

IF TERROR REIGNS, WILL TORTS FOLLOW?

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INTRODUCTION

The tragedy of September 11 has changed the way that Americans live. We are subject to greater scrutiny in airports, buildings, hotels, concerts, sports events—wherever we gather in large numbers. Industry has dramatically increased its security standards. Disaster plans, contingency plans, evacuation plans, and emergency response plans—whatever name one wishes to give to the steps that will be taken by a person or entity to protect human health and life, and to maintain business continuity in response to a variety of hypothetical terrorist attacks—have multiplied.

We pray that 9/11 is an event in American history that will never repeat itself. Vigilance remains the challenge; complacency is the fear. If terror reigns, however, will torts follow? This paper aims to make a contribution to the issues facing potential tort plaintiffs and defendants in the context of a post-9/11 world. **Will 9/11 affect the “duty of care” that is the *sine qua non* of a tort action? And in the post-9/11 efforts to develop emergency plans trying to anticipate different forms of terrorist attacks, who may be at risk from the attacks, and how to respond to the attacks, will courts permit the recovery of economic losses? And if so, will a jury’s finding on “foreseeability” be predetermined?**

Using the 1928 decision in *Palsgraf v. The Long Island Railroad Company*¹ and the 1985 decision in *People Express Airlines, Inc. v. Consolidated Rail Corporation et al.*,² as a backdrop, the importance of “context”—the historical framework within which a duty/foreseeability determination is made—is first emphasized. Next, this article identifies talked-about biological, chemical, radioactive, and conventional terrorist threats in an attempt to describe the duty/foreseeability context of future torts arising out of terrorist attacks. Finally, this article examines legislative actions designed to limit liability for claims arising out of terrorism-related acts, the impact of terrorism-excluded insurance coverage, and pending legislation which attempts to address insurance risks posed by terrorism.

DUTY OF CARE UNDER PALSGRAF

Although decided nearly 75 years ago, the *Palsgraf* decision has had a continuing impact on tort law. The facts are straightforward. Mrs. Palsgraf had the misfortune of being injured by falling scales when she was standing on a rail passenger platform awaiting her train to Rockaway Beach.³ The injury followed this sequence of events. “A train stopped at the station, bound for another

1. 162 N.E. 99 (N.Y. 1928).

2. 495 A.2d 107 (N.J. 1985).

3. *Palsgraf*, 162 N.E. at 99.

place.”⁴ A man carrying a package under his arm ran to catch a train.⁵ The package was wrapped in a newspaper.⁶ The man jumped aboard the car.⁷ He appeared unsteady so a guard, who had held a door on the train open for the man, reached forward to help the man.⁸ Another guard on the platform pushed the man from behind.⁹ The package carried by the man fell upon the rail tracks.¹⁰ The package “contained fireworks, but there was nothing in its appearance to give notice of its contents.”¹¹ The fireworks exploded.¹² “The shock of the explosion threw down some scales at the other end of the platform many feet away.”¹³ Mrs. Palsgraf was struck by the scales, was injured, and sued.¹⁴ A jury found the defendant liable for Mrs. Palsgraf’s damages.¹⁵ The defendant appealed.¹⁶

A majority of the New York Court of Appeals reversed.¹⁷ Writing for the Court of Appeals, Judge Cardozo determined that the conduct of the guard “was not a wrong in its relation to the plaintiff, standing far away.”¹⁸ Because there was nothing about the package that gave notice of its potentially perilous contents, the railroad was found to have owed no duty to Mrs. Palsgraf:

If no hazard was apparent to the eye of ordinary vigilance, an act innocent and harmless, at least to outward seeming, with reference to her, did not take to itself the quality of a tort because it happened to be a wrong, though apparently not one involving the risk of bodily insecurity, with reference to some one else.¹⁹

The Court of Appeals explained that any other result would be untenable, giving these pre-9/11 examples:

A guard stumbles over a package which has been left upon a platform. It seems to be a bundle of newspapers. It turns out to be a can of dynamite. To the eye of ordinary vigilance, the bundle is abandoned waste, which may be kicked or trod on

4. 162 N.E. at 99.

5. *Id.*

6. *Id.*

7. *Id.*

8. *Id.*

9. 162 N.E. at 99.

10. *Id.*

11. *Id.*

12. *Id.*

13. *Id.*

14. 162 N.E. at 99.

15. *Id.*

16. *Id.*

17. *Id.*

18. *Id.*

19. 162 N.E. at 99.

with impunity. Is a passenger at the other end of the platform protected by the law against the unsuspected hazard concealed beneath the waste?²⁰

One who jostles one's neighbor in a crowd does not invade the rights of others standing at the outer fringe when the unintended contact casts a bomb upon the ground. The wrongdoer as to them is the man who carries the bomb, not the one who explodes it without suspicion of the danger. Life will have to be made over, and human nature transformed, before prevision so extravagant can be accepted as the norm of conduct, the customary standard to which behavior must conform.²¹

There was a lone dissent.²² Judge Andrews argued that the act of knocking the package from the passenger's arm was negligence.²³ The only issue thereafter was what damage proximately flowed from the negligence.²⁴ Saying that injury in some form was probable based on the explosion that followed, Judge Andrews felt that, as a matter of law, he could not say that Mrs. Palsgraf's "injuries were not the proximate result of the negligence."²⁵ Judge Andrews borrowed this example from an "unpublished manuscript" on the law of torts:

A chauffeur negligently collides with another car which is filled with dynamite, although he could not know it. An explosion follows. A, walking on the sidewalk nearby, is killed. B, sitting in a window of a building opposite, is cut by flying glass. C, likewise sitting in a window a block away, is similarly injured. And a further illustration: A nursemaid, ten blocks away, startled by the noise, involuntarily drops a baby from her arms to the walk. We are told that C may not recover while A may. As to B it is a question for the court or jury. We all agree that the baby might not. Because, we are again told, the chauffeur had no reason to believe his conduct involved any risk of injuring either C or the baby. As to them he was not negligent.²⁶

Judge Andrews argued, however, that the chauffeur's "belief that the scope of the harm he might [inflict] would be limited is immaterial" because "[h]is act unreasonably jeopardized the safety of any one who might be affected by it."²⁷ In other words, the duty existed. If recovery is to be denied to C and to the baby, it is because of the absence of proximate cause, Judge Andrews argued, adding: "And here not what the chauffeur had reason to believe would be the result of his conduct, but what the prudent would foresee, may have a bearing. . . ."²⁸

20. 162 N.E. at 100.

21. *Id.*

22. *Id.* at 101 (Andrews, J., dissenting).

23. *Id.* at 105.

24. *Id.*

25. 162 N.E. at 104-05.

26. *Id.* at 104.

27. *Id.*

28. *Id.*

And in comments that have been quoted often to explain decisions finding no duty of care, Judge Andrews declared: "It is all a question of expediency. There are no fixed rules to govern our judgment. There are simply matters of which we may take account. . . . There is in truth little to guide us other than common sense."²⁹

FORESEEABILITY UNDER *PEOPLE EXPRESS*

Fast forward nearly 60 years. *Palsgraf* happens to be the first decision (among many) cited by the New Jersey Supreme Court in *People Express Airlines* where the discussion of legal duty and foreseeability of harm produced the opposite outcome.³⁰

The facts were again uncomplicated. "On July 22, 1981, a fire began in the Port Newark freight yard of defendant Consolidated Rail Corporation (Conrail) when ethylene oxide . . . escaped from a tank car, punctured during a 'coupling' operation with another rail car, and ignited."³¹ The plaintiff was an airline that was housed in the North Terminal building of the adjacent Newark Airport.³² Fearing the risk of an explosion from the burning tank car, the airline's employees were evacuated and not permitted to return for 12 hours.³³ *People Express* sought damages for the economic losses it alleged were sustained by its inability to conduct business for this length of time.³⁴ The trial court granted summary judgment to the railroad.³⁵ The Appellate Division reversed,³⁶ and the New Jersey Supreme Court affirmed the Appellate Division's decision.³⁷

At oral argument before the New Jersey Supreme Court, *People Express* argued that "some of the defendants were aware from prior experiences that ethylene oxide is a highly volatile substance. . . ."³⁸ Wisely, in hindsight, it also argued that "emergency response plans in case of an accident had been prepared."³⁹ And, in fact, after the fire occurred, "some of the defendants' consultants helped determine how much of the surrounding area to evacuate. The municipal authorities then evacuated the area within a one-mile radius

29. 162 N.E. at 104.

