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Please Expect Turbulence: Liability for Communicable Disease Transmission During Air Travel

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PLEASE EXPECT TURBULENCE: LIABILITY FOR COMMUNICABLE DISEASE TRANSMISSION DURING AIR TRAVEL

INTRODUCTION

Airplanes are a modern necessity of life, which allow for quick and convenient transportation across the globe. A staggering number of people fly every year.[1] In 2016 alone, U.S. based airline carriers enplaned over 821.8 million passengers.[2] Although air travel is a feature of present day life, it is not without its issues.[3] One of these issues is the threat to human health by the transfer of communicable diseases on airplanes.[4] Think of it this way: Passengers from all walks of life, some sick and some healthy, are enclosed in a small space[5] and are breathing the same recycled air.[6] It should be no surprise that individ-

1. *See generally Passengers All Carriers–All Airports*, U.S. DEP'T TRANS., https://www.transtats.bts.gov/Data_Elements.asp–?Data=1 (last visited Jan. 12, 2017).

2. *Id.*

3. *See* Christopher Sanford, *Air Travel*, MERCK MANUAL, http://www.merckmanuals.com/professional/special-subjects/medical-aspects-of-travel/air-travel (last updated Jan. 2017).

4. *See* Petra A. Illig et al., *Conveyance & Transportation Issues: Air Travel*, *in* THE YELLOW BOOK: CDC HEALTH INFORMATION FOR INTERNATIONAL TRAVEL 2016 ch. 6 (2016), http://wwwnc.cdc.gov/travel/yellowbook/2016/conveyance-transportation-issues/air-travel ("Communicable diseases may be transmitted to other travelers during air travel."); Melanie Haiken, *Planes Can Harbor Deadly Germs for 7 Days, Study Shows*, FORBES (May 20, 2014, 5:55 PM), https://www.forbes.com/sites/melaniehaiken/2014/05/20/deadly-bacteria-can-live-for-a-week-on-planes-study-shows/#2f600d6e7f82 (explaining one study of a Delta Airlines plane found bacteria on plane surfaces can survive up to a week—MRSA survived 7 days and E. coli bacteria survived 4 days). Further, in spring 2009, Vice President Joe Biden fueled concerns regarding transmission of disease in airplane cabins by advising individuals "to avoid confined spaces such as airplanes for the fear of contracting the flu [H1N1] from a sneezing passenger." Hugo Martin, *Swine Flu Outbreak Revives Fears About Air Quality in Planes*, L.A. TIMES (Oct. 17, 2009), http://articles.latimes.com/2009/oct/17/business/fi-briefcase17.

5. "An aeroplane [sic] cabin provides the smallest volume of available air per person of any public space." David Ozonoff & Louis Pepper, *Ticket to Ride: Spreading Germs a Mile High*, 365 LANCET 917, 917 (2005).

6. Ruwantissa Abeyratne, *International Responsibility in Preventing the Spread of Communicable Diseases Through Air Carriage—The SARS Crisis*, 30 TRANS. L.J. 53, 55 (2002) [hereinafter Abeyratne, *International Responsibility*].

uals routinely become ill while flying[7]—in fact, there dozens of articles on how to avoid just that.[8]

Communicable diseases, which are viruses that invade the human body and cause an infection,[9] include measles, chicken pox, polio, hepatitis, human immunodeficiency virus (HIV), acquired immune deficiency syndrome (AIDS), norovirus, legionnaires, e. coli, Ebola, influenza, tuberculosis, just to name a few.[10] Historically, communicable disease threats are not unique; for example, the bubonic plague impacted millions of people around the world and can still be found in Africa, Asia, and South America.[11] As recently as early 2003, an international severe acute respiratory syndrome (SARS) outbreak, which originated from a Chinese doctor who treated patients with symptoms of the disease and later boarded an airplane, resulted in 8,422 SARS cases and 916 deaths worldwide.[12] In 2009, the world faced the H1N1 swine flu pandemic,[13] which infected individuals in more than 213 countries[14] and caused at least 16,713 deaths.[15] While many have thought communicable disease outbreaks were an issue of the past, these recent outbreaks have shown the vulnerability of modern society. The U.S. government attempts to mitigate the spread of communicable diseases via air travel through the Do Not Board (DNB) list, which prevents individuals who pose a risk of spreading an

7. *See* Scott McCartney, *Where Germs Lurk on Planes; What to Do When Stuck at 30,000 Feet Next to Sneezers and Coughers*, WALL ST. J. (Dec. 20, 2011), https://www.wsj.com/articles/SB10001424052970204058404577108420985863872 (noting that a study found 20% increased risk in catching a cold while flying).

8. *See, e.g.*, Talia Avakian, *13 Tips to Avoid Getting Sick on a Flight*, BUS. INSIDER (Sept. 8, 2015), http://www.businessinsider.com/how-to-avoid-getting-sick-on-a-plane-2015-8C; McCartney, *supra* note 7; Tony Merevick, *The Easiest Ways to Avoid Catching a Cold When You Fly*, THRILLIST (Nov. 24, 2015), https://www.thrillist.com/news/nation/the-easiest-ways-to-avoid-catching-a-cold-when-you-fly; Claiborne Ray, *How Not to Catch a Cold on a Plane*, N.Y. TIMES (Mar. 30, 2015), https://www.nytimes.com/2015/03/31/science/how-not-to-catch-a-cold-on-a-plane.html?_r=0.

9. 3 LOUISE J. GORDY & ROSCOE N. GRAY, ATTORNEY TEXTBOOK OF MEDICINE § 33.40 (3d ed. 2015).

10. CAL. CODE REGS. tit. 17, § 2500(j) (2016).

11. Jatin Vyas, *Plague*, U.S. NAT'L LIBR. MEDICE (Mar. 9, 2017), https://medlineplus.gov/ency/article/000596.htm.

12. Courtney Clegg, Comment, *The Aviation Industry and the Transmission of Communicable Disease: The Case of H1N1 Swine Influenza*, 75 J. AIR L. & COM. 437, 440 (2010).

13. MyLinda K. Sims, *When Pigs Fly: Does the ADA Cover Individuals with Communicable Diseases Such as Novel H1N1 Influenza, "Swine Flu"?*, 37 N. KY. L. REV. 463, 471 (2010).

14. DAVID A. RELMAN ET AL., INST. OF MED. OF THE NAT'L ACADS., THE DOMESTIC AND INTERNATIONAL IMPACTS OF THE 2009-H1N1 INFLUENZA A PANDEMIC: GLOBAL CHALLENGES, GLOBAL SOLUTIONS: WORKSHOP SUMMARY 2 (2010), http://www.ncbi.nlm.nih.gov/books/NBK52792/pdf/Bookshelf_ NBK52792.pdf.

15. *Id.* at 22.

illness during travel from boarding a commercial flight.[16] The DNB, however, has not been as useful as it could be.[17]

Despite regulation at the international, federal, and state levels, communicable disease outbreaks frequently make news headlines.[18] After the news story breaks, an individual is left wondering what happened to the passengers who contracted the disease from the infected passenger who boarded the plane? Communicable diseases have the potential to require extensive medical intervention, which translates into expensive medical bills and lost wages, and can be life threatening.[19]

This Comment argues that the United States should increase surveillance and monitoring of communicable diseases through a combined effort between the federal government, medical professionals, and airline companies to implement the proposed "Communicable Disease No-Fly Database" (hereinafter the "No-Fly Database") to update and replace the existing DNB list. The proposed No-Fly Database") will maintain a routinely updated list of individuals with confirmed communicable disease diagnoses. Physicians will place any individual diagnosed with a qualifying communicable disease on the No-Fly Database. Any individual placed in the No-Fly Database will be recognized as infected with a contagious communicable disease that poses a public health threat and will be denied the right to board the aircraft. The No-Fly Database will be cross-referenced with the flight manifest at the time of check-in. The increased supervision will effectively prevent infected individuals from boarding the plane, thus decreasing the risk of disease transmission onboard.

Furthermore, this Comment argues that an infected passenger who *knows* or *reasonably should know* that he is ill and transmits his or her illness to another passenger should be held civilly liable for injuries sustained by the harmed passenger. "The health of the public is another shared value. Not only does each individual have an interest in staying healthy but also all of together share an interest in having a

16. *Questions and Answers About the Federal Register Notice: Criteria for Recommending Federal Travel Restrictions for Public Health Purposes, Including for Viral Hemorrhagic Fevers*, CTR. FOR DISEASE CONTROL & PREVENTION (Mar. 27, 2015), http://www.cdc.gov/quarantine/qas-frn-travel-restriction.html; *see infra* notes 83–89 & 202–23.

17. *See infra* notes 202–23.

18. *See, e.g.*, Peter Elkind, *How Ice Cream Maker Blue Bell Blew It*, FORTUNE (Sept. 25, 2015, 12:00 PM), http://fortune.com/2015/09/25/blue-bell-listeria-recall/; Maggie Fox, *Exclusive: Patient with Extreme Form of TB Sent to NIH*, NBC NEWS (Jun. 9, 2015, 7:38 AM), http://www.nbcnews.com/health/health-news/exclusive-patient-extreme-form-tb-sent-nih-n371806.

19. *See* AON RISK SERVS., INFECTIOUS DISEASES IN THE WORKPLACE: "PEOPLE AT RISK" 2–7 (2008), http://www.aon.com/about-aon/intellectual-capital/attachments/risk-services/infectious_disease_in_the_workplace.pdf.

healthy population."[20] Individuals owe a duty to society to reasonably prevent the spread of communicable diseases. When an individual acts with reckless disregard for the safety of society, for example, by boarding a plane when he knows that he has a rare, highly contagious form of pneumonia, that individual has violated his duty. Thus far, caselaw does not answer the question of whether contracting a communicable disease during a flight constitutes an injury.[21] Therefore, creating this cause of action will incentivize individuals to be more cautious when they know or suspect that they have contracted a communicable disease because liability would be a potential consequence for the spread of the disease.

Part II of this Comment addresses (1) how communicable diseases spread and (2) the legal framework for combatting communicable diseases generally in the community, as well as in air travel.[22] This Part develops an understanding of the federal and state regulations currently in place.[23] Part III of this Comment analyzes why the surveillance systems, as well as airline monitoring mechanisms, currently in place are inadequate to prevent infected individuals from boarding planes and, therefore, spreading the disease to other passengers.[24] This Part proposes two solutions: (1) a No-Fly Database for infected individuals, and (2) a cause of action for passengers infected during the flight. Part IV of this Comment addresses the impact that the database and new cause of action are likely to have on society, and why both implementations are necessary.[25] Finally, Part V concludes the importance of the proposed solutions discussed in this Comment. Ultimately, communicable diseases, which can be life threatening, are easily spread via air travel, so the law should prevent infected individuals from recklessly exposing other passengers to disease.

II. BACKGROUND

Before addressing how the United States can improve its disease prevention via air travel, it is necessary to understand the existing prevention infrastructure. This Part explains what communicable dis-

20. *Introduction: Ethical Theory and Public Health*, *in* PUBLIC HEALTH ETHICS: THEORY, POLICY, AND PRACTICE 20 (Ronald Bayer et al. eds., 2007).

21. N. Pieter M. O'Leary, *Cock-A-Doodle Doo: Pandemic Avian Influenza and the Legal Preparation and Consequences of an H5N1 Influenza Outbreak*, 16 HEALTH MATRIX 511, 532 (2006).

22. *See infra* notes 28–132 and accompanying text.

23. As this Comment does not focus on an international solution, Part II only briefly discusses the international regulations.

24. *See infra* notes 133–332 and accompanying text.

25. *See infra* notes 333–404 and accompanying text.

eases are and how they spread via air travel, thus highlighting the severity of the problem.[26] This Part also addresses the international, federal, and state legal framework for generally combatting the spread of communicable diseases, as well as how each level of government addresses disease prevention in air travel.[27]

A. How Do Communicable Diseases Spread?

In short, a communicable disease is a virus that invades the human body, causing an infection.[28] Communicable diseases can spread through a number of ways, including: (1) direct or indirect contact with another person; (2) aerosolized particles or droplets in the air; (3) bodily fluids; (4) solid objects; and (5) contaminated food and water.[29] Some communicable diseases are spread when an infected person speaks, coughs, or sneezes, as small droplets containing the disease spread into the air.[30] Depending on the droplet size, it may travel a long distance (aerosol),[31] or short distance (droplets),[32] and may be inhaled by another person. Communicable diseases can also spread through direct bodily contact when the skin of the infected individual comes into contact with another person's skin, or through indirect bodily contact when an individual's skin comes into contact with a contaminated object or surface.[33] Direct contact and aerosolized dispersion are the key modes of transmission for diseases such as tuberculosis, SARS, and influenza.[34] The airplane cabin environment, in which many people are crammed together, facilitates these methods of transmission.

Airplane cabins necessarily lack fresh air, so the air becomes stale from continuous recycling.[35] Additionally, once the recycled air in the airplane cabin becomes stale, the chance of removing droplets from

26. *See infra* notes 28–45 and accompanying text.

27. *See infra* notes 46–132 and accompanying text.

28. Londe, *supra* note 9, § 33.40.

29. *Ways Infectious Diseases Spread*, GOV'T S. AUSTL. (2012), http://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/health+topics/health+conditions+prevention+and+treatment/infectious+diseases/ways+infectious+diseases+spread.

30. *Id.*

31. *Id.* (including chickenpox, measles, and tuberculosis).

32. *Id.* (including the common cold, influenza, meningococcal disease, and rubella).

33. *Id.* (including chickenpox, herpes, conjunctivitis, head lice, ringworm, scabies, warts, and impetigo spread through direct or indirect bodily contact).

34. Y. Li et al., *Role of Ventilation in Airborne Transmission of Infectious Agents in the Built Environment—A Multidisciplinary Systematic Review*, 17 INDOOR AIR 2, 5 (2007); *see also* Ruwantissa Abeyratne, *The Spread of Tuberculosis in the Aircraft Cabin-Issues of Air Carrier Liability*, 27 TRANS. L.J. 41, 42 (2000) [hereinafter Abeyratne, *The Spread of Tuberculosis*].

35. Abeyratne, *The Spread of Tuberculosis*, *supra* note 34, at 44.

the air, which is usually accomplished by fresh air, becomes remote.[36] Because droplets in the air typically induce the spread of communicable disease, the inability to remove the droplets in recycled airplane air increases the chances of communicable diseases transmittal to passengers.[37] Notably, large commercial aircrafts typically recirculate fifty percent of the air delivered to passengers.[38] The recirculated air passes through high efficiency particulate air (HEPA) filters before being re-introduced to the cabin.[39] The filters are designed to capture dust, vapors, and bacteria.[40] The standard of efficiency by which HEPA filters are measured is the rate at which a filter removes 0.3 micron-diameter particles.[41] Viruses range in size from 0.01 to .3 microns, so consequently, many viruses are outside of the optimal-zone-for-capture by a HEPA filter.[42] Further, the air filtration system cannot protect passengers who "are seated within a few feet of a coughing, sneezing, virus-spewing passenger."[43] Due to the ease with which communicable diseases can spread, communicable diseases have earned the old maxim, "diseases know no borders."[44] This saying is even more true when applied to air travel,[45] thus it is necessary for governments to develop infrastructure to help prevent disease transmission via air travel.

B. Legal Framework for Communicable Disease Prevention in Air Travel

Given the perilous nature of communicable diseases, governments and international organizations around the world have promulgated procedures and regulations to prevent the spread of disease.[46] This

36. *Id.*

37. *Id.* at 44. Martin Hocking, a chemist at the University of Victoria in Canada, "determined that airplane passenger transmission rates for colds were found to be 113 times the normal ground level transmission rates . . . [due to] dry cabin air . . . . The lack of humidity in the airplane cabin allegedly prevents the proper functioning of the nature human defense system in fighting viruses and bacteria." Clegg, *supra* note 12, at 452.

38. Alexandra Mangili & Mark A. Gendreau, *Transmission of Infectious Diseases During Commercial Air Travel*, 365 LANCET 989, 989 (2005).

39. *Id.* at 989–90.

40. *Id.* at 990.

41. James D. Miller, *Defensive Filtration*, ASHREA J., Dec. 2002, at 18, 22.

42. *Id.* at 18. As a point of reference for how small viruses truly are, "the period at the end of this sentence is approximately 300 microns in diameter." *Id.*

43. Martin, *supra* note 4.

44. *See generally CDC Works 24/7 Around the Globe Because Diseases Know No Borders*, CTR. FOR DISEASE CONTROL & PREVENTION, http://www.cdc.gov/about/pdf/facts/cdcfastfacts/global-health-impact-factsheet.pdf (last visited Jan. 14, 2017).

