

## Div C Part II: Disease Detectives and the Environmental Impact of Terrorism

(Suggested Time: 30 min)

The terrorist attack on the World Trade Center (WTC) on September 11, 2001, exposed thousands of people to potentially harmful debris and environmental contaminants. Studies have shown that survivors and others who witnessed the attack suffered psychological trauma, in particular, post-traumatic stress disorder (PTSD) symptoms. The collapse of the two WTC towers released a highly alkaline mix of pulverized steel, glass, cement, and other debris into the immediate environment (Fig 1). The fires started by the crashes of the two airplanes into the twin towers and the subsequent collapse of the buildings at Ground Zero burned for approximately 3 months. Toxic smoke and fumes were released into the atmosphere, creating a cloud of dust, smoke, and debris. Workers and residents continued to be exposed to pollutants during rescue, recovery, cleanup, and restoration.



Fig 1: Dust and smoke cloud over Manhattan, September 11, 2001.  
(from <http://wtcdata.nist.gov/>)

Shortly after the attacks on 9/11, the New York City Department of Health and Mental Hygiene (DOHMH) proposed an environmental health registry of persons exposed to the WTC disaster. In July 2002, the Agency for Toxic Substances and Disease Registry (ATSDR), at the Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, began collaboration with DOHMH to create the World Trade Center Health Registry (WTCHR). WTCHR, the largest environmental health registry created in the United States and now an ongoing collaboration with CDC's National Institute for Occupational Safety and Health, is designed to expand knowledge about the long-term health effects of the 9/11 disaster and serve as a valuable public health resource for future research.

The mission of the WTC Health Registry is to

- identify and track the long-term physical and mental health effects of the attacks and their aftermath;

- share findings and recommendations with enrollees, others affected, the public and policymakers;
- respond to health concerns and assess gaps in care for 9/11-related health problems; and
- offer guidance to public health professionals in planning for potential future emergencies.

Eligibility for enrollment in the WTCHR was voluntary for people who lived, worked, or went to school in the area of the WTC disaster or were involved in rescue and recovery efforts. Criteria were developed for identifying persons who suffered the most direct exposure to the events of 9/11 and its aftermath on the basis of proximity by time and place to the WTC attack, probability of exposure to the dust and debris cloud, and exposure to fires and fumes from burning debris at the WTC site during the months after the attack. Researchers determined **four broad eligibility groups**:

1. Persons who were south of Chambers Street in Manhattan on September 11, 2001.
2. Persons involved in rescue, recovery, clean-up, and other activities at the WTC site, at the Staten Island Recovery WTC Operations Center, or on transport barges from the WTC site at least one shift anytime during September 11, 2001–June 30, 2002.
3. Persons whose primary residence was south of Canal Street in Manhattan on September 11, 2001.
4. School children enrolled and staff employed at schools south of Canal Street on September 11, 2011 (Figure 2).

Persons in the above groups 2, 3 and 4 did not have to be present on 9/11.

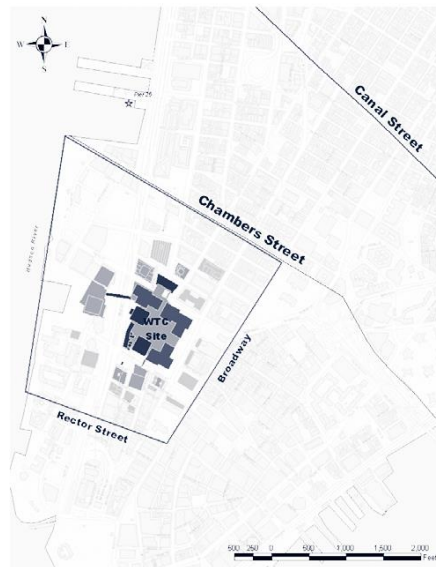


Fig 2: Map of area around the World Trade Center, September 11,2001. **Source:** Centers for Disease Control and Prevention. Surveillance for World Trade Center disaster health effects among survivors of collapsed and damaged buildings. In: MMWR Surveill Sum 2006;55(No. SS-2).

1. (4 pts) Health outcomes can be classified as being either acute or chronic. Give two examples of each type of health outcome that might be expected from exposures resulting from the September 11, 2001 terrorist attacks.

