicians were the professional class with the highest rate (21%) of past bioterrorism training, but the lowest willing (69%) to assist. In a bio-event, medical personnel, especially physicians, will be in high demand, so it is critical to determine why physicians are unlikely to offer assistance to the state. Perhaps trainings need to be more encouraging for people to volunteer. For example, the trainings can give details on possible job duties or how they and their families would be protected. In terms on knowledge-based training, more skills seem to be needed in identifying bioterrorism diseases in patients, including differential diagnoses.

Nurses: Nurses also had a relatively high rate of past training, however this rate and general bioterrorism knowledge seem to be lower than for physicians. Nurses might benefit from trainings that are focused on their profession and not the medical community in general. In terms on knowledge-based training, more skills seem to be needed in identifying bioterrorism diseases in patients, including differential diagnoses. Nurses also need to be more familiar with the state's mandated reporting laws.

Dentists: Dental resources could prove to be very valuable if the conventional medical capabilities are overwhelmed. However, in order to tap this potential, the dentists will need to be trained in all aspects of bioterrorism response. In this study only 3 (2.3%) of the dentists had received any sort of past training.

Veterinarians: Veterinarians were the most willing (85%) to assist. They had one of the lowest rates of training at 10%, yet were very knowledgeable in the objective questions (73% average score). The resources this professional class offers could be tapped by trainings that create strong partnerships and define roles and interactions between veterinarians and other medical and health professionals. Veterinarians also need to be prepared to identify, diagnose and treat both zoonotic bioterrorism diseases (directed at the human population, but can appear in animals), but also potential agroterrorism diseases (directed at the animal population).

Social workers and psychologists: Social workers and psychologists were highly willing (73%) to provide assistance to the state in a bio-event. However, only 12% had received past training. Social workers and psychologists would be called in to perform trauma psychology (also called psychological or emotional first-aid), which is very different from their usual roles. All who assist should be trained (or certified) in this area.

7 APPENDIX A: PHYSICIAN SURVEY AND RESULTS

Kindly provided by Dr. Katz

Part I: Knowledge Questions

Questions 1-13 are knowledge-based questions. Please answer these to the best of your ability. Individual responses will be kept anonymous, while aggregate responses will help the Department of Health and the University of Hawaii to identify areas that should be addressed in our targeted health professions bioterrorism preparedness training. **Please circle the one best answer for the following questions.**

1. Which of the following diseases have potential for person-to-person spread? (n = 113)
 - A. Anthrax and plague 5/113 = 4.4%
 - B. Plague and botulism 1/113 = 0.9%
 - C. Botulism and brucellosis 0/113 = 0%
 - D. Smallpox and plague 107/113 = 94.7%

2. Which of the following are good biological terrorism threats because of substantial morbidity and mortality, ease of production, efficient dissemination, stability in aerosol, or high infectivity? (n = 114)
 - A. Anthrax, chickenpox, botulism, and plague 1/114 = 0.9%
 - B. Anthrax, smallpox, chickenpox, and plague 25/114 = 21.9%
 - C. Anthrax, smallpox, botulism, and plague 81/114 = 71.1%
 - D. Anthrax, smallpox, mumps, and plague 7/114 = 6.1%

3. The deadliest form of anthrax is: (n = 115)
 - A. Cutaneous 0/115 = 0%
 - B. Inhalational 113/115 = 98.3%
 - C. Gastrointestinal 1/115 = 0.9%
 - D. Bubonic 1/115 = 0.9%

4. Which of the following symptoms is/are not commonly found in inhalation anthrax and if present could help to differentiate an upper respiratory tract infection from anthrax? (n = 115)
 - A. Rhinorrhea and sore throat 55/114 = 48.2%
 - B. Dyspnea 14/114 = 12.3%
 - C. Meningeal signs 30/114 = 26.3%
 - D. Vomiting 15/114 = 13.2%

5. A pathognomonic chest X-ray finding of advanced inhalation anthrax is:
 - A. Cavitation 31/115 = 27%
 - B. Widened mediastinum 52/115 = 45.2%
 - C. Normal chest X-ray despite dyspnea and tachypnea 32/115 = 27.8%

6. Smallpox has all of the following clinical features **EXCEPT**: (n = 111)
- A. The incubation period ranges from 7-17 days. $4/111 = 3.6\%$
 - B. During the incubation period, the infected person looks and feels healthy and cannot infect others. $46/111 = 41.4\%$
 - C. Infectivity is highest after the fever has begun and during the first 7-10 days following the appearance of the rash. $15/111 = 13.5\%$
 - D. The virus can only be spread through direct or indirect contact with open lesions (e.g., by touching an infected lesion or by contact with infected clothing or bedding). $46/111 = 41.4\%$
7. Which of the following features help to distinguish the rash of smallpox from that of chickenpox: (n = 111)
- A. The initial smallpox lesions coincide with the onset of fever while the fever in chickenpox precedes the rash by 2-3 days. $24/111 = 21.6\%$
 - B. The smallpox rash is centrifugal (majority of lesions on the face and extremities) while the rash in chickenpox is central (majority of lesions on the trunk). $50/111 = 45.0\%$
 - C. Various stages of lesion progression can be found at any one single location on a smallpox patient while the lesions of chickenpox tend to be all at the same stage of development. $30/111 = 27.0\%$
 - D. Lesions rarely occur on the palms and soles in smallpox, while lesions commonly occur on the palms and soles in chickenpox. $7/111 = 6.3\%$
8. What infection control measures are recommended for a person with suspected or confirmed smallpox? (n = 112)
- A. Isolation of the person in a negative-air pressure room $2/112 = 1.8\%$
 - B. Protective clothing for health-care workers in contact with that patient $0/112 = 0\%$
 - C. Vaccination of persons involved with direct medical care of suspected cases $2/112 = 1.8\%$
 - D. Monitoring contacts of suspected smallpox cases for febrile illness $2/112 = 1.8\%$
 - E. All of the above infection control measures are recommended for a person with suspected or confirmed smallpox $106/112 = 94.6\%$
9. What is a critical measure in preventing contact transmission of vaccinia virus (the agent used in the currently licensed smallpox vaccine)? (n = 112)
- A. Thorough hand washing after contact with the vaccination site $74/112 = 66.1\%$
 - B. Isolation of the vaccinated person $9/112 = 8.0\%$
 - C. Use of a porous bandage to cover the vaccination site $12/112 = 10.7\%$
 - D. Antibacterial ointment applied to the vaccination site $2/112 = 1.8\%$
 - E. Application of the vaccine at an anatomic site normally covered by clothing $15/112 = 13.1\%$

10. Epidemiologic features of a plague outbreak that may indicate an intentional release of the plague organism include: (n = 113)
- A. Occurrence in persons with known health risks such as chronic pulmonary disease 2/113 = 1.8%
 - B. Occurrence in areas with prior reported rodent deaths 7/113 = 6.2%
 - C. Location of infections outside areas of known enzootic infection 104/113 = 92.0%
11. The most common early presenting syndrome associated with the majority of high risk ("Category A") bioterrorism-associated diseases (i.e., anthrax, botulism, plague, smallpox, tularemia, and viral hemorrhagic fevers) is: (n = 113)
- A. Acute bloody diarrhea 1/113 = 0.9%
 - B. Influenza-like illness 94/113 = 83.2%
 - C. Acute hepatitis 0/113 = 0%
 - D. Fever and rash 18/113 = 15.9%
12. Persistence of spores in the environment is of concern after a bioterrorism event involving: (n = 114)
- A. Anthrax 80/114 = 70.2%
 - B. Tularemia 1/114 = 0.9%
 - C. Plague 0/114 = 0%
 - D. All of the above 33/114 = 28.9%
13. According to Hawaii State Law, a physician who sees a patient he or she suspects of having anthrax or smallpox must notify the State Department of Health: (n = 113)
- A. By phone as soon as the suspected diagnosis has been laboratory confirmed 10/113 = 8.8%
 - B. By phone as soon as the provisional diagnosis is established 87/113 = 77.0%
 - C. By mail, phone, or fax within 72 hours 5/113 = 4.4%
 - D. Immediately after receiving written permission from the patient (or his/her legal guardian) 11/113 = 9.7%

Part II: Knowledge Levels

For questions 14-17 please mark the single best answer that reflects your current knowledge/level of competency.