45. *See* Mangili & Gendreau, *supra* note 38, at 989.

46. *See* Obijiofor Aginam, *International Law and Communicable Diseases*, 80 BULL. W.H.O. 946, 947 (2002), http://www.who.int/bulletin/archives/80(12)946.pdf.

Part addresses the framework of the international, federal, and state legal efforts to combat the spread of communicable diseases.

1. International Health Regulations[47]

The International Health Regulations (IHR) are a set of voluntary principles that legally bind World Health Organization (WHO) member states[48] and attempt to create norms for handling medical and health issues.[49] The IHR require that aircrafts be disinfected, decontaminated, and de-ratted in order to ensure safe, sanitary conditions during travel.[50] It also allows member states to require medical documentation, such as an international certificate of vaccination,[51] from passengers prior to entry into the state.[52] In the event that a traveler is suspected of carrying a disease, the receiving state may hold the passenger for non-invasive tests, observation, quarantine, medical treatment, or altogether deny the passenger entry to the state.[53] The IHR are similar to the United States' federal regulations for controlling communicable diseases.

2. Federal Regulation to Prevent Spread of Communicable Diseases

The United States government, at both the federal and state level, has the duty to prevent the spread of communicable disease, as public health is vital for a flourishing society.[54] The federal government satisfies its duty primarily through the power to impose quarantines[55] for

47. As this Comment does not focus on the international aspect of communicable diseases in air travel, only a short description of the international regulations will be offered to provide useful context to the international problem.

48. The WHO is a specialized agency within the United Nations whose primary role is to direct and coordinate international health. *About WHO*, W.H.O., http://www.who.int/about/en/ (last visited Jan. 14, 2017). The WHO consists of 194 member states, including the United States. *Countries*, W.H.O., http://www.who.int/countries/en/ (last visited Jan. 14, 2017).

49. *See* INT'L HEALTH REGULATIONS art. 2 (W.H.O. 2005), http://apps.who.int/iris/bitstream/10665/43883/1/9789241580410_eng.pdf; *see also* Alexandra R. Harrington, *Germs on a Plane!: Legal Protections Afforded to International Air Travelers and Governments in the Event of a Suspected or Actual Contagious Passenger and Proposals to Strengthen Them*, 22 J.L. & HEALTH 295, 304 (2009).

50. INT'L HEALTH REGULATIONS art. 22. Although the IHR requires aircrafts to be disinfected and decontaminated, the IHR is silent as to frequency at which this must occur. *Id.*

51. *Id.* art. 2.

52. *Id.* art. 31.

53. *Id.* art. 18.

54. *What Is Public Health?*, AM. PUB. HEALTH ASSOC., https://www.apha.org/what-is-public-health (last visited Jan. 14, 2017).

55. Quarantine is different from isolation. Quarantine separates and restricts the movement of *healthy* persons who may have been exposed to a communicable disease, but do not show symptoms, while isolation restricts the movement of *ill* persons by separating them from those who are well. *See* CTR. FOR DISEASE CONTROL & PREVENTION, FACT SHEET: LEGAL AUTHORI-

interstate and foreign traffic,[56] and providing support and guidance to the states through various federal agencies.[57] The traditional role of public health agencies is to exercise discrete powers[58] such as injury prevention,[59] surveillance,[60] and infectious disease control.[61] This subpart explains (1) the federal power to quarantine, and (2) details the ways in which the federal government provides support and guidance to state communicable disease prevention efforts.

a. The Federal Power to Quarantine

Quarantine, an early method of disease prevention, was utilized under English common law, which recognized the right of the state to limit the movement of infected individuals.[62] The American colonies adopted the English law, imposing quarantines as early as 1647.[63] Early American courts considered public health a fundamental state duty:

> It is a well-recognized principle that it is one of the first duties of a state to take all necessary steps for the promotion and protection of the health and comfort of its inhabitants. The preservation of the public health is universally conceded to be one of the duties devolving upon the state as a sovereignty . . . .[64]

While the power to quarantine largely falls under the state police power, the federal government has the authority to quarantine as well.[65] The federal government's power to quarantine expanded as

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TIES FOR ISOLATION AND QUARANTINE (2015), http://www.cdc.gov/quarantine/pdf/legal-authorities-isolation-quarantine.pdf.

56. 42 U.S.C. §§ 264–272 (2012); 42 C.F.R. §§ 70–71 (2016).

57. Lea Ann Fracasso, Comment, *Developing Immunity: The Challenges in Mandating Vaccinations in the Wake of a Biological Terrorist Attack*, 13 DEPAUL J. HEALTH CARE L. 1, 15 (2010). These agencies include the Centers for Disease Control and Prevention, and the National Institutes of Health, which operate under the auspices of the United States Department of Health and Human Services. *Id.* at 16.

58. Lawrence O. Gostin, *A Theory and Definition of Public Health*, *in* PUBLIC HEALTH LAW: POWER, DUTY, RESTRAINT 39 (2008).

59. Federal health agencies prevent injuries by ensuring consumers use safe products. *Id.*

60. Federal health agencies conduct surveillance through screening and reporting. *Id.*

61. Federal health agencies control infectious diseases through vaccination, partner notification, and quarantine. *Id.*

62. 1 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAWS OF ENGLAND 161–62 (discussing the state's right to confine infected individuals in their home or aboard arriving ships for forty days).

63. RALPH CHESTER WILLIAMS, THE UNITED STATES PUBLIC HEALTH SERVICE, 1798–1950, at 64–65 (1951).

64. Application of Halko, 54 Cal. Rptr. 661 (Ct. App. 1966) (citing Lausen v. Bd. of Supervisors, 214 N.W. 682, 684 (1927)).

65. Margaret M. Corley, Comment, *Disease or Deprivation: The State's Authority to Quarantine, Depriving the Individual of His Constitutional Liberty, in the Shadow of H1N1*, Apr. 2010, at 22.

the result of the 1893 decision out of the Western District of Michigan, *Minneapolis, Saint Paul v. Milner*,[66] in which the Court allowed the federal government to impose restrictions on immigration as part of efforts to prevent the spread of communicable diseases.[67]

Since then, Congress has increased the federal government's ability to enforce quarantine laws without deference to state law[68] through the enactment of Title 42, section 264 of the United States Code.[69] This section enables the Surgeon General, with the approval of the Secretary of Health and Human Services (HHS), to make and enforce regulations that she believes "are necessary to prevent the introduction, transmission, or spread of communicable diseases."[70] The Secretary of HHS, in consultation with the Surgeon General, may recommend that the President apprehend or detain individuals for the purpose of preventing the spread of communicable diseases.[71] Through these Executive Orders, the federal government determines when it may apprehend or detain individuals infected with specific diseases.[72] For example, in April 2005, President George W. Bush signed Executive Order 13,375 to include "influenza caused by novel or reemergent influenza viruses" as a quarantinable disease.[73] Additionally, Title 42 of the United States Code allows the Surgeon General to require bills of health for air navigation and aircrafts.[74] The federal quarantine power enables the federal government to act on its own; however, the federal government often acts in conjunction with the states by providing support and guidance.

b. Federal Support and Guidance for State Prevention Efforts

By way of guidance and support, HHS handles the majority of federal health planning and policy, and it tasks the umbrella agencies, the Center for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH), with researching and developing policies for disease prevention.[75] HHS is authorized to collect morbidity data

66. Minneapolis, St. P. & S. S. M. Ry. Co. v. Milner, 57 F. 276 (W.D. Mich. 1893) (per curiam).

67. *Id.* The state maintained the power to detain passengers from uninfected countries despite the inconvenience resulting to the emigrants. *Id*.

68. Katherine Vanderhook, A History of Federal Control of Communicable Diseases: Section 361 of the Public Health Service Act 38 (2002) (unpublished Third Year Paper, Harvard Law School), https://dash.harvard.edu/bitstream/handle/1/8852098/vanderhook2.pdf?sequence=2.

69. 42 U.S.C. § 264 (2012).

70. *Id*. § 264(a).

71. *Id*. § 264(b).

72. *Id.*

73. Exec. Order 13, 375, 70 Fed. Reg. 17,299 (Apr. 1, 2005).

74. 42 U.S.C. § 270 (2012).

75. Fracasso, *supra* note 57, at 16.

from state and local public health authorities throughout the United States for use in quarantine measures.[76] The CDC tabulates and disseminates morbidity data collected from the states[77] via the National Notifiable Disease Surveillance System (NNDSS).[78] The NNDSS is a nationwide collaboration that enables all levels of public health agencies to share disease related health information in order to monitor, control, and prevent the occurrence and spread of communicable diseases.[79] The NNDSS utilizes the disease-surveillance data[80] to identify and track cases of disease.[81] This capability allows the NNDSS to determine appropriate interventions to limit the spread and severity of the disease.[82]

In addition to tabulating and tracking disease information, the CDC, in conjunction with the United States Department of Homeland Security (DHS), manage the public health do not board list (DNB).[83] The DNB list may prevent individuals from boarding an aircraft that has a point of origin or final destination within the United States, thus restricting international and domestic travel.[84] Once public health authorities determine that an individual meets one of the four qualifying criteria[85] for placement on the DNB list, the individual is not permit-

76. *Mandatory Reporting of Infectious Diseases by Clinicians*, CTR. FOR DISEASE CONTROL & PREVENTION MMWR RECOMMENDATIONS & REPORTS, June 22, 1990.

77. Morbidity measures the prevalence of an illness in a population. *See Basic Statistics: About Incidence, Prevalence, Morbidity, and Mortality – Statistics Teaching Tools*, N.Y. DEP'T HEALTH (Apr. 1999), https://www.health.ny.gov/diseases/chronic/basicstat.htm.

78. *Mandatory Reporting of Infectious Diseases by Clinicians*, *supra* note 76. The NNDSS is a "passive surveillance system" that reports on all diseases under national surveillance. Sandra W. Roush, *Enhancing Surveillance*, *in* MANUAL FOR THE SURVEILLANCE OF VACCINE-PREVENTABLE DISEASES 19-1 (5th ed. 2011).

79. *National Notifiable Diseases Surveillance System (NNDSS)*, CTR. FOR DISEASE CONTROL & PREVENTION (Aug. 19, 2015), http://www.cdc.gov/nndss/ [hereinafter *NNDSS*].

80. Disease surveillance data is dependent on complete and accurate reporting. *See* Roush, *supra* note 78, at 19-1. Detailed and accurate clinical information, such as the date that symptoms presented, symptoms duration, and laboratory results, can be aggregated by disease to study the disease trends, incidence, and prevalence. *Id.* at 19-2.

81. *NNDSS*, *supra* note 79.

82. *Id.*

83. *Federal Air Travel Restrictions for Public Health Purposes—United States, June 2007—May 2008*, 57 CTR. FOR DISEASE CONTROL & PREVENTION: MORBIDITY & MORTALITY WEEKLY REP. 1009, 1009 (2008). The creation of the DNB list is authorized pursuant the Public Health Service Act, 42 U.S.C. §§ 264–265 (2012). *See* 80 Fed. Reg. 16,400–01 (Mar. 27, 2015).

84. *Questions and Answers About the Federal Register Notice*, *supra* note 16.

85. To be placed on the DNB,

> a person must: (1) be known or believed to be infectious with, or at risk for a serious contagious disease that poses a public health threat to others during travel; and (2) not be aware of his or her diagnosis, have been told about the diagnosis and not be following public health recommendations, or be unable to be located; or (3) be likely to travel on a commercial airplane into, through, or from the United States or travel internation-

ted to fly until he or she is no longer contagious.[86] The DNB is typically used to prevent individuals with contagious tuberculosis, measles, and Ebola from boarding planes;[87] however, individuals with other communicable diseases may be prohibited from flying.[88] The analysis of the DNB list in Part III compares the existing federal mechanism to Alexandra Harrington's no-fly list and the proposed No-Fly Database. Beyond these few federal mechanisms, the federal government leaves issues of public health largely to the states, which utilize varied models to enforce public health laws.[89]

3. State Regulation to Prevent the Spread of Communicable Diseases

State governments are tasked with safeguarding public health, while the federal government provides guidance and support through multiple federal agencies.[90] Common to each state model is the desire to bolster the prevention of communicable diseases.[91] This subpart addresses (a) the mandatory reporting of communicable diseases; (b) the state regulation of vaccinations; and (c) the state criminalization for the willful transmission of a communicable disease.

a. Mandated Disease Reporting

Common to all state public health laws is the mandatory reporting of communicable diseases to public health officers.[92] There are slight variations in the diseases to be reported, to whom the disease must be reported, and the timeframe in which the report must be made.[93] For example, California requires every mandated reporter to immediately report, within twenty-four hours to the state Department of Health

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ally by any means; or (4) need to be placed on the DNB and Lookout list to respond to a public health outbreak or to help enforce a public health order.

Id.

86. *Id.*

87. *Id.*

88. *See Federal Air Travel Restrictions for Public Health*, *supra* note 83 (noting that the "public health DNB list is not limited to those communicable diseases for which the federal government can legally impose quarantine").

89. Ariel R. Schwartz, *Doubtful Duty: Physicians' Legal Obligation to Treat During an Epidemic*, 60 STAN. L. REV. 657, 683 (2007) (stating that "the federal government's role . . . is primarily to advise and support state and local governments").

90. Fracasso, *supra* note 57, at 15.

91. *See generally* CAL. HEALTH & SAFETY CODE §§ 120130, 120175 (West 2015); 20 ILL. COMP. STAT. 2305/2–2.1 (2014); 745 ILL. COMP. STAT. 45/1 (2014); N.H. REV. STAT. ANN. § 141-C:7 (2015); TEX. HEALTH & SAFETY CODE § 81.042 (2015).

92. *See, e.g.*, *supra* note 91 and accompanying text.

93. *Compare* ILL. ADMIN. CODE tit. 77, § 690.200 (2015), *with* N.H. REV. STAT. ANN. § 141-C:7, *and* TEX. HEALTH & SAFETY CODE § 81.042.

Services, every discovered, known, or suspected case of a communicable disease.[94] In comparison, New Hampshire only provides that if a mandated reporter becomes aware that an individual is afflicted with a communicable disease, then the mandated reporter must report to the state Department of Health Commissioner.[95] In the event that a mandated reporter fails to report the disease, then the individual may be guilty of a misdemeanor[96] punishable, in some jurisdictions, by a fine ranging from $50 to $1,000.[97] The reported data is aggregated and submitted to the CDC.[98] The importance of mandatory reporting cannot be understated because surveillance systems, such as the NNDSS, depend upon this information.[99] Many of the diseases upon which the NNDSS conducts surveillance are preventable by vaccines; however, as the next subpart will explain, diseases have the ability to genetically mutate into new, stronger strains of the disease that necessitate constant surveillance.

b. Vaccines: History and the Law

The development of vaccines[100] to fight against life-threatening diseases was a remarkable breakthrough in science, and has been considered one of the greatest medical advancements in the past hundred years.[101] This subpart provides a background for understanding how vaccines prevent disease and how states prevent communicable diseases through vaccination mandates.[102]

94. CAL. HEALTH & SAFETY CODE § 120190.

95. N.H. REV. STAT. ANN. § 141-C:7.

96. *See* CAL. HEALTH & SAFETY CODE §120295 (2015); N.H. REV. STAT. ANN. § 141-C:21 (2015); TEX. HEALTH & SAFETY CODE § 81.049.

97. CAL. HEALTH & SAFETY CODE §120295.

98. *Mandatory Reporting of Infectious Diseases by Clinicians*, *supra* note 76.

99. W.H.O., COMMUNICABLE DISEASE SURVEILLANCE AND RESPONSE SYSTEM: GUIDE TO MONITORING AND EVALUATING 2 (2006), http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf.

100. Vaccines imitate an infection to teach the body how to defeat a particular virus so that the body is left with a memory of how to fight the virus in the future. CTR. FOR DISEASE CONTROL & PREVENTION, UNDERSTANDING HOW VACCINES WORK (2013), https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf.