30. *People Express Airlines*, 495 A.2d at 107.

31. *Id.* at 108.

32. *Id.*

33. *Id.*

34. *Id.*

35. 495 A.2d at 109.

36. 476 A.2d 1256 (N.J. App. Div. 1984).

37. *People Express Airlines*, 495 A.2d at 107.

38. *Id.* at 108.

39. *Id.*

surrounding the fire to lessen the risk to persons within the areas should the burning tank car explode.”⁴⁰

People Express did not claim physical harm to person or property.⁴¹ Its alleged losses were purely economic.⁴² By seeking a recovery, it was challenging a “virtually *per se* rule barring recovery for economic loss unless the negligent conduct also caused physical harm,”⁴³ a doctrine that continues to be the subject of considerable analysis and debate.⁴⁴

The court surveyed the case law and concluded that the rationales supporting the prohibition on recovery of economic loss, while understandable, were so riddled with exceptions that meritorious claims were being unfairly denied: “The asserted inability to fix chrySTALLINE formulae for recovery on the differing facts of future cases simply does not justify the wholesale rejection of recovery in all cases.”⁴⁵

The New Jersey Supreme Court reviewed those exceptions, focusing its analysis on (1) the foreseeability of events and (2) what the defendant knew or should have known about the consequences of the defendant’s acts.⁴⁶ One group of exceptions, the New Jersey Supreme Court explained, involved the “special relationship” between an alleged tortfeasor and a plaintiff deprived of economic expectations even though it did not have a direct relationship with the defendant:

Courts have justified their finding of liability in these negligence cases based on notions of a special relationship between the negligent tortfeasors and the foreseeable plaintiffs who relied on the quality of defendants’ work or services, to their detriment. The special relationship, in reality, is an expression of the courts’ satisfaction that a duty of care existed because the plaintiffs were particularly foreseeable and the injury was proximately caused by the defendant’s negligence.⁴⁷

The New Jersey Supreme Court cataloged the “special relationship” cases in the category of “negligent misrepresentation” and cited numerous examples, involving auditors, surveyors, termite inspectors, engineers, attorneys, notaries, architects, and weighers who were found to have had a duty to plaintiffs making claims against them.⁴⁸

40. 495 A.2d at 108.

41. *Id.* at 109.

42. *Id.*

43. *Id.* at 109. The most oft-cited case is *Robins Dry Dock & Repair Co. v. Flint*, 275 U.S. 303 (1927) (prohibiting recovery against an entity that negligently damaged a vessel in port in an action by a time charterer for the inability to use a vessel while it was being repaired).

44. See generally Herbert Bernstein, *Civil Liability for Pure Economic Loss Under American Tort Law*, 46 AM. J. COMP. L. 111 (1998). Kenneth S. Abraham, *The Trouble with Negligence*, 54 VAN. L. REV. 1187 (2001).

45. *People Express Airlines*, 495 A.2d at 111.

46. *Id.* at 112.

47. *Id.*

48. *Id.* at 112-13.

A second category of exceptions, the New Jersey Supreme Court explained, involves recovery to persons in a "particularly foreseeable group, such as sailors and seamen, for whom the law has traditionally shown great solicitude."⁴⁹ In both sets of cases:

courts "have found it fair and just,"

...
to impose liability on defendants who, by virtue of their special activities, professional training or other unique preparation for their work, had particular knowledge or reason to know that others ... would be economically harmed by negligent conduct. In this group of cases, even though the particular plaintiff was not always foreseeable, the particular class of plaintiffs was foreseeable as was the particular type of injury.⁵⁰

The New Jersey Supreme Court described another category of cases where recovery of economic loss without physical harm was permitted as "cases akin to private actions for public nuisance."⁵¹ Cases such as *Guste v. M/V Testbank*⁵²

49. 495 A.2d at 113.

50. *Id.*

51. *Id.*

52. 752 F.2d 1019 (5th Cir. 1985) (*en banc*). The Fifth Circuit decision involved the collision of a bulk carrier and a container ship in the Mississippi River Gulf outlet. *Id.* at 1020. The collision caused the release of hydrobromic acid to the air and the loss of 12 tons of pentachlorophenol into the river. *Id.* The outlet was closed for 19 days and all fishing, shrimping, and related activity was temporarily suspended in the outlet and four-hundred square miles of surrounding marsh and waterways. *Id.* A majority of the *en banc* court rejected claims for economic losses "by shipping interests suffering losses from delays or rerouting, marina and boat operators, wholesale and retail seafood enterprises not actually engaged in fishing, shrimping, crabbing or oystering in the area, seafood restaurants, tackle and bait shops, and recreational fishermen, oystermen, shrimpers, and crabbers." *Id.* at 1021, n.2. The Court of Appeals' majority determined that there must be physical damage or injury to a proprietary interest before a recovery for economic losses can be permitted. *Id.* at 1021. In the same breath, the Court of Appeals noted that the rights of commercial fishermen were not before the court and that "[a] substantial argument can be made that commercial fishermen possess a proprietary interest in fish in waters they normally harvest sufficient to allow recovery for their loss. Whether the claims of commercial fishermen ought to be analyzed in this manner or simply carved from the rule today announced, in the fashion of *Union Oil*, or allowed at all, we leave for later." *Id.* at 1027, n.10. Judge Wisdom wrote a vigorous dissent that rejected the policy arguments articulated by the majority, and suggested that the fear of unlimited liability was overdone: "The limitation imposed by 'particular' damages, together with refined notions of proximate cause and foreseeability, provides a workable scheme of liability that is in step with the rest of tort law, compensates innocent plaintiffs, and imposes the costs of harm on those who caused it." *Id.* at 1046 (Wisdom, Rubin, Politz, Tate, and Johnson, JJ., dissenting). Judge Wisdom's test focused not on the absence of a duty of care but instead on proximate cause, foreseeability, and "particular" damage: (1) "the damage must be proximately caused by the accident"; (2) allowable claims, under foreseeability rules, are only those "arising from activities in process at the time of the accident or [those] that can be proven with certainty"; and (3) damages must be "particular" and distinguishable from those suffered by the general public. *Id.* at 1049.

and *Union Oil Co. v. Oppen*⁵³ were cited to illustrate the New Jersey Supreme Court's characterization of permitted recoveries "[w]here a plaintiff's business is based in part upon the exercise of a public right":⁵⁴

The theory running throughout these cases, in which the plaintiffs depend on the exercise of the public or riparian right to clean water as a natural resource, is that the pecuniary losses suffered by those who make direct use of the resource are particularly foreseeable because they are so closely linked, through the resource, to the defendants' behavior.⁵⁵

As if to emphasize its point that the "no recovery for economic loss" rule had significantly eroded, the New Jersey Supreme Court then cited *Clay v. Jersey City*⁵⁶ where a lessee-manufacturer had to vacate its tenancy because Jersey City negligently failed to maintain the plaintiff's sewer line while repairs were being undertaken.⁵⁷ Damage to the physical premises was regarded as the claim of the owner.⁵⁸ The tenant's damages related solely to loss of use of the premises—"purely" economic loss.⁵⁹ Both were permitted, the court noted, adding that Jersey City "had had notice of the leak [for several years] and should have known about it even earlier."⁶⁰

The New Jersey Supreme Court extracted two themes from its discussion of the exceptions to the rule that economic losses were not recoverable in a negligence action:

1. "[K]nowledge or special reason to know of the consequences of the tortious conduct in terms of the persons likely to be victimized and the nature of the damages likely to be suffered will suffice to impose a duty upon the tortfeasor not to interfere with economic well-being of third parties."⁶¹

53. *Oppen*, 501 F.2d 558 (9th Cir. 1974). *Oppen* involved claims of commercial fishermen for economic losses resulting from an oil spill from Union Oil's Platform A in the Santa Barbara Channel in 1969. *Id.* at 559. The Court of Appeals determined that the claims were foreseeable and, therefore, the commercial fishermen's claims were compensable under California negligence law despite the economic loss rule: "To assert that the defendants were unable to foresee that negligent conduct resulting in a substantial oil spill could diminish aquatic life and thus injure the plaintiffs is to suppose a degree of general ignorance of the effects of oil pollution not in accord with good sense." *Id.* at 569. The Court of Appeals explained that its holding was limited to commercial fishermen, and did "not open the door to claims that may be asserted by those . . . whose economic or personal affairs were discommoded by the oil spill of January 28, 1969." *Id.* at 570.