14. I could respond effectively to a bioterrorist attack: (n = 114)

18.4% (21)	Strongly Disagree	43.9% (50)	Disagree	24.6% (28)	Neutral	13.2% (15)	Agree	0% (0)	Strongly Agree
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15. I know how to access clinical information about bioterrorism: (n = 115)

7.8% (9)	Strongly Disagree	27.0% (31)	Disagree	17.4% (20)	Neutral	35.7% (41)	Agree	12.2% (14)	Strongly Agree
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16. I know where to call to report a suspect bioterrorism attack: (n = 115)

6.1% (7)	Strongly Disagree	34.8% (40)	Disagree	19.1% (22)	Neutral	32.2% (37)	Agree	7.8% (9)	Strongly Agree
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17. I know how to identify and recognize a bioterrorism event in human populations: (n = 115)

13.9% (16)	Strongly Disagree	40.0% (46)	Disagree	26.1% (30)	Neutral	19.1% (22)	Agree	0.9% (1)	Strongly Agree
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Part III: Response and Training

18. I received prior training in bioterrorism preparedness: (n = 112)

21.4% (24)	Yes
78.6% (88)	No

If Yes, please note the number of hours in the past year:
range: < 1 hr to 100 hours; mode = 1 hour; median = 1 hours

19. In the event of a bioterrorist attack, I would be willing to provide assistance in the state's response and control efforts: (n = 107)

73.8% (79)	Yes
26.2% (28)	No

20. Which of the following areas do you feel you have a need for training? Please mark all that apply:

83.5% (96)	A.	Recognition of an illness or injury in humans as potentially resulting from exposure to a bioterrorist (BT) agent
68.7% (79)	B.	Surveillance (including syndromic surveillance) for BT agents
68.7% (79)	C.	Laboratory diagnosis of BT agents
79.1% (91)	D.	Safety measures to be taken by a public health responder in a BT event, including the use of protective equipment
76.5% (88)	E.	Isolation and decontamination procedures
63.5% (73)	F.	How to access clinical information about BT
61.7% (71)	G.	Who to call if a BT event is suspected
53.9% (62)	H.	How the public health system works in Hawaii

67.0% (77)	I.	Basic education regarding biological incidents
53.9% (62)	J.	Disease investigation and reporting/epidemiologic methods
58.3% (67)	K.	Hawaii's laws and statutes relating to public health measures

Please specify any additional training needs related to bioterrorism preparedness and response that you may have:

Four physicians had comments:

Comment 1. 1) What is available for outer island re: RX and support (ie meds, isolation and decontamination facilities, military or DPH support); 2) "Passive" learning (e.g., mailed brochures and mass faxes) seems to waste a lot of time/ money/ paper. Internet dissemination is most efficient. Good website would be helpful so info is available if/when needed. Pamphlets/brochures/faxes tend to get lost. Best would be a .pdf document that could be downloaded and stored on individual's computer, so it is easily available and accessible if/when needed or questions arise.

Comment 2. CD ROM for reference

Comment 3. I can't find my bioterrorism CD!

Comment 4. Repetitive exposure to clinical info and Rx – (action indicated). I'm retired – available.

Part IV: Background Information

For each of the following categories please mark the single best /correct answer:

Age: (n = 109)

0%	<20
0%	20 – 29
15.6% (17)	30 – 39
26.6% (29)	40 – 49
33.9% (37)	50 – 59
16.5% (18)	60 – 69
7.3% (8)	70 – 79
0%	80+

Gender: (n = 109)

73.4% (80)	Male
26.6% (29)	Female

Current Work Setting: (may have more than one answer)

91	Patient care
9	Administration
0	Public Health
8	Academic institution
9	Retired/Inactive

I am actively practicing my medical/nursing profession: (n = 108)

91.7% (99)	Yes
8.3% (9)	No

I describe my practice as: (n = 111)

34.2% (38)	Primary care
62.2% (69)	Specialty
3.6% (4)	Other (Please note):

I am American Board of Medical Specialties (ABMS) certified: (n = 106)

85.8% (91)	Yes
14.2% (15)	No

8 APPENDIX B: NURSE SURVEY AND RESULTS

Kindly provided by Dr. Katz

Part I: Knowledge Questions

Questions 1-13 are knowledge-based questions. Please answer these to the best of your ability. Individual responses will be kept anonymous, while aggregate responses will help the Department of Health and the University of Hawaii to identify areas that should be addressed in our targeted health professions bioterrorism preparedness training. **Please circle the one best answer for the following questions.**

1. Which of the following diseases have potential for person-to-person spread? (n = 142)

E.	Anthrax and plague	14/142 = 9.9%
F.	Plague and botulism	0/142 = 0%
G.	Botulism and brucellosis	1/142 = 0.7%
H.	Smallpox and plague	127/142 = 89.4%

2. Which of the following are good biological terrorism threats because of substantial morbidity and mortality, ease of production, efficient dissemination, stability in aerosol, or high infectivity? (n = 144)

A.	Anthrax, chickenpox, botulism, and plague	4/144 = 2.8%
B.	Anthrax, smallpox, chickenpox, and plague	32/144 = 22.2%
C.	Anthrax, smallpox, botulism, and plague	97/144 = 67.4%
D.	Anthrax, smallpox, mumps, and plague	11/144 = 7.6%

3. The deadliest form of anthrax is: (n = 144)

A.	Cutaneous	7/144 = 4.9%
B.	Inhalational	136/144 = 94.4%
C.	Gastrointestinal	1/144 = 0.7%
D.	Bubonic	0/144 = 0%

4. Which of the following symptoms is/are not commonly found in inhalation anthrax and if present could help to differentiate an upper respiratory tract infection from anthrax? (n = 142)

E.	Rhinorrhea and sore throat	59/142 = 41.5%
F.	Dyspnea	19/142 = 13.4%
G.	Meningeal signs	35/142 = 24.6%
H.	Vomiting	29/142 = 20.4%

5. A pathognomonic chest X-ray finding of advanced inhalation anthrax is: (n = 137)

D.	Cavitation	55/137 = 40.1%
E.	Widened mediastinum	44/137 = 32.1%
F.	Normal chest X-ray despite dyspnea and tachypnea	38/137 = 27.7%

6. Smallpox has all of the following clinical features **EXCEPT**: (n = 137)
- E. The incubation period ranges from 7-17 days. $8/137 = 5.8\%$
 - F. During the incubation period, the infected person looks and feels healthy and cannot infect others. $54/137 = 39.4\%$
 - G. Infectivity is highest after the fever has begun and during the first 7-10 days following the appearance of the rash. $31/137 = 22.6\%$
 - H. The virus can only be spread through direct or indirect contact with open lesions (e.g., by touching an infected lesion or by contact with infected clothing or bedding). $44/137 = 32.1\%$
7. Which of the following features help to distinguish the rash of smallpox from that of chickenpox: (n = 128)
- E. The initial smallpox lesions coincide with the onset of fever while the fever in chickenpox precedes the rash by 2-3 days. $21/128 = 16.4\%$
 - F. The smallpox rash is centrifugal (majority of lesions on the face and extremities) while the rash in chickenpox is central (majority of lesions on the trunk). $51/128 = 39.8\%$
 - G. Various stages of lesion progression can be found at any one single location on a smallpox patient while the lesions of chickenpox tend to be all at the same stage of development. $37/128 = 28.9\%$
 - H. Lesions rarely occur on the palms and soles in smallpox, while lesions commonly occur on the palms and soles in chickenpox. $19/128 = 14.8\%$
8. What infection control measures are recommended for a person with suspected or confirmed smallpox? (n = 138)
- F. Isolation of the person in a negative-air pressure room $3/138 = 2.2\%$
 - G. Protective clothing for health-care workers in contact with that patient $2/138 = 1.4\%$
 - H. Vaccination of persons involved with direct medical care of suspected cases $1/138 = 0.7\%$
 - I. Monitoring contacts of suspected smallpox cases for febrile illness $1/138 = 0.7\%$
 - J. All of the above infection control measures are recommended for a person with suspected or confirmed smallpox $131/138 = 94.9\%$
9. What is a critical measure in preventing contact transmission of vaccinia virus (the agent used in the currently licensed smallpox vaccine)? (n = 136)
- F. Thorough hand washing after contact with the vaccination site $77/136 = 56.6\%$
 - G. Isolation of the vaccinated person $6/136 = 4.4\%$
 - H. Use of a porous bandage to cover the vaccination site $27/136 = 19.9\%$
 - I. Antibacterial ointment applied to the vaccination site $2/136 = 1.5\%$
 - J. Application of the vaccine at an anatomic site normally covered by clothing $24/136 = 17.6\%$