101. Asif Doja, *Genetics and the Myth of Vaccine Encephalopathy*, PAEDIATRICS & CHILD HEALTH, Sept. 2008, at 597.

102. This subpart does not focus on whether mandatory vaccination would resolve the issue of communicable disease spread via air travel because it is too large of a topic to tackle in this Comment.

i. Vaccines "eradicated" communicable diseases

Infectious diseases were a leading cause of death until the beginning of the twentieth century.[103] Diseases such as smallpox, the bubonic plague, polio, diphtheria, tuberculosis and measles claimed thousands of lives.[104] Today, the occurrence of many of these illnesses has drastically reduced due to the success of vaccinations.[105] The benefits have been remarkable, as millions of deaths have been prevented, millions of lives have been improved, and billions of dollars of societal resources have been saved for other uses.[106] Vaccinations have been so successful that decreased attention is paid to immunizations; this is partially because most people alive today never saw the devastation disease had on their ancestors.[107]

Although communicable diseases had been mostly eradicated through the use of vaccinations and antibiotics, communicable diseases have shown a tenacious ability to adapt, re-adapt, and survive by mutating into a new pathogenic form for which the public generally has no immunity.[108] This phenomenon is known as diseases becoming "drug resistant."[109] The "emergence of drug resistance in many organisms is reversing some of the therapeutic miracles of the last 50 years,"[110] causing scientists to worry about these "new" communicable diseases, as they have the potential for global reach and devasta-

103. *Achievements in Public Health, 1900–1999 Impact of Vaccines Recommended for Children – United States, 1990–1998*, 48 CTR. FOR DISEASE CONTROL & PREVENTION: MORBIDITY & MORTALITY WEEKLY REP. 243, 243–44 (1999).

104. *Id.*

105. Steve P. Calandrillo, *Vanishing Vaccinations: Why Are So Many Americans Opting Out of Vaccinating Their Children?*, 37 U. MICH. J.L. REFORM 353, 362 (2004).

106. *Id.* at 369.

107. *Id.* at 362.

108. Peter N. Fonkwo, *Pricing Infectious Disease*, 9 EMBO REPS. S13, S13 (2008). It is important to note that antibiotics, which are medicines used to prevent and treat bacterial infections, greatly reduced the rate of infection for many communicable diseases in the mid-1900s. *Achievements in Public Health, 1900–1999: Control of Infectious Diseases*, 48 CTR. FOR DISEASE CONTROL & PREVENTION: MORBIDITY & MORTALITY WEEKLY REP. 621, 621–22 (1999). Such widespread use of antibiotics has, however, led to antibiotic resistance. *Antibiotic Resistance*, W.H.O. (Oct. 2016), http://www.who.int/mediacentre/factsheets/antibiotic-resistance/en/. Antibiotic resistance makes it increasingly difficult to effectively treat infections because the bacteria have adapted to antibiotics designed to kill them. *Id.* For a more robust discussion of antibiotic resistance, see generally C. Lee Ventola, *The Antibiotic Resistance Crisis*, 40 PHARMACY & THERAPEUTICS 277 (Apr. 2015), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4378521/.

109. Drug resistance is the "ability of microbes, such as bacteria [and] viruses . . . to grow in the presence of a chemical (drug) that would normally kill it or limits its growth." *What Is Drug Resistance?*, NAT'L INST. ALLERGY & INFECTIOUS DISEASES (Feb. 18, 2009), https://www.niaid.nih.gov/research/what-drug-resistance.

110. AON RISK SERVS., INFECTIOUS DISEASES, *supra* note 19, at 5.

tion.[111] For example, the tuberculosis virus[112] cannot be prevented by vaccine and has genetically adapted to become multidrug-resistant[113] and extensively drug-resistant[114] to the traditional drugs used to treat tuberculosis.[115] These mutated viruses are essentially new diseases for which individuals have no immunity or prior exposure via a vaccine;[116] therefore, the mutated virus has the potential to trigger an epidemic.[117]

Vaccinations clearly play a vital role in preventing the spread of communicable diseases. Due to their prominence in public health, many state governments and the federal government have implemented legal frameworks that regulate and mandate vaccinations.

ii. The Fundamentals of Vaccination Law

In the landmark case *Jacobson v. Massachusetts*,[118] the U.S. Supreme Court held that state police power allowed states to protect public health by requiring all citizens receive a smallpox vaccina-

111. Polly Price, *Symposium: Teaching Public Health Law: Public Health Control Measures in Response to Global Pandemics and Drug Resistance*, 43 J.L. MED. & ETHICS 40, 50 (2015).

112. Tuberculosis is a commonly contracted disease that can have devastating effects, including death. *Infectious and Chronic Diseases*, U.S. DEP'T STATE, http://www.state.gov/e/oes/intlhealthbiodefense/id/ (last visited Jan. 14, 2017). Tuberculosis spreads similarly to influenza (i.e., through person-to-person contact). *See* Harrington, *supra* note 49, at 302. A person with active tuberculosis can spread the disease by coughing, sneezing, or speaking. Corley, *supra* note 65, at 26.

113. Multidrug-resistant tuberculosis is caused by strains resistant to rifampicin and isoniazid, two kinds of drugs used to treat tuberculosis. Gunar Gunther, *Multidrug-Resistant and Extensively Drug-Resistant Tuberculosis: A Review of Current Concepts and Future Challenges*, 14 CLINICAL MED. 279, 280 (2014). Gunar Gunther, consultant physician for the Division of Clinical Infectious Diseases at the Research Center Borstel in Borstel, Germany, notes that multidrug-resistant TB strains "are being actively transmitted from person to person with increasing frequency." *Id.* at 279.

114. Extensively drug resistant tuberculosis is a rare type of multidrug-resistant tuberculosis that is resistant to the most potent tuberculosis drugs—rifampicin, isoniazid, injectable agents (i.e., amikacin, kanamycin, and capreomycin), and fluoroquinolones. *Id.* at 279–80. The treatment options for extensively drug-resistant tuberculosis are less effective and much more expensive. *See Fact Sheet: Extensively Drug-Resistant Tuberculosis (XDR TB)*, CTR. FOR DISEASE CONTROL & PREVENTION (May 4, 2016), https://www.cdc.gov/tb/publications/factsheets/drtb/xdrtb.htm.

115. *See Drug Resistant TB*, CTR. FOR DISEASE CONTROL & PREVENTION (Oct. 15, 2015), http://www.cdc.gov/tb/topic/drtb/.

116. Vaccine formulations must be updated for the virus strains; therefore, pharmaceutical companies must essentially develop new vaccines every time a new virus strain arises. *See* Petra Oyston & Karen Robinson, *The Current Challenges for Vaccine Development*, 61 J. MED. MICROBIOLOGY 889, 890 (2012) ("[V]accines may be strain-specific, requiring a multivalent formulation which is changed frequently.").

117. *What Would Happen If We Stopped Vaccination?*, CTR. FOR DISEASE CONTROL & PREVENTION (May 19, 2014), http://www.cdc.gov/vaccines/vac-gen/whatifstop.htm.

118. 197 U.S. 11 (1905).

tion.[119] The defendant, Jacobson, claimed the Massachusetts law mandating smallpox vaccinations[120] was an unreasonable invasion of his person liberty.[121] The Court acknowledged that individual liberty interests prevent state intrusion in some instances, but individual rights themselves cannot intrude upon other people's rights as they pertain to health.[122] Thus, when health concerns of the larger community are at stake, the state may infringe upon individual rights.[123] Nearly two decades following the *Jacobson* decision, in *Zucht v. King*,[124] the U.S. Supreme Court reiterated that the power to compel vaccination is within the state's policy power, by upholding the idea that a state may exclude children from school for failing to present proof of vaccination.[125] In both *Jacobson* and *Zucht*, the U.S. Supreme Court refused to interfere with the states' police power unless the execution of such power was unreasonable.[126]

Today, all fifty states have enacted compulsory vaccination laws,[127] in part due to the health and welfare benefits made possible by vaccines.[128] However, each state may determine the nature and stringency[129] of its vaccination laws.[130] Illinois' Communicable Disease Prevention Act, section 315/1 states, "it is declared to be the public policy of this State that all children shall be protected . . . by the appropriate vaccines and immunizing procedures to prevent communicable diseases . . . ."[131] Despite regulation at the international, federal, and state levels, communicable diseases continue to spread via air

119. *Id.* at 39.

120. *Id.* at 28–29.

121. *Id.* at 26.

122. *Id.*

123. *Id.*

124. 260 U.S. 174 (1922).

125. *Id*. at 177.

126. *Jacobson*, 197 U.S. at 28; *Zucht*, 260 U.S. at 176–77.

127. Calandrillo, *supra* note 105, at 381–82.

128. *Id.* at 381.

129. Despite the benefits of vaccination mandates, many states provide exemptions for individuals who do not want to vaccinate. Tara Sheoran, Note, *Herding Immunity: Can Public Health Fight Off Disease Using Canada's Voluntary Vaccination System?*, 20 CARDOZO J. INT'L & COMP. L. 785, 794–95 (2012). Many parents choose not to vaccinate their children for fear that the vaccines do more harm than good. *See* Calandrillo, *supra* note 105, at 359. Depending on which state law is conferred, individuals are granted vaccination exemptions for (1) medical opposition; (2) religious opposition; and (3) non-religious moral or philosophic opposition. Sheoran, *supra* note 129, at 794.

130. Sheoran, *supra* note 129, at 786.

131. 410 ILL. COMP. STAT. 315/1 (2014).

travel.[132] The following proposed solutions will help prevent disease transmission aboard an aircraft.

III. Analysis

The problem with applying federal quarantine laws and state criminalization statutes to air travel is the presumption that an outbreak will be readily observable and identifiable before or during air travel.[133] Public health law, broadly, is the authority for, and responsibility of, organized society to ensure the optimal environment for the population's health.[134] The law can empower innovative solutions via seven models: "taxation and spending, alteration of the informational environment, alteration of the built environment, alteration of the socioeconomic environment, direct regulation, indirect regulation through the tort system, and deregulation."[135]

This Comment proposes two solutions to address the fragmented system for controlling communicable disease transmission by utilizing (1) direct regulation and (2) indirect regulation models.[136] Part A highlights the numerous incidents of communicable disease spread via air travel and the toll such outbreaks have.[137] Part B analyzes the direct regulation methods utilized by the federal government and proposes implementing the No-Fly Database to improve surveillance and prevent further spread of communicable diseases.[138] Part C analyzes the indirect regulation through the tort system and advocates for imposing liability upon the individual who transmits a communicable disease to fellow passengers.[139]

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132. It would be unrealistic to claim the solutions proposed in this Comment will totally prevent disease transmission aboard an aircraft, but the author believes that the changes proposed in this Comment will substantially decrease the risk of transmitting diseases by air travel.

133. Harrington, *supra* note 49, at 312.

134. Erika Blacksher, *Public Health Ethics*, U. Wash. Sch. Medicine, https://depts.washington.edu/bioethx/topics/public.html (last visited Jan. 15, 2017).

135. Gostin, *supra* note 58, at 28–29.

136. *Id.* at 29. The informational environment may be altered by educating and encouraging the public to make healthy choices through communication campaigns, requiring businesses to properly label their products or government regulation of misleading information. *Id.* at 32. The built environment may be altered by reducing injury (e.g., workplace safety and fire codes), communicable diseases (e.g., sanitation, zoning, housing codes), and environmental harms (e.g., lead paint and toxic emissions). *Id.* at 34.

137. *See infra* notes 140–73 and accompanying text.

138. *See infra* notes 174–255 and accompanying text.

139. *See infra* notes 256–332 and accompanying text.

A. Numerous Incidents of Communicable Disease Spread Via Air Travel

In early 2003, the WHO announced the re-emergence of severe acute respiratory syndrome (SARS).[140] Within a few days of the outbreak, it became clear that the disease was spreading by air travel along major airline routes.[141] The outbreak began in China when an infected physician traveled to Hong Kong.[142] The physician stayed in a hotel and subsequently infected at least sixteen hotel guests who stayed on the same floor as the physician.[143] Those guests returned home and spread the disease to Vietnam, Singapore, and Canada.[144] The passengers within three rows of the infected individuals were most at risk.[145] "On one flight, it was thought that one infected passenger likely transmitted SARS to 22 out of 119 passengers on board."[146] The outbreak resulted in 2,223 suspected cases in eighteen countries.[147]

More recently, in April 2015, a woman infected with a highly drug resistant form of tuberculosis flew from India to Chicago, Illinois.[148] Upon arriving in Chicago, the woman traveled to Missouri, Tennessee, and then returned to Chicago.[149] She finally sought medical treatment in Chicago, nearly seven weeks after landing in the United States.[150]

Perhaps the most memorable incident of a communicable disease being transmitted through air travel occurred with the "tuberculosis traveler" incident in May 2007.[151] Andrew Speaker, a thirty-one-year-old personal injury lawyer from Atlanta, Georgia, took several international flights while infected with a rare, highly drug-resistant form of tuberculosis.[152] Mr. Speaker was aware at the time of his flights

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140. W.H.O., THE WORLD HEALTH REPORT 2003: SHAPING THE FUTURE 73 (2003), http://www.who.int/whr/2003/en/whr03_en.pdf?ua=1.

141. *Id.*

142. *Id.*

143. *Id.* at 74–75.

144. Clegg, *supra* note 12, at 440.

145. *Air Travel 'Fuelled SARS Spread*,' BBC NEWS (Dec. 17, 2003, 11:56 PM), http://news.bbc.co.uk/2/hi/asia-pacific/3329483.stm.

146. Clegg, *supra* note 12, at 440.

147. Abeyratne, *International Responsibility*, *supra* note 6, at 58.

148. Denise Grady, *Tuberculosis Case Prompts Search for Patient's Fellow Passengers*, N.Y. TIMES (June 8, 2015), http://www.nytimes.com/2015/06/09/science/tuberculosis-case-prompts-search-for-patients-fellow-airline-passengers.html?_r=0.

149. *Id.*

150. *Id.*

151. *U.S. Steps Up Precautions over TB*, BBC NEWS (May 30, 2007, 9:21 PM), http://news.bbc.co.uk/2/hi/americas/6706437.stm.

152. *See id.*; *see also* Eve Conant, *TB Man Tells His Side of the Story*, NEWSWEEK (May 31, 2007, 8:00 PM), http://www.newsweek.com/tb-man-tells-his-side-story-100883. Tuberculosis af-

that he was infected with a rare form of tuberculosis, as he had been diagnosed three months prior.[153] Mr. Speaker's local public health agency informed him that traveling was against medical advice;[154] however, Mr. Speaker did not believe he was sick enough to infect others, so he disregarded public health officials' warnings.[155]

While in Italy, Mr. Speaker's diagnosis was altered to extensively drug-resistant tuberculosis.[156] United States health officials contacted Mr. Speaker to inform him that he should not travel and that he should voluntarily enter quarantine.[157] Instead, he boarded the plane, placing those around him at risk of contracting the rare, drug-resistant form of tuberculosis, because he believed Italy's tuberculosis treatment would not be as effective as the treatment available in the United States.[158] The general consensus is that an airplane passenger infected with tuberculosis, which is spread through the air,[159] can transmit the disease to passengers within three rows of his seat.[160] Thus, "[w]henever Speaker coughed, spoke, laughed, or sneezed, he released living virulent bacilli into the air, exposing other passengers to infection."[161] Although no passengers contracted Mr. Speaker's extensively drug-resistant tuberculosis, the event prompted public outcry against the actions of the tuberculosis traveler, who disregarded the warnings of officials and placed fellow passengers at risk of contracting the disease.[162]

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fects individuals across a spectrum of severity. Sims, *supra* note 13, at 477. Mr. Speaker was infected with multidrug-resistant tuberculosis, which is a strain of tuberculosis that is resistant to the first line drugs used to treat all persons with tuberculosis. *See* CTR. FOR DISEASE CONTROL & PREVENTION, TB ELIMINATION: MULTIDRUG-RESISTANT TUBERCULOSIS (MDR TB) (June 7, 2012), http://www.cdc.gov/tb/publications/factsheets/drtb/mdrtb.pdf.

153. Conant, *supra* note 152.

154. Hilary Fallow, *Reforming Federal Quarantine Law in the Wake of Andrew Speaker: The "Tuberculosis Traveler,"* 25 J. CONTEMP. HEALTH L. & POL'Y 83, 84 (2008).

155. *Exclusive: TB Patient Asks for Forgiveness But Defends Travel*, ABC NEWS, http://abcnews.go.com/GMA/OnCall/story?id=3231184&page=1 (last visited Jan. 14, 2017) [hereinafter *Exclusive: TB Patient*]. Mr. Speaker maintained that officials only advised, not ordered, him not to travel. Mike McPhee, *Doubts on TB Patient's Wedding*, DENVER POST (June 1, 2007, 8:03 AM), http://www.denverpost.com/nationworld/ci_6037621.

156. Fallow, *supra* note 154, at 84. Extensively drug resistant TB is a rare type of multidrug-resistant TB that is resistant to almost all drugs used to treat TB. *See generally* CTR. FOR DISEASE CONTROL & PREVENTION, TB ELIMINATION: EXTENSIVELY DRUG-RESISTANT TUBERCULOSIS (XRD TB) (2013), http://www.cdc.gov/tb/publications/factsheets/drtb/xdrtb.pdf.

157. *Exclusive: TB Patient*, *supra* note 155.