Acute: \_\_\_\_\_

Chronic: \_\_\_\_\_

2. (1 pt) Exposures can be categorized as acute or chronic. Rates from which of these categories is most likely to be affected by including persons who were not present on 9/11?
3. (1 pt) If persons from all four eligibility groups were included in the denominator, it would...  
*(Select the best answer from the following to complete the sentence)*
  - a. Underestimate the risk of adverse outcomes from chronic exposures.
  - b. Overestimate the risk of adverse outcomes from chronic exposures.
  - c. Underestimate the risk of adverse outcomes from acute exposures.
  - d. Overestimate the risk of adverse outcomes from acute exposures.
  - e. Have little effect on estimates of the risk of adverse outcomes from chronic exposures.
  - f. Have little effect on estimates of the risk of adverse outcomes from acute exposures.

Participation in the registry was voluntary. Registrants were recruited for enrollment through outreach in local and regional media. Lists of names and contact information of potentially eligible persons were provided by such groups as employers and government agencies. Also, anyone could enroll by calling a toll-free telephone number or preregistering on the WTCHR Internet site. Information will be periodically collected from participants through a series of surveys throughout 20 years. The first (i.e., baseline) survey was used to collect information when participants first registered (2003-2004). During the baseline interview, respondents were asked about specific injuries on 9/11, respiratory symptoms and non-respiratory symptoms suffered before and after 9/11, and physician-diagnosed conditions before and after 9/11. The second (Wave 2) and third (Wave 3) surveys were conducted in 2007-2008 and 2011-2012, respectively. A Staten Island Landfill and Barge Worker Survey was conducted in 2010 to collect information from those transporting debris from the WTC or working with the debris at the Staten Island disposal site.

4. (1 pt) Persons who experienced chronic illness after 9/11 might have been more motivated to participate in the World Trade Center Health Registry than those who did not. What term is used for this effect?

5. (1 pt) What impact might the differences in motivation to participate have on estimates of the risk for illness after the 9/11 attacks?

*(Select the best answer from the following)*

- a. It would underestimate the risk.
- b. It would overestimate the risk.
- c. It could either underestimate or overestimate the risk depending on different factors.
- d. It would have limited effect on estimates of risk

6. (1 pt) Give one technique that investigators used or one thing they did to reduce selection bias.

The terrorist attacks occurred on September 11, 2001. Data collection did not occur until 2003-2004.

7. (1 pt) How might the 2-3 year interval between 9/11 and data collection affect the reporting of minor injuries versus the reporting of severe injuries?

*(Select the best answer from the following)*

- a. Minor injuries and transient symptoms are more likely to be underreported than major injuries and chronic symptoms.
- b. Minor injuries and transient symptoms are less likely to be overreported than major injuries and chronic symptoms.
- c. Minor injuries and transient symptoms are more likely to be overreported than major injuries and chronic symptoms.
- d. Minor injuries and transient symptoms are less likely to be underreported than major injuries and chronic symptoms.
- e. No differences are likely to occur.

8. (1 pt) What term is used for systematic error caused by differences in accuracy or completeness of recall to memory of past events or experiences?

9. (2 pts) Persons who died from causes either related or unrelated to 9/11 are probably underrepresented in the registry even though their relatives or other surrogates were interviewed. Name two other groups of persons who are probably underrepresented in the registry.

Multiple studies have been published that use WTCHR data. Thousands of persons were involved in rescue and recovery efforts immediately after the collapse of the WTC on 9/11 and during the months that followed. Although the majority of workers were professionals, many were volunteers. These included the lay volunteers (i.e., persons with no organizational affiliation and occupations unrelated to rescue and recovery work [e.g., members of church groups or community organizations and persons present in the area immediately following the attack] and affiliated volunteers (i.e., those who reported membership in recognized organizations [e.g., the American Red Cross]). One group of investigators hypothesized that lay disaster volunteers might be more likely than affiliated volunteers to experience long-term adverse mental and physical health outcomes because of their earlier arrival at WTC site,

more intense exposure to multiple hazards, lack of protection from physical and psychological hazards, a lack of training before the disaster, or insufficient postdisaster support. They also predicted that lay volunteers would be more likely to report unmet health care needs and less usage of postdisaster monitoring and treatment programs.

The study used WTCHR data from 4,974 enrollees who completed baseline (Wave 1) and Wave 2 surveys, were aged  $\geq 18$  years on 9/11, and reported volunteering in rescue or recovery activities during September 11, 2001-June 30, 2002.

10. (3 pts) Epidemiologists often study chains of causation, which means that one thing leads to another that leads to another, and so on. For example, peer pressure can lead to cigarette smoking and cigarette smoking can result in lung cancer and heart disease. List one of the chains of causation proposed by these investigators.