10. Epidemiologic features of a plague outbreak that may indicate an intentional release of the plague organism include: (n = 139)

- D. Occurrence in persons with known health risks such as chronic pulmonary disease 4/139 = 2.9%
- E. Occurrence in areas with prior reported rodent deaths 23/139 = 16.5%
- F. Location of infections outside areas of known enzootic infection 112/139 = 80.6%

11. The most common early presenting syndrome associated with the majority of high risk ("Category A") bioterrorism-associated diseases (i.e., anthrax, botulism, plague, smallpox, tularemia, and viral hemorrhagic fevers) is: (n = 140)

- E. Acute bloody diarrhea 3/140 = 2.1%
- F. Influenza-like illness 110/140 = 78.6%
- G. Acute hepatitis 0/140 = 0%
- H. Fever and rash 27/140 = 19.3%

12. Persistence of spores in the environment is of concern after a bioterrorism event involving: (n = 142)

- E. Anthrax 67/142 = 47.2%
- F. Tularemia 4/142 = 2.8%
- G. Plague 2/142 = 1.4%
- H. All of the above 69/142 = 48.6%

13. According to Hawaii State Law, a physician who sees a patient he or she suspects of having anthrax or smallpox must notify the State Department of Health: (n = 139)

- A. By phone as soon as the suspected diagnosis has been laboratory confirmed 32/139 = 23.0%
- B. By phone as soon as the provisional diagnosis is established 80/139 = 57.6%
- C. By mail, phone, or fax within 72 hours 13/139 = 9.4%
- D. Immediately after receiving written permission from the patient (or his/her

legal guardian) 14/139 = 10.1%

Part II: Knowledge Levels

For questions 14-17 please mark the single best answer that reflects your current knowledge/level of competency.

14. I could respond effectively to a bioterrorist attack: (n = 145)

24.0% (35)	Strongly Disagree	43.4% (63)	Disagree	21.4% (31)	Neutral	11.0% (16)	Agree	0% (0)	Strongly Agree
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15. I know how to access clinical information about bioterrorism: (n = 145)

9.7% (14)	Strongly Disagree	24.8% (37)	Disagree	20.7% (30)	Neutral	39.3% (57)	Agree	5.5% (8)	Strongly Agree
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16. I know where to call to report a suspect bioterrorism attack: (n = 145)

15.9% (23)	Strongly Disagree	35.2% (51)	Disagree	11.0% (16)	Neutral	33.1% (48)	Agree	4.8% (7)	Strongly Agree
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17. I know how to identify and recognize a bioterrorism event in human populations: (n = 146)

15.8% (23)	Strongly Disagree	45.2% (66)	Disagree	23.3% (34)	Neutral	15.1% (22)	Agree	0.7% (1)	Strongly Agree
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Part III: Response and Training

18. I received prior training in bioterrorism preparedness: (n = 142)

20.4% (29)	Yes
79.8% (113)	No

If Yes, please note the number of hours in the past year (28 answered):
Range: < 1 hr to 10 hours; mode = 1 hour; median = 1 hour

19. In the event of a bioterrorist attack, I would be willing to provide assistance in the state's response and control efforts: (n = 139)

74.1% (103)	Yes
25.9% (36)	No

20. Which of the following areas do you feel you have a need for training? Please mark all that apply: (n = 146)

86.3% (126)	L.	Recognition of an illness or injury in humans as potentially resulting from exposure to a bioterrorist (BT) agent
71.9% (105)	M.	Surveillance (including syndromic surveillance) for BT agents
71.2% (104)	N.	Laboratory diagnosis of BT agents
84.9% (124)	O.	Safety measures to be taken by a public health responder in a BT event, including the use of protective equipment
76.0% (111)	P.	Isolation and decontamination procedures
66.4% (97)	Q.	How to access clinical information about BT
68.5% (100)	R.	Who to call if a BT event is suspected
56.8% (83)	S.	How the public health system works in Hawaii

78.1% (114)	T.	Basic education regarding biological incidents
65.1% (95)	U.	Disease investigation and reporting/epidemiologic methods
68.5% (100)	V.	Hawaii's laws and statutes relating to public health measures

Please specify any additional training needs related to bioterrorism preparedness and response that you may have: (Verbatim comments from 16 respondents):

Comment 1. 1. We don't know when alert levels (color) scale rises-- if it includes Hawaii and if it refers to bio or bombs. 2. If a dirty bomb was dropped over Hawaii--What? No protocols--No clue what a citizen or CN RN is to do. As an RN I am expected to rush to the hospital to help--What does my own family do?? I abandon them? 3. An epidemic might be easier to deal with than a bio-terror attack. One could at least take steps to protect each other.

Comment 2. I am not able to respond to this. I would appreciate any information re: bioterrorism. Thank you.

Comment 3. Availability and training in the use of communications technologies around the State. Ridiculous example: Satellite communications dish and equipment paid for and set up on Molokai DOH office, yet not one practice use/ example of how to use it!! To my knowledge I don't even think the unit has been turned on even once since the set-up technicians left (months ago!)

Comment 4. We receive bioterrorism inservice but this needs to be given every 6 months or so in order to improve comfort level of health care workers. I cannot remember everything at once and we need more frequent updates. I'm unsure of many of the answers and feel embarrassed to submit this.

Comment 5. I feel it is necessary to continually update and review these skills.

Comment 6. Extensive training should be targeted to specific group. Education for health care and non-health care providers is always good. But need to be reasonable with resources that are available.

Comment 7. Interpersonal skills useful in dealing with panicky family.

Comment 8. Attended one infectious disease conference where content of 2-3 hours were about bioterrorism one year ago.

Comment 9. As an actively practicing RN in a hospital setting, I am surprised I have not had any inservice in this. Should it not be mandatory for all active clinicians?

Comment 10. I know nothing about this matter. I would appreciate learning so I can be of assistance should anything like bioterrorism occur.

Comment 11. Disaster Mental Health/ Psychological effects of BT (Lay public, organizational & health professionals). Note: Please make sure your PH training includes psych/ mental health aspects. (Also how to distinguish anxiety reactions vs physical and psych effects of exposure vs BT agent).

Comment 12. Psychiatric issues regarding panic and leadership in serious crisis would be helpful subjects for classwork for me

Comment 13. I have never had training in any bioterrorism preparedness and would not know what to do. It would be good to know the "basics" and continue training to increase knowledge as with CPR training. It could be ongoing and perhaps all hospitals can incorporate it in the yearly or every 2 yr training of all staff. We become focused on our present situation at work and think of BT while at home watching the news.

- Comment 14. I am a retired RN, however, I would like to learn more about BT events.
 Comment 15. Anything that you can provide.
 Comment 16. Upcoming training and practice drills summer 2004.

Part IV: Background Information

For each of the following categories please mark the single best /correct answer:

Age: (n = 143)

0%	<20
6.3% (9)	20 – 29
23.1% (33)	30 – 39
33.6% (48)	40 – 49
25.9% (37)	50 – 59
10.5% (15)	60 – 69
0%	70 – 79
0.7% (1)	80+

Gender: (n = 142)

10.6% (15)	Male
89.4% (127)	Female

Current Work Setting: (may have more than one answer)

102	Patient care
17	Administration
6	Public Health
7	Academic institution
13	Retired/Inactive

I am actively practicing my medical/nursing profession: (n = 143)

87.4% (125)	Yes
12.6% (18)	No

NURSES ONLY (please designate whether you are an RN or APRN): (n = 144)

88.2% (127)	Registered nurse
11.8% (17)	Advanced practice registered nurse

9 APPENDIX C: DENTIST SURVEY AND RESULTS

Kindly provided by Dr. Katz

Part I: Knowledge Questions

Questions 1-10 are knowledge-based questions. Please answer these to the best of your ability. Individual responses will be kept anonymous, while aggregate responses will help the Department of Health and the University of Hawaii to identify areas that should be addressed in our targeted bioterrorism preparedness training for dentists. **Please circle the one best answer for the following questions.**