158. Harrington, *supra* note 49, at 297.

159. Fallow, *supra* note 154, at 83

160. Harrington, *supra* note 49, at 302.

161. Fallow, *supra* note 154, at 83–84.

162. Harrington, *supra* note 49, at 296.

Following this incident, tuberculosis has emerged as a perceived public health hazard, especially because these incidents can have catastrophic consequences for any individual that contracts the disease.[163] Drug-resistant tuberculosis comprises around 1.0–1.5% of all tuberculosis cases,[164] and "requires lengthy regimens of toxic drugs, imposes high costs on the health care system and society, and causes high mortality rates."[165] Treatment for drug-resistant tuberculosis requires at least two years of expensive medications and hospitalization for approximately 75% of patients.[166] The average, direct cost of treating non-drug-resistant tuberculosis is $17,000, while drug-resistant tuberculosis treatment costs between $134,000 and $430,000.[167] Add in productivity losses and the average drug-resistant tuberculosis treatment costs between $226,000 and $554,000.[168] Suzanne Marks, an epidemiologist for the CDC's Clinical and Health Systems Research Branch,[169] found that private insurance only covers 75% of beneficiaries with drug-resistant tuberculosis for 80% of the costs.[170] Further, the resulting psychological consequences of contracting a potentially deadly communicable disease are immense. Patients infected during the 2003 SARS outbreak reported emoting fear, denial, and frustration.[171] A patient's anxiety can extend beyond the physical consequences of contracting a communicable disease to the social stigmatization.[172]

Clearly, contracting a rare form of tuberculosis—or any communicable disease—has a significant impact on both the individual and society. Marks notes that prevention opportunities are limited, and investment in disease control infrastructure, as well as the capacity to prevent disease, is critical.[173] The prevalence of disease transmission via air travel and the impact that it can have necessitate stronger regulation of the infected individuals' conduct.

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163. *Id.* at 301.

164. Suzanne Marks et al., *Treatment Practices, Outcomes, and Costs of Multidrug-Resistant and Extensively Drug-Resistant Tuberculosis, United States 2005–2007*, 20 EMERGING INFECTIOUS DISEASES 812, 812 (2014).

165. *Id.*

166. *Id.* at 818.

167. *Id.* at 817.

168. *Id.*

169. *Suzanne Marks Worked with Village Woman, Turning Small Businesses into Success Stories for Entire Families*, CTR. FOR DISEASE CONTROL & PREVENTION, http://www.cdc.gov/globalhealth/employment/suzanne-marks.htm (last updated Jan. 7, 2015).

170. Marks et al., *supra* note 164, at 817.

171. G. Pappas et al., *Psychological Consequences of Infectious Disease*, 15 CLINICAL MICROBIOLOGY & INFECTION 8, at 744 (Aug. 2009).

172. *Id.*

173. Marks et al., *supra* note 164, at 817.

B. Direct Regulation for Preventing Communicable Disease Transmission in Air Travel

The United States government has the power to directly regulate individuals and businesses.[174] "In a well-regulated society, public health authorities set clear, enforceable rules to protect the health and safety of workers, consumers, and the population at large."[175] The regulation of an individual's behavior, such as requiring passengers in a car to wear seat belts or motorcyclists to wear a helmet, reduces injuries and death.[176] Regulating infected individuals' conduct through the no-fly list and through tort liability will reduce the number of individuals who contract a communicable disease. Currently, disease prevention in air travel is inadequate because (1) the division of public health powers leads to uncoordinated approaches of handling communicable disease prevention and control; (2) disease surveillance conducted by airlines is ineffective; and (3) the current DNB is a lengthy and ineffective method for preventing infected passenger from flying. To combat the fragmented system currently in place, highly contagious individuals should be placed into the proposed specialized No-Fly Database.

1. Government Surveillance of Communicable Diseases

Governments are authorized to regulate public health.[177] One of the mechanisms utilized by the federal government to regulate public health is surveillance systems[178] designed to provide public health officials with sufficient information to prevent and combat the spread of communicable diseases.[179] Surveillance is the "systemic collection, analysis and public health response to the occurrence of infectious disease conditions in our communities" and "encompasses both the report and investigation of cases and the submission of clinical specimens when needed for testing at a . . . public health laboratory."[180] Essentially, surveillance provides government officials with data regarding when, where, and how a communicable disease outbreak occurred.[181] The keys to treating and controlling communicable

174. Gostin, *supra* note 58, at 36.

175. *Id.*

176. *Id.*

177. Aginam, *supra* note 46, at 947.

178. *See Questions and Answers About the Federal Register Notice*, *supra* note 16; *see also Federal Air Travel Restrictions for Public Health*, *supra* note 83.

179. David Fidler, *Return of the Fourth Horseman: Emerging Infectious Diseases and International Law*, 81 MINN. L. REV. 771, 827 (1997).

180. *Id.* at 823.

181. *Id*. at 827.

disease are (1) identifying the agent, (2) understanding how the disease works, (3) ascertaining how the individual was initially infected, and (4) identifying how the disease can be transmitted to other individuals.[182] Without this information, it is nearly impossible to combat or control communicable diseases.[183]

The United States utilizes the NNDSS as a surveillance system for all levels of public health.[184] Disease reporting conducted by the states is submitted to the CDC for inclusion into the NNDSS.[185] The NNDSS compiles the data to monitor and prevent the spread of disease.[186] Despite having a national communicable-disease surveillance system, the structure of the federal government weakens the ability of public health officials to act effectively.[187] The federal government's power to prevent and respond to communicable diseases is limited because states have the primary responsibility for communicable disease control.[188] For example, while the CDC provides surveillance data to state public health authorities, the CDC cannot respond to a disease outbreak unless it is invited to do so by state authorities, and the CDC cannot implement control and prevention measures outside the quarantine power because those powers belong to the states.[189] "The nature of the federal system and division of public health powers provides an 'increased likelihood of uncoordinated approaches' to multistate disease outbreaks."[190] This fragmented system creates a breeding ground for miscommunication among agencies and between the states and federal government. The miscommunication between vital actors in the public health arena leads to an uncoordinated initiative that is not integrated among the actors and thus lacks universal support.[191] To further exacerbate the problem of ineffective prevention, airlines fail to adequately monitor the health of their boarding passengers. Despite this shortcoming, the CDC's extensive surveil-

182. *Id.* at 777.

183. *Id.*

184. *See NNDSS*, *supra* note 79.

185. *See National Notifiable Disease Surveillance System (NNDSS) Data Collection and Reporting*, CTR. FOR DISEASE CONTROL & PREVENTION (May 6, 2015), https://wwwn.cdc.gov/nndss/nedss.html.

186. *NNDSS*, *supra* note 79.

187. Fidler, *supra* note 179, at 827.

188. *Id.*

189. *Id.*

190. *Id.*

191. *See generally* PATRICIA ORDONEZ DE PABLOS, GREEN TECHNOLOGIES AND BUSINESS PRACTICES: AN IT APPROACH 37 (2013) (noting that "uncoordinated initiatives do not assist . . . in gaining a competitive advantage, or make a meaningful strategic impact").

lance system for tracking communicable diseases could be extended to prevent infected individuals from boarding airplanes.[192]

2. The Ineffectiveness of Airline Disease Monitoring

Transmission of communicable diseases has become a greater litigation risk for businesses because businesses are facing private plaintiffs who have been injured.[193] Incidents in which passengers disregard their illness and thus place fellow passengers at risk raise concerns for the airline industry regarding their potential liability in the event of a communicable disease outbreak.[194] Airlines must balance the safety of their crew and passengers against the interests and rights of the passenger traveling with the communicable disease.[195] Under federal regulations, pilots act as the "master of a vessel" in charge of a conveyance of interstate traffic, and have a duty to report any case or suspicion of a communicable disease to local public health authorities.[196] Airline carriers may deny boarding, delay boarding, require a medical certificate, or impose conditions on a passenger (such as wearing a mask) if airline personnel believe the passenger with the communicable disease poses a "direct threat" to the safety and health of others.[197]

Airlines may be resistant to prevent passengers from boarding in the event that their actions violate the Air Carrier Access Act, which prohibits airlines from discriminating against a passenger with a disability.[198] Although "disability" does not include an individual infected with a communicable disease,[199] airlines may be wary to deny boarding to an infected individual if there is possibility for discrimination liability. Despite the various statutes and regulations imposing monitoring requirements, airline monitoring is not as effective as it should be given how frequently disease transmission aboard aircrafts oc-

192. The CDC already operates a do-not fly list. *See Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83. This Comment argues that the system should be modified.

193. Lindsay Wiley, *Rethinking the New Public Health*, 69 WASH. & LEE L. REV. 207, 209–10 (2012).

194. Judith R. Nemsick, *Preventing Airline Liability for Spread of Communicable Diseases*, HOLLAND & KNIGHT LLP (Dec. 2007), http://www.hklaw.com/publications/Preventing-Airline-Liability-for-Spread-of-Communicable-Diseases-12-18-2007/.

195. *Id.*

196. 42 C.F.R. § 70.4 (2016).

197. 14 C.F.R. § 382.21 (2016). A "direct threat" means "a significant risk to the health or safety of others that cannot be eliminated by a modification of policies, practices, or procedures, or by the provision of auxiliary aids or services." 14 C.F.R. § 382.3.

198. 49 U.S.C. § 41705 (2012).

199. 14 C.F.R § 382.3. A disability means "a physical or mental impairment that, on a permanent or temporary basis, substantially limits one or more major life activities, has a record of such an impairment, or is regarded as having such an impairment." *Id.*

cur.[200] Therefore, a stronger prevention method must be implemented to stop infected individuals from boarding aircrafts.

3. The "Communicable Disease No-Fly Database" as a Proposed Solution

The United States should increase surveillance and monitoring of airline passengers in order to prevent the spread of communicable disease. To combat the fragmented system currently in place, through a combined effort, the federal government and the airline companies should place highly contagious individuals into the proposed, specialized No-Fly Database. The proposed No-Fly Database is not a radical idea or expansion of authority; no-fly lists already exist for other classes, such as suspected terrorists[201] and individuals that pose a serious threat to public health.[202] Individuals with a communicable disease are generally restricted under federal regulations from traveling from one state to another during the contagion period.[203] This No-Fly Database would simply enforce this federal regulation; however, enforcement of the regulation via the DNB is ineffective and does not pass muster, as evidenced by the numerous stories of communicable diseases spreading via air travel since the DNB's inception. The proposed No-Fly Database would cure the deficiencies of the current system by streamlining the DNB list-placement process and simplify the role of airlines by only requiring that they check boarding passengers for DNB placement prior to boarding.

a. The Federal Do Not Board List

As previously stated, the CDC and DHS operate the DNB list for individuals who pose a serious threat to public health;[204] however, this mechanism for preventing the spread of communicable diseases is ineffective. First, placement on the DNB list is a rather lengthy process. It starts with a local or state public health authority notifying a CDC

200. *See Infectious Diseases on Aircraft*, EUROPEAN CTR. FOR DISEASE PREVENTION, http://ecdc.europa.eu/en/healthtopics/ragida/Pages/default.aspx (last visited Jan. 14, 2017).

201. *Terrorist Screening Center*, FBI, https://www.fbi.gov/about/leadership-and-structure/national-security-branch/tsc (last visited Jan. 14, 2017).

202. *Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83. For example, the public health DNB is only been used for passengers with suspected or confirmed cases of pulmonary tuberculosis. *Id.* Individuals infected with tuberculosis can transmit the virus through the air and remains contagious for long periods of time. *Id.*

203. 42 C.F.R. § 70.3 (2015).

204. *Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

Quarantine Station.[205] Upon receipt of the notification, the CDC and the local public health department collaborate on the case.[206] If the CDC concurs with the public health authority's determination, then the CDC officer approves the DNB placement request and forwards this information to the CDC Emergency Operations Center.[207] The Emergency Operations Center then submits the request to the HHS.[208] HHS forwards the request to the Department of Homeland Security, which notifies the Transportation Security Administration (TSA) and the United States Customs and Border Protection (CBP).[209] In 2007, the CDC placed only thirty-three individuals on the DNB list.[210] The DNB list clearly does not reach its full potential when compared to the current number of individuals on the no-fly list for suspected terrorists (approximately 16,000).[211] The federal DNB list allows domestic and international health officials to request that an individual, who meets specified criteria, be restricted from boarding a commercial flight departing from, or arriving in, the United States.[212]

In order to place an individual on the DNB list and restrict him from international travel, the individual must meet the following criteria: (1) the individual is likely be contagious with a communicable disease that would pose a serious public health threat if the individual is allowed to board the plane; (2) the individual is unaware of or will likely not adhere to public health officials' recommendations; and (3) the individual is likely to attempt to board the plane.[213] Once an individual is placed on the DNB list, the airline company is instructed not to issue a boarding pass to that individual.[214] However, the federal DNB model includes several steps before the airline ever receives that information.[215] First, the CDC complies the list of individuals restricted from boarding an airplane.[216] Then, the information is passed

205. *See generally* PETER HOUCK, CTR. FOR DISEASE CONTROL & PREVENTION, U.S. PUBLIC HEALTH TRAVEL RESTRICTION & INTERVENTION TOOLS (2011), http://www.icao.int/NACC/Documents/Meetings/2011/RAMPHT3/CAPSCA%20TRIA%20presentation.pdf.

206. *Id.*

207. *Id.*

208. *Id.*

209. *Id.*

210. *Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

211. *Terrorist Screening Center*, *supra* note 201.

212. *Id.*

213. *Federal Air Travel Restrictions for Public Health*, *supra* note 83.

214. *Id.*

215. *See Feds Maintain Public Health No-Fly List*, WBRC FOX 6 NEWS (Jan. 13, 2015, 5:50 PM), http://www.wbrc.com/story/26797831/feds-maintain-public-health-no-fly-list.

216. *Id.*

along to HHS, which in turn provides the list to the TSA.[217] Next, TSA shares the list with the airlines.[218] Finally, the airline purposely does not issue a boarding pass to individuals on the DNB list.[219] The individual is not removed from the list until public health officials determine the individual is no longer contagious.[220] The median length of time an individual remains in the DNB is twenty-six days.[221] Once an individual receives medical confirmation that he is no longer contagious, the individual is removed from the DNB list within ten[222] to twenty-four hours.[223] A new model for preventing infected individuals from boarding aircrafts is necessary as the federal DNB list is tedious and ineffective.

b. Harrington's No-Fly List

As an alternative to a federally operated DNB list, Alexandra Harrington, an attorney specializing in international law, suggested the creation of an international do-not fly list maintained by the WHO.[224] An individual would be placed on the internationally operated list if (1) the individual received a confirmed diagnosis of a communicable disease; (2) there is high suspicion that the individual has contracted a communicable disease; or (3) the individual has lived in, traveled to, or was otherwise in contact with an area of suspected or confirmed disease outbreak.[225] The individual's physician or hospital doctors would make the placement in the event that there is a confirmed or suspected diagnosis;[226] however, there is no procedure for placing an individual on the no-fly list when the individual has been in contact with an area of suspected or confirmed disease outbreak.[227]

Harrington suggests that the individual may only be removed from the database when (1) a certified medical personnel determines the individual is no longer infected with a disease; (2) the individual has been successfully treated for the disease and is no longer contagious; (3) the person demonstrates that he or she has not been in contact

217. *Id.*
218. *Id.*
219. *Federal Air Travel Restrictions for Public Health Purposes, supra* note 83.
220. *Id.*
221. *Id.*
222. HOUCK, *supra* note 205.
223. *Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.
224. Harrington, *supra* note 49, at 313.
225. *Id.*
226. *Id.*
227. The physician may ask the individual whether he or she has been in contact with any areas of suspected or confirmed disease outbreak. Then, the physician would be able to place the individual on the no-fly list.

with an area confirmed or suspected of an outbreak; and (4) the area with which the individual had contact is no longer a site of an outbreak.[228] While the extensive requirements for removal from the database are comprehensive, undoubtedly to ensure the safety of fellow passengers, the requirements are overly burdensome and inhibit an individual's right to travel.

c. The Proposed Communicable Disease No-Fly Database

The proposed No Fly Database will cure the deficiencies of the federal DNB list and Harrington's do-not fly list. Like the federal DNB list, the database will be maintained and operated by the CDC and DHS,[229] as both agencies have access to public health and public threat information.[230] Further, individuals placed on the list should be restricted from air travel domestically, as well as internationally.[231] The public health threat does not diminish simply because the individual is traveling throughout the United States.[232]

i. Diseases included on the No-Fly Database

The CDC will routinely publish and update a list of communicable diseases for which a diagnosis would result in placement on the No-Fly Database.[233] The communicable diseases which warrant placement in the No-Fly Database will not be limited to those for which the federal government can legally impose isolation and quarantine;[234]

228. *Id*.