Categorical variables collected included

1. recruitment source (list- vs. self-identified),
2. sex,
3. eligibility category (worker-only versus multiple eligibility groups),
4. age group,
5. race/ethnicity,
6. education,
7. 2002 household income,
8. employment status,
9. New York City residency, and
10. state of residence on 9/11.

Exposures and experiences previously shown to be associated with increased risk of adverse mental and physical health outcomes were studied. These included presence on 9/11, exposure to dust cloud, witnessing horrific events, being injured on 9/11, and bereavement or knowing anyone who lost their life on 9/11.

Timing of volunteer work was classified by the first date enrollees worked at any WTC site and time spent at all sites combined.

Information was collected regarding

1. a self-reported professional mental health diagnosis of depression, PTSD, or anxiety disorder for the first time after September 11, 2011;
2. probable PTSD defined as a score of  $\geq 44$  on a standardized PTSD checklist;
3. new or worsening lower respiratory symptoms since 9/11; and
4. post-9/11 asthma, defined as asthma or reactive airway dysfunction syndrome.

Enrollees were asked at Wave 2 if they had any unmet health care needs. Those answering affirmatively were asked if they were unable to get care for a problem related to 9/11. All were asked whether they had received any services from a list of established post-disaster medical monitoring and treatment programs.

Demographic characteristics of lay and affiliated volunteers are shown in Table 1.

**Table 1: Select demographic characteristics of volunteers enrolled in the World Trade Center Health Registry (N=4,974)**

Characteristic	Affiliated (n = 3,702)	Lay (n = 1,272)
Recruitment source		
List	2,344	268
Self	1,358	1,004
Sex		
Male	1,728	869
Female	1,974	403
Eligibility category		
Worker only	3,190	633
Multiple eligibility	512	639
New York City residents on 9/11		
Yes	1,043	809
No	2,659	463
Age group (yrs) on 9/11		
18–24	279	86
25–44	1,482	758
45–64	1,640	397
≥65	287	28
Race/ethnicity		
White, non-Hispanic	3,185	972
Black or African American, non-Hispanic	106	63
Hispanic or Latino, any race	231	141
Asian	68	51
Other	112	45

**Source:** Adapted from Debchoudhury I, Welch AE, Fairclough MA, et al. Comparison of health outcomes among affiliated and lay disaster volunteers enrolled in the World Trade Center Health Registry. *Prev Med* 2011;53:359–63.

11. (1 pt) Which group included the greatest proportion of New York City residents on 9/11?

Volunteers in multiple eligibility categories included individuals who met more than one of the listed eligibility criteria. Persons who were in multiple categories (e.g., category 1, 2 or 3) might have had greater exposure and more risk for certain conditions than persons who belonged to only one category.

12. (1 pt) What term do epidemiologists use to refer to the association where increased exposure results in either an increased risk for illness or more severe illness?

Information on the exposures and experiences reported by both groups of volunteers are displayed in Table 2.

**Table 2. Exposures and experiences of volunteers after the World Trade Center terrorist attacks on September 11, 2001, by type of volunteer (N = 4,974)**

<b>Exposure/experience</b>	<b>Affiliated (n = 3,702)</b>	<b>Lay (n = 1,272)</b>
Present on 9/11		
Yes	952	983
No	2,750	289
Sustained any injury on 9/11		
Yes	160	247
No	792	736
Caught in dust cloud that resulted from collapse of twin towers on 9/11		
Intense	259	397
Some	159	156
None	503	386
Number of horrific events witnessed		
5	122	166
4	123	171
3	156	183
2	173	182
1	230	175
0	135	88

**Source:** Adapted from Debchoudhury I, Welch AE, Fairclough MA, et al. Comparison of health outcomes among affiliated and lay disaster volunteers enrolled in the World Trade Center Health Registry. *Prev Med* 2011;53:359–63.

13. ( 5 pts) Using the data from Table 2, complete the following formula to calculate the relative risk (RR) for injury among affiliate volunteers compared with lay volunteers.

$$RR= [A/(A+B)]/[C/(C+D)]$$

- a. A =
- b. A+B =
- c. C =
- d. C+D =
- e. RR

14. (3 pts) Write a statement describing the relative risk (RR) derived by the formula in Question 13 to a lay audience.
15. (3 pts) Using the data from Table 2, complete the following formula and calculate the risk for witnessing at least one horrific event among all volunteers in this study.

$$\text{Risk} = \text{Number witnessing at least one horrific event} / \text{Number at risk} = A / (A+C)$$

- a. A =  
 b. C =  
 c. Risk =

Date of first volunteer work, number of days worked at any WTC site and whether the volunteer worked on the pile of debris resulting from the collapse of the two towers are displayed in Table 3.