1. Which of the following diseases have potential for person-to-person spread? (n = 131)
 - I. Anthrax and plague 13/131 = 9.9%
 - J. Plague and botulism 1/131 = 0.8%
 - K. Botulism and brucellosis 1/131 = 0.8%
 - L. Smallpox and plague 116/131 = 88.5%

2. Which of the following are good biological terrorism threats because of substantial morbidity and mortality, ease of production, efficient dissemination, stability in aerosol, or high infectivity? (n = 130)
 - A. Anthrax, chickenpox, botulism, and plague 4/130 = 3.1%
 - B. Anthrax, smallpox, chickenpox, and plague 29/130 = 22.3%
 - C. Anthrax, smallpox, botulism, and plague 85/130 = 65.4%
 - D. Anthrax, smallpox, mumps, and plague 12/130 = 9.2%

3. The deadliest form of anthrax is: (n = 131)
 - A. Cutaneous 4/131 = 3.1%
 - B. Inhalational 117/131 = 89.3%
 - C. Gastrointestinal 5/131 = 3.8%
 - D. Bubonic 5/131 = 3.8%

4. Which of the following symptoms is/are not commonly found in inhalation anthrax and if present could help to differentiate an upper respiratory tract infection from anthrax? (n = 128)
 - I. Rhinorrhea and sore throat 56/128 = 43.8%
 - J. Dyspnea 17/128 = 13.3%
 - K. Meningeal signs 36/128 = 28.1%
 - L. Vomiting 19/128 = 14.8%

5. Smallpox has all of the following clinical features **EXCEPT**: (n = 130)
- A. The incubation period ranges from 7-17 days. $6/130 = 4.6\%$
 - B. During the incubation period, the infected person looks and feels healthy and cannot infect others. $44/130 = 33.8\%$
 - C. Infectivity is highest after the fever has begun and during the first 7-10 days following the appearance of the rash. $19/130 = 14.6\%$
 - D. The virus can only be spread through direct or indirect contact with open lesions (e.g., by touching an infected lesion or by contact with infected clothing or bedding). $61/130 = 46.9\%$
6. Which of the following features help to distinguish the rash of smallpox from that of chickenpox: (n = 125)
- A. The initial smallpox lesions coincide with the onset of fever while the fever in chickenpox precedes the rash by 2-3 days. $24/125 = 19.2\%$
 - B. The smallpox rash is centrifugal (majority of lesions on the face and extremities) while the rash in chickenpox is central (majority of lesions on the trunk). $44/125 = 35.2\%$
 - C. Various stages of lesion progression can be found at any one single location on a smallpox patient while the lesions of chickenpox tend to be all at the same stage of development. $47/125 = 37.6\%$
 - D. Lesions rarely occur on the palms and soles in smallpox, while lesions commonly occur on the palms and soles in chickenpox. $10/125 = 8.0\%$
7. What infection control measures are recommended for a person with suspected or confirmed smallpox? (n = 129)
- K. Isolation of the person in a negative-air pressure room $1/129 = 0.8\%$
 - L. Protective clothing for health-care workers in contact with that patient $2/129 = 1.6\%$
 - M. Vaccination of persons involved with direct medical care of suspected cases $6/129 = 4.7\%$
 - N. Monitoring contacts of suspected smallpox cases for febrile illness $2/129 = 1.6\%$
 - O. All of the above infection control measures are recommended for a person with suspected or confirmed smallpox $118/129 = 91.5\%$
8. What is a critical measure in preventing contact transmission of vaccinia virus (the agent used in the currently licensed smallpox vaccine)? (n = 124)
- K. Thorough hand washing after contact with the vaccination site $59/124 = 47.6\%$
 - L. Isolation of the vaccinated person $13/124 = 10.5\%$
 - M. Use of a porous bandage to cover the vaccination site $22/124 = 17.7\%$
 - N. Antibacterial ointment applied to the vaccination site $1/124 = 0.8\%$
 - O. Application of the vaccine at an anatomic site normally covered by clothing $29/124 = 23.4\%$

9. The most common early presenting syndrome associated with the majority of high risk (“Category A”) bioterrorism-associated diseases (anthrax, botulism, plague, smallpox, tularemia, and viral hemorrhagic fevers) is: (n = 130)

- I. Acute bloody diarrhea 1/130 = 0.8%
- J. Influenza-like illness 87/130 = 66.9%
- K. Acute hepatitis 0/130 = 0%
- L. Fever and rash 42/130 = 32.3%

10. According to Hawaii State Law, a physician or dentist who sees a patient he or she suspects of having anthrax or smallpox must notify the State Department of Health: (n = 131)

- A. By phone as soon as the suspected diagnosis has been laboratory confirmed
16/131 = 12.2%
- B. By phone as soon as the provisional diagnosis is established 64/131 = 48.9%
- C. By mail, phone, or fax within 72 hours 9/131 = 6.9%
- D. Immediately after receiving written permission from the patient (or his/her legal

guardian)

42/131 = 32.1%

Part II: Knowledge Levels

For questions 11-17 please mark the single best answer that reflects your current knowledge/level of competency:

11. I could respond effectively to a bioterrorist attack: (n = 131)

16.8% (22)	Strongly Disagree	47.3% (62)	Disagree	26.7% (35)	Neutral	8.4% (11)	Agree	0.8% (1)	Strongly Agree
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12. I know what to do as a dentist in the event of a suspect bioterrorism attack: (n = 131)

16.8% (22)	Strongly Disagree	48.9% (64)	Disagree	24.4% (32)	Neutral	9.2% (12)	Agree	0.8% (1)	Strongly Agree
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13. I know how to access clinical information about bioterrorism: (n = 131)

13.0% (17)	Strongly Disagree	32.8% (43)	Disagree	25.2% (33)	Neutral	26.0% (34)	Agree	3.1% (4)	Strongly Agree
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14. I know where to call to report a suspect bioterrorism attack: (n = 131)

14.5% (19)	Strongly Disagree	35.1% (46)	Disagree	22.1% (29)	Neutral	24.4% (32)	Agree	3.8% (5)	Strongly Agree
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15. I know how to identify and recognize a bioterrorism event in human populations: (n = 131)

16.0% (21)	Strongly Disagree	42.7% (56)	Disagree	26.7% (35)	Neutral	13.7% (18)	Agree	0.8% (1)	Strongly Agree
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16. I am familiar with (could recognize) the oral manifestations of bioterrorism agents: (n = 130)

14.6% (19)	Strongly Disagree	41.5% (54)	Disagree	31.5% (41)	Neutral	11.5% (15)	Agree	0.8% (1)	Strongly Agree
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17. I am familiar with the ADA report "Dentistry's Response to Bioterrorism and Other Mass Disasters": (n = 130)

23.8% (31)	Yes
76.2% (99)	No

Part III: Response and Training

18. I received prior training in bioterrorism preparedness: (n = 132)

2.3% (3)	Yes
97.7% (129)	No

If Yes, please note the number of hours in the past year: (3 answered):
Range: < 1-3 hours; median and mode both < 1 hour

19. In the event of a bioterrorist attack, I would be willing to provide assistance in the state's response and control efforts: (n = 130)

73.8% (96)	Yes
26.2% (34)	No

20. Which of the following areas do you feel you have a need for training? Please mark all that apply:

91.7% (122)	W.	Recognition of an illness or injury in humans as potentially resulting from exposure to a bioterrorist (BT) agent
63.2% (84)	X.	Surveillance (including syndromic surveillance) for BT agents
56.4% (75)	Y.	Laboratory diagnosis of BT agents
82.7% (110)	Z.	Safety measures to be taken by a public health responder in a BT event, including the use of protective equipment
74.4% (99)	AA.	Isolation and decontamination procedures
72.9% (97)	BB.	How to access clinical information about BT
76.7% (102)	CC.	Who to call if a BT event is suspected
54.9% (73)	DD.	How the public health system works in Hawaii
70.7% (94)	EE.	Basic education regarding biological incidents
51.9% (69)	FF.	Disease investigation and reporting/epidemiologic methods
63.2%	GG.	Hawaii's laws and statutes relating to public health

(84)	measures
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Please specify any additional training needs related to bioterrorism preparedness and response that you may have: (Verbatim comments from 6 respondents):