229. *See Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83. Although the DNB list should restrict domestic and international travel, this system will be unable to monitor the travel of passengers coming to the United States from other countries. International travel arriving in the United States will have to be monitored by the departing country. Admittedly, this is one of the strengths of Harrington's model which is monitored by the WHO. *See* Harrington, *supra* note 49, at 313.

230. *See generally Disease Surveillance and Monitoring*, CTR. FOR DISEASE CONTROL & PREVENTION (Feb. 19, 2016), http://www.cdc.gov/about/pdf/facts/cdcfastfacts/disease-surveillance-factsheet.pdf; *Preventing Terrorism Results*, DEP'T HOMELAND SEC. (July 13, 2015), https://www.dhs.gov/topic/preventing-terrorism-results#.

231. While this Comment does not focus on the international aspect of communicable disease spread via air travel, such a risk exists. It would be imprudent and detrimental to international public health to only restrict domestic air travel; however, this Comment does not address the international aspect of the DNB.

232. *See Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83 ("Persons with communicable diseases who travel on commercial aircraft can pose a risk for infection to the traveling public.").

233. States already publish lists of communicable diseases for which physicians must report a diagnosis or suspected diagnosis depending upon the jurisdiction. *See, e.g.*, N.Y. COMP. CODES R. & REGS. tit. 10, § 2.1 (2016).

234. Under 42 U.S.C. § 264, the Secretary of HHS may apprehend, detain, or conditionally release persons believed to be carrying communicable diseases specified in Executive Order as

however, the federally quarantinable diseases may influence the CDC's decision on which diseases to include on the list. Instead, the predetermined diseases that warrant placement on a No-Fly Database, will be those that pose a serious public health threat.[235] Individuals infected with illnesses of a smaller degree, such as the common cold or sinus infection, will not be subject to placement in the No-Fly Database because these illnesses do not constitute a public health threat.[236] An individual will only be placed in the No-Fly Database if he receives a confirmed diagnosis of a communicable disease for which the CDC has determined warrants a placement in the No-Fly Database. Such determination will be influenced by federal quarantinable diseases list,[237] as well as the disease-surveillance data collected by the NNDSS.[238] For example, diseases for which a diagnosis would result in placement in the No-Fly Database could be epidemic-prone diseases, such as cholera, yellow fever, Ebola, epidemic meningococcal disease, SARS, or drug-resistant tuberculosis.[239] Although the Database will cast a wider net to prevent more infected individuals from traveling via air, the Database raises concerns about the deprivation of individuals' rights.

ii. Individual liberty: primary concern

Limiting an individual's liberty is a major concern for the implementation of the No-Fly Database; however, its effectiveness depends on its ability to prevent infected individuals from traveling. Therefore, the No-Fly Database proposition limits the occasions for which an individual must be placed in the No-Fly Database because it may

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quarantinable. Currently, the list of diseases eligible for isolation and/or quarantine include: cholera, diphtheria, infectious tuberculosis, plague, smallpox, yellow fever, viral hemorrhagic fevers (including Ebola and others not yet isolated or named), severe acute respiratory syndrome, and influenza. *See* Exec. Order No. 13,295, 68 Fed. Reg. 17,255 (Apr. 9, 2003), *as amended by* Exec. Order No. 13,375, 70 Fed. Reg. 17,299 (Apr. 5, 2005), *and* Exec. Order No. 13,674, 79 Fed. Reg. 45,671 (Aug. 6, 2014).

235. *See Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

236. *See generally* W.H.O., THE WORLD HEALTH REPORT 2007: A SAFER FUTURE–GLOBAL PUBLIC HEALTH THREATS IN THE 21ST CENTURY OVERVIEW 6–8 (2007), http://www.who.int/whr/2007/chapter1/en/. Illnesses that are not severe enough for which the government cannot apprehend, detain, or conditionally release should not be a basis for placement on the no-fly list.

237. The federal government has previously determined that these diseases are public health threats such that a suspected or confirmed case of a quarantinable disease warrants the deprivation of individual freedom. *See* Paul Callan, *Ebola Quarantine Is Perfectly Legal*, CNN (Oct. 6, 2014, 2:38 PM), http://www.cnn.com/2014/10/06/justice/callan-law-on-quarantine/.

238. The surveillance data will indicate which diseases are particularly contagious and likely to spread easily via air travel. *See NNDSS*, *supra* note 79.

239. *See Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

infringe on the individual liberty to choose how and when to travel.[240] On the surface, restricting an individual's ability to travel because the individual has lived in or traveled to an area with a communicable disease outbreak seems overly burdensome. Further, by predetermining which diseases warrant placement in the No-Fly Database, Harrington and the government's multiple qualifications for placement on the no-fly list[241] are no longer necessary. The proposed No-Fly Database simplifies this process. If an individual is infected with a disease that the CDC has identified as contagious, such that it poses a serious health threat, the individual is automatically placed on the list.[242] Thus, unlike Harrington's model, there is no need to consider whether the individual will adhere to public health officials' recommendations, if the individual is likely to attempt to board a plane, or if the individual has been in contact with an area with a confirmed disease outbreak in the placement determination.[243] The qualifications for placement on the DNB are clearly established, but it is important to understand how this system will actually operate.

iii. A practical application of the proposed database

Upon diagnosis of a communicable disease, the treating physician will submit the diagnosis to the No-Fly Database to automatically add the individual to the No-Fly Database.[244] The No-Fly Database will be operated by software, which airlines will be able to access to automatically cross-reference the No-Fly Database with the boarding passenger at flight check-in.[245] If any passenger checking in for a flight is

240. *See* Saenz v. Roe, 526 U.S. 489, 498 (1999) (stating the constitutional right to travel is "firmly embedded in our jurisprudence").

241. Harrington, *supra* note 49, at 313; *Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

242. To be sure, there will likely be misdiagnoses that result in placement on the DNB and thus deprivation of individual liberty. However, diagnostic technologies are continually improving. *See* Angela Caliendo et al., *Better Tests, Better Care: Improved Diagnostics for Infectious Diseases*, 57 CLINICAL INFECTIOUS DISEASES S139, S144 (2013) ("We are at the beginning of a significant transformation in diagnostics and it is critical to capitalize on the current opportunity to invest in the most needed diagnostics and enable the utilization of improved diagnostics for both clinical management and public health surveillance."). Thus, the incident rate for misdiagnosis resulting in placement on the DNB and deprivation of individual liberty will be continually decreasing and the deprivation of that individual's right to travel should be accommodated.

243. Harrington's DNB model considers these circumstances when determining whether to place an individual on the DNB list. *See* Harrington, *supra* note 49, at 313.

244. *See id*. Alexandra Harrington advocated for placing individuals on the "no-fly" list if the individual has a confirmed diagnosis or high suspicion of a communicable disease, or if the individual lived in, had traveled to, or was otherwise in contact with an area confirmed or suspected of a communicable disease outbreak. *Id.*

245. This system would be integrated with the boarding check-in such that the airline would be able to cross reference individuals flying on standby without pre-issued boarding passes.

matched in the No-Fly Database, the airline is alerted and able to prevent the passenger from boarding. Unlike the airline companies' current system of checking for visible signs of illness,[246] the database is a verifiable method for determining whether the passenger is ill, such that he should not be flying.

As Harington suggests, an individual will be removed from the database when (1) a medical professional determines that the individual is no longer contagious and submits that data to the CDC for removal from the database; or (2) the individual has been effectively treated for communicable disease and can provide proof of such treatment.[247] The government's model requires a public health official to determine that the individual is no longer contagious;[248] however, a primary care provider could just as easily determine an individual is no longer contagious.[249] Therefore, a medical confirmation by a medical professional will be sufficient for removal from the no-fly list. A "medical professional" means a physician holding a medical degree, specialized in internal medicine,[250] and having the requisite medical license for the state in which the individual practices, or a nurse practitioner holding a master's degree in nursing and having the requisite state license. In order to receive a medical confirmation, the individual must visit a medical professional to receive a recommendation that he is healthy to fly. The medical professional will submit the recommendation to the No-Fly Database for CDC review. Once the CDC confirms that the individual is healthy to fly, based on the medical professional's recommendation, the individual will be removed from the No-Fly Database. This process should also take no longer than ten to twenty-four hours from the time the recommendation is submitted to the CDC's confirmation and the subsequent removal from the system. However, it may be reasonable to provide the medical professional the option to classify the recommendation as "urgent" under certain circumstances.[251] This clearly has great potential for abuse; therefore, it should be used sparingly and only in extreme cases.

246. O'Leary, *supra* note 21, at 532.

247. Harrington, *supra* note 49, at 313.

248. *Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

249. *Infectious Disease Diagnosis*, MAYO CLINIC, http://www.mayoclinic.org/diseases-conditions/infectious-diseases/diagnosis-treatment/diagnosis/dxc-20168659 (last visited Feb. 4, 2017).

250. Internal medicine physicians, generally thought of as "family doctors," specialize in preventing, treating, and diagnosing diseases that affect adults. *About Internal Medicine*, AM. COLL. PHYSICIANS, https://www.acponline.org/about-acp/about-internal-medicine (last visited Jan. 14, 2017).

251. Whether to mark a recommendation as "urgent" would be discretionary upon the medical professional's judgment.

Undoubtedly, the No-Fly Database will inconvenience some individuals,[252] but the benefits to public health that will result from restricting air travel to uninfected or noncontagious individuals outweigh the temporary obstacles the No-Fly Database may create. This No-Fly Database will effectively prevent infected individuals from boarding the plane, thereby decreasing the risk of disease transmission onboard.[253]

A realistic consequence of the No-Fly Database is that the travel ban may deter individuals from seeking medical attention close to a scheduled flight. An individual who knows or should know that he is infected with a communicable disease may not seek medical attention to avoid being placed in the No-Fly Database.[254] To prevent this from occurring, if the infected individual boards an airplane and subsequently infects other passengers, then the infected individual should be held civilly liable for any damages that result to the other passengers.[255]

C. Indirect Regulation Through the Tort System to Prevent Communicable Disease Transmission in Air Travel

"Public health authorities and private citizens possess powerful means of indirect regulation through the tort system."[256] Civil litigation can redress many different kinds of public health harms; however, it is important to remember that litigation is not an unmitigated good.[257] The tort system imposes economic burdens on both the individual and the business.[258] Litigation is costly for the individual and

252. Harrington, *supra* note 49, at 313. Additionally, passengers living in rural areas without steady access to physicians may find it difficult to be treated prior to boarding the plane, such that they are no longer contagious or to receive medical confirmation that he or she is healthy enough to fly. Further, lower income passengers, or passengers with limited insurance coverage, may be financially burdened by the requirement that they seek medical attention for their contagious communicable disease. Although these individuals should be seeking medical attention whether they can afford it since these diseases can be deadly if untreated.

253. *Id.* at 313.

254. *See* Major Garrett, *Obama Fans Ebola Travel Fever*, CBS NEWS (Oct. 17, 2014, 6:00 AM), http://www.cbsnews.com/news/obama-fans-ebola-travel-ban-fever/.

255. To be sure, lower income passengers who travel while infected will be financially burdened if they are held liable for infecting another passenger; however, that is the risk the infected passenger runs when they fly while contagious. The recoverable damages work as a deterrent for flying while contagious and an incentive to seek medical treatment before flying.

256. Gostin, *supra* note 58, at 37.

257. *Id.*

258. *Id.*

drives up the cost of doing business.[259] For example, from 2006 to 2008, companies paid average discovery costs of $621,880 on the low end and $2,993,567 on the high end.[260] Despite the economic burdens the tort system places on litigants, infected individuals who transmit a disease while aboard an aircraft should be liable for the damages to a fellow passenger. Realistically, this method for preventing transmission of communicable diseases should only be utilized when the plaintiff has suffered large damages from the disease.[261] This Part analyzes whether the individual who transmits the communicable disease may be found liable for the damages incurred by a fellow passenger who contracts the disease while aboard the aircraft.

1. Pursuing Individual Liability for Damage Arising Out of the Disease Transmission

Plaintiffs may be inclined to hold the airline company liable for their injuries because the airline company has deeper pockets and owes a general duty to protect passengers from harm;[262] however, plaintiffs should pursue litigation against the ill passenger that spread the communicable disease. While airline companies owe a general duty of reasonable care to protect their passengers,[263] some factors may not be within the airline's control. For example, it may not be reasonably foreseeable[264] to an airline that an individual will travel while infected with a highly contagious disease despite governmental warnings.[265] In such a case, it may be fairer to sue the infected passenger that transmitted the disease rather than it would be to sue the airline. Thus far, case law does not answer the question of whether contracting a communicable disease during a flight constitutes an in-

259. LAWYERS FOR CIVIL JUSTICE ET AL., LITIGATION COST SURVEY OF MAJOR COMPANIES 4 (2010), http://www.uscourts.gov/sites/default/files/litigation_cost_survey_of_major_companies_0.pdf.

260. *Id.* at 3.

261. Establishing a threshold for damages may be necessary in order to prevent individuals from bringing lawsuits to recover minimal damages. However, this threshold may also encourage would-be defendants to fly because they know resulting damages will be too small for a potential plaintiff to pass the threshold to successfully sue.

262. *See* Price v. Canadian Airlines, 429 F. Supp. 2d 459, 464 (D.N.H. 2006); O'Leary, *supra* note 21, at 532; Nemsick, *supra* note 194.

263. *See* Bethel v. N.Y.C. Transit Auth., 92 N.Y.2d 348, 356 (1998).

264. Reasonably foreseeable risks are those "that a reasonable person would recognize while exercising 'such attention, perception of the circumstances, memory, knowledge of other pertinent matters, intelligence, and judgment as a reasonable man would have.'" David W. Barnes, *Reasonable Care in Tort Law: The Duty to Take Corrective Precautions*, 36 ARIZ. L. REV. 357, 379 (1994) (citing RESTATEMENT (SECOND) OF TORTS § 289 (AM. LAW INST. 1965)).

265. *See infra* notes 140–73 and accompanying text for the "tuberculosis traveler" story.

jury.[266] This Comment advocates that passengers should pursue the passenger who infected everyone, rather than the airline, to encourage individuals not to travel while sick.

2. Liability for the Negligent Transmission of Communicable Disease While Aboard an Aircraft

Given the hefty profits earned by airline companies,[267] infected passengers may be more inclined to pursue litigation against the airline rather than the individual. However, infected passengers who negligently transmit their diseases to fellow passengers should be responsible for the damages incurred by those who contract the disease. The infected passenger owes her fellow passengers a duty to prevent disease transmission while aboard the aircraft. Some states recognize a cause of action for intentional or negligent transmission of a communicable disease under (1) a general prima facie tort theory;[268] (2) a theory of intentional or negligent infliction of emotional distress;[269] (3) a theory of fraud, deceit, and misrepresentation;[270] or (4) a negligent communication of a communicable disease.[271] This Comment argues that there should be a specific cause of action for negligent transmission of communicable diseases while onboard an aircraft, rather than relying on these varied causes of action. This subpart focuses on establishing the elements for such cause of action.

3. Creating the Case for Negligent Transmission of Communicable Disease

Negligent conduct is generally defined as the failure or omission to act in a way as would a reasonably careful person, or acting in a way

266. O'Leary, *supra* note 21, at 532.

267. *See* Hugo Martin, *American Airlines Reports Record Profit, Again*, L.A. TIMES (Oct. 23, 2015, 11:38 AM), http://www.latimes.com/business/la-fi-american-airlines-profits-20151023-story.html; Anirban Chowdhury, *IndiGo Announces 24% Increase in Quarterly Net Profit, Biggest PBT in Ten-Year History*, ECON. TIMES (Jan. 22, 2016, 2:53 AM), http://articles.economictimes.indiatimes.com/2016-01-22/news/69989512_1_aditya-ghosh-indigo-october-december.

268. Doe v. Roe, 598 N.Y.S.2d 678, 679–80 (1993). The elements for a prima facie tort theory are the (1) the infliction of intentional harm, (2) solely to injure plaintiff without any excuse or justification, (3) resulting in special economic damage which must be specifically pleaded, and (4) by an act or series of acts that would otherwise be unlawful. *Id.* A cause of action for a prima facie tort likely would not be brought for transmission of a communicable disease while flying.

269. *Id.*

270. *Id.* Fraud, deceit, or misrepresentation may be a cause of action for a passenger infected by another contagious passenger; however, it is typically a cause of action in HIV/AIDs lawsuits. *See* Douglas Baruch, *AIDS in the Courts: Tort Liability for the Sexual Transmission of Acquired Immune Deficiency Syndrome*, 22 TORT & INS. L.J. 165, 175 (1987).