54. *People Express Airlines*, 495 A.2d at 113.

55. *Id.* at 114.

56. *Id.* (citing 181 A.2d 545 (N.J. Ch. 1962)), *aff'd*, 84 N.J. Super. 9 (App. Div. 1964).

57. *Id.* at 114.

58. *Id.*

59. *People Express Airlines*, 495 A.2d at 114.

60. *Id.*

61. *Id.* at 115.

2. "The foreseeability standard that may be synthesized from these cases is one that posits liability in terms of where, along a spectrum ranging from the general to the particular, foreseeability is ultimately found."⁶²

The court imagined a fairness scale: "[t]he more particular is the foreseeability that economic loss will be suffered by the plaintiff as a result of defendant's negligence, the more just is it that liability be imposed and recovery allowed."⁶³

The New Jersey Supreme Court then stated its holding:

We hold therefore that a defendant owes a duty of care to take reasonable measures to avoid the risk of causing economic damages, aside from physical injury, to particular plaintiffs or plaintiffs comprising an identifiable class with respect to whom defendant knows or has reason to know are likely to suffer such damages from its conduct. A defendant failing to adhere to this duty of care may be found liable for such economic damages proximately caused by its breach of duty.⁶⁴

The New Jersey Supreme Court "stress[ed]" that "an identifiable class of plaintiffs is not simply a foreseeable class of plaintiffs."⁶⁵ It explained, for example, that a sales person delayed in the conduct of business because a highway is closed due to a negligently caused accident may be a foreseeable plaintiff, but the presence of such a person in the area "would be fortuitous, and the particular type of economic injury that could be suffered by such persons would be hopelessly unpredictable and not realistically foreseeable."⁶⁶ Rather:

An identifiable class of plaintiffs must be particularly foreseeable in terms of the type of persons or entities comprising the class, the certainty or predictability of their presence, the approximate numbers of those in the class, as well as the type of economic expectations disrupted.⁶⁷

62. 495 A.2d at 115.

63. *Id.* at 116.

64. *Id.* The New Jersey Supreme Court later explained:

We do not mean to suggest by our recitation of these facts that actual knowledge of the eventual economic losses is necessary to the cause of action; rather, particular foreseeability will suffice. The plaintiff still faces a difficult task in proving damages, particularly lost profits, to the degree of certainty required in other negligence cases. The trial court's examination of these proofs must be exacting to ensure that damages recovered are those reasonably to have been anticipated in view of the defendants' capacity to have foreseen that this particular plaintiff was within the risk created by their negligence.

Id. at 118.

65. *Id.* at 116.

66. *Id.*

67. 495 A.2d at 116.

The court recognized:

that some cases will present circumstances that defy the categorization here devised to circumscribe a defendant's orbit of duty, limit otherwise boundless liability and define an identifiable class of plaintiffs that may recover. In these cases, the courts will be required to draw upon notions of fairness, common sense and morality to fix the line limiting liability as a matter of public policy, rather than an uncritical application of the principle of particular foreseeability.⁶⁸

If a duty is found to exist, that does not end the inquiry. *People Express* teaches further that "particular foreseeability" may also be employed to determine if the economic injury was proximately caused.⁶⁹ The kinds of considerations that were to be taken into account to determine whether economic losses were "particularly foreseeable and proximate" were listed by the court: "The economic injury was close in time and space; the defendant had ample opportunity to ascertain the identity and nature of the plaintiff's interests. Further, the amount of litigation and extent of liability was finite, rather than expansive."⁷⁰

The New Jersey Supreme Court concluded its proximate cause analysis by holding that "a defendant who has breached his duty of care" to "particularly foreseeable plaintiffs may be held liable" for those economic losses that "are the natural and probable consequence of a defendant's negligence in the sense that they are reasonably to be anticipated in view of defendant's capacity to have foreseen that the particular plaintiff or identifiable class of plaintiffs . . . is demonstrably within the risk created by defendant's negligence."⁷¹

In applying this holding to the facts, the New Jersey Supreme Court determined that *People Express* was entitled to a trial on the merits.⁷² What persuaded the court were, at least, the following facts:

- (1) "the close proximity of the North Terminal and People Express Airlines to the Conrail freight yard";
- (2) "the obvious nature of the plaintiff's operations and particular foreseeability of economic losses resulting from an accident and evacuation";
- (3) "the defendants' actual or constructive knowledge of the volatile properties of ethylene oxide; and"
- (4) "*the existence of an emergency response plan prepared by some of the defendants . . . which apparently called for the nearby area to be evacuated to avoid the risk of harm in case of an explosion.*"⁷³

68. 495 A.2d at 116.

69. *Id.*

70. *Id.* at 117

71. *Id.* at 118.

72. *Id.*

73. 495 A.2d at 118 (emphasis added). As a reminder, the emergency response plan was described in oral argument, and, by inference, was not a subject of briefing. *Id.* at 108. One might argue that this fact was essential to support the New Jersey Supreme Court's analysis.

It is this last foreseeability fact that takes on added future tort significance in the post-9/11 world of vulnerability assessments, risk assessments, and emergency response plans, as will be discussed below.

THE DUTY AND FORESEEABILITY LANDSCAPE AFTER 9/11

Palsgraf's determination that foreseeability is part of the calculus to determine the existence of a duty of care remains a subject of legal debate. Whatever one's view, a railroad employee who kicks what appears to be a stack of newspapers or improperly handles an innocent looking piece of abandoned luggage, but which actually contains an explosive that is thereby detonated, will after 9/11, generate a different analysis from the one that Judge Cardozo used in *Palsgraf*. Similarly, an individual carrying a seemingly mundane package which contains an explosive, who tosses it on a rail track below a platform on which there are standing dozens of people would prompt a different look by Judge Cardozo after 9/11 if there was no screening of packages under circumstances that warranted screening. Threats that were imagined—or more fairly, not imagined—months ago, now are the subject of daily newspaper stories.

Foreseeability is not a static concept, as *People Express* explained. It must have a context and that context will vary over time. Economic losses are grave matters. Even with the heightened burden of proof placed on *People Express* to prove proximately caused damages,⁷⁴ the erosion of the economic loss rule in the arena of the future terrorist tort could have debilitating consequences for defendants. Yet emergency plans to save lives and minimize the risk of harm may actually demonstrate the existence of “particular foreseeability” that could affect both the outcome of the “duty” inquiry and the presence or not of proximate cause for damages, especially if the response is not consistent with the plan.

What are the terrorist contexts against which planning is ongoing and within which future tort actions might be brought? September 11 has prompted unprecedented discussion of biological, chemical, radioactive, and conventional terrorist threats to human health and life and business continuity. These threats are described generally below.⁷⁵ These questions should be asked in considering each threat:

- Who is potentially at risk from the threat?
- What duty of care, if any, might be said to exist to those potentially at risk, and who owes that duty?⁷⁶
- What is nature of the harm (physical injury or death, property damage, or economic losses)?

74. See 495 A.2d at 113; *Clay*, 181 A.2d 545.

75. This discussion of terrorist threats is designed to be illuminating, not exhaustive.

76. This question and the discussion that follows is intended to exclude the perpetrators of a terrorist attack who would be liable parties under any standard.

- How particularly foreseeable is harm, should the duty be breached?
- Was the harm proximately caused by the breach of the duty?

CHEMICAL THREATS

Chemical threats take, at least, two forms: (1) direct attacks on persons using a chemical weapon and (2) direct attacks on the integrity of containers of stored chemicals (e.g., in tanks or pipelines) that are fixed in their location or are in transport.