- Comment 1. Hawaii Army National Guard
- Comment 2. Treatment and access to medicines and training in administering these agents- remember we're just dentists.
- Comment 3. How to keep my family safe while I work as a responder at home and if infected
- Comment 4. Concise handbook with phone numbers and easily referenced pages to aid in identification of disease and proper responses
- Comment 5. What happened to Salmonella typhosa?? How about chemical poisoning? KCL, Safrin (sic)
- Comment 6. Degree in Microbiology- 12 credit hours of tropical medicine at UH

21. I prefer to obtain bioterrorism preparedness education/training in the following formats (Please choose three): (n = 133)

54.9% (73)	A.	CD-ROM/DVD
63.2% (84)	B.	Lecture/seminar
45.1% (60)	C.	Written information through the mail
7.5% (10)	D.	Written information through e-mail
21.1% (28)	E.	Internet (web-based) education
7.5% (10)	F.	National/Regional Meetings
23.3% (31)	G.	Societal Meetings
0.8% (1)	H.	Teleconference
28.6% (38)	I.	Video

22. Please note your level of interest in the following training/education modes of delivery:

	No Interest	Low Interest	Moderate Interest	High Interest
A. Evening lectures (n = 126)	23.0% (29)	27.0% (34)	34.9% (44)	15.1% (19)
B. Weekend lectures (n = 124)	39.5% (49)	28.2% (35)	19.4% (24)	12.9% (16)
C. All day workshop/ conference during the work	23.1% (28)	22.3% (27)	37.2% (45)	17.4% (21)

week (n = 121)					
D.	Two half day conference during the work week (n = 118)	32.2% (38)	33.9% (40)	30.5% (36)	3.4% (4)
E.	Internet/ Web-based course (n = 121)	18.2% (22)	19.8% (24)	29.8% (36)	32.2% (39)

Part IV: Background Information

For each of the following categories please mark the single best /correct answer:

Age: (n = 132)

0	<20
0.8% (1)	20 – 29
17.4% (23)	30 – 39
43.9% (58)	40 – 49
18.2% (24)	50 – 59
14.4% (19)	60 – 69
3.8% (5)	70 – 79
1.5% (2)	80+

Gender: (n = 131)

87.8% (115)	Male
12.2% (16)	Female

Current Work Setting: (may have more than one answer):

119	Patient care
4	Administration
3	Public Health
1	Academic institution
8	Retired/Inactive

I am actively practicing my dental profession: (n = 132)

93.9% (124)	Yes
6.1% (8)	No

10 APPENDIX D: VETERINARIAN SURVEY AND RESULTS

Kindly provided by Dr. Katz

Part I: Knowledge Questions

Questions 1-10 are knowledge-based questions. Please answer these to the best of your ability. Individual responses will be kept anonymous, while aggregate responses will help the Department of Health and the University of Hawaii to identify areas that should be addressed in our targeted bioterrorism preparedness training for veterinarians. **Please circle the one best answer for the following questions.**

1. Which of the following diseases have potential for person-to-person spread? (n = 120)

M.	Anthrax and plague	7/120 = 5.8%
N.	Plague and botulism	0/120 = 0%
O.	Botulism and brucellosis	3/120 = 2.5%
P.	Smallpox and plague	110/120 = 91.7%

2. *F. tularensis*, the causative agent for tularemia, is listed by the US Public Health Service as having the highest potential for use as a bioterrorism agent ("Category A"). The reasons for this include: (n = 121)

A.	High potential for person-to-person spread	2/121 = 1.7%
B.	High infectivity potential (inhalation or inoculation of as few as ten organisms may cause disease)	40/121 = 33.1%
C.	Both A and B	59/121 = 48.8%
D.	Neither A nor B	20/121 = 16.5%

3. The deadliest form of anthrax is: (n = 124)

A.	Cutaneous	3/124 = 2.4%
B.	Inhalational	114/124 = 91.9%
C.	Gastrointestinal	6/124 = 4.8%
D.	Bubonic	1/124 = 0.8%

4. Epidemiologic features of a plague outbreak that may indicate an intentional release of the plague organism include: (n = 123)

G.	Occurrence in persons with known health risks such as chronic pulmonary disease	2/123 = 1.6%
H.	Occurrence in areas with prior reported rodent deaths	4/123 = 3.3%
I.	Location of infections outside areas of known enzootic infection	117/123 = 95.1%

5. Smallpox has all of the following clinical features **EXCEPT**: (n = 123)
- E. The incubation period ranges from 7-17 days. 3/123 = 2.4%
 - F. During the incubation period, the infected person looks and feels healthy and cannot infect others. 51/123 = 41.5%
 - G. Infectivity is highest after the fever has begun and during the first 7-10 days following the appearance of the rash. 16/123 = 13.0%
 - H. The virus can only be spread through direct or indirect contact with open lesions (e.g., by touching an infected lesion or by contact with infected clothing or bedding). 53/123 = 43.1%
6. Which of the following features help to distinguish the rash of smallpox from that of chickenpox: (n = 103)
- E. The initial smallpox lesions coincide with the onset of fever while the fever in chickenpox precedes the rash by 2-3 days. 16/103 = 15.5%
 - F. The smallpox rash is centrifugal (majority of lesions on the face and extremities) while the rash in chickenpox is central (majority of lesions on the trunk). 49/103 = 47.6%
 - G. Various stages of lesion progression can be found at any one single location on a smallpox patient while the lesions of chickenpox tend to be all at the same stage of development. 31/103 = 30.1%
 - H. Lesions rarely occur on the palms and soles in smallpox, while lesions commonly occur on the palms and soles in chickenpox. 7/103 = 6.8%
7. What infection control measures are recommended for a person with suspected or confirmed smallpox? (n = 118)
- P. Isolation of the person in a negative-air pressure room 0/118 = 0%
 - Q. Protective clothing for health-care workers in contact with that patient 0/118 = 0%
 - R. Vaccination of persons involved with direct medical care of suspected cases 4/118 = 3.4%
 - S. Monitoring contacts of suspected smallpox cases for febrile illness 0/118 = 0%
 - T. All of the above infection control measures are recommended for a person with suspected or confirmed smallpox 114/118 = 96.6%
8. The most common early presenting syndrome associated with the majority of high risk ("Category A") bioterrorism-associated diseases (anthrax, botulism, plague, smallpox, tularemia, and viral hemorrhagic fevers) is: (n = 123)
- M. Acute bloody diarrhea 0/123 = 0%
 - N. Influenza-like illness 108/123 = 87.8%
 - O. Acute hepatitis 0/123 = 0%
 - P. Fever and rash 15/123 = 12.2%

9. According to Hawaii State Law, a veterinarian who sees an animal he or she suspects of having anthrax must notify the State Department of Agriculture: (n = 123)
- A. Within 24 hours of laboratory confirmation of the suspected diagnosis. 20/123 = 16.3%
 - B. Within 24 hours of establishing the provisional diagnosis 95/123 = 77.2%
 - C. By mail, phone, or fax within 72 hours 8/123 = 6.5%
10. When reporting a case of anthrax to the State Department of Agriculture, a veterinarian must include the name and address of the owner of the animal(s): (n = 123)
- A. In all cases 118/123 = 95.9%
 - B. Only after receiving written permission from the owner of the animals 0/123 = 0%
 - C. In no cases. Reporting only requires that the veterinarian provide information on the species, location, and number of animals involved 5/123 = 4.1%

Part II: Knowledge Levels

For questions 11-17 please mark the single best answer that reflects your current knowledge/level of competency:

11. I am familiar with the International Office of Epizootics (OIE) "List A" diseases: (n = 125)

26.4% (33)	Strongly Disagree	40.0% (50)	Disagree	15.2% (19)	Neutral	12.8% (16)	Agree	5.6% (7)	Strongly Agree
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12. I could respond effectively to a bioterrorist attack: (n = 123)

21.1% (26)	Strongly Disagree	36.6% (45)	Disagree	26.0% (32)	Neutral	14.6% (18)	Agree	1.6% (2)	Strongly Agree
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13. I know what to do to as a veterinarian in the event of a suspect bioterrorism attack: (n = 125)

18.4% (23)	Strongly Disagree	33.6% (40)	Disagree	25.6% (32)	Neutral	20.8% (26)	Agree	1.6% (2)	Strongly Agree
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14. I know how to access clinical information about bioterrorism: (n = 125)

10.4% (13)	Strongly Disagree	17.6% (22)	Disagree	20.8% (26)	Neutral	40% (50)	Agree	11.2% (14)	Strongly Agree
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15. I know where to call to report a suspect bioterrorism attack: (n = 124)

12.9% (16)	Strongly Disagree	24.2% (30)	Disagree	19.4% (24)	Neutral	37.9% (47)	Agree	5.6% (7)	Strongly Agree
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16. I know how to identify and recognize a bioterrorism event in a human population: (n = 124)

16.8% (21)	Strongly Disagree	38.4% (48)	Disagree	28.0% (35)	Neutral	16.0% (20)	Agree	0.8% (1)	Strongly Agree
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17. I know how to identify and recognize a bioterrorism event in animal populations: (n = 125)

11.2% (14)	Strongly Disagree	18.4% (23)	Disagree	26.4% (33)	Neutral	40.0% (50)	Agree	4.0% (5)	Strongly Agree
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Part III: Response and Training

18. I received prior training in bioterrorism preparedness: (n = 123)

12.2% (15)	Yes
87.8% (108)	No

If Yes, please note the number of hours in the past year: 14 answered:
Range: < 1 hour – 60 hours; median = 6 hours; mode < 1 hour.