271. Kathleen K. v. Robert B., 198 Cal. Rptr. 273, 276 (Ct. App. 1984).

that a reasonably careful person would not act under the circumstances, either of which causes an invasion of another's interest.[272] Further, negligence may be found where the individual failed "to take a level of precautions commensurate with the likelihood and magnitude of the risk created by the individual's conduct."[273] Essentially, negligence refers to the individual's conduct falling below the standard established for the protection of others against a reasonable risk of harm.[274] In the context of communicable diseases, these negligence theories are applicable to individuals who carelessly expose others to disease.[275] In order to establish a cause of action for the negligent transmission of a communicable disease, the plaintiff must establish (1) that the defendant owed a duty to the plaintiff; (2) a breach of that duty; (3) a causal connection between the conduct and the resulting injury; and (4) actual damages.[276]

In *John B. v. Superior Court*,[277] a case of first impression, the Supreme Court of California noted the practical issues of imposing criminal liability for exposure.[278] Although *John B.* is a criminal case, the court's rationale for imposing liability for exposing another to a communicable disease exemplifies how and why civil liability should be extended to the infected defendant. In determining liability, the *John B* court considered (1) what duty an infected individual has to avoid transmitting the disease; (2) what level of awareness should be required; and (3) what responsibility the victim has to protect himself against infection.[279] In *John B.*, both husband and wife were HIV positive.[280] The wife filed a lawsuit[281] alleging that her husband was infected first and that he knowingly transmitted the disease to her,[282] while the husband conversely alleged that the wife infected him.[283]

The court relied on precedent established by other jurisdictions that imposed liability on individuals who harmed others by transmitting

272. Haymes v. Catholic Bishop of Chi., 243 N.E.2d 203, 205 (Ill. 1968); Krivitski v. Cramlett, 704 N.E.2d 957, 960 (Ill. App. Ct. 1998).

273. Needham v. White Labs., Inc., 847 F.2d 355, 358 (7th Cir. 1988).

274. Getson v. Edifice Lounge, Inc., 453 N.E.2d 131, 134 (Ill. Ct. App. 1983).

275. Baruch, *supra* note 270, at 174.

276. James B. Damiano, Comment, *Sexually Transmitted Diseases: A Courtroom Epidemic*, SETON HALL L. eREPOSITORY 7 (Jan. 1, 2012).

277. 137 P.3d 153 (Cal. 2006).

278. *Id*. at 159–60.

279. *Id.* at 155.

280. *Id.*

281. *Id.*

282. *Id.*

283. *John B.*, 137 P.3d at 155.

communicable diseases.[284] The court found that "to be *stricken with disease* through another's negligence is in legal contemplation as it often is in the seriousness of consequences, no different from *being struck with an automobile* through another's negligence."[285] Therefore, the typical elements of a negligence claim[286] apply when deciding liability. The court noted that other jurisdictions imposed liability when the defendant acted not only negligently,[287] but also when the defendant had actual or constructive[288] knowledge of a communicable disease.[289]

The state of California maintained an overriding public policy of preventing the spread of disease[290] that would be enhanced by imposing a duty of care on those who have reason to know they are infected.[291] Limiting liability to actual knowledge, the court stated, would have "perverse effects on the spread the virus," as people would be incentivized to avoid diagnosis and therefore the potential tort liability.[292] The court further explained that "extending liability to those with constructive knowledge of the disease. . . 'will provide at least a small incentive to other to use proper diagnostic techniques and to alter behavior and procedures so as to limit the likelihood of . . . transmission.'"[293]

a. Establishing the Duty of Care

Where there is no legal duty, there is no liability. It is critical to establish that the defendant owes a duty to the plaintiff before the defendant may be found liable for acting negligently.[294] This element of the negligent transmission claim may be harder to establish; thus,

284. *Id.* at 159.

285. *Id.* (citing Billo v. Allegheny Steel Co., 195 A. 110, 115 (Pa. 1937)).

286. Damiano, *supra* note 276, at 7.

287. *John B.*, 137 P.3d at 159.

288. "[A]ctual knowledge . . . [is] '[d]irect and clear knowledge, as distinguished from constructive knowledge' and . . . exists where a person sees something 'first hand.' Constructive knowledge is knowledge that 'one using reasonable care or diligence should have.'" Christine L. Eid, Comment, *Lawyer Liability for Aiding and Abetting Squeeze-Outs*, 34 WM. MITCHELL L. REV. 1177, 1199 (quoting BLACK'S LAW DICTIONARY 888 (8th ed. 2004)).

289. *John B.*, 137 P.3d at 160 (citing Deuschle v. Jobe, 30 S.W.3d 215, 219 (Mo. Ct. App. 2000) ("[A] person is liable if he knew or should have known that he was infected with a disease and failed to disclose or warn his sexual partner.").

290. *Id.* at 162 (citing CAL. HEALTH & SAFETY CODE § 120290 (2006)).

291. *Id.*

292. *Id.* at 161.

293. *Id.* (citing DONALD HERMANN, TORTS: PRIVATE LAWSUITS ABOUT AIDS, AIDS AND THE LAW: A GUIDE FOR THE PUBLIC 172 (1987)).

294. Eric Schulman, *Sleeping with the Enemy: Combatting the Sexual Spread of HIV-AIDS Through a Heightened Legal Duty*, 29 J. MARSHALL L. REV. 957, 968 (1996).

this subpart provides an in-depth investigation on the ways in which a duty may be established. The notion of duty is founded on the idea that every individual is responsible for exercising due care to avoid unreasonable risks of harm to others.[295] If the court finds the defendant owed a duty to the plaintiff, then the law imposes on the defendant an obligation to act with reasonable care towards the plaintiff.[296] The determination of whether a duty is owed depends on a variety of factors including:

> 1) the foreseeability, 2) degree of certainty that plaintiff suffered injury, 3) closeness of connection between defendant's conduct and injury suffered, 4) moral blame attached to defendant's conduct, 5) policy of preventing future harm, 6) extent of burden to defendant and the consequences to the community of imposing a duty to exercise care with resulting liability for breach, and 7) availability, cost, and prevalence of insurance for the risk involved.[297]

The reasonable foreseeability that an infected passenger will harm a fellow traveler will likely be a major hurdle for any plaintiff to overcome.

i. The reasonable foreseeability of negligent transmission

Unlike cases of negligent transmission of HIV/AIDS, in which the duty element may be inferred from the nature of the sexual relationship,[298] such an inference is less obvious in the case of the negligent transmission of tuberculosis, influenza, or any other airborne communicable disease.[299] The foreseeability of transmitting the disease strengthens the existence of a duty to prevent its transmission.[300]

A court may be more willing to find the infected passenger owed a duty to the rest of the passengers, or at least to those in close proximity, if the likelihood that an infected passenger will transmit his communicable disease to another passenger is relatively high.[301] The likelihood of infection depends upon the nature of the risk and how the disease is transmitted.[302] The severity of the risk,[303] the potential

295. Damiano, *supra* note 276, at 8.

296. Schulman, *supra* note 294, at 969.

297. *Id.* at 957 n.96.

298. Baruch, *supra* note 270, at 175.

299. *See id.* ("In contrast to other communicable diseases such as tuberculosis or chicken pox, AIDS is usually spread from victim to victim as the result of intimate sexual contract.").

300. Schulman, *supra* note 294, at 970.

301. *See, e.g.*, Andrews v. Cervantes, 493 F.3d 1047, 1056 (9th Cir. 2007) (finding that the plaintiff's close proximity to inmates with serious contagious diseases satisfied the "imminent danger" standard).

302. Sims, *supra* note 13, at 478. For example, H1N1 influenza is an airborne disease transmitted through droplets expelled by an infected individual and inhaled by another. *Seasonal Influ-*

magnitude of the harm,[304] and the duration that the infected individual poses a risk[305] all contribute to the likelihood that an infected passenger will transmit his communicable disease.[306] Last, the probability that a disease will be transmitted should be considered when determining the likelihood of infection.[307] Therefore, whether a defendant owes a duty to the plaintiff to not transmit a communicable disease aboard the aircraft could vary depending upon the severity of the illness.

Courts are more willing to find an occurrence foreseeable when there is a special relationship in which a person entrusts themselves to the protection of another.[308] A plaintiff suing for the negligent transmission of a communicable disease aboard an aircraft may encounter some difficulties establishing a duty when the defendant is a mere stranger;[309] however, courts in many states have held that individuals have a duty to warn in communicable disease cases.[310]

ii. The existing general duty to warn

In cases involving the knowing transmission of a communicable disease, the law is clear that an individual who knowingly exposes another to a communicable disease is liable for damages.[311] For example, in the case *Smith v. Baker*, out of the Southern District of New York, the court found the defendant liable for the negligent transmission of whooping cough.[312] In *Baker*, the defendant took his

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enza and Influenza A (H1N1), W.H.O., http://www.who.int/ith/diseases/si_iAh1n1/en/ (last visited Jan. 14, 2017).

303. Sims, *supra* note 13, at 478. For example, "[t]uberculosis is most contagious in confined areas with persons with whom extensive time is spent." *Id.*

304. *Id.*

305. For example, individuals infected with H1N1 have a shorter contagion period than individual infected with tuberculosis. *Id.*

306. *Id.* at 477–78.

307. *Id.* at 479.

308. Schulman, *supra* note 294, at 970.

309. While DNA fingerprinting can identify the disease strain, it may be difficult for a plaintiff to establish a special relationship if the defendant is simply a stranger on the airplane.

310. *See* Schulman, *supra* note 294, at n.107.

311. *See, e.g.*, Smith v. Baker, 20 F. 709, 710 (S.D.N.Y. 1884) (holding defendant liable for the negligent transmission of whooping cough); Gilbert v. Hoffman, 23 N.W. 632, 634 (Iowa 1885) (finding hotel inn-keeper negligent for allowing guests to frequent hotel with knowledge of the presence of smallpox); Hendricks v. Butcher, 129 S.W. 431, 432 (Mo. Ct. App. 1910) (ruling that a person afflicted with typhoid fever has the duty to act in a manner which will not communicate the disease, and to warn persons of the affliction if approached); Kliegel v. Aitken, 69 N.W. 67, 68 (Wis. 1896) (affirming an action for negligent transmission of typhoid fever and declaring that individuals infected with smallpox who negligently expose another person to the disease, and that person subsequently contracts the disease, are liable for damages).

312. *Baker*, 20 F. at 709–10.

three children who were infected with contagious whooping cough to the plaintiff's boarding house thus exposing the plaintiff's children to whooping cough.[313] The court found that the defendant failed to exercise due care in preventing the transmission of the whooping cough.[314] The existing caselaw could easily be extended to find that infected individuals owe a duty to prevent the transmission of communicable diseases aboard aircrafts.

b. Establishing a Breach of the Duty of Care

Once the duty is established, the court must determine whether the duty was breached. A breach of the duty to prevent the transmission of communicable diseases aboard an aircraft occurs the moment the infected passenger boarded the plane. Due to the ease with which communicable diseases can spread throughout the cabin,[315] it is almost inevitable that the infected passenger will transmit the disease. Whether the transmission causes an injury to a fellow passenger is a question of causation.

If the infected defendant boards the plane, knowing or suspecting[316] that he is infected with a communicable disease, then the defendant's conduct breaches his or her duty to prevent the transmission of a communicable disease.[317] Courts will generally find the defendant had knowledge of the communicable disease, even without a medical diagnosis, if the defendant exhibited obvious symptoms.[318] In such a case, the plaintiff must show that the defendant knew that he was infected and disregarded the plaintiff's welfare by exposing the plaintiff to the disease.[319]

c. Transmission is the Proximate Cause of Plaintiff's Injuries

Once the breach of duty is established, the plaintiff must show that the breach was the proximate cause of her injuries. If the defendant breached his duty, but the breach was not the cause in fact of the plaintiff's injuries, then the defendant is not responsible and the plain-

313. *Id.* at 709.

314. *Id.*

315. *See* Abeyratne, *The Spread of Tuberculosis*, *supra* note 34, at 56.

316. Liability would not be extended to an individual that was unaware that he was infected at the time they boarded the airplane. Although the plaintiff would like to recover, the defendant does not owe the plaintiff a duty to prevent the transmission. Thus, the plaintiff cannot recover.

317. The defendant's knowledge, or suspicion, may be a difficult hurdle to overcome; however, it may be proved by circumstantial evidence, such as exhibited signs of illness.

318. Meany v. Meany, 639 So. 2d 229, 235–36 (La. 1994); M.M.D. v. B.L.G., 467 N.W.2d 645, 647 (Minn. Ct. App. 1991).

319. Earle v. Kuklo, 98 A.2d 107, 109 (N.J. Super. Ct. App. Div. 1953) (holding the landlord liable for failing to inform tenants that his family was infected with tuberculosis).

tiff cannot recover from the defendant.[320] Due to the ease at which a communicable disease may spread throughout an aircraft, the defendant's presence on the airplane places the other passengers at an unreasonable risk for contracting the communicable disease.[321] However, issues may arise in establishing that the defendant was the proximate cause of the plaintiff's contraction of the communicable disease, especially when the communicable disease spreads through the air.

The *Restatement (Third) on Torts* notes, "If the harms risked by . . . [the defendant's] tortious conduct include the general sort of harm suffered by the plaintiff, the defendant is subject to liability for the plaintiff's harm."[322] Every time an infected individual boards an airplane, the risk of transmission to fellow passengers exists.[323] Therefore, a causal connection exists between the infected defendant boarding the plane, the defendant spreading his disease via droplets in the air, and the plaintiff contracting the disease. It is important to note that passengers, both infected and healthy, travel from the same airport; thus, plaintiffs may find it difficult to establish that Passenger A, rather than someone else within the airport, transmitted the disease which now afflicts the plaintiff.[324] In any event, once the causality is established, damages may be assessed.

d. The Recoverable Damages

Damages can include medical costs, lost wages, and pain and suffering from exposure.[325] The damages award may include the reasonable cost or value of medical treatment, hospital care, and other related

320. Luke Meier, *Using Tort Law to Understand the Causation Prong of Standing*, 80 FORDHAM L. REV. 1241, 1246 (2011) ("[C]ause in fact requirement in a Negligence claim is met if the plaintiff can show a link between the defendant's substandard or 'negligent' behavior . . . and the plaintiff's injury or damages.").

321. Abeyratne, *International Responsibility*, *supra* note 6, at 56.

322. RESTATEMENT (THIRD) ON TORTS § 29 (AM. LAW INST. 2010).

323. Andrew Pavia, *Germs on a Plane: Aircraft, International Travel, and the Global Spread of Disease*, J. INFECTIOUS DISEASES, Mar. 2007, at 621.

324. Establishing that the defendant transmitted the communicable disease to the plaintiff would likely require examining medical records; however, if the defendant boarded the plane while infected and contagious, he likely did not seek medical attention prior to flying. In which case, establishing causality may require disease DNA sequencing. *See Using Genetic Tools to Fight Viral Outbreaks*, U. UTAH GENETIC SCI. LEARNING CTR., http://learn.genetics.utah.edu/content/science/viruses/ (last visited July 6, 2016) (explaining that scientists can use DNA sequencing to trace viruses).

325. A defendant could potentially argue for the mitigation of damages through proof of vaccination, because it shows a commitment to protecting the health of the community. Further, a defendant could argue that a plaintiff was contributorily negligent by failing to receive vaccinations, thus failing to protect herself from the obvious dangers posed by communicable diseases.

expenses that are necessarily incurred as the result of the injury from the time of the injury to the time of trial, as well as those expenses reasonably certain to be incurred in the future.[326] This cause of action is reserved for plaintiffs that contract extreme cases of communicable diseases, meaning plaintiffs cannot sue for contracting the flu or the common cold. Therefore, the plaintiff is likely to incur very expensive medical bills due to the almost inevitable hospital stay, as well as high-priced treatments and medicine to fight the illness.[327]

The damage award may include recovery for loss of earnings.[328] "When a person is injured, the 'cost of an injury and the loss of time or health may be an overwhelming misfortune,' and one the person is not prepared to meet."[329] If a plaintiff was gainfully employed at the time of the injury, and probably would have remained gainfully employed had he not been injured, then he may recover for the loss of earnings equivalent to the value of his time.[330] Therefore, a plaintiff who successfully brings suit for the negligent transmission of a communicable disease aboard an aircraft could expect to recover for the time that the he was rendered unable to work due to his injuries.

Further, a damages award may include recovery for the pain and suffering experienced by the plaintiff,[331] as well as for emotional distress arising out of the injury.[332] Thus, a plaintiff injured by the negligent transmission of a communicable disease aboard an aircraft could recover for pain and suffering, as well as for the emotional distress, experienced while infected with a communicable disease.