**Table 3. Time and level of exposure of volunteers working at the World Trade Center (WTC) site after September 11, 2001 (N = 4,974)**

Time/level of exposure	Affiliated (n = 3,702)	Lay (n = 1,272)
First day of volunteer work		
September 11, 2001	162	360
September 12, 2001	196	300
September 13–17, 2001	396	350
September 18–December 31, 2001	1,657	173
January 1, 2002–June 30, 2002	995	31
Number of days worked at any WTC site		
1–7	792	524
8–30	650	118
31–90	190	39
≥91	91	26
Worked on the debris pile at the WTC site		
Yes	439	442
No	3,257	829

**Source:** Adapted from Debchoudhury I, Welch AE, Fairclough MA, et al. Comparison of health outcomes among affiliated and lay disaster volunteers enrolled in the World Trade Center Health Registry. *Prev Med* 2011;53:359–63.

16. (3 pts ) Using the data from Table 3 and the following formula, what proportion of lay volunteers first worked at any World Trade Center site on September 11 and 12<sup>th</sup>, 2001?

$$C = A/B$$

- a. A =  
 b. B =  
 c. C =



17. (3 pts) Using the data from Table 3 and the following formula, what proportion of affiliated volunteers worked more than 1 week at any World Trade Center site?

$$C = A/B$$

- a. A =
- b. B =
- c. C =

18. (3 pts) How did the work history of affiliated and lay volunteers differ?

The occurrence of mental and physical health outcomes in affiliated and lay volunteers is displayed in Table 4.

**Table 4. Physical and mental health outcomes among affiliated and lay volunteers working at the World Trade Center site after September 11, 2001 (N = 4,974)**

Outcome	Affiliated (n = 3,702)	Lay (n = 1,272)
Post-9/11 professional mental health diagnosis		
None	2,868	807
Early	465	299
Late	209	81
Probable PTSD		
None	3,086	791
Chronic	192	189
Late onset	205	166
Resolved	75	53
New or worsening lower respiratory symptoms since 9/11		
Yes	1,275	797
No	2,427	475
Post-9/11 asthma/reactive airway dysfunction syndrome		
None	2,946	945
Early	64	53
Late	69	35

**Source:** Adapted from Debchoudhury I, Welch AE, Fairclough MA, et al. Comparison of health outcomes among affiliated and lay disaster volunteers enrolled in the World Trade Center Health Registry. *Prev Med* 2011;53:359–63.

19. (4 pts) Calculate the appropriate measure for the strength of association (either odds ratio or relative risk) between the risk of having any form of PTSD among lay volunteers as compared with affiliated volunteers (show your work).

20. (3 pts) Write a statement of your findings from the previous question that you might provide to the media.

Self-identified enrollees were more likely to report probable PTSD, new or worsening lower respiratory symptoms, and newly diagnosed asthma than list-identified enrollees.

21. (2 pts) How might differences in the percentage of self-identified enrollees affect the observed risk for these conditions, compared with the actual risk among lay volunteers?

22. (1 pt) What term is used for the type of bias where ill persons are more likely to participate than well ones?

Debchoudhury et al reported, "Volunteers with greater exposure to the disaster may have been more likely to recall and connect their symptoms to the disaster than volunteers with lesser exposure. Due to the lack of detailed documentation of actual tasks performed and duration of time worked by volunteers who did not perform work on the pile, we were unable to examine the full range of activities performed by all volunteers" (p. 362).

23. (1 pt) What term is used for the type of bias where persons with greater exposure are more likely to remember and connect their symptoms to the exposure than persons with less exposure?

24. (2 pts) If one assumes that lay volunteers had greater exposure to the disaster than the affiliated volunteers, how does the risk for the conditions reported here compare with the actual risk and why the difference?

25. (3 pts) One observation that supports this assumption is that a greater proportion of lay volunteers than affiliated volunteers started on September 11. Give three other observations that support this assumption.

Debchoudhury et al. also point out that many lay volunteers had to join a professional organization to continue volunteering. Possibly, not all individuals self-identifying as affiliated volunteers had the level of predisaster experience and/or training ordinarily provided by those organizations.