19. In the event of a bioterrorist attack, I would be willing to provide assistance in the state's response and control efforts: (n = 116)

91.4% (106)	Yes
8.6% (10)	No

20. Which of the following areas do you feel you have a need for training? Please mark all that apply: (n = 125)

85.6% (107)	HH.	Recognition of an illness or injury in humans as potentially resulting from exposure to a bioterrorist (BT) agent
82.4% (103)	II.	Recognition of an illness or injury in animals as potentially resulting from exposure to a bioterrorist (BT) agent
75.2% (94)	JJ.	Surveillance (including syndromic surveillance) for BT agents
66.4% (83)	KK.	Laboratory diagnosis of BT agents
82.4% (103)	LL.	Safety measures to be taken by a public health responder in a BT event, including the use of protective equipment
82.4% (103)	MM.	Isolation and decontamination procedures
60.8% (76)	NN.	How to access clinical information about BT
69.6% (87)	OO.	Who to call if a BT event is suspected
66.4 (83)	PP.	How the public health system works in Hawaii
64.0% (80)	QQ.	Basic education regarding biological incidents
60.8% (76)	RR.	Disease investigation and reporting/epidemiologic methods
73.6% (92)	SS.	Hawaii's laws and statutes relating to public health measures

Please specify any additional training needs related to bioterrorism preparedness and response that you may have: (Verbatim comments from 11 respondents):

Comment 1. I am a current member of DMAT HI-1 Team (NDMS/FEMA) in Maui. I have been a member of VMAT for 2 years prior to joining the Maui DMAT team. Attended 3, 3+ day field training exercises on Disaster Management & Preparedness & Bioterrorism (2 yrs). Completed NDMS-DMAT Basic and Veterinary on-line training modules. Participated in Federal deployment to Virginia (6/02) Avian influenza Task Force (USDA/VA Dept. Ag). I feel underprepared for a local disaster. Point is that these are perishable skills. Requires yearly training/ contact with the system and people in it to be effective when needed. Need more local training.

Comment 2. It seems the State is ill prepared to prevent let alone respond to West Nile Virus...which most health professionals believe will soon come to Hawaii...(ie the CDC). I would hate to speculate on our preparedness to prevent/react to any one of the BT possibilities

Comment 3. Meeting to plan and coordinate the role of private veterinarians and veterinary organizations such as the Hawaii Veterinary Medical Association (HVMA) in bioterrorism preparedness and how they would respond in case of bioterrorism or a disease outbreak

Comment 4. I believe we are poorly informed by the State as to which diseases they would like us to be most vigilant for as well as provide training in ID these diseases. The State should provide instruction about who to call about BT or disease of concern rather than rely on a veterinarian's ability to research these instructions on our own.

Comment 5. I have not received any information on disease reporting since the West Nile Virus forms were sent out. Before that the previous one was rabies reporting procedures.

Comment 6. Dear Dr Katz, In reference to the above chart I not only have my pants down to shoe top level—I have them completely off!! Yes we all need the training in order to be ready. I would rather err on the side of caution than to be caught off guard, and I think that as veterinarians, we could be the first line of defense. I'll be glad to do whatever I can.

Comment 7. Train law enforcement (HPD), Federal Aviation Agency, US Customs, State Search & Rescue on first aid and usage of anti-nerve gas, anti-anthrax chemotherapies. Supply specialized kits for the various agencies and handlers.

Comment 8. Very ignorant of bioterrorism preparedness

Comment 9. A flow chart specific to health professionals on each island would be a helpful tool. Names, positions, phone/email addresses, tasks, responsibilities, and areas of expertise would be essential to help everyone to collaborate and accomplish essential tasks. In the event of chaos each island may become isolated and will need to be self-sufficient.

Comment 10. I know little more than the average lay person.

Comment 11. We are all probably weak in bioterrorism procedures and knowledge because there has not been any educational programs required for us to take.

21. I prefer to obtain bioterrorism preparedness education/training in the following formats
(Please choose three): (n = 125)

63.2% (79)	J.	CD-ROM/DVD
56.0% (70)	K.	Lecture/seminar
50.4% (63)	L.	Written information through the mail
8.0% (10)	M.	Written information through e-mail
29.6% (37)	N.	Internet (web-based) education
21.6% (27)	O.	National/Regional Meetings
16.8% (21)	P.	Societal Meetings
1.6% (2)	Q.	Teleconference
25.6% (32)	R.	Video

22. Please note your level of interest in the following training/education modes of delivery:

	No Interest	Low Interest	Moderate Interest	High Interest
F. Evening lectures (n = 109)	26.6% (29)	24.8% (27)	33.9% (37)	14.7% (16)
G. Weekend lectures (n = 107)	29.9% (32)	29.9% (32)	29.9% (32)	10.3% (11)
H. All day workshop/ conference during the work week (n = 108)	33.3% (36)	24.1% (26)	26.9% (29)	15.7% (17)
I. Two half day conference during the work week (n = 107)	34.6% (37)	29.0% (31)	26.2% (28)	10.3% (11)
J. Internet/ Web-based course (n = 109)	7.3% (8)	17.4% (19)	33.0% (36)	42.2% (46)

Part IV: Background Information

For each of the following categories please mark the single best /correct answer:

Age: (n = 122)

0%	<20
3.3% (4)	20 – 29
17.2% (21)	30 – 39
33.6% (41)	40 – 49
30.3% (37)	50 – 59
10.7% (13)	60 – 69
4.1% (5)	70 – 79
0.8% (1)	80+

Gender: (n = 122)

57.4% (70)	Male
42.6% (52)	Female

Current Work Setting: (may have more than one answer):

99	Patient care
15	Administration
6	Public Health
1	Academic institution
11	Retired/Inactive

I am actively practicing my veterinary profession: (n = 122)

91.0% (111)	Yes
9.0% (11)	No

11 APPENDIX E:

SOCIAL WORKER AND PSYCHOLOGIST SURVEY AND RESULTS

Kindly provided by Dr. Katz

Part I: Knowledge Questions

Questions 1-7 are knowledge-based questions related to mental health interventions for victims/survivors of mass violence. Please answer these to the best of your ability. Individual responses will be kept anonymous, while aggregate responses will help the Department of Health and the University of Hawaii to identify areas that should be addressed in our targeted bioterrorism preparedness training for mental health professionals. **Please mark the one best answer for the following questions.**

1. Early, brief, and focused psychotherapeutic intervention can reduce distress in bereaved spouses, parents, and children: (n = 175)

94.9% (166)	True
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5.1% (9)	False
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2. In general, survivors who manifest no symptoms of adjustment difficulties for approximately two months following exposure to mass violence do not routinely require follow-up: (n = 174)

12.6% (22)	True
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87.4% (152)	False
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3. Selected cognitive behavioral approaches may help reduce incidence, duration, and severity of acute stress disorder, post-traumatic stress disorder (PTSD), and depression in survivors: (n = 173)

99.4% (172)	True
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0.6% (1)	False
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4. The two best validated treatment elements for PTSD are direct therapeutic exposure and cognitive restructuring: (n = 163)

69.3% (113)	True
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30.7% (50)	False
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5. Early intervention in the form of single one-on-one recitals of events and emotions evoked by a traumatic event has consistently been shown to reduce the risk of later PTSD and related adjustment difficulties: (n = 169)