Due to the potential for devastation caused by communicable diseases and the ease at which they can spread through air travel, it is crucial that passengers do their part to prevent the spread of communicable diseases. It is the responsibility of each and every individual to act reasonably when they know or should know that they may be

326. Day v. S. Line Equip. Co., 551 So. 2d 774, 788 (La. Ct. App. 1989), *cert. denied*, 553 So. 2d 474 (La. 1989); *Ex parte* Hicks, 537 So. 2d 486, 489–90 (Ala. 1988).

327. *See, e.g.*, Marks et al., *supra* note 164, at 818.

328. Atl. Sounding Co. v. Townsend, 557 U.S. 404, 423 n.10 (2009) ("[A] court may take steps to ensure that any award of damages for lost wages . . . is offset by the amount of lost wages awarded as part of a recovery.").

329. E. River S.S. Corp. v. Transamerica Delaval, 476 U.S. 858, 871 (1986) (citing Escola v. Coca Cola Bottling Co., 150 P.2d 436, 441 (Cal. 1944) (Traynor, J., concurring)).

330. Simon v. Ciancio, 475 P.2d 343, (Colo. App. 1970) (stating that plaintiff's testimony that his earnings averaged between $1,000 to $1,500 per month at the time he was injured and that he was unable to work for almost two months was sufficient to show his lost earnings).

331. *See* Seagers v. Pailet, 656 So. 2d 700, 703 (La. Ct. App. 1995) (stating the jury awarded the plaintiff $54,179.58 for pain and suffering).

332. Hamilton v. Ford Motor Credit Co., 502 A.2d 1057, 1066 (Md. Ct. Spec. App. 1986) ("[R]ecovery may be had in a tort action for emotional distress arising out of negligent conduct.").

infected with a communicable disease. Individuals should be held liable when they negligently transmit a communicable disease while aboard an aircraft. Further, replacing the federal DNB list with the proposed No-Fly Database will effectively prevent individual infected with contagious communicable diseases from boarding airplanes and placing fellow passengers at risk of infection. Both proposals will impact the passengers, airlines, and government in different ways.

IV. IMPACT

While communicable disease outbreaks facilitated by air travel may seem isolated, the incidents of such outbreaks are easily recounted. As highlighted in Part III.A,[333] the 2003 SARS outbreak began when a Chinese doctor transmitted the disease to fellow airline passengers and ultimately infected a reported 2223 individuals in eighteen countries.[334] More recently, in April 2015, a woman flew from India to Chicago, Illinois while infected with a highly drug resistant form of tuberculosis.[335] Thankfully, there were no reported incidents of disease transmission. The most memorable incident is the tuberculosis traveler of May 2007.[336] Against medical advice and the requests from the CDC, Mr. Speaker, while infected with a rare, highly drug-resistant form of tuberculosis, flew on multiple international flights.[337] The tuberculosis traveler incident prompted public outcry against Mr. Speaker for disregarding the warning of health officials and placing fellow passengers in danger of contracting the deadly communicable disease.[338]

"Over the last forty years, the emphasis of American culture has shifted from social obligation and economic fairness to individual freedom, self-reliance, and personal responsibility, thus relocating health from the public sphere to the private realm."[339] This individualistic approach to air travel can cause catastrophic consequences. Therefore, regulation of infected individuals' conduct through the No-Fly Database and through tort liability is necessary to reduce the number of individuals who contract a communicable disease. This Part addresses the advantages and hurdles for implementation of the pro-

333. *See supra* notes 133–73 and accompanying text.

334. Abeyratne, *International Responsibility*, *supra* note 6, at 57–58.

335. Grady, *supra* note 148.

336. *U.S. Steps Up Precautions over TB*, *supra* note 151.

337. *Id.*; *see also* Conant, *supra* note 152.

338. Harrington, *supra* note 49, at 296.

339. Gostin, *supra* note 58, at 41.

posed No-Fly Database and the creation of a cause of action for the negligent spread of communicable disease.

A. The Proposed Solutions Will Prevent Disease Transmission Aboard Aircrafts

The proposed solutions described in Part III will shift the view of public health from an individualistic perspective back to a social obligation. People are willing to travel while infected with a communicable disease,[340] even one that is extremely rare and highly contagious, because individuals inherently act out of self-interest[341] rather than the common good. The Communicable Disease No-Fly Database and a cause of action for the negligent transmission of a communicable diseases aboard an aircraft are necessary to protect the health and welfare of fellow passengers on aircrafts, as well as people around the world.

1. An Important Inconvenience: The No-Fly Database

Public health has a broad appeal because it is a universal aspiration; however, what best serves the population may not always best serve each individual's interests.[342] The No-Fly Database will likely inconvenience some individuals. For example, a person may be restricted from important travel for work or personal reasons, or an individual may be misdiagnosed with a disease that she does not have.[343] Despite these individual considerations, the public health benefits created by restricting air travel to uninfected or non-contagious individuals outweigh any temporary obstacle the database may create for some.

While the United States already has an established DNB list, the mechanisms for preventing infected individuals from boarding aircrafts are insufficient. The proposed No-Fly Database will effectively prevent infected individuals from boarding the plane, thereby decreasing the risk of transmission onboard.[344] For example, had the proposed No-Fly Database existed when the tuberculosis traveler checked-in for his flight to Italy, he would have been prevented from

340. *See, e.g.*, *Exclusive: TB Patient Asks for Forgiveness But Defends Travel*, *supra* note 155. *See generally* Grady, *supra* note 148; *U.S. Steps Up Precautions over TB*, *supra* note 151.

341. Claire Andre & Manuel Velasquez, *Unmasking the Motives of the Good Samaritan*, SANTA CLARA U. MARKKULA CTR. FOR APPLIED ETHICS, Winter 1989, https://legacy.scu.edu/ethics/publications/iie/v2n1/samaritan.html.

342. Gostin, *supra* note 58, at 6.

343. Harrington, *supra* note 49, at 313.

344. *Id.*

flying until he was no longer contagious.[345] The tuberculosis traveler incident is a prime example of such insufficiency, and he proposed No-Fly Database should be implemented to improve upon the existing infrastructure.

The software upon which the No-Fly Database will function must still be developed.[346] The No-Fly Database raises health information technology[347] privacy concerns because it will contain confidential medical information.[348] To protect this confidential information, the government must restrict access to the protected health information contained in the Database, meaning only treating medical professionals have access.[349] Such access would require an identification number and password to ensure secured access. Further, the software must incorporate sufficient safeguards and firewalls to prevent security breaches.[350] Routine monitoring of the No-Fly Database conducted by the government will provide additional protection.[351] If a cybersecurity breach is identified, DHS is most prepared to investigate the incident and coordinate a response.[352] Currently, DHS' National Cybersecurity Protection System "provides intrusion, detection, ad-

345. The tuberculosis traveler incident occurred in May 2007 and the federal DNB was not created until June 2007. *See U.S. Steps Up Precautions over TB*, *supra* note 151; *see also Federal Air Travel Restrictions for Public Health Purposes*, *supra* note 83.

346. The federal government would be responsible for the cost of developing the software because it will be operating the No-Fly Database even though the federal government is severely in debt. *See* Mike Patton, *The U.S. Debt: Why It Will Continue to Rise*, FORBES (Sept. 18, 2014, 6:24 PM), https://www.forbes.com/sites/mikepatton/2014/09/18/the-u-s-debt-why-it-will-continue-to-rise%20/#45c175405254.

347. Health information technology is the exchange of health information in the electronic environment. *Health Information Technology*, U.S. DEP'T HEALTH & HUMAN SERVS., http://www.hhs.gov/hipaa/for-professionals/special-topics/health-information-technology/index.html (last updated Nov. 6, 2015).

348. U.S. DEP'T OF HEALTH & HUMAN SERVS., THE HIPAA PRIVACY RULE AND ELECTRONIC HEALTH INFORMATION EXCHANGE IN A NETWORKED ENVIRONMENT: INTRODUCTION 1 (2015), https://www.hhs.gov/sites/default/files/ocr/privacy/hipaa/understanding/special/healthit/introduction.pdf.

349. HHS promulgated tips for improving the cybersecurity of health care data. *See generally* U.S. DEP'T OF HEALTH & HUMAN SERVS., TOP 10 TIPS FOR CYBERSECURITY IN HEALTH CARE (2015), https://www.healthit.gov/sites/default/files/Top_10_Tips_for_Cybersecurity.pdf.

350. *Id.* The Department of Homeland Security operates the Network Security Deployment division to improve cybersecurity within the federal government. *See Securing Federal Networks*, U.S. DEP'T HOMELAND SECURITY, https://www.dhs.gov/topic/securing-federal-networks (last visited Jan. 14, 2017).

351. The CDC currently "reviews the records of all people on the DNB list every two weeks to check whether they can be removed." *Questions and Answers About the Federal Register Notice*, *supra* note 16. Therefore, it should be relatively simple to add routine monitoring of the cybersecurity infrastructure.

352. *See Cybersecurity*, U.S. DEP'T HOMELAND SECURITY, https://www.dhs.gov/topic/cybersecurity (last visited Mar. 20, 2017), *see also Cyber Incident Response*, U.S. DEP'T HOMELAND SECURITY, https://www.dhs.gov/cyber-incident-response (last visited Mar. 20, 2017).

vanced analytics, information sharing, and intrusion prevention capabilities that combat and mitigate cyber threats to the Federal Executive Branch information and networks."[353] This system could provide insights into the health data hacking, such that the Department could form an appropriate response to the intrusion.

a. Privacy Concerns Related to the No-Fly Database

Passengers may be concerned about who has access to their protected health information.[354] The Health Insurance Portability and Accountability Act (HIPAA), enacted in 1996, guards against the disclosure of protected health information.[355] The HIPAA legislation states that the reporting of communicable diseases to local or state health officials is exempt if the reporting is mandated within the state code and utilized for the surveillance and prevention of communicable diseases.[356] For example, the information collected by state health officials and submitted to the NNDSS for surveillance and monitoring is exempt from HIPAA regulations.

The HIPAA Privacy Rule allows for the disclosure of protected health information (PHI) to "business associates."[357] Business associates create, receive, maintain, or transmit protected health information.[358] Airlines with access to the No-Fly Database will be considered business associates of the federal government because the airline companies will receive the PHI of its passengers. Further, the business associates must not use or disclose any PHI,[359] and they must comply with HIPAA regulations unless the business associate is willing to pay a penalty for violating the act;[360] therefore, passengers need not worry that the airlines will disclose their PHI.

The No-Fly Database may deter individuals from seeking medical attention close to a scheduled flight because the individual does not want their physician to place him in the No-Fly Database. By placing the patient in the No-Fly Database against the patient's wishes, the

353. *Securing Federal Networks*, *supra* note 350.

354. *Your Rights Under HIPAA*, U.S. DEP'T HEALTH & HUMAN SERVS., http://www.hhs.gov/hipaa/for-individuals/guidance-materials-for-consumers/ (last visited Mar. 20, 2017).

355. Pub. L. No. 104-191, 110 Stat. 1936 (1996).

356. 45 C.F.R. § 164.512(b) (2016); *see also Communicable Disease Reporting in Michigan*, MICH. DEP'T HEALTH & HUMAN SERVS., http://www.michigan.gov/mdhhs/0,5885,7-339-71550_5104_31274-12538—,00.html (last visited Jan. 14, 2017).

357. 45 C.F.R. §§ 164.502(e)(1), 164.504(e)(1), 164.532(d)–(e) (2016); *Business Associates*, U.S. DEP'T HEALTH & HUMAN SERVS., http://www.hhs.gov/hipaa/for-professionals/privacy/guidance/business-associates/ (last visited Jan. 14, 2017).

358. *Business Associates*, *supra* note 357.

359. 45 C.F.R. § 164.504(e)(2) (2016).

360. 42 U.S.C. § 1320d-6 (2012).

doctor values public interest over the patient's interests. This change in the doctor-patient relationship could subvert its foundation. Physicians owe a duty to their patients to keep medical and patient information confidential.[361] Thus, "[p]atients have developed a reasonable expectation that their medical information will not be disclosed without their consent by their physicians."[362] Because physicians would be required to disclose to the No-Fly Database that a patient is infected with a communicable disease, patients may no longer trust their physicians with sensitive, confidential health information, thereby decreasing the physician's ability to properly treat the patient.[363] The quality of health care diminishes when physicians cannot provide adequate treatment.[364] This relationship can remain intact because the quantity of information disclosed and access to such information is limited.

Only the patient's identity and diagnostic information will be entered into the Database. For example, if an individual is diagnosed with drug-resistant tuberculosis, then the doctor will enter the individual's name, date of birth, perhaps a social security number, and that the individual has drug-resistant tuberculosis. Only the CDC has full access to the submitted patient information, whereas airline staff will only see the identifying information, such as name, date of birth or perhaps a social security number, and that the individual is restricted from flying. The actual diagnosis will not be disclosed to airline staff. This will help to reduce the stigmatization of the passenger since fewer people, especially those without a medical interest, as opposed to a physician or the CDC who do have such an interest, will know the individual's private medical information.[365]

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361. *See, e.g.*, Humphers v. First Interstate Bank, 696 P.2d 527, 535 (Or. 1985) ("A physician's duty to keep medical and related information about a patient in confidence is beyond question."); *see also* David H. Thom et al., *Measuring Patients' Trust in Physicians When Assessing Quality of Care*, 23 HEALTH AFFAIRS, July/Aug. 2004, at 4, 124, 126 ("[T]hese relationships are deeply personal and can be profoundly life-altering . . . the essential quality of these relationships is a fundamental good worth pursuing.").

362. Ralph Ruebner & Leslie A. Reis, *Hippocrates to HIPAA: A Foundation for a Federal Physician-Patient Privilege*, 77 TEMP. L. REV. 505, 551 (2004) (citing Alberts v. Devine, 479 N.E.2d 113, 118–19 (Mass. 1985) ("[C]onfidentiality of the [physician-patient] relationship is a cardinal rule of the medical profession, faithfully adhered to in most cases, and thus has come to be justifiably relied upon by patients seeking advice and treatment.")).

363. *See* Jennifer Fong Ha, *Doctor-Patient Communication: A Review*, 10 OCHSNER J. 38, 38 (2010) ("A doctor's . . . ability to gather information in order to facilitate accurate diagnosis, counsel appropriately, give therapeutic instructions, and establish caring relationships with patients . . . the ultimate goal . . . [is] achieving the best outcome and patient satisfaction, which are essential for the effective delivery of health care.").

364. *Id.*

365. The hope is that the passenger will not feel as though "everyone knows" that he is infected. Rather, it will be like any other situation in which only those will the need to know about the diagnosis, such as the doctor, CDC, or employer, are informed.

b. Procedural Due Process Implications

Placement on the No-Fly Database raises constitutional issues regarding an individual's right to travel.[366] However, as the Court in *Jacobson* noted, the state may infringe on individual rights when the health concerns of the larger community are at stake.[367] Further, placement in the No-Fly Database raises due process implications because an individual has been deprived of the constitutional right to travel without procedural due process.[368] "Government and private actors, however, may effect the intentional deprivations of property or liberty . . . [But] [o]ur legal system requires process for many such losses,"[369] meaning an individual must be provided notice and the opportunity to be heard.[370]

To avoid unconstitutionally depriving individuals placed in the No-Fly Database of their right to travel, the CDC should provide procedural due process to redress placement in the No-Fly Database.[371] The treating medical professional who diagnoses the individual should first inform the individual that he is being placed in the Database. Not only will this improve the doctor-patient relationship, such that the patient may feel less as though the doctor betrayed him by placing him in the Database behind the patient's back, but it will provide advance notice to the individual that he will be restricted from flying. Once the CDC receives the identifying information and diagnostic information, the CDC must provide prompt formal notice to the individual explaining why the individual's freedom to travel is restricted.[372] Such notice would also provide the individual with the opportunity to contest their inclusion on the Database.

366. *See* Saenz v. Roe, 526 U.S. 489, 498 (1998).

367. *See* Jacobson v. Massachusetts, 197 U.S. 11, 12 (1905).

368. *See* Latif v. Holder, 28 F. Supp. 3d 1134, 1163 (D. Or. 2014) (finding that DHS' process for placing individuals on the terrorist no-fly list deprived plaintiff of his constitutional right to travel without procedural due process); *see also* Edward Rubin, *Due Process and the Administrative State*, 72 CALIF. L. REV. 1044, 1045 (Dec. 1984) ("[P]rocedural protection must be triggered by some underlying 'liberty' or 'property' right.").