26. (1 pt) What type of bias is this?

27. (1 pt) If the predisaster experience or training does in fact reduce the risk of the outcomes as suggested by this study, how would the reported risk compare to the actual risk?

28. (3 pts) You are the director of a public health department in an area that has just experienced a major disaster (e.g., think of the Texas fertilizer plant explosion or the Boston marathon bombing but much worse). You have had thousands of lay volunteers come to your area to help during the first few days. List three things you would do to protect these people from the types of exposures and outcomes described in this event.

Question/Answer Sheet/Key

Disease Detectives

Div C

Part II – WTC

1. (4 pts) Health outcomes can be classified as being either acute or chronic. Give two examples each type of health outcome that might be expected from exposures resulting from the September 11, 2001 terrorist attacks.

Acute: Injuries, eye irritation, sore throat or similar

Chronic: PTSD, asthma, chronic cough, depression or similar

2. (1 pt) Exposures can be categorized as “acute” or “chronic”. Rates from which category (acute or chronic) is most likely to be affected by including persons who were not present on 9/11?

**Acute**

3. If persons from all 4 eligibility groups were included in the denominator, it would...

*Select the best answer from the following to complete the sentence*

- Underestimate the risk of adverse outcomes from chronic exposures.
  - Overestimate the risk of adverse outcomes from chronic exposures.
  - Underestimate the risk of adverse outcomes from acute exposures.**
  - Overestimate the risk of adverse outcomes from acute exposures.
  - Have little effect on estimates of the risk of adverse outcomes from chronic exposures.
  - Have little effect on estimates of the risk of adverse outcomes from acute exposures.
4. (1 pt) Persons who experienced chronic illness after 9/11 may have been more motivated to participate in the World Trade Center Health Registry than those who did not. What term is used for this effect?

**Selection bias**

5. (1 pt) What impact might that effect have on estimates of the risk for illness after the 9/11 attacks?

*Select the best answer from the following.*

- It would underestimate the risk.
- It would overestimate the risk.**
- It could either underestimate or overestimate the risk depending on a number of factors.
- It would have little effect on estimates of the risk

6. (1 pt) Give one technique that investigators used to reduce selection bias.

**Investigators conducted outreach to eligible persons whose names were on lists. (or similar)**

7. (1 pt) How might this affect the reporting of minor injuries versus the reporting of severe injuries?

*Select the best answer from the following.*

- a. **Minor injuries and transient symptoms are more likely to be under-reported than major injuries and chronic symptoms.**
  - b. Minor injuries and transient symptoms are less likely to be over-reported than major injuries and chronic symptoms.
  - c. Minor injuries and transient symptoms are more likely to be over-reported than major injuries and chronic symptoms.
  - d. Minor injuries and transient symptoms are less likely to be under-reported than major injuries and chronic symptoms.
  - e. There is not likely to be any difference.
8. (1 pt) What term is used for systematic error caused by differences in accuracy or completeness of recall to memory of past events or experiences?

**Recall bias**

9. (2 pts) Persons who died from causes either related or unrelated to 9/11 are probably under-represented in the registry even though their relatives or other surrogates were interviewed. Name two other groups of persons who are probably underrepresented in the registry.

- **Persons who were from out-of-state/country**
- **Homeless persons and those who did not have access to local or regional media**
- **Those who had incorrect or missing information on the lists**
- **Persons who were not on any of the lists (or similar answers)**

10. (3 pts) Epidemiologists often study chains of causation, which means that one thing leads to another that leads to another, and so on. For example, peer pressure can lead to cigarette smoking and cigarette smoking can result in lung cancer and heart disease. List one of the chains of causation proposed by these investigators.

Initial: **Lay disaster volunteers**

Intermediate:

- **earlier arrival at World Trade Center sites**
- **more intense exposure to multiple hazards**

- as well as a lack of training or prior disaster experience,
- or insufficient post-disaster support

Final **long term adverse mental and physical health outcomes**

11. (1 pt) Which group included the greatest proportion of New York City residents on 9/11?

**Lay volunteers**

12. (1 pt) What term do epidemiologists use to refer to the relationship where increased exposure results in either an increased risk for illness or more severe illness?