59.8% (101)	True
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40.2% (68)	False
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6. Existing clinical studies strongly support the use of eye movement desensitization and reprocessing (EMDR) as an early mental health intervention, following mass violence and disasters, as the treatment of choice over other approaches: (n = 163)

20.9% (34)	True
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79.1% (129)	False
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7. "Psychological first aid": (n = 165)
- A. Is a key component of early intervention in a mass casualty event 103/165 = 62.4%
 - B. Describes the administration of pharmacotherapy and long-term hospitalization for victims of a mass casualty event 0/165 = 0%
 - C. Is a "misleading" term that "should not be used to describe psychological intervention" according to the National Institute of Mental Health 62/165 = 37.6%

Part II: Knowledge Levels

For questions 8-16 please mark the single best answer that reflects your current knowledge/level of competency:

8. I know how to identify and recognize a bioterrorism event: (n = 175)

8.6% (15)	Strongly Disagree	37.1% (65)	Disagree	21.7% (38)	Neutral	28.6% (50)	Agree	4.0% (7)	Strongly Agree
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9. I am able to provide appropriate mental health interventions in the aftermath of traumatic events: (n = 175)

5.7% (10)	Strongly Disagree	18.3% (32)	Disagree	20.6% (36)	Neutral	42.3% (74)	Agree	13.1% (23)	Strongly Agree
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10. I am knowledgeable about critical incident stress debriefing and critical incident stress management: (n = 175)

9.1% (16)	Strongly Disagree	20.6% (36)	Disagree	25.7% (45)	Neutral	32.6% (57)	Agree	12.0% (21)	Strongly Agree
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11. I know the DSM IV criteria for Post Traumatic Stress Disorder: (n = 174)

4.6% (8)	Strongly Disagree	10.9% (19)	Disagree	6.3% (11)	Neutral	51.1% (89)	Agree	27.0% (47)	Strongly Agree
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12. I know when and how to refer victims or response personnel to mental health professionals for more intensive mental health services: (n = 174)

0% (0)	Strongly Disagree	5.2% (9)	Disagree	11.5% (20)	Neutral	52.3% (91)	Agree	31.0% (54)	Strongly Agree
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13. I know how to identify populations who may encounter barriers in receiving mental health services during an emergency: (n = 175)

0.6% (1)	Strongly Disagree	13.7% (24)	Disagree	16.6% (29)	Neutral	50.3% (88)	Agree	18.9% (33)	Strongly Agree
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14. I know how to ensure ongoing support for the psychological impact of a "weapons of mass destruction" event on the family of victims: (n = 175)

10.9% (19)	Strongly Disagree	38.3% (67)	Disagree	26.9% (47)	Neutral	18.3% (32)	Agree	5.7% (10)	Strongly Agree
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15. I am able to distinguish psychological illness from the organic sequelae of a bioterrorism event: (n = 175)

13.1% (23)	Strongly Disagree	42.9% (75)	Disagree	24.6% (43)	Neutral	16.0% (28)	Agree	3.4% (6)	Strongly Agree
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16. I am able to identify and manage populations exhibiting the normal range of stress reactions to a bioterrorism event: (n = 174)

5.7% (10)	Strongly Disagree	22.4% (39)	Disagree	25.9% (45)	Neutral	36.2% (63)	Agree	9.8% (17)	Strongly Agree
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Part III: Response and Training

17. I received prior training in bioterrorism preparedness: (n = 173)

10.4% (18)	Yes
89.6% (155)	No

If Yes, please note the number of hours in the past year (15 answered):
Range: < 1 hr – 32 hours; median = 3.5 hrs; mode = < 1 hr.
Was your training from the American Red Cross: (17 answered):
Yes = 12; No = 5

18. In the event of a bioterrorist attack, I would be willing to provide assistance in the state's response and control efforts: (n = 171)

74.9% (128)	Yes
25.1% (43)	No

19. Which of the following areas do you feel you have a need for training? Please mark all that apply: (n = 176)

86.4% (152)	A.	Recognition of an illness or injury in humans as potentially resulting from exposure to a bioterrorist (BT) agent
83.5% (147)	B.	Basic education regarding biological incidents
84.7% (149)	C.	Safety measures to be taken by a public health responder in a BT event, including the use of protective equipment
79.0% (139)	D.	Isolation and decontamination procedures
73.9% (130)	E.	Who to call if a BT event is suspected
50.0% (88)	F.	How the public health system works in Hawaii
40.9% (72)	G.	How to conduct mental health assessments using valid and reliable methods
55.7% (98)	H.	How to provide critical incident stress debriefing and critical incident stress management
73.9% (130)	I.	How to access valid and reliable mental health information about BT
43.2% (76)	J.	How to identify populations who may encounter barriers in receiving mental health services during an emergency
57.4% (101)	K.	How to develop and adapt emergency mental health responses to take into account barriers and cultural differences

69.9% (123)	L.	How to ensure ongoing support for the psychological impact of a weapons of mass destruction event on the family of victims
75.0% (132)	M.	How to distinguish psychological illness from the organic sequellae of a bioterrorism event and from an appropriate emotional response to such an event
52.3% (92)	N.	How to identify and manage the normal range of stress reactions to a bioterrorism event
51.1% (90)	O.	Screening and identification of risk factors for chronic post-traumatic problems
53.4% (94)	P.	Working with traumatized children
53.4% (94)	Q.	Working with special populations such as emergency services workers
53.4% (94)	R.	Where to find mental health counseling services in the aftermath of a BT event
36.9% (65)	S.	When to refer victims or response personnel to mental health professionals for more intensive mental health services

Please specify any additional training needs related to bioterrorism preparedness and response that you may have: (verbatim comments from 20 respondents):

Comment 1: I have not had any training could use some

Comment 2: Being retired military I would like information on how the private/ public sector would interface with local military personnel

Comment 3: A massive barrier to implementing bioterrorism training in HI. The frontline workers filling the jobs of social workers in the public mental health system of Hawaii often have seriously inadequate educational backgrounds (eg non-mental health degrees) & are so poorly supervised on average that they are not able to provide fundamental care management and mental health support functions. Training them would take decades! If you are serious you will need to import regular bioterrorism experts to fulfill the coverage

Comment 4: I was an army medic x14 yrs before getting out and returning to school. However, the process of decontamination in the military is different from civilian support and I would think there has been advancements since I got out of the army in 1993. I think that everyone should know how to don a protective mask, feel comfortable wearing one and have ways to protect themselves and family in case of NBC emergencies

Comment 5: How to educate the public about normal reactions to trauma, use of own resources, ambulance-chasing mental health professionals and empirically supported psychological assistance

Comment 6: Bioterrorism preparedness is very unfamiliar to me, and I know very little about it and feel uncomfortable about what to do

Comment 7: Because I am a mother of a very young child I would not be able to devote much time to this issue right now. However, if Hawaii were in dire need of mental health professionals to assist people after a bioterrorism event, I might consider assisting as best as I was able

Comment 8: RE: mental health svc in Military: Currently all MH centers / agencies are very maxed out due to the war efforts and MH needs for the service members. Manpower is a big need, and a separate agency/ personnel seems warranted BUT this has its drawbacks. If existing MH manpower is used I believe

adequate compensation is needed if these folks are going to take on bioterrorism response and/or preparedness

Comment 9: I think that even if are already has prior training, it would be good to have refreshers or updates

Comment 10: What geographic areas are most vulnerable to BT (eg target site) in Hawaii. What if any populations/groups are most susceptible to BT (eg military) Specific government efforts to ensure BT awareness, training, preparedness for BT Attacks

Comment 11: I left the healthcare field two years ago. Currently I have no desire to even return to the social work profession or to work for any healthcare organization. As important as bioterrorism preparedness is, I am not able to engage in any training at this time

Comment 12: In my experience all MH professionals need very straight forward checklist style summaries of what and how related to what they already know about assessment and intervention that is specifically tailored to mass ...panic & PTSD-info is delivery is necessary but trainees need to walk away with written materials that reinforce what was taught and follow-up sessions need to use the familiar materials with added materials as new assessment techniques and proven interventions become known

Comment 13: How to handle my own family needs with bioterrorism on all psychological levels and physical levels

Comment 14: Explaining to children about BT in the event it occurs

Comment 15: How we would work with the military in a united front? What help could expect from the Mainland? What about tourists who speak other languages and have different cultures? How to prevent panic. How to reach out to immigrants and others maybe living here illegally? Will they come out for help?