369. Ann Woolhandler, *Procedural Due Process Liberty Interests*, 43 HASTINGS CONST. L.Q. 811, 817 (Summer 2016).

370. Fuentes v. Shevin, 407 U.S. 67, 80 (1972); *see also* Latif v. Holder, 969 F. Supp. 2d 1293, 1296 (D. Or. 2013) (alleging that the Department of Homeland Security violated plaintiff's right to due process by failing to provide either post deprivation notice or any meaningful opportunity to contest their continued inclusion on the terrorist no-fly list).

371. Tanvir v. Lynch, 128 F. Supp. 3d 756, 764 (S.D.N.Y. 2015) (noting the government revised its redress procedures as a result of *Latif*).

372. This would best be done through a written letter mailed to the patient. Notice by publication, which is satisfactory under some circumstances, *see* Mullane v. Cent. Hanover Bank & Trust Co., 339 U.S. 306, 317–18 (1950), would not be appropriate here because notice by publication would likely disclose PHI and cause social stigmatization.

c. The Impact to Airline Company Profits

Additionally, airlines may fear the proposed No-Fly Database will cause business losses due to cancelled flights and requests for reimbursement for denied boarding. One of the primary goals for businesses is to maximize profits.[373] This goal is no different for the airlines.[374] Airplanes are expensive, fuel is costly, and it is difficult to predict how many passengers will fly each year.[375] Thus, throughout the decades, many airline companies have gone bankrupt[376] or out of business.[377]

"The airline industry is vulnerable to global events,"[378] such as political disruptions and disease outbreaks. In fact, airline profits tend to plummet during communicable disease outbreaks.[379] For example, after the September 11, 2001, attacks on the World Trade Center, the airline industry lost a reported $13 billion.[380] More relevant to the issue at hand, North American airlines lost approximately $1 billion during the 2003 SARS outbreak,[381] while Asian-Pacific carriers lost approximately $6 billion.[382] More recently, in reaction to news of the first Ebola case in the United States in September of 2014, the share

373. Neil Skaggs, *Profit Maximization*, ILL. ST. U. DEP'T ECONOMICS, http://economics.illinoisstate.edu/ntskaggs/readings/maximization.shtml (last visited Jan. 4, 2017) ("[I]n many industries, profit maximization is not simply a potential goal; it's the only feasible goal, given the desire of other businesspeople to drive their competitors out of business.").

374. Caitlin Kenney, *Why Airlines Keep Going Bankrupt*, NPR (Dec. 16, 2011, 12:18 PM), http://www.npr.org/sections/money/2011/12/16/143765367/why-airlines-keep-going-bankrupt.

375. *Id.*

376. *U.S. Bankruptcies and Services Cessations*, AIRLINES FOR AM., http://airlines.org/data/u-s-bankruptcies-and-services-cessations/ (last visited Jan. 14, 2017).

377. *See* Mark C. Niles, *On the Hijacking of Agencies (And Airplanes): The Federal Aviation Administration, "Agency Capture," and Airline Security*, 10 AM. U. J. GENDER SOC. POL'Y & L. 381, 383 n.4 (2002) ("[M]ore small carriers have been driven out of business than the number still in the air."). *See generally Defunct Bankrupt Airlines from Around the World – The Most Recent US Airlines Filing Bankruptcy*, AVIATION EXPLORER, http://www.aviationexplorer.com/defunct_airlines_worldwide.htm (last visited Jan. 14, 2017).

378. Teresa Cederholm, *Must-Know: SARS' Impact on the Airline Industry*, MKT. REALIST (Oct. 20, 2014, 3:52 PM), http://marketrealist.com/2014/10/must-know-sars-impact-airline-industry/; Teresa Cederholm, *Why Fatal Disease Outbreaks Impact Economic Activity*, MKT. REALIST (Oct. 20, 2014, 3:48 PM), http://marketrealist.com/2014/10/why-fatal-disease-outbreaks-impact-economic-activity/ [hereinafter Cederholm, *Why Fatal Disease Outbreaks Impact Economic Activity*] (noting airline stocks are sensitive to changes in economic conditions).

379. Sharon Begley, *Flu-Conomics: The Next Pandemic Could Trigger Global Recession*, REUTERS (Jan. 21, 2013, 2:47 PM), http://www.reuters.com/article/us-reutersmagazine-davos-flu-economy-idUSBRE90K0F820130121.

380. Teresa Cederholm, *Why Political and Legal Factors Impact the Airline Industry*, MKT. REALIST (Sept. 3, 2014, 2:56 PM), http://marketrealist.com/2014/09/why-political-and-legal-factors-impact-airline-industry/.

381. *See* Begley, *supra* note 379.

382. *Id.*

prices of major U.S. airlines dropped substantially—an average of 17% among the airlines.[383] Further, airlines tend to lose profits during disease outbreaks because passengers rightly fear the possibility of disease transmission through air travel.[384] "Travelers may choose to postpone their travels because . . . of concerns about their health."[385] Thus, airlines have a vested interest in preventing disease outbreaks.

2. *Returning to Solidarity: Individual Liability for the Negligent Spread of Communicable Disease*

The well-being of society depends upon individuals, when infected with a contagious communicable disease, acting responsibly with the common good in mind. Individuals who cannot meet this standard of care should be held liable for the damages that result. If the No-Fly Database does not prevent an individual infected with a communicable disease from boarding a plane, tort liability serves as a second method of prevention. An individual, who knows or should know that he is infected with a communicable disease, may not seek medical attention in order to avoid being placed in the No-Fly Database. In such event, if the infected individual boards an airplane and subsequently infects other passengers, then the infected individual should be held liable for the damages that result to fellow passengers.

a. Difficulties in Identifying the Defendant

Practical limitations exist for imposing tort liability on the disease transmitter, such as the potential difficultly identifying the defendant. Unless passengers exchange contact information while aboard the aircraft, the plaintiff like will be unable to identify the defendant. Airlines are required by regulation to keep flight manifests confidential.[386] The passenger information contained on the manifest may only be disclosed to the U.S. Department of State, the National Transportation Safety Board, and the U.S. Department of Transportation.[387] Although confidential, flight manifests have been found dis-

383. Teresa Cederholm, *Why the Ebola Scare Led to a 16% Drop in the Airline Index*, MKT. REALIST (Oct. 20, 2014, 4:05 PM), http://marketrealist.com/2014/10/why-ebola-scare-led-to-a-16-drop-in-airline-index/. These airlines include Delta, Southwest, American, Jetblue, United, and Alaska. *Id.*

384. Cederholm, *Why Fatal Disease Outbreaks Impact Economic Activity*, *supra* note 378.

385. Todd Wilson & Nicole Cohen, *Conveyances & Transportation Issues: Perspectives: What to Expect When Traveling During an International Outbreak*, *in* THE YELLOW BOOK: CDC HEALTH INFORMATION FOR INTERNATIONAL TRAVEL (2016) (noting that disease outbreaks can result in large decreases in travel volume).

386. 14 C.F.R. 243.9(c) (2016).

387. *Id.*

coverable subject to a protective order.[388] In *Nathaniel v. American Airlines*, plaintiff brought suit against the airline for injuries allegedly sustained from the airline's failure to accommodate the plaintiff. The court, recognizing the plaintiff had no other means of obtaining the passenger information to contact potential witnesses, granted discovery of the flight manifest.[389] Note, however, that the cases in which flight manifests are discoverable, the airline was a party to the litigation. Although the underlying rationale is similar here—that the plaintiff likely would have no other means of identify and contacting the individual who infected her—it is unknown whether a judge would compel discovery of the flight manifest in civil litigation in which the airline is not a party.

In the alternative, a plaintiff may have to go through public health authorities to identify the defendant. Public health authorities can obtain contact information for passengers who fly while infected with a communicable disease.[390] A plaintiff could make public health authorities aware that a communicable disease was transmitted to her while flying and the authorities would investigate to identify the transmitter. However, the authorities may refuse to disclose identifying information to the plaintiff avoid a HIPAA violation.

The plaintiff may also attempt to identify the defendant via the "DNA fingerprint" of the communicable disease. Advances in science allow for disease tracing of communicable disease, which can track and confirm the spread of communicable disease.[391] Disease tracing identifies a disease case, determines its contacts, and compares the genetic sequence of the identified case to its contacts.[392] This allows

388. Wallman v. Tower Air, Inc., 189 F.R.D. 566, 569 (N.D. Cal. 1999) (finding adequate "justification within the discovery rules for producing the list" subject to a confidentiality agreement); Delta Airlines v. Cook, 816 N.E.2d 448, 461 (Ind. Ct. App. 2004) (finding that defendant's passenger list was discoverable with limitation as to what use may be made of the information); Nathaniel v. Am. Airlines, 2008 WL 5046848, at *7 (D.V.I. Nov. 20, 2008) (finding the flight manifest discoverable subject to a protective order because the plaintiff had no other means of obtaining the contact information of potential witnesses).

389. *Nathaniel*, 2008 WL 5046848, at *7.

390. Illig et al., *supra* note 4.

391. Eugene Russo, *Stalking Infectious Diseases*, SCIENTIST (June 12, 2000), http://www.the-scientist.com/?articles.view/articleNo/12877/title/Stalking-Infectious-Disease/. It is also important to note that plaintiffs may not detect the disease immediately after the flight. "Given the long latency period between exposure and disease such cases [of tuberculosis transmission aboard a plane] are unlikely to detected." Karen Marienau et al., *Flight Related Tuberculosis Contact Investigations in the United States: Comparative Risk and Economic Analysis of Alternate Protocols*, 12 TRAVEL MED. & INFECTIOUS DISEASE 54, 55 (2014). Thus, disease DNA tracking may become vital to determining the defendant.

392. BENJAMIN ARMBRUSTER & MARGARET BRANDEAU, STAN. U., THE COST-EFFECTIVENESS OF CONTACT TRACING FOR ENDEMIC DISEASES (2007), http://users.iems.northwestern.edu/~armbruster/2007AugUBC_poster.pdf.

for the identification of different strains of a single virus or bacteria and the tracking its trends.[393] Disease tracing may be expensive,[394] depending on who pays for it.[395] Disease tracking is also labor intensive,[396] but is highly likely to find infected people.[397] The cost of sequencing a genome rapidly decreased in a matter of fifteen years. In 2001, the National Human Genome Research Institute reported the cost of sequencing a genome was over $100,000; yet, in 2015, the cost is around $1,000.[398] Although $1000 is significantly less money than $100,000, it can still be too great a sum depending on the financial stability of the plaintiff. That said, if a plaintiff is willing to spend thousands of dollars to sue for the contraction of a communicable disease,[399] then $1000 to determine the identity of the defendant is a mere drop in the bucket. Despite its relative cost, disease DNA tracing could demonstrate the causal connection between the defendant's negligence and the plaintiff's contraction of the communicable disease.

b. Liability Incentivizes Passengers to Consider the Public Good

Individuals should be held accountable for their harmful actions. Tort liability for the negligent spread of communicable disease incentivizes infected individuals to refrain from flying. The United States is a highly litigious society,[400] and the creation of this cause of action could potentially increase the already high volume of litigation. How-

393. *Outbreak Detection*, CTR. FOR DISEASE CONTROL & PREVENTION (July 15, 2013), http://www.cdc.gov/pulsenet/outbreak-detection/index.html.

394. *See* Kris Wetterstrand, *The Cost of Sequencing a Human Genome*, NAT'L HUM. GENOME RES. INST. (Jan. 15, 2016), http://www.genome.gov/sequencingcosts/; *see also*, *Price List*, CORNELL U. INST. BIOTECHNOLOGY, http://www.biotech.cornell.edu/brc/genomics/services/price-list#overlay-context=brc/genomics-facility/next-generation-sequencing (last visited Jan. 14, 2017).

395. If an individual pays for the sequencing, it could be considered a costly method for establishing causation. Realistically, the plaintiff will bear the cost of DNA sequencing to overcome the hurdle of identifying the defendant.

396. ARMBRUSTER & BRANDEAU, *supra* note 392.

397. *Id.* Pulse-Net is a national laboratory network which utilizes DNA fingerprinting to detect disease outbreaks. *About Pulse-Net*, CTR. FOR DISEASE CONTROL & PREVENTION (Feb. 16, 2016), https://www.cdc.gov/pulsenet/about/index.html. These laboratories use whole genome sequencing, a newer method of DNA fingerprinting, to provide the most accurate bacterial fingerprinting data possible today. *Outbreak Detection*, CTR. FOR DISEASE CONTROL & PREVENTION (Feb. 16, 2016), https://www.cdc.gov/pulsenet/outbreak-detection/index.html.

398. Wetterstrand, *supra* note 394.

399. Paula Hannaford-Agor & Nicole Waters, *Caseload Highlights: Estimating the Costs of Civil Litigation*, 20 NAT'L CTR. FOR ST. CTS. 1, 5 tbl.3 (2013).

400. *Lawsuit Abuse Impact*, U.S. CHAMBER COM. INST. FOR LEGAL REFORM, http://www.instituteforlegalreform.com/issues/lawsuit-abuse-impact (last visited Jan. 14, 2017) (claiming America has an addiction to litigation).

ever, individuals inherently wish to avoid being sued[401] because lawsuits are time consuming,[402] expensive,[403] and emotionally overwhelming.[404] Therefore, these considerations will likely motivate infected individuals to visit their doctor for treatment rather than risk the potential liability. The imposition of tort liability effectively causes individuals to consider the public good rather than their own self-interests while infected with a communicable disease.

V. Conclusion

Due to communicable diseases' potential for devastation and the ease at which they can spread through air travel,[405] it is crucial that passengers do their part to prevent the spread of communicable diseases. "The health of the public is a shared value. Not only does each individual have an interest in staying healthy but also all of together share an interest in having a healthy population."[406]

The federal DNB list must be replaced with the proposed No-Fly Database. The improvements the proposed No-Fly Database makes to the existing DNB list will effectively prevent individual infected with contagious communicable diseases from boarding airplanes and placing fellow passengers at risk of infection. It is the responsibility of every individual to act reasonably when they know or should know that they may be infected with a communicable disease; therefore, individuals should be held liable when they negligently transmit a communicable disease while aboard an aircraft.

The proposed No-Fly Database and the cause of action for the negligent transmission of a communicable disease aboard an aircraft will shift the current view of public health as an individual freedom and

401. *See* William Boyd, *The Law and Politics of Tort Reform: Justice and Democracy Forum: The Law and Politics of Tort Reform*, 4 Nev. L.J. 377, 412 (2003) (stating some doctors "express incredible emotional upset when they become defendant in medical malpractice lawsuits."); *see also* Elaine Draper, *Preventative Law by Corporate Professional Team Players: Liability and Responsibility in the Work of Company Doctors*, 15 J. Contemp. Health L. & Pol'y 525, 552 (1999) ("Industry's standard for labeling is stricter than OSHA's, because companies don't want to be sued.").

402. Curtis Karnow, *Complexity in Litigation: A Differential Diagnosis*, 18 U. Pa. J. Bus. L. 1, 11 (2015) ("For surely costly time-consuming litigation is bad.").

403. Corey Ciocchetti, *Tricky Business: A Decision-making Framework for Legally Sound, Ethically Suspect Business Tactics*, 12 Cardozo Pub. L. Pol'y & Ethics J. 1, 83 (2013); Hannaford-Agor & Waters, *supra* note 399, at 5 tbl.3.

404. Sandra Tunajek, *Dealing with Litigation Stress Syndrome*, Am. Assoc. Nurse Anesthesiologist News Bull. (July 2007), https://www.aana.com/resources2/health-wellness/Documents/nb_milestone_0707.pdf.

405. *See, e.g.*, Clegg, *supra* note 12, at 440; Relman, *supra* note 14, at 2, 22.

406. *Introduction: Ethical Theory and Public Health*, *supra* note 20, at 20.

personal responsibility[407] to a social obligation in which everyone has a stake. Peter Fonkwo, Resident Advisor for the United States Agency for International Development project on Family Health and HIV/AIDS in Cameroon,[408] states:

> Infectious diseases constitute a major problem for the world . . . . No country can afford to remain aloof in the battle against [infectious] diseases, especially given the potentially far-reaching and devastating effects that they could have on the human race at large . . . . Therefore, all stakeholders . . . must take the necessary bold steps forward . . . . We already know a lot of what we must do; we just need to do it. The future of the human race depends on our actions today.[409]

While it would be naïve to think law or medicine could create an environment in which it is impossible for communicable diseases to spread through air travel,[410] it is possible to create an environment in which it is not as easily spread.

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407. Gostin, *supra* note 58, at 41.

408. *African Health Specialists Gather in Washington*, VOA News (Oct. 29, 2009, 9:50 AM), http://m.voanews.com/a/a-13-a-2003-07-01-36-african-67317317/270863.html.

409. Fonkwo, *supra* note 108, at S17.

410. Harrington, *supra* note 49, at 317.

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