The most famous and recent example of a direct attack on persons was the release of sarin in the Tokyo subways in 1995 by the Japanese cult, Aum Shinrikyo.⁷⁷ "Twelve people were killed and many more were injured. . . ."⁷⁸

Sarin is one of a handful of chemical agents that challenge the limits of the threat assessment process. The 1999 GAO Report on Combating Terrorism evaluated the threat posed by chemical and biological weapons.⁷⁹ The following chart comes from Appendix I from this GAO Report and considers the likelihood that certain chemical agents will be used in a terrorist attack.⁸⁰ This chart and the entire GAO Report must be viewed in context, however. The report was limited to an evaluation of agents that could "cause mass casualties [in excess of 1,000] by means of improvised weapons or devices and not through contamination of water, food supply, agriculture, or livestock."⁸¹ Plainly, any chemical (or biological) agent that is used in a location likely to result in less than 1,000 casualties is no less threatening.⁸²

77. GAO, Report, COMBATING TERRORISM: NEED FOR COMPREHENSIVE THREAT AND RISK ASSESSMENTS OF CHEMICAL AND BIOLOGICAL ATTACKS, NSIAD-99-163 at 4 (Sept. 7, 1999), available at <http://www.gao.gov/terrorism.html> [hereinafter 1999 GAO REPORT ON COMBATING TERRORISM].

78. *Id.* More deaths were not caused "because of the poor quality of the chemical agent and the dissemination technique used." *Id.*

79. *Id.* at 2.

80. *Id.* app. I at 28.

81. *Id.* at 10.

82. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at 9-10.

Chemical Agents⁸³

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Choking Agents				
Chlorine ⁸⁴	Industrial product. No precursors required.	Not persistent.	Low.	Likely agent due to its availability as a commercial product.
Phosgene ⁸⁵	Industrial product. No precursors required.	Not persistent.	Low.	Likely agent due to its availability as a commercial product.

83. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. I at 28.

84. *Id.* "At room temperature, chlorine is a yellow-green gas with a pungent irritating odor." AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) MEDICAL MANAGEMENT GUIDELINES, General Information: Chlorine 1, at <http://www.atsdr.cdc.gov/mmg> (last visited Sept. 9, 2002) [hereinafter ATSDR]. Its odor is detectable at concentrations below the OSHA permissible exposure limit so odor will serve as a warning. *Id.* Chlorine is used as bleach, and "as a chemical reagent in the synthesis and manufacture of [many products]." *Id.* at 2. "Chlorine reacts explosively or forms explosive compounds with many common substances such as acetylene, ether, turpentine, ammonia, fuel gas, hydrogen, and finely divided metals." *Id.* at 3. "The toxic effects of chlorine are primarily due to its corrosive properties." *Id.* at 5.

85. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. I at 28. "Phosgene is used as an intermediate in the [production of] isocyanates, polyurethane, polycarbonates, dyes, pesticides, and pharmaceuticals," among other chemicals. ATSDR, *supra* note 84, Phosgene at 2. "Phosgene is a colorless . . . liquid . . . and a colorless, nonflammable gas above 47° F. At low concentrations, its odor is similar to that of green corn or new-mown hay" ("musty" for those unfamiliar with such odors). *Id.* at 1. "[A]t high concentrations, its odor [is] sharp and suffocating." *Id.* "The odor threshold for phosgene is 5 times higher than the OSHA PEL [permissible exposure limit]" so odor would not provide a sufficient warning of hazardous concentrations. *Id.* Its irritating qualities can be mild and delayed, so exposure for a long period may result before the exposure is realized. *Id.*

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Nerve Agents⁸⁶				
Tabun ⁸⁷	Not readily available manufacturing instructions, but precursors available. Relatively easy to manufacture.	Intermediate.	High.	Likely agent due to availability of precursor chemicals and relative ease of manufacture.
Sarin ⁸⁸	Moderately difficult and precursor chemicals are covered by the Chemical Weapons Convention (CWC). ⁸⁹	Not persistent.	High.	Likely agent due to demonstrated use by Aum Shinrikyo, but restrictions on precursor chemicals could create difficulties for production.

86. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. I at 28. "Nerve agents are the most toxic of the known chemical warfare agents. They are chemically similar to organophosphate pesticides and exert their biological effects by inhibiting" what are called "acetylcholinesterase enzymes" (thereby producing a toxic level of acetylcholine at nerve synapses which disrupts the transmission of nerve impulses). ATSDR, *supra* note 84, Nerve Agents at 1. The dose and route of exposure are important factors in analyzing the initial effects of nerve agents, but they are readily absorbed and fatal systemic effects can be rapid. *Id.* at 1. "Most of the nerve agents were originally synthesized in [the development of] insecticides, but because of their toxicity, they were evaluated for military use." *Id.* at 2. Tabun was synthesized in 1936 by a German scientist followed by sarin two years later. *Id.* Soman "was synthesized in 1944 by a German chemist, and VX was synthesized in the early 1950s by a British scientist." *Id.* "Nerve agents were used by Iraq against Iran" in their war. *Id.* "They are known to be included in military stockpiles of several nations, including the United States." *Id.* Reversal of nerve agent toxicity depends on the prompt administration of existing antidotes. See also Jeffrey L. Arnold, *Nerve Agents, G-Series: Tabun, Sarin, Soman*, 2 eMedicine Journal, No. 10 (Oct. 16, 2001), at <http://www.emedicine.com/EMERG/topic898> (last visited Sept. 10, 2002); Fergus Nicoll, *VX - one drop is lethal*, BBC News, June 24, 1998, at http://news.bbc.co.uk/1/hi/english/world/middle_east/119136.stm (last visited Sept. 11, 2002).

87. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. I at 28.

88. *Id.*

89. This Convention has been in force since April, 1997. "According to chemical experts, illegal acquisition of precursor chemicals would raise suspicions and attention due to the provisions of the convention." *Id.* at 11.

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Soman ⁹⁰	Difficult. Precursor chemicals controlled by CWC.	Intermediate.	High.	Not likely, due to difficulty of manufacture and control of precursor chemical.
VX ⁹¹	Difficult to manufacture. Precursor chemicals controlled by CWC.	High.	Very high.	Not a likely agent due to difficulty of manufacture and control of precursor chemical.

Choking agents are widely available but are more likely to cause nausea or dizziness rather than death.⁹² If panic can be caused in a large crowd, however, physical injury may result. Liquid chlorine stored in large quantities, however, has the potential to be quite lethal if released under the right conditions.⁹³

Nerve agents are designed to attack the nervous system to stop a person's breathing.⁹⁴ Tabun, sarin, and soman are clear, colorless, and tasteless.⁹⁵ Tabun has a slight fruit odor.⁹⁶ Soman has a slight fruity or camphor odor but neither

90. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. I at 28.

91. *Id.*

92. *Id.*

93. Carol D. Leonnig & Spencer S. Hsu, *Fearing Attack, Blue Plains Ceases Toxic Chemical Use*, WASH. POST, Nov. 10, 2001, at A1. Wastewater treatment plants have large amounts of liquid chlorine on hand to treat raw sewage. *Id.* One such plant, the Blue Plains Wastewater Treatment Plant located southwest of Washington, D.C. four miles from the Capitol, removed 900 tons of liquid chlorine and sulfur dioxide stored at the plant after September 11. *Id.* "Jerry N. Johnson, general manager of the D.C. Water and Sewer Authority, which runs the plant," told the Washington Post "that the rupture of a full 90-ton tanker [of these chemicals] could spread a lethal cloud, which could kill people within 10 miles. . . ." *Id.* More than 2.7 million people live within a 15-mile radius of the plant. *Id.* Because of increased security costs, many utilities are following the example of Blue Plains in abandoning the use of liquid chlorine in favor of safer disinfectants. *Id.*

94. ATSDR, *supra* note 84, Nerve Agents at 6.

95. *Id.* at Nerve Agents at 3. The Centers for Disease Control and Prevention (CDC) has expedited efforts to develop rapid detection tools for more than "nerve agents, nitrogen mustard, hydrogen cyanide, toxic industrial chemicals, and other compounds that terrorists might use." *CDC Lab Placing Greater Emphasis on Anti-Terrorist Work, Official Says*, BNA DAILY ENV'T REP., Nov. 7, 2001, at A-5.