**Dose-response**

13. (5 pts) Using the data in Table 2, complete the formula below to calculate the relative risk (RR) for injury among affiliate volunteers as compared to lay volunteers.

$$RR = [A/(A+B)]/[C/(C+D)]$$

- a. A = **160**
- b. A+B = **952**
- c. C = **247**
- d. C+D = **983**
- e. RR = **0.669**

$$RR = (160/952)/(247/983) = 0.669$$

14. (3 pts) Write a statement describing the relative risk (RR) derived from the formula in Question 13 to a lay audience.

**The risk of injury among affiliated volunteers who were present on 9/11 was 0.669 times that of lay volunteers who were present on 9/11. Or similar (1 pt for each underlined section)**

15. (3 pts) Using the data in Table 2, complete the following formula and calculate the risk for witnessing at least one horrific event among all volunteers in this study.

$$\text{Risk} = \text{Number witnessing at least one horrific event} / \text{Number at risk} = A/(A+C)$$

$$A = (952+983) - (135+88) = 1681$$

$$C = 952+983 = 1935$$

**Risk = 86.9 per 100 persons**

16. (3 pts ) Using the data in Table 3 and the following formula, what proportion of lay volunteers first worked at any World Trade Center site on September 11 and 12, 2001?

$$C = A/B$$

$$A = 660$$

$$B = 1272$$

$$C = 51.9$$

17. (3 pts) Using the data in Table 3 and the following formula, what proportion of affiliated volunteers worked more than 1 week at any World Trade Center site?

$$C = A/B$$

$$A = (3702-792)$$

$$B = 3702$$

$$C = 78.6$$

18. (3 pts) How did the work history of affiliated and lay volunteers differ?

**Affiliated workers tended to come well after and were less likely to have worked on “The Pile” than lay workers. Affiliated workers tended to work longer than lay workers. Or similar – 1 pt per each underlined section**

19. (4 pts) Calculate the appropriate measure for the strength of association (either odds ratio or relative risk) between the risk for having any form of PTSD among lay volunteers as compared with affiliated volunteers (show your work).

$$RR = [(1272-791)/1272] / [(3702-3086)/3702] = 2.27$$

20. (3 pts) Write a statement of your findings from the previous question that you might provide to the media.

**Lay volunteer workers were 2.3 times more likely to have reported any form of PTSD than affiliated volunteers. Or similar – 1 pt for each underlined section**

21. (2 pts) How might differences in the percent of self-identified enrollees affect the observed risk for these conditions as compared with the actual risk among lay volunteers?

**Since the lay volunteers had a greater percent of self-identified enrollees than the affiliated volunteer group, the reported risk among lay volunteers may be greater than the actual risk. (or similar – 1 pt for each underlined section)**

22. (1 pt) What term is used for the type of bias where ill persons are more likely to participate than well ones?

**Selection bias**

23. (1 pt) What term is used for the type of bias where persons with greater exposure are more likely to remember and connect their symptoms to the exposure than persons with less exposure?

**Recall bias**

24. (2 pts) If one assumes that the lay volunteers had greater exposure to the disaster than the affiliated volunteers, how does the risk of these conditions reported here compare with the actual risk and why the difference?

**The reported risk of symptoms in affiliated volunteers may have been less than the actual risk since they may have been more likely to forget them than lay volunteers. (or similar – 1 pt for each underlined section)**

25. (3 pts) One observation that supports this assumption is that a greater proportion of lay volunteers than affiliated volunteers started on September 11. Give three other observations that support the assumption.

**Lay volunteers were more likely to be present on 9/11, to have witnessed one or more horrific events, to have been injured, and to be in the “multiple exposure” category than affiliated volunteers. (or similar – 1 pt for each answer)**

26. (1 pt) What type of bias is this?

**Misclassification bias**

27. (1 pt) If the pre-disaster experience or training does in fact reduce the risk of the outcomes as suggested by this study, how would the reported risk compare to the actual risk?

**If lay volunteers were misclassified as affiliates, the reported risk of outcomes in affiliated volunteers would be greater than the actual risk.**

29. (3 pts) You are the director of a public health department in an area that has just experienced a major disaster (e.g., think of the Texas fertilizer plant explosion or the Boston marathon bombing but much worse). You have had thousands of lay volunteers come to your area to help during the first few days. List three things you would do to protect these people from the types of exposures and outcomes described in this event.

**Accept any reasonable actions, including but not limited to:**

- **Provide training programs before allowing them to help**
- **Assign them to minimal risk situations**
- **Provide safety equipment and insist on its use**
- **Provide follow-up counseling and assistance**