Comment 16: PDT/BBP preventing disease transmission and blood borne pathogens

Comment 17: Assessing the likelihood of anyone in Hawaii falling victim to bioterror US. The needs that exist here currently vis a vis child abuse, sexual abuse, STD's, AIDS, Domestic violence, access to health care, etc

Comment 18: After reading this summary I think I need all the training I can possibly receive!

Comment 19: What is the action taken by the State and County as a result of bioterrorism? What do people do when under attack?

Comment 20: I have been home with my daughter and have not worked F/T since 2/2000. While working briefly P/T in NY after 9-11 we did not have training in bioterrorism.

20. I prefer to obtain bioterrorism preparedness education/training in the following formats (Please choose three): (n = 176)

38.6% (68)	S.	CD-ROM/DVD
72.7% (128)	T.	Lecture/seminar
32.4% (57)	U.	Written information through the mail

18.8% (33)	V.	Written information through e-mail
27.8% (49)	W.	Internet (web-based) education
19.9% (35)	X.	National/Regional Meetings
12.5% (22)	Y.	Societal Meetings
11.4% (20)	Z.	Teleconference
30.7% (54)	AA.	Video

21. Please note your level of interest in the following training/education modes of delivery:

	No Interest	Low Interest	Moderate Interest	High Interest
K. Evening lectures (n = 157)	31.8% (50)	34.4% (54)	27.4% (43)	6.4% (10)
L. Weekend lectures (n = 156)	38.5% (60)	28.2% (44)	25.6% (40)	7.7% (12)
M. All day workshop/ conference during the work week (n = 162)	16.0% (26)	8.0% (13)	40.1% (65)	35.8% (58)
N. Two half day conference during the work week (n = 161)	19.3% (31)	16.1% (26)	32.9% (53)	31.7% (51)
O. Internet/ Web-based course (n = 155)	24.5% (38)	18.7% (29)	32.9% (51)	23.9% (37)

Part IV: Background Information

For each of the following categories please mark the single best /correct answer:

Age: (n = 173)

0%	<20
5.8% (10)	20 – 29
16.2% (28)	30 – 39
24.9% (43)	40 – 49
37.0% (64)	50 – 59
13.9% (24)	60 – 69
2.3% (4)	70 – 79
0%	80+

Gender: (n = 174)

23.0% (40)	Male
77.0% (134)	Female

Mental health profession: (n = 175)

74.3% (130)	Licensed social worker
25.7% (45)	Licensed psychologist

Current Work Setting: (may include more than one answer):

102	Patient care
27	Administration
13	Public Health
25	Academic institution
14	Retired/Inactive

I am actively practicing my mental health profession: (n = 172)

81.4% (140)	Yes
18.6% (32)	No

12 APPENDIX F: ADDITIONAL MAILINGS

- First cover letter
- Postcard thank you text
- Second cover letter
- Third and final cover letter

31 May 2004

Dear

The University of Hawaii is working with the Hawaii State Department of Health to survey health professionals in Hawaii so that we may upgrade our state's preparedness for and response to bioterrorism. Your name was randomly selected from a list of health care professionals licensed to practice in Hawaii. Your participation is essential in order to obtain a representative sample of our target population. Completion of the enclosed survey should take approximately ten minutes.

We would greatly appreciate your assistance in helping us to identify the training needs of health care professionals in Hawaii. Your feedback from this survey will help us to design and offer educational interventions that better fit your training needs.

Please do not write your name on the survey. All responses are strictly confidential. The surveys are numbered to allow us to target non-respondents for repeat mailings. Prior to analyzing the survey responses, all numbers will be separated from the surveys to ensure each respondent's anonymity. Answers to the "knowledge-based" questions, along with a list of relevant resource materials, will be posted on-line at <http://www2.hawaii.edu/~katz> after completion of the survey administration.

If you have any questions, please contact Dr. Al Katz, Department of Public Health Sciences and Epidemiology, John A. Burns School of Medicine at 808-956-5741 or via e-mail at katz@hawaii.edu.

Your participation in this research project is completely voluntary. If you have any questions on your rights as a research participant, please contact the University of Hawaii Committee on Human Studies at 808-956-5007. Thank you in advance for your participation in this important training needs assessment survey.

Sincerely,

Edwin C. Cadman, M.D.
Dean, John A. Burns School of Medicine
University of Hawaii

Paul V. Effler, M.D., M.P.H.
State Epidemiologist
Hawaii State Department of Health

Alan R. Katz, M.D., M.P.H.
Associate Professor and Survey Coordinator
University of Hawaii

Last week, a bioterrorism preparedness needs assessment survey was mailed to you. Your name was randomly selected from a list of licensed health care providers in Hawaii.

If you have already completed and returned the survey to us, please accept our sincere thanks. If not, please do so today. We are especially grateful for your help as this will allow us to develop the most relevant educational interventions to meet your needs.

If you did not receive a survey or if it was misplaced, please call our University office at 956-8577 and we will get another one in the mail to you today.

A handwritten signature in black ink, appearing to read 'AKZ', with a long horizontal line extending to the right.

Alan R. Katz, M.D., M.P.H.
Associate Professor and Survey Coordinator
University of Hawaii John A. Burns School of Medicine

21 June 2004

Dear

Approximately three weeks ago, we mailed you a bioterrorism preparedness needs assessment survey. To the best of our knowledge, it has not yet been returned.

The survey responses we received have identified a number of important topics for us to address. We believe the results of this survey will be extremely useful in guiding the Hawaii State Department of Health and the University of Hawaii in the development of relevant educational interventions for Hawaii's health care professionals.

We are writing again because of the importance your completed survey has for helping to get accurate results. Your name was randomly selected from a list of health care professionals licensed to practice in Hawaii; hence your participation is essential in order to obtain a representative sample of our target population.

Please be assured that all responses are strictly confidential. The surveys are numbered only to allow us the ability to check your name off our mailing list once it is returned. Prior to analyzing the survey responses, all numbers will be separated from the surveys to ensure each respondent's anonymity.

If you have any questions, please contact Dr. Al Katz at 808-956-5741 or via e-mail at katz@hawaii.edu.

Your participation in this research project is completely voluntary. If you have any questions on your rights as a research participant, please contact the University of Hawaii Committee on Human Studies at 808-956-5007.

We hope that you will return your completed survey soon. Thank you in advance for your participation in this important training needs assessment survey.

Sincerely,

Edwin C. Cadman, M.D.
Dean, John A. Burns School of Medicine
University of Hawaii

Paul V. Effler, M.D., M.P.H.
State Epidemiologist
Hawaii State Department of Health

Alan R. Katz, M.D., M.P.H.
Associate Professor and Survey Coordinator
University of Hawaii

19 July 2004

Dear

During the last two months we have sent you several mailings related to our bioterrorism preparedness needs assessment survey.

The purpose of the survey is to help the Hawaii State Department of Health and the University of Hawaii in the development of relevant educational interventions for Hawaii's health care professionals.

This is the last contact we will be making with our random sample of health care professionals licensed to practice in Hawaii.

We are sending you this final note as we are concerned that those persons who have not responded may have different perceived educational needs than those who have. Hearing from everyone in this small statewide sample helps assure that the survey results are as accurate as possible.

Your responses to the survey questions are strictly confidential. The surveys are numbered only to allow us the ability to check your name off our mailing list once it is returned. Prior to analyzing the survey responses, all numbers will be separated from the surveys to ensure each respondent's anonymity.

If you have any questions, please contact Dr. Al Katz at 808-956-5741 or via e-mail at katz@hawaii.edu.

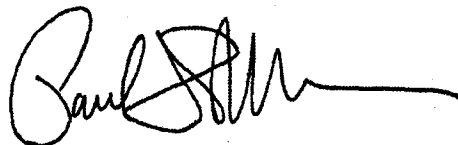
Your participation in this research project is completely voluntary. If you have any questions on your rights as a research participant, please contact the University of Hawaii Committee on Human Studies at 808-956-5007.

We appreciate your willingness to consider our request as we conclude our survey. Thank you in advance for your participation in this important training needs assessment survey.

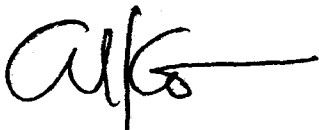
Sincerely,



Edwin C. Cadman, M.D.
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