96. ATSDR, *supra* note 84, Nerve Agents at 3.

odor can be relied upon to provide sufficient warning against an attack.⁹⁷ VX gas was made by Saddam Hussein in Iraq.⁹⁸ It is amber-colored, tasteless and odorless, and possesses no warning properties.⁹⁹

The 1999 GAO Report on Combating Terrorism explained that there are a number of precursor chemicals that have to be acquired and then used properly in a series of manufacturing steps before a nerve agent can be produced.¹⁰⁰ Some of these manufacturing steps are difficult and hazardous in and of themselves.¹⁰¹ As a result, a "sophisticated laboratory infrastructure" would be required to achieve the "careful temperature control, cooling of the vessel, heating to complete chemical reactions, and distillation" to complete production of a nerve agent.¹⁰²

In addition, distribution of the nerve agent in an outdoor environment subjects the attacker's likelihood of success to the effects of wind, heat or cold, sunlight, and moisture.¹⁰³ Hence, indoor attacks would be the most likely especially in places where large numbers of people congregate and are unable to disperse quickly.¹⁰⁴

Suppliers of precursor chemicals, laboratory equipment manufacturers, laboratories handling chemical or choking agents, landlords,¹⁰⁵ persons associated

97. ATSDR, *supra* note 84, Nerve Agents at 3.

98. *Iraq 'produced nerve gas warheads,'* BBC ONLINE NETWORK, June 24, 1998, available at http://news.bbc.co.uk/1/hi/english/world/middle_east/118934.stm (last visited Sept. 5, 2002). The BBC News reported that United Nations weapons inspectors in Iraq uncovered evidence that Iraq filled Scud missile warheads with VX. *Id.* Iraq's Deputy Prime Minister, Tariq Aziz, reportedly said that Iraqi scientists had experimented with VX but not could not turn it into a weapon. *Id.*

99. ATSDR, *supra* note 84, Nerve Agents at 3.

100. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at 12-13.

101. *Id.*

102. *Id.* at 11-12.

103. *Id.* at 13.

104. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at 13. The 1999 GAO REPORT ON TERRORISM also discusses (1) "blood agents": hydrogen cyanide (a "likely agent" whose precursor chemicals are covered by the CWC) and cyanogen chloride (a likely agent also); (2) "blister agents": sulfur mustard ("not likely" because of the difficulty to obtain precursor materials and moderate production problems), nitrogen mustard (HN-2 and HN-3) (same), and lewisite (same); and one other nerve agent: GF (not a likely agent due to the difficulty to manufacture it and the control of precursor chemicals by the CWC). *Id.* at app. I at 28-29.

105. The duty of care of landlords to tenants usually is addressed by "premises liability" torts. Generally speaking, the common law says that a landlord owes no duty of care to a tenant for the criminal acts of a third party. Tracy A. Bateman & Susan Thomas, *Landlord's Liability for Failure to Protect Tenant From Criminal Acts of Third Persons*, 43 A.L.R. 5th 207, 207 (1996). The doctrine is riddled with exceptions. *Id.* Contractual undertakings to protect a tenant are, of course, easy to comprehend. Other exceptions are muddled and typically, quite fact specific. They may involve a history of prior incidents, the voluntary assumption of providing security but doing so negligently, a "special relationship" that puts a burden on the landlord to provide adequate security, "special circumstances" or the totality of the circumstances generally, and the location of the criminal act

with the importation of goods, and sellers of devices that might be used to distribute chemical agents to harm others, would appear to be among the potential defendants in the chain of harm avoidance of a chemical terrorist threat.

BIOLOGICAL THREATS

Anthrax leads the list of biological weapons that can cause death and illness and disrupt business operations, especially because of the potential lag time between exposure to a biological weapon and detection of the attack.¹⁰⁶ Anthrax is not a contagious agent but its disruptive effects are obvious.¹⁰⁷

in common areas under a landlord's control, for example. Bateman & Thomas, *supra*. See generally *id.* (a comprehensive discussion of the cases throughout the United States); Melinda L. Reynolds, *Landowner Liability for Terrorist Acts*, 47 CASE W. RES. L. REV. 155, 162-180 (1996) (article also contains a discussion of some of the litigation that resulted from the 1993 attack at the World Trade Center at pp. 186-92); James H. Stilwell, *Texas Premises Liability Jury Definitions, Instructions, and Questions for Criminal Actor Cases—A Pattern to Ease the Madness?*, 17 REV. LITIG. 259 (1998); Donna Lee Welch, *Ann M. V. Pacific Plaza Shopping Center: The California Supreme Court Retreats From Its "Totality of the Circumstances" Approach to Premises Liability*, 28 GA. L. REV. 1053 (1994); Mark P. Buell, *Liability for Inadequate Security*, 69 FLA. B.J. 58 (March 1995). One has to wonder whether building owners that require identification as a condition of entry can now ever stop the practice. Or must they insure that the identification process is more than perfunctory, as is typically the case, and whether the failure to discover a terrorist who produced a fake driver's license to gain entry will be the basis for a future tort.

106. THE ADVISORY PANEL TO ASSESS DOMESTIC RESPONSE CAPABILITIES FOR TERRORISM INVOLVING WEAPONS OF MASS DESTRUCTION, THIRD ANNUAL REPORT TO THE PRESIDENT AND THE CONGRESS 32 (Dec. 15, 2001), available at <http://www.rand.org/nsrd/org/nsrd/terrpanel/terror-screen.pdf> (last visited Sept. 10, 2002).

Because other surveillance methods often do not provide near real-time reporting, and because reporting can be critical for the prevention, recognition, and treatment of disease outbreaks, interest in early warnings through syndromic surveillance is growing. Syndromic surveillance relies on reports from pharmacies, hospitals, primary care medical providers, and others about syndromes or symptoms that may indicate an epidemic sooner than reports of specific diagnoses.

Id. The Report then described an innovative program in New York City where 11 hospitals report daily to the New York City Department of Health on the number of hospital admissions via the emergency department. *Id.* at n.59. Calls to 911 that can be related to influenza (based on experience) are also monitored. *Id.* The Advisory Panel pointed out that even New York's system cannot operate without good communications between medical and health entities: "The West Nile virus was first recognized not by the excellent syndromic surveillance systems in place in New York but by an astute infectious disease physician who had recently met the public health epidemiologist and called her when she saw three unusual cases of encephalitis." *Id.* at n.60. See also GAO REPORT ON HOMELAND SECURITY, *Challenges and Strategies in Addressing Short- and Long Term National Needs*, GAO-02-160T at 21 (Nov. 7, 2001) (discussing gaps in the nation's surveillance network).

107. David E. Rosenbaum, *Sterilized Mail To Be Scanned For Evidence*, N.Y. TIMES, Nov. 1, 2001, at B8. The anthrax mail bombs of the fall of 2001 caused nearly 70 tons of mail to be shipped to

Anthrax is on a list that includes a number of other bacterial agents as well as viral agents, as summarized in the following chart from the 1999 GAO Report on Combating Terrorism.¹⁰⁸

BIOLOGICAL AGENTS¹⁰⁹

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Bacterial Agents				

Ohio for decontamination. Rosenbaum, *supra*. The anthrax attack on the headquarters building of American Media Inc. publications in Boca Raton, Florida, resulted in anthrax spores spreading to the second and third floors of the building from the mail room on the first floor. Andrew C. Revkin & Dana Canedy, *Anthrax Pervades Florida Site, and Experts See Likeness to That Sent to Senators*, N.Y. TIMES, Dec. 5, 2001, at B5. The building was closed as a public health threat, and the contamination caused the death of the photograph editor and the near death of a mail room clerk. *Id.* In the Hart Senate Office Building where Senator Tom Daschle received the anthrax spore-filled letter, spores were "detected on the first, fifth, sixth and ninth floors and in filters in the heating and air conditioning system." David E. Rosenbaum, *Gas Will Be Used to Kill Bacteria in Senate Office Building*, N.Y. TIMES, Nov. 3, 2001, at B9. The building had to be closed for three months while the decontamination was planned and then implemented. Meredith Preston, *Superfund: Cost for Anthrax Cleanup in Congress Reaches \$23 Million, EPA Tells Grassley*, BNA DAILY ENV'T REP., Mar. 7, 2002. As of March 6, 2002, EPA had incurred more than \$23 million to address anthrax cleanup in U.S. Capitol buildings, the bulk of which was spent at the Hart Senate Office. *Id.* Meredith Preston & Linda Roeder, *White House Requests Supplemental Funds for Anthrax Cleanup Costs, Transportation*, BNA DAILY ENV'T REP., Mar. 25, 2002, at A-6.

108. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30. Generally the "problems and their solutions" to respond to any type of terrorist incident (command and control, planning and operations, resource management and logistics, communication, exercises, and mass casualties), and then those applicable to both biological and chemical terrorist events (public health surveillance, detection and risk assessment, protective equipment and training, chemical and biological-specific planning, hospital notice and decontamination, distribution of pharmaceuticals, vaccines and pharmaceuticals, laboratories, medical and veterinary coordination, and quarantine). GAO, *Combating Terrorism: Considerations for Investing Resources in Chemical and Biological Preparedness*, GAO-02-162T at 9-11 (Oct. 17, 2001).

109. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30.

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Anthrax ¹¹⁰	Virulent stock is hard to obtain and process.	Spores are very stable. ¹¹¹ Resistant to sunlight, heat, and some disinfectants.	Very high for pulmonary anthrax. ¹¹²	Possible, but requires sophistication to manufacture ¹¹³ and disseminate. ¹¹⁴

110. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30.

111. Anthrax spores were located in more than a dozen locations in Washington, D.C., and even turned up on equipment sent from Washington D.C. to Indianapolis for routine maintenance. Rosenbaum, *Sterilized Mail To Be Scanned For Evidence*, *supra* note 107, at B8. Anthrax spores were also found in a mail pouch sent from Washington to the United States embassy in Lithuania. *Id.* Four mail centers in New Jersey were closed and millions of pieces of mail were in limbo awaiting delivery. David W. Chen & Steven Greenhouse, *As Anthrax Cases Mount, the Tranquil Rhythms of Suburban Havens Are Disrupted*, N.Y. TIMES, Nov. 1, 2001, at B9. A laboratory worker was infected with skin anthrax in March 2002, by handling without gloves vials of spores collected from the attacks of the fall of 2001. *A Nation Challenged; New Case of Anthrax Is Tied to Bare Hands*, N.Y. TIMES, Apr. 5, 2002, at A8.

112. On November 9, 2001, the CDC published clinical details of the treatment of 10 patients who suffered from inhalation anthrax as a result of the contaminated letters sent to members of Congress and the news media in October 2001. Gina Kolata, *Anthrax Report Fixes on Victims' Stories*, N.Y. TIMES, Nov. 10, 2001, at B8. It seems clear that aggressive treatment (antibiotics, drugs to maintain blood pressure, ventilators to aid breathing, draining chest fluids, and compressing a patient's lungs) resulted in the survival of six of the 10 patients. *Id.*

113. This may not be true. William J. Broad, *Geographic Gaffe Misguides Anthrax Inquiry*, N.Y. TIMES, Jan. 30, 2002, at A11. The Ames strain of anthrax, which was used in the fall 2001, letter attacks, apparently is common in soils in Texas where old cattle trails would be likely areas to search for lethal spores. *Id.* As a result of a clerical error in a 1986 scientific paper, investigators had thought that the Ames strain had first been identified in Iowa. *Id.* In fact, it was found in Texas in the early 1980s. *Id.*

114. As much fear as was created by the anthrax letters of fall 2001, a more deadly form of distribution is through the intake system of building ventilation systems. James Glanz, *Report Sees Lower Towers That Can Empty Faster*, N.Y. TIMES, Mar. 28, 2002, at A15. Where a building intake is accessible and unmonitored, fine particles that carry anthrax and other biological or chemical agents can quickly spread if a filter system is not capable of stopping them. *Id.* (citing the chairman of a mechanical, electrical, and plumbing firm in Manhattan, the article explains that it can cost millions of dollars "to fully rework an existing building to filter out all biological and chemical agents, move and monitor intake vents, and keep internal air pressure just high enough to prevent terror agents from being sucked in through the small cracks around windows and doors").

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Plague ¹¹⁵	Very difficult to acquire seed stock and to process.	Can be long-lasting, but heat, disinfectants and sunlight render it harmless.	Very high.	Possible but not likely, as it is difficult to acquire a suitable strain and to weaponize and disseminate it.

115. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30. Plague is caused by a bacillus called *Yersinia pestis*. *Quick Facts About Plague*, at <http://www.acponline.org/bioterro/plague.htm> (American College of Physicians and American Society of Internal Medicine Web Page) (last visited Sept. 10, 2002) [hereinafter *Plague*]. A civilian working group has concluded that:

[a]n aerosolized plague weapon could cause fever, cough, chest pain, and hemoptysis [(coughing of blood from the respiratory tract)] with signs consistent with severe pneumonia 1 to 6 days after exposure. Rapid evolution of disease would occur in the 2 to 4 days after symptom onset and would lead to septic shock with high mortality without early treatment. Early treatment and prophylaxis with streptomycin or gentamicin or the tetracycline or fluoroquinolone classes of antimicrobials would be advised.

Thomas V. Inglesby, M.D. et al., *Plague as a Biological Weapon: Medical and Public Health Management*, 283 JAMA 2281, 2281 (May 3, 2000).

Given the availability of *Y. pestis* around the world, capacity for its mass production and aerosol dissemination, difficulty in preventing such activities, high fatality rate of pneumonic plague, and potential for secondary spread of cases during an epidemic, the potential use of plague as a biological weapon is of great concern.

Id. Transmission of the plague has occurred through flea bites but, in the case of pneumonic plague, also by respiratory droplets. *Id.* Bubonic plague is the most naturally occurring form of the disease, but pneumonic plague is the greater fear in a bioterrorist attack. *Id.*

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Glanders ¹¹⁶	Difficult to acquire see stock, moderately difficult to process.	Very stable.	Moderate to high.	Potential, but difficult to acquire, produce, and disseminate.

116. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30. "Glanders is an infectious disease that is caused by the bacterium *Burkholderia mallei*." CDC, REPORT ON DISEASE INFORMATION, GLANDERS, at http://www.cdc.gov/ncidod/dbmd/diseaseinfo/glanders_g.htm (last visited Sept. 7, 2002). It primarily affects horses, donkeys, and mules. *Id.* The disease has not been seen in humans in the United States since 1945 but it is common in domestic animals in Africa, Asia, the Middle East, and Central and South America. *Id.* It "is transmitted to humans by direct contact with infected animals." *Id.* Human-to-human transmission has been reported as well. *Id.* Symptoms are a function of the route of infection. *Id.* Localized infections will develop in 1-5 days in a cut or scratch. *Id.* Pulmonary infections can result in pneumonia, pulmonary abscesses, and pleural effusion. *Id.* In the bloodstream, glanders infections are usually fatal within seven to 10 days. *Id.* Chronic infections involve "multiple abscesses within the muscles of the arms and legs or in the spleen or liver." *Id.* There is no vaccine available for glanders. *Id.* The mortality rate is over 50 percent even with antibiotics.

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Tularemia ¹¹⁷	Difficult to acquire correct strain; moderately difficult to process.	Generally unstable in environment. Resists cold, killed by mild heat and disinfectants.	Moderate, if untreated, low if treated.	Possible, but difficult to stabilize.

117. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30. "Tularemia was first described as a plague-like disease of rodents in 1911 and [was later] recognized as a potentially severe and fatal illness in humans." David T. Dennis, M.D. et al., *Tularemia as a Biological Weapon: Medical and Public Health Management*, 285 JAMA 2763, 2764 (June 6, 2001). Large waterborne outbreaks of the disease occurred in Europe and the Soviet Union in the 1930s and 1940s. *Id.* In technical terms, it is "a small, non-motile, aerobic, gram-negative coccobacillus." *Id.* at 2766. "In 1969, a World Health Organization expert committee estimated that an aerosol dispersal of 50 kg of virulent *F tularensis* . . . with five million inhabitants would result in 250000 incapacitating casualties, including 19000 deaths." *Id.* at 2764. This article presented the conclusions of a Working Group on Civilian Biodefense, summarized as follows:

A weapon using airborne tularemia would likely result 3 to 5 days later in an outbreak of acute, undifferentiated febrile illness with incipient pneumonia, pleuritis, and hilar lymphadenopathy. Specific epidemiological, clinical, and microbiological findings should lead to early suspicion of intentional tularemia in an alert health system; laboratory confirmation of agent could be delayed. Without treatment, the clinical course could progress to respiratory failure, shock, and death.

Id. at 2763.

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Brucellosis ¹¹⁸	Difficult to acquire seed stock; moderately difficult to process.	Very stable. Long persistence in wet soil or food.	Very low.	Not likely because of difficulty of getting stock, long incubation period and low lethality.

118. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 30. Brucellosis is caused by the bacteria of the genus *Brucella*. CDC REPORT ON DISEASE INFORMATION, BRUCellosis, at http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm (last visited Sept. 7, 2002). These bacteria are usually passed among animals. *Id.* "Humans become infected by coming in contact with animals or animal products that are contaminated with these bacteria." *Id.* Symptoms are flu-like and may include fever, sweats, headaches, back pains, and physical weakness. *Id.* "Severe infections of the central nervous system or lining of the heart may occur." *Id.* In the United States, the disease is very uncommon with 100 to 200 cases occur per year. *Id.* But it is "very common in countries where animal disease control programs have not reduced the amount of disease among animals." *Id.* Humans are usually infected by eating or drinking something contaminated with the bacteria, inhaling the organism, or having the bacteria enter the body through skin wounds. *Id.* Person-to-person spreading of the disease is extremely rare. *Id.* Avoiding unpasteurized milk, cheese, or ice cream is a good way to avoid the infection. *Id.* There is no vaccine available for humans. *Id.* Antibiotics are typically used to treat the disease and recovery can take a few weeks to several months. *Id.* Mortality is usually less than 2 percent. *Id.* The Nuclear Threat Initiative (a foundation headed by Ted Turner) recently awarded a \$1.3 million grant for three former Soviet laboratories in Russia to help develop a new vaccine against brucellosis, "which threatens animals in the United States and throughout the world." Judith Miller, *Turner's Foundation to Spend Millions to Fight Bioterrorism*, N.Y. TIMES, Nov. 25, 2001, at B7. Brucellosis has already received some publicity in connection with a potential bioterrorism attack. SUSPECTED BRUCellosis CASE PROMPTS INVESTIGATION OF POSSIBLE BIOTERRORISM-RELATED ACTIVITY - NEW HAMPSHIRE AND MASSACHUSETTS, 1999, MMWR 2000 (June 16, 2000), at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4923a1.htm> (last visited Apr. 8, 2002) (reporting on a patient who may have been exposed "to 'laboratory flasks' and 'cultures' kept in her apartment by her boyfriend . . . a foreign national studying marine biology . . . [who] . . . had returned to his country of citizenship." No convincing evidence of terrorism was determined after a coordinated investigation by clinical, public health, and law enforcement personnel).

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Q Fever ¹¹⁹	Difficult to acquire seed stock; moderately difficult to process and weaponize.	Stable. Persists for months on wood and in sand.	Very low if treated.	Not likely because of low lethality.

119. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 31. Query Fever is a bacterial "zoonosis" (it can be transmitted from animals to humans). UNIVERSITY OF FLORIDA, ENVIRONMENTAL HEALTH & SAFETY REPORT ON Q FEVER, at <http://www.ehs.ufl.edu/Bio/qfever/qinfo.html> (last visited Sept. 29, 2002). It is a relatively rare disease in humans. *Id.* The infection occurs throughout the world. *Id.* Q fever is spread through airborne dissemination of contaminated dust which is contaminated from the tissue or body fluids of animals infected with the bacteria or by direct contact with infected animals or materials that the animals have contaminated. *Id.* Person-to-person contact is regarded as unlikely. *Id.* In humans, Q Fever is usually asymptomatic lasting for less than two weeks after exposure (even without treatment) and can be mistaken for acute viral illness. *Id.* It produces fever, chills, headaches, malaise, and severe sweats. *Id.*

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Viruses¹²⁰				
Hemorrhagic fevers (Ebola ¹²¹ and Marburg ¹²²)	Very difficult to obtain and process. Unsafe to handle.	Relatively unstable.	Depending on strain, can be very high.	Unlikely because of difficulty of acquiring pathogen, safety considerations, and relative instability.

120. 1999 GAO REPORT ON COMBATING TERRORISM, *supra* note 77, at app. II at 31.

121. *Id.* Ebola is a fever that is often fatal. CDC REPORT ON EBOLA HEMORRHAGIC FEVER, at <http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola.htm> (last visited Sept. 7, 2002). It occurs in humans and nonhuman primates. *Id.* It is named after a river in the Republic of the Congo where it was first recognized in 1976. *Id.* There are four species of Ebola; three have caused disease in humans. *Id.* Researchers believe that Ebola was originally transmitted from an animal to a human. *Id.* Confirmed cases of Ebola have been reported in the Republic of the Congo, Gabon, Sudan, the Ivory Coast, and Uganda. *Id.* "No case of the disease in humans has ever been reported in the United States." *Id.* Researchers believe that after the infection in humans occurs, the virus can be transmitted by direct contact with the blood or secretions of the infected person or through contact with objects such as needles. *Id.* Symptoms are not the same for all infected persons, but fever, headache, muscle aches, stomach pain, fatigue and diarrhea occur within a few days after infection. *Id.* Death can occur within one week of infection. *Id.* The immune response appears to dictate who survives the infection. *Id.* Early diagnosis is difficult because early symptoms are nonspecific to the virus and could be identified as being caused by a number of diseases. *Id.*

122. Marburg fever is a "rare, severe type of hemorrhagic fever which affects both humans and nonhuman primates." CDC REPORT ON MARBURG HEMORRHAGIC FEVER, at <http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/marburg.htm> (last visited Sept. 7, 2002). It is caused by a unique animal-borne RNA virus of the filovirus family which includes the four species of Ebola virus as its only other members. *Id.* It was first recognized in 1967 when outbreaks occurred in laboratories in Marburg and Frankfurt, Germany, and in Belgrade, Yugoslavia. *Id.* The infections came from exposures to monkeys or their tissues. *Id.* It is not clear how an animal host transmits the virus to humans, but once infected the virus can be spread by contact. *Id.* The virus incubates for five to 10 days before suddenly causing fever, chills, and headaches. *Id.* Symptoms become more severe over time and may include liver failure and severe hemorrhaging. *Id.* These symptoms are similar to other infectious diseases, such as typhoid fever or malaria, so diagnosis may be difficult, at least for an initial case. *Id.* The fatality rate is between 23-25 percent of those infected. *Id.*

	<i>Ease of Manufacture</i>	<i>Environmental Persistence/ Stability</i>	<i>Lethality</i>	<i>GAO Observations</i>
Smallpox ¹²³	Difficult to obtain stock and to process. Only confirmed sources are in the United States and Russia.	Very stable.	Moderate to high.	Questionable because of limited availability. But consequences of an attack are deemed especially serious.

While the 1999 GAO Report on Combating Terrorism characterized the anthrax risk as “possible,” that assessment can no longer be held with a strong conviction. Indeed, fanciful distribution concepts may, one day, be tested.¹²⁴ And if a major anthrax attack occurs, the public health system’s ability to respond to it will likely be controlled by the ability of personnel to collect specimens, the capacity of laboratories to analyze samples, the coordination of command functions, the quality of the communications,¹²⁵ and the challenge of storing large numbers of specimen samples for criminal prosecutions.¹²⁶ Future torts will

123. 1999 GAO REPORTING ON COMBATING TERRORISM, *supra* note 77, at app. II at 31.

124. The New York Times reported the discovery in the offices of a private relief organization in Kabul, Afghanistan, of documents discussing the history of anthrax and how anthrax can be spread through artillery shells, airplanes and trucks. Douglas Frantz & David Rohde, *2 Pakistanis Linked to Papers on Anthrax Weapons*, N.Y. TIMES, Nov. 28, 2001, at B1. Also found were “[p]lans for building a balloon and what appeared to be a rocket” . . . along with . . . empty steel tubes and parts of a rocket-propelled grenade. A container of helium sat on a work bench. *Id.* The article continued: “[t]he diagrams of the balloons seem to show a possible method for slowly dispersing some type of biological or chemical agent from the air. Words scribbled in the diagram appear to say ‘cyanide.’” *Id.* One diagram showed “four balloons flying together in tandem with a box around them.” *Id.* Crop dusting planes are a more likely target for a distribution device and, as a result, the entire pesticide application business is receiving greater scrutiny. Karen L. Werner, *States, Federal Government Sharing Data To Tackle Chemical Threats From Terrorists*, BNA DAILY ENV’T REP., Nov. 7, 2001, at A-8.

125. Lawrence K. Altman, *Preparation for Anthrax Is Called For*, N.Y. TIMES, Dec. 15, 2001, at B7 (reporting on the results of a two-day meeting at the CDC of health officials who expressed deep concern over the system’s capacity to respond to an anthrax attack involving many more than the 18 cases that had been confirmed since October 2001).

126. *Id.* In connection with the post 9/11 anthrax bioattack, rugs, sets of china, jewelry, hundreds of envelopes, and hundred-dollar bills were among the items that had to be stored as a result of the criminal investigation, even though these specimens were found not to be contaminated. *Id.*

almost certainly look at negligent hiring practices at laboratories where anthrax research is being conducted.¹²⁷

If the smallpox virus can be secured, it represents a genuine health threat. It is highly contagious and spreads rapidly.¹²⁸ It was eradicated in 1977 as a result of aggressive, worldwide public health strategies.¹²⁹ Hence, the World Health Assembly recommended in 1980 that vaccination programs cease.¹³⁰ The reappearance of smallpox today would require the theft of the virus from stockpiles in the United States¹³¹ or Russia¹³² and the ability of infected persons to spread the bacteria before succumbing themselves to its effects.¹³³ A civilian study group evaluating smallpox as a biological weapon reached this conclusion:

If used as a biological weapon, smallpox represents a serious threat to civilian populations because of its case-fatality rate of 30% or more among unvaccinated

127. Jim Yardley, *At an Anthrax Lab, the World Changed Quickly*, N.Y. TIMES, Nov. 21, 2001, at B6 (reporting on anthrax research laboratory security changes generally after 9/11, but noting proposed legislation that would require criminal background checks of foreign students working in the laboratories).

128. Donald A. Henderson, MD, MPH et al., *Smallpox as a Biological Weapon: Medical and Public Health Management*, 281 JAMA 2127, 2127 (June 9, 1999). "Smallpox spreads . . . primarily by droplet nuclei or aerosols expelled from the [mouths or nose] of infected persons and by direct contact." *Id.* at 2129.

129. *Id.* at 2128.

130. *Id.* Routine smallpox vaccinations were stopped in the United States in 1972. Lawrence K. Altman, *Plan for Smallpox Rules Out Mass Vaccination*, N.Y. TIMES, Nov. 27, 2001, at B7.

131. The CDC houses the United States' smallpox stockpile. Sheryl Gay Stolberg & Judith Miller, *Bioterror Role An Uneasy Fit for the C.D.C.*, N.Y. TIMES, Nov. 11, 2001, at A1. The building itself was reported to have been a target of one of the hijacked aircrafts on September 11. *Id.* Intergovernmental (federal, state, and local) communications as well as communications to health care providers in the case of a bioterrorist emergency is important. *Id.*

132. Henderson et al., *supra* note 128, at 2128.

133. "In people exposed to smallpox, the vaccine can lessen the severity of or even prevent illness if given within 4 days after exposure." CDC REPORT ON FACTS ABOUT SMALLPOX, at <http://www.bt.cdc.gov/DocumentsApp/FactSheet/SmallPox/About.asp> (last visited Sept. 7, 2002).

The incubation period is about 12 days (range: 7 to 17 days) following exposure. Initial symptoms include high fever, fatigue, and head and back aches. A characteristic rash, most prominent on the face, arms, and legs, follows in 2-3 days. The rash starts with flat red lesions that evolve at the same rate. Lesions become pus-filled and begin to crust early in the second week. Scabs develop and then separate and fall off after about 3-4 weeks.

...

Persons with smallpox are most infectious during the first week of illness, because that is when the largest amount of virus is present in saliva. However, some risk of transmission lasts until all scabs have fallen off.

Smallpox kills approximately one-third of the persons infected by it. *Id.* See Sheryl Gay Stolberg, *He Routed Smallpox, Now Tackles Bioterror*, N.Y. TIMES, Nov. 18, 2001, at B1.

persons and the absence of specific therapy. Although smallpox has long been feared as the most devastating of all infectious diseases, its potential for devastation today is far greater than at any previous time. Routine vaccination throughout the United States ceased more than 25 years ago. In a now highly susceptible, mobile population, smallpox would be able to spread widely and rapidly throughout this country and the world.¹³⁴

In June 2001, a hypothetical smallpox bioattack in shopping malls in Oklahoma City, Philadelphia, and Atlanta, dubbed "Dark Winter" by the exercise's organizers, was staged.¹³⁵ The attack was hypothesized to have occurred in December 2002 and infected 3000 people.¹³⁶ Taking into account the time it would take to diagnose the disease, how the numbers of infected persons would have increased before the realization of the attack had been confirmed, and assuming: (a) that doctors unfamiliar with the disease might not recognize it at first; (b) even vaccinated persons (from decades ago) would still be susceptible at some rate; (c) some geographic dispersion of infected individuals might occur; and (d) the difficulty of tracing the first persons infected, large numbers of persons rapidly became infected.¹³⁷ Six days into the hypothetical epidemic, 2,000 cases had been reported in 15 states, with 300 deaths.¹³⁸ After

134. Henderson et al., *supra* note 128, at 2127. "Smallpox probably was first used as a biological weapon in the French and Indian Wars (1754-1767)" when British forces "distributed blankets that had been used by smallpox patients [to American Indians] with the intent of initiating outbreaks among [them]." *Id.* at 2128. More than 50 percent of the affected tribes died from the resulting epidemic. *Id.*

135. Tara O'Toole et al., *Shining Light on "Dark Winter,"* 34 CLINICAL INFECTIOUS DISEASES 972, 974 (2002), available at <http://www.journals.uchicago.edu/CID/journal/issues/v34n7/020165/020165.web.pdf> (last visited Sept. 10, 2002).

136. *Id.* at 973-74. It was estimated "as little as 30 g of smallpox could cause 3,000 infections." *Id.* at 974. The organizers noted that "the former Soviet Union was able to produce smallpox by the ton. . . ." *Id.* at 974.

137. *Id.* at 972-83.

138. *Id.* at 977. A key assumption in the exercise was that the United States had only 15.4 million doses of smallpox vaccine available to administer to persons so as to "ring" the infection areas and that only 12 million doses would actually be usable (due to inefficiencies and waste). *Id.* at 976. As the infection spread in the exercise, vaccine distribution decisions became critical ones. *Id.* at 974. The United States Government is rapidly trying to remedy this weakness. Sheryl Gay Stolberg, *U.S. Orders Vast Supply Of Vaccine For Smallpox*, N.Y. TIMES, Nov. 29, 2001, at B8. It has ordered 209 million doses of smallpox vaccine to supplement the stock of 15.4 million doses. *Id.* Recent tests have demonstrated that the U.S. stockpile can be diluted five times and still be effective. *Id.* Hence, the U.S. effectively has about 77 million doses and a stockpile of 286 million doses. *Id.* Aventis Pasteur Inc., the vaccines business of Aventis Pharma AG, announced on March 29, 2002, that it has an inventory of smallpox vaccine in the range of 75 to 90 million doses that it will be donating to the United States. Press Release, Aventis Pasteur, *Aventis Pasteur Donates Approximately 75 to 90 Million Doses of Smallpox Vaccine to the U.S.* (Mar. 29, 2002), <http://www.aventis.com> (last visited Sept. 7, 2002). The National Institute of Health will be running clinical studies to determine if the Aventis stockpile can be diluted without losing potency.

